HERITAGE

&

HISTORY

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BIGROX33 AUSTRALIA

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BRITAIN, IRELAND & EUROPE

National Library of Australia Cataloguing-in-Publication entry is available: -
Author: Thomas, Neil L.
Title: HERITAGE & HISTORY

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CHAPTERS :: CONTENT SUMMARIES

The mythical founders of the city of Rome in 753 BC knew of ancient Britain; their early Roman calendar had ten months totalling 304 days plus 61 intercalation days. Stonehenge Sun calendar 2500 BC had 16 months counted on 19 inner bluestone pillars = 304 days, to which were added 61 intercalation days. Ancient Stonehenge calendar passed into darkness after Julius Caesar decreed his 365 day twelve month Julian calendar in 45 BC. A century later Roman Legionnaires exterminated British Druids in Wales 61 AD. Prehistoric straight roads and tracks in England and Wales today are now named 'Roman Roads'. Chapter 23 'Lines & Angles' tells how the ancient *staen* distance of 2.25 kilometres became a new Roman league of 2.22 kilometres. Advent of a Celtic Christian Church and Ogham script is mentioned.

Chapter 9: Coligny Calendar,

A fragmented bronze sheet unearthed in 1897 AD near Coligny, Ain Province, France revealed a lunar calendar inscribed in Latin characters c.100 BC. Twelve Gallic month names; Moon calendar of twelve months a year, a fifty-nine day bi-monthly lunar cycle; month names are *Samonios, Dumannios, Rivros, Anagantios, Ogronios, Cvtios, Giamonios, Simivisonnios, Eqvos, Elembivios, Edrinios* and *Cantlos,* translated as SUMMER, SECOND, THIRD, HOARD, OGRE, SHELTER, WINTER, BUDSWELL, LAMBING, SPRING, BETWEEN and lastly FULL CIRCLE. A record of native Gallic Celtic language; half the names are Welsh and half Irish, demonstrating Gallic links with Brythonic and Gaelic languages. Mention of the Antikythera mechanism c.67 BC is made.

Chapter 10: Woodbury & Heathrow,

Iron Age buildings in England; Little Woodbury, Wiltshire was a circular timber dwelling. Caesar's Camp building on the London airport site was another Iron Age structure, a native British farmhouse demonstrated the pi ratio 22/7.

Chapter 11: World Religions & Thirty-three,

Thirty-three indicating a sacred entity was first detected in Ireland 3500 BC. Knowth kerb stone K14's wavy line shows 33 bends, defining a deity's home. The world's major religions, Judaism, Buddhism, Christianity and Islam include many instances where 33 is cited in one form or another. Since their inception, the literatures of Judaism, Buddhists, Christians, and Moslems adopted the symbolic use of thirty-three to indicate the highest, to infer sacred values to places or persons. A common thread of texts and philosophical practices span the boundaries.

Chapter 12: Bronze Age,

About 2000 BC operations began at a vast north Wales copper ore mine. Two millennia industrial effort accomplished the export of ten million bonze axes and brass artefacts throughout Britain and Europe. A northern shipping route led to the creation of Aberdeen, a southern route supplied European markets. The Caergwrle Bowl c.1200 BC epitomised truth and honesty; on display at the National Museum of Wales the Bowl has thirty-three counts indicating the highest standards of truth, trust, trade; commerce prospered.

Chapter 13: Black Clouds,

The Christian Bible's Old Testament, Book of Genesis 18, 19 described how "God rained on the cities of Sodom and Gomor'rah brimstone and fire ... and he overthrew those cities and all the plain and all the inhabitants and that which grew upon the ground". I explain scientifically how earthquake events ended their existence. World-wide apocalyptic happenings occurred 2240 BC in Palestine,

Sumeria, Egypt, Sudan, Jordan, Malta, Ireland and Britain, the Americas, China, India. Climate changes persisted until life re-asserted itself centuries later.

Chapter 14: Woodhenge Sun & Moon temple,

Woodhenge timber building near Stonehenge constructed c.2400 BC is an egg shaped building in plan with a midsummer dawn axis 49.9^0 east of north. Concrete plinths mark the positions of post pits excavated by archaeologists Cunnington, Evans and Wainwright 1926-1970. Woodhenge features the Sun calendar, five day weeks, sixteen month years, the ability to forecast total lunar eclipses every 18.03 years.

Chapter 15: Durrington Walls Sun temple,

Durrington Walls erected about 2400 BC is three kilometres north-east of Stonehenge in Wiltshire, England. Archaeological excavation 1966-68 by Drs Wainwright and Longworth found a circular structure; six rings of 177 timber posts. Outermost ring of 61 posts was the same number as Woodhenge and Stonehenge features. A uniquely styled building, it has the same fundamental design as Stonehenge and Woodhenge.

Chapter 16: Mount Pleasant Sun temple,

Near Dorchester in the west of England, a 45 metres diameter building built c.2400 BC comprised 183 timber posts in five concentric rings, an outer circular ditch and a mound beyond. The numbers and arrangement of Mount Pleasant posts enabled Sun calendar days, months and seasons to be tallied by posts counts. Primarily a Sun calendar, there are no perceived lunar functions at Mount Pleasant.

Chapter 17: Stonehenge; Sun & Moon calendars temple,

Stonehenge c.2500 BC stands in England 's Salisbury Plain, an ancient monument visited by a million tourists every year. Stonehenge and its surrounds has the densest concentration of ancient monuments north of the European Alps. About 2500 BC, eighty 4 ton bluestone pillars sourced from the Preseli mountains in south-west Wales were brought to the site, an equal number of much larger 25 ton sarsen stones from nearby Marlborough Downs were transported to the location at that time. Five great sarsen sandstone arches named trilithons were erected. Within a trilithons **U** formation, 19 bluestone pillars were placed in a matching arrangement, the open end facing midsummer sunrise. A ring of 30 sarsen columns erected outside the trilithons were joined by lintels; 61 bluestone pillars were placed concentrically within the 30 sarsen ring. Stonehenge of 2500 BC has the same calendar fundamentals as other Sun and Moon buildings in Ireland and elsewhere in Britain, a Sun calendar tallied sixteen months a year, months of four weeks and five days each week, 365 days a year. Outside the ring of 30 sarsen columns, twin rings of pits were dug into the chalk ground about 2500 BC, one of 29 and the other of 30 pits. Fifty-nine Y and Z Holes tallied a Moon calendar, six months of six weeks each of five days, repeated a second time but one day less each month, a twelve month lunar year of 354 days. Five great trilithons and nineteen bluestone pillars tallied the eighteen years and eleven days lunar eclipse cycle. Sarsen columns and arches, bluestone pillars tally the Sun calendar, rings of Y and Z Holes tally the Moon calendar with no excess or deficiencies in the numbers required. England's Stonehenge represented sixteen progressive arithmetic series numbers

Most experts agree Stonehenge c.2500 BC had a calendar purpose tho' I am unaware of any other comprehensive analysis of the kind described in my 1991 doctorate thesis describing the Stonehenge Sun calendar, Moon calendar and lunar total eclipse events.

Chapter 18: Avebury Created, page

Avebury ancient monument is Britain's largest ancient monument, larger than Stanton Drew, Stonehenge, Windmill Hill, Woodhenge and Mount Pleasant Built during Neolithic Age Britain four and a half thousand years ago, a ring of 99 massive tall stones half a kilometre diameter encircle the site; 150,000 tons of hard chalk was excavated to form a ditch and embankment. Avebury is a replica of the creation of mankind's world by the fertility deity, justice, the health goddess, all mankind's wants.

Chapter 19: Silbury Triangle, page

Silbury Hill, Avebury, the Sanctuary form a triangle in the proportions 33:27:18, the Hill corner is within a percent of a 90^0 right angle.

Chapter 20: Silbury Hill, The Sanctuary, Sun calendar, page

Three features; Silbury Hill c.2700 BC, the Sanctuary calendar building and Avebury c.2500 BC relate to each other in time and space. Silbury Hill was the model for Egypt's Djoser stepped pyramid at Giza c.2600 BC. Explanations are offered; their relationships, functions and surveyed characteristics. Prehistoric Silbury Hill, the largest man-made earthwork in Europe is a traditional round house dwelling shape but with no ground level entry. Predicated an overnight resting place for the Sun deity, West Kennet Avenue links Avebury and the Sanctuary Sheep Temple.

Chapter 21: Stanton Drew Sun temple, page

The west of England's Somerset Stanton Drew monument is the largest prehistoric timber building c.2900 BC; Britain's earliest Sun and Moon calendar building. Nine timber post pit rings tallySun and Moon calendars and the Saros lunar eclipse cycle of 18.03 years, the 19 year Meton cycle. Post rings count the Sun calendar of sixteen months, five day four week months with intercalary days each month, sixteen months of twenty-two or twenty-three days. Ring nine posts tally the Moon calendar 354 days a year.

Chapter 22: Arminghall Henge Sun temple,

A ditch and bank henge structure was built about 3100 BC at , Norfolk, England. An oval of eight timber posts established a north-east to south-west axis of the monument, the midwinter solstice.

Chapter 23: Lines & Angles,

Britain 's Ordnance Survey Department maps show straight roads and tracks termed 'Roman Roads'. Roman Legions marched along these routes but ancient places existed long before the Legions arrived on Britain's shores. Sites along tracks are not spaced apart in Roman linear distances but an ancient measurement system. Stone Street from Canterbury to Hole Hill in Kent, Stane Street in Sussex, Highcliffe Castle in Hampshire to Stonehenge were surveyed in *staen, country miles* and *leagues*. Stone Street is 10 *staens* long, Hampshire coastline cliffs to Stonehenge is 22 *staen* long, 49.65 kilometres. Other features relate by sixty-four divisions of a circle. Paris Academicians devised the *metre,* Emperor Napoleon spread these new measures across Europe during his military campaigns. I aver the recent International Metric System *metre* equals three *Celtic feet*, the ancient linear 'foot' measure of the third millennium BC.

Chapter 24: Tustrup, Sun Calendar,

The sea-linked peoples of Denmark created Tustrup's central *stendysserne* and satellite *dyssernes* c.3100 BC. The (Fibonacci) progressive arithmetic number series 1,2,3,5,8,13,21,34,55 was the basis for three stone circles designs; two structures and combination geometric arrangement of linear measures and mathematics. Tustrup design presaged Egyptian, Sumerian and Greek mathematics by a millennia.

Chapter 25: Orkney Sun temple,

Scotland's Orkney Isles structures c.3300-3200-3100 BC are viewed as sea-linked locations between Ireland, Wales, Scotland and Denmark. Petroglyphs indicate both Sun and Moon calendars were in use. The Ring of Brodgar characterises nautical navigation employing sixty-four compass directions.

Chapter 26: Symbols & Numbers,

Ireland's mid-fourth millennium BC developed thirty or more glyph symbols with specific meanings. Newgrange c.3200 BC passage mound is the second oldest building in Europe with a six metre high corbelled chamber. Petroglyphs presage the Celtic numbers 1, 2, 3, 4, 5, 6, 7, 8, 9 in universal use today.

Chapter 27: Rhondda Sun Calendar,

An oak tree log 1.7 metres long dated c.4270 BC was found in Wales mid-July 2013 sunk deep in a Rhondda valley peat bog. Knife cut markings on its wood surface are interpreted as Sun and Moon calendars, the first comprehensible writing and reading in human history; the glyphs are viewed as a statement of a Sun calendar five day weeks, four week months, sixteen month year, a twelve month year Moon calendar.

Chapter 28: Morton, Scotland 's Tentsmuir forest in Fife, a Morton beach shelter of twenty or so posts in sand dunes included three posts in a north south alignment, their overall distance a little over two metres. Narrow slots between three pairs of outer posts viewed sunset on four occasions a year; midsummer, the equinoxes and midwinter. Three alignment directions were capable of annual repetition; the Morton site evidence is seen as a first instance of astronomy about 5800 BC.

Chapter 29: Europe, France, Carnac, Sun & Moon Calendar,

The Loire group of dolmens in France exhibit ancient measures, ½, 1½, 2, 5 and 10 *faethms*. Thirty or more Neolithic *hunebedden* monuments in the Netherlands are aligned generally east west, the southern entrance is evidenced by two megaliths capped by a stone slab. France's Carnac lines of stones are the first evidence of European Sun and Moon calendars and measures in 4th millennia BC.

Chapter 30: Evolution, Cheddar Man, Red Lady,

Skeletal remains found in 1823 south Wales named 'The Red Lady of Paviland' are the oldest human ceremonial burial evidence in Europe. The bones were those of a *homo sapiens* male aged in his late twenties or early thirties, red ochre dust had been sprinkled on the remains. Carved mammoth bones were nearby. Most recently dated about 33,000 years ago, the remains preceded Ice Age peak about 25,000 years ago. In following millennia warmer climatic conditions prevailed. Ten thousand years ago England's Cheddar Gorge was occupied by *homo sapiens,* a hunter-gather group member now known as 'Cheddar Man' was interred in a cave, his DNA has been analysed and reported. Celtic peoples DNA is discussed.

Chapter 31: Length & Time parameters,

Past ancient monuments and artefact characteristics are described and summarised; numbers, linear lengths and distances, forms and shapes seen to be used consistently throughout the millennia.

Chapter 32: Threads,

Patterns of ancient monuments and artefact characteristics are described; numbers, linear lengths and distances, forms and shapes consistently used throughout the millennia.

Chapter 33: Appendices,

Date & dating, carbon dates,

HERITAGE & HISTORY

This book relates four decades work; the history of the sea-linked peoples in north-west Europe, the British Isles, Ireland, touching on Iceland, Greenland and Vinland settlement on the river St. Lawrence, Newfoundland, Canada. **Heritage & History** chronicles Morton 5800 BC, Rhondda Calendar 4270 BC, Tustrup and Stonehenge 3100-2500-1100 BC, Brython Measurement Values, Fibonacci series, Celtic Numbers, Cheddar Man, the Carnac stone lines. Sun and Moon calendars and a five day weeks from 4270 BC to 61 AD until the advent of the Roman Empire and Julius Caesars' seven day week calendar are examined. Every chapter was composed on a stand-alone basis, each is inter-related to many others; some repetition is involved where illustrations are integral to the relevant text.

An engineer's professional rules require one to adopt the Keep It Simple principle, recognize Murphy's Law of things that can go wrong, do not fight Nature but go along with it, then double check everything. Those have been my guiding principles preparing this history and putting it into Word and print. A chartered engineer in the Australian oil and gas industry, anthropological and archaeological research led me to understand how the historic myths and folklore of the north-west sea-linked European peoples complement prehistoric events; the evidence fits together. I began with the corners and gradually filled in pieces of a jigsaw puzzle, I present you with the picture.

In Appreciation

For Joan, whose help and understanding during a forty year study of anthropological and archaeological papers and historical matters, field visits to ancient places, an appreciation of folklore, the Celtic myths and legends has made this book possible.

In Acknowledgment

Monash University, Victoria, Australia:- President Margaret Gardner; Vice-Chancellor Malcolm I. Logan, Professor Alan S. Henry, Dr Peter J. Bicknell and staff members who guided and facilitated my doctorate thesis "The Proto-Civilisation of Albion & Erin"; the basis for this book. Because the help, encouragement offered, criticism gladly received and material provided by many people during the last thirty and more years, I wish to record my appreciation of their support: -

Staff at Monash University, Staff at the Victorian State Library, Libraries of the University of Melbourne, Monash University and Monash Council Library. Alexander Thom, A. S. Thom, R J C Atkinson, Glyn Daniel, George Eogan, David A Thorne, Olé H Larsen, G J Wainwright, Susannah Morgan, John M. Leah, Avis C. Leah, F K Annable, M Rednap, Clews Everard, H G Welfare, Aideen Cremin, Raghnall O'Floinn, Piet Geldtelder, Judy Wells, Goulvan Pennaod, John S Martin, Michael Baillie, Wu Wexiang, David Etheridge, Jean Sabbe, Babu Krishna Rijal, K Paddayya, Patrick de Dekker, Bob Foster, Takashi Ikeda, Fara Fuzaty, Derrick Lees, Euan W MacKie, Gordana Burdeu to name only a few.

In Memory of

Alfred Watkins whose 1925 book 'The Old Straight Track' energised public awareness and interest in Britain's prehistory. Professor Alexander Thom laid the foundations for this book. His son, Dr Archibald S. Thom whose Scottish hospitality and encouragement in the nineteen-eighties energised this Author to gather the evidence, link the dots into coherent whole patterns and write these pages for your study and reflection in the twenty-first century.

REVIEWS

"Concerning his 1991 Monash University PhD thesis "The proto-civilisation of Albion & Erin'':-
Neil's supervisor Dr Peter Bicknell of the Department of Classical Studies describes the core ideas of the thesis as "Very convincing" and believes it is a major contribution to modern understanding of human activities and beliefs in pre-Bronze Age Ireland, Britain and Europe."
Editor, Monash University Research Review

"Since I supervised Thomas's doctoral thesis I am strongly convinced that his core attributions deserve to be taken very seriously indeed. The distinguished assessors of Thomas' thesis felt likewise."
Dr Peter J. Bicknell, Monash University, Clayton, Victoria, 1991

"Recently published book 'Stonehenge Sacred Symbolism' reveals a family of inscriptions at Knowth, the ancient Irish monument built about 3500 BC, are the earliest comprehensive writing and arithmetic portrayals in human history. They describe the behaviour of the Heavens, a Sun calendar having eight festivals every year. 'Stonehenge Sacred Symbolism' reveals the Bible's Old Testament tale of Sodom and Gomorrah's disappearance actually occurred about 2250 BC. A world-wide catastrophic event saw Egypt, India, China, the Americas, Britain, Malta, Palestine, Jordan, Sumeria suffer starvation, cold and drought conditions. Empires collapsed and humanity reverted to a basic frugal life. 'Stonehenge Sacred Symbolism' reveals how England's ancient Stonehenge, also Mount Pleasant, Woodhenge and Durrington Walls were all built as Sun and Moon calendars."
Monash University Research Review Editor, 2010
"Recently published book 'Stonehenge Sacred Symbolism' reveals a family of inscriptions at Knowth, the ancient Irish monument built about 3500 BC, are the earliest comprehensive writing and arithmetic portrayals in human history. They describe the behaviour of the Heavens, a Sun calendar having eight festivals every year. 'Stonehenge Sacred Symbolism' reveals the Bible's Old Testament tale of Sodom and Gomorrah's disappearance actually occurred about 2250 BC. A world-wide catastrophic event saw Egypt, India, China, the Americas, Britain, Malta, Palestine, Jordan, Sumeria suffered starvation, cold and drought conditions, empires collapsed and humanity reverted to a basic frugal life. 'Stonehenge Sacred Symbolism' reveals how England's ancient Stonehenge, also Mount Pleasant, Woodhenge and Durrington Walls were all built for an exact purpose. Stonehenge's eighty sandstone monoliths and eighty smaller bluestones tallied a Sun calendar of sixteen months a year, four weeks a month, five days a week, 365 days a year. It was also a Moon calendar of twelve months a year, six weeks of five days each month, a year of 354 days. Eclipses of the Moon were recorded. Names of the Coligny twelve Moon calendar months translate as Summer, Second, Third, Hoard, Ogre, Shelter, Winter, Budswell, Lambing, Spring, Between and Full Circle. The sea-linked peoples of the north-west - Ireland, Britain and western Europe have much in common. Deities,

legends and myths, Sun and Moon calendars, all are revealed in Stonehenge Sacred Symbolism. Remnants of the Britons and Irish Neolithic culture have survived down to the present day. Evidence of the extraordinary feats can be found in Stonehenge, as well as other great prehistoric monuments, according to the radical – perhaps definitive – explanation of their design and purpose, put forward by a Monash researcher. He describes the likely role of the enigmatic Long Man of Wilmington, a giant figure carved into the Sussex hillside, is that of a surveyor. Far from being herdsmen and hunter gatherers, the inhabitants of Ireland and Britain performed prodigious feats of surveying, design and engineering. The Australian Curriculum, Assessment and Reporting Authority Board of Studies advise the book 'Stonehenge Sacred Symbolism' has been drawn to the notice of Curriculum Managers and Senior Project Officers for their attention. The book will be a valuable resource to accompany the curriculum at school level. This would be best promoted through school networks and authorities. We wish you well in your continuing work, kind regards.
Australian Curriculum, Assessment and Reporting Authority, 16th June 2010.

''Stonehenge – visited by a million visitors a year – is revealed anew in a startling new book "Heritage & History" by Dr Neil L. Thomas. His customary storytelling blends facts with hypotheses; here the author adopts a rigorous but readable approach to explain mysteries surrounding ancient sites. Dr Thomas discovers hitherto unknown arithmetic connections between England's third millennium Stonehenge on Salisbury Plain and other ancient places. He adds an important new book to the great wealth of research and gives real solutions to questions around numerous prehistoric conundrums. Joined with the fourth millennium Ireland's Knowth mound, Denmark's notable Tustrup, Stonehenge lunar eclipse ring, fifth millennium readable writing on Wales' Rhondda calendar oak log and Scotland's Morton sunset watcher, he give voice to the Mesolithic and Stone Age people's sea-linked societies, all but forgotten in the mists of time."
Simon D. Plant, BA (Hons), MA History, Melbourne University, Australia

''The ancient British of 4500 years ago already understood the special properties of right angled triangles, they also knew the relationship between a circle's diameter and its circumference, pi = 22/7. The village of Avebury almost due north of Stonehenge, actually lies in the centre of the largest stone circle in Britain. The book's author suggests the great ring at Avebury may have been the spiritual capital of prehistoric Britain, and its design is the physical embodiment of the Norse creation myth (of mankind's earth). Norse legends and an Icelandic saga of AD 930 describe a temple of similar design to the one at Avebury dedicated to the god Thor. Avebury's Obelisk centre stone corresponds to Thor's stone. Many other megalithic stone circle and rings in Britain and Europe feature-the-same-circle-and-central-pillar.''
Graeme O'Neill, past Science Correspondent of 'The Age' Australia.
See www.bookstore.bookpod.com.au/p/1071681/stonehenge-sacred-symbolism.html

CHAPTER ONE :: TODAY & YESTERDAY

"Philosophy is written in this grand book - I mean the universe - which stands continually open to our gaze, but it cannot be understood unless one first learns to comprehend the characters in which it is written. It is written in the language of mathematics, and its characters are triangles, circle, and other geometrical figures, without which it is humanly impossible to understand a single word of it. Without these, one is wandering about in a dark labyrinth." Galileo Galilei, AD 1564-1642

My kith and kin, my forebears, who were they, where did they live?

TODAY

This 'grand book' "Heritage & History" is really a detective story, complete with many characters and themes; the curtains open, characters appear and assume reality, their features are shaped and the stage is set. Present day Hallowe'en and Mayday celebrations happen. We have highways and machines, computers, satellites and worldwide communications, arithmetic, calendars and a metre at our fingertips. How and when did it begin?

Origins of language, mathematics and social cohesion investigated by European researchers are mostly conducted with a habitual mindset attitude towards the east and south; to Egypt, Greece and Roman areas. Turn around and look west and north; to the first writing in Wales, mathematics in Denmark, our number glyphs in Ireland. The *written history* of mankind, the manner of his thoughts, beliefs and way of life is mostly limited to the records of the past two millennia. Come with me to eight millennia before the present day; to a time when mankind looked, thought much as we do today but in a far less complicated ways. Beyond the written records of ancient times, archaeologists excavate evidences of pre-history; they are rewarded by pieces of broken pottery, mud brick walls of dwellings, gold ornaments, bronze swords, burial mounds and the like. But there is far more to it than that. I offer to take you from the comfort of the present day back to our prehistoric roots. Accompany me on a journey from our present day to a far distant past of the north-west sea linked peoples, to the prehistory of Ireland, the British Isles, Scandinavia and Europe.

Be Patient

Reviewing my writings long after they were first drafted, I found were many individual facts and so much information in each chapter, I earnestly recommend you proceed at a leisurely pace. In the language of writers and publishers, the text is 'dense'. Read a chapter, review what has gone before and perceive the relationships between this and that. As you make progress and successive chapters are absorbed I trust you may understand the results of forty years work. I employed the technique of 'joining up the numbered dots' to reveal the outline of ancient society, how they thought and calculated in whole numbers, why they did what they did, all seen from my perspective as a career engineer, surveyor, architect.

TO BEGIN

Beginning a book titled "Heritage & History" requires something of the now, the present to establish a baseline and allow you dear reader, an opportunity to fully understand and comprehend my message.:-

In my lifetime a new Australian Parliament House was constructed to incorporate modern facilities and meet the needs and functions of twentieth century legislators. The House incorporates an architectural design element inherited from Stonehenge times; the Golden Number Ratio, a design technique to ensure an appealing appearance. Australia's capital city Canberra is situated in the Australian Capital Territory. Parliament House is described as a working building in a prime position on Capital Hill; a unique blend of impressive architecture set in a beautiful landscape, the building is one of Australia's most significant and popular cultural attractions. The subject of a world-wide competition in 1986-87, Parliament House on Capital Hill was designed and overseen by Mitchell/Giurgola & Thorp, architectural consultants, New York, U.S.A.

Partner Richard G. Thorp was a 1967 graduate of Melbourne University School of Architecture. Constructed in the nineteen-eighties, a grand opening was performed by our Queen Elizabeth the second in 1988.

The Doorway Design

Summarising the observed Parliament House façade design elements, the extensive façade has the form of twenty-one open doorways with window apertures above in most instances. Three central doorways have the same proportions as the far left and right groups, only the centre doorway has a window aperture above. A second element style is full height groups of four openings mid-left and mid-right of the centre with the same doorway width. All twenty-one doorways offer an aesthetic appearance of a well proportioned series of pristine white arches: -

One entire building façade; two sets of doorways are set back to the left and right of the centre portion. A set of three doorways are positioned at the façade centre. Left and right of the central façade are five doorway sets. Full height columnar spaces total eight. Thirteen doorways adhere to the same proportions. There are a total of twenty-one doorway entrances.

Each doorway window aperture has the proportions 8:13. Parliament House, progressive arithmetic Fibonacci series numbers are 1,2,3,5,8,13,21. The building façade design incorporated a series of design elements that accord with the Fibonacci progressive arithmetic series numbers 1,2,3,5,8,13,21 in exactly the same manner as ancient Stonehenge in England built about 2500 BC.

YESTERDAY

Certain cynics speculate about our forebears three hundred generations ago; often inferring our forebears were animalistic savages dressed in skins, communicating with each other by a series of grunts. Such cynical people entirely lack objectivity and reality. We can all picture a beautiful heroine or handsome hero featured in a glossy magazine, the personal images of our contemporaries only one hundred generations ago during the classical Greek and Roman civilisations when sculptors created exquisite marble statues of men and women. I recall admiring Greek statues of Apollo and Venus de Milo, graceful beauty personified two thousand years before our time. Roman statues of their Emperors have individual features, known to closely resemble the person in whose honour it was created. It cannot be said the ancient Greek and Romans one hundred generations past were any more or less handsome or beautiful than their descendants who are our neighbours today.

There are no valid reasons to suppose people living two hundred generations before the Greeks differed in appearance or manner of thinking. Be assured our forebears two or three hundred generations ago were like us in so many ways.. The basis is there in past records.

Time and Tide

How small or tall, near or far, does it take long? It's those questions that come to mind when we know we have to do something. Whether events in our home or where we have to go, in many ways mankind has an unconscious need to measure time and space. I propose to show the sea-linked people living more than five thousand years ago in the British Isles and Ireland, north-west Europe and Scandinavia had the ability to comprehensively measure time and space, to mark important events in their lives.

The first inklings of these skills are seen nearly eight thousand years ago in Scotland at Morton. Ever so gradually their breadth of skills advanced, knowledge accumulated until they eventually established writing in Wales, an Irish calendar to measure time and the basis of mathematics in Denmark. Whole numbers were the essence of their work. Bequeathed to us, the basic tools of thought that have served us well as we advance our knowledge of the world we inhabit.

How far? Calendars, Miles & Leagues

Since 1582 we have lived by the Gregorian calendar, twelve months a year, seven days a week. I offer an account of skills that originated some time before 4270 BC and endured until the Roman Empire. Comprehensive Sun and Moon calendars, consistent forms of writing began in those distant times. We still have traces of the *Stonehenge* Sun calendar with us today as we measure time, record anniversaries, the passing of days, weeks, months and years. Modern societies mostly use the International System of Measurements, a title abbreviated to the 'Metric System'. The cornerstone of this new international standard of measurement is the lineal *metre* from which other measurement units are derived. I intend to show the basis of the Metric System, the *metre,* is much older than mankind's recorded history. We continue to use the *Celtic foot, yard*, *faethm, furlang, staen* and *league* even though they are disguised with metric names.

Prehistoric man thought and employed only whole numbers, a fundamental factor to remember when considering why and how ancient monuments were conceived, designed and constructed.

Maths & Myths

Buried in myths and legends of long ago, one can often find grains of fact. To correctly interpret these small pieces can be worriesome, fraught with traps, distractions and deviations. I have teased out genuine information before presenting it to you. A quotation from Galileo Galilei1600 AD heading Chapter One cogently makes the case for mathematics as the basis of human activity, a sufficient reason to search for the origins of mathematics. Fourth millennium BC mathematicians used the vulgar fraction 22/7 to accurately determine the circumferential length of a circle in relation to a measure of its diameter. By the third millennium BC, right angled triangles with sides in the ratio 3:4:5 and 5:12:13 were the basis for geometric designs of Woodhenge and Stonehenge buildings in southern England, values still in use today.

Myths and mathematics of long ago became entwined into the religious practices of the major world religions. Originally a symbolical and numerical linear value five millennia ago, thirty-three

became a philosophical sacred attribute of a person, place or event in the newer religions Buddhism, Judaism, Christianity and Islam.

The Whole

Having reached far back in history to garner a portion here and pieces there, gathering the whole together this volume chronicles events from our day back to the Domesday Book, Saxons and King Arthur, the Roman Empire and probes into prehistory. Before the Iron and Bronze Ages, Neolithic Stonehenge was the metropolitan centre of ancient Britain. From written records of today's world, particular dates are AD 1500, 950, 600, 535, 495, then BC 50, 1000, 1500, 2250, 2300, 2400, 2500, 2750, 2750, 3000, 3500, 5800, 8,000. That is as far as the book goes in any detail. Principal portions of the picture portray events in prehistoric Scotland, Ireland, the British Isles, Europe and Scandinavia; how these have led to our complex technological lives.

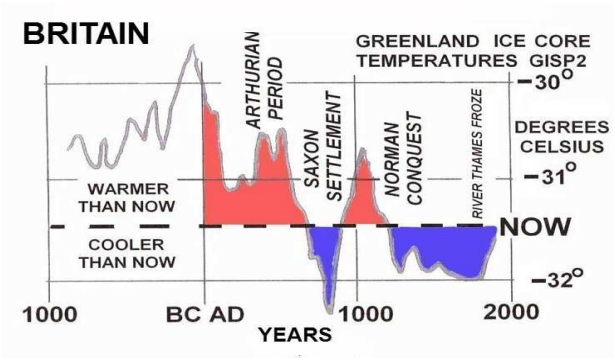
Most retrospective detective stories require the reader to value the theme and characters, to perceive a plot and solve the clues. In this volume I offer the reader themes of the Sun and Moon calendar characters, 22/7, the *faethm* and *metre*, the sacred symbolism of thirty-three, a world-wide catastrophe about 2240 BC, the impact of climatic changes from earliest times. Summarising the constructs in Ireland, Britain and Denmark during the fourth and third millennia BC: -

Knowth passage mound c.3500 BC.
Newgrange passage mound c.3200.
Dowth passage mound c.3200.
Orkney and Ness of Brodgar c.3200 – 3100 BC
Tustrup constructed 3100.
Stonehenge Aubrey Holes 3100 BC.
Stanton Drew c.2900 BC.
Hindwell enclosure built c.2700 BC.
Avebury standing stones c.2600 BC.
Woodhenge, Stonehenge Durrington Walls calendar buildings constructed around 00 BC.
The Black Clouds apocalypse about 2240 BC ended a period of great community works.
The European Bronze Age commenced about 2000 BC.

There are many more pieces of the puzzle to be collected in the future, tasks for which I seek input from open minded knowledgeable people in their particular fields of expertise. The plait formed by these threads is now resurrected for your enjoyment.

CLIMATE

Vast ice sheets covering northern Europe, the Americas and higher latitudes began retreating fifteen thousand years ago, mankind has prospered since; previously uninhabited areas became habitable ten thousand years past. Often omitted from direct mention in archaeological reports, the subject of climatic conditions and how it governed peoples' day-to-day lives is important. For example, warmer conditions than we are currently experiencing this century existed during Egypt's 'Old Kingdom'



between 2900 BC and 2200 BC, an era that saw great community works and the construction of many temples, three celebrated pyramids and the sphinx at Giza.

Twenty-first century climate research scientists of the Greenland International Scientific Project obtained ice core temperature records from deep in the Greenland ice sheet; temperatures in the last eight thousand years varied in the range -29^0 Celsius and -32^0 Celsius, the trace shows continual warmer – colder cycles. Atmospheric conditions in temperate latitudes averaging $+20^0$ C today varied to comparable extents. Annotations on the temperature illustration show the relationship between Greenland ice core temperatures and human activity in Ireland and Britain, western Europe and Scandinavia. In the context of "Heritage & History" the period between eight thousand years **B**efore the **P**resent and our own time is of most interest.

You should know Neolithic millennia were degrees warmer than at present, a factor that improved food productivity and offered more leisure time for community works. After the peak in 2240 BC of about -29.5^0, GISP2 temperatures fell between one and two degrees Celsius, circumstances that were reflected in cooler temperate latitudes. Little eventuated in Britain and elsewhere in the northern hemisphere for centuries after Stonehenge, Woodhenge and Durrington Walls were constructed around 2500 BC. This also explains a cessation of major works in Egypt.

THE INTERNATIONAL METRIC SYSTEM

Publication of my 1975 book "An Introduction to Metric Units", ISBN 095972320X took the form of a series of pages and clear films; included several clear sheets intended for projection purposes onto a screen for audience viewing. The book fifty or so A4 sheets in a folder sold through distributor L & S Educational Supplies P/L. The blurb read:-

"A unique and comprehensive teaching aid designed to illustrate the International System (SI) of metric units in classrooms conditions presented material in an unusual way to enable students to comprehend and more readily understand the relationship between one unit and another. Presented so that they can be projected and viewed in three-dimensional depth by simple superimposition of individual transparency sheets showing the linear, mass, time, heat and electrical quantities the full relationships between the units used in civil, mechanical, electrical engineering and science are clearly shown. As one transparency sheet is placed over another, links are highlighted between sets of values displayed in logical order and metric value or extension of the value by a ten factor or a dimension."

The Parliament of Australia enacted the National Measurement System Act in 1960 by passage through the Parliament with an integrated group of Acts and Regulations. A principal provision required that all commercial dealings be conducted in metric units, otherwise such transactions would be deemed invalid, would not be enforceable and not in accordance with Australian law and legal requirements. Metric units are designated:-

Length name	metre	Symbol	m
Time name	second		s
Mass name	gram		g

HERITAGE & HISTORY

This book is are principally concerned with time and length. Mass and volume are concepts too difficult to analyse and relate to relate modern measurements systems with any prehistoric methods. I intend to tease out evidence to show our forebears understood and employed fundamental time and length concepts; names have been devised in harmony with the subject; fingers, hands, fut, faethm, furlang, staen. Answers are given to the questions; why do we have metres, why are there sixty-four compass directions?

THREE WORDS: Druids, Bards & Ovyds

An original manuscript by George Borrow "Celtic Bards Chiefs and Kings" was written about 1830; it remained unknown until 1928 when it was published by John Murray, Albermarle Street, London. I received a first edition copy via Better World Books Ltd., an *ex libris* copy from Antrim County Council Library Service, Nth Ireland, UK, 1929. Pages 29,30-31,32 and 33,34-35,36 are uncut. My interest concerned text on page 34 (transcribed by hand):-

> "So here we have …… The dignitaries spoken of in the Triad [refer] to three orders termed respectively *Bardd, Ovvydd* and *Derwydd* or Poet, Philosopher and Druid which constituted what was called *Barddas* or bardism. The motto of this was "*y gwir yn erbyn y byd*" or "the truth against the world". Druids were the font of instruction, moral and religious, in Britain and Gaul."

A Latin reference to "the 'Ofyd' a philosopher, thinker" was also sourced from the Triad. These words were a reference basis for my 2008 ebook "Welsh Tales" ISBN 9780957828230.

Three Colleges

Three academic 'orders' or colleges, the "triad"; of thinking and philosophy, language prose and poetry, principles and knowledge - technical work skills, these are the basis of our civilization. The words *Bardd, Ovvydd* and *Derwydd* are henceforth spelled 'Bard', 'Ovyd', 'Druid' in the general text of this book.

CHAPTER TWO :: SPORT, CRICKET & BASEBALL

THE LONG MAN OF WILMINGTON & CERNE ABBAS GIANT

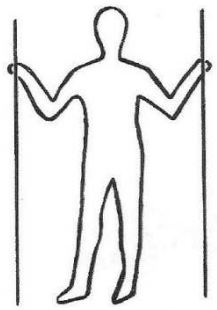
Twelve generations past our forebears linked cricket and baseball with fathoms and furlongs.

SYNOPSIS

Worldwide, bat and ball games of cricket and baseball have six essentials – participating teams of players, bat, ball, the critical pitch distance. Played by men and women in countries on every continent, each generation enjoys its own version. Our televised international matches attract large audiences. Both cricket and baseball games appear to have a common basis; their origins can be traced back to very early times; three tracks in southern Brython measured in Measurement units.

The Long Man of Wilmington

An outline male figure is portrayed on a north-facing hillside a short distance inland from Eastbourne on England's south coast. The Long Man of Wilmington has been the subject of much debate concerning its identity. Why was the figure created and whom does it represent? Two long staves are held in his outstretched arms. These staves are considered to represent two parts of a right angled pacing frame employed to survey tracks and routes across the country in prehistoric times. A braced right angled frame measured 2.07 metres, one *faethm,* one *megalithic rod* from tip to tip. The Long Man measures thirty-three *faethms*, 68.4 metres from head to toe. Components of his walking frame readily lent themselves to the creation of a game of cricket, a wicket of two vertical sticks and a bail, a length of pitch equal to ten ancient *faethms*, 20.7 metres, 23 statute yards.



THE LONG MAN

Presumed formed in prehistoric times, the figure probably represents the surveyor of ancient tracks in southern Britain whose tools of trade were two 'dods' or staves. Craft family names such as Smith, Taylor and Farmer include Dodman, the maker and user of staves. His tools of trade and his associations with Sussex, England, lent themselves to enabling cricket and baseball games centuries ago. The Long Man portrayal represents a Dodman and should be re-named 'The Dodman of Wilmington'.

The Cerne Abbas Giant

The Cerne Abbas Giant in Dorset is comparable in many ways with the Long Man of Wilmington, an outline figure formed on the sloping side of a hill. Its height is 2½ x ten cricket pitches, 25 *faethms.* The Giant is somewhat less well proportioned than the Long Man. Its date is unknown, possibly of early Roman times. The figure has noticeable male characteristics. A nearby enclosure named Trendle probably housed a Maypole, indicating it was a popular Beltane fertility festival site two thousand or so years ago.

THE GAME OF CRICKET & THE RULES TODAY

In our twenty-first century, the world-wide popularity of cricket is immense; a bat and ball game, cricket has seven essentials – two participating teams of eleven players, bat and ball, two wickets and the critical pitch distance between wickets. Comprehensive rules governing the modern game may be had from authoritative references. The most significant rules provide for two wickets, each of three stumps with bails across and a height of 28½ inches, separated by a pitch twenty-two yards long, 66 statute feet. Ends of the pitch are marked with lines known as the "popping crease" and "bowling crease" to determine the bowler's and batman's safe limits. Both creases are 4 feet from the wickets, thus the distance between creases is 66 feet less 2 x 4 = 58 feet, the nominal flight of the ball. A traditional cricket game takes place over several days. Recent popular innovations such as 'one day cricket' and 'twenty-twenty cricket' owe their origins to older forms of the game

Yesterday , The Early Cricket Game & Rules

The most promising information describing an early form of cricket is shown by scenes on a porcelain bowl in the Melbourne Cricket Club Museum and another bowl exhibited at the Marylebone Cricket Club's Museum in London. Before those pictorial examples, there are mentions back to the thirteenth century quoting names such as *creag*, *creckett, cricce, cryce* and *criquet*. A common feature consistency of each medieval name is a hard 'c' followed by 'r' and the 'i' vowel. How those early games were played and the rules are unknown. The style of those ancient games causes great debate in enthusiasts' circles. These observations should add fuel to the fire.Probably the earliest reference to the game of cricket is in the household accounts of King Edward the First of England; court documents of 1300 AD list the royal prince's expenses for *creag* or *cricce* [a crooked staff]. A written record of 1478 describes *criquet* in northern France, at that time part of the larger realm ruled by the King of England.

No written account of a cricket game is known until 1727. That year, the Duke of Richmond and a Mr Broderick agreed to play a cricket game in Sussex, England. Their written rules stipulated a pitch length of 23 English statute yards from wicket to wicket, 69 feet, a significant choice for the length of pitch. Two stumps and a single bail formed a wicket. While it was a realistic distance for the bowler to hit the wicket with a ball and dismiss the batsman, I conjecture there may have been an underlying historical reason to adopt 23 statute yards as the length of pitch.

The Melbourne Cricket Club Museum houses a unique antique porcelain bowl and lid, both ornamented in the style of an English country scene and a game of cricket; the bowl lid scene portrays six men playing cricket - a wealthily dressed umpire with a plume in his hat, a wicket keeper, a batsman holds a stick curved at its lower end similar to a hockey stick. Two figures wait to catch the ball. The bowler is about to deliver the ball underarm to the batsman. There is a length of pitch between a bowling position and the wicket. The scene, its elements and general air reflect the rules written by the Duke of Richmond and Mr Broderick in 1727. The images shown on the bowl and lid scenes harmonise with the game played under the 1727 Duke of Richmond's written rules. Museum records attribute the imagery to a Mr Gravelot c.1739 and a bowl manufacture date of 1744, assessments based upon scientific research data.

It is conjectured the cricket game images created by Mr Gravelot sought to portray the 1727 cricket game rules at a time when considerable tension existed between proponents of the 'old game' and those of the 'new game' advocated by the Sussex Cricket Club. The Melbourne bowl and its imagery could be considered advocacy for the 'old game' by its adherents. New 'Laws of Cricket' promulgated by the Sussex Cricket Club in 1744 varied the earlier game to include three stumps at both ends of a pitch having a length of 66 feet. A larger bowl is exhibited at Lord's cricket ground London at the Marylebone Cricket Club's Museum also shows a country scene, a batsman, an umpire and a number of fielders playing a game of cricket; three stumps are shown at both ends of a pitch. Scenes shown on the lid and bowl, their elements and general atmosphere empathise with the new 'Laws of Cricket' promulgated by the Sussex Cricket Club in 1744; the wider world participates in this popular game today.

THE GAME OF BASEBALL & THE RULES TODAY

Baseball has seven essentials – two teams of nine players, bat and ball, a pitcher and batter [batsman], the critical distance between them. Comprehensive rules governing the modern game may be had from authoritative sources. The most significant rule provides for a central mound on which the pitcher stands and the batter's position at home plate. The distance between them is sixty feet six inches. Allowing for both players arm movements in play, the pitcher's throw and the batters swing of the bat, the nominal flight of the ball is close to fifty-eight feet. Searching for the origins of baseball, keys to the puzzle are the length of pitch and the critical flight distance of the ball.

Baseball game & rules

When baseball originated is perhaps better understood than cricket. Northern France was the base for William the Conqueror's conquest of England in 1066 AD. Two centuries later, a succession of Norman kings based in London governed England and the western part of France, games were heavily influenced by English practices. A French manuscript of 1344 illustrates *la soule*, a game probably broadly similar to baseball. This mention offers support for the idea both baseball and cricket had a common bat and ball game origin. An English 1744 woodcut illustration shows a game field accompanied by a rhyming description of "base-ball". The year 1755 saw William Bray record a baseball game played in Guilford, Surrey, England.

Surrey is mentioned as the location for both cricket and baseball games, credence for the idea of both games' common origin in the south of England. The flight of the ball and the time needed by a batter to anticipate its path before making an attempt to hit the ball were critically important.

Fifty-eight statute feet meets those criteria, as it does in cricket. On that basis, the ability of the pitcher to throw a ball to the batter meant the length of pitch could also be related to measurements used in antiquity, *Celtic feet*, *short yard*, the *faethm* [*fathom*] and the *furlang,* [*furlong,* furrow length].

THE LONG MAN OF WILMINGTON

Viewed from the sea, the south coast of England faces the English Channel. The most well-known portions of its coastline are the white chalk cliffs near the sea-port of Dover. Eastbourne, a coastal seaside resort not far west of Dover affords the visitor wonderful views of the Sussex Downs, sheep graze on the slopes, fresh breezes blow away any cobwebs in one's mind. The grassy Downs roll in an undulating fashion for mile upon mile, a hinterland that holds promise of rewards for the explorer. A short distance inland from the south coast is The Long Man of Wilmington as it is now named, an outline figure portrayed on a north-facing hillside. An excellent view may be had from the nearby road. The figure's origin has mystified local people and visitors from far afield; speculation and unfounded hypotheses compounded the problems.

An article and sketch by Dr Phene described the Long Man of Wilmington, material published in Sussex local Graphic newspaper 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, the feet and ankles shown only by dotted lines. Dark sediment had washed down the 28^0 slope, filling the channels of exposed chalk that allowed grass to grow. The figure held two staves of realistic appearance, thick at the top and tapered towards their base.

No doubt the publicity resulting from Dr Phene's initiative and the newspaper illustration led to a restoration effort by the Reverend W. de Saint Croix and his colleagues in April, the spring of 1874. The present outline of the Long Man of Wilmington was created; in the form illustrated with two thin straight staves, part extended above the hands. The April figure left foot is portrayed in a curious manner.

Which of the two figures most closely represented the original Long Man is an open question, a matter that may not be resolved. Meanwhile, without delving too deeply into that aspect, it is clear that the figure represents an upright man holding two vertical sticks or staves in his outstretched rms. At my request, the Secretary of the Sussex Archaeological Society arranged to measure the height of 'The Long Man of Wilmington' figure, no easy task on the 28^0 incline. He advised the distance was 68.13 metres from head to toe, a slight difference with the *furlang* [68.4 metres, the *furrow length*]. The Secretary's measurement of 68.13 metres can readily be excused by difficult surveying conditions and the width of outline ditches showing the exposed white chalk sub-strata. The difference of a foot or so is unimportant.

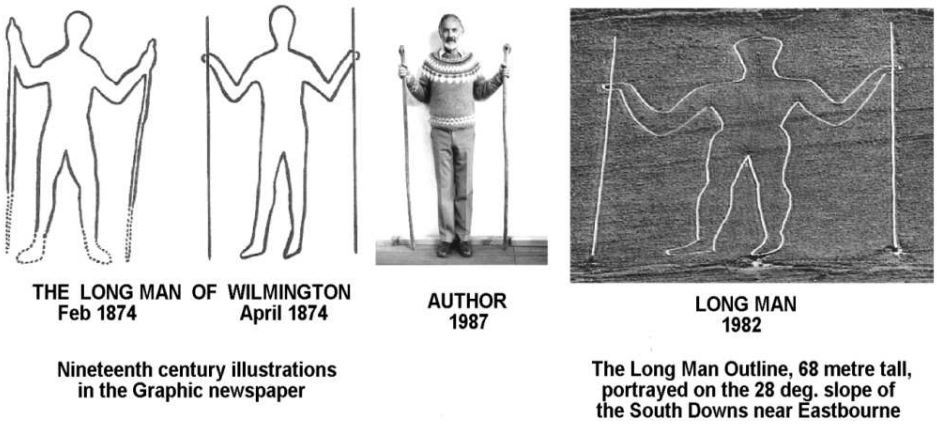
The Real Long Man

Alfred Watkins offered observations concerning The Long Man of Wilmington, his identity and the description of an infirm man who walked with the aid of two sticks or staves as 'doddery'. The Long Man of Wilmington has two sticks or staves but no appearance of any infirmity. A series of reference searches provides these hints to the Man's identity:

The Oxford English Dictionary volume II, pp 574 and 576 provides these definitions of 'dod' and 'doddery'. DOD - A stalk, staff or club. A reeds mace or cat's tail, 'typha latifolia'; [A tall

slender plant with an enlarged top]. The noun Dodman: - Origin unknown; connected with dod; a snail, a hoddy doddy. References include Francis Bacon AD 1626 who wrote 'Animals that cast their shells, lobster, crab, dodman, tortoise'. In 1674, Fairfax referred to 'snayl or dodman'. Charles Dickens put the words: - "I'm a regular dodman" into the mouth of Mr. Peggotty in his 1848 novel 'David Copperfield'. The appellation 'dod' can be traced in Lower's and Reaney's Dictionaries of Surnames that define 'Dod' to mean a stave or staff maker, a person engaged in that occupation. A Dictionary of Surname offers this information: - "Dodman: A class of men called dodomanni appear in the Exon Domesday [1086 AD], and afterwards as Dodeman and Deudeman. The word awaits explanation. See Dudman. ….. "Dudman: Apparently an ancient personal name implying some quality or employment."

'Dodman' was perhaps a Middle Ages family name or more recently a nickname for a garden snail as we know it today. To answer the question, "What was the link between the snail and the Dodman's staves"; I suggest a snail's antenna is the answer. Both are long and slender, two in number and have an enlarged end. Each snail antennae tip has an eye in the form of a black dot, similar in appearance to a hole drilled through the thicker end of a wooden stave, just as one would obtain from uprooting a sapling, trimming the bole and boring a hole through. A snail's shell carried on its back can be compared to the Dodman's large backpack, bedroll and a long coiled rope carried as part of his surveying equipment. From the trade practised by a man or woman to a person's name is but a short step. Many family names such as Fisher, Baker, Farmer, Gardener, Smith and Taylor can be cited. I consider the wooden article we now call a stave or staff used to be named 'dod' in early British and Saxon times. I suggest a stave maker was described as a dod-man in earlier days. From that I concluded the patronym Dodman developed; a person who made his own tools of trade for surveying purposes.



REPRESENTATIONS OF THE LONG MAN OF WILMINGTON

The Wilmington outline figure of a man standing with his legs apart and holding two staves has these 'Dodman' characteristics. Join me with Alfred Watkin's proposal he should be re-named 'Dodman of Wilmington'. Dr Phene's drawing represented a man holding two staves. Each had a thicker top at one end that tapered to a slender lower tip at ground level. Such a portrayal brings to mind a stave-maker uprooting a small tree, trimming the root bowl of unwanted roots and forming a straight trunk that gradually tapered to the top. Dr Phene's drawing represented a man holding two staves. Each had a thicker top at one end that tapered to a slender lower tip at ground level. Such a portrayal brings to mind a stave-maker uprooting a small tree, trimming the root bowl of unwanted roots and forming a straight trunk that gradually tapered to the top. By selecting the right saplings, more dods of that kind could readily be made, two, three or more as needed. To complete the work, holes drilled through the bowls of two staves have allowed the insertion of a short wooden dowel to function as a hinge. Adding two cross braces to fix the dods at a 90^0 angle would then complete a pacing frame, similar to that used today to ensure soldiers take uniformly long paces whilst marching in step**.**

Dowel Pin & Stave Holes

Staves

Pacing Frame

Two wooden staves were fabricated, each close to 1½ metres length. To pivot the two staves at right angles, I made holes through the bowls of sufficient diameter to take a wooden dowel pin. Two cross braces of 0.83 metres length were fashioned. The right-angled frame tip-to-tip linear measure was 2.07 metres, the faethm. A pacing frame of that kind would have enabled a surveyor to measure a straight-line survey route as fast as he could walk. Accuracy would have been satisfactory. Any discrepancies caused by each stave rotating $180^{\mathbf{0}}$ in the ground as the frame was swung around and moved forward, would be self-correcting as the next move was made.

Such a portrayal brings to mind a stave-maker uprooting a small tree, trimming the root bowl of unwanted roots and forming a straight trunk that gradually tapered to the top. By selecting the right saplings, more dods of that kind could readily be made, two, three or more as needed. To complete the work, holes drilled through the bowls of two staves have allowed the insertion of a short wooden dowel to function as a hinge. Adding two cross braces to fix the dods at a 90^0 angle would then complete a pacing frame, similar to that used today to ensure soldiers take two wooden staves were fabricated, each close to 1½ metres length. To pivot the two staves at right angles, I made

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Providing the two pacing frame staves have a length of 1.47 metres and are braced at a right angle then the tip-to-tip distance is 2.07 metres, one *faethm,* the linear measure of antiquity. Thirty-three *faethms* equals a *furlang* = 68.4 metres, virtually the measured height of the Dodman of Wilmington.

Faethms & Furlangs

Dr William Stukeley the celebrated eighteenth century English antiquarian had great interest in ancient matters reaching back to the Roman era fifteen hundred years before. He published his book *Roman Prints* in London and showed two bar chart relationships between the "English statute foot" equal to 305 millimetres and "Celtic foot" of between 332 and 335 millimetres. I studied the copy held by the State Library of Victoria.

In 1967, Professor Alexander Thom**,** then Emeritus Professor of Engineering at Oxford University published his discoveries concerning ancient measures used in Britain about the time Stonehenge was built during the third millennium BC. He surveyed about one hundred and fifty ancient stone circles in Britain and found most employed two units of measurement he termed the *megalithic yard* of 0.829 metres and *megalithic rod* of 2.072 metres. The ratio between the two units equalled 1**:**2½.

Finding Dr Stukeley's '*Celtic foot'* of 332-335mm multiplied by 2½ = 830mm, my name '*ford*' short for 'forward', very close to Thom's *megalithic yard* of 829mm. Conversely Thom's *megalithic rod* of 2.072 metres multiplied by 2½ = one *faethm.* Observe thirty-three times a *faethm* equals my *furlang* [the *furrow length, megalithic dod,* Md] = 68.4 metres, the height of the Long man of Wilmington. Observe the six units names commence with 'f', a common Cymraeg practice. It can be shown the *furlang* multiplied by 33 equals my *staen,* the *country* or megalithic *mile*, Mml, 2.25 kilometres, 1.4 statute miles. Again, *staen,* the *country* or *megalithic mile* multiplied by 2½ is the unit termed *staen league*, Mlg, 5.64 kilometres, close to three British Royal Navy nautical leagues. Many enquiries later developed into the BRYTHON MEASUREMENTS embodying the Thom 2½ relationship and a multiplicand second factor33. The BRYTHON MEASUREMENTS units and my linear unit name designations have harmonious relationships with historical accounts.

The Beowulf Saga c.AD 725 is the earliest recorded saga written in English. Evil Grendel and Beowulf's undersea battle quotes the word *faethm*. A book of English riddles c.AD 1000 used *faethmum* with reference to a length. Spellings included *faethm*, *faden*, *fethm*, *fethmos, fathmr.*

THREE BRYTHON ROADS

SYNOPSIS

Southern Britain features three prehistoric routes with common characteristics; Stonehenge Track, Stane Street and Stone Street; each a continuous straight alignment line in red for many kilometres with eleven place names and measured intervals. These features are interpreted as proof an established linear measures system was applied in Stonehenge of Stane Street in Sussex and Stone Street, Kent. The words stonehenge/stane/stone/staen/stein are seen and interpreted to mean

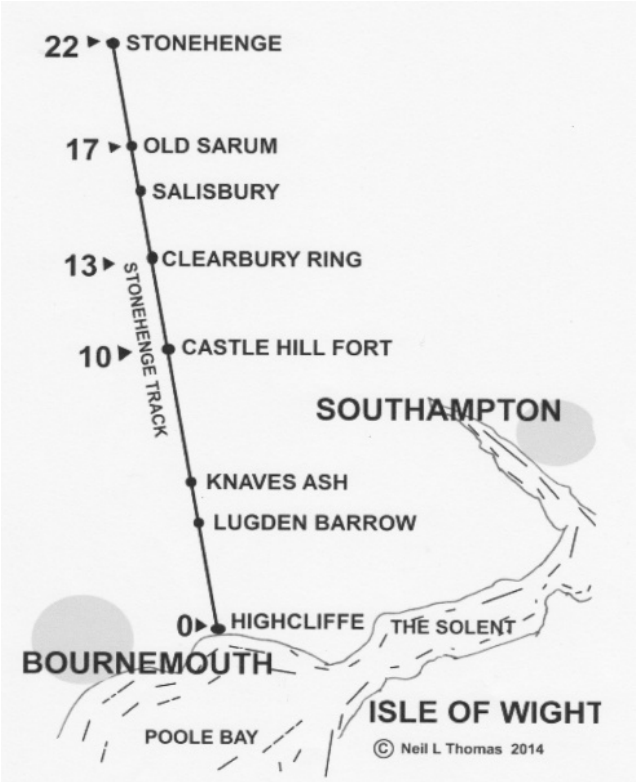
'measures' in this instance distances 'staen' and 'staen league ' enumerated in my linear Brython Measurements table; 'stein' is the related beer mug
measure favoured in European countries. Sport as a seasonal celebration in the form of football and cricket is seen as popular with Stonehenge Stone Street and Stane Street communities onwards from about 2000 BC. Both ball games cricket and football are predicated between teams onwards from 2000 BC; named settlements along the route number eleven.

STONEHENGE TRACK, WILTSHIRE & HAMPSHIRE

England's southern coastline faces the waters of the English Channel; three straight routes generally are aligned in north/south directions; they commence at selected inland locations and terminate at prehistoric harbour sites along the Channel coastline. Names given to the three routes on British Ordnance Survey Department maps are Stonehenge Track, Stane Street and Stone Street; three routes having perceived common characteristics. About 3000 BC, the Salisbury Plains site for Stonehenge was chosen to allow clear visions of moonrise and moonset in far distant horizons. Inland from a cliff-top viewpoint Highcliffe on the Channel coast line the Track progresses north at increments of whole number staen, Castle Hill and Clearbury Ring earthworks are notable prehistoric sites along the entire twenty-two staen length straight line track from Stonehenge to the coast. During the Bronze Age, onwards from 2000 BC Hampshire hinterland forests supplied timber to feed the voracious appetite of innumerable furnaces for charcoal production spaced along Stonehenge track, a contribution to the manufacturing processes concerned with making ten million bronze axes exported to Europe and Scandinavia.

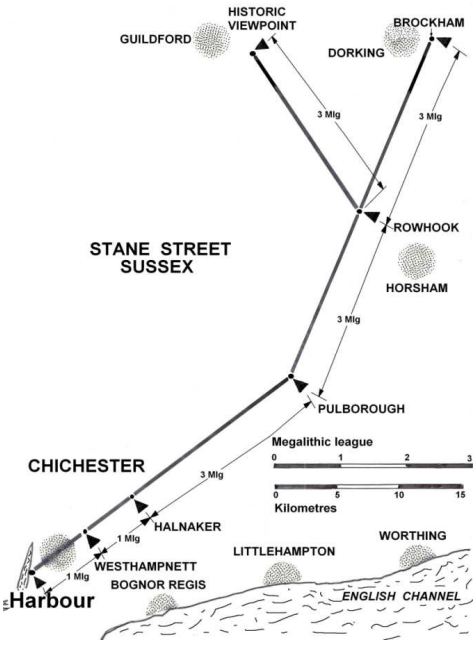
Place name	kilometres	staen
Stonehenge	0.0	**0.0**
Old Sarum	12.5	**5.0**
Clearbury Ring	18.06	**8.0**
Castle Hill Fort	27.30	**12.0**
Knaves Ash	38.45	**17.0**
Highcliffe	49.65	**22.0**

Observe the twenty-two staen length of Stonehenge Track has eleven two-staen intervals between named destinations; additionally recall Stonehenge ancient monument central feature is five trilithons – a group featured within an oval enclosing five trilithons; surrounded by an oval with axes of 13 x 8 faethms and a 33 faethms perimeter.



STANE STREET, SUSSEX

Considered created and surveyed in the Bronze Age about 2000 BC, Stane Street commences near Chichester, Sussex. A harbour is close to the southern terminus of Stane Street. Places along the forked track at incremental distances of 3 *staen leagues* are named staging posts. My illustration of Stane Street track in Sussex was prepared - years ago; the illustration's linear unit 'Megalithic league' Mlg has been renamed 'staen leagues'. Uniformly long three staen leagues sections are featured in the Stane Street routes. Three staen leagues approaches twenty kilometres, considered a day's portage distance carrying a load of charcoal from a forest sites to several furnace destinations in the vicinity of the harbour. Named locations along Stane Street; Rowhook nd Pulborough were presumed sites for over-night lodging premises frequented by charcoal carriers. A third day's porterage southwards from Pulborough to Halnaker brought charcoal fuel close to sites of many ore reduction and metal alloying furnaces near Westhampnett and Bognor Regis close to Chichester harbour. Observe the eleven *staen league [megalithic league]* length of Stane Street has eleven intervals between named settlement destinations.



The Long Man of Wilmington, the Dodman of Wilmington, is situated mid-way between Stone Street in Kent and Stane Street in Sussex. The Ordnance Survey Motoring Atlas scales the distance from The Man to Stone Street as the crow flies as 36 miles, from The Man to Stane Street is 35 miles dependent upon chosen points on Streets to measure distances. It seems clear the choice of this midway site to create an outline figure links it firmly with characteristics of two Streets in Kent and Sussex. Both Streets exhibit significant prehistoric places spaced along their routes, distances readily measured in whole number intervals of *staen* (*megalithic miles*) 2.25 kilometres and *staen leagues* of 5.64 kilometres.

STONE STREET, KENT

Stone Street, Kent is a straight route from Canterbury southwards to Hole Hill, a distance of 22½ kilometres, 4 staen leagues or 10 staen (*megalithic miles*). Canterbury city perimeter oval ring road has a linear perimeter measure close to one staen, (megalithic mile). Observe how the present day hamlet and Stone Street cross roads named 'Sixmile' on today's Ordnance Survey Department maps is a scaled distance of 8½ statute miles or actually just six staen, (megalithic miles) from Canterbury.

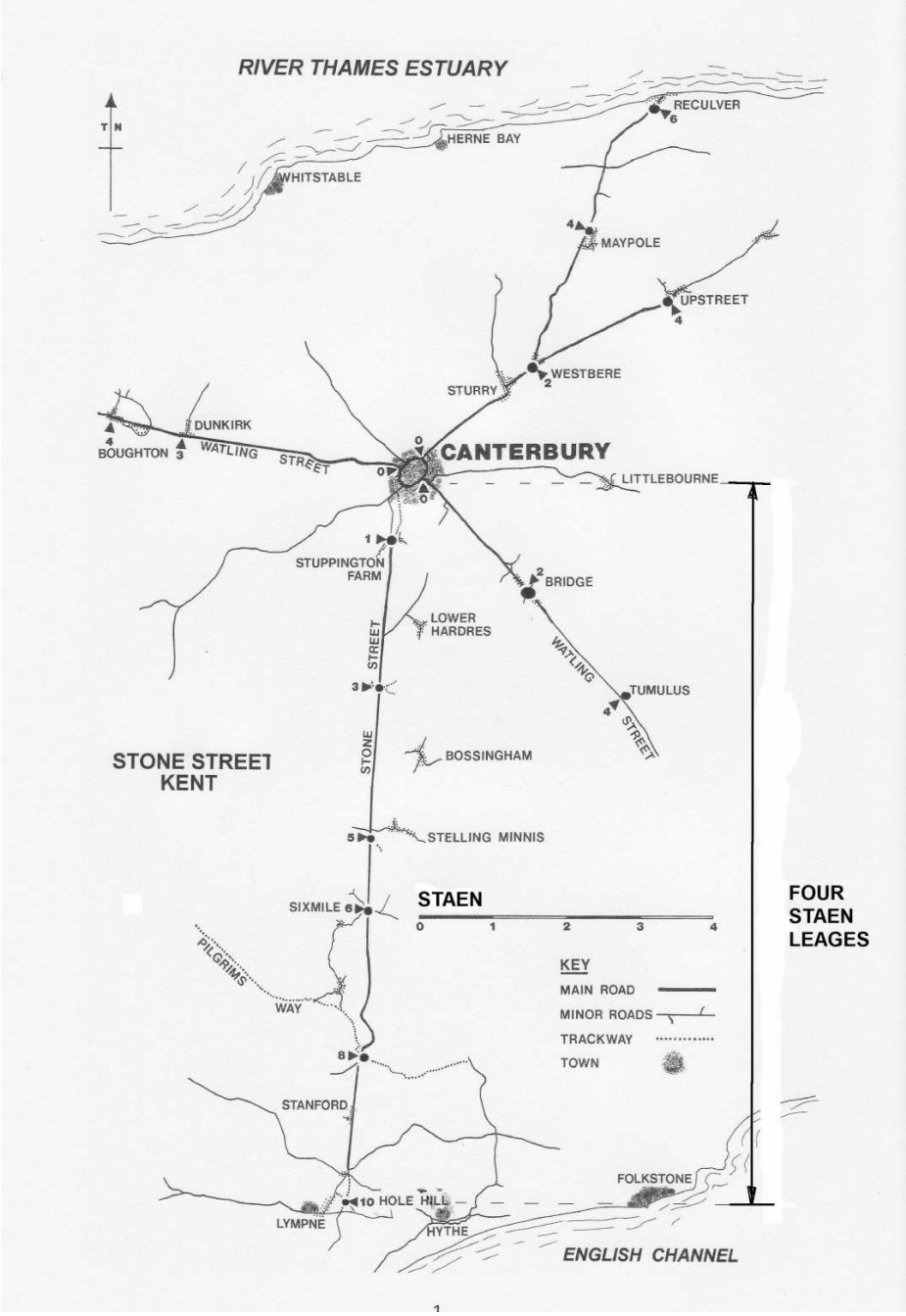
Nineteenth century maps identify many known prehistoric places along Stone Street and Stane Street in Sussex, prehistoric sites formed long before the Roman era. You should find little difficulty envisaging England's south coast long ago; no windmills to generate electricity, no roads or railways, only scrub, grass and extensive forests of trees in Sussex, sheep browsed on grass swathed across the windswept Downs. Here and there could be seen a group of simple dwellings. Smoke spiralled

upwards from people's homes, a tranquil rural scene. One coastal community included a Dodman amongst its people, a man who surveyed Stone Street in Kent and Stane Street in Sussex employing the ancient measurement units; *fut, short yard, faethm, furlang, staen (country mile)* and *league.* The Dodman's task had been to establish sites for traveller's rest houses along inland tracks at distances suited to a day's travel by itinerant merchants offering salt, tools, clothes and ornaments to customers in return for bed and board. Eventually villages grew around the rest house sites during the century's anno Dommini.

Considered surveyed and created in the Bronze Age shortly after 2000 BC, Stone Street in Kent is a straight route from Canterbury southwards to Hole Hill, a distance of 22½ kilometres, 10 staen or 4 staen leagues. Canterbury city perimeter oval ring road has a linear perimeter measure close to one staen. Observe how the present day hamlet and crossroads named 'Sixmile' on today's Ordnance Survey Department maps is a scaled distance of 8½ statute miles is actually just six staen south of Canterbury, hence the name. Nineteenth century maps identify many known prehistoric places along Stone Street in Kent and Stane Street in Sussex, prehistoric sites formed long before the Roman era. You should find little difficulty envisaging England's south coast long ago; no windmills to generate electricity, no roads or railways, only scrub, grass and extensive forests of trees in Sussex, sheep browsing on grass swathed across the windswept Downs. Here and there could be seen a group of simple dwellings. Smoke spiralled upwards from people's homes, a tranquil rural scene.

Stone Street formed a significant role in the industrial activities of the Bronze Age era; hinterland forests in Kent were a source of timber, logging enabling charcoal production on a large scale, the fuel for copper and tin ore reduction furnaces and metal refining and alloying to bronze. Charcoal to fuel the furnaces was transported from inland areas by human pedestrian effort along Stone track to a coastal enclave on the south coast near Dover harbour.

My illustration 'Stone Street, Kent' made in 2007 shows the present day place names and how ancient locations relate to Brython Measurements table distances, each prehistoric site indicated by a black triangular identity marker. Observe the ten staen, four staen leagues length of Stone Street had eleven identified settlement locations. The eleven neighbourhoods are presumed the recruiting sources of eleven members of a Stone Street cricket eleven team. Three straight routes named Stonehenge Track, Stane Street and Stone Street have southern termini on the Channel coast; all three identified with a common 'eleven' factor, all measured in the same staen linear measurement units; seen as beyond coincidence and viewed as conclusive evidence of consistent and enduring proof of a cohesive society that continued building straight routes for many generations in the Neolithic and Bronze Ages.



The old proverb 'All work and no play makes Jack a dull boy' was the citation at the commencement of this essay; 'eleven' is the number of players in cricket and soccer teams. Stonehenge features pairs of upright sarsen columns and lintel cross bars; these are the same characteristics as cricket wickets and soccer/football goal posts. A great deal of hard physical work by the many for years and years was involved in the construction of the famed Stonehenge ancient monument; equally to survey and

form three straight routes through forested areas of prehistoric southern Brython necessitated more hard physical work by successive generations for many years.

With famous Stonehenge features in mind at the beginning of the Bronze Age about 2000 BC it is predicated the inhabitants of ancient Brython conceived the ideas of cricket and football, three teams each of eleven players representing their respective settlements in Hampshire, Sussex and Kent. The stage was set for annual competitions between three teams in the spirit of sportsmanship and goodwill, no more was Jack a dull boy.

Nowadays Lord's Marylebone cricket ground is known as 'The Oval', yet another factor in the ancient game; an echo of 2500 BC when Stonehenge was constructed with a central feature of five trilithons enclosed by and oval whose axes measure 13 x 8 faethms and has a perimeter length of 33 faethms to symbolically indicate the highest of the highest.

Q.E.D. as we used to say in my school long ago. Non- Latin scholars should know Q.E.D. is the acronym for '*quad est demonstrandum', "*quite easily done"*.*

Formed in prehistoric Bronze Age times, the Long Man of Wilmington figure represents the surveyor of ancient tracks in southern Britain whose tools of trade were two staves or 'dods'. Craft family names such as Smith, Taylor and Farmer include Dodman, the maker and user of staves. His tools of trade and his associations with Sussex and Kent lent themselves to enabling cricket and soccer games centuries ago. The Long Man portrayal represents a Dodman and he should be re-named 'The Dodman of Wilmington'. The figure is very close to mid-way between Stane Street and Stone Street and an indication the choice of location was selected by representatives of both communities, the place a tribute on the sloping Sussex hillside to mark respect for their Dodman and a celebration of games played by their heroes and winning teams. The hillside silhouette figure marked the great work done by their Dodman measuring the ten faethm lengths of cricket pitches and the lengths and widths soccer/football grounds oval formations, the ten faethm length of the cricket pitch, originally 23 yards.

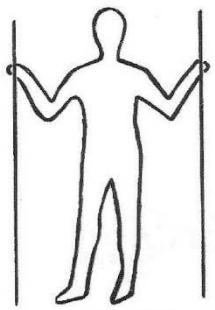
COMMON CRITERIA Cricket, Soccer/Football

Originally the length of the cricket playing ground, the pitch, was *ten faethms*, 20.7 metres, 69 English statute feet, 23 yards; now reduced since 1744 to 22 yards; the length of a Gunter's surveyor's linked chain employed on survey work on Britain's canals and railway work. The popular name for a cricket ground is an "Oval". There are eleven players in both teams, the same number as settlement zones along Stonehenge Track, Stone Street and Stane Street.

A round cricket ball relates to the size and nature of a hand held maul used to whiten and refresh the surface of Stonehenge sarsen columns onwards from Bronze Age times BC and later.

Early cricket game rules assert wickets comprised two upright stumps joined by a horizontal bar, the third stump was a later innovation.

The width of a soccer/football playing ground is 68 metres, 75 yards, the same height as the Long Man of Wilmington from head to heel. The length of the soccer/football playing ground is the width of the ground multiplied by the *Golden Ratio Number* 1.6, thus forming a field of the same length/width



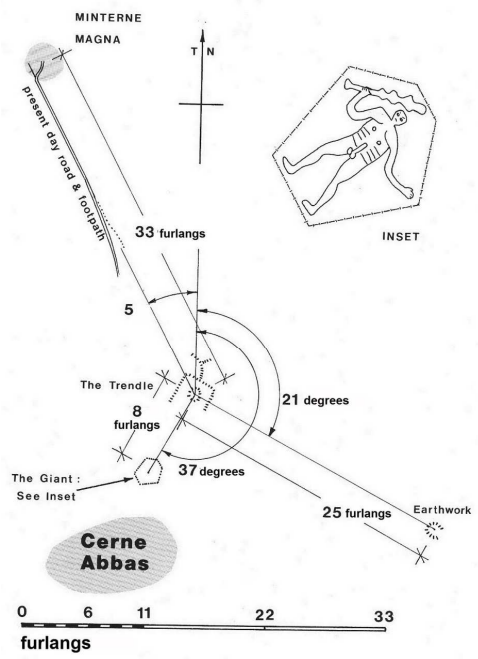
THE LONG MAN

proportions as the oval surrounding Stonehenge five trilithons; 13:8. There are eleven players in both soccer/football teams, the same number as settlement zones along Stone Street and Stane Street. A round soccer/football ball is the size and nature of an inflated pig's bladder, readily available onwards from 2000 BC, today's soccer match ball ≈ 22cm diameter; the goal comprises two upright posts joined by a horizontal bar, reminiscent of Stonehenge and the ring of thirty tall columns.

hapter 12 'Bronze Age' is a period beginning about two millennia BC when bronze axes were made in ancient Brython in very large numbers for export to Europe. Stone Street and Staen Street formed a significant role in the industrial activities of the era; hinterland forests in Sussex and Kent were a source of timber, logging, charcoal production on a large scale, the fuel for copper and tin ore reduction furnaces and metal refining and alloying to bronze. Charcoal to fuel the furnaces was transported from inland areas by human pedestrian effort along three tracks to coastal harbours along the south coast.

BRYTHON MEASUREMENTS table

One 'finger' ≈ 27 millimetres, the Monkton barrow gold disc.
Five 'fingers' ≈ one 'hand', 133 millimetres.
2½ 'hands' ≈ 'fut', 333 millimetres, Stukeley's "Celtic foot" 1/3rd metre
2½ 'fut' ≈ 'ford', 830mm, a step forward, Thom's "megalithic yard".
2½ 'ford' = 'faethm', 2.07 metres, Prof. A. Thom's "megalithic rod".
33 'faethms' = 'furlang', 68.4 metres, Long Man's height, a furrow length.
33 'furlangs' = 'staen', 2.25 kilometres = 1.40 statute miles.
2½ 'staens' = 'staen league', 5.65 kilometres.



CERNE ABBAS and THE GIANT

The creators of the outline figure on the South Downs hillside had to decide on the size of their tribute to the Dodman. Of all the usual measures of a person, his or her height from head to toe is a primary criteria. I concluded The Man's reported head to toe height [68.4 metres] is a classic example of one *furlang,* thirty-three *faethms,* linear measurement units of the ancient system. The length of a cricket pitch – **ten** *faethms,* very close to the Gunter's surveyors chain 66 feet, 22 yards.

The Cerne Abbas Giant, Dorset

Similar in style to the Long Man of Wilmington, the Dodman of Wilmington, the Cerne Abbas Giant c.200 AD is carved into the chalk hillside a short distance north of Cerne Abbas village in Dorset. The distance from head to heel is a little over fifty metres. The right hand holds a club aloft, indicative of aggressive intent, the other arm is outstretched to preserve its balance, and it displays

prominent male anatomical features; . By comparison with the 'Dodman', the design and execution standards are less. The mixture of warlike pose and a disproportionately small head infer the designer had questionable surveying abilities. The foreshortened head and misshapen arms odd appearance may be related to the figure's height of only twenty-five *faethms*. Local tradition connects the figure with a brief revival of the Greek deity Hercules. The Giant's Herculean posture and Roman pottery engravings indicate a common date. Maybe the Giant represents the Celtic deity Helith, interpreted as the equivalent of Hercules, the Greek deity. Ordnance Survey Department map ST 60 SE, scaled 6 inches to 1 mile, shows the Giant and how the figure relates to other important adjacent ancient sites. The Trendle is nearby, a central and significant location, the word 'trendle' or its alternative 'trundle' means to cause to whirl or rotate, a verb descriptive of a Maypole and dancers weaving the ribbons as they circulate around the tall pole. The Trendle is centred within a three sided embankment, open on the south side and facing the Giant's enclosure. The Giant figure is about 25 *faethms* tall, a distance that may be thought of as 2½ cricket pitches. Surrounding the Trendle are three places of interest; to the south-east is an earthwork at a linear distance of 25 *furlongs*. South-east is the Trendle about 8 *furlangs* away. North-west of the Trendle is Minterne Magna village, displaced slightly off to one side of the straight road and footpath, thirty-three *furlangs* distant from the Trendle. The angular directions of the three locations with respect to true north are; north to east plus 5 M^0, that is 16 M^0 + 5 M^0 = 21 M^0, then north to south plus 5 M^0 or 37 M^0 and lastly 5 M^0 west of north. The Cerne Abbas Giant distances and directions of adjacent ancient sites show the application of both whole number angular and linear measures in defined ways during second century AD Dorset.

Other Games

As many readers will recall, in days past the young people of a village danced around the Maypole on May the first, each holding a long ribbon tied to the top of the pole. As the dancers circled the pole the ribbons became shorter and shorter until eventually everyone was close together around the Maypole. As the dancing ended and dusk fell the young people retreated in pairs to secluded places away from the firelight and other festivities. A local Cerne Abbas tradition says a newly wedded wife who slid on her bottom down the Giant's figure would ensure her fertility.

Why These Large Scale Expressions of Ceremony & Recreation?

Hinted at during the course of accounting for the origins of cricket and baseball, Bronze Age sports balanced the hard work concerned with the manufacture of masses of charcoal, firing copper and tin reduction furnaces, alloying the metals and forging ten million axes exported from Brython's south coast across the Channel to Europe in two millennia BC. At the southern terminus of Stone Street in Kent, Hole Hill served as the beacon lookout. Sussex's Christchurch harbour at Stane Street southern terminus served as an equivalent location. Christchurch harbour in Hampshire was similarly served by Highcliffe beacon and lookout at the southern end of Stonehenge track.

CHAPTER THREE :: ENGLAND & WALES

SYNOPSIS

How big, how far; these are questions asked daily by the man on the land and the lords of the land. Searching recent centuries for linear measures used and recorded in historic times, the Domesday Book translated by Darby and his Associates provides verifiable evidence.

The Domesday Book, AD 1086

King William the Conqueror of Normandy famously defeated English Saxon King Harald at the Battle of Hastings in 1066 AD. Years passed, the Normans extended and consolidated their rule over France, England and Wales, building castles and establishing themselves as the new rulers of England and Wales. By 1085 AD King William was the ruler of a major portion of France, England and Wales; his advisers saw the need to establish a sound basis of land valuations and population numbers for taxation purposes. King William decreed a survey of England should be made, the population and land areas, a first such detailed survey and unique in European history. Gathering the data was completed by 1086 and the assembly of information is known as the Domesday Book. This singularly important survey of England and Wales is a very valuable record of the time, the first population and land ownership survey written in Latin, population numbers and classes, names of villages and measures of land holdings were recorded by literate clerics and others able to write.

Analysed by Darby and his associates, the result of their diligent work is contained in a seven volume set published in 1964. Their land holding descriptions quote only two English linear measures 'furlongs' and 'leagues'; minor and major measurement values. The authors state, "We have assumed the Domesday 'league' comprised twelve 'furlongs'." I understand the authors made their twelve times linear measures multiplication factor assumption on the basis of the Roman linear measurement system where a factor of twelve was practised. The correctness of their decision is underlined in the following discussion:-

Three *pes* equations are part of the traditional Roman linear measures table, I have included them to illustrate two matters, firstly the 2½ x 10 = 25 and also the relationship between the *pes, decempeda* and *stade:* 25 x 25 = 625 *pes.* I have been able to determine the likely origins of two 2½ x 10 relationships in the Roman measurement table; they probably derived from a knowledge of ancient British measurement practices. The Roman *league* (1½ Roman *miles*) equalled 2.220 km, only 37 metres shorter than one staen of 2.257 km. It appears likely the Romans chose to adopt the ancient staen as an acceptable linear unit but termed it their Roman mile by a one and a half multiplication factor.

THE ROMAN LINEAR MEASUREMENT TABLE BC/AD

12 *uncia* (inch)	**=**	**One *pes*, (foot), approx 296 mm**
10 *pes* (feet)	=	One *decempeda*, (perch), 2.96 metres
* [25 *pes*	=	A linear measure of 7.40 metres]
12 *decempeda*	**=**	**One *actus*, 35.4 metres**
* [2½ x 10 *pes*	=	A linear measure of 74.0 metres]

* [2½ x 74.0 metres	=	One *stade* (furlong), 185 metres]
625 *pes* (25 x 25)	=	One *stade*, (furrow long), 185 metres
5000 *pes* & 8 *stades*	=	One Roman *mile*, 1.48 kilometres
12 *stades*	**=**	**One Roman *league*, 2.22 kilometres**
1½ Roman *miles*	=	One Roman *league*, 2.22 kilometres

The human need for three broadly similar units is clear; recall the Roman *pes* of 295 mm was shorter than the Celtic foot of 332-335 mm. Twice the Roman *actus*, 70.8 metres, was slightly longer than the furlang (megalithic dod) of 68.4 metres. Their *stade,* 185 metres, was slightly shorter than three times the furlang, 205.2 metres.

NOW RETURN TO THE DOMESDAY BOOK 1086 AD: -

There is a very strong natural conservatism by farmers and landowners who know the worth of their holdings, both in terms of monetary value, productivity and physical area of land. Any change in their personal understanding of the worth of their land would have been strongly resisted. Which poses the question, "Which linear measurement values were used by the native British farmers at the end of the first millennium and before the Domesday Book in 1086 AD?"

To examine two Domesday Book measures; the *fathom* and *league*, concepts of linear units already in general use by the wider community. As I explain in the Chapter 23 'Lines & Angles', the outline figure of the Long Man of Wilmington portrayed on the South Downs near Eastbourne measures 68.4 metres from head to toe. This length I suggest was the recognised standard, the *furlang*. Three times 68.4 equals 204 metres is close enough to English *statute* furlong = 201.3 metres = King Edward's statute measure dated 1305 AD. Comparing the three furrow long lengths, three *dods* of 204 metres, the Roman *stade* of 185m and the BRYTHON MEASUREMENT VALUES *furlang,* all were of similar magnitude.

The Domesday Book translators' adoption of a twelve factor, 12 x 185 metre furlong to Roman *league* 2.22 km was a reasonable one; in the absence of any Domesday Book clue to the linear measurement standards in use in 1085 AD, a future reappraisal should consider the furlong measure was probably almost correct and their league measures slightly overstated the actual values.

KING EDWARD'S STATUTE, 1305 AD

In Romanised England between 45 AD and 410 AD, trade and quantity measures were officially conducted in Roman and Greek measurement units. Following the Saxon invasions during the fifth and sixth centuries, then the Vikings during the eighth century and Normans in the eleventh century, it is well known a multiplicity of measurement systems was employed by agricultural and trades people in England by the thirteenth century. The year 1305 AD saw advisors to King Edward the First of England recommend a new English consolidated system of measurements, both linear and weight measures. The linear measures established by the King's statute became:-

3 barleycorns		One inch, 25.4 mm
12 inches	=	One foot, 305 mm
Three feet	=	One *ulna* (yard), 915 mm
5½ *ulna*	=	One rod, 5.03 metres
40 rods	=	One furlong, 201.17 m
8 furlongs	=	One statute mile, 1.609 km
& 4 rods width x 40 rods length	=	One acre, 4046.9 m^2

One quarter of an acre, 10 rods = 1011.73 m^2

The recommendation by King Edward's advisors that 5½ ulna or 16½ feet should equal one rod seems a curious relationship until one realises that:-

16½ statute feet of 304.79 mm = 5.029 metres, 1 English statute rod

15 Northern feet of 335 mm = 5.025 metres, 2 Megalithic yards

15 Celtic feet of 333 mm = 5.00 metres, approx. 2 *faethms*

In other words, 5½ *ulna* or 16½ statute feet is within a percent of 15 Celtic feet or 'Northern' feet i.e. 2 *faethms*. This relationship 5½ *ulna* or 16½ statute feet appears to be the reason why King Edward's advisors chose the curious 5½ multiplicand relationship between the *ulna* and the *rod.* Evidently the age-old traditional measures were still in use, now disguised under slightly different names. The reason for acceptance of King Edward's new linear measures was continuity, a redeeming feature seen by farmers and landowners alike that ensured the acceptance of the 'new' measures. Nothing had really changed, the Celtic foot of 333 millimetres continued; no fences had to be moved, no hedges replanted, boundaries were still the same.

The Quarter Acre

The emotive term 'his own quarter acre' was an area of land cultivated by Medieval freeholders and peasants alike, an area of cultivated land sufficient for the basic needs of a family in England's climate. Such a vital element of agricultural life had been a strong fundamental tradition for ages past and to a degree is still with us today. In Edwardian statute terms, the quarter acre was one statute rod width and forty rods length, that is an area of 5.03 metres x (40 x 5.03) metres = 1011.7m^2, close to one hectare today.

Returning to megalithic measures, a portion of land two *pace* width and three *furlangs* length is an area of 4.97 m x 3 x 68.4 m = 1021.9 m^2. Landholders who practised in ancient units may not have been concerned about an almost imperceptible difference of 10.2 m^2 or only 1%. Their real estate boundaries were not changed, only the arithmetic measure. This was no cause to reject the new Edwardian measure by the wider farming community in England. The old width, 2 faethms = 4.98 metres, the old length, 3 furlang = 205.2 metres, compared with the new 1 rod = 5.02 metres, the new length 40 rods = 201.17 metres, was evidently close enough for practical purposes. The sacrosanct traditional quarter acre concept continued in peoples' minds. King Edward's advisors who devised the 1305 Statute Measurement system clearly had a pragmatic view of their chances of success. The rule of King Edward the First (b.17/18 June 1239 – d.7 July 1307 AD) was firm and ordered;, also known as **Edward Longshanks** and **Hammer of the Scots** (Latin: *Malleus Scotorum*), Edward was King of England from 1272 to 1307.

BRYTHON MEASUREMENTS table

one 'finger' ≈ 27 millimetres, the diameter of the Monkton Farleigh barrow gold disc.

Five 'fingers' ≈ one 'hand', 133 millimetres.

2½ 'hands' ≈ 'fut', 333 millimetres, Stukeley's "Celtic foot" 1/3rd metre

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CHAPTER FOUR :: CADBURY CASTLE

"Cuthwine and Ceawlin fought the Britons, and killed three kings,
Conmail, Condidan and Farinmail, in the place called Dyrham.
They took three cities: Gloucester, Cirencester and Bath."
The Anglo-Saxon Chronicles for the year 577 AD

SYNOPSIS

The site known as Cadbury Castle is on the crest of the hill overlooking the river Exe valley in Somerset, west of England. In Arthurian times the hilltop location was an excellent vantage point of considerable strategic importance. A 1967-90 archaeological hilltop discovery found charred timber post stumps arranged in a generally rectangular pattern approximately 19 metres by 10 metres. They indicated a timber post building was burnt to the ground, probably as a result of Saxon military action against the British about the time of the Battle of Dyrham in AD 577. The structure was probably a meeting hall, the headquarters of a local Dumnonian chief.

The Saxons

Measurements of the building indicate the sum of wall lengths added to thirty-three faethms, a symbolically significant value indicating the hall was associated with a ruling person presumably a dwelling place and meeting hall of a British chieftain whose territory embraced the valley of the Exe, a hall built in the traditional age-old way. After that date, the west-country native British lost their autonomy and became subservient to Saxon rulers. The Cornish branch of Brythonic Celtic was about to be eclipsed by the gradually developing English language.More than an hundred years had passed since the first Saxons settled in Kent. By the middle of sixth century, the pagan invaders had made progress as far as the west of England. Bath, Salisbury, Stonehenge and Dorchester were within their grasp. The Anglo-Saxon Chronicles record the defeat of the 'Britons' at the Battle of Dyrham [present day Deorham] in 577 AD. The force of invading Saxons led by Cuthwine and Ceawlin killed three British kings named Conmail, Condidan and Farinmail and succeeded in taking the cities of Gloucester, Cirencester and Bath. Present day Deorham village and the site of the Battle of Dyrham is about 100 kilometres north-east of Cadbury Castle. The city of Bath lies between these two places. The presence of a large victorious Saxon force in the Somerset area led me to conclude the sacking and burning of Cadbury Castle building probably took place during the summer of 577 AD.

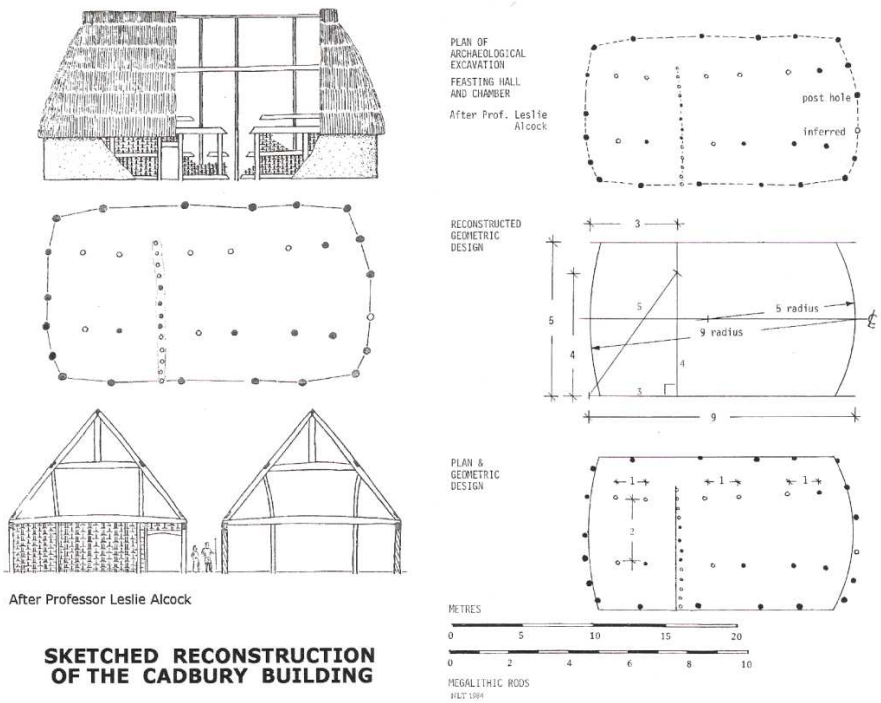
Cadbury Castle, Somerset

Cadbury Castle was on the crest of the hill one kilometre south-west of the village of South Cadbury in Somerset. Archaeological excavations directed by Professor Leslie Alcock in 1967-70 found charred remains of a series of timber post stump holes that were carbon dated to about 600 AD. The archaeological dig brought to light evidence of occupation since Iron Age times, at least a thousand years before the sacking and burning of Cadbury Castle buildings.

The original structure shown by the building layout was of considerable size. Observe the parallel side-walls, curved end walls, an interior partition that divided the building into the proportions of two to one. Professor Alcock surmised the building had wattle and daub walls to a height of about two metres (one *faethm*), a thatched roof with curved gabled ends and interior posts to provide added support or perhaps to facilitate further divisions of the interior spaces. Professor Alcock reasoned the large structure was originally a banqueting hall, perhaps the habitation of a native British ruler, an opinion with which I wholeheartedly agree. The greater portion of the building may have been a feasting chamber with refectory tables and accommodation for perhaps twenty warriors and guests. The smaller partitioned section may have been the regal person's private chamber. Hilltop Cadbury Castle was a vantage point with wide sweeping views across the surrounding countryside. It's symbolic significance is explained in Chapter 23 'Lines and Angles', where scaled staen (megalithic mile) and league distances to Glastonbury Tor and Montacute Hill are explained, also the route of Fosse Way which traverses the low lying area between these three ancient strategic vantage points.

The Geometry

Based upon the Professor's archaeological report findings, I prepared an illustration showing a building plan, a reconstructed geometric design and timber post holes overlaid by the design. The scaled dimensions of the building: 19 metres from end to end and a width of 10 metres have been



After Professor Leslie Alcock

SKETCHED RECONSTRUCTION OF THE CADBURY BUILDING

converted to faethms. The probable geometric design basis of the layout is established, measured in those units. A Pythagorean 3:4:5 right-angled triangle defined the inner partition at right angles to the outside walls and one third of the way along the building. Note how the designer appears to have employed the odd numbers three, five and nine to determine wall linear measures. The radii defining the end walls arcs are rather difficult to establish but my best guesses are 5 faethms and 9 faethms, two dimensions that facilitate the five metre width of the building. The straight side walls are reasonably clearly defined with lengths just short of 9 faethms. Internal posts are carefully spaced apart at 1 and 2 faethms. Of notable importance is the sum of all the lengths, the two long side walls, the two end walls plus the partition wall = 9 + 9 + 5 + 5 + 5 = **33** faethms**.** The adoption of thirty-three faethms symbolic adjectival value of by the structure's designer as an integral part of its design confirms the opinion Cadbury Castle was the local ruler's regal dwelling, *Caer Cad bore,* Cad big house with a sunrise view.

The *Anglo-Saxon Chronicles* recorded marauding Saxons defeated the West Country British at the 'Battle of Dyrham' in 577 AD. Seven years later, in 584 AD the *Anglo Saxon Chronicles* record the same Saxon Ceawlin and another named Cutha fought the Britons at a place named *Fethanleag*. Cealwin took many towns and countless spoils of war. Cutha was killed fighting the British. *Caer Cadbury* may have been the home of Conmail or Condidan, a sad day for the Cymry in 577 AD.

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CHAPTER FIVE :: SCANDINAVIA

SYNOPSIS

Scandinavian population expansion led to the foundation of England, Iceland, Greenland, the Baltic countries and western France; how this was achieved by a 64 point navigation compass touched on.

VIKING SOCIETY

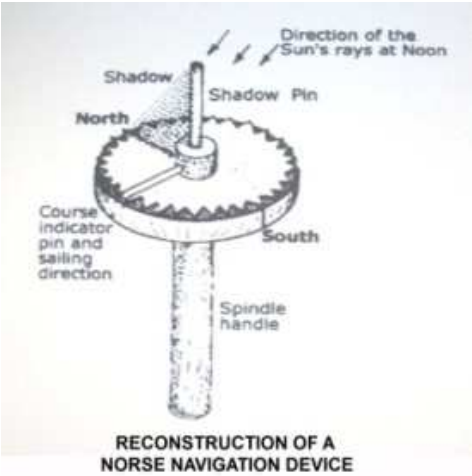
Scandinavian society very late in the first millennium AD featured a population expansion and widespread migration to the east, south and west. To the east, Swedish based people established settlements that became Finland, Estonia and Latvia on the eastern shores of the Baltic Sea. To the south-east, Ukraine flourished and Kiev was founded. To the south, sailors reached France, Paris and the Mediterranean. From the south-west they raided England's North Sea eastern shores, settling and farming the land. To the west, Dublin was founded as a trading port. Westwards from Scandinavia, Scotland's Shetland Isles, then Iceland was settled in 874 AD, Greenland and Newfoundland followed. Several centuries of world-wide warmer climate was a reason for these migrations; better agricultural conditions improved crop yields and living conditions. The extent of the climatic change can be judged on the Author's annotated graphical presentation based on data by Dr R. B. Alley 2004 derived from the temperature record obtained from the Greenland International Scientific Project ice core GISP2. A period of warmer weather (red peak) is identified. Progressive Viking settlements of Iceland, Greenland and Vinland occurred.

An enquiring mind may pose the question, "How did they sail across the North Sea and Atlantic Ocean in their long ships; navigate without magnetic compass and sextant?" In other words, how did they know the direction of north and degrees of bearing to set sail? I shall explain my hypothesis. On the Greenland west coast Viking settlement Brattalid a wooden artefact was discovered last century, a circular disc with a central spindle and notches all around the disc perimeter. I made a replica of the Norse Compass Navigation Device as illustrated; three views and its component functions are explained in captions. Your atlas will show a ship's crew sailing from a south Norwegian coastal fijord port to Iceland would have set a course north-west by west by west, $8^0 + 1^0 + 1^0 = 10^0$ west of north, ten sixty-fourths. Days sailing with a fair wind and a steersman's allowance for left to right cross beam drift caused by the Gulf Stream, Icelandic volcano peaks would have been sighted by a look-out. Coastal navigation was the technique, headland by headland, to arrive safely at Reykjavik settlement on the south-west coast of Iceland. Navigation by use of the sixty-four degrees system was proven and firmly launched. The steerboard sailor directed the Norse long ship's heading; port and steerboard were the nautical vocabulary. Centuries later the Dutch Royal Navy sailed to the East Indies, British Royal Navy ships sailed to India and Australia, France and Germany established colonies in Africa, travelling by sea around the world's oceans. Port Out, Starboard Home; a POSH cabin on the shady side was the language of British and Indian vice-regal staff on home leave to and from England.

Early in Iceland's settlement, Snorri Sturlusson's Icelandic saga tells of a wave cleaver long ship captain Thorulfson how he sought a place for a new village. Circumnavigating Iceland, he cast a log into the sea waters and when it drifted inshore he established a village and nearby built a circular ring of stones with a central stone column where offenders could be tried for any offence they

committed, the feature named for Thor his patron deity. The ring of stones was an echo of a justice circle described in England's Avebury stone circle c.2500 BC in chapter 18 'Avebury's Creation' that had come down from Neolithic Britain through thirty-five centuries to Viking times. Another example; I quote from Wikipedia 6/6/2016, "In 985 AD Eirik the Red left Iceland and settled in Greenland, founding there the first permanent colony Bratalid. He returned to Iceland in 986 AD and gave accounts of a country he called Grænland, hoping that the name would make it an attractive option for settlers. It was from this Greenland colony (Brattalid) that Eirik's son Leifur Heppni ('Leif the Lucky') sailed in the year 1000 to discover North America, which he named Vínland the Good. One of the reliable Icelandic sagas suggests Leif Eriksson heard of Vínland from another Icelander, Bjarni Herjólfsson, who had sighted it some 14 years prior. The northern tip of Newfoundland in Canada is now named L'Anse aux Meadows in the French style; an archaeological site in the province of Newfoundland and Labrador.

I recommend a Google browse for < L'Anse aux Meadows > where you will find a comprehensive account of those Norse endeavours. One note of caution, because our present cooler climatic conditions do not allow 'Mediterranean' crops to flourish at Newfoundland's latitude certain pessimistically inclined archaeological reports dismiss any link with wild grapes thought to have grown in the region named "Vinland". Because Newfoundland climate in 1000 AD was probably 1½ degrees warmer than now, that could have been sufficient to allow a variety of wild grapes to prosper. Perhaps a brand of Viking grappa named 'sköl', a brew made in their New World workshops accompanied evening saga tales. I recall reading archaeological accounts concerning several traditional rectangular Norse buildings found at L'Anse aux Meadows.



RECONSTRUCTION OF A NORSE NAVIGATION DEVICE

VIKING COMPASS

The Viking settlers converted reddish-brown algae deposits found near streams to produce iron. I read an account in past times the local 'Red Indian' native tribes people included the noun 'iron' and a couple of other Norse words in their vocabulary.

Viking voyages of exploration became source material for one of Europe's greatest periods of literature, Snorri Sturlusson's written Icelandic sagas records. The voyage from Portugal to the Americas by Christopher Columbus in 1492 AD was a second phase of European footsteps in the New World.

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CHAPTER SIX :: MYTHS & LEGENDS

SEVENTEEN & THIRTY-THREE

"To know the myths is to learn the secret of things. In other words, one learns not only how things came but also where to find them and how to make them reappear when they disappear."
Mircea Eliade 1907-1986

Bards recounted myths and legends. Allegorical symbolism had meaning.

SYNOPSIS

The adjectival symbolism attached to the numbers seventeen and thirty-three in myth and legend has been in use since the fourth millennium BC. From ancient Ireland to modern Japan, thirty-three was and is in use to mean highest, ultimate, regal, royal and heavenly. Seventeen implied 'half-way there', that is towards the goal. Three passage mounds were constructed in Ireland's Boyne Valley about 3500 BC. Irish legends tell of their sacred nature and a deity who dwelt in the Knowth mound. Adjacent to its eastern passage entrance is a large flat stone inscribed with a serpentine line displaying thirty-three changes of direction. Half way around on the western side of the mound, another similarly inscribed stone has seventeen changes of direction. These displays are considered counts of those numbers and their symbolism. The hundred and ten metre diameter Knowth mound was thus defined as a sacred place.

On the walls of Karnak temple in Egypt, faithful archivist Thanuny recorded the military exploits of Pharaoh Thutmosis the Third who lived during the fifteenth century BC. Among the hieroglyphs were the numbers thirty-three and seventeen. These numbers related to his long reign and many victories in battles fought by the Pharaoh. An Indian folk tale of the eighth century BC concerned Queen Piya and King Rama. King Rama was the thirty-third and pre-eminent royal person, she is said to have had thirty-two children by him. Alexander the Great of Macedonia died in 323 BC, said to have been aged thirty-three. Jesus Christ was said to have been in his thirty-third year when he ascended to Heaven. Thirty-three is firmly embedded in the present day major religion's practices and texts. The myths, legends and folk tales of Ireland, Scotland, Cornwall, Brittany and Wales and Scandinavia include a hero and heroine, characteristically difficult tasks to be performed, giants and ogres, shape-changing by the characters, the adjectival use of certain numbers to define a deity, a chief, and a ruler. The Scottish folk tale 'Green Kirtle' includes shape-changing by the hero, the adjectival use of the number seventeen inferring the happy couple was halfway to their wedding and a family. The Welsh tale *The Dream of Rhonabwy* from the *Mabinogion* is a description of the Battle of *Badon,* (Bath) in AD 495. King Arthur's forces defeated the Saxon invaders, they paid a large tribute and an uneasy peace endured for a generation. *The Dream* narration relates a sequence of four board games played by King Arthur and his *alter ego* Owein. There are thirty-three play positions on the board. The Battle of Catraeth [Catterick, north Yorkshire] between Welsh and English forces in 598 AD was commemorated by the Welsh bard Aneirin [c.570-630 AD]. His poem invokes seventeen to imply the warrior's readiness for the battle, halfway to victory or alternatively half way to the ultimate sacrifice of life.

IRELAND, The Boyne Valley Passage Mounds, Knowth, Newgrange, Dowth

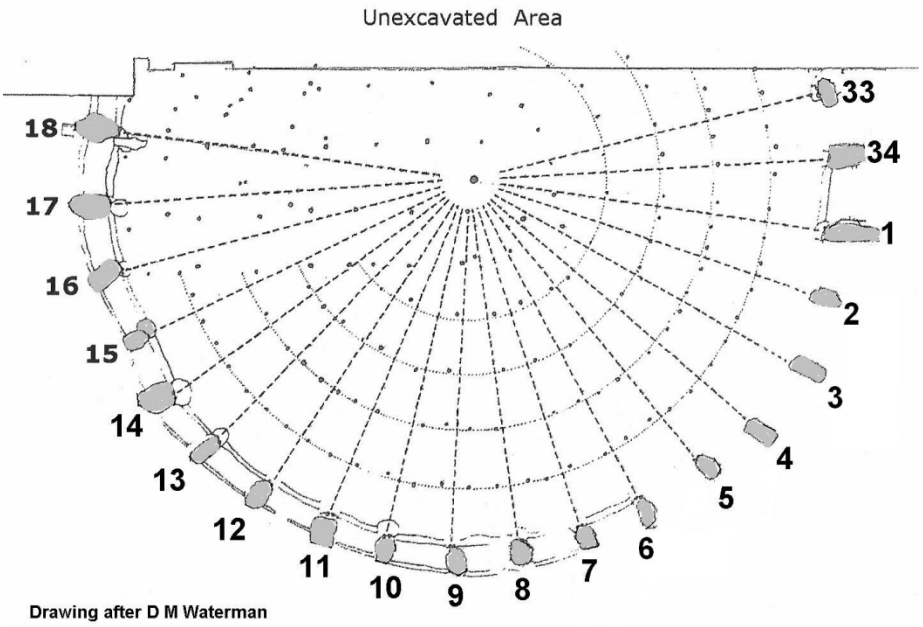
Ireland's fourth millennium BC saw construction begin on the Knowth, Newgrange and Dowth passage mounds. Situated on high ground within a bend of the river Boyne in central Ireland and dated close to 3500 BC, Knowth passage mound is roughly 110 metres diameter with its encircling perimeter earthwork supported by 132 large flat kerbstones set on edge. Next to the eastern passage entrance is kerb stone numbered K14, inscribed with a serpentine line having thirty-three changes of direction. I interpret this petroglyph as a symbolic statement of the mound's sanctity, as the home of a deity. Directly opposite on the west side, kerb stone K81 has a serpentine line with seventeen changes of direction, thought to mean 'halfway' to an objective, in other words half way around the mound. These Knowth petroglyphs are the first indication I found indicating adjectival symbolism attributed to the numbers seventeen and thirty-three.

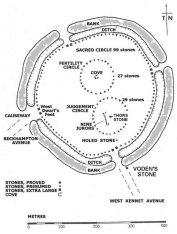
The Navan Mound

Archaeological research papers describe the Navan mound**,** its excavation and the important building revealed below its cover of earth and rubble. Forty metres diameter, the Iron Age timber post building at Emain Mancha in County Armagh is dated about 600 BC. Two-thirds excavated by a team in 1994, the well-defined building plan revealed a carefully executed symmetrical circular design of five rings of timber posts.

The Navan mound is estimated to have comprised 34 posts, seventeen pairs. A perceived feature was a clear view to be had by an observer standing between the outermost ring pairs of posts, looking in towards the centre post. The disposition of posts forming rings two three and four appears to allow a clear view from the perimeter inwards to the centre. The excavation plan showed twenty perimeter posts, those numbered 1 and 18 are diametrically opposite each other. There are seventeen spaces for spectators between posts. Posts 33 and 16, 34 and 17 adhere to the same principle, unexcavated posts 19 to 32 are presumed to pair with posts 2, 16.

NAVAN MOUND PLAN Drawing annotated by the Author 2000





The purpose of the Navan building may have been to commemorate popular beliefs in the settlement of Erin described in the mythical tale *Lebor Gabala Erenn*. The outermost post ring semicircle has seventeen spaces between eighteen posts, the number of plains settled by newcomers to Erin**.** The opposite semicircle should also have seventeen spaces between post pairs. I suggest the building could be interpreted to represent two worlds, the Otherworld and a new land settled by Cessair, Partholon, Nemed and their descendants. Envisage a head priest with sixteen lesser priests standing between post pairs, each individual representing an Otherworld deity who dwelt on the seventeen vacant plains of Erin. Seventeen chiefs representing the settler tribes of Cessair, Partholon and Nemed stood between posts of the other semicircle. At a given signal, seventeen chiefs of the seventeen provinces and seventeen mythical Otherworld beings faced towards the centre post of the building. Seventeen Otherworld beings walked towards the centre post of the Navan building, symbolising their welcome to immigrant tribes of settlers to Erin.

A choir sang hymns accompanied by music, harps strummed and trumpets sounded, the community joined in the singing. The mythical Otherworld beings and tribal chiefs approached the centre post, there to join together in celebration of the settlement of Erin. By meeting and greeting, the ceremony would have marked arrival on the beaches of Erin and settlement of seventeen plains. The High Priest, representing the highest of all the ancient deities would direct the assembly of sixteen lesser priests and seventeen chiefs, a total of thirty-three beings, to celebrate the ultimate achievement and successes of the peoples of Erin.

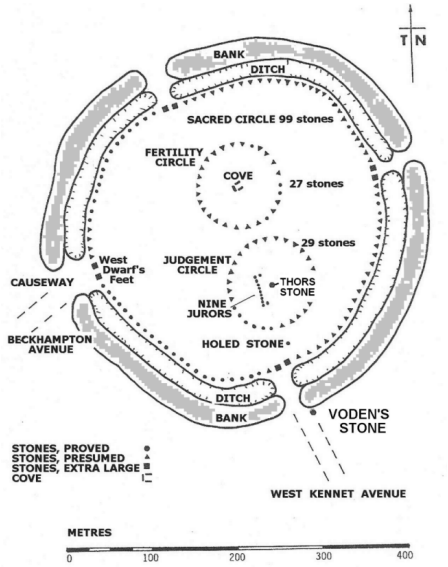
To account for the Navan building in this way, its design and possible function, answers some questions but raises a few more. Nonetheless, the numbers involved and the size of the grand structure infer its sacred nature as a Temple commemorating the settlement of Ireland in the pre-historic past.

Forty metre diameter approaches the typical size of more Neolithic and Iron Age buildings, a linear length that converts to a perimeter of six furlangs, an application of traditional architectural design principles.

ENGLAND, Avebury

A far more ancient myth concerns Avebury, the largest ancient monument in England built about 2500 BC. The outer ring of stones originally comprised ninety-nine large upright stones, three times thirty-three defining the ring as a sacred place protected by Woden, Thor and Freyr. Beyond the ring is a deep ditch, originally up to ten metres deep and four metres wide at the bottom. Further out is an embankment that was six metres high and up to twenty-five metres wide at the base. From the north, east, south and west directions, four causeways cut across the embankment and ditch allowing ready pedestrian access into the flat central area.

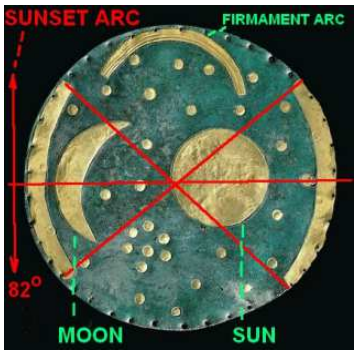
Avebury aerial photograph courtesy Dr G. J. Wainwright



AVEBURY & ITS FUNCTIONS

Avebury's assembly of standing stones has identical features to the Norse myth concerning *Midgard's* [Middle Earth's] creation by three ancient deities, Voden, Vili and Ve. The choice of ninety-nine tall stones surrounding the flat central area is thought to define the sacred place area, a 'temple' on Earth. Viewed as a safe place for mankind to live, it is a sacred temple protected by ninety-nine upright stones, thirty-three representing each deity.

GERMANY, the Nebra sky disc



Far to the east of England's Avebury, a Bronze Age hilltop tomb was subjected to grave robbers' ransack in 1999 near Nebra village in southern Germany. They found a bronze disc, clearly of great anthropological and archaeological value. The bronze sheet, thirty-two centimetres diameter, portrays images of the Sun, Moon and a number of stars with three arcs close to its perimeter edge, all gold foil appliqué items. Based upon other artefacts found later at the site, a date of about 1600 BC has been attributed to the find.

Reported by Dr Harald Meller of Berlin Museum, the artefact was interpreted as the Sun disc left and crescent Moon right, two arcs at the right and left, also the lower arc thought to represent a boat. My work led me to conclude the correct artefact orientation is illustrated right showing the Firmament arc at the top, Moon left and the Sun right, thirty Stars; thirty-three stellar items displayed on the Disc indicative of its immense importance and sacred value attributed to the Nebra Sky Disc on display at the Halle State Museum of Prehistory:-

My interpretation of the Disc symbolism and intent is a representation of mythical stellar deities and an overhead shield created to protect mankind from aggression by wicked Otherworld frost gods, the same tradition as Sturlusson's Norse saga and Avebury's Creation in England. Annotated images by the Author 2005.

EGYPT, The 'New kingdom', King Thutmosis III, c.1500 BC

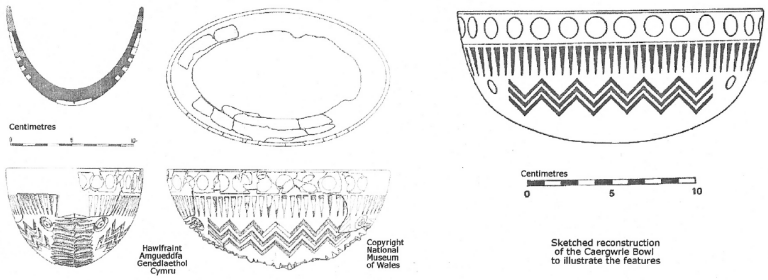
Prosperity peaked in ancient Egypt during the second millennium BC; great temples and monuments were built during the 'New Kingdom' period 1550 to 1070 BC. Monarchs were known by the title 'Pharaoh' who ruled with absolute authority and had a place among the panoply of Egyptian gods.

Thutmosis the First ruled from 1504 to 1492 BC and was succeeded by Thutmosis II, 1492 to 1479 BC, an ineffectual ruler in poor health who died at a young age. That year, Queen Hatshepsut assumed the responsibilities of Pharaoh while her son Thutmosis was a child. First as regent and later in her own right, Queen Hatshepsut ruled Egypt from 1479 to 1457. During her reign, her son followed a military career leading Egyptian forces in a series of battles against foreign foes. The famous "***Aida"*** opera by Giuseppe Verdi is based on Thutmosis' career. Queen Hatshepsut was succeeded by her son Thutmosis titled 'The Third' 1458-1425 BC. He continued his military career as the leader of many foreign expeditions, achieving victories over the Syrians, Hittites and other northern foes. Pharaoh Thutmosis III deeds were recorded in great detail by his archivist Thanuny on the walls of the Karnak temple buildings at Luxor. The hieroglyphs portray the seventeen and thirty-three as number adjectives in a series of inscriptions telling of his life and times. The account asserts Thutmosis III undertook seventeen victorious military campaigns, interpreted as an adjectival description of his great military prowess. The citation of thirty-three years from his ascent to the throne in 1458 BC until the time of his mummification in 1425 BC is taken to mean he had achieved greatness and reached the land of Afterlife, the desired destiny of Egyptian deities. Entombed in the Valley of the Kings, the site of his burial is known by the designation KV 34.

The adjectival application of both numbers seventeen and thirty-three affirms their symbolic use in Egypt during the fifteenth century BC. The hieroglyphic biographical record of the Pharaoh's life and military exploits illustrated the high regard with which Thutmosis was held as Pharaoh and the widespread continuity of symbolism linked with these numbers. Pharaoh Thutmosis III was succeeded by his son Amenhotep II who ruled until 1419 BC. He too was entombed in the Valley of the Kings, the tomb site listed as KV 35.

WALES, THE CAERGWRLE BOWL Discovered in the year 1823 near Wrexham, North Wales, the Caergwrle Bowl is on display at the National Museum of Wales in Cardiff. Found close to Caergwrle CaThe Bowl was almost certainly made of black Kimmeridgian oil shale rock, sourced probably from the Channel coast off Dorset in the west of England. The Bowl's date of manufacture has been estimated close to 1200 BC, the later Bronze Age.

Left; illustrations courtesy the Director, National Museum, Wales
Right; annotated Caergrwle Bowl drawing Author 1987



An oval vessel with an internal depth of 70 millimetres below the rim, an outside width - a short axis 112mm, the length - long axis measures 182mm; dimensions that are the progressive arithmetic series numbers 5:8:13 multiplied by 14mm, the 'finga' basic unit dimension. Two pairs of rondels each end are one 'finga' diameter. Refer to the Monkton gold disc described in chapter 17, 'Stonehenge', page 293. You should be aware Stonehenge ancient monument in England was built about 2500 BC; there are five trilithons located within an oval eight faethms wide and thirteen faethms long. Traditional mathematical design knowledge clearly remained strong in the minds of Ofyd designers for many generations, principles enduring for very many centuries.

A Count of Thirty-three

The rim of the oval Bowl is ornamented with a ring of appliqué gold foil, underneath is an array of wedges. Below the wedges on both sides of the oval Bowl are three rows of zigzags. I have been advised each zig and zag consisted of a slender rolled slug of metallic tin foil, around which a portion of gold foil had been wound. These gold covered tin slugs were let into grooves cut into the black shale rock, sloped alternatively forward and backwards. Counting the rows on one side of the Caergwrle Bowl, each change of direction is interpreted as a unit count. Progressing along the first row for example, the count was \/ = 1, then \/\ = 2, and \/\/ = 3 and so on to \/\/\/\/\/\/ = 11. Parallel with the first row, the next two rows also sum to the same number, hence the total of three rows = 3 x 11, a count of thirty-three on each side of the Bowl, a definition of its regal associations.

Envisage the lustrous gold appliqué on a matt black Bowl. To seal a commercial Bronze Age trade deal by a toast between negotiators, enhanced by the multiple expressions of thirty-three on the Bowl signified the highest standard of truth, contract terms would be remembered and fully complied with in the future. At a signing ceremony, both contractors would have declared their mutual bargain by a drink of wine from each side of the Bowl. Perhaps it contained locally brewed mead or red wine imported from Mediterranean countries, long a favourite of nobility in Brython and later Britannia as evidenced by the early style amphorae found at many archaeological sites.

The various design elements indicate the Bowl would also have held pride of place at royal couple's betrothal or wedding. At the most auspicious moment, it is supposed the *Brenin* and his consort the *Brenhines* toasted good health and prosperity (thirty-three counts), the couple's future, a family (the lip ring of 17 rondels, symbolism for half-way between one and thirty-three). Having regard to other instances where thirty-three was linked with high status events, regal places and persons**,** it is reasonable to conclude the Bowl had strong symbolic associations with two important persons facing each other on opposite sides of the Bowl. The Caergwrle Bowl was, in my opinion, suitable as a toasting vessel used on important occasions such as community and trade ceremonies, business dealings, betrothals, weddings, anniversaries and blessing a newborn child.

INDIA, Royal Personages

An Indian legend from the north of the country concerns the children of King Oksagarit, said to relate to a time about 750 BCE, two centuries before the Buddha was born. The tale may have originated in northern India, nowadays the State of Nepal, a land of forest and mountains situated between present day India and the Himalayan range of mountains: -

"King Oksagarit's first wife had several sons and daughters including Princess Piya. The King's second wife also bore a son the King favoured above the first wife's children and he chose him as his heir and successor. Offended by their father's action, the first wife's children departed the kingdom. Not long afterwards the eldest sister Piya contracted leprosy, so Piya's brothers took the Princess to a cave deep in the forest, to live there free from rejection and abuse by the general population.

[The distressing disease destroys tissue and a victim becomes swollen and disfigured, sometimes even losing portions of the body's extremities. Other body parts become distorted. Healthy people avoid a leper because of the risk of infection from the sufferer.]

"King Rama was ruler of the ancient city of Benares. He also contracted leprosy and abdicated in favour of his son. King Rama sought solitude away from his subjects in the same forest as Princess Piya. His diet included fruit, berries and kalaw tree leaves. Curative properties of the kalaw tree gradually caused his leprosy to disappear and he became well again.

Walking in the forest one day near Princess Piya's cave he heard her scream. A tiger was attempting to attack her but the narrow cave entrance prevented its entry. The King rescued her and he saw the effects the illness on the once beautiful princess. So he fed her on kalaw tree roots, leaves, and fruit. In time she recovered from the illness, the signs of leprosy disappeared and she was cured of the disease. The King and the Princess married and it was said she bore him thirty-two sons. The King was the thirty-third and most elevated royal person."

[Listeners to this tale would know it is impossible for a woman to have thirty-two children in her lifetime. The storyteller's use of the number was not intended as a factual description of the Princess' life but to emphasize her stature as a regal lady, wife and mother. The storyteller was informing the audience there were now thirty-three male royals cared for by the fully recovered Princess Piya. She had reached the pinnacle of a woman's desire to have a truly royal family. The Princess' recovery was attributed to the kalaw tree's curative powers; it provides seeds from which chaulmoogra oil is obtained. Providing the seeds are fresh, their oil enables leprosy patients to be treated. A high success rate has been achieved curing sufferers of the disease.]

MACEDONIA, Alexander the Great

Philip of Macedonia became Regent in his late twenties to his baby nephew. He eventually overthrew his nephew and crowned himself King Philip the Second of Macedonia 359-336 BC. A great military man who founded the Macedonian Empire, Philip was assassinated in 336 BC.

Philip's son Alexander was destined to become the celebrated Macedonian King Alexander the Great. He is quoted as being born in Pella, Macedonia, the year 356 BC. The celebrated Greek philosopher Aristotle tutored the boy Alexander. For reasons that will shortly become clear I query Alexander's supposed date of birth in 356 BC, the year is open to question. A legend linked with the young Alexander concerns a horse. Alexander's father King Philip fancied an untamed horse and wished to own it, but no one could tame the animal. Alexander showed his ability and actually tamed the horse, naming it Busephalis. The horse became Alexander's favourite steed, reputedly said to have lived a long life until it died at an advanced equine age of thirty-three. Records tell his horse actually died in Bactrie during a military campaign in the year 325 BC. Alexander named the place 'Bucephala' after the animal.

Ascending the Macedonian throne in the year 336 BC, Alexander the Great conquered most of the then known world, ranging from Greece to India, from Egypt to the Balkans. In more than a

decade he travelled to the four quarters of the Middle East and as far as India adding conquest to conquest. He earned an enduring reputation and a place in history for his great military achievements. The greatly increased Macedonian Empire created in this way was however destined to be fairly short lived. Whilst on a military expedition, Alexander the Great is said to have attended a great feast late in May 323 BC. He became ill, either from eating suspect food or as a result of a dose of poison. He died on June 10th or 11th of that year due to a fever, a relatively young man said to be aged thirty-three.

References mostly base his date of birth to be thirty-three years before his death, that is 323 + 33 = 356 BC. His death was most probably accurately dated, but in my opinion Alexander the Great's date of birth is open to question. His death at the reputed age of thirty-three was, I consider, a symbolic adjectival device to imply the great man had successfully reached the pinnacle of his life and ascended to the heavenly abode of the Macedonian gods. Use of the symbolic adjective 'thirty-three' to describe the supposed age of Alexander's horse Busephalis, also in reference to Alexander himself I interpret as examples of the widespread use of 'thirty-three' to infer or imply regal, heavenly, having reached the pinnacle of Macedonian society.

CELTIC TRADITION Storytellers

Celtic oral storytellers had an extensive repertoire of myths and legends; there are many references of bards in Wales, Brittany, Cornwall, Ireland and Scotland who could remember dozens of tales learnt over the years and who entertained their audiences with a fresh tale every evening around the croft or cottage fireplace. Their skills and wonderful memories derived from trained minds and an innate native ability. The names of Irish heroes and kings and queens have direct equivalents in many stories from Wales and Scotland. Variations in the tasks to be undertaken, the difficulties to be overcome by the hero until he was able to rescue the princess and her maidens, Otherworld beings, ogres and dwarfs, all these showed the nature of the myth, legend, the storyteller and his trade as he travelled across Celtic lands.

Historians generally assert immigrant 'Celtic' settlers from Europe, salt vendors from the Austrian Alps, crossed the Channel and arrived in the Islands of Britain and Ireland during the first millennium BC. These immigrants came into lands already well settled by 'Brythons', [early Britons] and 'Goidels', two peaceful and industrious ancient peoples who had farmed the Isles for three millennia before the 'Celts' arrived. As is the nature of humanity, the native peoples of the Isles absorbed the newcomers and a mixed society grew out of the blending. Becoming known in recent times collectively as Celts, the Brythonic [Welsh] and Goidelic [Irish/Scots] became known by the newcomers pseudonym.

A frequent theme in most Celtic tales is the use of certain selected numbers to offer the listener an abbreviated adjectival meaning to describe a king, a hero, reward attained, and success of a mission. Of these numbers thirty-three was the paramount value. By associating that number in an adjectival manner to describe a person, a game, a place, the elevated kingly or royal nature of the person was immediately understood and appreciated by the audience without unnecessary superfluous persiflage. Quoting thirty-three in an adjectival way shortened the time to tell the tale but enhanced the atmosphere. In another sense, an audience mental vision of the circumstances was fully established immediately. Telling a tale was made more entertaining without the tedium of endless words and flowery phrases.

In other societies and cultures, a king was described to his audience by the use of laudatory phrases, endless praise, flowery compliments and flattery. Listeners to a protracted telling of those tales heard mellifluous verbiage and were informed how great the regal person so described.

Symbolic Numbers

One can appreciate the Celtic folktale or story and its tangible elements, yet one should also be aware of unspoken customs beneath the surface, particularly with earlier tales. Odd numbers with symbolic meanings were quoted and used to define or augment the qualities of a person or place. The principle qualities of certain numbers were broadly: -

- The pre-eminent odd number was thirty-three. Its use as an adjective implied the person or place was the highest, regal or royal, very highly placed, was sacred or of the Otherworld. It indicated having reached the ultimate, to imply ascent to Heaven.
- Twenty-seven was often the number of adventurers, three groups of nine, who were successful in their mission, they achieved fulfilment.
- The primary number seventeen is midway between one and thirty-three. Its adjectival use indicated the hero or heroine was halfway towards a supreme achievement or half way to Heaven.
- Thirteen was not the unlucky number we think of today. Thirteen's adjectival sense and use is often hard to identify, however the story's style and substance usually indicate a symbolic sense. Instances describe a chief with twelve surrounding supporters, a definition of their legitimacy.
- Eleven described a smaller successful group, an heroic team leader and ten adventurers, the fundamental team, the head and two sets of five [fingers of a hand].
- Nine indicated humanity as a whole, three sets of the basic family group of three, three generations of the family group.
- Seven in olden times was apparently not symbolically significant. Re-telling folk tales nowadays, modern writers collectively quote seven this and seven that. I believe this newer practice had no early symbolism; significance only came to Britain and Ireland with Christianity.
- Five had symbolic value in the sense of the middle and four surrounding areas, the fundamental Celtic territorial land division. The High King ruled the pre-eminent centre. Answerable to the High King four vassal kings ruled surrounding provinces.
- Three defined the basic family unit: man, woman and child.

IRELAND; *LEBOR GABALA ERENN*

Mythical Ireland was supposedly uninhabited when the first settlers arrived on its shores. The legendary poem *Lebor Gabala Erenn* is an account of the settlement of Ireland by five successive waves of tribes. Cessair was the first tribe in the most distant past. Then there was only one plain to settle, the Plain of Elta made by God. The Partholon arrived and cleared four more plains, a sum of five. The Nemed followed and cleared twelve more plains on which the people could settle. At that stage there were seventeen plains or settled areas. The quoted use of the number 'seventeen' was a symbolic indication the settlers were half way to their goal of prosperity and a good place to live. Two more waves of settlers followed; the Fir Bolg and the Tuatha De Danann.

The poem tells of events in the mythical remote and distant past, it embodies the symbolic significance of thirty-three in its structure. If there are any who disagree with the quoted number of nouns in each line of the poem, bear in mind the text has been translated from Gaelic to English and

thus "Ranked the showery wood" could be two or maybe three nouns depending upon the translator. Observe how the first fourteen lines concern only the land and its peoples. The fifteenth line has an entirely different context and only one noun, a final and thirty-third noun 'incantation'. The 'cunning' bard had successfully completed the difficult task of describing the regal worth of the land and its peoples by employing thirty-two nouns. Adding the last line and another single noun he attributed sacred value to the land of Erenn. I quote a translation of the poem in *Lebor Gabala Erenn*, the 'Book of the Taking of Ireland', words that exemplify the continuity of myths and legends throughout the ages: -

"I seek the land of Ireland,	2 nouns per line
Coursed by the fruitful sea,	2
Fruitful the ranked highland,	2
Ranked the showery wood,	2
Showery the river of cataracts,	2
Of cataracts the lake of pools,	3
Of pools the hill of the well,	3
Of a well a people of assemblies,	3
Of assemblies the King of Temair;	2
Temair, hill of the peoples,	2
Peoples of the Sons of Mil,	2
Of Mil of ships of barks;	3
The high ship of Eriu,	2
Eriu lofty, very green.	2
An incantation very cunning ..."	1
	Total 33 nouns

SCOTLAND, A Folk Tale

The first Scottish tale to come to mind exemplifying symbolism and numbers is titled *Green Kirtle*, a story about a Prince, the son of the King of Erenn and a Scots lassie: -

"A bonny Scots lassie named Green Kirtle and the Prince played cards. She lost the first game. Because she had lost the game she enquired what forfeit she had to pay. "Nothing," replied the Prince. Next day they met again and played a second game. This time Green Kirtle won the game so the Prince asked what forfeit he had to pay. "I will lay a spell on you," said Green Kirtle, "You'll not rest until you find me again."

The Prince returned home. His father the King asked the Prince what was wrong with him. "I'm under a spell," he replied. "I have to remove the spell myself." Next day the Prince set off on foot without a servant or a dog. Walking from place to place, after a long time the Prince arrived at a castle where he stayed for what he thought was only a month. The girl who was serving him said, "You have actually been here for two years." But that did not bother the Prince, he said, "I feel so strong I could lift a mountain." [Two years in the ancient Sun calendar is 2 x 16 = 32 months. The next day was the first day of the third year and the 33rd month of his stay at the castle. The Prince had achieved full fitness by that time and was ready for anything, the ultimate test and achievement of his goal.]

"Next day he left the castle in search of Finn Macula, eventually finding him fishing for trout. The Prince asked if he could serve Finn who replied he had no need of a man. Finn asked, "Who are you?" to which the Prince replied he was the King's son. Finn answered by saying he was the one who should give service to the King's son so the pair set off seeking adventure.

A stag raced past at top speed across nine glens and nine hills. The Prince wished to capture the stag so he caught the March wind and eventually caught the stag by its back leg; Old Carillon appeared and demanded the Prince let go the stag but he refused. The Prince and Old Carillon fought and he defeated her but not before she had put a spell on Finn Macula. To release Finn from the spell, the Prince shape-changed into a horse and the pair raced over nine mountains with the first leap and over nine more mountains with the second leap. Finn dismounted in sight of the Green Griffin's castle. He took three stoups of wine and three loaves of bread from the Griffin's castle store and fed them to the horse. The horse sprang over the castle wall at the third attempt so Finn climbed over the wall and was made welcome by the Griffin's wife. [Nine mountains and nine more with three stoups, three loaves, third attempt, the sum is twenty-seven indicating a hero's success, the ultimate was nearly achieved.]

It was three hours before dawn, and Finn was (bedded) with the Griffin's wife, and so the Carlin's spell was broken. Finn and the Prince left the castle at the mouth of the morning. The Griffin saw them leaving and shape-changed into a Griffin-bull. The Prince did likewise and they fought, they shape-changed into asses and fought again. The third time they shape-changed into hawks and this time the Prince-hawk killed the Griffin-hawk. Finn carried the dead hawk to the castle and Green Kirtle opened the door. The Prince was waiting inside the castle in human form. She had prepared a fine meal for them and they feasted. Green Kirtle, the bonny Scots lassie, accompanied the Prince when he returned home to Erin and they were married. The merriment, the feasting and dancing lasted a year and a day without stopping."

[A year and a day is 16 months plus a day, that is into the seventeenth Sun calendar month. The Prince and Green Kirtle were half way to their ultimate achievement of founding a regal family, their future and children.]

SCOTLAND, Loch Fyne

Thirty-three rounded quartz stone pebbles were found by Dr Euan MacKie at a prehistoric archaeo-astronomical site on the western shore of Brainport Bay in mid-Argyllshire, Scotland. This cache of thirty-three pebbles presumably defined Argyllshire as a sacred land.

ENGLAND, Folk Tales

A typical Celtic and Norse story technique saw an evil or beneficent beings' ability to unexpectedly change shape and thus confuse the hero pursuing the other. In the Norse tale *Weland, Smith of the Gods,* three beautiful maidens shape-changed into white swans, to fly forlornly forever, unfulfilled. Old British tales describe how the principal deity Woden walked the land, shape-changed from a deity to human form, disguised in an all-enveloping long hooded cloak, his pseudonym Grim.

Michael J. Alexander, 1977 observed *"Beowulf* is the first large poem in English to have survived transplant from an oral to a literary mode. It is the beginning of English literature. Old English poets (bards) are represented as composing to the harp and therefore the poetry was to be chanted or sung. *Beowulf* was not meant to be read, but to be listened to."

The *Beowulf* tale is clearly an account of Danish and southern Swedish people in the fifth and sixth centuries. By telling the tale in the Old English tongue of eighth century Anglo-Saxons, the poem is traditionally placed about the middle of that century. *Beowulf's* 3182 verses contain no reference to the British Isles or Christianity, making it very clear it is a Scandinavian tale of considerable antiquity. I have found no obvious nor indeed partially concealed use of the various symbolic numbers in editions of Beowulf, from which I concluded either the translators or storytellers had not adopted the adjectival symbolic number technique in other English tales found in the reference.

WALES The Mabinogion 'The Dream of Rhonabwy' 495 AD

An important collection of old Welsh tales takes the form of two books; *Llyfr Gwyn Rhydderch*, the White Book of Rhydderch written down about AD 1300-1325 and preserved in the National Library of Wales, Aberystwyth, Ceredigion. A second is the Red Book of Hergest, *Llyfr Coch Hergest,* dated about 1375-1425 a volume held in the Library of Jesus College Oxford, England. Both are collectively known as the *Mabinogion*, eleven tales stated "the finest flowering of the Celtic genius, a masterpiece of Medieval literature".

Selecting *The Dream of Rhonabwy* as typical of the Mabinogion stories, being an account of King Arthur's success fighting the Battle of Gorwynnion in 495 AD, chapter 7 'Board Games' offers a full account and analysis of the *Dream of Rhonabwy,* the significant matter being the *gŵyddbwyll* board game and the pair of regal players. The board had thirty-three playing positions arranged in a cruciform pattern. Told by Rhonabwy the raconteur, *The Dream of Rhonabwy* tells of his dream in which King Arthur and Owein apparently indulgently play four board games of *gŵyddbwyll* while a battle is raging. At the end of the tale it is revealed the three-day Battle of Badon had been fought between Christian British forces and pagan Saxons. The time was evidently during King Arthur's reign as the High King of Britain, a circumstance which points to Madawg being a regent, answerable to King Arthur during his temporary absence from the seat of government at the British *Urnach* in Powys*,* earlier named the Roman *Uroconium,* Latin spelling *Viroconium,* now present day Wroxeter mid-way along the border between Wales and England.

Summarising numerical instances in the *Dream of Rhonabwy*, three is very common. After the first day's reconnaissance by Selyf, the actual Battle lasted three days. Squire messengers, two sets of three, identified by five animal emblems arrived from five places to address King Arthur and Owein. King Arthur's forces derived from the five provinces of Britain, Rheged in the north, and Dumnonia in the southwest, the Midlands in the east and Wales in the west with Powys at its centre, King Arthur's government seat and jurisdiction.

The Jones and Jones *Mabinogion* translation of *The Dream* from old Welsh to modern English quotes the truce period requested by the Saxon chief Osla to be 'a fortnight and a month'; wrongly interpreted as 14 + 31 = 45 days. In my belief the original Cymraeg text described two weeks of five days plus one month of twenty-three days, a total of thirty-three days, symbolising Osla's regal authority to seek a truce on behalf of the Saxon forces. At the conclusion of the three-day Battle of Baddon (Bath), Owein lowered the banners and King Arthur prepared to consider the terms of surrender with Saxon chief Osla Big-knife. The account by the bard provides a long list of councillors' names consulted by Arthur. Names quoted include nobles and notables from past, present and future generations, wise men from Britannia, Norway, Denmark and Greece.

This listing of advisors to Arthur at a time he needed sage advice and the benefit of past policies has two aspects; the storyteller's wish to assure his listeners King Arthur was a wise man able to receive advice; to affirm support for the negotiated surrender terms, "four-and-twenty asses coming with their burdens of gold and silver" given by Osla Big-knife to King Arthur.

WALES & SCOTLAND The Battle of Catraeth 598 AD (Catterick)

On the west coast of Scotland, Rheged, [approximately the area of Strathclyde today] was the stronghold of an important clan threatened by invaders. In support of their kith and kin, the Cymry came from near and far, distant British lands from the north, west and south, to assemble near Catraeth, [now Catterick]. Three hundred warriors gathered to celebrate their unity before the Battle, their aim to repel the invading Saxons and Angles. The Welsh poets Taliesin [c.AD 555-610] and Aneirin [c.AD 570-630] told of the event at the close of the sixth century. Both were the supreme bards of Welsh culture, tellers of tales in praise of their kings, lords and heroes, both used similar techniques in their poems.

Taliesin journeyed north from Cymru to Rheged to serve as bard to King Urien. His poem recounts how King Urien fought Saxon foes at Catraeth. Taliesin, Taliesin remained back at court, lamenting his absence from the King's side. His poems have a wonderful strident vividness, a skilful use of language, alliteration and rhyme, a telling phrase structure and choice of words.

A younger man, the bard Aneirin witnessed the Battle of Catraeth in AD 598. He recounted how heavily outnumbered Cymry were defeated by overwhelming Saxon and Angles forces. His poem, a eulogy to the fallen warriors opens with the line "This is the Gododdin, Aneirin sang it". The Gododdin poem is a lament in skilful and vivid language to three hundred Cymry warriors killed at the Battle of Catraeth. He names and lauds kings, lords and nobility, their worthiness and heroism. His sorrow at their deaths is palpable. Aneirin praises name many; he recounts their prowess and valour, their generosity of heart. The bard bemoans their loss in the fighting, the death of so many heroic Cymry. Aneirin is said to be the only survivor, one of three hundred. There is a particular need to comment on three mentions in the translation from Old Welsh into English:-

Stanza IX "At dawn men who went to Catraeth shortened their lives in battle: they drank sweet yellow ensnaring *mead a year*, with glad musicians.

Stanza XXXII "Equally feasted (as they rushed on) with *mead for a year*,
to bolster their huge purpose.

Stanza LXXVII "Because he (Gododdin's lord) carried a great obligation,
having feasted on *mead for a year*, so he was killed.

The meaning of Aneirin's poem *Gododdin* is not immediately clear unless one is aware of the importance of the stanza phrase "*mead for a year*". A first reading leads to the impression three hundred Cymry warriors caroused and drank copious quantities of the fermented honey drink for an entire calendar year. Such was clearly the worst preparation for a battle against Saxons. In the context of the Gododdin poem, I believe the assembled Cymry did not spend a dissolute calendar year carousing and drinking mead before the battle began. The word "mead" is used in the stanzas as a shorthand way of implying the warrior host prepared for the impending battle with other Cymry clans, socialising, practicing tactics and raising their morale. The past tense phrase "for a year" actually meant sixteen months (of the ancient Sun calendar) had passed. Next day, after the sixteenth month and into the seventeenth month, was the day of the Battle. Aneirin used the

number seventeen to mean the Cymry warriors were fully prepared for the fight, were battle ready and half-way to their goal of victory over the pagan Saxons or half-way to Heaven for those who were to die at the Battle of Catraeth in AD 598.

SCANDINAVIA The Norse Myths

Amongst the many Norse myths and legends handed down to us is the story 'The Lord of the Gallows' that tells how Odin the Allfather, highest of the Norse panoply of gods, gave an eye to *Mimir* the spring at the foot of *Yggrasill* the World Tree. Suffering from hunger and thirst Odin was pierced by a spear, he gained wisdom and understanding after hanging for nine long days and nights from the windswept tree of life *Yggdrasill*. During that terrible time Odin learnt eighteen powerful songs; their themes "to give help to comfort grief and lessen pain, heal the sick with knowledge, be a valiant warrior, to rescue captives, to intercept danger, to defeat the foe, to extinguish fire, to counter hatred, to quell the storm endangering his ship, to quell magic, to lead fellow warriors, to revive a hanged man, to preserve a child's life, to train his memory, to gain wisdom, to be a good lover, to charm a damsel, to keep a secret." The symbolism of nine nights plus twice nine pieces of wisdom amounts to twenty-seven elements in the tale, elsewhere in this text considered a symbolic sense of success fulfilment and achievement by a hero.

Sun & Moon Calendars

The appearance of the Nebra Sky Disc relates directly to the five day week feature of the Sun and Moon calendars. The Sun disc is Sunday, the Moon crescent is Moonday, three perimeter features equate to Wodensday, Thorsday and Freyrday; the five day week defined. Comparisons may be made with the Rhondda Calendar in Wales, the Nebra sky disc in Germany, Ménec stone rows in France, Tustrup in Denmark and England's Stonehenge.

THIRTY-THREE

Symbolism indicated by the number thirty-three has been in use for six millennia to attribute sacred value to a place or circumstance. Fifty or so typical examples of its use since the first perceived occasion in Ireland 3500 BC are quoted. In myth and legend, folk tales, ancient monument counts, measurements, thirty-three applied in adjectival and adverbial ways inferred or meant the highest possible, regal, royal, ultimate, heavenly, to have reached the Otherworld. Seventeen implied 'half-way there'; that is halfway towards the ultimate achievable goal. The practices continue today.

Symbolism & Numbers

Our world today proceeds at constant rush, we often have time for only a cursory glance or momentary consideration of this or that. Symbolism has now largely taken a back seat but in earlier times it was an important element of day-to-day life. One can know a folktale or story and appreciate its tangible elements, yet one should also be aware of unspoken customs beneath the surface, particularly with early tales originating in prehistoric times. Odd numbers attributed with symbolic meaning were quoted and employed as adjectives. The adjectival symbolism associated with each particular number was used to define or augment important qualities of a person, place or situation. The adjectival symbolism attached to the number thirty-three in myth and legend has been in use since the fourth millennium BC. From ancient Ireland to modern Japan, thirty-three has been used to mean regal, royal, ultimate, and heavenly, to have reached the Otherworld. Seventeen

implied 'half-way there', that is towards the goal. Instances in the symbolic adjectival use of thirty-three as a number are cited: -

[1] Ireland's 110 metre diameter Knowth passage mound was built about 3500 BC. The huge earthen construct was surrounded and supported by 132 kerb stones, 128 are in place, 5 missing stones are indicated by pressure marks. Each quadrant was originally formed with 33 kerb stones. A kerb stone close to the entry portal is inscribed with a petroglyph having a wavy line of 33 bends signifying a count of that number defining the mound's sacred nature.

[2] Denmark's Tustrup *stendysserne* ancient monument c.3100 BC comprised above ground level features and stone rings. Distances between features were surveyed in whole number *faethm* and *furlang* measures. A *faethm* = 2.073 metres, 33 *faethms* = 1 *furlang* of 68.4 metres. The feature arrangements of four sides and two axial distances from component to component sum to 132 *faethms*, 4 x 33.

[3] England's Stonehenge was first established about 3100 BC, the means of forecasting lunar eclipses. The ring of 56 Aubrey Holes is enclosed by an 87 metre diameter circle whose circumference measures 132 *faethms*, 4 x 33, thus defining the enclosed area's sacred nature.

[4] England's three prehistoric straight line tracks head north from Channel coast cliff tops; Stonehenge track is most noteworthy. Surveyed track lengths are related in multiples of eleven *staen* units; 33 *faethms* = 1 *furlang*, 33 *furlangs* = 1 *staen* of 2.25 kilometres.

[5]Stonehenge's five trilithon arches erected about 2500 BC are enclosed by an ellipse having a 33 *faethm* locus perimeter. Stonehenge was thus defined as a sacred place.

[6] France's ancient monument, the rectangular Le Grand Dolmen c.3100 BC, has straight walls whose lengths sum to a total of 33 *faethms,* 68.4 metres.

[7] England's Stanton Drew calendar building c.2900 BC was defined by an encircling ditch, the inner edge of which had a circumference measuring 165 *faethms*, 5 x 33, 342 metres.

[8] England's conical five layered Silbury Hill was commenced about 2750 BC. The side slope is 33^0. Its base circumference was originally 7 x 33 *faethms,* seven *furlangs.* The ground level diameter has slightly increased from 153 to about 160 metres due to its age and slippage of the outer skin.

[9] Egypt's Pharaoh Djoser's five layered stepped pyramid commenced c.2667 BC at the Sakhara necropolis. It has a rectangular base whose perimeter measures 7 x 33 *faethms,* seven *furlangs.*

[10] England's Avebury ring of standing stones c.2500 BC originally totalled 99 standing stones, 3x33.

[11] England's Avebury ring of standing stones is the largest ancient monument in the country. The outer touching ditch edge perimeter measures 17 x 33 *faethms,* seventeen *furlangs,* seventeen times the height of the Long Man of Wilmington.

[12] England's West Kennet Avenue c.2500 BC joining Avebury and the Sanctuary ancient monument is 33 x 33 *faethms* = one *staen,* a "*country mile"* length, 2.25 kilometres.

[13] Beckhampton Avenue from Avebury to the burial mound zone is a length of one *staen,* 2.25 km.

[14] Mount Pleasant calendar building in the west of England, c.2400 BC, had a circumference of 66 *faethms*, 2 x 33, its sacred area defined by the inner edge of the encircling ditch, two *furlangs*.

[15] The Ring of Stones, Stenness, Orkney, was defined by the inner edge of the encircling ditch, a circumference of 66 *faethms.*

[16] England's famous Stonehenge built about 2500 BC includes five trilithon arches enclosed by a geometric oval whose perimeter measure is 33 *faethms,* 68.4m, thus defining a sacred place.

[17] Nearby Woodhenge c.2300 BC had a outer perimeter of timber posts, 66 *faethms,* two *furlangs*.
[18] Another nearby ancient monument Durrington Walls enclosure area is defined by an encircling ditch whose inner edge measures 17 x 33 *faethms,* seventeen *furlangs, .*
[19] Durrington Walls southern building c.2300 BC had a perimeter of 66 *faethms,* two *furlangs*.
[20] The ancient poetic account of newly settled Ireland's wonderful qualities, the *Lebor Gabala Erenn,* includes 33 nouns in the poem stanza.
[21] Ireland's Fourknocks c.1800 BC mound petroglyph inscription illustrates three vertical parallel columns of 11 parallelograms, 33 geometric figures.
[22] A set of thirty-three rounded quartz pebbles were found by Dr Euan MacKie at a prehistoric archaeo-astronomical site at Loch Fyne, Scotland. Their date is uncertain but would be of the third millennium BC.
[23] Germany's one Celtic foot diameter Nebra Sky Disc c.1600 BC features 33 celestial objects, gold foil applications of the Sun, Moon and stars on the bronze disc, a sacred item of wonder.
[24] Egypt's Pharaoh Thutmosis III c.1500 BC was commemorated by an inscription of the numbers 17 and 33 on the Karnak temple walls, the number of battles he won and years he reigned.
[25] The Long Man of Wilmington outline figure on the Sussex hillside, England, measures 68.4 metres from head to toe*,* 33 *faethms,* one *furlang*.
[26] A *staen*, (the Kent traditional *country mile)* = 33 *furlangs* = 33 x 33 = 1089 *faethms*.
[27] Stone Street in Kent, England, is a straight road between Tylers Hill, ancient Canterbury in Kent and Hole Hill, a vantage point to view the Sun's rays at dawn over the waters of the Channel. Thirteen and a half kilometres south of Canterbury, today's maps name 'Sixmile', a minor cross roads on the straight road. The distance is six *staen* south of Canterbury. Eleven named locations are identified on the route.
[28] Originating at Christchurch harbour in Sussex, England, Stane Street proceeds in a generally nor-nor-easterly direction for 70 kilometres. Eleven named locations on the straight Street happen every 6.43km intervals, 2½ *staen leagues.*
[29] Originating on the Channel coastline in Hampshire, England, the Stonehenge Track c.2500 BC, proceeds in a generally nor-nor-westerly direction for 50 kilometres. Named locations on the straight Track occur every 2.25km intervals, from Highcliff to Stonehenge is 22 *staens*, twice eleven*.*
[30] The Nebra Sky Disc features 28 stars, three stellar objects and two celestial items, totalling 33.
[31] Ornamentation on the Welsh Caergrwle Bowl c.1000 BC shows three rows of eleven zigzag apices on opposite sides 2 x 3 x 11 = 66 defining a sacred object of beauty; gold foil applied on a black mineral base, three elevens.
[32] An Indian folktale c.750 BC attributes King Rama with 32 sons. He was the thirty-third and most elevated royal.
[33] An Iron Age 'Heathrow Temple' c.500 BC building once existed on the site of London's airport until removed during airport runway construction works. The rectangular timber building had four walls whose lengths summed to 33 *faethms,* 68.4 metres*.*
[34] Buddhist philosophy began c.500 BC with the concept of a cosmic mountain, Mount Meru, a sacred place inhabited by thirty-two lesser gods with Indra the Supreme Being at its head, the thirty-third deity.
[35] Alexander the Great, king of Macedonia, is said to have died in 336 BC aged 33 years.

[36] Jesus Christ is said to be in his 33rd year when he ascended to Heaven in the year AD 33.

[37] Emperor Arthur of Britain played a Cymru board game '*gŵyddbwyll*' in AD 495. The game board has thirty-three play positions arranged in a unique cruciform pattern.

[38] Ireland's King Eochaid Ailtleathan of Tara, a contemporary of King Arthur, was challenged by Midir to play '*brannumb*', the Gaelic game identical with the Welsh '*gŵyddbwyll*' in all perceived respects.

[39] The prophet Mohammed's disciples and followers offer prayers daily in thirty-three groups.

[40] Cadbury castle hall, a British ruler's building in Somerset, England, was totally burnt by Saxon warriors after a battle AD 577. The rectangular structure had wall lengths that totalled 33 *faethms*.

[41] Thirty-three royal captives were taken prisoner in AD 917 by the Saxon *Aethelflaed* following fighting at *Brecenan Mere,* Brecon, Wales.

[42] Moslems recite prayer phrases thirty-three times on each occasion.

[43] Chinese Emperor Kangxi built a Buddhist temple in AD 1695, to celebrate his 33rd year as ruler.

[44]Today's newly established Japanese Buddhist temple has a street frontage of 33 'ken', a similar linear value to the ancient *faethm*, the number 33 employed as a means of defining its sacred qualities.

[45] Scot's Freemasonry societies incorporate 33 as a significant element in their strong traditions.

[46] U.S.A. Washington's Freemasonry societies incorporate 33 as a special element in their traditions.

[47] U.S.A. Washington's city plan has a design basis of thirty-three; street numbers, street names.

[48] Western communities commemorate those servicemen and servicewomen fallen in wars on Remembrance Day at the eleventh hour of the eleventh day of the eleventh month each year, 11 + 11 + 11 = 33; eleven a.m., the eleventh day, the month of November every year. The custom was established in 1918.

[49] The ring of Australian Standing Stones at Glen Innes, New South Wales, incorporates 33 as a symbolic number and linear measure in its 1992 design.

[50] On a much lighter vein yet somehow linked with the long tradition, you may patronise cafes and restaurants named "Thirty-three", a fortunate choice of name by the proprietor.

[51] Asia's Vietnam has 'Biere 33' on sale, a self-evident name.

You may know of more instances that could be added to this list of fifty quoted examples.

Thirty-three has echoed around the world since it first appeared about 3,500 BC in Ireland; the adjectival use meaning always along similar lines :– royal, sacred, the highest.

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CHAPTER SEVEN :: BOARD GAMES

"If you must play, decide on three things at the start:
the rules of the game, the stakes, and the time to declare the result." Old Proverb.

SYNOPSIS

Board games have been popular in all societies since time immemorial. Delving into the probable nature of board games having great antiquity and particularly those with Celtic characteristics, the Welsh *gŵyddbwyll* and the Irish *brannumb* have been identified and are seen as one and the same game. The philology of the two Celtic names is explained. The Irish *brannumb* board game is described in several Irish folk tales and legends concerning royal personages and regal situations. Item by item, these rich descriptions match equally important accounts of the Welsh *gŵyddbwyll* game. Both Celtic games were played on boards having thirty-three playing positions arranged in a cruciform manner with five overlapping parts, each of nine positions. The historical accounts describe royal players of the games, boards made of silver and golden play pieces to emphasise the regal importance of the game. The cruciform pattern parallels the traditional Celtic land division of five realms. Thirty-three playing positions are perceived as an emphasis of symbolism attached to the number thirty-three, an indication of high circumstances, a regal situation and an ultimate achievement.

THE BOARD GAMES

The great significance of *gŵyddbwyll* can be understood following a study of the Welsh *Mabinogion*, a collection of eleven myths and legends, several of which refer to *gŵyddbwyll* in regal circumstances. A story with particularly relevant symbolism, *The Dream of Rhonabwy,* describes how Emperor Arthur played *gŵyddbwyll* against his *alter ego* Owein. Game play is interrupted by a series of squires who alternatively address Arthur and Owein, seeking their guidance in the fighting a battle; eventually four games are concluded and the battle ceases. The British achieved victory; defeating the Saxons at the Battle of Badon in AD 495. The Welsh *gŵyddbwyll* and Irish *brannumb* are seen as antecedents for a board game pastime mentioned in England in the late fifteenth century royal records; the English name '*fox and geese'* board game.

The History of Wales

To provide background to discussions about these uniquely Celtic board games, the Irish *brannumb* and Welsh *gŵyddbwyll*, I offer a brief history of Wales and Ireland during the first six centuries AD.

Roman rule over the area now known as England and Wales; the Province of Britannia began early the first century AD and continued for more than three hundred years, it had significant influence on the native population and their attitudes to life. Meanwhile in Ireland, native customs and their way of life continued, little altered by an occupying power in their eastern Celtic neighbours' lands. Following the AD 410 departure of Roman Legions from the Empire's Province, a period of uncertainty followed and with it a need for British self-reliance. A series of battles were fought to repel sea-borne invasions by Angles, Saxons, Irish brigands, sallies by Pictish tribes from the north.

It was the time from 480 to 519 AD of celebrated Emperor Arthur, the legendary ruler. Of particular importance was the Battle of Badon near Bath; in 495 AD Emperor Arthur's forces defeated invading Saxons led by Osla Big-knife. References to Irish and Welsh board games are documented until the sixth century. After that there is an almost complete lack of historical material from the late sixth to the eighth centuries. Known as the Dark Ages, this period 535 AD resulted from an Indonesian volcanic eruption, an event that caused a world-wide catastrophe. Enormous volumes of ash and sulphurous products were ejected into the atmosphere. The Sun was obscured for years, crops failed, starvation ensued, millions died. By 542, a resultant bubonic plague pandemic hit Constantinople; After 250,000 corpses had been consigned to the Bosphorus the civil authorities ceased recording deaths. Centuries of trade between the Mediterranean ports and Britain had continued well into post-Roman times, circumstances that led to the arrival of the plague in Britain soon after 545 AD.

Not knowing what was to come in a year or two, Gildas the monk wrote his *Annales Cambriae* in 545 AD, the *Annals of Britain*, a somewhat biased catholic record of Britain's history up to that time, singularly important for its timing. Maelgwyn the Great of Gwynedd, ruler in North Wales is known to have died of the plague in 549 AD, native British population suffered very badly. As a society, the Britons' post-Roman culture largely passed into oblivion. There were no known authoritative attempts to record the history of native Britons after Gildas' *Annales Cambria, the* manuscript probably remained unread for centuries. Two hundred and fifty years later at Bangor monastery in north Wales, the Welsh monk Nennius [*Ninniaw* was his native name] compiled *Historia Brittonum***,** a history of Britain. Written in Latin with added side notes penned in his native Welsh language, the book was first published in 796 AD, he listed thirty-three 'cities' in the realm:-

1. Caer ebrauc – York
2. Caer ceint - Canterbury
3. Caer guroc - Anglesey?
4. Caer guorthegern - Deganwy
5. Caer custeint – Carnarfon
6. C'r guoranegon - Worcester
7. Caer segeint – Silchester
8. Caer guin truis - Norwich
9. Caer merddin – Carmarthen
10. Caer peris - Porchester
11. Caer lion - Caerleon
12. Caer mencipit - Verulam
13. Caer caratauc – Catterick
14. Caer ceri - Cirencester
15. Caer gloui – Gloucester
16. Caer luilid - Carlisle ???
17. Caer grant – Cambridge
18. Caer daun - Doncaster
19. Caer britoc - Bristol
20. Caer meguaid – Meivod

21. Caer mauiguid - Manchester
22. Caer ligion - Chester
23. Caer guent - Caerwent
24. Caer collon - Colchester
25. Caer lundein – London
26. Caer guorcon – Woran
27. Caer lerion – Leicester
28. Caer draithou - Drayton
29. Caer pensalvelcoit - Pevensey, Sussex
30. Caer teim - Teyn Grace, Devonshire
31. Caer urnach - the Roman Viroconium in Shropshire, now Wroxeter
32. Caer celemion - Camelot
33. Caer loit coit – Lincoln

Nennius may have had first-hand knowledge of a number of places but only second or third hand information about others, their names and how they should be spelled. Latin was not a language with a uniform spelling regime. For that reason alone, written Latin names and their translations should be viewed with generosity. Most of the equivalent modern-day listed place names have been related to Nennius' eighth century place names. A small number of names, either eighth century Latin spelling or twenty-first century English may be in question. Each city or town name is prefaced by the Cymraeg *caer* [Welsh] meaning city: It is significant Nennius listed thirty-three place names, indicative of a continuation of ancient tradition and symbolic meaning surrounding the number thirty-three and its highly sacred symbolism. Nennius made two references to Arthur with the title "Emperor" in his writings, a phrase meaning he regarded Britain as a most worthy, a sacred realm ruled by a regal person.

WALES, the Board Game G*ŵyddbwyll*

The native legends of Wales include eleven stories known collectively as the Mabinogion. Several tales include mention of the unique Welsh board game *gŵyddbwyll*, translated as "Axe the Goose" or "Kill the Goose", a board game for two players having thirty-three playing positions, a war strategy game and key feature of those stories.

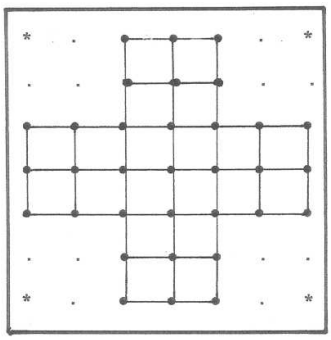
By way of an explanation for readers seeking to understand *gŵyddbwyll*, other writers translating old Welsh into English have used *chess* as the basis for a comparative explanation for the two board games. Unfortunately a ruse of that kind does not convey the symbolic regal importance of *gŵyddbwyll*; indeed it has the opposite effect. A better understanding of the Irish and Welsh board games and their symbolic meaning as part of a story plot can be found if royal players and regal circumstances are appreciated. Presumably because the Welsh *gŵyddbwyll* and Irish *brannumb* were so well known to the entire community in the early centuries AD, comprehensive descriptions of both games, the method of play and number of pieces have yet to be found. It seems clear the wider audience was well aware of both games and did not need to be told the details of the rules, the play pieces names or number of games in a cycle.

Gathering clues from a number of instances where both games are referred to, I have assembled sufficient information to assess their nature. According to Mabinogion folk tales, the board game *gŵyddbwyll* was clearly favoured as a pastime of lords and nobles, board and playing

pieces almost invariably described as being made of precious metals silver and gold. Bright jewels marked four board corner positions that tallied four game sets as they were played. Board games, strategic thinking, mental effort and numbers; four corners, five sets of nine, thirteen pieces, thirty-three places, these are examples of an outlook and way of thinking.

A legal principle of Welsh and Irish Celtic land law is the concept of a central territory and four outlying provinces. Four lesser provincial Lords answerable to the High Lord match the cruciform plan of the board's thirty-three playing positions. The symbolism of thirty-three playing positions arranged in a cruciform pattern on the board links directly with the customary Celtic land division into five parts. Seven rows by seven lines total forty-nine places. Four games in a set were played in both Welsh and Irish descriptions, progress marked in the four outermost corners by jewels.
Outer parking positions at each of the four corners accommodated 'axed geese' taken out of play. Subtracting these four sets of places at each of the four corners leaves a balance of thirty-three playing positions arranged in a cruciform pattern.

RECONSTRUCTION OF A *GŴYDDBWYLL* GAME & BOARD



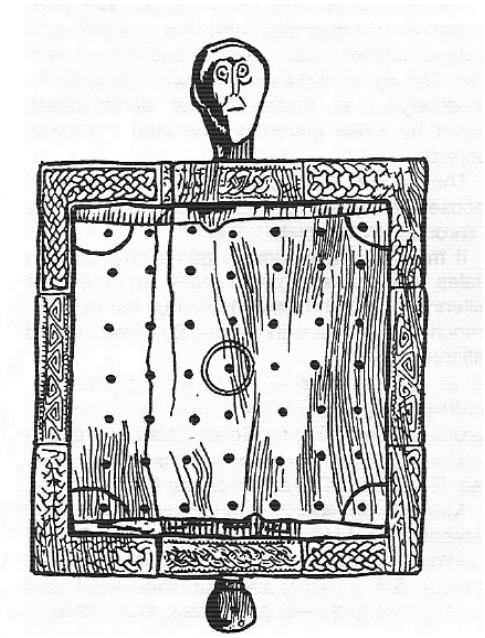
The playing pieces comprised one centre piece, initially placed at the centre of the board and thirteen geese pieces arranged along one side of the board. The centre piece moved one or two places at a time, seeking to 'axe' or 'kill' each goose by jumping over them one by one. As each game progressed and up to twelve 'killed' goose pieces of the original thirteen were taken from play, they were parked at the four by three outer corner positions on the board. The centre play piece won that game because there were insufficient geese to immobilise him. By careful thought, strategic play and manoeuvres by both players, a gaggle of geese endeavoured to crowd the centre piece into a corner; the geese won that game.

IRELAND, History of *Brannumb*

An Irish tale concerns the royal estate at Tara where the "green of Tara had seven views (rows) on every side". In other words the grassed area was set out in rows and columns, seven a side, an outdoor game board of forty-nine positions for the purpose of playing *brannumb.* Another Irish folk story, *The Settling of the Manor of Tara* tells of the early centuries AD and gives a description of a game where there was "a silver board and golden pieces and each corner is lit by a precious stone,

and the bag for the (playing) pieces was made of plaited links of bronze." Lord Eochaid of Tara was challenged by Midir to play four games of *brannumb.* Midir addressed the Irish Lord by his sobriquet "O white of tooth". Elsewhere I explain how British Arthur's baptismal name *Owein Ddantgwyn* is translated as "Owen Whitetooth". Two sobriquet phrases indicate contemporary lives by Arthur and Eochaid in the Celtic lands.

It is clear the Irish *brandub* board and game *brannumb* and Welsh game *gŵyddbwyll* had almost identical features. The regal players, a Welsh *brenin* [king] and the Irish *branan* [king], gold playing pieces, silver boards, thirty-three play positions, indicate a close relationship between the Celtic peoples of Ireland and Britain. The Irish Gaelic board name *brandub* has two parts, *bran* and *dub*. Welsh Cymraeg *Brân* and *du* mean raven and black, signifying the black bird of symbolic notoriety, a harbinger of death; geese are killed and removed from the board.



A wooden gaming board was unearthed in 1932 during archaeological excavations near Ballinderry not far from Dublin, Ireland. The Ballinderry Game Board is dated to c.950 AD, the period of Viking settlement and creation of Dublin as a trading centre. Opposite sides of the Board are inscribed with markings indicating two different board games. On the upper side of the board are seven by seven rows and columns of peg holes. A double circle surrounds the central peg hole. The four outermost corner holes are set apart by quadrant markings. O'Neill Henken wrote the authoritative paper in which he described the Ballinderry Board, its history, purpose and nature. The Ballinderry Board cruciform pattern of thirty-three peg holes is clearly perceived. He offered the well-argued opinion that the Board "is primarily a *fox and geese* game board". English references to *fox and geese* did not appear until five centuries later than the assessed Board date. O'Neill Henken may not have been

aware of the great antiquity of the Irish board game *brannumb* yet the Ballinderry Board embodies the direct and deduced elements of the ancient game.

ENGLAND, *Fox & Geese*

The absence of any specific English references to *fox and geese* before the fifteenth century implies the game arrived from elsewhere and was adopted by the Norman nobility. The game's Celtic associations point to a conclusion the Norman nobility learnt of the pastime during their conquest of the Welsh provinces. It became a board game for nobility in newly conquered England and Wales some time after the AD 1086 Domesday Book.

The Irish and Welsh game central playing piece, presumably named 'High Lord' or 'Lord', [Welsh *brenin* and Irish *branan*], apparently underwent a name change to *fox* as the game crossed the border from Celtic lands to Norman England in the twelfth century. Fox hunting was a favourite sport of Norman royalty in the Middle Ages, an understandable reason for the adoption of a new name 'fox' for the centrepiece. Thirteen *geese* retained their name as a direct translation of the ancient Welsh word *gwydd* to the English 'geese', hence the Norman *'fox and geese'*. A game resulting in a win by the *geese* and the defeat of the *centre piece* may not have pleased the newly anointed Norman King of England. King William and his heirs may not have wanted it to be said a *geese* player 'killed' the centre piece whose Cymraeg name identified with high status and royalty. I postulate elsewhere the centre piece equated with the griffin, the Welsh flag red centrepiece.

The English board game *fox and geese* is not referred to nor mentioned in any English records earlier than John of Salisbury's writings in the twelfth century, the period when the Norman conquest of England and Wales was consolidated. He named *volpes* (foxes) in what may possibly have been a reference to the game. A stone seat in Gloucester cathedral was carved with a *fox and geese* board in the fifteenth century. The first specific reference to *fox and geese* can be found in the household accounts of England's King Edward IV, AD 1461-83. Two sets of *marelles* (game pieces) were purchased; "two foxis and twenty-six hounds of silver gilt", Grunfeld pages 92-97. Relating this record to the royal outdoor summer sport of fox hunting, an indoor board game *fox and hounds* was seemingly popular with the King and nobility on wintry days. Various writers define *fox and hounds, fox and geese* as a 'hunt game' for this reason.

Rules of the Game *Fox & Geese*

The English *fox and geese* board game rules allowed one player to have thirteen geese and the other player a fox. Geese pieces are initially placed on the board along one side, the fox at the centre of the thirty-three places. Geese chase the fox and endeavour to corner him so he cannot move. Each player is able to move a piece in turn one position at a time. The *fox* may jump over and 'kill' each individual *goose* and thus remove it from play, making two or more jumps in succession if possible. As the game progresses, up to twelve dead *geese* are taken out of play, to be parked in the four corner sets of three peg holes. Eventually only one *goose* out of the original thirteen remain to chase the *fox*; a single *goose* cannot prevent a *fox* moving freely about the board. Clearly the *fox* has won that game. Conversely, a gaggle of geese corner fox so that he cannot move, geese are victorious.

SCANDINAVIA, *Hnefatafl*

No account of north-west European board games would be complete without a short description of the Norse battle game *hnefatafl*. Well documented, it was played on square wooden boards, variously divided into 18x18, 13x13, 11x11, 9x9 and 7x7 columns and rows. Each player had a

number of playing pieces. The description of *hnefatafl* cannot be construed to match the descriptions of *gŵyddbwyll, brannumb* and the board itself *brandubh*. It is well to avoid any confusion between those games and the comparatively well-known Norse game *hnefatafl*. Readers will recall Vikings established their Dublin trading centre a century or so before the Ballinderry Board was crafted. It has some design elements reminiscent of Norse themes, particularly the handle. One may conclude the Irish Celtic game *brannumb* was known to the Vikings in Ireland, any extent to which it was played in Scandinavia is unclear although it is likely *brannumb* was the antecedent of *hnefatafl*.

EUROPE, ***Asalto***

Medieval versions of Celtic board games became popular in Europe around the sixth century romantic legends of King Arthur and Queen Guinevere were included in itinerant European storytellers' repertoire during the twelfth and thirteenth centuries. Historical novels by Geoffrey of Monmouth and Chretien de Troyes popularised these themes. The earliest English form of *fox and geese* was played with thirteen geese and one fox; later French versions of the game were played with fifteen and even seventeen geese, affording a bias to ensure the geese won the game. The game became very popular in Germany under the name *asalto*.

NEPAL, *Lion & Goats*

Today's traveller to Kathmandu, the capital of the Kingdom of Nepal on the southern slopes of the Himalayas may have paused before a wonderful range of souvenirs displayed in the gift shops. Amongst the many and varied articles for sale one can see the Nepalese equivalent of a *gŵyddbwyll* game board, thirty-three playing positions arranged in cruciform pattern on a cleverly made brass board. The Nepalese name for their game is translated as *Lion and Goats*, the descriptive name inferring the manner of play and the nature of the pieces engaged in a strategic battle for survival. The *lion* commences in the centre position. Play proceeds as the *lion* is surrounded by a herd of *goats*. The *lion* may 'kill' *goats* in successive moves until eventually he wins the game. The quality of the game board and the playing pieces vary, as does the price. An indication of the considerable reverence with which people regard the board game can be seen by the excellent workmanship of well-made games.

CHESS, The World Board Game

We know the Eastern board game *chess* became very popular in Western countries relatively recently. Chess is a game for two players, each with sets of sixteen play pieces. The square board has sixty-four square playing positions, eight rows by eight lines coloured alternatively dark and light. The thirty-two playing pieces, eight special pieces and eight pawn sets for each player are identical except for colour. To play the game requires a good memory, great skill.

The Irish game *brannumb*, the Welsh game *gŵyddbwyll* and the English game *fox and geese* have passed out of favour in recent centuries; sadly the imported chess has become the game of choice.

I urge a renewal of interest in our native game.

CHAPTER EIGHT :: ROMAN TIMES

"The year in Rome was known by the name of the Consuls then in office."
"The unit of Roman measures was *pes* or foot." Cassell's Latin Dictionary
Roman Legions patrolled Britannia's highways.

The Years BC

A reminder; this book progresses from Now, back through a time machine telescope to the past. Historical references to early communities in Britannia are few and far between, however we have a record by Diodorus of Sicily about 40 BC. I quote the translation:

> "Hecataeus of Thrace [who lived in the fourth century BC] had told of the mythology of the ancients and how opposite the land of the Celts, [i.e. Gaul in Western Europe] there existed an island not smaller than Sicily, and which situated under the constellation of the Bear is inhabited by the Hyperboreans, who are called by that name because their home is beyond the point where the north wind [the Boreas] blows. And the land is both fertile and productive of every crop, and since it has an unusually temperate climate it produces two harvests each year.
>
> Moreover, the following legend is told concerning it, [the land of the Brython] Leto, mother of Apollo and Artemis (Zeus was their father) was born on this island, and for that reason Apollo the Sun god is honoured among them above all other gods; and the inhabitants are looked upon as priests of Apollo after a manner, since daily they praise this god continuously in song and honour him exceedingly. And there is a notable temple that is adorned with many votive offerings and is circular in shape. Furthermore, a city is there which is sacred to this god, and the majority of its inhabitants are players of the cithera [the harp]; and these continually play this instrument and sing hymns of praise to the god, glorifying his deeds. The Hyperboreans also have a language ..... peculiar to them, and are most friendly disposed towards the Greeks, and especially towards the Athenians and the Delians, who have inherited this goodwill from most ancient times. The myth also relates that certain Greeks visited the Hyperboreans and left behind them costly votive offerings bearing inscriptions in Greek letters. And in the same way Abaris, an Hyperborean, came to visit Greece in ancient times and renewed the goodwill and kinship of his people to the Delians. They also say that the Moon, as viewed from the island appears to be a little distance from the earth and to have prominences, like those of the earth, which are visible to the eye. The account is also given that the god visits the island every nineteen years, the period in which the return of the stars to the same place in the heavens is accomplished; and for this reason the nineteen-year period is called by the Greeks 'the year of Meton'. At the time of this appearance of the god, he both plays on the cithera and dances continuously the night through from the vernal [Spring] equinox until the rising of the Pleiades [stellar group], expressing in this manner his delight in his successes. And the kings of this city are called Boreades, since they are descendants of Boreas, and the succession to these positions is always kept in the family."

Remember the greeting "Good morning" = "Bore da" in Cymraeg [Welsh]

My principle reason for quoting Diodorus is the specific reference to communication between an Isle [of Britain] in the far west and Greece in the east. The classical Greek civilisation flourished early in the first millennium BC, several centuries before a Roman civilisation blossomed. Numerous Mediterranean towns and cities founded by Greeks eventually became part of the Roman Empire. The transmission of information concerning forms of calendar may well have arisen long before Hecataeus wrote of ancient times, knowledge passed down from Greek savants to the early Romans.

The Early Roman Calendar

In the west, forms of solar and lunar calendars had been in use four thousand years in Europe, Ireland and Britain. Perhaps Sun and Moon calendar knowledge was conveyed from ancient Britannia to Rome before the eighth century BC. Abaris the Hyperborean made the long journey from Britain to an established Greek civilisation. Perhaps the nascent Roman community learned of the Sun Calendar from this traveller of ancient times. According to O'Neil, a familiar story credits the mythical Romulus with devising a ten months calendar named *Martius, Aprilis, Maius, Iunius, Quintilis, Sextilis, September, October, November* and *December.* I should point out *Martius* was the first month named for Mars, then a fertility deity. After *Iunius* the fourth month, numerical names commenced, *Quintilis* [Quin = 5], *Sextilis* [Sex = 6], *September* [Sept = 7], *October* [Octo = 8] the eighth month, *November* the ninth [Non = 9] and finally *December* [Dec = 10] the tenth month in the series. There were 31 days in the four months *Martius, Maius, Quintilis, October* and 30 days in the other six months, a total of 304 days. "Both [historians] Censorius and Macrobius say the year of Romulus contained only 304 days" says O'Neil. He suspected the full Romulus year included an unnamed couple of winter months with 61 days duration. Later accounts describe the addition of two months inserted before *Martius.* Various adjustments occurred as time passed in the number of days each month. *(Note the numbers 304 and 61)*

Of many Roman deities, Mars is identified as particularly Roman; following a mystical union of the goddess Juno with a fabled flower, Mars was born to Juno. In early times Mars was a fertility god, the deity responsible for good seasons and for the protection of various animals and birds. Spring festivals were a celebration in his honour. Mars eventually became the deity worshipped as the god of war by followers throughout the Roman Empire.

A Mars legend says he took his sleeping wife the Vestal priestess Rhea Silvia by surprise one night. Mars fathered the twins Romulus and Remus who were soon to be placed in a winnowing basket and set afloat on the waters of the flooded river Tiber. The basket and its precious contents eventually came to rest under a fig tree. The twins were rescued and suckled by a she-wolf. A shepherd Faustulus and his wife Acca gave shelter to the infant twins. The well-known bronze statue of the she-wolf suckling Romulus and Remus is displayed in the Capitoline Museum, Rome.

The Romulus and Remus legend asserts Rome was founded in 753 BC. The twins chose a place for the city within seven surrounding hills, close to the waters of the river Tiber. After a small beginning, the city and its population grew and prospered in the next seven centuries, to become capital of the Roman Empire with its own calendar and systems of weights and linear measures.

At this point in a discussion, the important matter to note is the ten month Romulus calendar identified 304 days and hence a deduced 61 days to complete a solar year of 365 days. My chapter **, 'The Age' November 1991,** *From Dr P. J. Bicknell*

"I should like to c 17 description of the Stonehenge Sun calendar includes these same numerical characteristics, a pointer towards a Hyperborean traveller who revealed his 304 + 61 = 365 knowledge to a Romulus calendar sage. During the early centuries, several forms of calendar time measurement were practised in Rome. Details are somewhat sketchy, although evidence suggests a series of major and minor changes to early calendars took place.

Julius Caesar commissioned a new form of Roman calendar in the first century BC, a measure of the year's progress destined to become an integral part of the Roman Empire and its form of government. Known as the Julian calendar, it endured for centuries until the advent of our Gregorian calendar.

Arrival & Departure of the Romans in Britain

Julius Caesar and an expeditionary force landed on the shores of Kent in 55 or 54 BC, to retreat a short time afterwards to the relative safety of Gaul. In the reign of Emperor Claudius, a force of four Roman Legions led by Aulus Plautius accompanied by many auxiliaries crossed the Channel from Gaul to Britain in May 43 AD. Their objective was to conquer the fertile country, to grow cereals and obtain minerals. The Province of Britannia became a stable entity of the Roman Empire by the end of the first century AD, a situation that endured for the next three hundred years. At the command of Emperor Nero, in 57 AD an expedition led by Suetonius Paulinus pursued the last of the Druids to the Isle of Anglesey, Môn, and exterminated them in their sanctuary in 61 AD, an extermination took with it the Druid's remnants skills and knowledge inherited from Stonehenge times and earlier ages.

The Roman Legions were recalled by Emperor Theodosius in 410 AD to aid defence of Rome against marauding Goths. With the departure of an effective military backing to the civil administration, Britain had to defend itself against incursions by Saxons, Angles, Picts and Irish raiders. These were uncertain times during the fifth and sixth centuries AD.

LINEAR MEASURES

Feet and inches, miles and yards, centimetres, metres and kilometres, turn left, turn right, half right, how far? These are matters of day to day life. How tall are you? How far is it to the town? Which direction? We ask these questions every day, but I pose the question, "How did our British forebears two hundred generations past ask and answer these queries?" After all, they mostly had to walk and if they took the wrong track it was a real penalty in sweat and effort to correct the error.

My studies of the State Library of Victoria extensive collection of England's Ordnance Survey Department maps, mostly those issued early in the nineteenth century, scaled six inches to the mile and one inch to the mile, enabled me to compile over sixty instances of ancient straight tracks, each one carefully and accurately assessed. I have concluded they show the Neolithic, Bronze Age and Iron Age inhabitants of ancient Britain used systems of linear measurements and angles to establish the placement of settlements, barrows, stone circles and straight track routes long before the Romans arrived. As I develop my case, first of all I ask you to consider a point from relatively recent times. Antiquarian Dr William Stukeley had a great interest in ancient matters reaching back to the Roman era fifteen hundred years before his time. Stukeley's books quote two examples of his so-called "Celtic foot" [332-335 millimetres] and showed how the measure related to the English statute foot [305 millimetres] ordained by King Edward the First in 1305. References use the term 'Northern foot' as interchangeable with 'Celtic foot'.

Professor Alexander Thom concluded most of the 150 or more ancient stone circles had been designed and built using two linear units of measurement he named *megalithic yard* of 0.829 metres and *megalithic rod* of 2.073 metres, two units with a ratio 1:2½. My further researches into ancient sites, buildings and tracks showed they were based upon an extended linear measurement system from feet to leagues, a combination of two multiplication factors, 2½ and 33.

Roman Linear Measurements

Many straight roads and tracks on maps of England and Wales today are called Roman Roads, notwithstanding they were in existence centuries before Julius Caesar arrived on the shores of Britain in 54 BC. Chapter 23 'Lines & Angles' offers evidence showing ancient straight tracks in southern England identify significant places at intervals of staen (*country miles)* and staen leagues *(country leagues).*

Records describe how the Roman linear measurement system practised during the days of the Empire had a combination of three multiplication factors, 2½, 10 and 12 in their linear table:-

12 *uncia* (inch), 24.7 mm = One *pes*, (foot), close to 296 mm
10 *pes*(feet) 296 mm = One *decempeda*, (perch), 2.96 metres
625 *pes* = One *stade*, (furrow long)
{(2½ x 10) x (2½ x 10) = 625
5000 *pes* & 8 *stades* = One Roman *mile*, 1.480 km
{(2 x 2½) x 10^3 = 5000
12 stades = One Roman *league,* 2.22 km

The 2½ times multiplication relationships factor inherited into the Roman measurement table indicates derivation from ancient British linear measurement practices.

A second matter is the Roman *mile* of 1.48 kilometres and its relationship to the Roman *league*. It seems difficult to explain why the Romans saw any need to have a slightly only longer measure than their *mile*. The principle of a 1½ multiplication factor had been established in Egypt which is perhaps where the Romans learnt of it. To multiply their Roman *mile* by 1½ created the slightly longer unit named their Roman *league,* 2.22 km.

Observe the Roman *league* 2.22 km is 37 metres shorter than my *staen* of 2¼ kilometres. I suggest pragmatic Romans effectively adopted the ancient British *staen* as their own unit measure. Such a step meant the Roman Legion soldiers marching along straight tracks criss-crossing Britain, tracks already measured in staen of 2.257 kilometres, would scarcely have noticed the mile posts were an extra 37 metres further apart than the Roman *league*, a small difference hardly noticed on many days march along England's Watling Street from Dvrovernvm [Canterbury] to Londinivm [*Llyn Dinas* = London] and further on to Vroconium [ancient Cymraeg *Urnach* = Wroxeter] on the Welsh border.

As part of military conquest and their civil administration of the Province of Britannia they probably found the native *staen* (*country mile)* measure related to their shorter Roman *mile* by a 1½ factor. In time, the longer native *staen* measure became officially established as the *Roman league.* A simple move of that kind relating a 'new' longer Roman measure to their Roman *mile* measure was a good political move, part of the Imperial propaganda pressure upon native Britons and north-west

Europeans of Gaul. Written Latin records seem to have mutated the ancient *staen* to become the Roman *league*. A Latin observation describes the "*leaga gallica*"; with reference to Gaul (French) highways. Three centuries of Roman occupation from 43 AD to 410 AD erased memories of Britain and France's ancient measures.

The British Ordnance Survey Department Maps

Beginning in the early part of the nineteenth century AD, Britain's Ordnance Survey Department commenced an accurate geographical survey of the whole of England and Wales, the first country in the world to embark on such a detailed accurate survey record of the land and its features. The work commenced with maps made of south-east England, in later years surveys progressed to counties in the west and north; Wales, Scotland and Ireland.

Straight roads and tracks are named as 'Roman Roads' in England, Wales and southern Scotland. Watling Street is a classic example. Other 'Roman' routes shown by dotted lines have passed into disuse or changed from roads to simple tracks. The citation of the word 'Roman' has the effect of mentally blocking enquiries into past times when the tracks were first surveyed and used. Ordnance Survey maps describe and name great numbers of ancient sites, barrows, mounds and the like, a combination of information an invaluable record facilitating the analysis of past centuries evidence of early Britain's prehistoric works. Future research concerning ancient straight track routes should relate construction dates to identified ancient monuments situated at the beginning and ends of ancient routes, places of genuine antiquity along the way, the perceived reasons for their placement and existence. The most important elements of analyses are linear measurement intervals and angular relationship between ancient places and settlements; factors to aid assessments when prehistoric tracks were really established.

Departure of Romans from Britain and Subsequently

Recalled by Emperor Theodosius II in 410 AD to aid Rome's defence, the Legion's departure bequeathed Roman Empire's Britannia Province many aspects of Roman way of life; agriculture prospered, mining minerals continued, city and country life, retired Legionnaires settled on their own estates in Britannia, there were established overseas trade contacts. These circumstances meant educated sons and daughters, scions of wealthy Romano-Cymry families could read, write and had a sense of pride in their country, knowledge of administration policies and practices, military procedures and techniques.

THE FIRST MILLENNIUM ROMAN EMPIRE AND THE PROVINCES

CHRISTIAN CHURCHES

Roman Emperor Constantine decreed religious freedom in 313 AD, an event leading to the creation of a Roman Catholic Church and adoption of that form of Christianity throughout the Empire. Places of worship featured services conducted in Latin with statues and effigies in Roman style. Roman Britannia during the second and third centuries had long blended prehistoric deities with temples to Mithras with other Roman gods. Aspects of life in Britannia, Gaul and western societies were founded on plentiful forests, rivers and streams; notable Celtic customs focussed on sacred oak trees, tributes offered to lakes and river gods and beneficent nature generally. I speculate a version of a new religion arose termed the Celtic Christian Church, more suited to the nature of western societies. Evidences include itinerant 'saints' who travelled Wales, Ireland, Scotland and Continental

countries preaching Christianity and founding settlements. For example, chapels founded in Wales led to village names prefaced by 'Llan' followed by the saint's name, a strong evangelical movement probably formed. A new form of writing arose about that time; 'Ogham' is characterised by linear and columnar symbols identified with named tree and shrub species and an alphabet, being mostly read from right to left and upwards from the bottom line to the top. Trees grow upwards and spread left and right. A combination of Celtic Christian Church plain church and chapel interiors and Ogham script presumably practiced by Celtic Church saints underscored and emphasized social differences which contrasted markedly with ecclesiastical decorations in Roman Catholic Churches and services in Latin texts read in the conventional way from left to right and down the page.

Towards the end of the fifth century, Emperor Arthur was ruler of the Romano-Britannia Province based in Viroconium, mid-Wales Powys. During his absence from Powys, his regent Madaw, a rebellious brother Iorwoerth; possibly a Celtic Christian Church adherent and natural leader whose regal links gave him the authority to challenge Emperor Arthur's fearsome reputation. Arthur's forces were recent victors of a 495 AD battle fought in Powys. Welsh traditional tales and legends mention the encounter, accounts written in Latin by church priests of the era. No evidence has been identified concerning a basis for the rebellion, yet I surmise religious beliefs lay at the heart of the problem. Most accounts consider Ogham writing practices ceased about the end of the fifth century AD, an aspect of the Celtic Christian Church that was erased by Emperor Arthur's victory over Madaw's forces.

MERLIN

In the Province of Britannia post the Roman era, a Romano-Cymry Ambrosius Aurelianus was one who benefited by these circumstances; born about 410-420 AD of a father linked to the colour purple, he was destined to become Arthur's teacher and mentor. His name Ambrosius Aurelianus lent itself to an abbreviation = aMbrosius aURLIaNus = MURLIN, more usually spelled 'Merlin'.

I speculate Merlin was an adherent of the established Roman Catholic Church, later he tutuored the boy Owein [Arthur]; presumably to follow Roman Catholic Church practices.

THE CYNEDDA FAMILY LINEAGE

King Vortigern (his given name Gwrtheyrn) ruled Britannia from about 420 to about 446 AD. Owein was born about 460 AD, a third generation Cynedda family member. Ambrosius Aurelianus [Merlin] was appointed by Gwrtheyrn's son, also titled Vortigern, as tutor to the young Owein. A mature feature of the young man was his noticeable white teeth, *ddant-gwyn.*

Aged about twenty-eight, Owein wedded *Gwen-hwyfar:-*

OWEIN DDANT – GWYN and *GWEN – HWYFAR* (Gwen–ifer = Jenifer)

b.460? - d.519 b.460? - d.530-40?

Compare the couple's names *Owein Ddant-gwyn* 'Owein White-teeth' and *Gwen-hwyfar,* 'White-Salmon'. Both royals had a 'white' context, pointing towards a likely rise of popular catch-phrases "*Owein ddant-gwyn* and *Gwen-hwyfar".*

According to the Welsh legend "Arthur Becomes King", the Archbishop of London anointed *Owein Ddant-gwyn* as monarch about 488 AD. Owein's reign was notable for victory in twelve battles against incursions by predatory Picts, Saxons and Angles, Irish and Scandinavians. Owein defeated Britannia's foreign foes at Grantham 480 AD, four at King's Lynn, Ipswich, Charford, Bath,

Caerleon, Shrewsbury, Bassenthwaite, Edinburgh, Stirling and a last battle against a rebellious nephew Mordred at Forden, Powys in 519 AD when both Arthur and Mordred died of their wounds. His military successes earned him the sobriquet 'Bear', '*Arthur',* a native animal whose white teeth and fierce appearance earned respect, a name rendered jointly in Cymraeg and Latin.

King Arthur's widow, Gwen and their son Cynglas ruled Britannia from 519 AD until about 549 AD, more than a quarter of a century of relative peace and security. The arrival of the bubonic plague in Britannia about the middle of the fourth decade decimated the population. With time, two popular royals whose names mutated from '*Cyn'* to 'King' is a short step, from '*Gwen'* to 'Queen' equally so. Fifth century Cymraeg *Cyn* and *Gwen* names loaned into Saxon, to Norman and eventually modern English, becoming our regal titles 'King' and 'Queen'. The titles 'King' and 'Queen' are accepted today world-wide to infer highly ranked persons and values.

Cyn ≈ King and Gwen ≈ Queen

CHAPTER NINE :: COLIGNY CALENDAR

"Time has no divisions to mark its passage, there is never a thunderstorm nor blare of trumpets to announce the beginning of a new month or year. Even when a new century begins, it is only we mortals who ring bells and fire off pistols." Thomas Mann, 1875-1955

Moon calendar – twelve months a year - six week months - five day weeks.

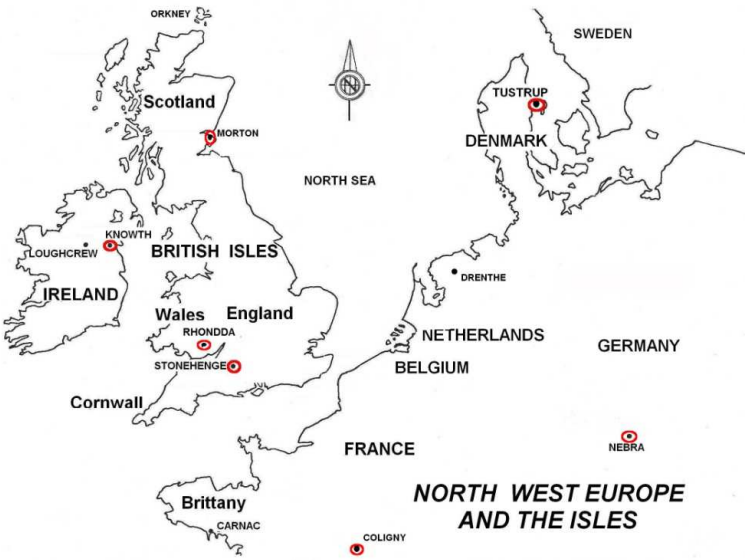
SYNOPSIS

Two thousand years ago, a bronze sheet about 1½ metres by 1 metre and 5 millimetres thickness was broken into small pieces, placed in an earthenware jar and buried at a site near Coligny, Ain Province, France to prevent it falling into Roman hands. It was re-discovered when unearthed in 1897 AD. The bronze pieces have now been re-assembled in the manner of a jigsaw puzzle, mounted on a board they reveal a yearly twelve-month lunar calendar, its cycles repeated five times. Named the Coligny Plaque, it is inscribed with words in capital letter Latin characters, not Roman names but purely Celtic core words with added terminations. Considered a most important ancient artefact, it portrays a comprehensive Moon calendar, twelve months a year, five day weeks, six weeks a thirty-day month. Every other month lost one day of the fourth week to maintain a fifty-nine day bi-monthly lunar cycle.

The twelve Moon month names are *Samonios, Dumannios, Rivros, Anagantios, Ogronios, Cvtios, Giamonios, Simivisonnios, Eqvos, Elembivios, Edrinios* and *Cantlos*.

BRONZE AGE ARTEFACTS

The Coligny Plaque is a record of the native Gallic Celtic language at that time; half the month names are early Welsh Brythoneg and half early Irish Gaelic, demonstrating Celtic Gallic links between the Brythonic and Gaelic languages. I translated the names as the first month SUMMER, SECOND month, THIRD month, HOARD month, OGRE month, SHELTER month, WINTER month, BUDSWELL month,



LAMBING month, SPRING month, BETWEEN month and lastly FULL CIRCLE month.

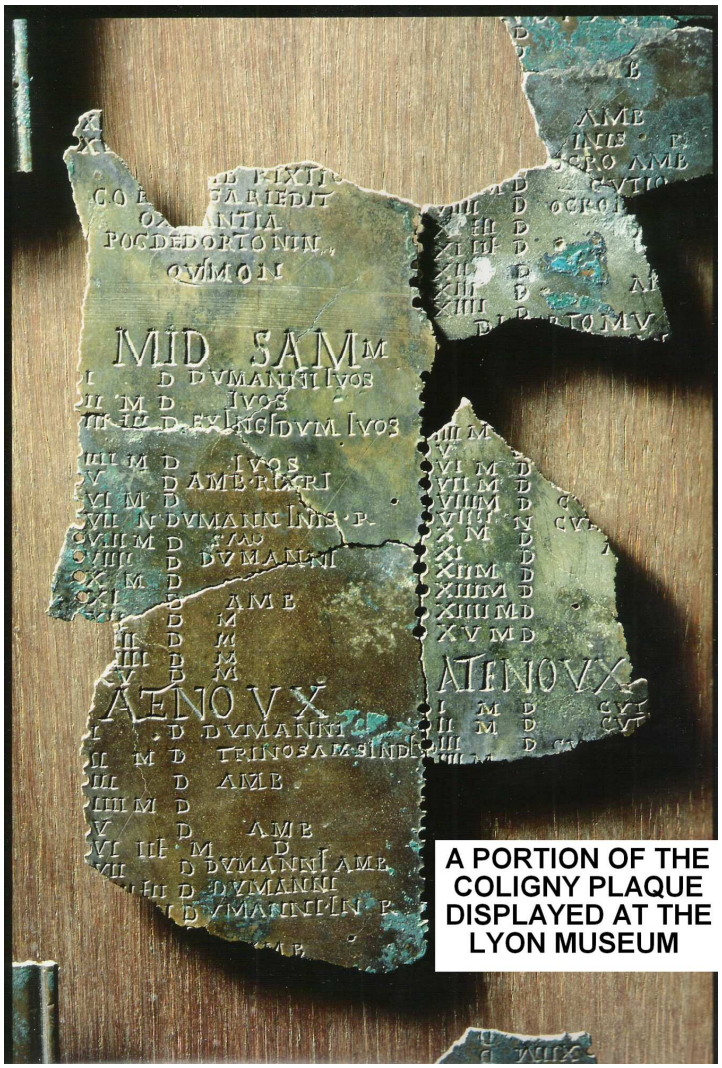
Archaeologists suggest the Coligny Plaque was manufactured between 200 BC and AD 50. Having regard to the known and deduced features, I consider its actual date of manufacture could be considerably earlier. Its suggested manufacture date is not really important, what far exceeds other considerations is the message offered by the Bronze Age Plaque. A skilfully made bronze article could properly belong to the Bronze Age well before 100 BC. The Coligny Plaque has identical Moon calendar features to the Irish Loughcrew and Knowth petroglyphs c.3500 BC, also to Stonehenge about 2500 BC. It demonstrates a fully comprehensive lunar calendar endured for four millennia before Julius Caesar decreed observance of the seven day week Julian calendar throughout the Roman Empire only two thousand years ago. My translation of the Moon calendar months' twelve Gallic names was facilitated by concordance between both five day week Moon calendar and Sun calendar seasons and events.

Two thousand years ago, the Roman Empire was well established throughout the Mediterranean and western Europe. The Roman province we now know as France, Belgium and part of the Netherlands was named Gaul in the days of the Empire. Its native peoples reportedly spoke a branch of the Celtic language; Gaulish-Gallic, now said to be extinct. As with other Celtic language branches, spoken Gallic language had very little recorded written vocabulary until the advent of the Romans and a written Latin alphabet. The scant records of Celtic words - inscriptions on coins, the occasional tombstone – these tell us little of their day-to-day lives, until now – the Coligny artefact.

The Gallic names inscribed on the Coligny Plaque are particularly significant; words written using the Latin alphabet and numerals but not language.

Twelve Celto-Gallic Coligny Moon month names may seem strange to us today but they would have been very familiar to Moon calendar's adherents two thousand years ago; Celtic communities were dependent upon an agricultural life, the Coligny Plaque month names reflect their lives.

Discovered in November 1897 by Monsieur Roux in a field north of Coligny village, Ain Province, France, the Plaque was first dated about 200 BC. More recent thinking by Duval et



A PORTION OF THE COLIGNY PLAQUE DISPLAYED AT THE LYON MUSEUM

Pinault estimates a later date of around 40 AD. These supposed dates of manufacture are actually of small importance, for as you will see chapter 17, the form of the Coligny lunar calendar matches the Stonehenge Moon calendar that had already been in use for millennia. The new Roman Julian solar calendar adopted throughout the Empire at the command of Julius Caesar in 45 BC had seven day weeks. It is reasoned a community of strong Moon calendar adherents in the Gallic province would not have been to the liking of Gaul's Roman Governor in the early first century BC rule over Gaul. A lunar calendar of north-west European origin is historically important. In an endeavour to preserve the Moon calendar faith, it is supposed the Plaque's custodians broke it into pieces and buried it in a jar about 100 BC where it remained concealed until it saw daylight again in 1897 AD. The pieces buried in an earthenware jar, a bronze artefact concealed from Roman eyes and confiscation for the value of the bronze.

A Coligny Plaque illustration was provided by and reproduced with permission of *M. le Directeur*, the *Musee de la Civilisation Gallo-Romaine*, Lyon, France. Only about a third of the 147 pieces are mounted upon a timber board background to accentuate a random nature of the breakages. Broken into pieces during the breakage, the vertical columns of day peg holes served much the same purpose as perforation lines on a torn sheet of paper.

A lunar calendar of European origin is historically important. Chapter twenty-six 'Symbols & Numbers' explains how much earlier Moon calendar inscriptions exhibited on Knowth stone K53 3500 BC and Loughcrew cairn F stone C1 offer the same message; twelve months of six five day weeks a year.

The Bronze Plaque Construction

Inscribed on a 1½ by 1 metre sheet about five millimetres thickness, the bronze smith's design set out required a rectangular sheet whose dimensions required a minimum number of 60 divisions; it is clear the smith drew a succession of vertical and horizontal lines, progressively subdividing the rectangular plaque to create sixty-four portions. Details required a day-by-day count, sets of five days each week, six weeks each month, twelve months a year, all repeated five times. In addition to the 60 named months, two more places were needed for intercalary months.

Antaran	Ecu 33	Samon 37	Ogron 41	Ecu 45	Samon 49	Ogron 53	Ecu 57th
Month	Elemb 34	Duman 38	Cut 42	Elemb 46	Duman 50	Cut 54	Elemb 58th
Giamon 31stmonth	Edrin 35	Riur 39	Giamon 43	Edrin 47	Riur 51	Giamon 55	Edri n 59th
Simiui'n 32ndmonth	Cantl 36	Anagan 40	Simiui'n 44	Cantl 48	Anagan 52	Simiui'n 56	Cantl 60thmonth

Ambaxtos	Riur 3rdmonth	Giamon 7	Edrin 11	Riur 15	Giamon 19	Edrin 23	Riur 27
month	Anagan 4th month	Simiui'n 8	Cantl 12	Anagan 16	Simiui'n 20	Cantl 24	Anagan 28
Samon 1st month	Ogron 5th month	Ecu 9	Samon 13	Ogron 17	Ecu 21	Samon 25	Ogron 29
Duman 2nd month	Cut 6th month	Elemb 10	Duman 14	Cut 18	Elemb 22	Duman 26	Cut 30

Instead of an extremely long casting about 3 metres by ½ metre, a balanced design was obtained by dividing the Plaque into a top half and lower half, two and a half years to each half cycle, resulting in a Plaque of elegant proportions about 1½ metres by 1 metre.

The Plaque is a tribute to the metal smith who created it. Casting in a foundry and forging a thin bronze sheet required the exercise of considerable technical skill to accomplish a reasonably uniform cast metal sheet. Forged, hammered and quenched many times to attain the required thickness, a satisfactory result was finally eventually achieved. Few blemishes can be detected in the 147 *recovered pieces.*

The cycle of Coligny lunar calendar months is illustrated. The wording on the Plaque places it amongst the most important record of very early Celto-Gallic vocabulary in written form and consequently is of great interest to philologists; earlier authors achieved rather limited success in month name translations. My research into the British and Irish Sun and Moon calendars found seasonal events exactly coincided in both calendars. These seasonal matches have been the cornerstone deciphering the twelve Coligny Calendar Gallic names of the lunar months and their literal meanings, I offer this interpretation of the names and their meanings.

Beginning the Plaque design layout plan by successive halving into 64 sections, an initial adjustment was made by inserting an intercalary Ambaxtos month of two sections, twenty-seven or twenty-eight days, six weeks all but two or three days. Below Ambaxtos month on the upper left portion of the Plaque, columns of months are numbered from *Samon* [Summer] month 1, *Duman* month 2, *Riuros* month 3. The sequential pattern continued for thirty months, 2½ years, to Cut month 30. On the lower portion of the Plaque, another intercalary month – a 27 or 28 days Antaran month - was inserted at that point to maintain synchronisation with the Sun calendar. The thirty-month 2½ year cycle continued. The second 2½ year period is shown beginning with *Giamon* [Winter], the months named and numbered 31 to 60. The five year Plaque presentation of the months *Samon, Duman, Riuros, Anagan, Ogron, Cutios, Giamon, Simiuison, Equos, Elembiu, Edrin* and *Cantlos* illustrate the vertical and horizontal arrangement of sixty lunar months of 1772 days, twelve months in each of a five year Moon calendar cycle. By adding 54 days of two intercalary months, the Moon calendar synchronised with five Sun calendar years of 1826 days.

The Coligny Month Names

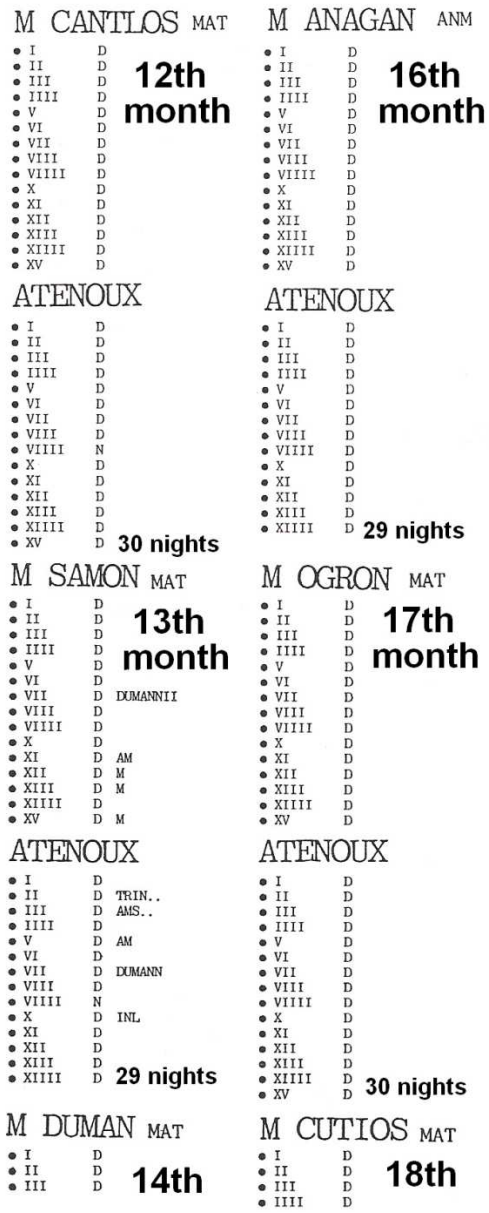
The Plaque was inscribed with twelve names written in Latin capital letter characters; *SAMONIOS, DUMANNIOS, RIVROS, ANAGANTIOS, OGRONIOS, CVTIOS, GIAMONIOS, SIMIVISONNIOS, EQVOS, ELEMBIVIOS, EDRINIOS* AND *CANTLOS*. After three weeks of five days, half way through each month, the Latin word *Atenoux* was inserted, followed by the next three weeks. Two intercalary periods at two and a half year intervals had pseudo Latin names, *AMBAXTOS* AND *ANTARAN.*

The Celtic lunar calendar month names appear to have twofold characteristics; core syllables of Celtic origin and end terminations of Greek or Latin origin. To pursue a translation of the name meanings; first the endings 'ios' and 'os' seen of Greek origins have been deleted. Another challenge for English speakers has been the transliteration of the Latin 'v' to 'u' and 'q' to 'c'. Readers should also be familiar with the Roman practice of using 'v' to represent both the consonant 'v' and vowel 'u'. At this point, I realised the syllables '*man', 'an'* and '*on*' appended to five Celtic core syllable

names were a common denominator, an harmonious final syllable equating to lunar calendar *moonth* names.

Name spellings used henceforth are *Samon, Duman, Riur, Anagan, Ogron, Cut, Giamon, Simiuison, Ecu, Elembiu, Edrin* and *Cantl.* Beginning each thirty-day month at the full Moon, three weeks elapsed to the crescent Moon. The Latin word *Atenoux* occurred at this point, translated as 'returning Moon' or 'the Moon returns again'. The second three weeks passed until once again a full Moon was seen at the end of the month. To allow for the actual lunar cycle, alternate months were allocated thirty days and twenty-nine days: six five-day weeks - then six five-day weeks, all but one day. The sum of 30 days plus 29 days equals the bi-monthly cycle of fifty-nine days, or nights if you prefer. The bi-monthly cycle was repeated six times in a lunar year of 354 days.

The illustrations show portions of the Plaque and lettering *CANTLOS, ANAGAN, ATENOVX, DUMAN, CVTIOS, SAMON, OGRON.* These words are header titles that relate to inscriptions below the words. *CANTLOS* month begins with three weeks of fifteen days; I to XV, the word *ATENOVX*, three more weeks follow to month end, XIIII, a total of thirty days or nights. *SAMON* month begins with three weeks of fifteen days; I to XV, the word *ATENOVX*, then a count recommences. Three more weeks follow less a day at month end, XIIII, a total of twenty-nine days altogether. Observe the Latin letter 'v' is employed in Plaque wording *M CVTIOS M*, *ATENOVX*, a convention practised at the time. Present practices replace the 'v' with 'u' in most cases.



COLIGNY PLAQUE RECONSTRUCTION

Days of the Week

To the right of vertical columns of peg holes and *D* for *dies* are various inscriptions written in Latin alphabet capital letters. The first day of *Duman* month is marked by a broken peg hole. *D* for *dies* is followed by the words *DVMANNI IVOS*. The next day count repeats the word *IVOS*. These words are principally the name of the particular month, e.g. *DVMANNI IVOS*, a reiteration of the month name. The frequent occurrence of *AMB* apparently enorses the sense of time passing, interpreted as 'the month is continuing', 'going around' from the Latin *ambages* or *ambigo*, 'a circuit' or 'going around'.

The groups of five days each week were numbered in Roman numerals adjacent to each peg hole: I, II, III, IIII and V, then VI, VII, VIII, VIIII, X and XI, XII, XIII, XIIII to XV. The inherently human fundamental principle of a five-day group I have called a 'week' is lent support by

counting the digits on one's hand and the Roman numerical system of five numbers. In the course of tallying the days each month, from full Moon the first three weeks were numbered one to fifteen. After the crescent Moon, the second half of the month and return to the full Moon was also tallied in exactly the same way, from one to fourteen or fifteen days according to the half monthly cycle. The numerals representing sixteen XVI, seventeen XVII, through to twenty-nine or thirty XXX were not used.

It is unclear if the individual five days of the week were named. No specific repetitive day name inscriptions have been identified. Most probably Moon calendar devotees used the same five day names as the Sun calendar devotees such as Sunday, Moonday, Wodensday, Thorsday and Freyrday, names proposed in chapter Seventeen Stonehenge.

Months of the Year

A key element in my decipherment of the Coligny Moon calendar month Gallic names was the realisation the Stonehenge Sun and the Coligny Moon calendars were in seasonal parallel. Both had the common principle of a five-day week. Significantly, the middle day of the first month in the Sun calendar was midsummer's day. Having previously established the Sun calendar first month was Summer, observe the first month on the Plaque panel was named *Samon*. References to the Irish Gaelic dictionaries show Summer as *samhradh* and the Scots Gaelic dictionary says *samhraigh*, whereas the Cymraeg dictionary word is *haf* and the Latin for Summer is *aestas,* clearly not relevant. The Gaullo-Celtic word *Sa-mon* is translated as *Summer Moonth*.

The next month panel is 'Duman'. The Latin word for 'two' is *duo* and the old French is *deux*, the Cymraeg is either *dau* or *dwy*, the Irish and Scots Gaelic words are *dha* and *dara*. All point to the two letters *Du* meaning 'second', followed by *man* meaning Moon; the *Second moonth*. It therefore follows *Duman* can readily be interpreted as 'Second Moonth'.

The third month '*Rivros*', transliterated to 'Riur-os' has been the subject of an extensive etymological hypothesis by Rhys (1909). He went to great lengths to equate '*Rivros'* to the Celtic deity 'Lugh' or 'Llew', the Celtic warrior god. I am unconvinced by his argument. Instead I offer the following based upon my appreciation of synchronisation between the solar and lunar calendars. Consider the syllable 'Riur'. Cymraeg three is *tri* and *tair*, Gaelic is *tri*. Older references spell the word *truir*. Latin for three is *tres* and I am informed the Gaullish is *trit[o]s*. I suggest that somehow the 't' became silent, maybe a local dialect aberration or for another reason. The third month name 'Ruir' or *Riur-os* in full appears to have meant the '*Third Moonth', - truir* month immediately prior to harvest time.

Next is '*Anagan*' month that presents a more complex problem. Matching the solar and lunar calendars side by side, Anagan month actually occurred close to harvest time and shortly before Autumn. After the harvest has been gathered, stocks of animal and human foodstuffs were stored in barns, dairies and granaries, well in advance of the cold Winter months when naturally available fresh food became scarce. The Scots Gaelic prefix *an* or *ann* is translated as 'anti' or 'against' and the word *gan* means 'scarce'. Hence the *An-a-gan(tios)* name is thought to mean 'against scarcity'. In other words *Anagan* was the month when food was hoarded against the coming Winter scarcity. I have concluded the closest translation sense for *Anagan* is '*Hoard Moonth'*, the time after the harvest had been gathered and stored in granaries before Winter began. Again the *t* was silent.

The fifth lunar month *Ogron* coincides with the Sun calendar month Samain [Hallowe'en in today's terms]. In olden days' tales and legends, it was a time when the Otherworld merged with mankind's world; ghosts, supernatural beings and fabled monsters mixed with unsuspecting people, often to their detriment. Ogres, monsters, giants and uncertainty prevailed.

Continuing agricultural themes, it's well documented the solar calendar month Samain or Samhain was the time to slaughter animals; cows, sheep, pigs etc. for two very good reasons; fodder and shelters for enclosed animals were most necessary in the cold Winter months of northern latitudes. The balance between available fodder supplies and herd reduction had to be struck. Equally, the requirement to preserve meat for the community's needs in the Winter, either by salting or drying, paralleled culling stock. Samain was the pragmatic solution to problems of reducing herds and to meet the need for Winter food and fodder.

I consider *Ogron*, or *Ogr-mon(th)*, the fifth month, became *Ogre Moonth*, the spooky lunar month equivalent to Halloween in today's stories.

The sixth month was named *Cutios* or *Cut* for short. Cymraeg for a pigsty is *cwt* where the *w* is pronounced '*oo*'. The Scots Gaelic word is *cut*. I believe *Cut* means the month when pigs and other farm animals were put into their Winter quarters, pigsties, cow byres and horse stables. The words 'sties' and 'byres' are later Saxon words. The Celtic lunar month named *Cut* was the time when domesticated animals were housed in enclosed shelters, well protected from snow and cold winds during *Shelter moonth*.

The seventh month was named *Giamon*, the *Gia-moon*. In modern Cymraeg [Welsh], the word for Winter is *gaeaf*, the Irish Gaelic is *geimhteadh* and Scots Gaelic is *geamhradh*. The first syllable is clear; *gaea, gaem* or *geim* means Winter in the three tongues. It is evident the Celto-Gallic word *Giamon* meant 'Winter Moon', the *Winter moonth*.

The eighth month was *Simiuison*, a name that presented great difficulty, seasonally it follows Winter. Only when I realised a walk along a hedgerow or forest path did the low branches of a tree gave the answer. To an observant person the perceptible swelling of new season's leaf buds holds promise of warmer weather to come quite soon. According to the Scots Gaelic dictionary the swelling of buds on a branch is *sumainn*. I have interpreted the month name *Simiuison* to mean *Budswell moonth*. February is exactly that time of year in north-western France and Britain. An observer can see for himself or herself the promise of new growth to come.

The ninth month '*Eqvos*' or rather *Equos* can be analysed in a straight forward way; first of all, delete the pseudo-Greek *os*, which leaves *Equ*. Phonetically the syllable is pronounced *Eku*. The ancient Sanscrit word for sheep is *pacu*, Celto-Gaelic is *pecu*. Latin for a flock of sheep is *ovite pecus*. The Scots and Irish Gaelic for sheep is *caora*, a *k* sound followed by an *ao* vowel, in a sense similar to the word root *ecu* spelled with a *c.* It therefore seems the month name had to do with sheep. The Coligny month I interpret to mean the lambing season, *Lambing Moonth* that followed *Budswell Moonth*. The equivalent Sun calendar event name was *Imbolc*, the augury of the lambing season.

The ninth month 'Ecu' has baffled other authors. To translate 'Equos' being linked to the Latin *equus* or 'horse' is wrong. I am unable to offer a logical interpretation showing how the noun *Equos* and the Coligny month relate to any association with a horse. In my view the month name translates as 'lambing'.

In my view the tenth month name *Elembiuios* shortened to *Elemb* is linked with the Cymraeg word for Spring *llam*, the Scots Gaelic is *leum*, the Irish Gaelic is *leimm*. At the same time of year, the Sun calendar month was Spring. There seems no doubt *Elemb* was *Spring moonth*. As with 'Equ' the 'E' appears nominally silent leaving only *lem* as the month name.

The eleventh month name *Edrin* is linked with the Scots Gaelic *eader* and the Irish Gaelic *indara*, both meaning 'between'. The vowel '*e'* followed by consonants *d-r* provides a link between the Celto-Gallic lunar month name and present day language. That being so, the month's sequence follows; *Edrin moonth* is 'the between month' after the tenth and before the twelfth month.
the penultimate month of the twelve month lunar calendar year.

Finally, *Cantlos* is the twelfth and last month of the year. In Cymraeg and Breton the word *cant* means 'circle' but in Old Cymraeg it meant 'edge of the circle', the perimeter, the ring. Both Scots and Irish Gaelic use the word *cuairt* to mean 'circle' or 'circuit', a similar use. I have interpreted the sense of *Cantl* as 'all the way round and back again' that equates to the last month before returning to *Samon* the first month. It is reasonable to conclude the name of the last month meant the year had turned full circle and the new year was nigh. I have translated *Cantl* as *Full Circle Moonth*.

Coligny Month Names & Their Meanings Summarised: -

Samon = Summer month coinciding with June and July.
Duman = Second month, July. Harvesting commences
Ruir = Third month, August and harvest time.
Anagan = Hoard, the putting away of stores for the winter, September
Ogron = Ogre, ancient Samain - spooks giants and ogres, Hallowe'en
Cut = Shelter, cattle and swine housed in winter quarters, November.
Giamon = Winter, the cold season of the year, December & January
Simiuison = Budswell, new leaves burst forth in February & March.
Ecu = Lambing season, March April.
Elemb = Spring, coincides with the equivalent month April.
Edrin = Penultimate month, before the last month of the year, May.
Cantl = Full circle month, June, the year returns to Summer again.

The Celtic Languages

Philologists and those well versed in the written word classify the Celtic languages into two main branches; firstly the Brythonic language branch spoken by the Welsh, Cornish and Bretons of Brittany, secondly the Goidelic branch spoken by Irish and Scots and the people of the Isle of Man. Goidelic speakers' lands did not become part of the Roman Empire, consequently relatively few Latin loan words were absorbed into Goidelic Celtic, Gaelic.

On the other hand, in the British Isles and Gaul where Brythonic Celtic was spoken a fair number of Latin loan words were absorbed. For example, the Cymraeg name for the glazed hole in the wall is *ffenestre*, the French is *fenestre* and the Latin is *fenestra,* whereas the English word is 'window'. Apart from loan words taken into two language branches a core of purely Celtic words endured, reflecting their similar ways of life. The myths and legends of early times are common to both societies. Bards and storytellers travelled freely, taking news and customs with them from Ireland to Brittany, Wales, Scotland, Gaul and back again.

In those circumstances it is not surprising Goidelic and Brythonic Gallic language branches developed in slightly different ways. Native speakers of the Goidelic branch use the word *Gaelic* when describing their tongue. The Welsh language is *Cymraeg*. These terms are used to define the respective branches of the Celtic language. English as an Anglo-Saxon language only developed several centuries later, a gradual process long after the invasions of the British Isles commencing in the fifth to seventh centuries by Angles and Saxons from Europe.

The Latin Names

Sir John Rhys explained the need for intercalary names for the two double blocks at the beginning of each two and a half year divisions of the five-year Coligny cycle. To maintain synchronism with the 365 day Sun calendar, the 354 day Moon calendar required an extra intercalary 'moonth' every 2½ years. After the elapse of two and a half years, the lunar calendar becomes 2½ x 11, (365-354) = 28 nights short of real solar time, almost equal to the lunar periodic cycle of 29½ nights between repeated full moons. For that reason the first intercalary month is named *Ambaxtos* meaning "the month attends and serves on the others" to quote Sir John's explanation. He based his translation on the lines from Julius Caesar's passage (Bell. Gall. vi 15, 2) - *"ut quisque est genere copiisque amplissimus, ita plurimos circum se* ***ambactos*** *clientesque habet*", meaning "as each is more distinguished in birth and resources, so he has about him very many vassals and clients." The word *Ambaxtos* is linked to *ambactos* meaning a vassal, I fully concur with his idea. *Ambaxtos* seems to have the sense of an 'adjustable lunar month that is dependent upon the solar calendar', a vassal month, 27, 28 or 29 days depending upon the discrepancy between the two calendars. The second intercalary month named *Antaran* occurred 2½ years later with similar purpose. Sir John explained it meant "the month which was an Ambaxtos which came between (the two 2½ year cycles)". He cited Sanscrit and Latin equivalents having the meaning "in between". I have been advised the closest Latin word is *antarius,* an adjective linked with the meaning 'raising up'. I interpret *Antaran* to mean 'The middle intercalary month of 28 nights required to catch up with solar calendar time'.

Confirmation the Celtic lunar calendar months began and ended at full Moon is given by the word *Atenoux.* Occurring fifteen nights after the first day of a Moon month, the translation according to Sir John has the sense of 'returning Moon'. In other words, the full Moon at the beginning of the month waned during three weeks to become the crescent Moon. It then returned to the full orb again fourteen or fifteen nights later. A related Latin word *Ater* means 'dark' or 'black' which is the condition when a crescent new Moon provides very little light at night. *Atenoux* is translated as 'the crescent Moon, the dark middle of the month', three weeks of five nights after the first of the month and three weeks of five nights before the end of the month and the full Moon returned.

Comments

An aside, observe a 30 day lunar month numerically identifies with 30 months in a 2½ solar year period. In turn, 30 x 2½ years = 75 years, close to the somewhat irregular 75 year cycle of the Halley comet and its reappearance. I wonder if the Coligny Moon calendar people had a trigesimal (30) measurement system, not a decimal (10) or sexagesimal (60) system.

One should note the generally agricultural nature of the Celtic lunar calendar names, the seasons and activities. In broad terms, name derivations in Cymraeg and Gaelic are more or less equal. As is generally appreciated, the Scots Gaelic and Irish Gaelic languages derive from the same

root and I have not differentiated between them. The names *Samon, Simiuison, Anagant, Equos* are unique to the Goidelic Gaelic language. Observe how the Coligny words *Ogron, Cantl* are unique to the Brythonic Welsh language branch.

The Stonehenge lunar calendar of 2500 BC, the earlier Irish Loughcrew cairn stone petroglyph and Knowth kerb stones K15 and K53 of 3500 BC, provide information the Moon's behaviour was well known to the Irish and British shamans more than three millennia before Coligny. The advent of the Roman Empire brought with it a knowledge of Latin writing to Western peoples, only then did the new skill give the Gallic Moon calendar 'shamans', or 'Ofyds' the ability to convey their ancient lunar calendar knowledge in a permanent form, a bronze plaque inscribed with Latin letters and numbers in their own Celto-Gallic language.

CELTO-GALLIC MONTH NAME TRANSLATIONS

Coligny Today's	**Cymraeg name**	**Scots Gaelic**	**Irish Gaelic**	**Latin name**	**Today's words French**	**English**
Sam(on)	*haf*	*samraigh*	*samradh*	*aestas*	*ete*	Summer
Du(man)	*dwy#*	*dara*	*dara*	*secundus*	*deuxieme*	Second
Ruir	*tri*	*triuir*	*triu*	*tertio*	*troisieme*	Third
Anagan	*cronni*	*an gann*	*ag gannu*	*copia*	*amasser*	Hoard
Ogr(on)	*anghenfil*	-------	------	*ingentis*	*geant(?)*	Ogre
Cut	*cwt #*	*cut*	-------	*hara*	*arbiter*	Shelter
Giam(on)	*gaeaf*	*geamhradh*	*geimhreadh*	*heims*	*hiver*	Winter
Simiuis(on)	*blaguro*	*sumainn*	-------	-------	*bourgeonner*	Budswell
Ecu	*dafag*	*caora*	*caora*	*pecus*	*agneau*	Lambing
Elembiu	*llam*	*leum*	*leimm*	*ver*	*printemps*	Spring
Edrin	*eiliad*	*eadar*	*eindara*	*penult*	*l'avant-dernier*	2nd last
Cantl	*cantle*	*cuairt*	*cuairt*	*reverti*	*retourner*	Full circle
Ambaxto	-----	-----	-----	*ambactus*		vassal*
Antaran	------	------	------	*anteri*		support*
Atenoux	------	------	------	*atenoux*		middle*
Totals related to Cymraeg & Gaelic items						
		<8 items>	<9 items>			

Key: # The Cymraeg *w* is pronounced close to '*oo*', hence 'doowy'.

dh The paired letters pronounced in Gaelic as a breath sound.

* Translations of Latin words.

Observe how the Coligny month names do not include the noun 'Autumn', 'The Fall' or any clear English equivalent. Cymraeg for 'autumn' is *hydref,* Latin is *auctummnus.* The name *Anagan* or 'hoard month' suggests the Gallic Celts were busy storing recently harvested crops than being concerned with leaves falling from deciduous trees at that time of year.

STONEHENGE & COLIGNY CALENDARS COMPARED

The Celto-Gallic language Coligny calendar month names and translations into Cymraeg, Gaelic, Latin, French and English, combined with the seasonal congruence between the Stonehenge Sun and Moon calendars support the hypothesis both forms of calendar commenced with Summer as the first month. A side-by-side comparison of two forms of calendar offer a good perspective on the practices of antiquity, the Celtic Gallic language Coligny calendar month names and translations into Cymraeg, Gaelic, Latin, French and English combined with the seasonal congruence between the Sun and Moon calendars support the hypothesis both forms of calendar commenced with Summer as the first month: -

SOLAR MONTHS	**LUNAR MONTHS**
Solstice/Equinox/Festivals	Coligny Lunar Calendar
Sixteen Months, 365 days	**Twelve Months,** 354 days
ONE, Summer solstice	ONE, SAMON, summer
TWO	TWO, DUMAN, second
THREE, Llew harvest festival	THREE, RUIR, third
FOUR	FOUR, ANAGAN, hoard
FIVE, Autumn, equinox	FIVE, OGRON, ogre
SIX	SIX, CUT, shelter
SEVEN, Halloween	SEVEN, GIAMON, Winter
EIGHT	EIGHT, SIMIUISON, budswell
NINE, Winter solstice	NINE, IMBOLC, lambing
TEN	TEN, ELEMBUI, Spring
ELEVEN, Imbolc lambing	ELEVEN, EDRI N, between
TWELVE,	TWELVE, CANTL, Full circle, Last
THIRTEEN, Autumn equinox	
FOURTEEN,	
FIFTEEN, Beltane, Maytime	
SIXTEEN	

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AN ASIDE

The Antikythera mechanism was discovered by sponge divers near the Greek island of that name in 1901 AD. A geared mechanical analogue computer made about 67 BC foretold astronomical and calendar events, perhaps based on Coligny and Brython knowledge.

CHAPTER TEN :: WOODBURY & HEATHROW
ENGLAND c.500 BC

"If in other sciences, we should arrive at certainty without doubt and truth without error, it behoves us to plan the foundations of knowledge in mathematics." Roger Bacon, c.1214 - c.1294

The Iron Age is here

SYNOPSIS

Two Iron Age buildings, both built about 500 BC in England, have been selected for discussion:-

Little Woodbury

Little Woodbury, situated south of Salisbury in Wiltshire, England, was a circular timber dwelling, probably a native British farmhouse. The style of design and construction is in the tradition of the large Neolithic calendar buildings described in other chapters. Little Woodbury exhibits a classic demonstration of the pi ratio 22/7. Its diameter measured seven *faethms* or megalithic rods and hence a twenty-two *faethms* circumference.

Caesar's Camp

The Caesar's Camp building at Heathrow, Middlesex, 'A Celtic temple', was excavated in the mid nineteen-forties at the future site of London airport. Characterised by its rectangular form, the timber post building is considered representative of the newly arrived European Celtic tribal traditions. The presumed basis of design incorporates a 3:4:5 sided triangle that defined the central inner area of the building. The surrounding outer area could have served as an audience observation zone.

The F*aethm*

Design basis measurements applied in both buildings appear consistent with the use of the linear measurement unit, the *faethm* or *megalithic rod*, equal to 2.073 metres.

LITTLE WOODBURY BUILDING, IRON AGE

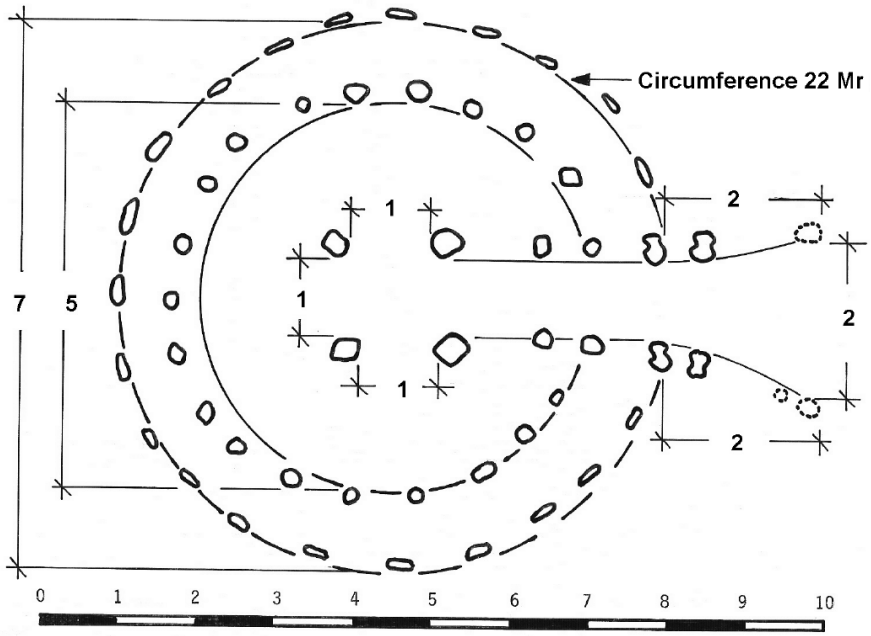
Little Woodbury village is near Salisbury, Wiltshire, southern England. Close by is an archaeological site, the subject of an investigation by Dr Gerhard Bersu in 1938/39. Dr Bersu found evidence of a small 15 metre diameter building. Four large diameter timber posts formed the central roof support, a number of timber posts surrounding the inner area and a ring of stone slabs and posts comprised the outer perimeter wall. A unique feature of the dwelling was the [presumed] entrance porch. A reasonable date for the construction is about the middle of the first millennium BC. It was not possible to determine an accurate date for the Little Woodbury building because Dr Bersu's archaeological work predated Dr Suess' work in 1970, the radio-carbon dating technique and calibration corrections. The building is considered a British Iron Age farmhouse, the mid-first millennium BC.

What was the nature of a farmer's life and times in southern England about that time? It is interesting to conjure up an image in one's mind. The native British farmer had much the same as

today's needs for a man on the land, although clearly much reduced expectations. To suggest ideas describing this Iron Age dwelling, the family's needs, his stock and even a hint of farming practices, I offer these thoughts. Most probably Little Woodbury had a sloping straw-thatched roof and wattle and daub walls. The four substantial central posts supported a conical roof and perhaps a smoke vent at the apex. Between the four posts a central fireplace served for cooking and heating purposes. In turn, the roof was structurally supported between the inner posts and along its outer perimeter by the ring of smaller posts. The measured distance between the central posts and the inner post ring would have allowed the family to sleep around the inner space with their feet towards the fire. Between the inner and outer concentric rings of timber posts and stones, the annular space about two metres width was presumably reserved for housing cattle during the winter. This arrangement would have served two purposes: that of protecting the family's wealth from wolves, bears and other predators, also providing warmth at night in the cold winter months.

The outermost ring of posts and stone slabs set on-edge is assumed to have supported a wattle and daub outer wall. The on-edge flat stones would have performed the purpose of a splash proof course preventing rainwater attrition of a wattle and daub surface. An overhang of the thatched roof beyond the outer wall would have further prevented rainwater drips washing away mud dung daub on the wattle walls above the base course. Scaled from Dr Bersu's drawing, the building outer diameter of 14.5 metres was equal to seven *faethms* or *megalithic rods.* Obviously the circumference was close to 45 metres, 22 *faethms*.

LITTLE WOODBURY FARM BUILDING, Drawing Author 1980



MEGALITHIC RODS or FAETHMS

The builder's choice of design dimensions in whole numbers 22 and 7 is seen as a display of arithmetical knowledge concerning the pi ratio. The 22 faethm dimension may also indicate a degree of symbolic philosophical consistency by enhancing the building's sanctity. A symbolic 33 faethms or *megalithic rods* building could have indicated a regal or superior personage was associated with the structure. The lesser 22 faethms dimension probably implied a lower ranked farming family.

Geometry

A reproduction of Dr Bersu's drawing has served as the basis for my reconstruction of the probable design plan of the building. The principal lines outline the circular shape of the building, its centre presumably the geometric centre of the group of four posts. An interpretation of the presumed design has been made based on the principle observed at many ancient sites – dimension lines touched the post or stone column – they were not measured at the centre of the post or stone column. At Bersu's Little Woodbury, a circle drawn with a radius of 2½ *faethms* or megalithic rods, Mr, is tangential to most inner posts. A group of posts on the side opposite the entrance deviate from the theoretical line and add to the perimeter length by a small amount. Possibly the builder of the Little Woodbury structure intended to design the inner wall posts with a circumference of 17 *faethms,* the number midway between unity and thirty-three, the symbolic half-way value. An outer circle drawn at a radius of 3½ faethms from the common centre point is seen to pass tangentially by the greater majority of the stone slab positions, corresponding quite closely with their positions recorded during Bersu's archaeological excavation. Other significant dimensions are shown; the centre posts scaled at the corners of a touching square have one faethm sides. The entrance portico and the passage scaled at 2 faethm proportions. I concluded the farm house building designer incorporated the whole numbers 22 and 7 in its construction, perhaps as a demonstration of his arithmetic and geometric knowledge and to enhance its sanctity.

British Ancient Monuments

The same arithmetic technique applied to ancient monuments constructed in earlier centuries: -

- The ring of 56 Aubrey Holes at Stonehenge c.3100 BC had an inner touching circumference shown to be 132 faethms, in which case the diameter equalled 42 faethms. This is the earliest example of the simple whole number pi ratio 22/7 detected to date.
- Stanton Drew c.2900 BC ring four diameter was close to 21 faethms, a circumference of 66 faethms, three times the ratio 22/7.
- The Sanctuary calendar building c.2500 BC had a circumference of 22 faethms and a diameter of 7 faethms, another example of 22/7.
- The Mount Pleasant calendar building c.2400 BC had an inner edge of the circular ditch equal to 66 faethms and thus its diameter was 21 faethms. These numbers are exactly half the Aubrey Holes dimensions.
- Durrington Walls c.2300 BC calendar building, ring four had an inside touching circle diameter close to 29 metres, 14 faethms and a circumference of 44 faethms.

These five instances of ancient monuments in Britain, when the whole number circumference to diameter ratio 22/7 was incorporated in the design, shows they knew and used the ratio 22/7 as a fundamental element of building design to achieve a degree of circumference/diameter accuracy. The error experienced by applying the ratio 22/7 in place of the accurate decimal value of pi is only one part in two thousand. A counter argument may be made that every circle must comply with the 22/7 ratio, certainly that must be so. Observe that the British ancient monuments quoted above possess a consistent feature - a circumferential length measured in whole number multiples of 22 faethms, not other intermediate whole number values such as 10, 15, or 25. It was concluded the Neolithic surveyor intentionally used the ratio 22/7 as early as 3100 BC in the first stage of Stonehenge. This technique of designing circular features accords a set of well-established rules handed on to successive generations. As the centuries passed, more examples are seen in 2900, 2500, 2400, 2100 and now 500 BC.

HEATHROW TEMPLE c.500 BC

Antiquarian Dr William Stukeley visited the Middlesex site on April 18th 1723. His sketch of that date showed earthworks with an exterior ditch and rectangular mound within. The central area was shown to be essentially flat. The site was known as *"Caesars Camp on Hounfow heath"*

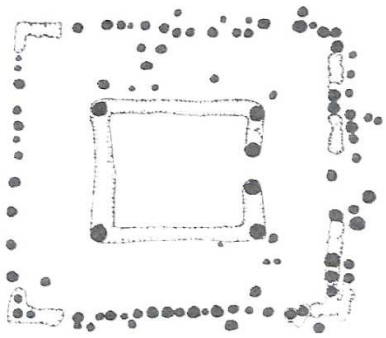
In advance of the construction of London Heathrow airport in the late nineteen-forties, an archaeological excavation team found traces of an Iron Age building of considerable size. Almost rectangular in plan, about 20 metres by 18 metres, the Iron Age structure had originally been built with inner and outer walls of timber posts. An entrance faced eastwards. It can be reasonably be assumed the structure was roofed with straw thatch, the apex supported by the six innermost large diameter posts and the outer perimeter by fifty or more slender wall posts. The timber postholes varied in

Excavation plan

Caesar's Camp Building

Heathrow, Middlesex

Timber post holes shown by filled black circles, earthwork ditches and foundations shown by parallel lines with depth indicators.



size, those within the inner courtyard posts being quite large, perhaps a metre diameter. The outer wall postholes indicated posts perhaps half a metre diameter. Scattered additional postholes within and without the principal walls may have been supplementary posts to support a roof or perhaps extra features such as an entrance portico, or ornamental arches.

The building is presumed to have been a Celtic temple, the rectangular inner sanctum defined and surrounded by six large diameter posts, an inner area for ceremonial purposes of about twelve square metres. Still under the same roof but between the inner and outer walls, the surrounding perimeter space would have been large enough to accommodate up to fifty witnesses to any ceremonies, maybe standing room only, but witnesses nonetheless. **ILLUSTRATION AUTHOR 1981**

Alternatively, the inner space could have been the tribal chief's area for the privileged few, carousing, eating and drinking. The surrounding space would have allowed less important people to join the feasting and merriment but at a respectful distance from the nobility. The elements of the original geometric design and its dimensions have been reconstructed as defined straight lines. Note these have been drawn to touch the posts, not through the centre of each principal post as practised today. The numerical lengths are quoted in *faethms*. Inner space post positions appear to have been defined by a 3, 4, 5 faethm right-angled triangle.

Observe that the west wall is slightly longer than the east wall by one faethm causing an almost imperceptible distortion to the rectangular structure. The estimated date for Heathrow temple construction is about 500 BC. A rectangular design and proximity to Europe indicate its designer had recently arrived in Britain. The site of London airport is not far from Canterbury, the city named after the Cantonici tribe. Possibly the builders of the temple were recent European immigrant arrivals in Britain who settled the Heathrow area about 500 BC. It seems the Caesars Camp rectangular building designer was not a native Briton applying the traditions of his country, unaware of the traditional significance of incorporating a symbolic numerical regal feature in a round building design as a form of blessing or to define its sanctity.

To assess the designer's intention to endorse the building with a degree of sanctity by including either the symbolic 33 or a 66 faethms perimeter dimension in its design, various combinations of internal and external dimensional lengths have been examined. No convincing results were obtained. The long-standing native British Isles and Ireland peoples' custom was to build circular structures. Homes, farmhouses, temples, Stonehenge and the passage mounds of Ireland are examples. I concluded the newly arrived settlers from Europe did not choose to sanctify the rectangular building by incorporating a 33 faethms dimension in its design.

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CHAPTER ELEVEN :: WORLD RELIGIONS & THIRTY-THREE

"Avoiding the extremes of indulgence and self mortification, the Buddha gained enlightenment of the middle path which produces knowledge and insight, which conduces tranquillity, of higher knowledge and enlightenment, leading to Nirvana."

Lancaster, 1982

One hundred and fifty generations past, new religions arose.

SYNOPSIS

Ancient Britain

The ring of Aubrey Holes at Stonehenge in southern England, constructed about 3100 BC was the first feature at the ancient site. The outer touching circumference of the ring of Holes has been found to be four times the numerical value of thirty-three faethms, 4 x 33 = 132 faethms. It is presumed the inner area was symbolically sanctified by the circumference dimension, a first application of its use. Many other instances of the symbolism associated with the number thirty-three are quoted and explained in other chapters.

Ancient Ireland

The significance of the number thirty-three indicating a sacred entity was detected as an inscription on the Knowth passage mound County Meath, Ireland, the construction dated about 3500 BC. Knowth kerb stone number K14 is inscribed with a wavy line showing thirty-three changes of direction, taken to be a count of that number, the stone situated close to the eastern passage entrance. The petroglyph is thought to define the Knowth mound's sacred nature as the home of a deity. Knowth's kerb stone K81, half-way around the mound on the opposite side, is inscribed with a wavy line of seventeen bends interpreted to mean half-way around the sacred place.

Today's Major Religions

The world's major religions, Judaism, Buddhism, Christianity and Islam include many instances where thirty-three is cited in one form or another. Since their inception, the literatures of Judaism, Buddhists, Christians and Moslems have adopted the adjectival and symbolic use of thirty-three to indicate, infer or emphasise sacred situations, circumstances, places or persons. A common thread of texts and philosophical practices span the millennia.

THE HINDU RELIGION 5000 BC

Quoted from the Ancient History Encyclopedia by Cristian Violatti:-

"Hinduism is often considered as a religion but it is actually more than that; it is a vast and complex socio-religious body which, in a way, reflects the complexity of Indian society. Unlike other traditions, Hinduism does not originate in a single founder, a single book or a single point in time. It contains many different beliefs, philosophies and viewpoints, not always consistent with each other. These apparent contradictions strike only those who are not familiar with this tradition: the Hindu insight claims that the Oneness expresses itself in many different forms." No evidence has been found of an incorporation of thirty-three and it's associated symbolism in Hinduism.

THE JEWISH RELIGION c.1100 BC Judaism

"We are commanded by the Torah..."; the recorded writings of the prophet Moses and religious customs support the strong traditions of Judaism's five thousand year history. The book describes how the twelve tribes of Judah migrated from conditions of slavery in Egypt to the Holy Land of Palestine, now Israel. Their leader was the prophet Moses who lived during the twelfth century BC. Termed the 'Old Testament' in the Christian Bible, the book says the "first born child of the Egyptians was smitten by God, whereas the Hebrews were spared such a fate and safely delivered to Israel."

Feast of the Passover

Twelve Israelite tribes led by Moses escaped from Egypt about 1,100 BC and safely 'passed over' the Red Sea to the other side. Marking the occasion by an annual celebration, initially called Feast of the Unleavened Bread, it is now known as The Feast of the Passover. Commencing on the second day of The Passover, the community is required to count thirty-three days. On that 33rd day, a Hebrew community marks *Lag Ba'omer*, a joyous event every year in the Jewish calendar. The word *Lag* is an abbreviation for *lamud* meaning 30 and *gimmel* meaning 3, hence la + g = lag, 33. *Lag Ba'omer* marked the cessation of a terrible epidemic in which many people died and celebrates the ultimate success in achieving final deliverance from the vicissitudes of their previous life in Egypt. The twelve Israelite tribes reached their ultimate goal, the Holy Land, there to live in peace.

BUDDHIST RELIGION, c.540 BC

Prince Sakyamuni was born of royal parentage and dwelt in the King's court from about 567 to 545 BC. He lived a life of plenty and comparative luxury during his younger years. After a visit to the town market and meeting the townspeople, the young Prince was dismayed by the abject poverty suffered by the common folk compared with the luxurious life he led in the palace. From that day on, he discarded the comfortable court life and became an itinerant preacher, his begging bowl affording him the only means to sustain life. He preached a religious philosophy embracing enlightenment and wisdom achieved through suffering. Becoming known as Buddha, 'The Enlightened One', his teachings spread all through the river Ganges valley region, more or less the area we now know as Nepal in the southern ranges of the Himalayas, then a part of India.

During the third century BC, the great Indian King Ashoka converted to Buddhist philosophy and initiated an evangelical movement that spread Buddhist beliefs throughout India and parts of Pakistan. About the same time, numerous Asian tribal groups in east and central Asia commenced migrating south and west. By so doing they arrived in the area we now know as New Delhi and came into contact with Buddhist philosophy. These tribal groups of merchant traders supported themselves by journeying great distances from China to Persia, bringing silk cloth from China to Samarkand. Onward from Samarkand, Persian merchants carried silk and other precious goods to meet the Roman aristocracy's demands for silks, perfumes, other exotic items and foreign artefacts.

This period known as the Ku Shan Empire extended from the second century BC to about 200 AD. Ku Shan merchants became converts to Buddhism and invited the disciples of Buddha to accompany them along their trade routes and establish *caravanserai* (travellers' inns) and monasteries along the way. The *caravanserai* materially benefited the Ku Shan merchants, offering accommodation and sustenance for travellers and their pack animals between far distant places along 'silk roads'.

Dissemination of Buddhist Philosophy

The Ku Shan merchant traders and Persian travellers supplied the wealthy citizens of the Roman Empire with Chinese and other goods from Eastern countries. In return Rome offered the traders wine, olive oil, the Empire's products and exquisite pale blue glass phials. Particularly treasured by Buddhist monks, the phials were used to preserve sacred relics. The safe transport of Buddhist relics to distant monasteries was made possible, thus enabling new sacred places establishment far distant from their origins.

The Silk Roads

The spread of Buddhism by traders along the main Silk Roads from Samarkand to China, from central China along tributaries of the main routes southwards to Burma and south-east Asia, evidences the philosophical value of the Buddhist religion and the sacred symbolism attributed to thirty-three**.**

In the converse direction, much-valued Roman glass phials were exchanged for silk and other valuables. Used by Buddhist monks, these glass containers preserved sacred objects derived from the Buddha. In turn, these relics were placed in stupas built near monasteries and at other holy places. A unique feature of Buddhism in the centuries BC saw these relics transported over long distances whilst still retaining their sacred value. Thus the Buddhist message was made known to many peoples around the known world. The sacred symbolic adjectival nature of the number thirty-three as an element in Buddhist philosophy has continued for thousands of years through to the present day. This feature of Buddhist beliefs has assured its perpetuity in many lands and amongst many peoples.

Concepts of State & Kingship in Asia

Founded upon firm Buddhist principles, the concept of two worlds became the basis for a social structure throughout much of Asia during the first millennium AD. A number of examples support the broad appeal of Buddhist philosophy to both rulers and the populace in Asian societies. Underlying these beliefs and practices was the fundamental principle of parallelism between the gods' universe and empires of mankind. On one level there was a universe, the dwelling place of the deities. On the other hand, the world of mankind reflected the gods' abodes in its manner of organisation and social relationships. The universe inhabited by the gods was conceived as a cosmic mountain, Mount Meru. On the summit of Mount Meru is Sudarsana, the second paradise, city of thirty-three gods where Indra reigns as the supreme king. On its slopes lie the lowest of the paradises wherein live Four Great Kings who are the guardians of the world.

Mankind's world resembled the same structure. A king, the Supreme Being, ruled his empire from a centre. Surrounding the king were [four?] advisors and beyond the capital of the empire, [eight?] provincial rulers held sway over the inhabitants living within their province boundaries. Following many generations of belief in Buddhism, the peoples living in Burma, Laos, Vietnam, Thailand, Malaysia, Sri Lanka, Cambodia and Java, have a common style of state organisation. In general terms their political systems were founded on the fundamental cosmic principles of the Buddhism.

Cambodia

In the image of the heavenly beings and their realm, a city-state was formed in ninth century Cambodia. The first Cambodian city of Angkor was founded about AD 900 with a small rocky hill Phom Bakheng at its centre. In the twelfth century King Jayavarman caused the building of Angkor

Thom. The city formed an enormous square about three kilometres each side, the sides facing the cardinal directions north, east, south and west. A wall and moat bounded the city on all sides, equivalent to the mountain ranges and oceans encompassing the world. An inscription tells us the centre of the capital was a mountain with a temple on its summit; "equal in beauty to the king of mountains" [Mount Meru]. The Cambodian concept, a centre with four sides and numerous provinces beyond, has similarity with Burmese principles.

Myanmar, Burma

Burmese chronicles describe how the gods themselves with Indra at their head built the ancient city of Srikshetra (Old Prome) on the lower reaches of the Irrawaddy. Approximately circular in shape, the city had a golden palace at its centre equivalent to Mount Meru and there were thirty-two gates in the city wall leading to the provinces beyond. It has been reported it was an old Burmese custom that each of the thirty-two city gates corresponded to thirty-two provinces or vassal states. Evidently the fundamental idea of a principal ruler and thirty-two other lesser rulers, a total of thirty-three, was inherent in the cosmic panoply of deities and also in the world of mankind. Indra was the most high of the deities and the earthly High King his representative.

In AD 1857, King Mindon directed the building of the city of Mandalay. Surrounded by a moat and city wall, the four sides faced cardinal directions. Each side of the square was about two kilometres in length. In the centre of the city, the royal palace with a seven-tiered tower over the King's throne in the audience hall was identified with Mount Meru.

Java

The kingdom of Java in the ninth century was divided into twenty-eight provinces each of which had a governor. These rulers together with the King's four ministers numbered thirty-two high officials. All were answerable to the High King, the thirty-third and most regal person in the land.

China

In the Chinese Shan province, the fourteenth century principality of Keng Tung was called "The Thirty-Two Towns of the Khun", the Khun being the ruling tribe and the thirty-third element. How times have changed to what has become present-day Canton.

India

The doctrines of Indian Brahmins envisage a circular world Jambudvipa, surrounded by seven seas and seven mountain ranges. At its centre is the cosmic mountain Mount Meru around which the Sun, the Moon and the stars revolve. The city of the gods is situated on its summit, a land surrounded by eight guardian deities, the Lokapalas.

CHRISTIAN RELIGION 33 AD

Five centuries after Buddha commenced his philosophical teachings in India, the Christian religion came into being in the land we now know as Israel and Palestine. Two thousand years ago Palestine was a province of the Roman Empire ruled by an appointee of the Roman Emperor Claudius. Roman civil rule and the Legions' military might afforded a degree of stability to Palestine and relative freedom from invasion by aggressors originating from land-locked countries to the north and east. The birth of Jesus Christ heralded the coming of Christianity, the monotheistic religion that now flourishes throughout the world. Preserved in written form decades after His death, the Christian Bible's 'New Testament' is a collection of writings by Jesus' twelve disciples recording His life and teachings.

Old Testament

The Christian Bible's 'Old Testament' is essentially the Jewish 'Torah' translated into the newer language.

New Testament

I now turn to the King James translation of ancient texts into English, a Bible first printed in Anno Domini 1611, revised in 1881 AD and subsequently. The New Testament's Saint Matthew's Gospel tells how, after performing many miracles and already knowing His fate, Jesus foretold (page 13, item 16, paragraph 21) "that he must go unto Jerusalem, and suffer many things of the elders and the chief priests and scribes, and be killed, and on the **third** day be raised up." Following the crucifixion when Jesus reputedly died on the cross, Joseph of Arimathea laid the body in his own newly hewn sepulchre (cave) and it lay there for **three** days, securely protected by the great round stone slab rolled across the door of the tomb. On the third day Jesus ascended to Heaven, aged in his **thirty-third year**. The Gospel continues (page 25, paragraph 28 - 16, 17) "But the **eleven** disciples went into Galilee, unto the mountain where Jesus had appointed them, and when they saw Him they worshipped Him."

Psalm 33, page 420

Psalm 33 begins "Rejoice in the Lord ..." and continues "The Lord looketh (down) from heaven; he beholdeth all the sons of men from the place of his habitation, he looketh forth upon all the inhabitants of the earth."

There is a parallel with the portrayal of the Lord looking down from Heaven and the Buddhist's Mount Meru. Note the similarity between the thirty-third psalm's expressions and the Buddhist concept of Mount Meru and Sudarsana, the second paradise, the city of the thirty-three gods where Indra the highest of the gods reigns as the supreme deity. I pose the question "Who chose to number this particularly significant psalm as the *thirty-third* psalm?"

Principles

These several mentions of 'three days', the 'eleven disciples', 'the mountain', also Jesus' reputed age of thirty-three; all are a continuation of earlier philosophies, elements indicating the use of thirty-three as a principal adjectival symbolic description of a sacred person. In my view, they were applied in an adjectival descriptive sense with the intention of immediately increasing the audience's awareness of His great importance as the Saviour of Christian mankind. There was no need for endless flowery phrases, only the succinct number thirty-three. Contemporary listeners to the Apostles telling the Gospel stories two thousand years ago would presumably already be well accustomed to the symbolic nature of the several symbolic numerical adjectives, three, eleven and thirty-three, values quoted adjectivally to enhance each Gospel story, not necessarily with any chosen numerical intent.

Monks & Monasteries

A remarkable feature of Buddhist philosophies and practices from the very earliest times had been the ability to transport holy relics from place to place. In a similar way, Christianity has flourished and spread worldwide by means of monks and monasteries and the transport of sacred objects from their source to the new religious centres. At each sanctified location, the branch of Christianity

practised by the Roman Catholic Church preserved an Holy relic in a sacred vessel, its presence affording a means of defining the sanctity of the cathedral.

The image of a learned monk seated on a stool in a Middle Ages *scriptorium*, hand copying an important text from the original book onto new vellum parchment, is familiar to history students. In more recent times, with the advent of printed books, the Christian Bible has become the transportable sacred symbol of all denominations of the Christian Churchest.

MOSLEM RELIGION, 570 AD

Mohammed was born in Arabia in the middle of the year AD 570. As an adult, he became the prophet of Islam, one of four major world religions. The Koran, the sacred book of Islam containing the writings of Mohammed requires adherents to the religion to observe strict social rules; dress, behaviour, morality, generosity towards the poor, care of animals, treatment of criminals. Moslems are required to recite prayer phrases, “Glory be to God”, “Thanks to God”, “There is no God but God”, “Allah is Great” each phrase repeated thirty-three times. A Moslem should ask for forgiveness for his sins ninety-nine times a day. God has 99 names, 3 x 33, a series of complementary adjectival values. The sacred symbolism, shown by the recitation of phrases thirty-three times, has consonance with the other major religions, a practice with five millennia history.

CHINA, 1695 AD, The Quing Dynasty

An example of the durability of Buddhist philosophy concerns the Chinese Emperor Kangxi who ruled from 1662 AD to 1723 AD. The Emperor caused a Buddhist temple to be built in 1695 AD, at a time said to be in the thirty-third year of the Emperor’s sixty-one year reign**.** The building became the residence of the yet to be crowned Emperor Yong Zheng before he ascended the throne in 1723 AD. His thirteen year rule ended in 1736 AD. In 1744, the ninth year of his reign, Emperor Qian Long, 1736-1796 AD ordained the sacred structure was again to become a Buddhist temple.

Today’s visitors to the renamed Yong He Gong temple can now enter the three centuries old building, one of the famous tourist destinations in Beijing, the capital of China.

JAPAN, Japanese Buddhism

Japan’s island group comprise the easternmost Asian archipelago. The great majority of the population, some two-thirds of the archipelago’s ninety million inhabitants are reportedly adherents of the Buddhist religion. From time to time, a new Buddhist temple may be required, fronting the street in a new district. In true Buddhist tradition, the carpenter surveys the premises and marks a street frontage incorporating certain sacred symbolic values in the design of the building and its environs.

Before the metric system was adopted in Japan, the old Japanese measurement unit ‘ken’ was used, a linear value equal to 1.818 metres. It was customary to measure the street frontage of a new temple in ‘ken’ facing the public street, the temple’s corner-to-corner frontage distance is required to be thirty-three ken, an affirmation of the sacred values attributed to the new temple**.** There are many more aspects of Japanese Buddhism that derive from the Buddha’s earliest teachings concerning the symbolism and meaning of the number thirty-three during five and a half thousand years of human history.

SCOTLAND **Loch Fyne in Scotland**

Thirty-three sparkling rounded quartz stone water-worn pebbles were found by Dr Euan MacKie at a prehistoric archaeo-astronomical site on the western shore of Brainport Bay in mid-Argyllshire,

Scotland in 2008. This cache of thirty-three pebbles underscores the widespread practices associated with the symbolical adjectival sacred, regal, heavenly qualities associated with that number.

WORLDWIDE

The islands of Ireland and Britain are the westernmost limit of the world's largest land-mass that is Europe and Asia. About seven thousand years ago, the sea-linked people of Scotland, Ireland and Wales saw the beginning of archaeoastronomy c.5800 BC, mathematics and numbers, the symbolic concept and cosmic values attributed to the number thirty-three. The Irish c.3500 BC Knowth passage mound petroglyphs are the first evidence discovered employing the number thirty-three as an adjective inferring a symbolic sacred value. Other instances followed. It appears the fundamental concept of the symbolism associated with thirty-three crossed the sea from Ireland to Britain not long after 3500 BC. Constructed and dated about c.3100 BC at the Stonehenge site, the ring of fifty-six Aubrey Holes has a circumference four times thirty-three faethms, defining the sanctity of the inner area enclosed by the ring of Holes.

Greek writers in the first millennium BC reported the presence of notable ancient monuments on the island of Britain, no doubt as a result of travellers from the Isles journeying to the Mediterranean countries. The important sacred and regal symbolism attributed to the number thirty-three was presumably at the forefront of travellers' minds as they went from place to place. When an opportunity came for a traveller from the western archipelago to describe his religious beliefs to the people of the Mediterranean, it seems the symbolism attributed to the number thirty-three found ready understanding and acceptance. The life of Pharaoh Thutmosis III of Egypt was recorded on a wall in the Karnak temple precincts; victorious in seventeen battles fought during his thirty-three year reign from 1458 BC to 1425 BC. Later travellers conveyed the simple philosophical idea further steps along the way, from Egypt and then Greece of Herodotus' time around 500 BC, eastwards to Persia and Nepal and the river Ganges valley in India. During the latter part of the first millennium BC, the symbolism and sacred concept of thirty-three was conveyed by Ku Shan merchants on their Silk Road travels.

The Twentieth Century

Following the conclusion of World War One, 1914-1918 AD, the European forces' ended; In memory of those who did not return after hostilities ended a two minutes silence and the cessation of all public activity in Europe and elsewhere was commemorated by public ceremonies. This annual tribute to the memory of men and women who made the ultimate sacrifice in war is marked on the eleventh hour of the eleventh day of the eleventh month of the Gregorian calendar. The choice of three elevens was seemingly a selection to remember those who had reached ultimate peace. Armistice Day as it was first named, Remembrance Day in our time, ceremonies and customs have continued for almost a century. Those who conceived the idea of commemorating the 1918 Armistice and cessation of hostilities at that particular date and time each year would have known of distant past customs and the symbolism attributed to the number thirty-three, three times eleven. I have been unable to establish any specific link between the ancient symbolism and who conceived the twentieth century custom.

Do you have an answer to the question "Who established three elevens, thirty-three, to commemorate their departed mates?"

The Twenty-First Century

The adjectival symbolism of thirty-three has spread all across the world from Ireland and Britain in the west all the way to the islands of the Japanese archipelago, a world populated by people who have embraced the sacred symbolism associated with the number thirty-three.

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CHAPTER TWELVE :: THE BRONZE AGE

TRUTH, TRADE, TRUST, COMMERCE, COPPER, TIN & ZINC, BRONZE, BRASS & FLINT

"Aros mae'r mynyddau mawr,
Rhuo trostynt mae y gwynt;
Clywir eto gyda'r wawr
Gân bugeiliaid megys cynt..."

"The mighty hills unchanging stand,
Tireless the winds across them blow;
The shepherd's song across the land
Sounds with the dawn as long ago ..."
John Ceiriog Hughes, 19th cent.

SYNOPSIS

Four thousand years ago was a busy time along the coastal waters of north Wales. Early in the second millennium BC an enquiring prospector discovered blue crystalline rock underneath the heather and storm blown stubby trees atop Pen y Gogarth headland, named today Great Orme Head. Pieces of blue rock sparkled green when thrown into the cooking fire, a magical performance. Even more amazing were particles of reddish metal found when the camp fires had extinguished.

In today's metallurgical language, blue tinged malachite copper ore $CuCO_3.Cu(OH)_2$ can be reduced to metallic copper Cu by roasting in a furnace, black Cornish tin ore was similarly treated. An estimated 2,000 tons of metallic copper were produced during the life of the Pen y Gogarth mine. Bronze, the alloy of copper and tin has many uses as a hard metallic alloy; axes, tools, weapons, ornaments. Brass, the alloy of copper and zinc has an appealing lustrous golden colour. These products inaugurated the Bronze Age in the Isles and Europe; ten million bronze axes were made and marketed. A northern sea route developed from Wales to Ireland, Scotland and Scandinavia. A southern sea route from Wales around the tip of Cornwall to England's south coast was a gateway to Europe. Trade in bronze, bronze axes and tin around Britain and across Europe by Cymraeg speaking salespeople was widespread; beliefs, deities, language vocabulary, customs and speech followed the sale of axes throughout Europe and as far as Greece.

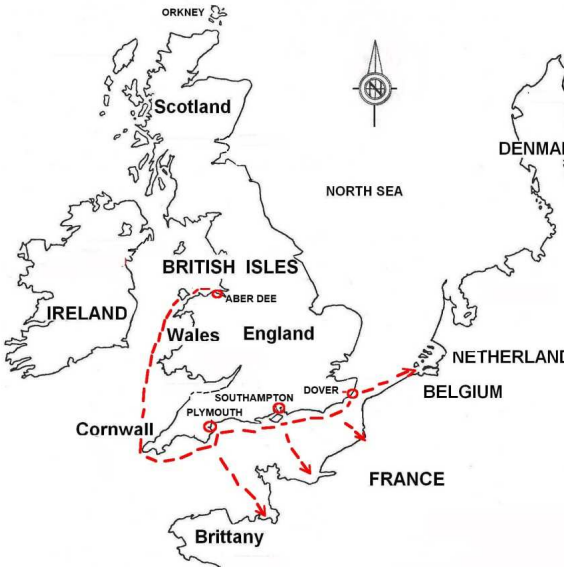
SOUTHERN ROUTE

Shipments of copper tin and zinc ores from Aber Dee to southern Britain for smelting processes were made along a southern route. A complementary southern sea route is predicated from north Wales, west along the coastline, southwards and around the tip of Cornwall, then east by coastal

navigation to any of several harbours along the Channel coastline. Shipment of black tin ore sourced from Cornish tin mines at Tintagel complemented the copper ore trade.

England's Channel coastline Hampshire and Sussex hinterlands were well forested locations in ancient times, ample timber supplies and with opportunities to manufacture charcoal to fuel furnaces refining malachite ore and tin ore to metallic states. Carefully blended proportions of copper and tin in furnaces produced hard and soft bronze alloys, brass artefacts and gold coloured ornaments, all made possible by an extensive refining and metal fabrication industry founded on metallurgical knowledge and techniques handed on from generation to generation.

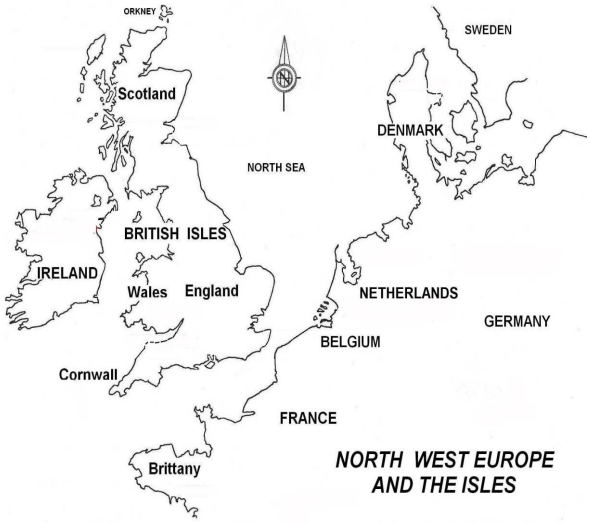
Today's traditional children's tales about the forests of Dean and Sussex frequently mention charcoal burners, their hard lives and onerous living conditions, undoubtedly an echo from prehistoric ages copper and tin industries. Cornish sources of tin ore refined at the same locations, reduced to metallic tin and blended with metallic copper produced bronze; careful adjustment of the percentage proportions afforded softer blends and harder more durable alloy blends, depending upon the required end use.



Two most likely Channel ports receiving ore shipments from mines in Wales and Cornwall are the harbour close to Bournemouth at the southern terminus of Stonehenge track. Further east Chichester harbour is close to the southern terminus of Stane Street, Sussex. A large proportion of an estimated ten million bronze axes made during the life of Pen y Gogarth mine (Great Orme Head) were exported through these ports to Gaul (France), thus initiating the European Bronze Age c.1900 BC. The authors of a Great Orme Head Mine paper estimate about 1,760 tones of copper were sourced from the mine in its lifetime, to which was added maybe 250 tons of Cornish tin = 2,000 tons of bronze; ten million 2kg axes exported across Europe, Scandinavia, Greece; ten million bronze axes in the course of two millennia.

NORTHERN ROUTE

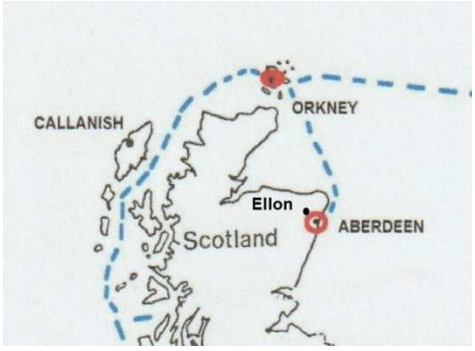
Beginning about 2000 BC, sailing coracles made sea voyages along the north Wales coast carrying copper ore cargoes from the Pen y Gogarth mine (Great Orme Head) to the estuary of the river Dee, Aber Dee, Clwyd. Copper ore was reduced in furnaces to metallic copper. In a similar way, nodules of zinc ore, $ZnCo_3$ zinc spar from the Gwynedd Moelyn mine near Snowdon were also shipped to Aber Dee for treatment in a similar fashion. Copper and tin from Cornwall blended became the alloy bronze, copper and zinc formed brass.



At Aber Dee, copper and tin ores were treated in furnaces and reduced to metallic form fuelled with charcoal derived from forest timber growing along the banks of Avon Dee. Export of crystalline ore, red metal and bronze along a northern route began to destinations in England, Scotland, Denmark and later to Sweden and the Baltic.

NORTHERN BRANCH,

Strong demand for bronze shipments arose in Scandinavia and the Baltic, outstripping the production capacity of Aber Dee. Another smelting site was initiated; a southern branch from Orkney to refine copper ore to metal was fuelled by charcoal made from forest timber growing in the Aberdeen hinterland. Settled and inhabited by immigrant Cymry with metallurgical knowledge and charcoal manufacturing experience, an industrial complex arose on a site now named Ellon. Charcoal has been found in near Ellon. Development of an area and naming of the area's creeks and rivers has an Old Cymraeg language flavour. The river is now named Ythan , (originally '*y Llan'* = *'*of the village'). The river estuary and port's name derived from Clwyd's Aber Dee with 'n' added to complete the noun Aberdeen; a foundation perhaps 1700 – 1500 BC, the location of Aberdeen city today. Copper bronze and brass trade along the northern route from Wales to Scandinavia continued for millennia. Nautical traditions and navigation techniques learned in those times served later in the first millennium AD Viking expansion and exploration of Iceland, Greenland and Canada; the 64 point Viking compass.



VIKING COMPASS

Navigation along coastlines and across open waters requires particular skills, techniques and mathematics. The means to accomplish voyages on a consistent basis was the ancient compass, a wooden disc having thirty-two notches around its perimeter. The vertical shadow pin enabled the north direction to be found every day at noon, the course direction pin was set by the ship's navigator for the desired course on which to sail. Two illustrations offer views of my replica model based upon a Norse Viking navigation compass artefact found last century at the western Greenland settlement

Brattalid founded by Leif Eriksson, son of Eirik the Red, the artefact dated about 1000 AD. The replica compass illustrated with sixty-four notches around its perimeter is predicated to have been employed by the sea-linked peoples of north-western Europe before 3000 BC and the erection of a ring of 64 stone columns at the Ring of Brodgar, Orkney's main island. Denmark's Tustrup ancient monument and the Ring are both dated about 3100 BC. Tustrup had several satellite *dysernne* dispersed at sixty-fourth directions in relation to the coastal central Tustrup *stendysserne*. Use of a like Viking navigation compass device enabled Leifr Eiríksson (970 – c. 1020) to establish Vinland; L'Anse aux Meadows on Newfoundland, Canada at the end of the first millennium AD.

Sixty-four Directions

Precedence for these sea-going navigational techniques is predicated with prehistoric voyages from Scotland's Orkney to Denmark's Tustrup along the 57th - 59th latitudes. Navigation using the wooden Norse Viking compass navigation device ensured consistency and reliability in fourth millennium BC.

FIVE BRONZE AXES

April 2018 saw *the* archaeological find of the year. Five large bronze axes were found by the use of a metal detector in a field in Midtjylland, Jutland, Denmark. Shown in the left of the illustration, the larger bronze axe has a length close to 30cm and a mass close to one kilogram. The smaller axe is about 25cm length. Presently being conserved in Midtjylland Museum under the auspices of Director Constanze Rassman the artefacts should be on public exhibition in the near future. It is conjectured these two axe artefacts represent ten million axes and other bronze and brass artefacts manufactured in Wales and traded across Britain and across the North Sea to Europe in the 2nd and 1st millennium BC.

PROSPERITY AND A TOAST TO SUCCESS

Ongoing from about 2000 BC, for a thousand years charcoal makers, malachite tin and zinc ore ore miners, furnacemen, sailors and the wider Brython population worked to produce ten million axes and other bronze and brass artefacts in strong demand from sea-linked peoples across Europe.

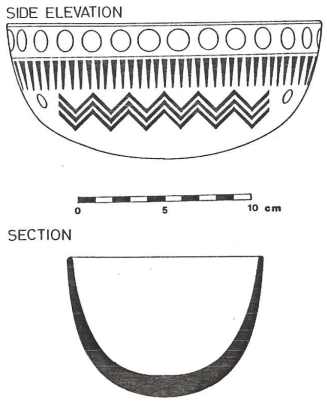
Envisage the Law-Giver seated at the head of a long table within the great hall at Caergwrle, the Vale of Clwyd, Wales. The Mold Cape covered his plaid jerkin and upper body. Ofyd, Bard, Druid, miners, charcoal burners, furnace operators, sailing coracles' captains, men and women of like kind were seated around the table. Matters of bronze and brass production, land and sea transport, sales of axes and other goods were negotiated and deals struck. As was their duty, senior Ofyds reviewed contract terms, Bards composed rhyme and song to ensure accurate remembrance, a Druid's team finalised charcoal burner logistic problems and initiated new furnaces for metal production. The Caergwrle Bowl passed from one to another, speeches were made, each person swearing truthfully to uphold the contracts entered into. Considerable wealth was created by trade in bronze axes and tools, brass ornaments, hard work. Metallurgical knowledge and artistry effort in

the north Wales valley of Avon Dee, Clwyd (Denbighshire) was rewarded by two notable artefacts; the gold Mold Cape and gold foil appliqué Caergwrle Bowl.

THE MOLD CAPE

The U.K. Post Office 2017 postage stamps feature the Mold Cape on the £1.52 value stamp; shown right the Mold Cape image is courtesy British Museum, London. Found in 1833 AD within a Bronze Age burial mound in a field named *Bryn yr Ellyllon* at Mold, a Clwyd Valley village, the Mold Cape has been expertly dated between 1900-1600 BC, early in the Bronze Age period. A one piece shoulders sized cape formed in hammered gold sheet with heavily indented ornamental designs was shaped to amply cover a person's shoulders, torso and upper arms. Observe the phonetic similarity between *Bryn yr Ellyllon* near Aber Dee, Clwyd, Wales and today's *Ellon* township situated in the hinterland west of Scotland's Aberdeen. *Browse for an Earth view* 'Ellon Aberdeenshire Scotland '

The Vale of Clwyd wider area should be regarded as a metropolitan zone in the Bronze Age, densely populated and noteworthy. A circumstance known to the Romans in later times; Chester legionary centre was by far the largest military town in Britannia Province with an 8000 seat coliseum.



THE CAERGWRLE BOWL

It is reported the Caergwrle Bowl artefact was found in 1823 close to Caergwrle Castle near Wrexham in the valley of Avon Dee, Clwyd, North Wales. The refurbished Bronze Age bowl shaped vessel can now be seen at Amgueddfa Cymru, the National Museum of Wales in Cardiff, South Wales. The Bowl was almost certainly made of black Kimmeridgian oil shale rock sourced from the Channel coast off Dorset in the west of England. Its date of manufacture has been expertly estimated at about 1200 BC, the British Bronze Age.

Design & Workmanship

In plan view, the vessel is oval with the long axis measuring 182 millimetres and a short axis 112mm, a length/width ratio of 1.62, the architects Golden Ratio Number design rule. The oval vessel volume is approximately three quarters of a litre. Newly manufactured and in its original state, the applied gold foil ornamentation offered a vivid contrast to the matt black material of the vessel, an overall design a testament to its designer and maker. Around the lip of the vessel, a band of gold foil has a series of ring impressions. Damage to the lip area prevents an accurate count

but allows a guess at the number originally formed. Taking into account slight variations in size of the rings, my best estimate is a total of seventeen, a number whose adjectival use in myths and legends is often used symbolically to indicate half-way to the ultimate.

Immediately below the lip is a continuous ring of gold foil elongated wedges. At a guess, the design proportions indicate about thirty-three elongated vees both sides of the oval Bowl; the Bowl's present condition prevents a better estimate of the numbers. Below the ring of wedges, the Bowl has three parallel rows of zigzags on both sides of the artefact, their condition sufficiently satisfactory to draw conclusions concerning their purpose. I have been advised each zig and zag consisted of a slender rolled slug of metallic tin foil around which a portion of gold foil had been wound. These gold covered tin slugs were let into grooves cut into the black shale rock base. The goldsmith set seventy-two slugs into the black base material to form three zig-zag rows on each side of the Bowl, each zig and zag apex is taken as a unit count of one. Progressing along the first row the count was \/ = 1, then \/\ = 2, and \/\/ = 3 and so on to \/\/\/\/\/\/ = 11. Parallel with the first row, the next two rows below also sum to the same number. Hence the sum of three rows = 3 x 11, a count of thirty-three on both sides of the Bowl in the face of persons opposite each other as they made the toast. Use of thirty-three in this manner symbolically infers the highest, regal.

Two pairs of rondels 14mm diameter are observed; these are guides to place left and right hand fingers and thumbs in positions where the mass of the heavy Bowl can be held with safety by the person making a toast. Underneath the Bowl's black Kimmeridgian rock base heavy grooves are observed; their purpose thought to ensure stability when the heavy liquid filled Bowl was passed from one guest to another by a servant on a sand coated the tray.

The name 'Caergwrle Bowl' Recent History

On an earlier tour of several museums in England, the Caergwrle Bowl exhibit was categorised as a model boat, an opinion based upon its oval plan shape and semi-circular side view. Earlier papers by Meyrick and Barnwell say they were apparently satisfied the vessel was a cup or bowl, both authors making no mention of its supposed image as a boat. There are no indications of nautical accoutrements such as a prow, a stern, seat fixings, sail posts, rudder, oars, rowlocks or even a keel. I am unable to accept the unfounded boat proposition because the several distinct applied gold foil patterns and design factors override a naïve opinion of that kind, a simplistic view that entirely ignores the highly symbolic aspects of the Bowl's design elements and its function as a vessel to toast a neighbour and pledge honest terms.

Cymraeg Mutations, *Treiglad Meddal*

In the context of Bronze Age trading commencing about 2000 BC based on the resources of Great Orme Head copper ore mine, honesty and truth, integrity and trust between individuals and groups was essential. The name 'Caergwrle' requires examination from a philological perspective. The Cymraeg language has a characteristic feature of 'mutation', a smoothing of a transition from one spoken word to the next when a harsh consonant ends a word and a second harsh consonant begins

the next; for instance "Nadolig y cyfarchion" [Christmas Greetings] where 'g' and 'c' are adjacent becomes "Nadolig gyfarchion". The English term 'Caergwrle Bowl' has been considered in relation to Cymraeg mutation grammar rules. It is argued the word 'Caergwrle' is a nineteenth century English interpretation of local people's spoken Cymraeg advice offered to English speaking Ordnance Survey staff concerning the name of the nearby castle. English military survey team officers mapping Wales wrote 'Caergwrle Castle' on O. S. maps about 1805.

The term 'Caergwrle' is viewed as a two word merge of Cymraeg 'caer' meaning 'castle', 'fort', 'big house' followed by 'gwrle' = 'caergwrle'. The second syllable 'gwrle' spoken after 'caer' mutates to 'gwrle' from 'cwr' or 'cywir' meaning 'sincere, true, honest', a strong 'k' sound. Equally a direct translation of the Cymraeg 'gwir' is 'truth' in English. The spirit of 'Caer-gwrle', 'Caer-gwir', 'Caergwir' linked to the noun 'Bowl' is interpreted as "Castle of Truth", "Castle of Honesty", a place where truth honesty and justice reigned; qualities demonstrated by guests participating in a toast to demonstrate their sincerity, commercial people sealing terms of contracts.

Trade in ores, charcoal, metallic copper and bronze axes began around 2000 BC along sea routes from the Great Orme Head mine along the north Wales coast and Aber Dee, west to Ireland. Sea voyages further north to Scotland, Orkney, Scandinavia and beyond created the Irish, British, Scots and Scandinavian Bronze Ages. To conduct trade and commerce over distances and from one generation to the next, honesty and trustworthiness are essential ingredients. The Caergwrle Bowl is viewed as proof of customary toasting practices in Wales in the millennia BC. There is a fundamental reason for these expressions of mutual trust and honesty amongst a group toasting their trust in each other. A cultural link between one community and the next engaged in the copper ore trade had to be based on strong expressions of truth and honesty and the trader's Cymraeg language. Custom took the form of 'Cywir' 'Gwir' ceremonial toasts, expressed today by 'Quaich' ('kwake') in Scotland [The spelling 'qu' in Scots vocabulary arose several centuries ago when French influence on the Scottish court and intelligentsia was highest] and 'Sköl' in Scandinavia. Ceremonial customs accompanied the bronze axes and tools; three toast expressions have strong consonant sounds, closely similar liquid bowls are a factor. Irish Gaelic has a similar toast word and beverage vessel. Two millennia of international bronze trade required high standards of trust and honesty. A focal centre for copper industry commercial practices, Caergwrle Castle in the north Wales Clwyd valley of Avon Dee is predicated as such a centre, a home for the Truth Bowl. Today, the annual Edinburgh Military Tattoo ceremony features a toast "slainte". London's Royal Society of Apothecaries dinner is marked by a toast; a bowl of beverage is circulated amongst members present.

Y Caer Gwir Cawg, Clwyd, Cymru, c.1200 BC
The Caergwrle Truth Bowl, Flintshire, Wales

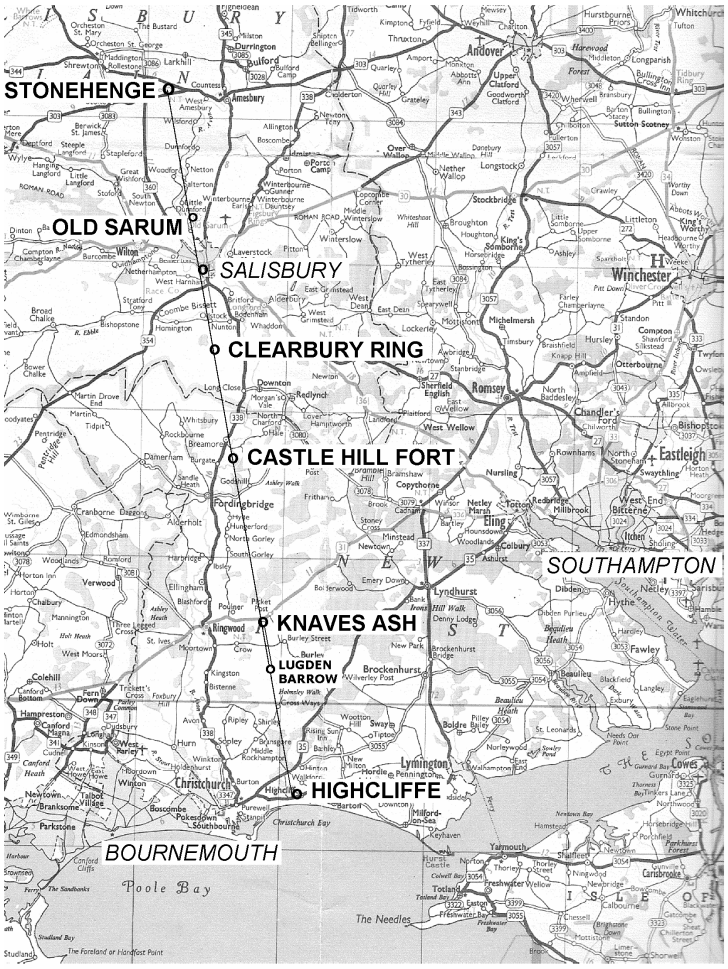
Ceremonial Use

The glittering artistic appearance of the newly made black and gold Bowl indicated its considerable importance to all who witnessed a ceremony when it was displayed and used. Gold foil applied on a background of black has very strong visual appeal. The ornamentation, design and arrangement of the several features are particularly worthy; the important symbolism portrayed by design elements requires understanding and acknowledgement. To seal a Bronze Age commercial trade deal by a toast between two negotiators, enhanced by the multiple expressions of thirty-three on the Bowl signifying the highest of high quality, contract terms would be toasted and remembered, to be fully complied with in the future. At a wedding ceremony, the royals would have declared their mutual bargain by a drink of wine from each side of the Bowl. An internal volume of the Bowl, approximately 750 mL or three cups is an ideal drinking vessel for circulation among guests at a royal toast. Perhaps it contained locally brewed mead or red wine imported from Mediterranean countries, long a favourite of the nobility in Brython, later Britannia, as evidenced by many early style amphorae found at numerous archaeological sites.

The various design elements indicate the Bowl would have held pride of place at a betrothal or wedding of a regal couple. At the most auspicious moment, it is supposed the *Brenin* and his consort the *Brenhines* toasted good health and prosperity (thirty-three counts), the couple's future, a family (the ring of 17 rondels). Having regard to other instances where thirty-three was linked with high status events, regal places and persons it is reasonable to conclude the Bowl had strong symbolic associations with two important persons facing each other on opposite sides of the Bowl. The Caergwrle Bowl was, in my opinion, equally suitable to serve as a toasting vessel or betrothal cup used on important occasions such as community and trade ceremonies, business dealings, weddings, anniversaries and blessing a newborn child.

Now to the straight routes along which many feet trod to transport ore, metals and charcoal to make the Bronze Age happen .....

Because a straight line is the shortest distance between two points.



HIGHCLIFFE TO STONEHENGE LINE 49.6 km

STONEHENGE TRACK, WILTSHIRE & HAMPSHIRE

Established about 3100 BC, a first stage Stonehenge fifty-six Aubrey Holes excavated into the chalk strata had the functional ability to forecast the next total eclipse of the Moon. By means of forward move counts around the ring of fifty-six Aubrey Holes, cycles of eighteen years and eleven days were counted, in later millennia named the 'Saros' Cycle. The Salisbury Plains site for Stonehenge was chosen to allow clear visions of moonrise and moonset on far distant horizons. Inland from a cliff-top viewpoint on the Channel coast line at distances of whole number staen, Castle Hill and Clearbury Ring earthworks are notable prehistoric sites defining the twenty-two staen long straight line track northwards from the coast to Stonehenge. Hinterland forests supplied timber to feed the voracious appetite of innumerable furnaces for charcoal production spaced along Stonehenge track and Stane Street. Bronze Age people presumably traversed the Stonehenge Track carrying newly made charcoal towards Highcliffe furnace sites in the vicinity of Christchurch harbour:-

Place name	**kilometres**	**staen**
Stonehenge	0.0	**0.0**
Old Sarum	12.5	**5.0**
Clearbury Ring	18.06	**8.0**
Castle Hill Fort	27.30	**12.0**
Knaves Ash	38.45	**17.0**
Highcliffe	49.65	**22.0**

STANE STREET, SUSSEX

To the east, Chichester harbour is near the southern terminus of Stane Street, Sussex. Distant places along the forked track are at increments of 3 *staen leagues.* Charcoal production in forested areas now named Dorking and

Brockham was transported south to fuel furnaces around Chichester.

My illustration of the Stane Street track in Sussex was prepared several years ago. Since then I have re-titled the BRYTHON MEASUREMENT VALUES units in a consistent way; the nomenclature length units changed from 'Mg' - 'megalithic leagues', please now read '*staen* leagues'.

Three staen leagues approaches twenty kilometres, considered a day's portage distance carrying a load of charcoal from a forest sites to several furnace destinations in the vicinity of the harbour. Named locations along Stane Street; Rowhook and Pulborough were sites for over-night lodging premises frequented by human charcoal carriers. A third day's porterage southwards to Halnaker brought the charcoal fuel close to the site of many ore reduction and metal alloying furnaces near Westhampnett and Bognor Regis close to Chichester harbour.

TIN

Now to Cornwall and the tin ore mining trade; the skills to mine shafts and tunnels paralleled the north Wales copper ore activities, mutually complementary in time, form and nature. An aspect of tin mining is the cumulative toxic properties of tin ore dust; wisdom found precautions were needed to eat food and avoid the poison initiated the development of the 'Cornish pastie'.

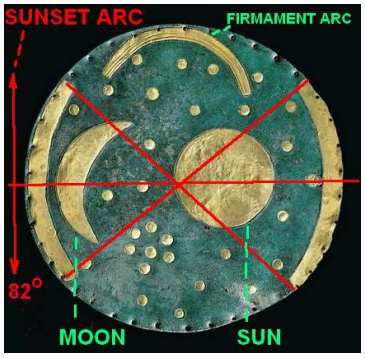
You may be familiar with the 'Cornish Pastie', a favourite pastry snack of communities linked with Cornwall, south-west Britain. A pastie consists of cooked vegetables with meat or fish wrapped in a folded envelope of flour pastry, semi-circular in shape, arc edges firmly sealed by crimping

before baking. Readily portable, one or two pasties with a leather container of water was the day's food for yesterday's tin miner working a shift in Cornwall's tin mines. When baked, the pastie pastry arc edges become firm, serving the purpose of supporting the pastie contents whilst the food is held, a pastie meal held in two hands with thumb and forefinger gripping the arc edges was consumed without any risk of ingestion of metallic tin compounds. At meal time the miner held the parcel securely by the rigid crimped edges and nibbled the pastry and its contents. Miners work-soiled hands impregnated with black tin ore particles did not contaminate the food; a health and safety measure. After meals end the ore dust contaminated crimped edges were discarded, to be consumed by rats inhabiting the mine.

THE EUROPEAN MARKETS & BRONZE ARTIFACTS

The noun 'bronze' occurs almost universally in modern European languages; seen as evidence the word arose from a common source; the sales men and women from Wales, vendors of bronze axes to Continental buyers in the millennia BC. I suggest browse the Internet for a translation; from west to east as far as Greece the word 'bronze' is there.

When the practical uses of axes and other artefacts had ended, worn out bronze items and how to re-use the alloy metal is evidenced by a series of instances, metallurgical knowledge was evidently made known to the Neolithic European societies by axe traders. Three instances are quoted in south-eastern Germany, Greece and France:-



NEBRA SKY DISC, GERMANY

First, far to the east of England, a Bronze Age hilltop tomb in southern Germany near Nebra village was subjected to grave robbers' ransack in 1999. Based upon other artefacts found later at the site, a date of about 1600 BC has been attributed to the find. They found a bronze disc, thirty-two centimetres diameter, clearly of great anthropological and archaeological value. The bronze sheet portrays images of the Sun, Moon and a number of stars with three arcs close to its perimeter edge, all gold foil appliqué items. Thirty-three stellar items displayed on the Disc indicate its immense importance and highly sacred value. The Nebra Sky Disc is a representation of mythical stellar deities and concept of an overhead firmament shield created to protect mankind from aggression by wicked gods from the Otherworld, the same traditions as Ireland's Knowth K15 kerb stone petroglyph c.3500 BC, Avebury's creation in England and much later in Sturlusson's Norse saga around 1200 AD.

GREECE

Yale University Art Gallery, Newhaven, Conn, U.S.A. has on exhibition titled 'Running Gorgon', a bronze statuette standing about nine centimetres tall. Cast in the Archaic Greek Period about 540 BC, the running figure has 'wings' and unique footwear reminiscent of Apollo's winged feet. Workmanship is a high standard, the founder clearly had sound knowledge of metallurgical processes. Of particular interest, it is relevant to establish whether the bronze alloy metal from which the cast figure was produced

originated in north Wales, the Pen y Gogarth copper ore mine. The percentage proportions of copper and tin together with traces of other metals and any impurities would make interesting reading. Metallurgical spectrographic analyses based on a series of tests are required to assess the Running Gorgon's metallic bronze alloy origins.

COLIGNY PLAQUE, FRANCE; PIECES MOUNTED ON A BACKBOARD

Two thousand years ago, a bronze sheet about 1½ metres by 1 metre and 5 millimetres thickness was broken into small pieces, placed in an earthenware jar and buried at a site near Coligny, Ain Province, France. It was re-discovered when unearthed in 1897 AD. The bronze pieces have now been *Photograph courtesy M. le Director, Lyon Museum, France.*

asssembled in the manner of a jigsaw puzzle; mounted on a board they reveal a yearly twelve-month lunar calendar, its cycles repeated five times. Named the Coligny Plaque, it is inscribed with words in capital letter Latin characters, not Roman names but purely Celtic core words with added terminations. Considered a most important ancient artefact, the Coligny Plaque portrays a comprehensive Moon calendar, twelve months a year, five day weeks, six weeks a thirty-day month. Every other month lost one day of the fourth week to maintain a fifty-nine day bi-monthly lunar cycle. The twelve Moon month names are *Samonios, Dumannios, Rivros, Anagantios, Ogronios, Cvtios, Giamonios, Simivisonnios, Eqvos, Elembivios, Edrinios* and *Cantlos*.

The Coligny Plaque is a record of native Gallic Celtic language at that time; half the month names are early Welsh Brythoneg and half early Irish Gaelic, demonstrating CelticGallic links with both Brythonic and Gaelic languages. I translated the month names thus; the first month SUMMER, SECOND month, THIRD month, HOARD month, OGRE month, SHELTER month, WINTER month, BUDSWELL month, LAMBING month, SPRING month, BETWEEN month and lastly FULL CIRCLE month.

Archaeologists suggest the Coligny Plaque was manufactured between 200 BC and AD 50. Having regard to the known and deduced features, I consider its actual date of manufacture could be many centuries earlier. A skilfully made bronze article could properly belong to the Bronze Age well before 100 BC. The Gallic names inscribed on the Coligny Plaque illustrate particularly significant words; written using the Latin alphabet and numerals but not the Roman language; twelve Celto-Gallic Coligny Moon month names may seem strange to us today but they would have been very familiar to Moon calendar's adherents two thousand years ago. Gaulish Celtic communities lived agricultural lives, twelve Coligny Plaque month names reflect this.

CELTIC BARDS CHIEFS & KINGS

Contemplating all that has gone before these pages I sought answers to the questions; why, what, where, when, who and how. Answers came from an unusual source; it was my good fortune to receive a copy of George Borrows' 1830 manuscript "Celtic Bards Chiefs and Kings" published in 1928 by John Murray, London. My copy has several pages uncut, making it difficult to easily read those text pages, courtesy of the State Library of Victoria photo-copies of these pages from their

edition of "Celtic Bards Chiefs and Kings" were mailed to me, a compact disc containing the eight pages of text; page 34 text follows **Chapter II;-**

> "We now proceed to give some account of the Welsh. We commence from a very early period, quoting from a Welsh triad: "These are the three artificers of poetry and record amongst the nation of the Cymry: Gwyddon Ganhebon who was first in the world invented vocal song, and Hu the Mighty who first invented the means of recording and preserving vocal song; and Lyndain the father of the Muse, who first gave rules to vocal song and a system to recording, and from what these men effected bards and bardism are derived, the dignities and customs pertaining were arranged systematically by the three original bards who were Plenydd Alon, and Gwbon." So here we have an account of the manner in which bardism originated, which account no one at the present day can confute or is bound to (dis)believe. The dignities spoken of in the triad [refer] to three orders, termed respectively Bardd, Ovydd, and Derwydd, or Poet, Philosopher, and Druid, which constituted what is called Barddas or bardism . Th motto of this institution was "*y gwir yn erbyn y byd* (truth against the world)" from which it would appear that bardism was instituted for the purpose of propagating truth and trust. Bardism, or, as it is generally, though improperly, styled, Druidism, was the fount of instruction, moral and religious, in Britain and in Gaul. *The* (x) *for context.*

The quote Borrow's own words, its phrases and context emphasise several fundamental principles of Cymry Bardic behaviour: with explanatory comment and support:-

- "*y gwir yn erbyn y byd*" is translated literally from Cymraeg to English as 'truth against the world'. I perceive this motto to mean, to have the sense of "maintain the truth" or "truth against *the lies* of the world".
- "Bardism was instituted for the purpose of propagating truth". An essentail basis for commerce and society's continuing function has been social forms of association; trade guilds of the Middle Ages; professional Institutes and Associations are plentiful in the modern world. The principal of a group with common interests preserving truthful standards continues today; a Parliament.
- Today; Mahatma Ghandi asserted "Truth is by nature self-evident".
- The triad refers to three orders; termed respectively Bardd, Ovydd, and Derwydd, or Poet, Philosopher, and Druid". Bardd is elsewhere explained as the literary person who is conjures words, forms ideas into poetry so they can be remembered and preserved for future use and applications. Ovydd, the philosopher is the class of person who is the scientist, the knowledgeable specialist who knows the truths, rules and principals, basic facts, fundamentals. Derwydd, the Druid is the wider class of person who directs and builds; architect, engineer, surveyor.

Stonehenge is the classic example of Bardism in operation and action. The monument's joint functional purposes; two methods of foretelling the next lunar total eclipse, tallying both Sun and Moon calendars. The entire Stonehenge design employed 360 parts of a circle, oval geometry, linear distances, the [Fibonacci] progressive arithmetic number series, all centered around its midsummer sunrise axis. Long after 3100 BC and 2500 BC, Bardism principles enabled later generations to continue Stonehenge academic traditions, the Sun and Moon calendars systems continued in operation for the next two millennia. Our ancestors learned by rote, thought in whole numbers,

knew names and places, arithmetic multiplication tables, personal ancestry generations, mottoes and recipes, children's nursery rhymes, speech. These examples continue in our world today. Because our life and learning is so much more detailed and scientifically complex with decimalization and intense accuracy, learning by rote has taken a back seat. The written word, printed books, electronic digital devices, these are today's literary tools.

BRONZE AGE GREECE 1400 BC to 300 BC

Ancient Middle Eastern and Mediterranean societies prospered in a variety of ways; the records are there for a reader's research efforts to be rewarded. Jericho tower is the classic example; an eastern Mediterranean settlement's five metre high structure dated around 8000 BC is a Stone Age marvel. Lands between the Euphrates and Tigris rivers to the east of Jericho saw the emergence of a series of kingdoms and empires; the Akkadian Empire ruled by Sargon the Great was known for his conquests of the Sumerian city-states in the 24th to 23rd centuries BC, contemporary with western Stonehenge c.2500 BC and it's multiplicity of stone columns and Sun and Moon calendar systems.

Beginning about 2000 BC Brython society exported ten million bronze axes, brass ornaments, and other products from the north Wales copper industry to Europe, an industry that would have reached a peak by 1400 BC extending as far as eastern Europe and the Mediterranean. Mycenaean written linear B writing declined about this time and Greece entered the Archaic Period, a gradual emergence of formative Greek society and culture with a panoply of Greek deities. Most probably the celestial orbs Sun and the Moon were pre-eminent. Lesser deities reflected the wants of an emerging society. Historical references to early communities in the Isles are few and far between, however we have a record by Diodorus of Sicily from about 40 BC. Quoting the translation in full: -

> "Hecataeus of Thrace [who lived in the fourth century BC] had told of the mythology of the ancients and how opposite the land of the Celts, [i.e. Gaul in Western Europe] there existed an island not smaller than Sicily, and which situated under the constellation of the Bear is inhabited by the Hyperboreans, who are called by that name because their home is beyond the point where the north wind [the Boreas] blows. And the land is both fertile and productive of every crop, and since it has an unusually temperate climate it produces two harvests each year.
>
> Moreover, the following legend is told concerning it, [the land of the Brython]. Leto, mother of Apollo and Artemis (Zeus was their father) was born on this island, and for that reason Apollo the Sun god is honoured among them above all other gods; and the inhabitants are looked upon as priests of Apollo after a manner, since daily they praise this god continuously in song and honour him exceedingly. And there is a notable temple that is adorned with many votive offerings and is circular in shape. Furthermore, a city is there which is sacred to this god, and the majority of its inhabitants are players of the cithera [the harp]; and these continually play this instrument and sing hymns of praise to the god, glorifying his deeds.
>
> The Hyperboreans also have a language ..... peculiar to them, and are most friendly disposed towards the Greeks, and especially towards the Athenians and the Delians, who have inherited this goodwill from most ancient times. The myth also relates that certain Greeks visited the Hyperboreans and left behind them costly votive offerings bearing inscriptions in Greek letters. And in the same way Abaris, an Hyperborean, came to visit Greece in ancient times and renewed the goodwill and kinship of his people to the Delians.

They also say that the Moon, as viewed from the island appears to be a little distance from the earth and to have prominences, like those of the earth, which are visible to the eye. The account is also given that the god visits the island every nineteen years, the period in which the return of the stars to the same place in the heavens is accomplished; and for this reason the nineteen-year period is called by the Greeks 'the year of Meton'. At the time of this appearance of the god, he both plays on the cithera and dances continuously the night through from the vernal [Spring] equinox until the rising of the Pleiades [stellar group], expressing in this manner his delight in his successes. And the kings of this city are called Boreades, since they are descendants of Boreas, and the succession to these positions is always kept in the family."

My reasons for quoting Diodorus are the specific references to language and communication between an Isle [of Britain] in the far west and Greece in the east. Trade in bronze goods from Wales to Europe of necessity required commercial support in the form of ambassadorial representatives and sales people; profits of trade had to be returned to the makers of bronze and brass goods. Natives of western lands who ventured to Mediterranean countries talked of bronze and brass goods to their customers in Cymraeg, their own language. Cultural exchanges accompanied those commercial deals. The Diodorus quote of Archaic times relates *"And in the same way Abaris, an Hyperborean, came to visit Greece in ancient time and renewed the goodwill and kinship of his people to the Delians".* Another tale tells how certain Greeks visited the Hyperboreans (in the far west) and "*left behind them costly votive offerings bearing inscriptions in Greek letters……."* (most probably at Stonehenge).

Two nouns need thought; "*Abaris, an Hyperborean".* Old Welsh customs named a son by inserting a preface 'ap' before the father's name, meaning 'the son of'. Richard's son was formed into 'ap Richard', the son of Richard, mutating to 'Pritchard'. Evan's son becomes 'ap Evan', becoming 'Bevan'. The son of Rhys was known as 'ap Rhys', to mutate and become 'Price'. I speculate the name '*Abaris*' was not a Greek name but had its origins in the native land of the bronze goods vendors; 'ap Aris' or 'ab Aris', the 'son of Aris'. Turning to '*Hyperborean',* the term *'hyper'* is translated as 'extra', 'further', 'more than'. The Cymraeg greeting "Good morning" is "Bore da", from which sense I aver '*borean'* implies 'morning'. The combination word '*Hyper-borean'* seems to involve a sense of 'beyond' the Pillars of Hercules (Gibraltar); a term relating to the western land of 'morning' and dawn, welcome to the the land of Heul (= Sun).

HELIOS

Cymraeg (Welsh) noun for Sun is 'Heul' and sunshine is 'Heulwen'. The personification of Sun in Archaic Greek mythology is Ἥλιος *Hēlios*. The two syllables; 'Hel' and 'ios', their origin and spoken sound of the deity's name is worthy of question; observe the strong phonetic relationship between the Cymraeg 'Heul' and the ancient Greek '*Hēlioss'*. Seemingly Archaic Greek tradition adopted the western deity's name Heul = Sun in a direct manner; Heul + ios = *Hēlios*, their Sun deity.

APOLLO

Another Archaic Greek deity of the prehistoric era is 'Apollo'; the deity of light, one who travels with the speed of light, often portrayed with winged feet. Sunshine emanates from the Sun, a very visible phenomenon on a misty morning midst valleys in mountainous parts of Greece. How did the name

'Apollo' develop? In the Welsh naming tradition I suggest *Hēlios*s the Sun deity had a mythical son, the light emanating from the celestial orb would be along the lines of 'ap Heul', a term that in time mutated to 'Ap heul', then 'Ap-eul' and 'Apeullo', eventually 'Apollo'. Seemingly Archaic Greek Age priests adopted the deity's name and concept in a direct grammatical manner from Cymraeg traditions.

LETO

A Greek myth relates how Leto was from the far west, her hair and complexion fair. She bore a fair haired baby boy, allegedly conceived by Helios, a western child who played with local native Greek children. One very fair haired, fair skinned Brython boy was distinctive among a gaggle of bronze skinned dark haired Greek children. The mother's club dubbed him 'ap Helios', hence 'Apollo'. He grew up and returned home to the far west, leaving a memory behind of a fair haired western boy who played with dark haired Greek children. "Women's business" talk and the Apollo story became part of folklore, to be amplified to account how Apollo could have been an offspring of Helios and Leto in a mythical way.

ZEUS

Zeús was the sky and thunder god in ancient Greece. A particularly notable feature of Greek vocabulary is the almost complete absence of 'z' in words; Zeus is the notable exception. Ancient Greek language Zeús is king of the gods on Mount Olympus, an allegiance similar to the north-western deities Thor and Odin. What better link with the noise thunder is there than the impact of a heavy bronze axe on a stone anvil and the resultant loud clap of noise. My thoughts led me to conclude the Old Cymraeg word 'bronze' widely used elsewhere in Europe and now Greece was a phonetic basis for the name 'Zeus'; BRON**Z**E--- **Z**EUS.

GOVERNANCE

Accompanying the bronze axe trade, and the ancient Welsh language and formation of a nascent Greek society about 1400 BC, there is every possibility matters of social organization and governance were discussed between axe salesmen and women and their Greek hosts. With the creation of the name Helios for their Sun Deity, tales about Leto and Apollo, Greeks could also have learnt stories about the Mold Cape and parliamentary style meetings about the many and varied Bronze Age industrial activities; mining, smelting, charcoal, travel by land and sea.

A form of Greek societal organization could well have arisen as a reflection of their visitors descriptions of parliamentary style proceedings presided over by the 'Law Giver' wearing the Mold Cape, the to and fro of discussions on Bronze Age logistic problems; the 'representative form of democracy' reputation of Greek civilization was inherited from Cymry bronze axe traders.

THE WORD BRONZE

Originating about 1400 BC, three Greek Archaic Age deities whose names are linked with European bronze trade artefacts demonstrate the extent and range of Cymry influence on eastern Europe and Mediterranean, the degree to which Cymraeg nouns were absorbed into a new Greek language. Added to three deity's names are other European Bronze Age era words reflected in modern languages; German, Scandinavian group, French, Hungarian, Spanish and Greek; all now include a noun spelled and pronounced very close to the English 'bronze'. Sales of ten million bronze axes across prehistoric Europe and today's European languages have a contradiction in modern Welsh.

English/Cymraeg (Saesneg/Welsh) dictionary references translate 'bronze' as 'pres'. The matter is under review; sources and reference bases for present day Cymraeg Welsh dictionary references and translations demand a thorough re-examination. Cymraeg (Welsh) for 'bronze' should be 'bronze' and for 'brass' should be 'brass'; not 'pres' used for both alloys. Observe three names initial letters 'b' and 'r'; rather more than a chance coincidence – Brython the country; alloys of copper and tin Bronze and Brass, Brython, Britain, Britannia, Brittany, brother, broad and bread.

Trade in bronze axes, tools, brass accoutrements and other goods to Scandinavia, Gaul, to eastern European and Mediterranean countries necessitated sales teams, travellers who offered Stone Age customers metal usage advice and information about their Bronze Age products. Said to be the oldest language in all Europe from Stonehenge times, Cymraeg (Welsh) contributed to Archaic Greek Age language development, mathematical knowledge with elements of arithmetic and geometry. From bronze sellers in the centuries 1400–300 BC who made contributions to Greek language and academic reputations the noun bronze is written " μπρούντζος ".

MATHEMATICIANS

The Greek Geometric, Archaic and Classical Periods 1400-300 BC are notable for the teachings of two Greek mathematicians Pythagoras and Euclid; their mathematical work concerned numbers, arithmetic and geometry, the properties and concepts of circles, ovals, triangles and right angles. Pythagoras the philosopher and mathematician conducted a school on the Greek island of Samos. He considered numbers were an important mathematical tool, two aspects of his syllabus were significant; the Fibonacci number series and that odd numbers were superior to even numbers. When odd whole numbers are halved into two parts, a unit always remains, halving even numbers does not.

By definition, prime numbers are those when halved a unit is a remainder; classic examples are 1 - 17 - 33. Britain's ancient monument Stonehenge c.2500 BC was based upon design elements of linear distances, stone columns and pillars whose numbers and dispersal are tallied by the progressive arithmetic series 1 2 3 5 8 13 21 34 55 89 144 233 377 610 987 1597. Successive numbers are the sum of two previous items; for example 5 + 8 = 13 and 610 + 987 = 1597. Observe how 13/8 etc. = 1.62 the Golden Ratio Number design criteria favoured by architects throughout the ages. It is believed Pythagoras taught this series to his students, an arithmetical series mostly now referred by the name 'Fibonacci' after the Italian mathematician of that name, his book '*Liber Abaci*' 1202 AD featured the progressive arithmetic number series and decimal system.

Euclid

Euclid the mathematician taught in Alexandria, Egypt, during the reign of Pharaoh Ptolemy 323-238 BC. Euclid is often referred to as "the father of geometry", his book *'Elements'* was a most influential mathematics textbook from those early times until the 20th century.

Oval

Most modern European languages include a noun spelled and spoken close to the English 'oval'. Do not be distracted by the synonym 'ellipse', a modern mathematician's term. Stonehenge's five trilithons layout, the central group geometry is an **oval** with a long axis linear dimension of thirteen faethms and a transverse dimension of eight faethms, the Golden Ratio 1.62, *quad est demonstrandum*.

Circle

Diodorus quoted Hecataeus of Thrace in the fourth century BC, who recorded *"And there is a notable temple that is adorned with many votive offerings and is circular in shape*". Stonehenge is **circular** in shape; which leads to the likelihood Bronze Age travellers from Greece described the ancient monument and explained it's *raison d'etre* and design basis. Greek and most European languages contain nouns pronounced very close to the English 'circle'. Cymraeg is 'cylch'. Q.E.D.

Triangle

In the same vein, many ancient monuments in Britain are founded on a triangular design basis whose characteristics include a right angle with sides in the proportions 3:4:5, 5:12:13 and 9:40:41, examples of Pythagorean theorem 'the square on the hypotenuse equals the sum of the squares on the other two sides'. Stonehenge c.2500 BC and Woodhenge c.2400 BC are such instances; refer to Professor Alexander Thom's books for examples and his mathematical analyses. Q.E.D.

Pythagoras and Euclid

Based on my earlier hypotheses, I consider it is reasonable to conclude Bronze Age salespeople travellers from far western Brython sold bronze and brass artefacts to Mediterranean Archaic Greeks who recounted the memorised arithmetic and geometrical properties of Stonehenge and related ancient monuments (*since daily they praise this god continuously in song and honour him exceedingly)* in their poetry and song.

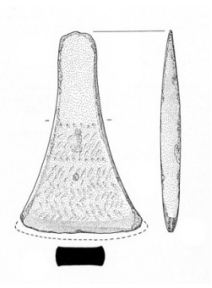
Much later in turn Archaic Period Greek philosopher priest's eventually provided Pythagoras c.570-495 BC and Euclid c.323-283 BC with their arithmetic and geometric knowledge; in our time enabling their mathematical theorems to be recorded in written terms.

Life would be more truthfully recorded if the mathematical and other knowledge presently attributed to Greek Classical savants of the early centuries BC was told in terms of third millennium BC; Somerset's Stanton Drew building; 95 metre and its design, Salisbury Plain's Woodhenge, Stonehenge, Stonehenge Track. Stane Street, Stone Street and Brython Measurement Values:-

BRYTHON MEASUREMENTS table

One 'finga' ≈ 27mm, diameter of Monkton barrow gold disc.
Five 'fingas' ≈ one 'fist', 133 millimetres.
Ten 'finga' ≈ 275 millimetres, the Stonehenge footstep, 360 degrees
2½ 'fists ≈ 'fut', 333 millimetres, Stukeley's "Celtic foot" 1/3^{rdm} metre
2½ 'fut' ≈ 'ford', 830mm, a step forward, Thom's "megalithic yard".
2½ 'ford' = 'faethm', 2.07 metres, Prof. A. Thom's "megalithic rod".
33 'faethms' = 'furlang', 68.4 metres, Long Man's height, a furrow length.
33 'furlangs' = 'staen', 2¼ km = 1.40 statute miles, "a country mile".
2½ 'staens' = 'staen league', 5.65 kilometres.

SELECTION OF BRONZE AGE AXES



Bronze Age

←-----

Courtesy British Museum

CHAPTER THIRTEEN :: BLACK CLOUDS

A WORLD-WIDE APOCALYPSE OF 2240 BC

"Egypt's pyramid builders stopped" "After Stonehenge, what next?"
"Sodom and Gomor'rah …….. brimstone and fire"

Civilisations collapsed about 2240 BC; chaos reigned around the world.

SYNOPSIS

Why vibrant and well-organised communities suddenly collapsed into chaos after 2240 BC can now be explained in terms of a common cause. I shall explain why people chose to live and work on the shores of the Dead Sea, and how a series of catastrophic events ended their existence. World-wide catastrophic happenings were initiated about 2240 BC in Palestine; the Americas, China, India, Sumeria, Egypt, Sudan, Jordan, Malta, Ireland and Britain were affected. The Bible's Old Testament, Book of Genesis 18, 19 described how "God rained on the cities of Sodom and Gomor'rah brimstone and fire ... and he overthrew those cities and all the plain and all the inhabitants and that which grew upon the ground". Recent students of history have voiced doubts about the presence of Sodom and Gomor'rah, citing the absence of any evidence the two places actually existed. Ancient Numeira and Baabedra villages high on the Jordan plateau experienced a violent earthquake.

China's northern and central provinces Stone Age communities experienced extended drought and cold; a change occurred in the course of China's Yellow river. Northern India experienced cold dry weather, the Indus Valley river Ghaggar changed course and joined the river Ganges. Neolithic builders of Malta's megalithic structures deserted their islands. Egypt's river Nile virtually ceased flowing and the Old Kingdom Pharaohs ceased building great pyramids. Mesopotamian Tigris & Euphrates rivers were affected. Little new works happened in Britain after Stonehenge was completed in 2500 BC.

Counter movements by Arabian and African tectonic plates are predicated as the cause of earthquakes and massive subterranean disturbances in the vicinity of the Dead Sea, followed by the release of vast quantities of crude oil and natural gas. Fiery clouds of smoke, sulphurous compounds, nano-sized black carbon particles together with fine limestone dust debris were lifted into the stratosphere by a great conflagration, to circle the earth for many years. Much reduced solar energy reached the earth's surface; deterioration of northern hemisphere weather resulted for an extended period of cold dry weather. Rivers dried, crops failed, vegetation died, forest fires spread far and wide. A major proportion of humanity and the animal population suffered severe privation and famine. Decades later the vast clouds of black particles gradually fell to earth in rain. Sunshine once again penetrated to the earth's surface; eventually normal weather patterns re-established after many decades. Life re-asserted itself, agriculture and populations prospered once more. The Sun shone once again on mankind, the birds and beasts, the plains and forests.

CATASTROPHE

History

Our own personal memories of past events are most vivid, even more so they may be greatly stimulated and supplemented by written and pictorial records. Beyond our century, knowledge and understanding of past events largely depends on the written word. Further back in time, evidence of happenings four thousand years ago require examination of other forms of record supplemented by the written word. I have gathered information relating to the air we breathe, the soil we walk on, the warmth of sunlight on our bodies and the water we drink. The assembled data indicates a catastrophic event happened about 2240 BC, close to Jordan and the Dead Sea. Mankind suffered

decades of deprivation thereafter, eventually recovering as more normal atmospheric conditions prevailed by 2000 BC.

The African Rift Valley

The world's greatest terrestrial rift valley begins in central Africa and extends northwards to the Red Sea and even further to Palestine and Syria. Situated between Palestine and Jordan, the Dead Sea valley geological feature was formed by subsidence of a wedge in the earth's crust many millions of years ago. It is the lowest place below sea level on the surface of the habitable earth. Movements between the African and Arabian tectonic plates continue to cause earthquakes in the Dead Sea valley, in Palestine and Jordan. Filled by the waters of the river Jordan and run off from adjacent high ground after winter storms, the Dead Sea has no ocean outlet, its saltiness is several times that of the oceans, high mineral contents inhibit life; its high density ensures most organic substances such as bitumen float. A widespread trade in bituminous materials is known to have occurred from very early times in Egypt, Sumeria and other Middle Eastern countries.

During the Egyptian 'Old Kingdom' from 2700 BC to 2300 BC, deceased Pharaohs were embalmed using a range of materials including bitumen. Bitumen to make asphalt mortar was used to build rock walls and harbour jetties in Arabian Gulf countries. Ships planks were caulked with bitumen and there were many other interesting uses. It is known the principal source of mineral asphalt and bitumen in those times was the Dead Sea area.

The Bible's Old Testament

Linking these recorded historical uses of bitumen with legendary events, I turned to the Old Testament; the King James version of the Bible's Old Testament Book of Genesis 18 & 19 translation records "the cry of Sodom and Gomor'rah is great because their sin is very grievous" and how God "rained on the cities of Sodom and Gomor'rah brimstone and fire ... and he overthrew those cities and all the plain and all the inhabitants and that which grew upon the ground ..... behold and lo, the smoke of the land went up as the smoke of a furnace."

The word 'Sodom' in Hebrew is **שרוף** translates as 'burnt'; 'Gomor'rah' in Hebrew is **שקוע** translates as 'immersed', names relevant to settlements on the Dead Sea coastal plain. Archaeologists recently discovered two ancient upland Jordanian 'cities' that were deserted around 2300 BC. Actually small villages named approximately Baabedra and Numeira, I consider these villages were two locations in the Genesis story. Although those catastrophic happenings are told in religious terms, they have a basis of historical fact. Long before the Bible story Genesis was recorded in written form, it is believed successive generations of Middle Eastern Neolithic people were entertained by a folk tale of an earthquakes and a great fire that followed. Communities living in Palestine and Jordan became accustomed to frequent minor earthquakes, events thought of as relatively unremarkable, not worthy of re-telling. Major earthquakes were another matter. That aspect is possibly hinted at in the phrase "and he overthrew those cities……." Of more significance was the great conflagration, destined to become the most important element in the story, eventually to be embodied in the Genesis chapter. Consider the four key phrases in the Biblical story: -

- The "very grievous sin" is a phrase I interpret to mean industrial processes that resulted in noxious and objectionable sulphurous odours generated by heated bitumen, not an actual moral or physical sin committed against a community or any individual.
- The "overthrow of Sodom and Gomor'rah" implies destruction; caused by a severe earthquake.
- The "land went up [skywards] as the smoke of a furnace" can readily be interpreted to mean enormous rising clouds of smoke and dust.

- Lastly "brimstone and fire rained [down] on the cities of Sodom and Gomor'rah" infers burning sulphurous products fell from the sky onto two coastal plain settlements Sodom and Gomor'rah, equally onto the pair of upland villages Baabedra and Numeira. It's in the translation.....

A scientific explanation to follow outlines the likely consequences of a severe earthquake in the Dead Sea region; explanations that take into account the physical characteristics and chemical properties of crude oil and natural gas.

Bitumen Mining

Shiny black bitumen is a particular series of long chain molecules in the vast range of petroleum hydrocarbon fractions. Pure bitumen is a stable solid material at ambient temperatures that becomes malleable at elevated temperatures, indeed a viscous liquid when heated further. It may or may not contain lighter fractions as part of its physical mixture, in which case it may become pliable at ambient temperatures. A bitumen mixture may behave both as a solid or plastic and occasionally as a liquid, depending upon the proportion of lighter fractions. The physical mixture of raw bitumen with added minerals, such as fine sand and small rocks is termed asphalt. The asphalt lake in California, USA is famous for its content of prehistoric animal skeletons preserved for millions of years by the lake material. Trinidad in the Gulf of Mexico has an asphalt lake with particular physical characteristics that make it ideally suitable for immediate highway construction road surfacing purposes. Embedded in Dead Sea cliff face exposed strata on the southern Jordan plateau are pockets of black bitumen and asphalt, seen and readily available for examination by a geologist's hammer. Large blocks of bitumen have been photographed floating on the dense Dead Sea waters.

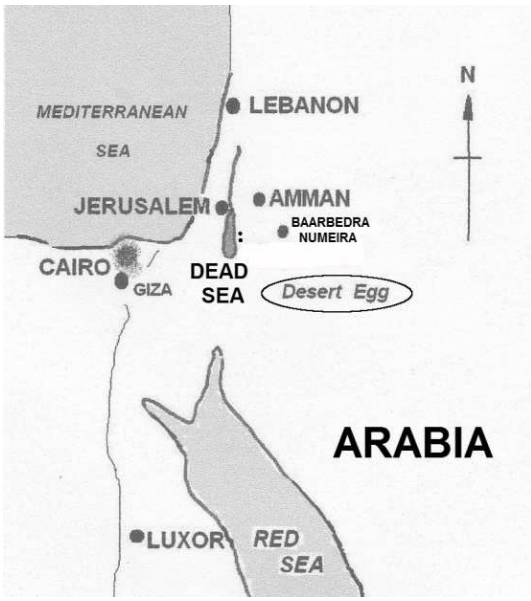
Generations before 2240 BC, I conjecture two Neolithic residential villages Baabedra and Numeira were well established on the upland Jordanian plateau, their inhabitants enjoyed a cooler desert climate. Meanwhile maybe two temporary industrial camp settlements [Sodom and Gomor'rah] existed on the Dead Sea eastern shoreline, a very hot and dry inhospitable place. Able-bodied workers commuted routinely from the upland villages down to two shoreline settlements to mine the bitumen. A substantial labour force dwelt close to their work place, to mine the eastern cliff face, to search the shoreline and obtain finds floating on the Dead Sea. Processed bitumen and asphalt were made ready and stockpiled at the coastline settlements, to be transported to Egypt and Arabian Gulf destinations by dhow and camel caravan.

The Dead Sea & Earthquakes

Earthquake intensity may range from a slight rumble that exhibits itself by the rattle of plates, cups and saucers to massive movements of the earth's crust causing fissures, subsidence, upheavals, noise, the collapse of buildings and considerable devastation. An Israeli geological scientist recently showed an example of a massive earthquake in ancient times. A diagonal fault line visible on the vertical cliff face in the Dead Sea valley showed horizontal strata had experienced a 1.75 metres vertical displacement. He considered the severity of that upheaval was at least 6.0 or even higher on the Richter scale.

The Dead Sea eastern shoreline feature is a wide expanse of gently sloping ground, gradually rising from sea level towards the foot of steep almost vertical cliffs of the high ground Jordanian plateau. The sloping shoreline strata comprises mixed layers of limestone dust, sand and small rocky debris, repeated many times, the result of endless centuries of winter rains and flash floods originating among the eastern plateau and mountains.

Saturated subterranean strata below Dead Sea water level possess interesting geophysical characteristics. Interstices between limestone dust, grains of sand and small rocks filled with dense oily Dead Sea water is a physical situation that can lead to dust sand rock mass liquefaction when



continuously vibrated at particular frequencies. This is similar to the technique employed by building construction workers involved in a concrete pour. By inserting a pulsating vibrator into the very viscous concrete mix, vibration causes the mixture to liquidise and flow downwards and laterally under the force of gravity. Recent Japanese and New Zealand earthquakes have resulted in closely related events shown on television media. Sandy zones change from stable conditions capable of supporting multi-storey buildings to undulating surface waves of sandy material into which cars and concrete blocks subside.

A predicated severe earthquake and prolonged series of aftershocks at particular frequencies would have acted exactly the same way on the Dead Sea eastern shoreline under-water strata. Similar to concrete slurry, the agitated mass of eastern shoreline rocks dust and sand strata saturated with dense oily waters of the Dead Sea would have caused subsidence of the shoreline beach which flowed to the lowest possible level, in this case the bottom of the Dead Sea. The rocky debris would have become a massive landslide, obliterating major portions of the shoreline. Faced with total oblivion any surface evidence of human habitation disappeared. Hence the complete disappearance “all the valley, and all the inhabitants, and what grew on the ground”.

Seismic Events

About 2240 BC, a major earthquake and extensive aftershocks led to the extinction of the male able-bodied workforce dwelling in industrial settlements [Sodom and Gomor’rah] on the broad sandy Dead Sea shoreline. Harvesting bitumen and asphalt for export and sale to Egypt was their reward for living in such very harsh hot and dry conditions.

Without any means of support, their families and young children, the aged and infirm inhabitants of the two villages living high up on the Jordanian plateau departed this life. Their twin ‘cities’ named Baabedra and Numeira are both reported to have been consumed by fire. The memory of a terrible catastrophe that befell them and their menfolk became a legend, the Book of Genesis. Far worse was to come, not only for the Dead Sea people but virtually for the entire world. A range of reasons why are suggested in the next pages:-

Crude Oil Petroleum Province

Crude petroleum comprises a range of hydrocarbon materials from gaseous natural gas (methane) to liquid gasoline (petrol) and kerosene, to viscous lubricating oils and solid black bitumen associated with crude oil. The wider Arabian Gulf area is particularly rich in petroleum minerals**.** Quantities of crude oil and natural gas are plentiful in countries bordering the Gulf. Petroleum bearing limestone strata hundreds of metres thick and at varying depths below ground are known to contain enormous quantities. Libya and Algeria in Africa also have extensive oil and gas quantities, deep in limestone strata below the Sahara desert sands. This broad band of limestone strata extends from Irak in the east, south to the greater area of the Gulf, further across to the Red Sea and Egypt and continues westwards across north Africa to Algeria. I conjecture it is likely in the far distant past, continuity of petroleum mineral quantities existed from the Arabian Gulf oil provinces all the way to the Libyan oil province in north Africa, specifically in Egypt, the Dead Sea and Jordan. Only relatively very small quantities of natural gas, oil and raw bitumen now exist in the Jordanian plateau limestone strata, an

anomalous situation compared with the vast quantities of petroleum minerals to the east in the Arabian Gulf, to the west in Libya and Algeria.

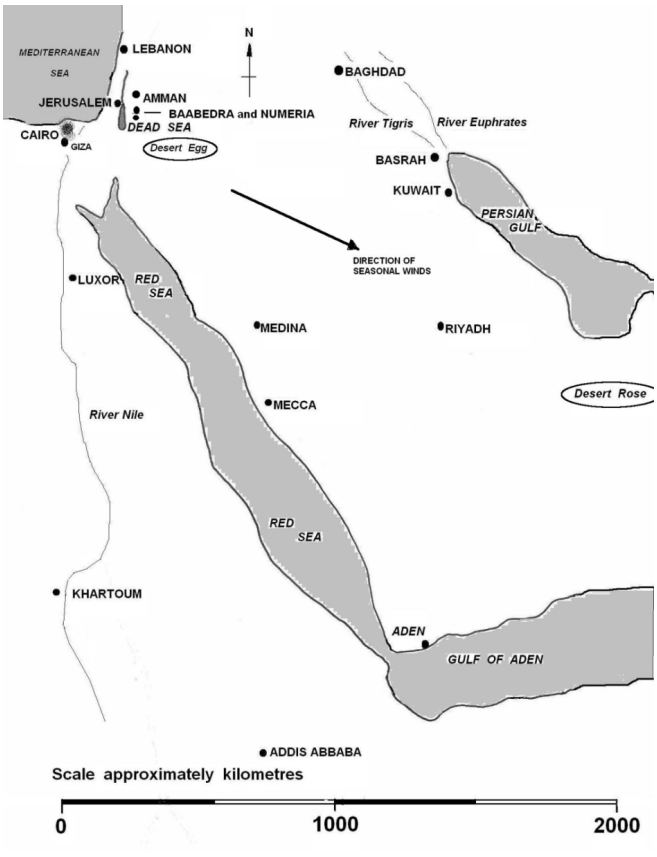
It is conjectured a substantial reservoir of natural gas, 'light' fractions of crude oil, 'heavy' bitumen products once existed in limestone strata below the Jordanian plateau, Dead Sea and Egypt. Experience shows the evaporation of lighter petroleum products leave behind less volatile products such as heavy oil and bitumen. In the Dead Sea, there are photographic records of black bitumen 'rocks' floating on the water's surface. The presence of 'heavy' bitumen floating on the Dead Sea and the wider Jordanian area indicates more volatile 'light' petroleum products were once present in considerable quantities.

It is predicated a major earthquake about 2240 BC in the Dead Sea and Jordanian plateau area was succeeded by prolonged after-shocks. Fractures of the deep underground petroleum bearing strata and extensive fissuring allowed the rapid release of oil and gas within a relatively short time. In those circumstances, the supersonic velocity of natural gas escaping from deep underground strata accompanied by surface sand and dust particles would generate considerable quantities of static electricity at very high voltages. The combination of combustible gas, crude oil liquid products, atmospheric oxygen and massive lightning bolts generated by static electricity would readily initiate a conflagration of considerable magnitude. Vast clouds of burning petroleum compounds released into the atmosphere, accompanied by enormous black clouds of nano-size carbon and rock dust particles, would have been lifted by the heat of the fires to stratospheric altitudes in the northern hemisphere. Fed by Jordanian subterranean reservoirs of oil and natural gas under great pressure, uncontrollable oil fires would have burnt for decades. The conflagration would have caused a black out of the Sun's energy and warmth; land temperatures would have fallen due to the inability of sunshine to penetrate the blanket of minute dust and carbon particles floating high in the stratosphere. Resultant cooler weather conditions would have led to reduced evaporation from the oceans and seas. In turn, this would have meant less uptake of moisture from the oceans leading to much reduced cloud formation and lower precipitation on mountains and plains, colder conditions especially at night. Adverse cold dry conditions driven by west to east stratospheric winds are reported to have prevailed over Jordan, Arabia, northern India, northern and central China, around the globe to Europe. Climatic changes to Mediterranean, Egypt, Sudan, Ethiopia and the Sahara, to Europe and the Americas and Australasian areas are reported. The wider world was seriously affected by cold and drought.

Sulphur

Oil and gas industry engineers and chemists will tell you 'sour' natural gas and crude oil often contain disturbingly high proportions of sulphurous compounds normally which have to be wholly removed by oil refining processes before the end products can be sold. The combustion of 'sour' petroleum products in natural circumstances such as the intense heat of oil and gas fires can result in an oxygen deficiency at the centre of the conflagration, a chemical condition which results in the formation of yellow elemental sulphur. At the time of the Black Clouds conflagration, it is supposed elemental sulphur aggregated into droplets and globules high in the atmosphere, gradually cooling as it fell to the ground, a [sulphur] hailstorm. "God rained on the cities of Sodom and Gomor'rah brimstone and fire." An almost identical physical process leads to water hailstones during a storm.

Blown from west to east by strong seasonal prevailing winds, liquid sulphur droplets accreted, cooled and fell to earth. Blown yet further to the east, sulphur particles aggregated to form lighter sulphur flakes that fell to earth. On impact with the desert surface, it is predicated the outer layers of hot semi-molten sulphur droplets immediately reacted with limestone dust to form white gypsum, and then further accumulated an outer skin of desert sand and rock particles. The sulphur within finally solidified inside a white gypsum envelope, the yellow core and white surround



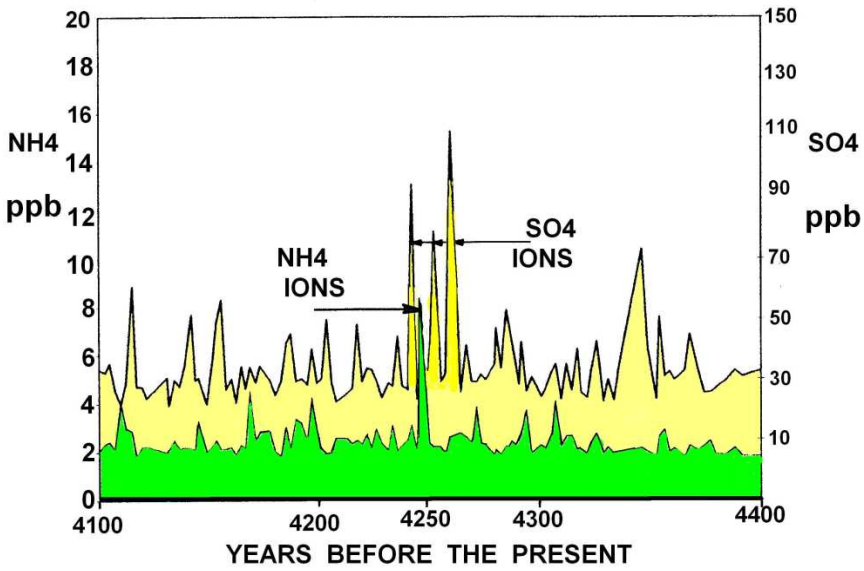
enclosed by a protective outer shell of light brown limestone dust and sand; geologist Dino Polites in the Wall to Wall television series 'The Naked Planet' is shown walking along bare rocky ground in southern Jordan picked up a golf ball sized rock on the sandy surface of the desert. Firm finger pressure can cause the 'rock' to disintegrate. The piece comprised an outer shell of sandy material enclosing a mantel of white gypsum powder around a core of raw yellow crystalline sulphur, an item similar to a chicken's egg - a brown shell, white albumen and yellow yolk, thus the name "desert egg".

A thousand kilometres to the south-east of Jordan, the United Arab Emirates are situated on the southern shores of the Persian Gulf. Inland from the coast travellers are faced by endless sand dunes, no living things to be seen. Guided tours by four wheel drive vehicles across endless sand dunes south from Oman offer an item of interest to geologists, the "desert rose" protruding from the sand. Given the name because of similarity with an opened rose flower with individual petals arranged in a generally circular form, the phenomenon is reported as thin flakes of gypsum [calcium sulphate] with a sandy covering, thus the name "desert rose".

ARABIA - Desert Egg & Desert Rose Locations

Nearby are accretions of sand formed as short strings and small lumps. The flat 'petals' or flakes of gypsum with a covering of sand dust may have formed in a manner similar to the way water is transformed into snow-flakes. I hypothesise minute particles of liquid elemental sulphur accreted into flakes or 'petals' and fell from the stratosphere to the ground as hot sulphur snowflakes. Contact with the desert sand in initiated a chemical reaction with limestone dust [calcium carbonate] eventually formed calcium sulphate petals, thus the name "desert rose". These sand, gypsum and sulphur "desert egg" balls and "desert rose" flakes are seen as material evidence supporting the proposition a vast oil and gas conflagration happened in past times, at latitude 30^0 north in the Middle East lands of Jordan and nearby Palestine.

Naturally occurring desert minerals are mostly silica, calcium carbonate and perhaps iron oxides or aluminium oxides. Iron rich meteorite particles are found here and there. The occurrence of gypsum, white calcium sulphate, on the sandy desert surface appears most unexpected and anomalous. I pose the question "Where did the sulphur originate?" I concluded the source of elemental sulphur in "desert egg" balls and "desert rose" flora was indirectly derived from sour petroleum minerals found in the Jordanian plateau limestone strata. No other credible alternative theories are envisaged that account for an origin of two forms of elemental sulphur with gypsum found on desert surfaces in the Middle East.



WORLD ATMOSPHERIC IONIC RECORD
EXTRACTED FROM GISP2 and R B ALLEY 2004

WORLD ATMOSPHERE

Greenland Ice Cores

A record of global atmospheric constituent gases, trace chemicals and particulate impurities has been preserved in ice sheets covering Greenland and Antarctica. Greenland continental shelf ice core GISP2 provides a record of world-wide atmospheric conditions. A small portion of the GISP2 World Atmospheric Ionic Record graph has been expanded to illustrate the concentrations of ammonium and sulphate ions for an extended period dating back thousands of years before the present. In the third millennium BC, around 2240 BC, 4250 BP, observe three important coincident high SO_4 ion peaks and a single NH_4 ion peak.

SO_4 ions

In this 'Black Clouds' hypothesis, sulphate ions are considered representative of the combustion of sour crude oil and natural gas in an atmosphere of oxygen and nitrogen. An examination of the GISP2 graphical record during the
centuries between 1500 BC and 2900 BC illustrates a reasonably steady base level of SO_4 ions in a band between 30 to 40 parts per billion for the entire
period. On fifteen occasions between 1500 and 2000 BC there are short duration isolated peak SO_4 values up to 150 parts per billion, ppb.

Other peaks occur about 2600 BC, 2800 BC and 2900 BC. There are three significant SO_4 peaks close together within the period between 2275-2235 BC, considered representative of a series of significant events.

Three peak values of major magnitude, SO_4 = 115 ppb, 80 ppb and 95 ppb, lead to my proposition a protracted sour oil and gas fire occurred during the twenty-third century BC. After an initial 'quake, it seems likely a series of aftershocks further fractured the Jordanian plateau region. On each occasion after the first shock, more escapes of natural gas and petroleum liquids continued to feed the massive fires that endured for decades.

NH_4 ions

Ammonium ions are considered particularly representative of burning carbonaceous material such as hydrocarbons, vegetation and forest fires. The combustion of forests would indicate extended extremely dry conditions following good growing seasons. The graph trace of parts per billion

ammonium NH_4 ions is taken as an indication of "burning biomass", in other words the combustion of carbonaceous material in an atmosphere of oxygen and nitrogen, e.g. crude petroleum or forest fires of great magnitude due to a decade of protracted dry weather. The typical ammonium ion concentration for the entire period 1500-3000 BC ranges is in the band 5-20 ppb. Four significant isolated peaks are seen about 1750 BC, 2240 BC, 2650 BC and 2925 BC with higher values in the range 40 to 80 ppb. A particularly significant ammonium ion peak of 55 ppb about 2240 BC coincides with three SO_4 peaks.

HYPOTHETICAL ATMOSPHERIC CHEMICAL REACTIONS
Arising From Oil & Gas Conflagration at High Altitudes
The coincidence of NH_4 and SO_4 ion concentration peaks are thought to be complementary to each other and the result of complex chemical reactions in the upper atmosphere and stratosphere involving O_2, N_2, H_2O, C_nH_n, $C_nS_nH_n$ about 2240 BC: -

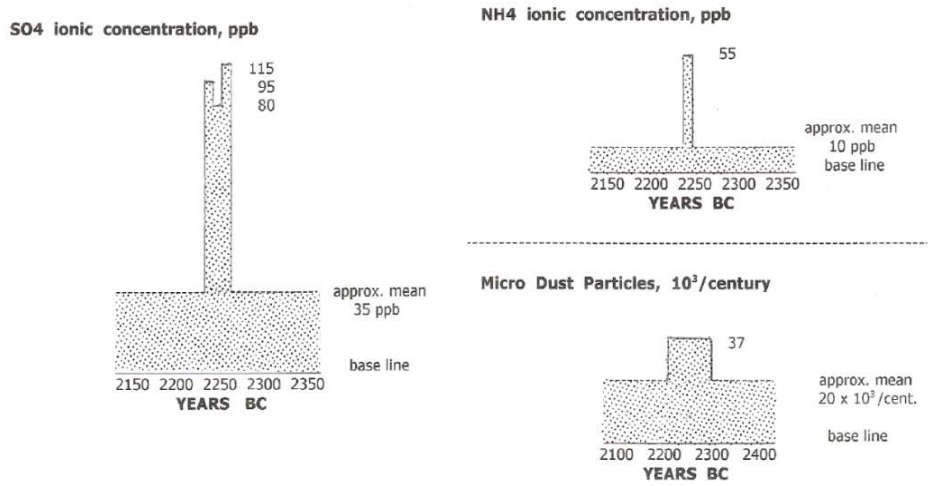
The initial cold stable static conditions: -
Atmosphere: O_2 = 20%, N_2 = 80%, Clouds = H_2O
Ground: Limestone = $CaCO_3$, Natural gas = CH_4, crude oil = $C_2H_2C_n$
Together with sulphur compounds in sour crude oil & natural gas = $C_nS_nH_n$, etc.

The conflagration: -
Following a series of earthquakes, natural gas escaped from fissured ground at supersonic velocity mixed with limestone sand and dust. Very high static electricity voltages were generated in the gas stream. Lightning led to combustion of hydrocarbons, black smoke and limestone dust clouds.

The result: -
An atmosphere with $C_nH_n + C_nS_nH_n + O_2 + N_2 > CO + CO_2 + SO_2 + SO_3 + SO_4 + NH_4$ formed in reducing conditions at high temperatures with little or no O_2 at the centre. Ammonia ions, elemental sulphur were created in an oxygen deficient atmosphere.

Then: -
The ground level aftermath, S (elemental sulphur) + limestone dust ($CaCO_3$)
Hot semi-liquid S accretions react with limestone dust carbonate particles: -$CaCO_3 + S + O_2$ >>>> $CaSO_4$ (calcium sulphate, gypsum)

HISTOGRAMS AUTHOR 2004
Histograms of the GISP2 data show the base lines relative to the SO_4 and NH_4 peaks in the twenty-third century BC: -
Left: - Sulphur ions concentration
Top right: - NH_4 atmosphere ions concentration
Lower right:- Micro-dust particles; three-fold increase on three occasions, five-fold increase on one occasion; Huascaran crater 37/20 increase almost double the average deposition.



The southern hemisphere work of Thompson *et al* in the July 7th 1995 issue of *Science* included figure 7 illustrating the deposition of dust particles sized between 0.63 and 16.0 micrometres per millilitre at Mount Huascaran site in the Peruvian Andes, South America. Over a ten thousand years period, the average deposition each century was a reasonably steady 20,000 particles per mmL. An increase recorded in the twenty-third century BC almost doubled the average deposition.

EVENTS ELSEWHERE

IRAK oil well fires

Hundreds of oil well fires lit by retreating Iraki troops after the Gulf War 1990-91 burned fiercely for many months in Kuwait. Great concern was expressed in the world's media about a potential risk to the world's climate should fires burn for unduly long periods. Those Gulf War crude oil fires were eventually extinguished by expert teams experienced in major oil well conflagrations. No ability to extinguish large, even small oil well and natural gas fires existed in ancient times; the phenomenon had to burn until the source was depleted.

IRELAND dendrology Record

Enquiries for other evidence of northern hemisphere climatic changes led me to consider the dendrology record. Fossilised oak trees recovered from bogs in Ireland offer an excellent record of annual growth patterns for past climatic conditions during several thousand years. My correspondent advised he found no identifiable indications of a cold dry spell period in Irish bog oak tree growth rings for the period around 2240 BC. Annual oak tree growth indicated by the width of the rings indicated no abnormally cold dry weather conditions. This contra evidence provides no support for my Black Clouds earthquake and conflagration hypothesis. A reason for this apparent contradiction of climatic conditions on the western edge of the European continent lies elsewhere. The Gulf Stream waters flowing from the Gulf of Mexico across the North Atlantic towards Ireland have brought warm moist air to the western edge of Europe for millennia. On the far west Irish coast, a meeting of low level warm moist air generated by the Gulf Stream with cold stratosphere conditions probably resulted in more or less normal precipitation over Ireland, as it does to this day. Tree growth in Ireland would have been more or less the same in those circumstances. One should consider the Black Clouds hypothesis was its most severe on continental areas, less so on coastal zones where a mass of sea water ameliorated the land climate.

EGYPT

The Old Kingdom, c. 3100 - 2200 BC

Egypt's historic 'Old Kingdom' is best known for the construction of the pyramids at Giza on the south-western edge of the river Nile delta. The Old Kingdom is said to have originated about 2900 BC and endured until the end of the period classified by Egyptologists as variously between 2345 and 2181 BC. Famous Cheops pyramid at Giza was constructed near the end of the Old Kingdom period, followed by the collapse of an ordered Egyptian society capable of great works. The Old Kingdom's prosperity depended almost wholly on the annual flow cycle by the river Nile. River flooding records indicate some variability between good and bad years, fluctuations tolerable in circumstances when reserve stocks of food and grain were stored against a recurrence of bad seasons. Years or perhaps decades of reduced Nile floods meant even the greatest quantities of stored grain would have been completely exhausted. To illustrate the nature of the ancient civilisation's dependence on the Nile, a brief account of their lunar solar calendar is given from about 3000 BC. The actual form of their calendar is open to some debate and experts have devoted much time and effort trying to piece together scraps of evidence. On the basis of collected evidence, a 'civil' calendar was devised and adopted some time prior to 2500 BC. Their calendar system was based upon a year of 365 days divided into twelve months. Months each had 30 days, the year 360 days. Five epagonal days were arbitrarily placed between the twelve months, thus the solar year of 365 days was almost achieved. The discrepancy between the Egyptian year of 365 days and the true tropical year of 365.2525 days has been subject to much research.

The months of the Egyptian civil calendar were grouped into three sets of four, reflecting the practices of the agrarian society and its dependence on the flow patterns of the river Nile. Following the Nile's annual behaviour, three groups of four months were named in equivalent terms 'Inundation' (flooding in Lower Egypt), 'Cultivation' and 'Harvest'.

EGYPTIAN PHARAOHS 2300 TO 2010 BC

The Egyptian Old Kingdom prospered between 2900-2300 BC with a series of rulers titled 'Pharaohs' during the Intermediate Period Sixth to Eleventh dynasties BC. Reported dates for these Dynasty Periods differ according to various references and expert interpretations of available records of Egyptian Pharaohs reigns. I have concluded the broader Intermediate Period actually began about 2240 BC, an opinion based upon troubles reported during the second half of Pharaoh Pepi Two's reign 2279-2219 BC. The Intermediate Period endured from the Sixth until the Eleventh Dynasty 1991 BC**.** The reported known rulers were: -

Sixth Dynasty Teti First 2345-2337 BC, Userkare 2323-2321, Pepi One 2321 – 2278, Pepi Two 2278-2284.

Seventh to Tenth Dynasties Niigret 2184-2181, 2181-2160 BC were periods of famine, civil disorder and rise in the death rate, the Northeast Africa climate become dryer combined with low inundations of the Nile, the cemeteries filled rapidly, not a good time for Egyptian society. Petty warlords ruled the provinces.

{The chronology available to me and associated conditions relating to river Nile flows are in need of revision to eliminate dynastic names and date discrepancies before and subsequent to the 2240 BC cataclysm.}

Eleventh Dynasty 2118-2010 BC Mentuhotep One, Intef One, Two & Three, Mentuhotep Two.

Pharaoh Pepi's reign from 2279-2219 = 60 years] was said to be a serious "catastrophe for Egypt". "Nothing of note happened during the first thirty years of his reign. During the second thirty years, from 2279-30 = 2249 BC, he was unable to provide strong leadership against (unspecified) dangers that assailed his kingdom." This was a time of turmoil and disaster. Well ordered Egyptian society disintegrated, revolution and chaotic conditions ensued**.** Society collapsed from within, the irrigation system was neglected, chaos prevailed, and the dead remained unburied**.** Starvation and desolation existed. The Egyptian agrarian civilisation was unable to feed its inhabitants. A series of hieroglyphic

inscriptions on a southern Egyptian local ruler's tomb asserted conditions were so severe the common people resorted to cannibalism. Another contemporary source of evidence revealed exactly the same situation in the north of the country. The dead remained unburied on the Nile delta, skeletons were left or disposed of haphazardly and cannibalism was reported. Three hundred years passed before normal conditions re-established themselves in Egypt and population numbers recovered sufficiently to sustain renewed community activity.

The Middle Kingdom began about 1991 BC, the non-royal born Pharaoh Amenemhat the First seized the throne and began a time of invigoration in Egyptian history. The Middle Kingdom twelfth dynasty rulers restored the irrigation system, reclaimed land, conquered Nubia to guarantee the supplies of gold from the south and traded with Mediterranean countries from the north. Mines were reopened. These activities exemplified the renewed capacity of Egypt's population for major communal works.

Why a hiatus in Egypt's history happened between 2279 and 1990 BC has been the subject of much speculation. Only recently has an answer appeared. A number of Egyptology scientists experienced in climatology, geology and Egyptology reached the conclusion a climate change occurred after 2300 BC**.** In practical terms, only an immense natural calamity could have caused vast changes in weather conditions.

Prolonged Jordanian Plateau and Dead Sea petroleum fires were the probable cause, my Black Clouds apocalypse hypothesis dates about 2240 BC. The Sun's warmth failed to reach the surface of the Earth, atmospheric temperatures fell causing cold and very dry conditions to prevail. Very low precipitation, rain and snow, fell on the Ethiopian mountains that feed the waters of the Blue Nile. Fed by the Nile in times of flood, Lake Tana in faraway Ethiopia is believed to have partly dried. Southern and northern Sudan, upper and lower Egypt experienced protracted drought. The entire length of the river Nile, on its journey from Ethiopia northwards through vast areas of desert to the Mediterranean delta saw flow much reduced. The annual inundation of arable land along the river's banks did not happen. Crops could not be planted and consequently food supplies were seriously reduced. Decades passed before normal weather returned and Egypt's prosperity again benefited from the Nile's annual life giving floods. After 1990 BC bountiful harvests were reaped once again in the second millennium. The Egyptian Middle Kingdom rulers embarked on major public works. Egypt's importance was re-established.

BRITAIN Stonehenge, c. 3100 to 2500 BC

British archaeological experts have shown Stonehenge, the most famous of all British ancient monuments was begun first about 3100 BC with the construction of an 87 metre diameter ring of fifty-six marker places named Aubrey Holes. Centuries later, during the twenty-fifth century BC, many communities constructed the major ancient monuments we know today. Silbury Hill, Avebury, Stonehenge, Woodhenge and Durrington Walls calendar buildings were constructed between 2700 BC and 2300 BC. An enquiring mind may wonder why so little activity followed in Ireland and the British Isles after 2300 BC. There had been more than a thousand years of activity in building great temples in stone and timber. Major community projects always require a substantial population, good harvests, but beneficent weather apparently failed to happen; It seems cataclysmic events after 2300 BC prevented a continuation of the previous pace of public activities. The archaeological record lists no new major works in Ireland or Britain for several centuries thereafter. It is reasonable to conclude an extended period of cold dry weather conditions in the twenty-second century BC,

described in Africa, Egypt, Palestine, Europe, India and China had an equally severe impact on the Neolithic inhabitants of the British Isles and Ireland. Cold and dry weather in the Isles would have caused crop failures and starvation. Generations of the Isles' inhabitants would have suffered equally severely as their Middle East, Indian sub-continent and Far Eastern cousins.

SUMERIA The Akkadian Period; after 2300 BC

During the Early Dynastic Period in the history of Ur 3000-2350 BC**,** a number of city states; Kish, Lagash, Umma and Ur emerged on the dusty sands of the Sumerian Plain, an area more or less equivalent to present day Irak. Their rulers raised armies to attack other cities whose relative wealth and water supplies were the envy of their neighbours. A seemingly endless series of wars resulted. Sargon the Great ruled Akkadia north of Sumeria after 2350 BC and unified the warring city states. Termed the Akkadian period, under Sargon's rule the northern Semitic armies conquered the Sumerian central plain cities and adjoining territories beyond the boundaries of Sumeria. It has been generously asserted that Sargon created the first empire in history.

His grandson followed as ruler of the empire in 2305 BC, his reign lasting into the next century. Sargon's grandson's period of rule can reasonably be estimated to have lasted at most fifty years, say from 2305 BC to about 2240 BC. After that time, internecine rebellions and attacks arising outside the empire's boundaries have often been cited as the cause of the Akkadian Empire's collapse. These civil disturbances and warfare would more logically be traced to natural apocalyptic phenomenon caused by cold dry weather, poor harvests and starvation of the population lasting for many decades. Between the Tigris and the Euphrates rivers, people suffered equally as much as the river Nile population in Egypt. Drought, famine and a subsequent lack of agricultural production resulted, followed by starvation.

Researchers consider the Akkadian Empire came to an end, reportedly about 2180 BC. I question this quoted date of 2180 BC, since it appears to be a direct translation from the Egyptian records and the collapse of the Old Kingdom under Pharaoh Pepi II. The Pharaoh reigned from 2279 to 2219 BC. A later date for the collapse of the Akkadian Empire seems much more likely, in my view perhaps after 2240 BC, half way through Pharaoh Pepi II' reign. When a decade of Jordanian conflagration is entered into an historical record analysis, it fully explains why stable conditions during the Akkadian Empire period lasted until about 2240 BC. After that time, the Empire collapsed and was followed by the Neo-Sumerian period, a time of considerable instability during the next couple of centuries.

MALTA The Mediterranean, 2300 BC

Situated south of Sicily in the middle of the Mediterranean Sea, the island of Malta and the smaller Gozo island to its north-west were settled around 5000 BC by Neolithic people**.** For millennia they farmed the land and cared for their stock. Thousands of limestone boulders scattered across the landscape were used to build large cleverly designed temples both above ground and underground. The temple Gigantija on Gozo Island is the oldest free-standing building in the world. Some individual megaliths have a mass of fifty tons, directly comparable with the 45 ton sarsen columns comprising Stonehenge and Avebury's ring of columns in Britain.

The general form of a Gozo construct is two vertical columns capped by a horizontal lintel. Some form a doorway, others a continuous solid wall without a space between the uprights. Yet

others comprise a man-made doorway formed through a large rectangular monolith that allows a person to climb through the hole to reach the other side. Below ground constructs included an extensive series of galleries and chambers excavated in the limestone bedrock, their form and plan closely resembling above ground temples. Inside the temple buildings, walls and ceilings were decorated with ochre and other colours showing various animals and designs. After 2300 BC these Neolithic people disappeared completely from their island leaving no written or other record of their civilisation, who they were and their eventual destiny. The apparent mystery remains to this day unless the 2240 BC natural disaster Dead Sea earthquake phenomenon is taken into account. The end of their occupation of these two small Mediterranean islands coincided with the sudden end of the Old Kingdom in Egypt not long after 2300 BC. Perhaps they too endured the failure of their agricultural system and died of starvation.

CHINA, 2200 - 2000 BC

Southern China experienced an event about 2280 BC that eventually led to major changes in the course of the Yellow river. A severe natural disaster, thought to have been an earthquake, caused profound archaeological and cultural changes. Four regional Longshan Chalcolithic cultures in the south-east China middle Yellow River area subsided into chiefdom level societies. Two regional Chalcolithic cultures in north and west China, between the Loess Plateau, the Mongolian Plateau and the eastern alluvial plain in central China, suddenly collapsed becoming chiefdom level societies about 2200 BC. Generally speaking, the period marks the end of the Chinese Neolithic Age. Extremely cold dry weather conditions after 2280 BC was a disastrous combination for the entire country. Severe climatic changes were experienced across northern and central China, years of cold and drought. During this period a southward shift of the south-east monsoon front resulted, the monsoon regime was significantly altered. Lengthened periods of monsoon rains in the south persisted for some time. Flooding and waterlogged conditions were experienced. The century between 2300 and 2200 BC marked the end of the Chinese Neolithic Age and eventually the beginning of the Bronze Age in central China. The rise of the archaic state Xia Dynasty c.2000 BC allowed much improved conditions for the people, circumstances that eventually led to significant Bronze Age achievements from c.1600 BC.

INDIA & PAKISTAN, India, 2200-2000 BC

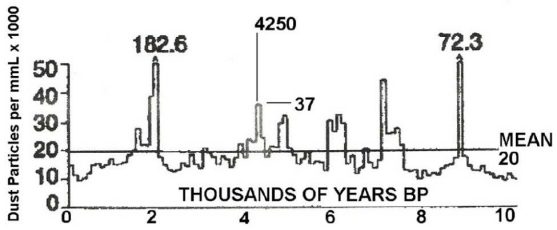
The river Indus and its tributaries stretch for a thousand kilometres from the Himalayas to the Arabian Sea. Parallel with and to the east of the river Indus in ancient times the river Ghaggar also flowed from the Himalayas to the Arabian Sea. Both rivers were squeezed between the Afghanistan mountain ranges on the west and the Indian Deccan Plateau to the east. The Plateau is known to be gradually moving towards the north, having given rise in ages past to the vast Himalayan ranges to the north and the Afghanistan ranges to the north-west. Northwards movement by the Indian tectonic plate during the period 2300-2000 BC are thought to have led to the drying up of the river Sarasvati [Ghaggar]. The river no longer flowed to the Arabian Sea. Its tributaries, the Sutlej and Yamuna, re-routed themselves and joined the river Ganges flowing east into the Bay of Bengal. Opinion has supposed earthquakes about that time initiated a period of severe drought in northern India. Circumstances in Pakistan undoubtedly had a drastic effect on the population of Mohenjo-daro and Harappa. The delta city of Dholavira suffered a most severe drought, the Sarasvati river

ceased to flow southwards. Prolonged cold arid conditions led to the failure of agriculture, starvation had an horrendous effect on the population. The cities of Dholavira, Harappa and Mohenjo-daro descended into obscurity by the end of the millennium. These events apparently coincided with the Jordanian conflagration about 2240 BC.

PERU MOUNT HUASCARAN DUST

This reconfigured histogram of Peru's Mount Huascaran candela dust accumulation during the last 10,000 years was derived from Dr Robert B. Alley's records of the Greenland International Ice Core Records 2014. Core records from the Mount showed decades long peak in dust particle deposits about 2240 BC, up from an average $20x10^3$ to $37x10^3$ dust particles per mmL in the size range 0.63 to 16 micrometres, an increase almost double the background level. The paper's authors assert "there was a major drought in the Amazon basin about 2200 BC +/- 200 years, by far the largest such event in the last 17,000 years."

Mount Huascaran dust particle deposits particles per mmL ordinates:-



COMPARABLE EVENTS

The 'Black Clouds' hypothesis is founded on an earthquake occurrence about 2240 BC in the Dead Sea area followed by a cataclysmic oil and gas conflagration whichshould be compared with well-documented more recent historical events. For example, similar natural volcanic disasters also have far reaching consequences –

INDONESIA, Krakatoa, 1883 AD

A well documented event is the 1883 eruption of the Krakatoa volcano; the cone blasted into the atmosphere. All that now remains is a ring of cliffs above sea level surrounding the submerged caldera. Thought to be gradually rising, the caldera suggests a foretaste of another Krakatoa eruption several generations hence.

INDONESIA, Krakatoa, 535 AD

David Keys book *Catastrophe* concerned world climate change in the sixth and seventh centuries AD, events evidenced by tree ring data and wide ranging expert geological studies. Keys' attributes the 535 AD event to a truly enormous eruption of an Indonesian volcano; probably like Krakatoa when that volcano erupted in 1883 AD. The island exploded, prolonged volcanic eruptions caused vast masses of magma and associated volcanic material to be ejected into the upper atmosphere. Little

remains of the island above sea level today. The volcanic eruption caused massive quantities of dust to circulate in the stratosphere, conditions which prevented the Sun's energy reaching the surface of the Earth. Thin layers of black volcanic material can readily be observed sandwiched between clean white compressed snows in deep core samples taken from Greenland glaciers. Very narrow or virtually absent annual growth rings of trees alive in the years 535-536 AD indicated extremely cold dry weather. Ice core samples from Greenland, strata analyses for pollen samples, dendritic records from North America, China and Europe underwrite proof of the cataclysmic event of 535 AD and its consequences. Fine dust circulated in the northern hemisphere for decades, sunlight was largely blotted out for many seasons and crops failed. Years of cold weather, frosts, drought and then flooding rains are recorded by writers from west to the Far East. The consequences of this natural cataclysm were terrible living conditions, starvation and disease for the populations of both Eastern and European countries. A direct result of that catastrophe was the appearance of a bubonic plague pandemic about 540 AD. Arabic elephant tusk traders from Ethiopia brought the highly contagious bubonic plague bacteria *yersina pestis* to the Roman world. Great numbers of people died in Constantinople, then the capital of the Eastern Roman Empire. Body counts of plague victims consigned to the Bosphorus Sea ceased after 250,000 corpses were dumped in the sea. The probable reason - civil authorities had no one left to perform recording work or count the dead. Cities around the Mediterranean and in southern Europe suffered equally severely. The combination of pandemic disease and cold dry adverse weather conditions dealt a double blow to humanity. Major reductions of the global population no doubt resulted.

BRITAIN

One aspect of British life had been three centuries of Roman trade in wines, silks and other goods from Mediterranean sources to the British Isles. The bubonic plague was carried by traders from African sources to Britain about 545 AD where it had a particularly severe impact on the entire native British population, long accustomed to close urban living in towns and villages. A significant proportion of the population died of the plague, including King Maelgwyn the Great of Gwynedd in AD 549.

MEXICO

At a site not far from present-day Mexico City, the immense city of Teotihuacan had a population approaching a quarter of a million by the sixth century AD. Suddenly it became a ghost town. Coincident reasons for a population exodus may have included cold dry weather imposed by the 535 AD volcanic eruption, conditions intensified by the city's high altitude, poor harvests, all leading to drought starvation and depopulation. Teotihuacan was forgotten for a millennium until re-discovered by today's archaeologists.

GREECE, Santorini Island, c. 1500 BC

Severe weather conditions caused major dislocation for previously prosperous societies, demonstrated by the classic example of the eruption of Santorini volcano in the Greek archipelago about 1500 BC. The archipelago includes many small islands, amongst which the island is now named Santorini, in past times called the Island of Thera. Little remains of its original form. Only a kilometre diameter ring of tall ragged cliffs now outcrop above the sea. Mediterranean waters fill the crater caldera to depths reaching 480 metres.

Geologists and volcanologists consider an earthquake preceded the Bronze Age volcanic eruption about 1500 BC, which in turn was followed by a tsunami. The eastern Mediterranean suffered a series of natural disasters. Earthquake shocks, clouds of volcanic debris and dust, salt water inundation of coastal agricultural land, a sequence of events that extinguished the flourishing Minoan civilisation on Santorini and the nearby island of Crete. Minoan coastal cities elsewhere in the eastern Mediterranean failed to survive as entities of the wider Minoan maritime civilisation.

WORLD WEATHER

Meteorological data shows prevailing stratospheric winds in the northern hemisphere circulate from west to east. Atmospheric pollutants such as dust and ion particles arising from a Black Clouds conflagration about 2240-2230 BC would have carried eastwards across the Arabian peninsula to Sumeria and onwards to India and China. In support of the concept of a prolonged period of cold dry weather conditions in the latter part of the third millennium BC the 1998 article in *Science* brings together the work of several researchers. These results can be summarised: -

- The Akkadian Empire founded by Sargon the Great collapsed a generation or two after 2300 BC**.**
- Windblown dust carried by the hot north-west summer winds from Jordan and Arabia to the Gulf of Oman accumulated in sea bed strata deposits. Core samples analysed 140 years apart showed a six fold increase of dust deposits about 2000 BC +/- 100 years, “reaching levels not found at any other time in the past 10,000 years”.
- Extensive archaeological references concerning ancient Sumeria, present day Irak, describe the Ur Nippur ziggurat. The Sumer city state was ruled by King Ur-Nammu who began building the great ziggurat of Ur in the city of that name about 2100 BC. References mostly date the commencement of its construction about 2100 BC and its completion about 2050 BC. The communal effort took two or three generations and good harvests to support the population. The ziggurat can be taken as a direct measure of a contemporary substantial population. To embark on the construction of a ziggurat of that size would have required a full recovery in Sumeria and adjacent countries after the projected Jordanian oil fires and climate change a century and a half before.
- Core records from the Peruvian Mount Huascaran show a decade’s long peak in dust particle deposits about 2240 BC. The New World event is complementary to the Old World happenings.
- Cold dry weather led to low rainfall, the Nile, Tigris and Euphrates annual floods failed and agriculture suffered.
- Northern hemisphere atmospheric records indicate almost simultaneously high levels of sulphur oxide and ammonia ions about 2240 BC.
- Bitumen was mined in the Dead Sea valley for export to the Egyptian Old Kingdom and elsewhere during the third millennium BC. The Egyptian economy collapsed after 2240 BC and recovered by 1900 BC.
- Prevailing winds from west to east blow across the Middle East towards the Gulf; sulphur and calcium sulphate depositions on the desert are known, occurrences presumably derived from the combustion of sour crude oil and natural gas.
- Frequent earthquakes occur in the general area of the Dead Sea.

- Petroleum mineral bearing limestone strata are present almost continuous from Algeria, Libya across to the Gulf of Arabia, Irak and as far as Kazakhstan. Midway, the Jordan, Israel, Egyptian limestone areas now appear largely deficient in the lighter petroleum mineral fractions, a great contrast with the Gulf of Arabia and North African petroleum provinces. Only heavy bitumen remained, blocks have been photographed floating on the Dead Sea. Asphalt lenses can be still seen on Jordanian cliff faces. A scattering of oil wells are present today along the Red Sea and adjacent lands, the production from which is a mere fraction of that by the north African and Gulf States.

JUST A THOUGHT

Egyptian, Maltese, British, Irish, Palestinian, Jordanian, Indian, Chinese and the Americas cataclysmic experiences during and subsequent to the decades after 2240 BC are well explained by world-wide weather effects. Direct parallels can be drawn with the eruption of Santorini Island about 1500 BC, the Indonesian volcanic eruptions of AD 535 & 1883. In the United States of America a few years ago, Mount Saint Helen volcano erupted; devastation was caused over a wide area.

A recent British Broadcasting Corporation television feature program gave detailed data and information about a projected eruption of the vast Yellowstone National Park caldera in the USA. Past eruptions at these sites millennia ago caused great devastation because of their magnitude and duration. Periodic catastrophes affecting mankind have happened many times in the past, mostly due to volcanic activity. A Jordanian earthquake about 2240 BC, followed by a massive escape of natural gas and crude oil leading to an apocalyptic conflagration would have caused world-wide weather effects similar in many ways to volcanic activity. Humanity can undoubtedly expect similar future catastrophic events.

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Dr Peter Cox, Hadley Centre, UK Meteorological Office.

CHAPTER FOURTEEN :: WOODHENGE

"Let us imagine what kind of Contrie this was at the
time of the antient Britons." John Aubrey 1626-97 AD.

One hundred and seventy-five generations before our time,
Woodhenge & Stonehenge were aligned with mid-summer dawn,
Durrington Walls was aligned with mid-winter dawn.

SYNOPSIS

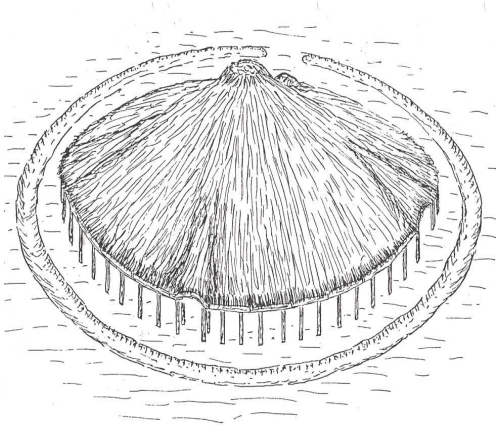
Woodhenge is situated on top of the hill, two kilometres north of Amesbury in Wiltshire, England, three hundred metres from Durrington Walls southern circle. Both ancient monuments were constructed about 2300 BC. Stonehenge was erected about 2500 BC, situated three kilometres south-west of Woodhenge. Woodhenge building in plan view has a unique egg shape instead of the more usual circular buildings of those times. The large timber structure comprised six rings of timber posts totalling 157 altogether. The main longitudinal design axis was midsummer dawn, 49.9^0 east of north. The building extending for a longitudinal distance of 45 metres, the minor axis was at right angles to the main axis having a span of 40 metres. Today's visitor can see rings of concrete plinths marking the positions of the original post pits excavated by archaeologists Cunnington, Evans and Wainwright between the years 1926 and 1970. All but two of the post pit positions were revealed during the 1926-70 excavations. Professor Alexander Thom surveyed the six rings of post pits marked by concrete plinths in 1976 and devised a geometric design reconstruction to best fit the positions of the post pits of the egg shaped plan of the building. I have slightly modified his geometric design interpretation to give a closer match to the actual positions of most plinths. These adjustments enabled a full reconstruction of the calendar purpose of the building to be found. Woodhenge has the same design features as Stonehenge; five weekdays, sixteen months a year, the Sun calendar. Oriented on midsummer dawn sunrise, Summer was the first month of the year. Features detected included the ability to forecast the Saros Cycle of lunar eclipses every 18.03 years and the 19 year Meton Cycle.

A Temple Trio

Stonehenge, Woodhenge and Durrington Walls, a trio of calendar buildings only hundreds of metres apart belong to the third millennium BC. The available archaeological and other records offer calibrated radio carbon C_{14} date assessments, sourced from various carbonaceous materials found at the several sites. These range a century or so either way, thus individual construction dates are difficult to estimate with any degree of accuracy. The most significant matter to appreciate is three large Sun calendar buildings existed about the same time in close proximity.

WOODHENGE TODAY

Woodhenge is situated on top of the hill, two kilometres north of Amesbury in Wiltshire, England. At the crest of the hill on the left of the road can be seen a series of round concrete plinths within a fenced field. These mark the positions of about one hundred and sixty-one timber posts originally placed in position about 2300 BC.



WOODHENGE Photograph Author 1982 Drawing Author 1983 Woodhenge bird's eye view

RECENT WOODHENGE

The main longitudinal axis of the original building is the direction of the rising sun as dawn breaks on midsummer's day. Squadron Leader Insall of the Royal Air Force made an aerial inspection of the site in 1925 and detected a series of rings of dark spots against lighter coloured grass elsewhere.

Mrs. M. E. Cunnington excavated the site in the seasons 1926-28 and found six concentric rings of post pits, an outer ditch and bank. That was the beginning! Professor J G Evans and Dr G J Wainwright conducted further research in 1970. Their reported results were re-interpreted by Professor Stuart Piggott and later by Mr Musson in 1971. A number of antler picks and animal bones were found at the site, discoveries which enabled a radio-carbon date to be assessed. Test results BM-667 and BM-678 gave dates of 1867 bc and 1805 bc. Applying a 400 years calibration correction, the construction date for ancient Woodhenge is rounded to about 2300 BC. Noted archaeologist Professor Piggott offered the opinion Woodhenge was a large roofed building, a view with which I fully concur for the reasons explained in the following pages. It has been estimated the timber post building should have had a life of four or five hundred years, maybe a little more or less.

Classification of pottery shards at the Wiltshire site of Woodhenge timber Sun and Moon Calendar building ranged from plain Neolithic to Grooved Ware and Bronze Age, indicate an extended period of occupancy ranging from about 2300 BC to 1500 BC. The diligence of the archaeological excavation teams was amply rewarded by the discovery of the vast majority of tall timber post pits. The concrete plinths positions, presumed to be the correct positions of timber posts, were accurately surveyed by Professor Alexander Thom in 1976 who provided me with a blueprint copy of his survey drawing data in 1986, information used for this analysis.

Linear Dimensions

Professor Thom's prepared an accurate survey plan of the concrete plinths showed the building to be egg shaped in plan with six concentric rings of posts. His intriguing geometric reconstruction showed semicircles, arcs, tangents and triangles with perimeters in multiples of twenty faethms, his *megalithic yards,* My. Slight differences are seen between surveyed post positions and his reconstructed design. When the concrete plinths were positioned in 1970, slight errors may have arisen compared with true timber post positions, potential sources of difference that may partly

explain any discrepancies. The Professor's design was based on triangle ABC, AB = 6 My, AC = 17½ My, BC = 18½ My. Horizontal axis position C occurs midway between post rings four and five.

His linear unit nomenclature was 'megalithic yard' 'My' and 'megalithic rods, 'Mr', the multiplicand 2½. With the benefit of other research concerning the straight tracks in Britain and France, I generated the Brython Measurements table:-

BRYTHON MEASUREMENTS table

One 'finga' ≈ 27 millimetres, diameter of Monkton barrow gold disc inner ridge.
Ten 'finga' ≈ 275 millimetres, the Stonehenge footstep length, 360 'degrees'.
2½ 'fists' ≈ 'fut', 333 millimetres, Stukeley's "Celtic foot" 1/3rd metre
2½ 'fut' ≈ 'ford', 830mm, a step forward, Thom's "megalithic yard".
2½ 'ford' = 'faethm', 2.07 metres, Prof. A. Thom's "megalithic rod".
33 'faethms' = 'furlang', 68.4 metres, Long Man's height, a plough furrow length.

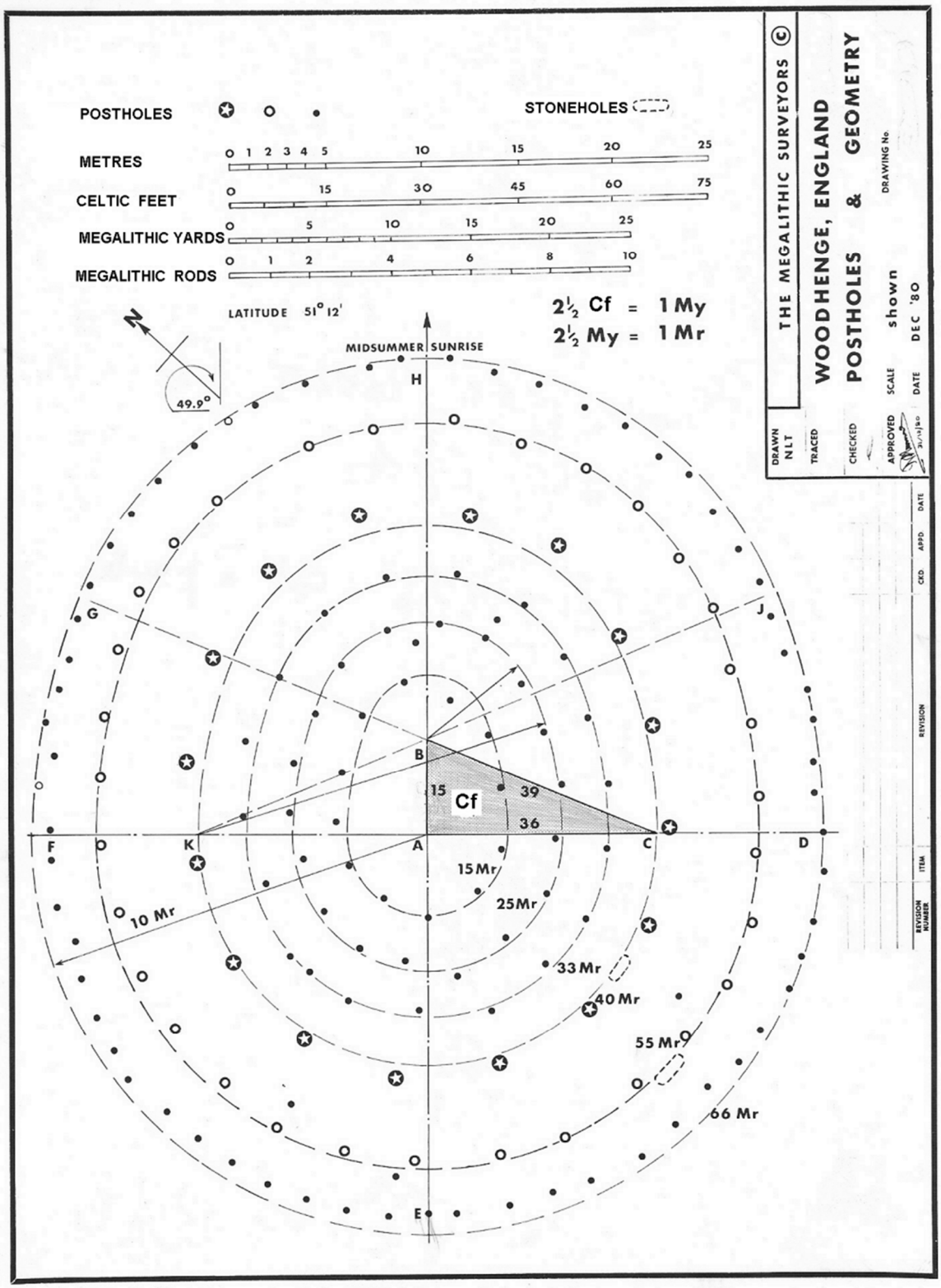
Applying the linear units I made an adjusted Wooghenge design based upon a 5,12,13 right-angled triangle ABC where AB = 15 fut, AC = 36 fut, and BC = 39 fut, Celtic feet. A revised point C now became located right on ring four of sixteen larger posts. The axis line FACD = 25 My = 10 *ford* = 10 Mr, 10 *faethms,* 20.73 metres. Ring four has a calculated perimeter measure of 40 *faethms* and defines a tangential path touching the posts. Rings one and four in my design have the same perimeter lengths as Thom. Rings two three and five closely follow the post positions. Ring six according to Thom has a better concordance.

The Posts

My new design lines coincide closely to the actual positions of the concrete plinths, the perimeter of each ring has been recalculated; the perimeter lengths of the six post rings is significant in terms of the adjectival symbolism attributed to the numbers 2½, 33 and 66. From ring one, we have: -

Ring one = Ten + 1 post pits = perimeter length = 15 faethms [Mr]
Ring two = Eighteen .. = ... = 25 faethms [Mr]
Ring three = Nineteen .. .. = ... = 33 faethms [Mr]
Ring four = Sixteen .. .. = ... = 40 faethms [Mr]
Ring five = Thirty-two .. = ... = 55 faethms [Mr]
Ring six = Sixty-one .. = ... = 66 faethms [Mr]
Total number of post pits = 157

WOODHENGE POST HOLES GEOMETRY drawn Author 1980


POSTHOLES
STONEHOLES
METRES
CELTIC FEET
MEGALITHIC YARDS
MEGALITHIC RODS
LATITUDE 51° 12'
2½ Cf = 1 My
2½ My = 1 Mr
MIDSUMMER SUNRISE
N
49.9°
H
G
J
B
15
Cf
39
36
F
K
A
C
D
E
15 Mr
25 Mr
10 Mr
33 Mr
40 Mr
55 Mr
66 Mr
THE MEGALITHIC SURVEYORS ©
WOODHENGE, ENGLAND
POSTHOLES & GEOMETRY
DRAWING No.
DRAWN NLT
TRACED
CHECKED
APPROVED
SCALE shown
DATE DEC '80
REVISION NUMBER
ITEM
REVISION
CKD
APPD
DATE

Ring one perimeter 15 faethms [Mr] adheres closely to the post positions, as do rings two and three. Ring three of 33 faethms is considered significant as a symbolic perimeter length, one *furlang*, for reasons to be explained. Sixteen ring four posts were much larger in diameter than posts in other ring posts. Regarding the distance between rings four and six, ring five appears to have been required for structural engineering reasons; posts would generally be about eight or nine metres tall.

There are four extra posts offset from the reconstructed geometric design perimeters in rings one, two and five. The outermost ring six appeared to have only two post pits overlooked at the time of the archaeological excavation; these are marked with open circles. Ring six is considered a symbolically significant perimeter, a length of 66 faethms - twice times 33, two furlangs; thus defining the sacred nature of the building encompassed by sixty-one posts. There were two stone slab compression marks due south of the centre, later shown to be in Samain, month seven, animal sacrificial stones.

Geometric Design

Of central importance is the right angled triangle ABC. A is the design centre point, B is where the excavators found a grave containing a skeleton. Below the base line FACD are the semi-circular lines DEF etc. Point B is the apex of a triangle on the building's main axis, the midsummer sunrise alignment. The geometric triangle has been drawn to scale: -

AB = 15 fut AC = 36 fut BC = 39 fut, (Celtic foot)

From which relationship:- AB squared + AC squared = BC squared

$225 \text{ fut}^2 + 1296 \text{ fut}^2 = 1521 \text{ fut}^2$

The distance from the geometric design base line centre point A to a point chosen at the intersection with ring four on the sixteen post ring is 36 fut, (Celtic feet). My proposition point C should be on the intersection of the axis and ring four can be appreciated when the sixteen posts are shown to be sixteen months of the Sun calendar year. The sixth ring comprised fifty-nine posts found at the time of the archaeological 'dig'. On a proportional spacing basis, two missing posts shown by open circles add to a total of sixty-one. This is the same number as the bluestone columns concentric with the ring of thirty sarsen columns at Stonehenge, the count of intercalary days each year of sixteen Sun calendar months.

Sixteen Months

Analysing the arrangement of sixteen sectors, it was desirable to determine the first 'month'. Resolving a number of alternatives, the midsummer sunrise bearing of the ancient monument led to a preliminary choice of sector one as Summer, the first month of the year. Confirmation of that conclusion; two flat stone pressure marks in the seventh month sector are thought to have been altar stones used when sacrificial animals were slaughtered during Samain, confirmation sector one was Summer.

Point B on the axis of midsummer dawn was given further thought. I found radial lines drawn from B and made tangential to the sixteen posts of ring four, further extended towards ring six, these radial lines intersected ring three. Nineteen posts in groups of five, five, five and four, four weeks are the 19 basic days. Counted 16 times a year, months of three weeks each of five days plus a short week of only four days, amounts to 19 x 16 = 304 days. These same radial lines also divided

ring six of sixty-one posts into groups of three, four and five, totalling 61 intercalary days. Adding these ring six post groups of intercalary days to the basic nineteen days every month, the total is 365 days, a Sun calendar year.

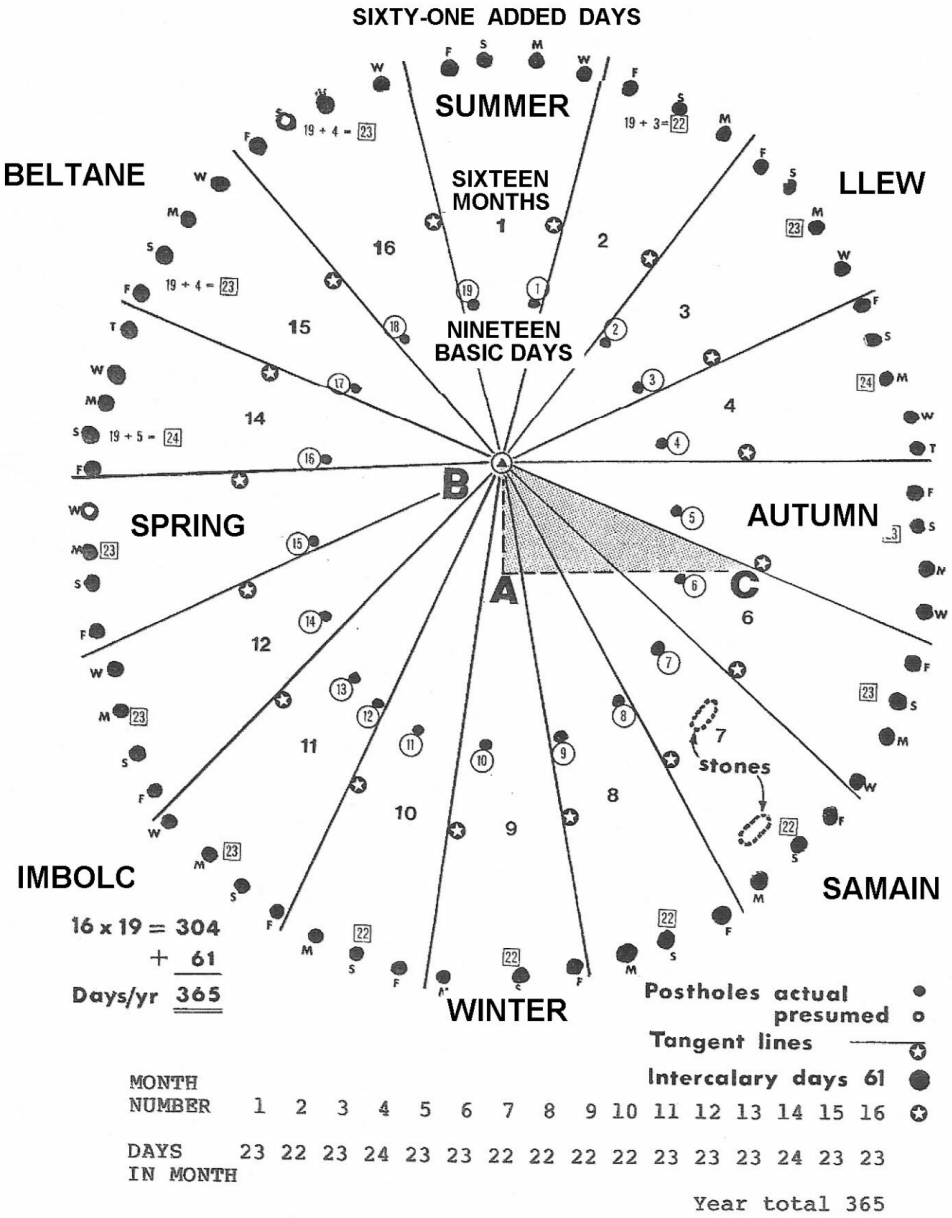
Numbers of Days per Month

It is thought Fourth month, after Llew harvest month and prior to Autumn month, would have the psychological advantage of seeming to pass slowly if it had twenty-four days. With the plentiful harvest in store, food for the community and fodder for the animals, it was a time to enjoy life.

Month fourteen, after Spring and before month fifteen is named Beltane, a good time of year to be alive. Fourteen also warranted being a 'long' month of twenty-four days. On the other hand, twenty-two day months Seven, Eight, Nine and Ten were the cold time of year when everyone would wish for the warmer days and the forthcoming new year. Month Two was reduced to twenty-two days to achieve the year of 365 days. It became clear the design elements of Woodhenge established Summer as the first month. The Sanctuary, Mount Pleasant, Stanton Drew, Stonehenge and Durrington Walls confirm this choice of short, normal and long month sequences.

Samain or Hallowe'en

Two impressions in the subsoil found in the month seven sector indicated large heavy stone slabs had been placed there several millennia ago. These two stones could have served as sacrificial animal slaughter stone slabs as large livestock herds were reduced in numbers at Samain ceremonies.



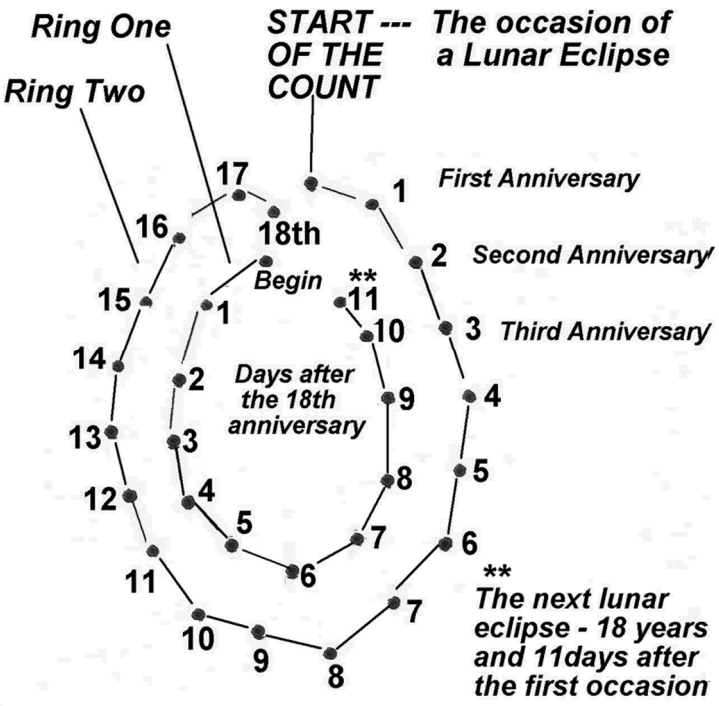
WOODHENGE SUN CALENDAR

In past times it was desirable to cull the community's livestock before cold winter weather made it necessary to house animals in enclosed winter quarters. Such arrangements provided food for preserved salted meat stocks for human consumption in winter and lesser animal fodder demands during the cold months. That time of year in today's terms is late October. Known as Samain, or Samhain in Irish folk tales, it is a season marked today by Hallowe'en customs from the 'Evening before All Hallows Day', a Christian calendar event.

Saros Celestial Feature

The Woodhenge design axis is the direction of midsummer solstice dawn, the same fundamental principle as Stonehenge built two centuries before, as explained in Chapter 17 'Stonehenge'.

Perhaps four post holes may yet be discovered in a nearby field, elements that could indicate if Woodhenge was also designed with lunar eclipse cycle forecast properties. When viewed from the centre of the Aubrey Holes, a full Moon rising between 'A' Posts 2 and 3 would experience an eclipse. There may be an equivalent in the siting of four large timber 'A' posts at Woodhenge yet to be found. Items of concern with Moon calendar follower's philosophies, as explained in chapter 26 'Symbols & Numbers', Knowth kerb stone K53 showed the Moon calendar philosophy embraced a counting technique of forward moves in 3500 BC. The Aubrey Holes at Stonehenge c.3100 BC also followed the same forward counting principle. Woodhenge ring two of seventeen posts has one other post [18th] close to the sunrise axis. This arrangement permits a count of eighteen forward moves [years] from the start post since the last eclipse of a full Moon.



WOODHENGE SAROS ECLIPSE COUNT Drawn Author 2008

Following the eighteenth anniversary, a count of days on ring one began with the post identified on the illustration. Eleven forward moves follow the same counting principle, ending with the offset post 11, identified by the asterisk note**, the day when a lunar eclipse was about to happen. This Moon eclipse cycle of eighteen years and eleven days since the last occasion was evidently known when Woodhenge was constructed about 2300 BC.

Woodhenge Meton Cycle

It appears highly probable the nineteen year Meton cycle when "the Heavens return to the same place" was known at Woodhenge. Ring two of eighteen posts plus the offset post, a total of nineteen posts, would have enabled a Meton count of years since the last occasion when the "Heavens" returned to the same direction.

Leap Years

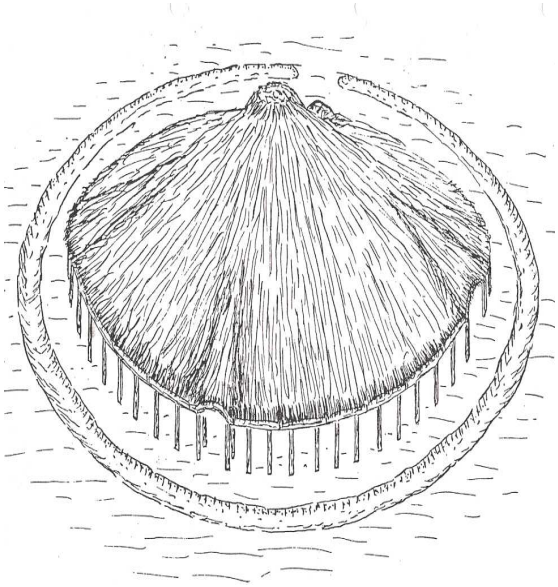
At Woodhenge and other calendar building sites in Britain and Ireland, no specific evidence has been detected that account for an additional leap year day every four years. Our present calendar system allows for the tropical calendar year of 365.2422 days by adding an extra day each fourth year. It seems clear the ancients did not have any concept of fractions or decimal parts of a whole of a day. For that reason they may have been unable to adjust for leap years in the manner we do today. It is

presumed an arbitrary adjustment was made every few years, perhaps when the actual moment of midsummer dawn was used to verify midsummer's day, indicating an extra day adjustment had to be made by postponing an announcement of midsummer’s day. After all, we count days as whole numbers, you would not have experienced a count of 0.2422 days each year in your lifetime, just a leap addedevery four years on the calendar.

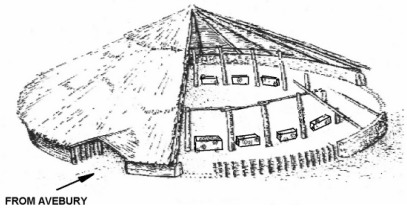
RELATIVE SIZES : FIVE BRITISH NEOLITHIC CALENDAR BUILDINGS

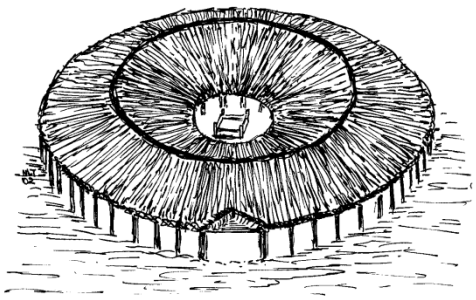
Fifty metres or thereabouts <……>

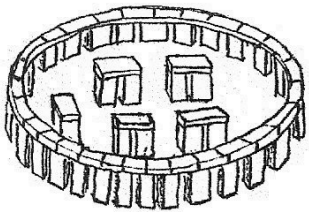
WOODHENGE



THE SANCTUARY

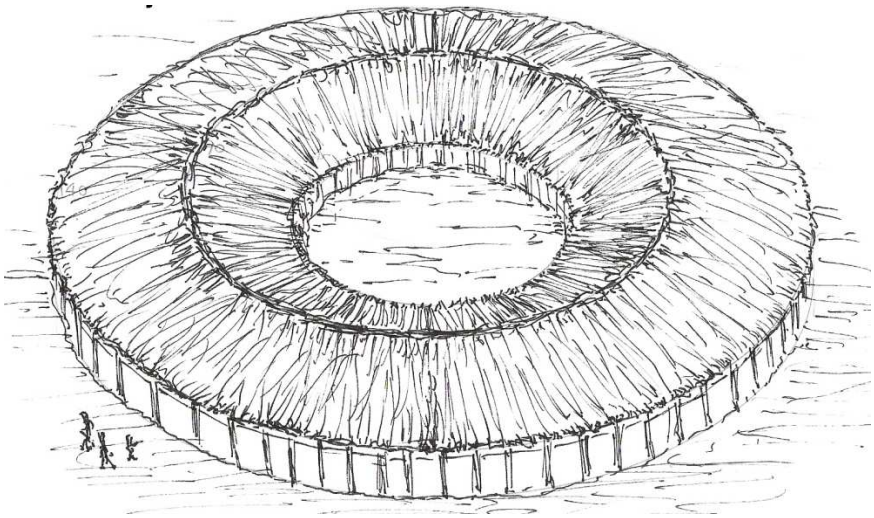






MOUNT PLEASANT **STONEHENGE**

STANTON DREW



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ditto **Avebury Survey 1982,** all three by private correspondence, 1966-1982

CHAPTER FIFTEEN :: DURRINGTON WALLS

ENGLAND c.2300 BC

"What is time? The shadow on the dial, the striking of the clock, the running of the sand, day and night, summer and winter, months, years, centuries - these are but arbitrary and outward signs, the measure of time, not Time itself. Time is the life of the soul." Longfellow 1807-1882

Durrington Walls aligned with dawn at mid-winter,
Woodhenge and Stonehenge aligned with mid-summer dawn.

SYNOPSIS

Durrington Walls southern circle timber post building was erected about 2300 BC, three kilometres north-east of Stonehenge in Wiltshire, England. Woodhenge was situated mid-way between Stonehernger and Avebury. Becoming the subject of an archaeological excavation during 1966-68, Drs Wainwright and Longworth found the circular structure comprised six rings of timber posts. An estimated one hundred and seventy-seven post were employed. Close to 39 metres diameter, the outermost sixth ring of sixty-one posts had the same number as the Stonehenge ring of bluestones and Woodhenge outermost posts ring. Durrington Walls' axis was aligned to midwinter sunrise, a design principle indicating a divergence of philosophical opinion in the community and a desire for a uniquely styled calendar building. I interpret the arrangement and numbers of posts at Durrington Walls to be the same fundamental design as Stonehenge and Woodhenge, a Sun calendar - sixteen months a year, four months of 22, 23 or 24 days, five days a week –ancient monuments oriented in the direction of midsummer sunrise. To embark on a major building project two centuries after Stonehenge clearly demonstrated the willingness of the community for hard work and strong conviction of purpose.

HIGHWAY A 345

The Wiltshire County Council road authority department planned to construct part of the A345 highway northwards from Amesbury, past Woodhenge site and on to Devises in the late nineteen-sixties. The intended route passed west of Durrington village houses and through a large field enclosed by an extensive earthen bank, an area known as Durrington Walls. Prior to road construction works, Dr G. J. Wainwright and an enthusiastic team were granted permission to excavate a portion of the route passing through the area within the Durrington Walls banks. The archaeological excavation proceeded with all speed, their aim to complete the dig before road works destroyed the ancient site for all time. It was anticipated significant archaeological remains would be found, justified by evidence of several timber buildings within the banks.

THE SITE & ARCHAEOLOGICAL FINDINGS

An approximately circular 'Durrington Walls' embankment half a kilometre across surrounds the site. Within its compass was found the remains of a number of timber structures. The most important site became known as the 'southern circle', the largest about forty metres diameter comprising post pits arranged in six concentric circles. Located close to a gap in the Walls leading to the southwest, the southern circle building was nearest the Avon river. Two thirds of the circular building's post hole pits were affected by the road works, leaving only the western portion leaving only the western portion untouched.

Durrington walls - southern circle - post pits

Dr G. J. Wainwright reported a radio-carbon date indicating construction of the southern circle structure occurred BM 395-397, 1930 bc +/- 90 years. Allowing a calibration correction of +400 years, and for the purposes of my interpretation of the designs in this and earlier buildings, I have assumed a rounded date of 2300 BC, a similar time as Woodhenge. His Report pp 224-225 estimated the longevity of Durrington Walls southern circle building at several centuries. Factors affecting the life of a timber building included the choice of post species such as oak, the site's dryness, a degree of effective weather proofing and size of the timbers. Close to the river, Durrington Walls southern circle site was not so well drained and probably experienced damp conditions perhaps leading to earlier decay than would otherwise be expected.Dr Wainwright's illustration 'Plan of the Post Holes and Decayed Timber Uprights' indicated timber post diameters varied from about 30 centimetres up to one metre. Two posts in the south-east sector were by far the largest. It will be noticed when viewed from the centre of the building they framed the Sun's first rays at the midwinter solstice. This solstice aspect of the calendar building points towards a philosophical design centred on the Sun calendar midwinter solstice dawn, instead of midsummer dawn as was the case with Stonehenge and Woodhenge built around the same era. At the solstice, dawn sun's rays would have shone along the processional way from the Avon towards an arched doorway leading to the central atrium. One wonders if their Sun deity's statue occupied a central position in the atrium in honour of midwinter solstice day. From the doorway, a watcher could look south-east through a gap in the embankment towards the waters of the Avon flowing past. The Report offers sound argument supporting the theory the building was thatched, rising from its outer perimeter to a central atrium. A thirty degrees roof slope rising from an outer perimeter height of say two metres would result in a central atrium height of nine metres. A central opening in the roof would have allowed sunlight to illuminate a ring of timber posts surrounding the vast open area within ring one. The spacious atmosphere created within the structure compares well with achievements in cathedrals and notable buildings today. Durrington Walls southern circle building probably served the nearby community for many generations to tally the Sun calendar, the Moon calendar, celebrate anniversary festivals, weddings, feasts and funerals. One hundred and seventy five generations ago, individual and family celebrations were just as desirable as they are today.

Post Numbers

Construction of the highway obliterated thirty to forty per cent of the ancient monument remains; prior excavation work succeeded in revealing major portions of six rings of post pits. Described in Dr Wainwright's Report and the Plan of the Post Holes, southern circle phases 2A and 2B, this reproduction of the original post pits placements is supplemented by my calculations of the additional post positions based upon average post spacing and arc lengths. Post pit numbers in each ring are considered to be: -

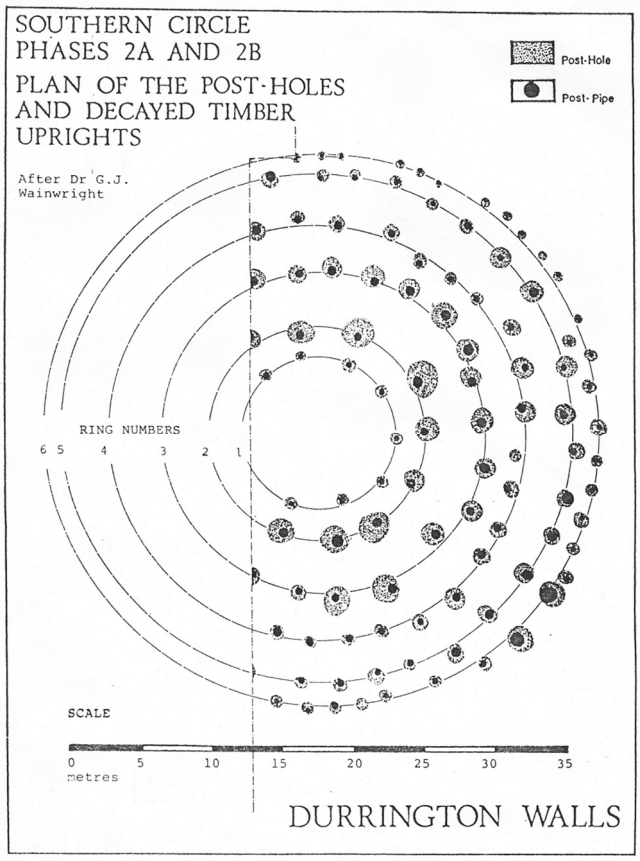
Ring	Posts	Pairs	Comment
1	10	5	Week days
2	12	6	Moon dual month pairs 29/30 days

3	24	12	Moon calendar months a year
4	32	16	Sun calendar months a year
5	38	19	Count of Moon eclipse cycles anniversary
6	61		Sum of intercalation days in 16 Sun calendar months
	177		Total number of Durrington Walls timber posts.

Ring One innermost ring comprised ten pits, considered as five post pairs with lintels across each pair. Woodhenge ring one had ten posts plus an extra one, the same number of sarsen trilithon arches at Stonehenge. Ten posts were presumably the means of tallying five days each week, the same principle as Woodhenge and Stonehenge.

Ring Two Experience tells me structural engineering requirements for a building this size would have required ring two posts to be major support members for the circular roof ridge. Comprising 12 posts, these very large diameter timbers supported the inner roof eve ridge. Ring two would have required 15-20 metre tall tree trunks placed in foundation holes about 4 to 5 metres deep. A structural ring, inwards from the outermost ring, was also a feature at Stanton Drew c.2900 BC.

Ring Three comprised large posts; twenty-four is the presumed number. Ring six at Stanton Drew also had twenty-four posts. Knowth kerb stone K15 petroglyph showed twelve 'day' rings. Identical reasoning is offered in explanation of their likely purpose and continuity of design principles over the centuries. On that basis, a tally of three weeks of five days plus a fourth week of four days = 19, adding the maximum 5 intercalary days per month requires (3 x 5) + (1 x 4) + 5 = 24 posts, the means of counting twenty-four days in the longest month Summer.



Ring Four of thirty-two posts is directly comparable with the Stonehenge circle of thirty sarsen columns with their lintels plus the Slaughter Stone and its twin, thirty-two altogether. These sixteen pairs of posts are assumed to be the count of sixteen months in a Sun calendar year. Ring four at Woodhenge also had the same count of sixteen post pits, the Months count.

Ring Five of thirty-eight posts, or most likely nineteen pairs of posts joined by lintel cross beams, is presumed to have been the means of tallying 19 basic days in four weeks each month; three weeks of five days plus one short week of four days, nineteen altogether. Stonehenge had an identical count of bluestone columns within the horseshoe of the five trilithons. Ring three at Woodhenge had nineteen

post pits. The ring of post pairs could equally well have served to forecast the nineteen year Meton cycle when the heavens return to the same place on the horizon.

Ring Six Compare the 59 slim posts with the other relatively large sizes of two post pits shown on the Plan. These slender ring six posts indicate the likelihood they did not support heavy structural roof loads. Their numbers point towards the conclusion they served the same purpose as the outer ring at Woodhenge, that of tallying the intercalary days each month. The pair of massive posts at the south-east on a bearing of north 130^0 east forming part of ring six has led me to conclude the pair formed side columns of a large doorway arch. Winter solstice dawn shafts of sunlight would have entered the building via the portal opening. It follows that Summer solstice sunset is diametrically opposite at the northwest. Perhaps the clue indicating how the designer chose to indicate when and where sixteen Sun calendar months count commenced may still be buried below ground in the unexcavated western portion of the site. In the absence of an indicator of any kind, I have chosen arbitrary apportionments to indicate the naming of the sixteen months of ring four and paired week day posts of ring five. Similarly, for the same reason, the intercalary days of ring six have been grouped in threes, fours and fives. On that basis, the Sun calendar months and days apportionment would have been:-

Months & Days

Month number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Days/month	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	= 304
Intercalary days	4	5	4	4	4	4	3	3	3	4	4	4	4	4	3	4 = 61
Total days	23	24	23	23	23	23	22	22	2	23	23	23	23	23	22	23 = 365 days a year

The Community & Their Sun Calendar Temp2le

As everyone appreciated, a calendar was the means of telling when a birthday is due, the date of a wedding anniversary, how many years from a past event to the next event. Records when crops should be sown, the seasons, all matters that enable a pattern of community and agricultural life to be measured and events planned ahead.

Perhaps five pairs of posts were marked with symbols for week day deities, sixteen pairs of month posts showed four seasons, two solstice and two equinox symbols on odd numbered months, with even numbers for eight months. Sacred oak branches, mistletoe garlands, rowan tree berries, stooks of wheat and barley at Llew, May blossom at Beltane could have adorned the lintel across the twin posts of the portal doorway or the arches marking particular months.

Celtic Quarter Days

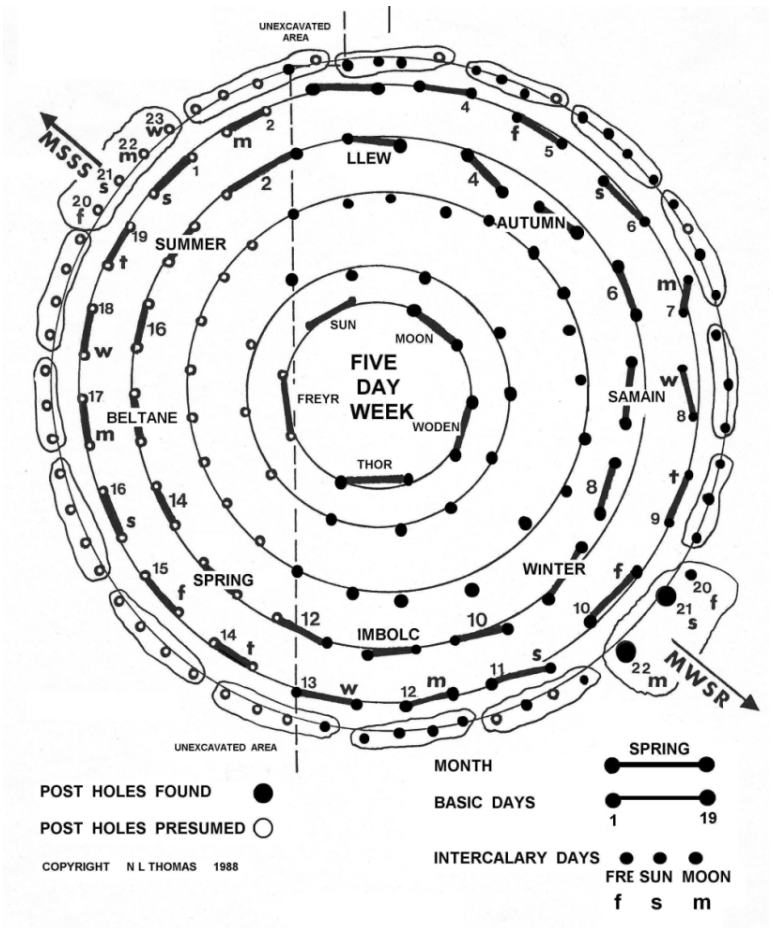
Readers may be familiar with Celtic quarter days; both Gaelic and Brythonic folk tales tell of quarter days when fairs and festivities were held, servants were hired, contracts made and concluded. These events were not held on Gregorian calendar quarter days of January 1st, April 1st, July 1st and October 1st, but on the Celtic quarter days named Llew or Lughnasad, Samain, Imbolc and Beltane. Dates for these days in the Gregorian calendar are Harvest festival on August 1st, All Hallows Day on November 1st, Candlemas on February 1st and Mayday on May 1st; dates forty days after the four solar events, the summer and winter solstice and the spring and autumn equinox.

In terms of the ancient Sun calendar, thirty-seven days elapsed from the solstice and equinox events to the third day of the first week in the third, seventh, eleventh and fifteenth months.

Perhaps the successful conclusion of a good harvest was celebrated for an entire week of five days in Llew or Lughnasad month. Following the festival event, a further fifty-four days passed until the next solar happening, a quarter year of ninety-one days. After Autumn month came spooky happenings; Otherworld beings and unknown deities haunted the unwary during the first week of Samain month.

Durrngton Walls Posts Count and Identification, illustration drawn Author about 1990

After winter's cold weather eased in the first week of Imbolc month, shepherds could count how many ewes were about to drop their lambs. When the hawthorn blossom was at its most magnificent, young people danced around the Trendle Pole for five days to celebrate the fertility festival of Beltane, a week of fun and frolic in the month of Beltane. A consistent design element throughout several ancient buildings from Ireland's Knowth to Mount Pleasant in south-west England and Durrington Walls has been the choice of the 12th and middle day of a 23 day Summer or Winter month to coincide with midsummer or midwinter solstice day. Ireland's Knowth mound kerb stone K15 has twelve small rings inscribed on the stone slab, the final ring includes an added marker, presumably a means of counting and identifying the twelfth day, the middle days of months Summer, Autumn, Winter and Spring. Stanton Drew ring six had twelve pairs of posts following in the same tradition several centuries later. A design provision of the same kind has been determined at Mount Pleasant, the key being the direction of midsummer dawn in sector one, halfway through Summer month. Woodhenge Stonehenge adhered to the same practice. The Sanctuary rings of stones and post pits apparently omitted a middle week or month marker feature. Affirmation the custom at Durrington Walls ring two is thought to have happened in 2300 BC. For eleven days prior to the actual winter solstice event, the shortest day of the year, the Sun watcher could anticipate its arrival. On the eleventh day the watcher may have announced the news of the imminent solstice happening on the next and twelfth day of the month. Traditional practices and knowledge continued. Dr Wainwright discussed building practices in England and Ireland on page 216 of his report. There are evidences of similar structures built in Ireland during the first millennium BC. At Navan in County Armagh, a circular structure 39.6 metres diameter has been revealed; the Navan



building and its likely associations is discussed in chapter 6 'Myths & Legends'. Dr Bersu reported on a circular building of 36.5 metres diameter at Ballacagen on the Isle of Man. Dr Bersu also reported a roofed building whose diameter was 41.1 metres at Lissue, County Antrim, Ireland with a suggested construction date between 800 and 1000 BC; ancient monuments in Ireland followed the same earlier traditions in England, probably in terms of tallying the Sun calendar, certainly in the choice of materials and manner of design and construction.

https://www.theguardian.com/science/2020/jun/22/vast-neolithic-circle-of-deep-shafts-found-near-stonehenge & https://www.bbc.co.uk/news/uk-england-wiltshire-53132567

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The twenty or so deep pits are seen as food preservation "Ice Pits"; the period between Winter snows and May first, Beltane fertility festival, young people dancing around the Maypole holding progressively shortening ribons as the daylight faded. Food to feed the hungry builders of Stonehenge in the form of fresh lamb, pork and beef was probably preserved in these ice pits. Sufficient fresh meat would be there for the catering needs of large crowds expected to gather from all over Brython during Beltane [Mayday]. Ice was collected and placed and accumulated in the p its through Winter months earlier in the year, melt water soaking away gradually through the chalk strata in warmer months.

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CHAPTER SIXTEEN :: MOUNT PLEASANT

ENGLAND 2400 BC

"Man has constructed numerous calendars to mark off the passage of time. Entirely practical at first, later for intellectual reasons, he needed to understand account for and to improve the time measures he used: thus astronomy developed." W. M. O'Neil 1975

Two hundred generations ago Sun calendar buildings were created.

SYNOPSIS

Two kilometres east of present day Dorchester in the west of England, a Neolithic community constructed a circular building about 2400 BC. Built with 183 timber posts arranged in five concentric rings, the outermost ring was about 45 metres diameter and beyond that was an encircling ditch and mound. Dr G. J. Wainwright's report to the Society of Antiquaries published in 1979 is the basis of these deductions and conclusions. The numbers, geometric design and arrangement of the Mount Pleasant posts enabled the Sun calendar days, the months and seasons were to be tallied by two circuit counts of the posts each year.

I concluded the function of the Mount Pleasant building was primarily that of a Sun calendar, sixteen months a year, four week months, five day weeks with no perceived lunar functions. At the centre of the building was a square stone feature, the four corners marked by stone columns with the sides in-filled with stone slabs set on edge. This stone feature is unique in the list of Neolithic buildings of the time. Its purpose is not immediately apparent, but as in modern day temples and churches, the stone feature could have served as an altar for any religious ceremonies. The geometric design analysis underscores the application of faethms and megalithic units. In the field where Mount Pleasant once stood, near the railway bridge a short distance east of Dorchester, a crop of cereals was planted in the field 1982. At the time of my visit early that year, green shoots were all that could be seen in the level field.

THE ARCHAEOLOGICAL EVIDENCE

Reproduced with special permission by Dr G J Wainwright 1980, his Report of the Mount Pleasant excavations in 1970 may be studied in the 1979 Journal of the Society of Antiquaries, London; a reproduction of Dr Wainwright's'General Plan' is quoted:-

Construction Date Considerable numbers of radio-carbon test dates are given in his Report; data afforded by materials found at the site and their locations. A calibrated carbon date about 2400 BC for the construction is estimated.

Design

Dr Wainwright's plan of the excavation has been the basis for deducing why and how the original design at Mount Pleasant was conceived. The building structure originating at a central point, a series of eight concentric rings were seen to be spaced at regularly increasing intervals spaced at one and a half *faethms*, 3.1 metres. An encircling ditch surrounded the central area, interrupted by a nor'-nor'-east causeway entrance.

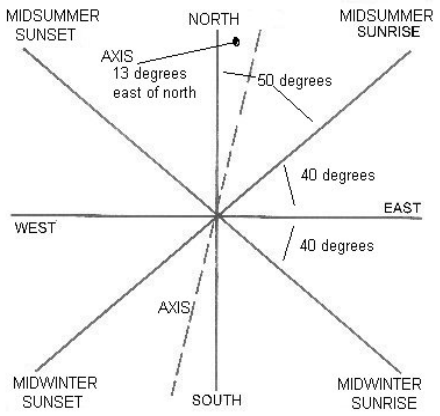
Of principal importance was the need to establish true north and how it related to the Mount Pleasant features, links with alignments of solstice sunrise at dawn and dusk. Successive pages of Dr Wainwright's Report showed several north direction signs whose actual bearings varied by some 10^0. Whether these directions were magnetic or true north was not indicated. The importance of reporting true north in archaeological reports is stressed. At the latitude and longitude of Dorchester, a 7^0 difference now exists between magnetic north and true north. My past experience indicated the importance of establishing true north to enable logical interpretations of monuments features and calendar characteristics.

To the left of the causeway entrance, two post pits are indicated in the ditch. Around to the right, a third post pit is indicated, also in the ditch. From the monument's centre, a line drawn between these [northern] pits can be related to the third pit indication in the [north-eastern] ditch. An included angle close to 50^0 at the centre is made by these two alignments. At the Mount Pleasant latitude north 51^0, an angle close to 50^0 exists between true north and midsummer sunrise. That known factor was seen as a satisfactory basis to conclude true north was the direction from the circular structures centre to a gap between two post pits in the ditch at the left of the entrance. From the geometric centre north-eastwards to the post pit in the ditch was that of midsummer solstice dawn, 50^0 east of north. These true north and midsummer solstice sunrise directions were a firm basis for further work.

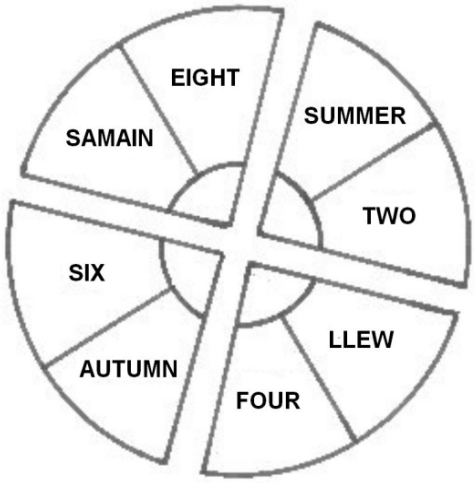
BRYTHON MEASUREMENTS table:-

One 'finga' ≈ 27 millimetres, diameter of Monkton barrow gold disc.
Five 'fingas' ≈ one 'fist', 133 millimetres.
Ten 'finga' ≈ 275 millimetres, the Stonehenge footstep length, 360 'degrees'.
2½ 'fists' ≈ 'fut', 333 millimetres, Stukeley's "Celtic foot" 1/3rd metre
2½ 'fut' ≈ 'ford', 830mm, a step forward, Thom's "megalithic yard".
2½ 'ford' = 'faethm', 2.07 metres, Prof. A. Thom's "megalithic rod".
33 'faethms' = 'furlang', 68.4 metres, Long Man's height, a plough furrow length.
33 'furlangs' = 'staen', 2¼ km = 1.40 statute miles, "a country mile", Stone St & Stane St measures.
2½ 'staens' = 'staen league', 5.65 kilometres, the Stonehenge Track measurement units.
Together with the progressive arithmetic number series:-
1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610, 987 at Stonehenge every step of the way
ad infininitum and the architects '*golden ratio number*' 13/8 = 21/13 etc **= 1.62**

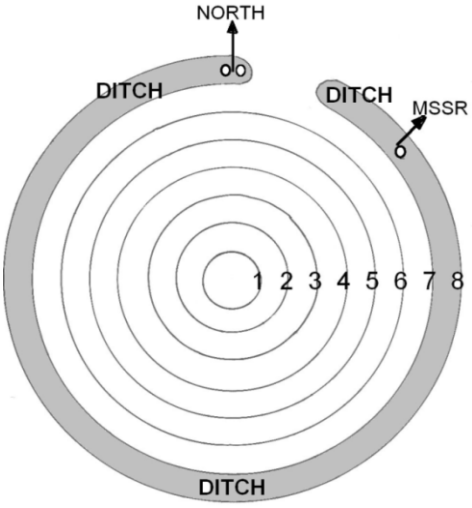
Based upon:-
Prof A. Thom's "megalithic yard" = 830mm Prof. A. Thom's "megalithic rod" = 2.07 metres
Dr William Stukeley's "Celtic foot" = averages 333 mm over several bar image lengths.
Long Man of Wilmington = 68.4 metres.
Caergwrle Bowl – four corner finger hold hollows = Ten 'finga' 275mm

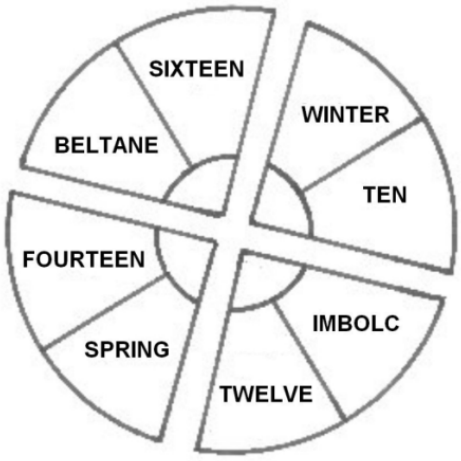


CARDINAL DIRECTIONS

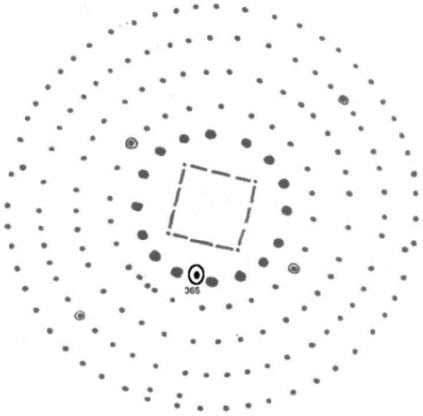


FIRST EIGHT MONTHS OF THE YEAR

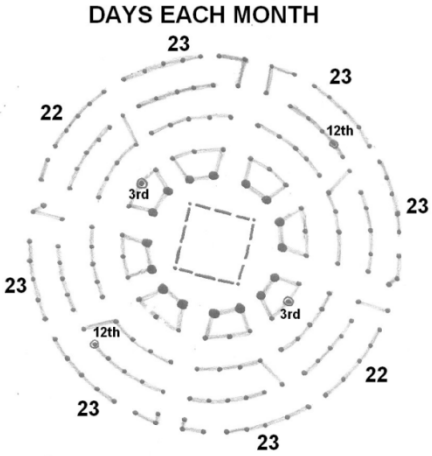




SECOND EIGHT MONTHS OF THE YEAR



183 POSTS



FIVE DAY WEEK GROUPS

FIRST CIRCUIT COUNT MOUNT PLEASANT POSTS

Perceiving the archaeological record showed 182 + 1 = 183 post pits, the geometry led me to conclude four avenues were present. Each quadrant of 45 or 46 posts thus formed could be halved into two sectors comprising sets of 23 or 22 posts, the days each month. These post numbers were directly related to the 365 day Sun calendar. Counts of the 182 posts twice a year tallied the ancient Sun calendar, the seasons, solstice and equinox in terms of months, weeks and days.

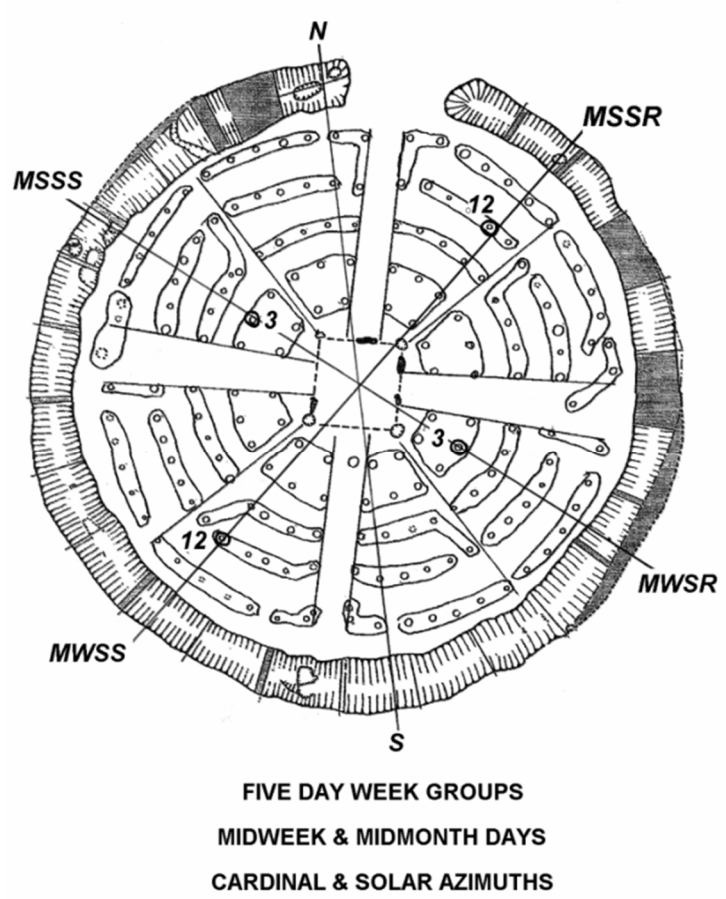
Shown '183 Posts'; sixteen large posts comprised innermost ring two. These are presumed to have tallied sixteen months of the Sun calendar. Each post may have had a suitable seasonal identification, either a month name or number. Equally these sets of four groups of four posts in the ring may equally have related to the four seasons, perhaps given names the equivalent of Summer, Autumn, Winter and Spring.

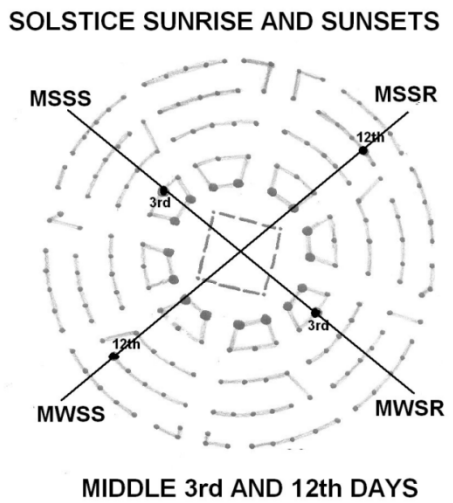
On the first circuit count, beginning in Summer month, sector one had 23 post pits. These have been grouped in sets of five, shown by lines joining the post dots. The days each week may have been named the equivalent of Sunday, Monday, Wodensday, Thorsday and Freyrday. In these sets of five days, the position of ring five post numbered 12 coincided with the midsummer solstice dawn alignment, 50^0 clockwise from true north. Post 12 was the middle day of a 23 day Summer month. Midsummer solstice sunset occurred in Samain month, diametrically opposite the midwinter solstice dawn. The second circuit count was similar, this time sector one was Winter and midwinter solstice sunrise occurred in Imbolc month 130^0 east of north. The dawn solstice alignment coincided with the 3rd day of week one. Spring month thirteen was the sunset occasion on the 3rd day of week one that month. Midwinter sunset, MWSS was directly opposite midsummer sunrise.

Post Holes Count Weeks & Days

To explain the manner in which a Sun calendar days tally was conducted, two clockwise counts of the 182 posts were made each half year, 364 days. The single post in the southern avenue was counted only once a year, the 365th day. Four solar events and four seasonal events were matched by four avenues and two circuit counts of the building's posts. Counted twice, 182 posts, four quadrants of 91 days and eight sectors of 45 and 46 days, equalled 364 + 1 = 365 days of the solar calendar.

Pairs of extra-large ring two posts presumably also tallied the first two days of the first week, possibly named for the celestial bodies, Sun and Moon. The next three days were tallied in the second row, perhaps days named for the old deities Woden, Thor and Freyr. Five posts in ring four of the sector tallied all five days of the second week of the month. And so on for weeks three and four. These twenty days were followed by three intercalary days, Sunday, Moonday and Wodensday seen on the outermost ring six post pits. A monthly total of twenty-three days accounted for Summer month, sector one. A similar counting sequence followed next month, twice around the 182 posts plus the 365th post. The illustration 'Days Each Month' grouped lines show the expected five days of the week. The middle days of the months and weeks occur on the solstice sunrise and sunset alignments are seen as particularly significant incidences.





Annotated Author 1981-2011

Solstice Sunrise and Quarter Days

Viewed from the centre I observed midsummer's day dawn alignment coincided with the middle and twelfth day of Summer month, a sector of 23 days. The next commemorative event occurs 37 days later, harvest festival Llew or Lughnasad, the third and middle day of the five day week one in the third month sector next after the eastern avenue.

Perceived relationships between solstice and equinox occasions as they relate to quarter days are shown. Beginning at midsummer sunrise alignment MSSR in Summer month of 23 days, a count began of days until the alignment of Llew month harvest festival day. To Llew festival on Wodensday, the third day in the first week, 37 days had elapsed since solstice dawn. Starting again next morning, a longer interval of 54 days elapsed until Autumn month twelfth day. A quarter year from MSSR to the MWSS alignment summed to 37 + 54, ninety-one days. In a similar manner, progressing around the entire monument twice, the same intervals were established. From the year's beginning, the intervals were 37, 54, 37, 54, then in reverse 37, 54, 37, 54 days from Summer to Winter and back again to midsummer, 364 days. A single day intercalation correction count of the single extra post in the southern avenue was added at a chosen occasion during the year to complete the full solar year 365 day cycle. The illustrations 'Solar & Quarter Days Intervals' shows a day or so discrepancy at the end of the Summer 37 day arc and the identified position of midwinter

sunrise, MWSR. No doubt you will recognise the MWSR alignment relates to the second circuit of month sectors count, an indication of the need to add a 365th day, perhaps at this time in the year.

SECOND CIRCUIT COUNT

Second time around, the first sector marked the 12th day of Winter month nine, the winter solstice, 54 days after Samain. Months nine and ten were the cold months. In the next quadrant, 37 days after the winter solstice [the Celtic] Imbolc day was marked, third day of the eleventh month. From the middle day of Imbolc to the Spring equinox was 54 days. Months named Spring and Fourteen followed until the count arrived at the western avenue. On the third day of Beltane month, the equivalent of Mayday was celebrated.

After 23 days of month Sixteen a second round of 182 days completed a total of 364 days. The single large post pit in the southern avenue is assumed to tally the 365th day, thus completing the Sun calendar year of 365 days. The sequence of months and the days in each month are seen as: -

Month No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
Days in	23	23	22	23	23	23	22	23	23	23	22	23	23	23	22	23	=	364
Month											Plus one post							1
										Total days in the Year								365

Mount Pleasant quarter day dates in terms of today's calendar start with the MSSR solstice: -

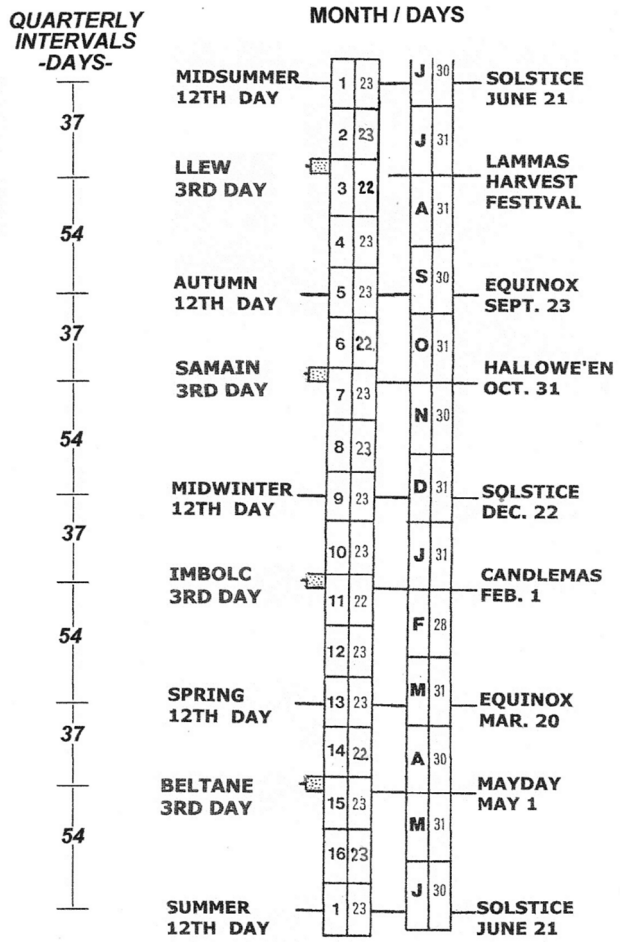
June 21st + 37 = Llew, July 28th [nearly 1st August, harvest festival]
+ 54 = the Autumn Equinox = September 21st,
+ 37 = Samain, October 28th, [nearly October 31st, Halloween]
+ 54 = MWSR December 21st,
+ 37 = Imbolc, January 27th, [nearly February 1st, Candlemas]
+ 54 = the Spring Equinox, March 21st,
+ 37 = Beltane, Mayday on the 1st of the month of May.
Finally + 54 = MSSR solstice, June 21st.

The 365th day a and leap years day may be added at any time.

Mount Pleasant building construction date about 2400 BC and its design as a Sun calendar compares with the Stonehenge Bush Barrow Plate and its alidade design. Please see chapter 17 'Stonehenge' for a full discussion on the Bush Plate. The Plate's alignments coincide with the same 37 and 54 days intervals, a provenance of c.1900 BC linked with its use as an alidade to set the same eight key dates implies five hundred years continuity of Sun calendar practice. Another forty or fifty generations before Mount Pleasant, the good folk at Knowth in Ireland used the same Sun calendar, graphically displayed on Knowth kerb stone K15. A century after Mount Pleasant, Woodhenge, Stonehenge and Durrington Walls southern circle building also adhered to the same Sun calendar philosophy in their designs. Two hundred generations after we continue today to mark Mayday and Halloween by related commemorative customs.

Calendar Comparisons

A columnar figure offers another, perhaps easier portrayal of the ancient Sun calendar as it relates to today's Gregorian calendar events. Thirty-seven and fifty-four day intervals are shown adjacent to solisticial and equinoctial events.

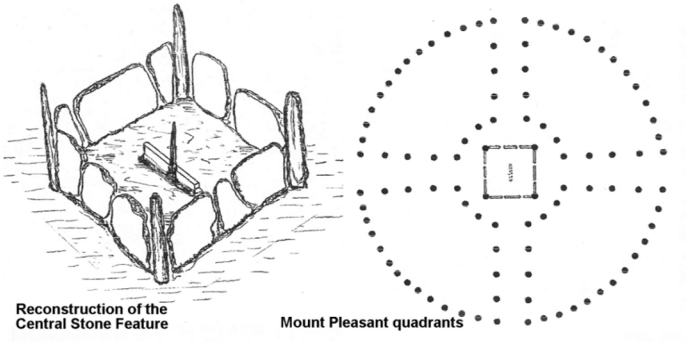


Julius Caesar's 54 BC calendar was reformed by Pope Gregory in 1582 AD to correct for 17 days slippage, the new calendar named the 'Gregorian' calendar. A detailed comparison of the Mount Pleasant calendar and the present Gregorian calendar reveals a number of interesting identities. Anglican Church ecclesiastical days differ slightly: Candlemas Day on February 1st is followed by Whitsunday, then Lammas Day on August 1st and Martinmas on November 11th. The ecclesiastical solar events are Midsummer Day celebrated on June 25th, three days after the actual day. Michaelmas Day on September 29th marks the festival of Saint Michael, a week after the equinox. Christmas Day, Christ's declared birthday is celebrated on December 25th, four days after the solstice. Lastly, Lady Day, Feast of the Annunciation on March 25th, four days later than the equinox.

The Central Stone Feature

It is reasonable to deduce the sixteen month Sun calendar loomed large in the lives of the Neolithic people dwelling near Mount Pleasant Temple. Celebrations of anniversaries, birthdays, weddings, public events, special days, were possible with knowledge of the Sun calendar. As a means to an end, Mount Pleasant was probably an important site and focus for their polytheistic religion. Celebrating community religious events usually requires a special place, a holy of holies. A central monument, five rings of tall posts roofed over with thatch and possessing an open central area with blue sky above surrounded by a ditch and embankment would have been most suitable for such a purpose. Based upon symbolic, mythic and archaeological deductions, the central feature is thought to have been a holy place. Featuring stone columns at four corners of a square joined by several on-edge slabs, two more on-edge slabs are identified at the centre of the building plan.

MOUNT PLEASANT CENTRAL STONE FEATURE drawn Author 1981



Although no archaeological finding supports this suggestion, the central stone feature could be considered an 'altar' where the high priest or shaman received offerings and tithes, blessed wedding couples and otherwise 'governed' the community.

Judgments may have been delivered from the holy place when offenders were found guilty of transgressing against the community's rules of behaviour. Celebrations of anniversaries, birthdays, weddings, public events, special days, were possible with knowledge of the Sun calendar. As a means to an end, Mount Pleasant was probably an important site and focus for their presumed polytheistic religion. Celebrating community religious events usually requires a special place, a central monument, five rings of tall posts roofed over with thatch and possessing an open central area with blue sky above urrounded by a ditch and embankment would have been most suitable for such a purpose.

Design Geometry & Linear Measures

The perceived geometry and design criteria incorporated into the Mount Pleasant placement of post pits can be explained as follows: -

The entire design appears to be founded upon approximately equal intervals between post rings. The mean ring radii increment from the centre to beyond the ditch is 3.1 metres, close to 1½ *faethms*. Beginning with the centre square, dimensions indicate a four sided stone feature was created by tangential lines around a circle about 6¼ metres diameter. Scaled from Dr Wainwright's 'General Plan of Site Four' the measured side length from stone hole 173 to 174 is close to 6¼ metres, equivalent to 3 *faethms.* Four sides of the square are tangential to ring one with a 1½ *faethm* radius from the geometric centre of the entire building. Next, ring 2 of 16 posts had a diameter of about 13 metres. Successive post rings numbered 3, 4, 5, had diameter lengths of about 19 m, 25m, 31 m and 37 m. The inside edge of the ditch approximates 44m and ditch outer diameter to 49.5m.

Observe the Mount Pleasant monument's radii increments from the centre to the outer edge of the ditch circumference may be expressed as simply 2.072 x 1½. On that basis, it appears the Mount Pleasant designer adopted a linear measurement unit of one and a half faethms, one and a half times Thom's *megalithic rod*. Why a one and a half faethm linear unit was chosen can be answered in the following way. Had a smaller Mount Pleasant designed based on a one faethm unit, the ancient monument would have been only two-thirds the size. A smaller building would have been considered impractical because the 183 posts would have been too close together. Alternatively, had a larger design unit been chosen, two faethms, a 2 x 2.2072 = 4.15 metres that would have consumed too many resources. The compromise of a midway unit equal to one and a half *faethms* was chosen for pragmatic reasons.

The ditch inside edge diameter is close to 44m, 137m circumference that converts to 66 faethms, twice 33 Mr, interpreting this twice 33 value as a declaration the central area within the circumference was a sacred zone within which the building was constructed. In a similar way, the ring of Aubrey Holes at Stonehenge has a circumference of 132 = 4 x 33 faethms, a means of defining the inner area's symbolically sacred nature of that monument.

The division of a circle from four cardinal directions north, east, south and west into sixty-four degrees of angle is a logical step, a method of progressively halving until a suitable sub-division unit is reached. I have termed these sixty-four divisions 'megalithic degrees', symbol M^0.

Because each quadrant of 16 M^0 is conveniently divided by the solstice sunrise and sunset alignments into the whole numbers 9 M^0 and 7 M^0, observe 9 M^0 is quite close to an accurate value at the Mount Pleasant latitude. In the sexagesimal system we employ today, the angle is 50^0.

Mount Pleasant avenues axes measure two and a half megalithic degrees, 2½ M^0 clockwise from a cardinal north and south directions. Why these alignment values were chosen is not immediately clear until one relates 2½ M^0 to my Brython Measurement Values multiplication factors; a choice of a favoured traditional number.

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CHAPTER SEVENTEEN :: STONEHENGE

Photo permission Megalithic Co. UK

A bird's eye view at midwinter dawn of twenty-first century Stonehenge

"Stonehenge really was the most incredible accomplishment." Bill Bryson

SYNOPSIS

Stonehenge, the group of stone columns standing in the middle of Salisbury Plain in southern England, is the most well-known ancient monument in Britain visited by a million tourists every year. The area surrounding Stonehenge has the densest concentration of ancient monuments north of the European Alps. About 2500 BC, eighty four-ton dolerite bluestones from the Preseli mountains in south-west Wales were brought to the site. An equal number of much larger twenty-five ton sarsen sandstones from nearby Marlborough Downs were transported to the same location about that time. Five great sarsen sandstone arches named trilithons were erected. Within the trilithons **U** formation, nineteen bluestone pillars were placed in a matching arrangement, the open end facing the direction of midsummer sunrise. Thirty sarsen columns were erected in a ring, each upright column joined by a lintel from one to the next. Sixty-one smaller bluestone pillars were placed concentrically within this ring of thirty sarsen columns. The Stonehenge of 2500 BC has the same design fundamentals as other Sun and Moon calendar buildings in Ireland and elsewhere in Britain.

The Sun calendar tallied sixteen months a year, months of four weeks and five days each week, 365 days a year. Outside the ring of thirty sarsen columns, twin rings of pits were dug into the chalk ground about 2500 BC, one ring of twenty-nine and the other of thirty pits, now named 'Aubrey Holes'. These fifty-nine Y and Z Holes were the means of tallying a Moon calendar, six months of six weeks each of five days, repeated a second time around but one day less each month, a twelve month lunar year of six dual 59 day months; a 354 day Moon year.

THE AUBREY HOLES

Stonehenge in Neolithic times about 3000 BC saw a ring of fifty-six pits were excavated into the chalk deep below the grassy sward. The pits are now named 'Aubrey Holes' their seventeenth century discoverer the antiquarian John Aubrey who first noticed and recorded several depressions

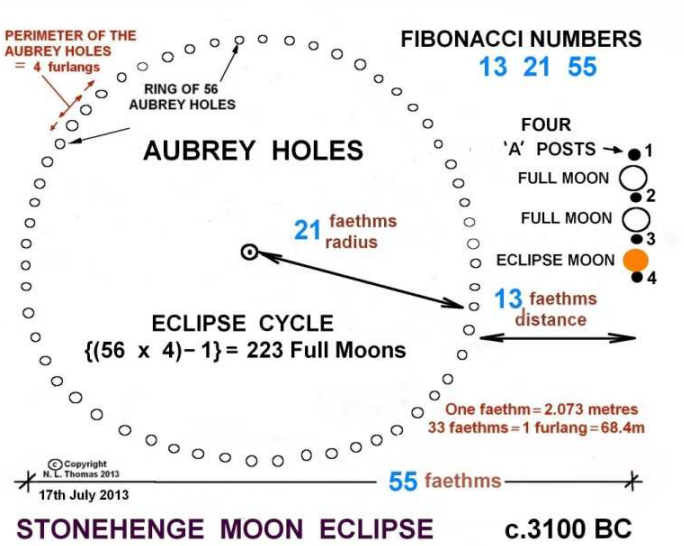
in 1666 AD. Recent work revealed the pits form a ring about 100 metres diameter, beyond that is an external bank and ditch that surround and define the site's extent.

Fifty-six pits

Fifty-six pits were the means to tally total eclipses of the Moon. Counting three circuits of full Moons from one pit to the next 19 + 19 + 18 = 56, then a fourth circuit of 55 full Moons; on eclipse night the lunar total eclipse orange full Moon would appear, the eclipse happened. Beginning again at the next full Moon, a forward move to Aubrey Hole number one, then two and three, continuing the tally for the next triple 56 full Moons plus a fourth 55 full Moons; a total eclipse orange Moon was seen. Every 18 years and 11 nights the total eclipse cycle re-commenced; repetitive far into the centuries. Four tall timber posts in a line were erected at some distance away on the eastern alignment of moonrise, 'A Posts' as they are named, their purpose to anticipate the arrival of the next full Moon and a total eclipse.

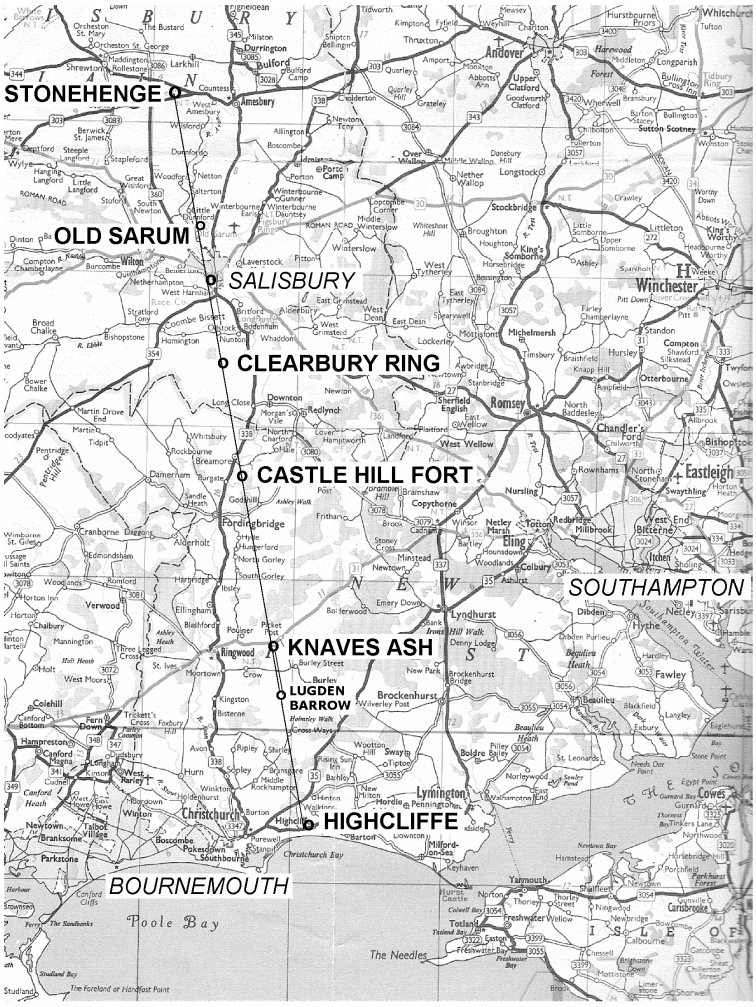
Lunar Total Eclipse Cycle, First Method, A Moonrise Happening, 3000 BC

Fifty-six Aubrey Holes were the first means of forecasting the total eclipse lunar cycle of 18 years, 223 full moons at Stonehenge; a second method was devised about 2500 BC by counting five trilithons, an account given shortly. Counting from the last full Moon and nights before a total eclipse was due, an astronomer observer witnessed a full Moon appear on the horizon entirely filling the space between 'A' Posts 1 and 2. As Moon rose in the night sky it became smaller and clearer to view. Next full Moon it happened again between posts 2 and 3. Moonrise on the third event saw the orb entirely fill the space between posts 3 and 4. As it rose up to a higher elevation, the celestial body gradually lost its fullness, an eclipse of the orb began until eventually only a glimmer of the Moon's whiteness was seen, a dark orange disc had taken its place, the total eclipse seen every 223 full Moons.



An aside; the Antikythera mechanism was discovered in 1901 AD by sponge divers near the Greek island of that name A geared mechanical analog computer made about 67 BC foretold astronomical and calendar events, the largest gear wheel 140mm diameter has 223 teeth.

See your Internet browser…….



HIGHCLIFFE TO STONEHENGE LINE 49.6 km

Counting 19 + 19 + 18 = 56 Aubrey Holes, the observed cycle count of 223 full Moons saw a total lunar eclipse recorded in whole numbers. The method results in an error of only half of one per cent compared with the accurate period of 18.61 years cycle = 55.83 years. The entire *Aubrey Total Eclipse Cycle* count would have begun again at Aubrey Hole 1 in the year 2944, then 2888 BC etc.

Significance is attributed to several design parameters employed in the design of the Aubrey Holes circle. Firstly the twenty-one *faethms* radius to the ring of fifty-six Aubrey Holes was a linear distance from the centre to the touching locus at the inner edge of an excavated Hole.

This was the first example found of linear *faethm* measures employed in England; a *faethm* standard value, 2.07 metres. I calculated the outer touching circumference of the circle of Holes thus chosen to be four *furlangs*, 4 x 33 *faethms*, an adjectival use of the number 33 to infer the highest sacred value to the site. At a chosen position four tall timber 'A' Posts were erected at thirteen *faethms* from the 56 Holes circle, again a specific odd number linear distance, whole numbers to within a percent or so.

THE STONEHENGE STRAIGHT TRACK TODAY :: LINEAR DISTANCES

Stonehenge is located nearly fifty kilometres north of Highcliff, a site overlooking tumultuous Channel waters. A straight continuous track from beginning to end, at regular intervals of 2.25 kilometres [country miles] seven of twenty-three site locations along its route are chronicled. Positions along *linear distances* can be identified; five digits on the left hand, the right hand, left foot and right foot, two ears and a nose, twenty-three pointy bits; a count, a choice of 23 positions.

Place name	***Kilometres***	***Staen***
Highcliffe	0.0	0.0
Lugden barrow	7.0	4.0
Knaves Ash	13.5	6.0
Castle Hill Fort	27.3	11.0
Clearbury Ring	31.4	14.0
Salisbury cathedral		
Old Sarum		18.0
Stonehenge	49.6	22.0

THE STONEHENGE TRACK THEN :: TIME

Measures of *time* can be related in a similar way; five digits on the left hand, the right hand, left foot and right foot, two ears and a nose; twenty-three pointy bits. What better than a calendar month **23** days, five day weeks, four week months, four quarters of 91 days, a 16 month year of 364 + 1 = 365 days.

An aspect of counting in whole numbers; a first quarter year began on day one, then to days numbered two, three, four all the way to ninety-one. A second quarter began on day one (same day) then to days numbered two, three, four all the way to ninety-one. Equally the third and fourth quarters began on day one (same day) then to days numbered two, three, four all the way to ninety-one. Which means an overlap of three or four days a year, depending how the Neolithic count method tallied the year's seasons. I emphasise the ancient counting method identified fence post numbers, not the panels between posts.

About 2500 BC, eighty four-ton dolerite bluestones from the Preseli mountains in south-west Wales were brought to the site. An equal number of much larger twenty-five ton sarsen sandstones from nearby Marlborough Downs were transported to the same location about that time. Five great sarsen sandstone arches named trilithons were erected. Within the trilithons **U** formation, nineteen bluestone pillars were placed in a matching arrangement, the open end facing the direction of midsummer sunrise. Thirty sarsen columns were erected in a ring, each upright column joined from one to the next by a lintel. Sixty-one smaller bluestone pillars were placed concentrically within this ring of thirty sarsen columns. The Stonehenge of 2500 BC has the same design fundamentals as other Sun and Moon calendar buildings elsewhere in Britain. The Sun calendar tallied sixteen months a year, months of four weeks and five days a week, 365 days a year. Outside the ring of thirty sarsen columns, twin rings of pits were dug into the chalk ground about 2500 BC, one ring of twenty-nine and the other of thirty pits, now named 'Aubrey Holes'. These fifty-nine Y and Z Holes

were the means of tallying a Moon calendar, six months of six weeks each of five days, repeated a second time around but one day less each month, a twelve month lunar year of six dual 59 day months; a 354 day Moon year. These are the ancient monument we see today, but what of yesteryear?

Stonehenge is located nearly fifty kilometres north of Highcliff-on-sea, a site overlooking tumultuous Channel waters. A straight continuous track from beginning to end, at regular intervals of 2¼ kilometres, seven of twenty-three site locations along its route are chronicled. Why 23? Positions along *linear distances* can be identified; five digits on the left hand, the right hand, left foot and right foot, two ears and a nose, twenty-three pointy bits; a count, a choice of 23 positions.

Five thousand years ago Neolithic man is seen to have thought and acted to achieve an objective; **twenty-three** sites at *staen* unit intervals apart forming a twenty-two *staen* long straight line track were established, vestiges of which still exist to this day. The 2¼ kilometres *Staen linear distance* measurement units of were compiled from evidence sourced from a large number of British Isles and Continental routes, sites and artefacts. I emphasise the ancient counting method identified fence post numbers, not the panels between posts.

Historical References

There are many verifiable references in historic documents to the c.2500 BC Stonehenge, probably the earliest being an account by Diodorus of Sicily in 40 BC. He referred to "A notable temple which is adorned with many votive offerings and is circular in shape, situated on an island beyond where the boreas (north winds) blow." a valid description of the ancient monument. AD." Henry of Huntingdon's writings dated 1130 AD provide the first certain reference to Stonehenge.

Onward to the seventeenth century, King James I of England commanded his architect Inigo Jones make a plan of the remains. Imaginative sketches published after the architect's death showed Inigo Jones' attempt to represent a redesigned Stonehenge in a purist symmetrical manner. His contemporary, the antiquarian John Aubrey made justly critical comments with an appropriate choice of words about Inigo Jones' drawings.

Sir Norman Lockyer published *Stonehenge and Other British Stone Monuments, Astronomically Considered* in 1906 AD to note the midsummer sunrise alignment of its principal axis and re-stated the Station Stones alignments first detected by Edward Duke in 1846. A viewer standing at the centre of the monument can see sunset on May 6th and August 8th over Station Stone 93. Sunrise on February 5th and November 8th is seen over Stone 91. In an issue of the 1963 Yorkshire Post newspaper, Mr C. A. (Peter) Newham published his discovery an observer standing on the position of Station Stone 94 mound can see the equinoctial sunrise in March and September by looking in the direction of the Equinoctial Stone hole near the Heel Stone pair. These several alignments afford a clear means of dividing the solar year into eight parts, one indication of its intended purpose.

The twentieth century has seen much speculation. Many recent hypotheses concerned Stonehenge's purpose, some extremely fanciful, others the result of careful scientific research have been offered. My 'Eureka' moment followed my visit to Stonehenge in May 1982. A few days later at my hotel in Åahus, Denmark, a sudden light bulb flash of clarity helped me realise the arrangement and numbers of Stonehenge columns portrayed and tallied the prehistoric Sun calendar, sixteen months, four weeks a month, five days each week, 365 days a year.

CONSTRUCTION STAGES c.3100 - 1100 BC

Professor R J C Atkinson considered the monument was constructed in six periods, an hypothesis in need of modification in the light of recent knowledge. Dr Ros Cleal co-authored *Stonehenge in its Landscape* published by English Heritage, giving a detailed list of five construction phases commencing with the Aubrey Holes c.3100 BC.

No doubt the 3100 BC Neolithic Druid builders and surveyors would have had many generations to develop their ideas before attempting to excavate the surrounding ditch and mound, then dig 56 Aubrey Holes and erect four tall timber 'A' Posts, then the Cursus, Stonehenge stage one. My Sun and Moon calendar research work led me to a fresh consideration of inter-relationships between successive stages. A degree of solar and lunar knowledge with skilled building experience linked to sufficient population would have been necessary prerequisites before such a community project was attempted. The major Stonehenge seen today was built around 2500 BC, it seems Stonehenge probably continued in use for many centuries after the Avenue was extended about 1100 BC. I offer a basis for understanding the Stonehenge construction stages:-

1st Stage 3100 BC - 56 Aubrey Holes, an external bank and ditch defined the extent of the sacred site, 110 temporary causeway posts, four tall 'A Posts'. A lunar Total Eclipse Cycle, a first method, a Moonrise Happening about 3000 BC. Fifty-six Aubrey Holes were the first means to forecast the total eclipse lunar cycle of 18 years, 223 full moons at Stonehenge;

2nd Stage 2600 BC: Four Station Stones; a rectangle with side lengths of 17 *faethms* and 42 *faethms*, a base of 5, 12, 13 right-angled triangles, also perhaps other sarsen columns not otherwise accounted for.

3rd Stage 2500 BC: A double circle of eighty bluestones was partly erected at the centre of the site, to be demolished and re-erected soon afterwards in stage four.

4th Stage 2500 BC: The ring of thirty columns and thirty lintels in solar and lunar themes, five trilithon arches, the so-called Slaughter Stone and its missing twin, the Heel Stone and its missing twin, probably the Equinoctial Stone were erected, a total of eighty sarsen stones. Eighty bluestone pillars positioned; a setting of nineteen within the five trilithons **U** plus a ring of sixty-one bluestone pillars inside the sarsen circle. Fifty-nine Y and Z Holes made beyond the ring of thirty sarsen columns. Operational Sun and Moon calendars were in use. The Moon eclipse cycle was known. A 500-metre long twin bank Avenue created on the mid-summer sunrise alignment.

5th Stage 1100 BC: The Avenue extended beyond the first half a kilometre length a further two km to the river bank. Both Cursus were devised.

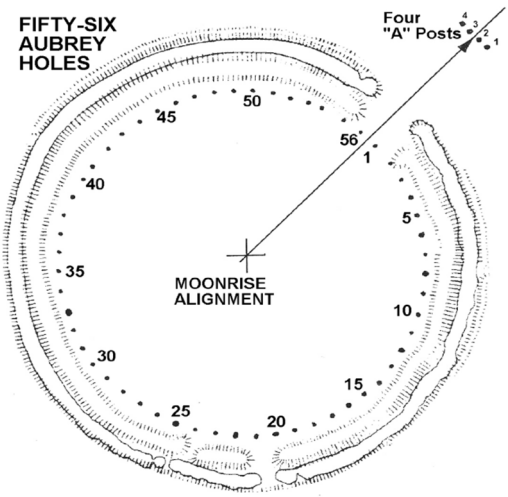
These five stages and approximate dates give a definitive idea of the extensive life of the ancient monument. Begun by Neolithic people, then the Beaker culture people and introduction of soft bronze tools, to harder tools in the later Bronze Age at the end of the second millennium, finally extending to Iron Age people and Austrian immigrants during the first millennium BC, a remarkably stable civilisation underlay successive stages. Stonehenge appealed to considerably more than a hundred and fifty generations of prehistoric people; Stonehenge was in use as a lunar eclipse forecast device and a Sun and Moon calendars temple until Roman times, more than three thousand years.

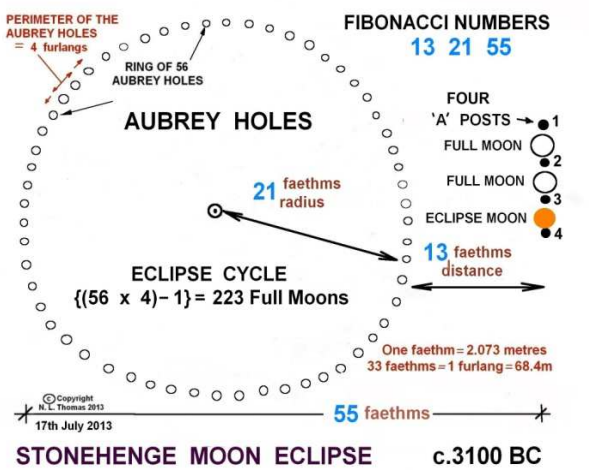
FIRST STAGE - 'AUBREY' RING OF HOLES c.3000 BC

Considerable significance is attributed to design parameters employed in the design of the Aubrey Holes circle. Firstly, the twenty-one *faethms* radius to the ring of fifty-six Aubrey Holes was a linear distance from the centre to locus just touching the inner edge of the excavated Hole. This was the first example of linear *faethm* measures employed in England; a *faethm* = 2.07 metres. I calculated the outer touching circumference of the circle of Holes thus chosen to be four *furlangs*, 4 x 33 *faethms*, an adjectival application of the number 33 to infer symbolic special value to the sacred site. To a selected position four tall timber 'A' Posts were erected at fifty-five *faethms* from the 56 Holes circle, a choice made for a specific linear distance, in this case very close to. By difference, the linear distance from the outer touching edge of the ring to the line of four 'A' Posts was seen to be thirteen *faethms*.

A ring of fifty-six deep pits were excavated, an external bank and ditch surrounded and defined the extent of the sacred site. Now named 'Aubrey Holes' after the antiquarian John Aubrey who first noticed and recorded several depressions in 1666 AD; recent archaeological work revealed about 3000 BC fifty-six deep pits were excavated into chalk sub-strata below the grassy sward forming a ring about one hundred metres diameter, an external bank and ditch surrounded and defined the extent of the site.Fifty-six was a number the means to tally total eclipses of the Moon. Counting three circuits of full Moons from one pit to the next 19 + 19 + 18 = 56, then a fourth circuit of 55 full Moons

On eclipse night the lunar total eclipse orange full Moon would appear, the eclipse happened. Beginning again at the next full Moon, a forward move to Aubrey Hole number one, then two and three, continuing the tally for the next triple 56 full Moons plus a fourth 55 full Moons; the total eclipse orange Moon was seen. Every 18 years and 11 nights the total eclipse cycle re-commenced repetitive far into the centuries. Four tall timber posts were erected at some distance away on the alignment of moonrise, four 'A Posts' as they are named.





LUNAR TOTAL ECLIPSE, FIRST METHOD, A Moonrise Happening 3000 BC

Two nights before a total eclipse was due, an Ofyd astronomer at a central point witnessed full a Moon appear on the horizon entirely filling the space between 'A' Posts 1 and 2. As Moon rose in the night sky it became smaller and clearer to view. Next full Moon it happened again between posts 2 and 3. Moonrise on the third event saw the orb entirely fill the space between posts 3 and 4. As it rose up to a higher elevation, the celestial body gradually lost its fullness, an eclipse of the orb began until eventually only a glimmer of the Moon's whiteness was seen, a dark orange disc had taken its place, the eclipse.

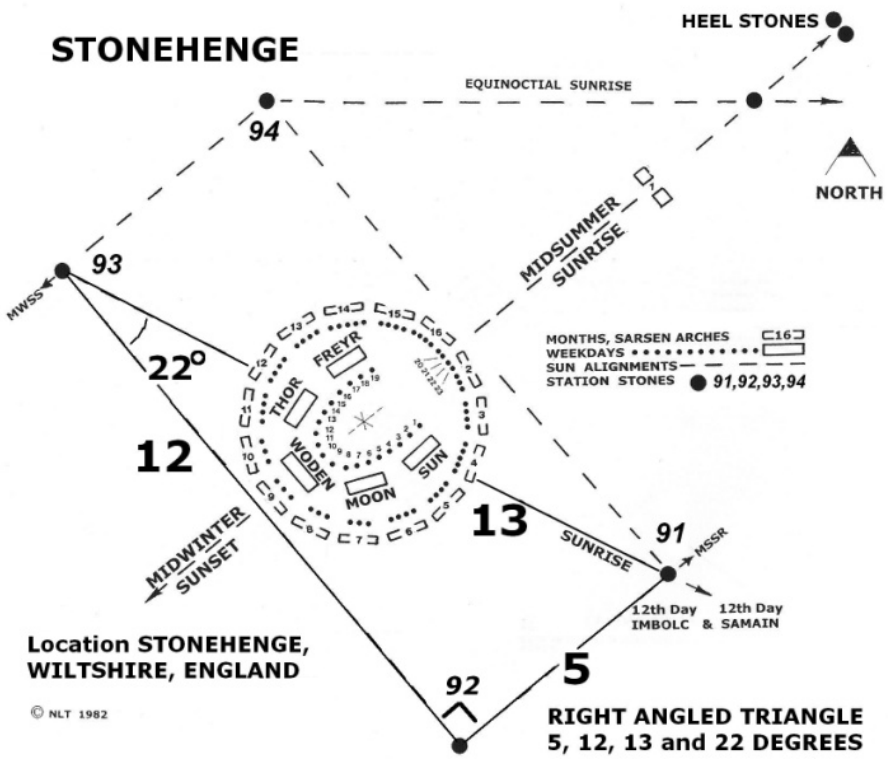
Counting 19 + 19 + 18 = 56 Aubrey Holes, the observed cycle count of 223 full Moons recorded in whole numbers saw a total lunar eclipse. The method results in an error of only half of one per cent compared with the accurate period of 18.61 years cycle = 55.83 years. The entire *Aubrey Total Eclipse Cycle* could have begun again on Aubrey Hole 1 in the years 2944, then 2888 BC.

Stonehenge Total Lunar Eclipse Forecast Methods

Dated about 3000 BC, the Aubrey Holes were the first means to forecast the total eclipse lunar cycle of 18 years, 223 full moons. A second method was devised with the five trilithons constructed c.2500 BC, an account given in the chapter shortly.

SECOND STAGE :: FOUR STATION STONES

The fourStation Stones were built around 2600 BC; four sarsen stone pillars erected at Aubrey Holes positions several centuries after the Aubrey Holes use began. A fifth equinox pillar was added along the alignment of midsummer solstice. Chosen positions for the four pillars meant point to point



alignments were directed to Sun calendar quarter day events. The four were positioned at corners of a rectangle whose sides measure 34.3 metres, 79.5 metres, the diagonals 86.2 metres. The included angle at the corner is 89.4^0 which allows a calculation; three sides of both triangles are very close to the ratio 5:12:13, a Pythagorean right-angled triangle.

Another notable instance in Britain is the triangle Silbury Hill, Avebury and Sanctuary dated about 2500 BC. I have reasoned the three sides are in the ratio 18:27:33 measured in *furlangs*. The triangle is almost right angled. Squaring the side dimensions: $18^2 + 27^2 = 1053$ and $3^2 = 1089$. The difference 1089-1053 = 356, about 3%. The 18:27:33 triangle was probably close enough to a right angle for pragmatic reasons, I suggest having in mind the designer primarily wished to incorporate three significant numbers three, nine and eleven in the triangle's side lengths to accompany the symbolism associated with the adjectival sacred symbolism of the number thirty-three.

Right angle triangle ratios were clearly well known and used in Neolithic practices to achieve a right angle corner, just as we do today. The Sun calendar building at Woodhenge is a good example. Whether Stonehenge mankind actually knew how to multiply both short side numerical lengths by themselves, and then add the two together, the result being the square of the hypotenuse, then take the square root is an open question. The Thom Station Stones 1973 survey indicates it would have been the original intention matching pairs of 5:12:13 ratio triangles were based on the midsummer/midwinter centreline axis and survey linear measures.

Professor Thom's survey and reconstruction of Borrowston Rig design shows an approximately right-angled triangle with sides of 24, 31 and 39 Celtic feet: - AB = 24 Cf and AC = 31 Cf with BC = 39 Cf so that $24^2 + 31^2 = 1537$ and $39^2 = 1521$. The difference, 1537 - 1521 = 16 Cf is close to 1%, thus an included angle 89^0 would have provided a 'right' angled triangle result sufficiently satisfactory for practical purposes. Professor Thom's survey of the egg shaped Clava stone circle in Scotland has a design geometry founded on a right angled triangle whose sides are judged to be in the ratio 3:4:5.

THIRD & FOURTH STAGES - STONEHENGE - 2500 BC

Stonehenge ancient monument site in Wiltshire, southern England is a tourist objective these days for a million visitors each year. A newly opened visitor centre, restaurant, bookshop, enquiry centre and parking offer everyone a welcome. The world heritage listed site is managed by Heritage England, responsible for the preservation of England's heritage sites. Similar bodies care for ancient sites in Wales, Scotland and Ireland.

THIRD STAGE 2500 BC, Double Circle of Bluestone Pillars

Somerset's massive Stanton Drew calendar temple building was a mixture of tall timber posts and encircling stone placements, dated about 2900 BC, two centuries after the ring of Aubrey Holes had been excavated in the ground to tally the lunar cycle events. The numbers and circular patterns of certain temple post rings tallied 18 and 11, the characteristic years and days of lunar eclipse cycles. By 2500 BC, Stanton Drew's timber posts would most likely have long since fallen, leaving only memories of the temple's lunar and calendar functions. A more permanent stone form of lunar total eclipse cycle was required. Considerations from architectural and engineering viewpoints a short time before 2500 BC saw considerable number of bluestone pillars sourced from the south Wales

Preseli mountain site, sacred debris mementoes of the heavenly deities aerial battles for supremacy. The bluestones were arranged in a circular pattern on the Stonehenge site, their specific numbers and form are uncertain although evidence of stone holes can be interpreted to show a ring of eighteen pairs was possibly intended. Whilst still incomplete, the arrangement was dismantled and the bluestones re-used in part as elements of the trilithons functions to tally Stonehenge Moon's total eclipse cycle, 18 years and 11days. A double circle of eighty bluestones partly erected at the centre of the site were demolished and re-erected afterwards in stage four. Why are there five trilithons at Stonehenge? That is the number of days each week, a prime example of mental thought processes and the human body. We have four limbs each with five digits, two ears and a nose, twenty-three pointy bits. A month of twenty-three days is characterised by the **U** arrangement of the nineteen bluestone pillars and five trilithons. Architectural and engineering sequences clearly demanded the first portion of Stonehenge construction was the **U** of five massive sarsen 'trilithons', a word by Classically educated archaeologists; an arch of three stones, two columns and a lintel.

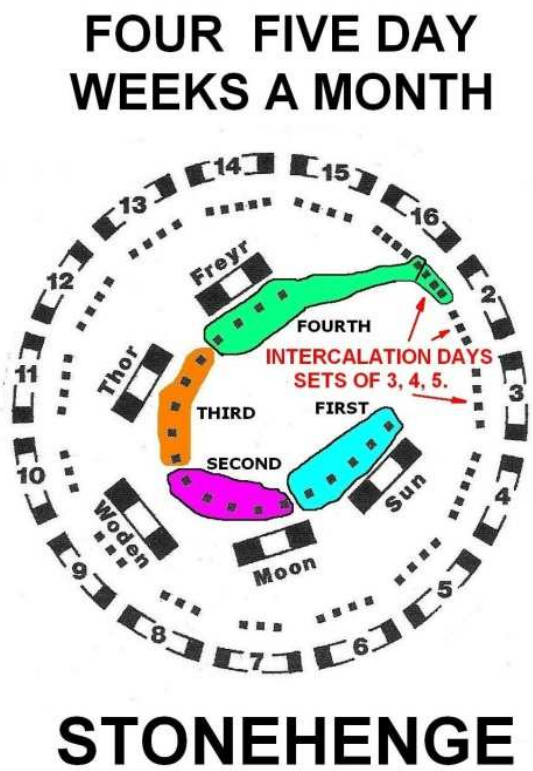
Likened to the inner sanctum of a temple, a place protected and encircled by thirty sarsen columns and facing the direction of dawn at the midsummer solstice, the open-ended **U** arrangement can be seen as a parent with open arms outstretched to welcome a returning child. I suggest the five trilithon pairs represented and were named for five days of their Sun and Moon calendar week; in today's language I suggest names similar to and derived from two celestial deities Sun and Moon and the three heavenly deities; possibly names as Sunday, Moonday, Wodensday, Thorsday and Freyrday.

STONEHENGE SUN CALENDAR DAYS: Bluestone Pillars

The Sun calendar philosophical arithmetic principle counted stones 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, continued in the same way. Week three continued - eleven to fifteen, finally to the fourth week of only four days - sixteen to nineteen. At that point, counting switched to the two pairs of bluestones pillars close to sarsen ring columns one and 30, a pair each side of the midsummer axis. These days are numbered 20, 21, 22 and 23, thus completing a tally of 19+4 = 23 days in the first month Summer, a counting sequence repeated fifteen more times, Sun year 365 days.

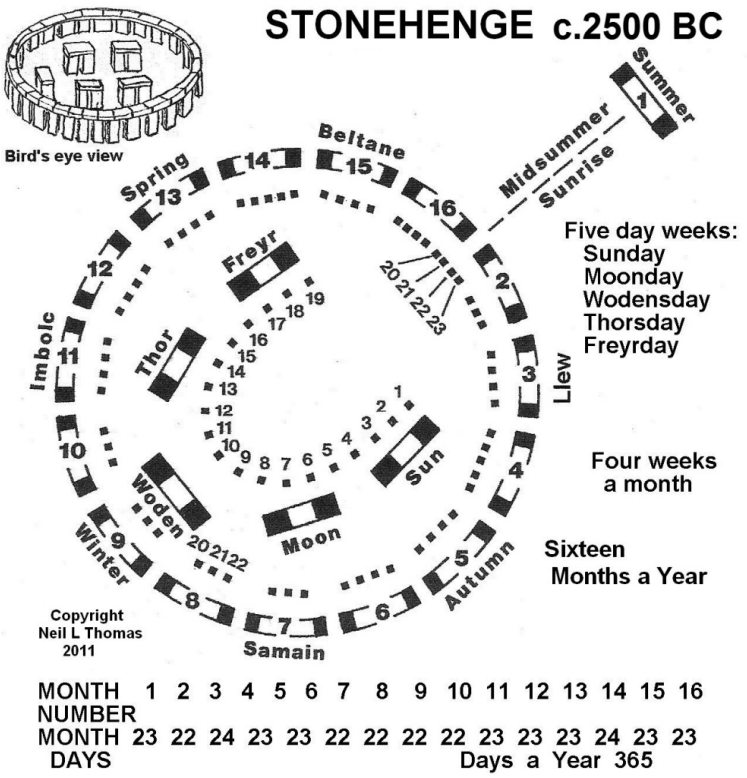
SUN CALENDAR MONTHS: SIXTEEN SARSEN COLUMN PAIRS



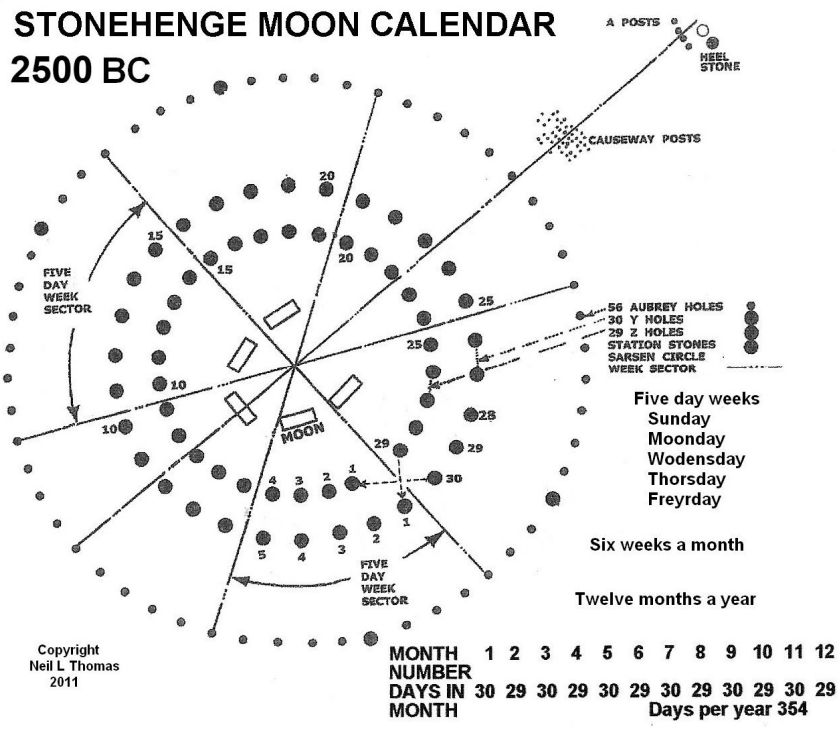
Stonehenge Sun calendar first month was Summer, identified as the Slaughter stone and its missing twin astride the mid-summer dawn axis of the entire construct. In a clockwise direction the next fifteen months were tallied by pairs of sarsen columns; Two, Llew (harvest), Four, Autumn, Six, Samain (Hallowe'en), Eight, Winter, Ten, Imbolc (lambing), Twelve, Spring, Fourteen, Beltane (Mayday) and Sixteen (29,30). That is why the Slaughter Stones columns pair together with the ring of fifteen pairs of sarsen columns correlates with sixteen Sun calendar months. Each month thereafter, day counting recommenced on all nineteen bluestones and then continued to fifteen more groups of threes, fours and fives, a total of sixty-one bluestone pillars concentric with the thirty sarsen column rings. Based upon sixteen monthly repeat counts of nineteen bluestone sets in the **U** shaped arrangement, the tally is 16x19 = 304 days to which were added 61 intercalary bluestones concentric with the thirty sarsen columns ring = 365 days/year.
The Stonehenge Sun calendar Ovyd priests tallied the year:-

STONEHENGE SUN CALENDAR, DAYS & MONTHS

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 days each year**



STONEHENGE SUN CALENDAR



The lunar monthly cycle from full Moon to new Moon and back again to full Moon is 29½ days, or nights if you prefer. To tally cycles of the Moon orb and its behaviour at Stonehenge about 2500 BC, a Moon calendar continued in use with concentric rings of fifty-nine Y and Z Hole markers excavated in the area immediately outside the sarsen columns ring. The nightly behaviour of the moon; the bi-monthly cycle of six long and six short months were based on the ring of thirty sarsen columns topped by a ring of thirty lintels. The inner Z ring numbered twenty-nine and the outer Y ring thirty Holes, 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 five nights per week, six weeks, a count of thirty. This was 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 Y Holes and Z Holes. When the Y Holes count reached Y30, the count reverted back to Z1 and the bi-monthly cycle began again. At month's end, from Z 29 the count returned to Y 1. The Moon calendar 'five night' week matched the Sun calendar 'five day' week.

Month No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**= 12**
Days/month	**30**	**29**	**30**	**29**	**30**	**29**	**30**	**29**	**30**	**29**	**30**	**29**	**= 354 days the lunar year**

FORECASTING LUNAR ECLIPSES 2500 BC by the **Trilithons & Bluestones**

There are two methods of forecasting lunar total eclipses at Stonehenge, an earlier 3000 BC *Aubrey Eclipse Cycle* and now the *Trilithons Eclipse Cycle* system. Eclipses of the lunar orb occur when the plane of the Moon's orbit intersects with the plane of the Earth's orbit, two occasions each month. Counting forward from one stone to the next on the **U** arrangement of bluestone pillars and trilithon columns was the key.

On the bluestone pillar named 'Eclipse Event' a marker was placed by the pillar 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 pillar eighteen [years].

Next, on the first night of an eleven night sequence, the marker was moved forward from the eighteenth bluestone pillar to Freyr trilithon sarsen column one, a count of **one**. Each night thereafter the Moon eclipse marker was moved forward to the next trilithon sarsen column 2, a count of **two**. After 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 pillar numbered eleven **11**.

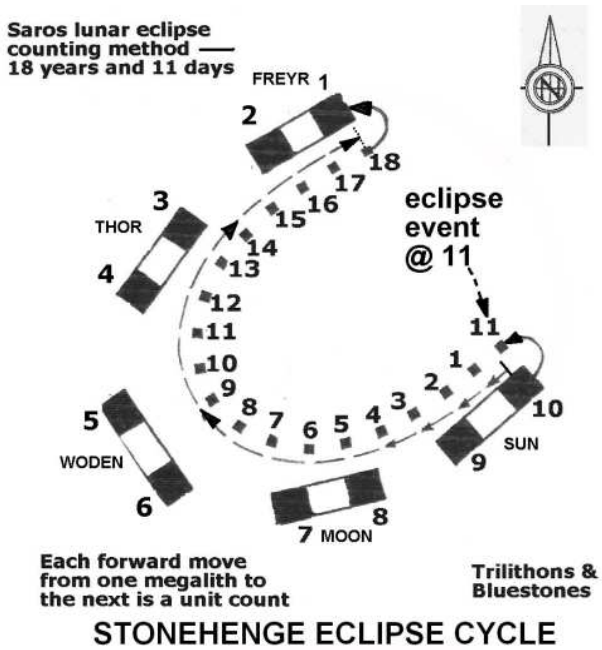
A lunar eclipse would have happened that night at the new Stonehenge, **18** years and **11** nights after the previous eclipse occasion. Perhaps a Stonehenge Ofyd astronomer saw an eclipse event when he was an acolyte aged twenty. In his late thirties, taught by his aged Ofyd patriarch, he learned to predict the phenomenon. Now middle aged, he could expect to see an eclipse of the Moon happen perhaps twice more in his lifetime, precious knowledge to be handed to his successor. Stonehenge central feature of five trilithons with nineteen bluestone pillars enclosed by an imaginary oval, the feature that identified two calendar events:

The means to forecast total Moon eclipses, later termed the Saros cycle after the Babylonian astronomer of that name 1000 BC. Five trilithons equated to and were named for five days each week; Sun, Moon, Woden, Thor and Freyr. Sixteen times a year, days of a four week month were tallied every month on nineteen bluestone pillars, 3 x 5 plus 4 = 19; sixteen months, nineteen days = 304 days. Sixty-one intercalary days counted on the ring of bluestone pillars were added to complete the Sun calendar year of 365 days. Put into poem and prose by the Bards in the language of the people, Sun and Moon temple values and symbolism were preserved for future generations.

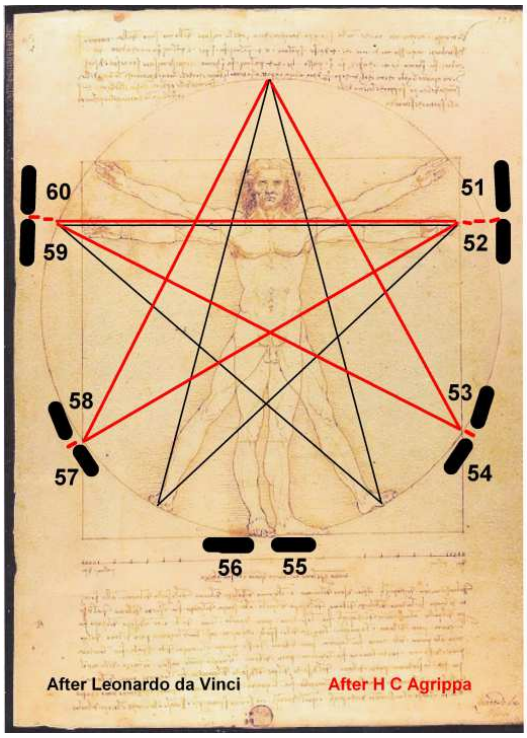
THE TRILITHONS OVAL

Observe the matching visual coincidence between a sketched human figure and its hands and feet placement in relation to the known positions of the trilithons at Stonehenge. A Stonehenge oval locus constructed with long axis to short axis proportions of 13:8 touches the outside faces of four pairs of trilithons, its origin at the point between ring columns 30-1, its locus perimeter length is 33 *faethms*. The Stonehenge oval locus commences at the point where the solstice dawn axis and Stonehenge outer perimeter line intersect, columns pair 30-1.

A consideration of the trilithon's oval is the placement of the four pairs of columns 51-52,



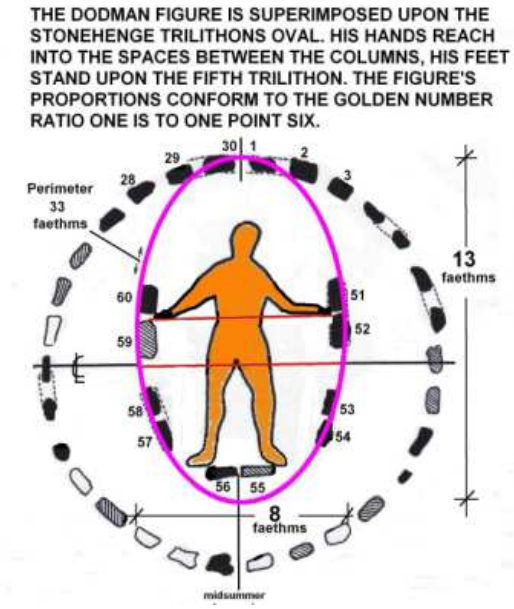
53-54, 57-58 and 59-60 around its perimeter. The illustration depicts a sarsen columns circle whose centre is on a cross line drawn through the exact centre of the monument. Trilithon 55-56 position is situated astride the midsummer sunrise axis offers an alternative to account for the trilithon arch straddling the axis; 55-56 served to support the feet of a human-like figure, a foot-stool so to speak. Consider the outline form of the Long Man of Wilmington in Sussex and an imaginary figure at the very centre of Stonehenge.



Leonardo di ser Pietro da Vinci VITRUVIAN MAN 1485 AD with annotations by the author showing Stonehenge trilithons numbers and positions

The trilithons could have been symmetrical at halfway or at the quarter points of the oval but not so. Trilithons 51-52 and 53-54 are not parallel to the main axis but match the oval curve. Trilithons 57-58 and 59-60 observe the same conditions. Trilithon 55-56 is within the oval compass but not tangential to the oval locus perimeter. Firstly regard the two trilithon pairs 51-52 and 59-60; a line drawn to represent the oval short axis is seen to pass through the spaces between pairs of arches. Placement of 51-52 and 59-60 directly opposite each other leads to two pairs 53-54 and 57-58; the question why and where were they were positioned?

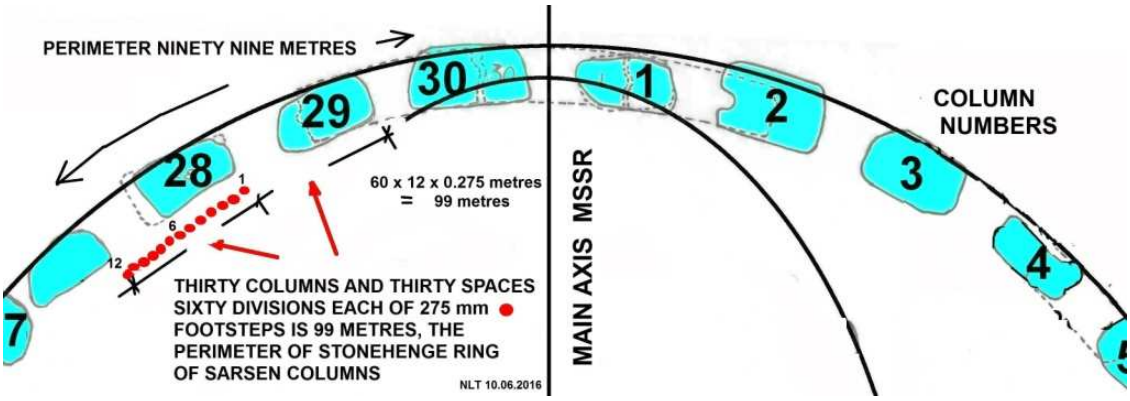
Does the figure represent the deity Woden? (Wednesday)



Four apices intersect the narrow space between the pairs of columns, in this way setting the placement of the four trilithons around the oval. The long axis - short axis proportions of the oval are 13/8 = 1.62, the Golden Number Ratio favoured by architects as the most visually appealing proportions for building designs.

Leonardo di ser Pietro da Vinci created his famous 'Vitruvian Man' sketch which now hangs in the Louvre Museum, Paris. Leonardo's figure shows feet and hands within a square and a circle. As well as the feet placed well apart, Leonardo da Vinci placed both feet together, the juxtaposition of the figure's feet coincide with trilithon arch 55-56. Accepting four Stonehenge trilithon arches were erected at positions where the column pairs touched the locus of an oval, a circle drawn whose centre coincided with the intersection of the major and minor axes of the oval served as the basis for a pentagram.

Well known in architectural, natural history and artistic circles as the most aesthetically pleasing for a visual concept, the Golden Ratio Number = 1.62 . Examples are the Cheops pyramid in Egypt c.2500 BC, Rome's Coliseum arena, Europe's Gothic style cathedrals, the Notre Dame in Paris, France c.1200 AD, the Taj Mahal in India 1648 AD, and more recent constructs of modern times, the Palace of Westminster Houses of Parliament, London 1840-70, and our Parliament House Canberra, Australia, 1988. In nature, the Golden Ratio Number is a growth characteristic of several plant species and living creatures. The Nautilus spiral shell is arguably the most cited example; I know of a chalk quarry between Swindon town and Stonehenge ancient monument where fossilised Nautilus snail shells are found. It seems the Golden Ratio Number 1.62 was known and applied in Stonehenge Britain from the third to first millennium BC, a feature of both large and small oval construct projects. The oval geometric properties of Canterbury city boundary, Hindwell Palisaded Enclosure 2700 BC, Stonehenge and the Caergwrle Bowl 1200 BC are consistent demonstrations of its use. These Fibonacci progressive arithmetic series number ratio 13 over 8 are the mnemonic to remember, the basis for any Golden Number Ratio architect's design principle rule, past or present today. The progressive arithmetic number series was enunciated by the Italian mathematician Fibonacci in his book "*Liber Abaci*" the "Book of Calculations" published in 1202 AD. The arithmetic series has been known by that name 'Fibonacci series' since the European Middle Ages. Stonehenge 3000 BC was designed and constructed on that basis; the progressive arithmetic number series progressive values are 1, 2, 3, 5, 8, 13, 21, 34, 55, 89; are the 2500 BC design basis of Stonehenge.



STONEHENGE and 360^0

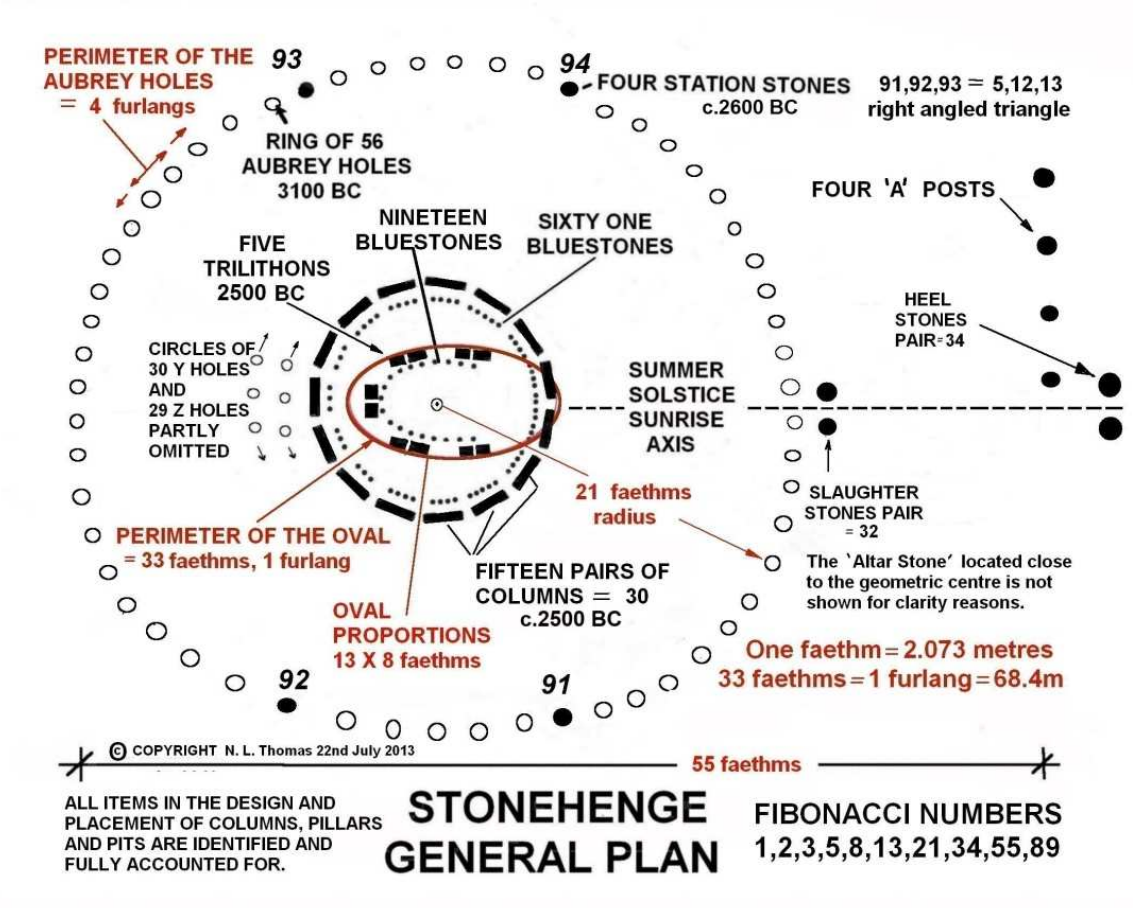
STONEHENGE 2500 BC DESIGN & THREE-SIXTY FOOTSTEPS

Stonehenge's architect 2500 BC was faced with a critical problem; *how large was the entire monument was to be*? Too large would be economically unacceptable and impracticable. Many related structures such as Silbury Hill and Avebury followed traditional precedents; Woodhenge, Durrington Walls and Mount Pleasant had perimeter measures of whole number *furlangs*, the ditch inner edge, an outer circumference for instance. Stonehenge c.2500 BC geometry, arithmetic properties, linear measures and numbers of sarsen columns and bluestone pillars, mutual relationships and dispositions are combined and represented are shown on drawing titled 'Stonehenge General Plan', viewed shortly. Note how the progressive arithmetic number series and linear measures are integral features of the design. With the objective of tallying the Moon calendar of thirty 'days' (29.5 nights) a spaced ring of thirty columns and spaces between each column pair was to be the fundamental design whole number basis.

Everyone has two feet whose length is about 270-280 millimetres in metric terms, say an average of 275mm. Predicated from Professor Thom's 1973 survey data, the 99 metre outer touching perimeter of the thirty columns ring is an indication the Stonehenge architect chose to make three hundred and sixty heel-to-toe measures to achieve a reasonably dimensioned Stonehenge Sun and Moon calendars temple building. The human foot length unit was chosen as the base for a Stonehenge ring design circumference for thirty sarsen columns with thirty spaces. Our nomenclature terms these divisions of a circle as 360 'degrees'. Thus the die was cast. Observe how 360^0 plus five days, trilithons: Sunday, Moonday, Wodensday, Thorsday and Freyrday = 365 days a Sun calendar year. In today's terms; Stonehenge design basis is a 360 degrees protractor.

STONEHENGE DESIGN & CONSTRUCTION

Stonehenge General Plan next page shows elements that tally with the progressive arithmetic series numbers **1, 2, 3**, **5, 8, 13, 21, 34, 55,** the first to the ninth in the progressive arithmetic numbers series; indications are included on the Plan to identify each series number origin, whether number and/or length. Architects employ the Golden Ratio of thirteen divided by eight = 1.62 etc., as a fundamental design parameter having the property of assuring excellent visual proportions and appeal in the design for a building masterpiece. Gathering these several aspects of Stonehenge and its design into one drawing, I prepared the General Plan illustration.



Observe how the Aubrey Holes ring with four A Posts c.3000 BC, four Station Stones c.2600 BC, five trilithons within an oval, a ring of thirty sarsen columns = 15 arches, the Slaughter pair, the Heel Stone pair 2500 BC, *faethm* linear perimeter measures, the axis of the summer solstice sunrise, numbers of columns, linear spaces, groups of items all assemble into a coherent whole.

That the construction was spread over many decades even several centuries was inherent in the design. See page 96 concerning the Monkton disc. After the Monkton Disc lineal basic measure of 27mm and the progressive arithmetic number series *as the second fundamental basis of Stonehenge design;* then thirdly 360 footsteps linear 99 metres measure around the thirty columns perimeter:- 1, 2, 1 + 2 = 3, 2 + 3 = 5, 3 + 5 = 8 etc etc , to 13, 21, 34, 55, 89.

RECENT HISTORY

An article and sketch by Dr Phene describing the Long Man of Wilmington was published in the Sussex county local Graphic newspaper 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, the feet and ankles shown only by dotted lines. Dark sediment had washed down the 28^0 slope, filling the channels of exposed chalk and allowed grass to grow. The figure held two staves of realistic appearance, thick at the top and tapered towards their base. No doubt the publicity resulting from Dr Phene's initiative and the newspaper illustration led to a restoration effort by the Reverend W. de Saint Croix and his colleagues in April, the spring of 1874. The present outline of the Long Man of Wilmington was created in the form illustrated with two thin

straight staves, a part extended above the hands. The April figure has a left foot portrayed in a curious manner. Which of the two figures most closely represented the original Long Man is open to question, a matter that may not be resolved for a long time. Meanwhile, without delving too deeply into that aspect, it is clear that the figure represents an upright man holding two vertical sticks or staves in his outstretched arms. The sixty-eight metre tall figure 'The Long Man of Wilmington' is portrayed on a north-facing hillside a short distance inland from Eastbourne on England's south coast, close to mid-way between Stone Street in Kent and Stane Street in Sussex, clearly related to the two Street routes. Subject of much debate concerning its identity; many ask why was the Long Man created and whom does it represent? Two long staves are held in his outstretched arms; considered to represent two parts of a right angled pacing frame employed to survey tracks and routes across the country in pre-historic times. Components of the frame readily lent themselves to the creation of a game of cricket, a wicket of two vertical sticks and a bail, a pitch length equal to ten *faethms*, 20.7 metres, 23 statute yards. The present 22 yard pitch length arose with the Surveyor's "Gunter's steel chain" employed when eighteen cebtury canals and railways were in the course of construction, a ready means of accurately determining the pitch dimensions,

Formed in prehistoric times, the figure probably represents the surveyor of ancient tracks in southern Britain. Craft family names such as Smith, Taylor and Farmer include Dodman, the maker and user of staves. His tools of trade and his associations with Sussex, England, lent themselves to enabling cricket and baseball games centuries ago. The so-called Long Man portrays a Dodman and should be re-named 'The Dodman of Wilmington'.

Bluestonehenge

There is one final aspect of the Stonehenge saga where the Avenue Extension meets the Avon river. The word 'henge' at the river bank marks the Avenue terminus where it reaches the Avon bank; the recently discovered 'Bluestonehenge'. Details are offered in English Heritage "*Stonehenge in its Landscape"*; twenty-six two ton bluestones were erected in a ring of maybe a furlang perimeter, an exterior henge is known, the bluestone pillars dismantled and moved to the Sun calendar site not long afterwards.

Stonehenge Progressive Arithmetic Number Series [Fibonacci Series]

Consolidating sixteen progressive number series terms, the first is a trilithon:-

- One trilithon comprises two columns and a sarsen lintel, three items.
- There are five trilithons within an enclosing oval whose axes measure eight faethms by thirteen faethms.
- The radius of the Aubrey Holes ring is twenty-one faethms.
- There are thirty-four sarsen columns; sixteen month pairs and Heel stone pair.
- From the south-west along the midsummer solstice axis to the Heel stone is fifty-five faethms.
- Two terms - 34 and 55 sum to the 10th term in the series, 89.

In sequence, sixteen terms of the Stonehenge progressive arithmetic number series are:-

1, 2, 3, 5, 8, 13, 21, 34, 55, 89. More are to come……..

THE MONKTON BARROW GOLD DISC AND ITS PROVENANCE

What & Where

During 1947 a small gold foil disc was found in a burial mound at Monkton Farleigh twenty miles or so from Stonehenge; the barrow built soon after the Stonehenge sarsen stones were erected**.** Excavations by Mr. Guy Underwood revealed the gold disc, a pottery beaker, flint arrowheads and fragments of an adult male's skeleton. The artefact is the earliest metal find found in Neolithic Britain, one of six. The gold disc was kept safe by the landowner since its discovery; it has recently been donated to the Wiltshire Heritage Museum, Devises, Wiltshire. The Museum's Mr. David Dawson kindly informed me of the matter. Cleaned by the Wiltshire Council Conservation Service, it is now on display at the Museum premises.

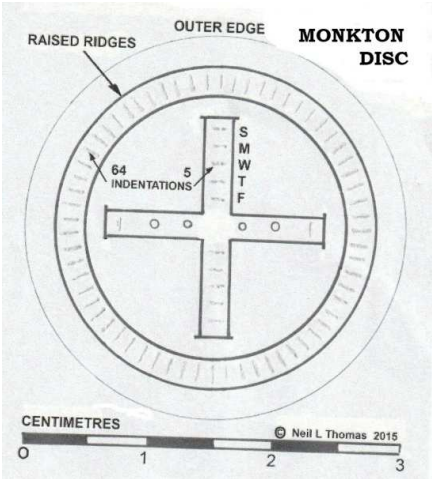
A Neolithic Age date c.2400 BC is predicated for the gold disc, although because of the Disc find proximity to Stonehenge a much earlier date is thought more likely in my opinion.

Purpose

The Monkton gold foil disc was necessarily formed and fabricated by a gold smith with selected form and size in mind. I am advised the disc measures three centimetres diameter; on that basis I speculate the critical design dimension was the 3cm diameter across the outermost perimeter edges shown. Within the outer of two concentric raised rings seen close to 29 millimetres diameter, a second concentric raised inner ring of about 26 mm diameter is seen. A nominal value of 27½mm is selected. Between the two rings radial indentations are observed, spaced more or less evenly around the annulus, 64 radial indentations tallying the weeks of a Sun calendar year.

The embossed central feature with its characteristic impressed indentations is seen to represent four arms in the form of a cross, a four week month, two arms of which have five indentations, the number coinciding with five days of the Stonehenge Sun calendar week, Sunday, Moonday, Wodensday, Thorsday and Freyrday to suggest a possible nomenclature. Two arms with five indentations, four arms and five day weeks, those numbers equate to a month in the sixteen month Sun calendar; four sixteens are sixty-four. Along the cross arm are four jagged holes, a pointer towards a possibility the gold foil disc was originally riveted to a backing board, the jagged edges indicating its forcible removal from a wooden board.

←-----27mm -----→



At both ends of the cross arm are single impressed indentations equivalent to a fifth day of the week, symmetrical with the two five mark arms of the other up/down cross arms. A suggested name for the Monkton Barrow gold foil disc; "Monkton Disc" the fundamental linear unit.

The 1795 Academicians of Paris sponsored by Emperor Napoleon devised systems of time, mass and linear measures based upon their newly determined linear length the '*metre'*. The International Metric System *metre* equals three *Celtic feet*, the ancient linear '*fut*' or 'foot' measure. It appears reasonable to aver the Monkton Barrow Gold Disc was a north-west prehistoric peoples' basic standard linear measure, the 27½ millimetres '*finga',* manufactured of gold foil for stability and permanency. If that was the intention, it appears the Monkton Disc design was a form of standard linear measure, a first linear measurement standard as such in history.

THE BUSH BARROW PLATE

Linear Measures Standard Devices

In AD 1808 a sheet of beaten gold was unearthed by antiquarians Mr William Cunnington and Sir Richard Colt-Hare at the 'Bush Barrow' burial mound situated about a kilometre south-south-west of Stonehenge in Wiltshire, England. The rhombus shaped gold sheet with a major axis of about 18 centimetres, a minor axis of 15 centimetres and half a millimetre thickness had been mounted upon a flat sheet of wood, the edges of the gold foil sheet turned around and under the wooden base. Only vestiges of the wooden base remained. The artefact was found resting on the breast of a tall man's skeleton interred in the barrow. A date of about 1900 BC has been ascribed to his burial in the Barrow. The valuable item was lodged with the Wiltshire Museum in Devises. In 1922 the Wiltshire Archaeological Society decided to permanently loan the gold Bush Plate and other monetarily valuable items to the British Museum for security reasons. The original Plate was copied and a true electroplate facsimile of the original Plate is retained in the Wilshire Museum.

Two exhibitions arranged by the British Museum at Tournai and Edinburgh in 1984 and 1985 included the Bush Plate in its original flat state. There had already been unfounded speculation in the intervening years concerning its purpose, coloured by an association of gold with jewellery in the minds of 'experts'. Mr Cunnington had postulated it was a breastplate. Since it was found on the breast of the skeleton between 1984 and 1985 this observation led to an unauthorised 'restoration'; re-shaping the gold artefact to slightly dished shape to conform to the breastplate idea. This singularly wrongful act has misled successive generations of students and researchers seeking to solve the riddle of the Plate's purpose.

Drs Colin Shell and Paul Robinson published a joint paper in the archaeological journal *Antiquity* June 1988 in which they discussed important historical issues relating to the Bush Barrow Plate, particularly its 'restoration' between 1984 and 1985. A sequel to the Shell paper saw Dr A. S. Thom, Commander J. M. D. Ker and Mr T. R. Burrows publish a further paper concerning the Plate in the September 1988 *Antiquity*. Their paper described its features, paying particular attention to the acute 80^0 angle of the rhombus shaped gold sheet and its inscribed line patterns. The three authors' joint paper advanced the hypothesis, "the Plaque is actually a surveyor's *aide memoir* designed to observe the key solar events in the calendar." The paper offered mathematical and astronomical calculations in support of their hypothesis. I consider their conclusions wholly correct.

Whilst correctly establishing in principle the Plate's intended purpose, Dr Thom and colleagues presumed the foci were at (a) and (b) on the rhombus long axis. By so doing, their hypothesis detected accurate sunrise directions only on solstice and equinox days. Sunrise alignments on quarter days intersect the perimeter line between apices of the zigzag lines. Their (a) and (b) assumption consequently implied all the zigzag pattern areas, the outer portions of the Plate, were effectively redundant and only served ornamental purposes. On the occasion of my stay to his home in 1986, Dr Archibald Thom sought my opinion concerning the Plate's likely purpose. He mentioned he and his co-authors were preparing a paper.

At the time I was not made aware of their hypothesis and unable to offer an opinion other than to comment on the 80^0 angles at both ends of the long axis, the angle between sunrise at the summer and winter solstice. On receipt of an offprint of their paper and a chance to study its contents, I observed two small holes close to the ends of the long axis and on the outer perimeter double lines. Their presence needed an explanation.

The four outer sets of zigzag patterns, the central inner three by three, nine rhombus and the overall design of the Plate required re-assessment and inclusion as parts of an entire design. To explain why these small holes marked **W** and **E** were the correct focii at the ends of the Plate's long axis, my following hypothesis is offered**.** When viewed from **W**, points **N** and **S** align with the summer and winter solstice dawn. From **W** the numbered zigzag pattern apices and perimeter double line meet at nodes that indicate sunrise alignments on quarter days.

These four quarter days have been given the Celtic names Llew/Beltane and Samain/Imbolc to aid identify the Plate as an ALidade and its calendar use throughout the year. At places remote from Stonehenge, the included angle of 80^0 at the ends of the west east axis would have permitted a reasonably accurate determination of the solstice, equinox and quarter day dates along a bandwidth between 50^0 and 52^0 north latitude.

Eight Events

There are many Welsh, Irish, Scottish folk tales that cite quarter day events, fairs and markets. Scottish legal practices dated leases and contracts on those quarter days, traditional events that hailed from much earlier times. The Celtic tradition of dividing a year into quarters of 91 days is well established and documented. There are 91 days between the Llew harvest festival day close to August 1st and the Samain or Hallowe'en spooky ceremonies at October 31st. After Samain ninety-one days pass before Imbolc day at the end of January. Another 91 days elapse until the Beltane fertility festival (Mayday on the first of that month). After Beltane, there are 91 days to the return of the Llew harvest festival. Should a day discrepancy become apparent, a one day intercalation

correction could readily be made any time.

On this basis, four months of the year can be apportioned into 37/91 and 54/91 parts. In contemporary arithmetic terms 37/91 = 0.407, very nearly 2/5th of the quarter. In the next portion of the quarter year, 54 days elapse, 54/91 = 0.593, very nearly 3/5th of the quarter. For example, dawn at midsummer is a direction from **W** to **N**. Thirty-seven days later, 37/91 or 2/5ths, the zigzag apex at the perimeter lines is the direction of dawn at Llew autumn festival. Onwards to the equinox is 54 days, 3/5th, the direction **W** to **E**. From Summer to Winter and back again, when viewed from **W** or **E**, the zigzag apices tally with the four festival day occasions and solstice and equinox directions. Eight events on a splendidly designed alidade, a gold sheet rhombus artefact executed with great skill.

Bush Plate Operation

For present purposes and to avoid tedious duplication, only sunrise directions from **W** are discussed. As one readily appreciates, the reverse directions and observations apply if sunset observations originated at hole **E**. On a basis the Druid Observer chose **W** as the sight origin to observe sunrises, the zigzag intersections with the outer perimeter line identify a series of marker points on the far side of the Plate in the sight line directions from **W** towards **N**, 1, 2, 3, 4, **E**, 5, 6, 7, 8 and **S.**

It is presumed a Sun Observer set the Bush Plate at eye level on a horizontal plane table supported by a tripod. He chose to arrange the Plate with the short **NS** axis along the meridian. The Plate's long axis **WE** faced due east, the equinox dawn sunrise. Carefully placing a slender bone sighting stick upright in the **W** hole, the Observer tallied dawn on midsummer's day, the 12th day of Summer month in the direction of **N**. Thirty-seven days later, two zigzag apices segment intervals, 2/5th, Llew harvest festival day dawned on the 3rd day of Llew month, defined by a sight line from **W** to point **2** on the perimeter lines. After Llew harvest festival there were three more segments until dawn was observed at **E**, when daylight and night time were of equal duration on the 12th day of Autumn month, the equinox 54 days after Llew festival. From Llew, 37 days passed until point **6,** dawn on the 3rd day of Samain month. After that, there were 54 days to midwinter dawn sunrise on the 12th day of Winter month and the **S** mark. Half a year had elapsed, two quarters of 91 days.

Recommencing the sequences in an anti-clockwise direction for the second half of the year from Winter to Spring, from the 12th day of Winter, 37 days passed until dawn on the 3rd day of Imbolc month, intersection **7**. The numbers of pregnant ewes were counted on that day, the equinox and point **E**. When Spring had passed, it was only 37 days to Beltane fertility festival on the 3rd day of the month at point **3**. The full Sun calendar year ended at **N** at dawn on the 12th day of Summer month, 54 days after Beltane festival, a full cycle of 364 days. Perhaps it was on this day the 356th day was added, 364 + 1 = 365 days, a full year. This demonstration of the match between the solar calendar cycles with the Bush Plate perimeter sector marks **N, 1,2,3,4, E** and **E, 5, 6, 7, 8, S** indicates the purpose of the Plate and reasons for details of its design. The 37 and 54 day intervals in a quarter year of 91 days permitted the division of **N** to **E** and **E** to **S** into five segments, points shown by the junction of the zigzag pattern's four apices around each sector of the perimeter edges. The use of double lines and zigzag pattern provide symmetry and harmony to the entire design. In passing, observe how the central rhombus with criss-cross lines forms nine internal spaces, seen as an ancient symbolic numerical device to relate the Plate and calendar to humanity in general.

These analyses fully account for the Bush Plate, its design and use as a Sun calendar alidade. The Bush Barrow provenance date of c.1900 BC, the actual function of the Plate; these considerations in my view indicate the Plate's actual date of manufacture could be anywhere in the four centuries between the construction of Stonehenge c.2500 BC and building the Bush Barrow about 1900 BC. Made of gold and unaffected by time, the Plate may have been in use from Stonehenge time until its internment with the Bush Barrow Man. Many barrows and tombs have revealed grave goods buried with important personages, in this case a Sun calendar Ofyd (priest) of great reputation well-earned in his lifetime.

Bush Plate Use

The Bush Barrow Plate and Clandon Barrow Plate have the same geometric rhombus shape and are of similar size. Combined with ten Irish and British calendar buildings whose design and numbers of posts or standing stones tallied the days, weeks and months, the existence of two almost identical Plates of about the same era supports the view a widespread knowledge of Sun calendar practices was present among Neolithic and Bronze Age communities in Britain and Ireland from age to age. The Bush Plate alidade probably served to allow a traveller to synchronise with the Stonehenge Sun calendar, even at a considerable distance from Stonehenge. A reasonably accurate solstice, equinox and quarter day date check could have been performed anywhere close to the Stonehenge line of latitude from western Ireland to Gaul and Nebra in eastern Europe. A few degrees north or south of latitude 51^0 would have given rise to only a day or so discrepancy, an imperceptible error readily capable of adjustment at any time. Given knowledge of the twelve month Moon calendar relationship to the sixteen month Sun calendar, a traveller may equally have been able to verify progress of the lunar year in communities whose philosophies embraced the alternative Moon calendar. In a sense, the Bush Plate could be considered a portable clock or chronometer used to determine eight annual events in the Sun calendar, an affirmation and confirmation of a European community's own calendar records.

Midsummer Solstice Sighting

Envisage a scene late in the third millennium BC, perhaps west in Cornwall, the Preseli Mountains in Wales, east to Hole Hill in Kent or ancient in Norfolk, far away in Nebra eastern Germany. To set up a mid-summer solstice calendar determination a series of steps were required. In advance of the sighting, the north-south meridian had to be established. By two sightings, the first flash of the Sun's orb as it appeared at dawn, and the last flicker of sunlight at dusk on the previous day, two staves were placed to mark those directions a distance away from the tripod and Plate. The staves enabled the Observer to bisect the angle between them and carefully align the Plate's short axis to the north-south meridian. On the day of the solstice, he arose from his slumbers just as the first glimpse of half-light came into the sky before dawn. Well wrapped against the dawn chill, he positioned a horizontal plane table supported on three legs. The gold Bush Plate alidade was placed on the table. The Observer positioned a slotted bone sighting stick firmly and vertically in the small hole W at the west end of the Plate. His helper held another needle thin pin vertically on the meridian line at N. At the moment the Sun peeped above the horizon, the Observer viewed both pins in line silhouetted against the first rays of light coming from a point on the distant horizon. That day, when the two pins and the first rays of sunlight were aligned as one, Midsummer's Day was proclaimed. Seven more

sightings on Llew, Autumn, Samain, Winter, Imbolc, Spring and Beltane awaited the Ovyd Observer and his assistant.

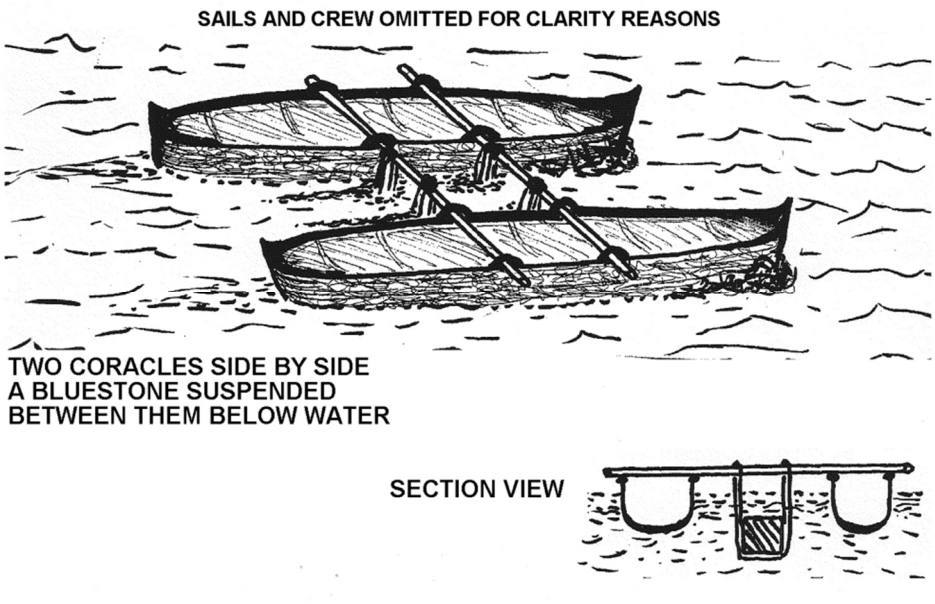
Bush Plate Size

The first question faced by the Stonehenge smith charged with manufacturing the gold Bush Plate was "How big?" You will recall the quoted dimensions of the Bush Barrow Plate "major axis of about 18 centimetres, a minor axis of 15 centimetres". Other references quote 185mm x 156mm. A series of calculations assessing the dimensions of the rhombus convinced me the smith based his design on the 14mm *finga* unit. The Welsh Caergwrle Bowl's oval dimensions are reported to be 182mm by 112mm. The Unitary Oval long axis 13 units multiplied by 14mm equals 182 mm and the short axis 8 units multiplied by 14mm = 112mm, demonstrating a 14mm value of the '*finga'* in Wales about 1200 BC. It seems more than coincidental the long axes of the Plate and the Bowl are so close; in the 180-182-185 millimetres range. In the Plate case the seasonal change of summer winter sunrise alignments angles of 80^0 determined the rhombus short axis dimension of 15cm. One can reasonably conclude the Bush Barrow Plate smith determined a long axis length of 13 *finga* the Fibonacci number, 13x14mm = 182 mm. Once the 182mm length was fixed, other factors and features of the Bush Barrow Plate followed in a dependent manner.

BUILDING STONEHENGE THE BLUESTONES c.2500 BC

A massive project involving transport by sea and land of eighty bluestones quarried from the Preseli Mountains in south-west Wales probably took place shortly before 2500 BC. Stonehenge bluestones have an average mass of about four tons and are known by the name because of a characteristically blue tinge when wetted. The 220 kilometre journey by sea and land required great organisation and discipline. Crews transported the bluestones by boat along the south coast of Wales, a journey fraught with danger during bad weather; a wait for favourable weather often happened between storms at sea. The final overland haulage up the northern Avon and across land to the Stonehenge site was less affected by weather.

To float a four ton rock about three metres length in seawater it's sensible to imagine two long coracles held together by half a dozen stout poles strapped with strong rope to the gunwales of the craft. Between them, suspended below the water line was a four-ton bluestone, its weight reduced to half by immersion in sea-water but still a heavy load for two long coracles to carry. A decade ago, it was reported a supposed bluestone was located below the waters of Milford Haven harbour as a the result of a storm blowing in from the south-west, bad weather caused them to jettison the heavy load.



Transporting a bluestone along the River Severn estuary:-

At the Stonehenge site, these eighty bluestones were partly erected in stage three to form a double ring of maybe thirty-eight column pairs in the middle of Stonehenge, plus three more pairs straddling the solstice dawn alignment. I conjecture the two sets of nineteen pairs in a semicircle each side of the midsummer alignment could have been used to count the nineteen basic days each month. Odd numbered months may have been counted on the north arc, the even numbered months on the south arc. The three pairs straddling the midsummer alignment could have tallied the intercalary days 20, 21 and 22 each month. The choice of nineteen pairs may also have been linked with the Meton Cycle nineteen year frequencies.

After the majority of bluestone columns were erected, a substantial change of plans occurred. All were dismantled for future use in the new grand plan for a huge sarsen monument. Telltale chips of bluestones found in the bases of a number of holes are the only evidence of that period just before 2500 BC. A date shortly before 2500 BC identifies the bluestone period, Stonehenge construction stage three.

Eighty bluestone pillars were an integral part of the sixteen month Sun calendar. For operational reasons, all bluestone pillars must have been contemplated and erected about the same time as the sarsen columns. As the operation of the Sun calendar is explained, I consider a ring of sixty-one of the eighty bluestone pillars were placed in position immediately inside the ring of thirty sarsen columns about 2500 BC, shortly after all the sarsens were erected. Nineteen bluestone pillars were positioned within the five trilithon arches. On the dawn side of the tenth bluestone and lying across Stonehenge midsummer dawn alignment axis lays the prone Altar Stone, a unique form of sandstone found at Milford Haven in South Wales. It too must have been brought by boat from its Milford Haven source to Stonehenge about the same time and transported in the same way.

STONEHENGE ARITHMETIC & GEOMETRY FEATURES

Assembling the data from earlier pages, it is clear Stonehenge construction phases from 3100, 2500 BC to 1100 BC were based on design criteria using measurement linear unit values; from small *fingas* to long *staen* leagues, whole numbers 1 to 9, 360 degrees of a circle, the progressive arithmetic number series 'first plus second = third', right angled triangles, rectangles, ovals, circles; these are seen as integral in the numbers of Stonehenge features, their characteristics and positions - a hole, a pillar, a column - one with respect to another, all these a creation of ancient Britons in the mid-third millennium BC.

STONEHENGE & AVEBURY ALIGNMENTS

An amalgamated plan of the area surrounding Stonehenge and Avebury linking lines between fifty or more ancient sites shown on the Ordnance Survey Department maps of the early nineteenth century demonstrates how surveying techniques were used to position one settlement with regard to others nearby in an area about sixty kilometres by forty kilometres. My illustration preparation was during the late 1970's; linear dimensions are quoted in kilometres, 'megalithic miles' and 'megalithic leagues'. Time passed; please allow the Author a generous allowance of goodwill; for '4 megalithic miles' read 'four *staen*'; for '4 megalithic leagues' read 'four *staen leagues'*. Degrees of direction with respect to North are stated in M^0, sixty-fourths of a navigational circle. East is 16 M^0 of course, south is 32 M^0**.** The composite drawing 'Stonehenge & Avebury Alignments' was prepared from a matched series of Ordnance Survey Department maps viewed in the State Library of Victoria. Observe the Stonehenge Track alignment to Highcliffe on the coast can be seen to extend to Bupton some 40 kilometres northwards from the Channel coast line cliff top.

STONEHENGE UNIVERSITY A BASIC PREMISE

Three colleges of ancient knowledge and skills named as Ovyds, Druids and Bards were mentioned in "Celtic Bards Chiefs & Kings" by George Barrow. The 'Ovyds' were reported in ancient Greek references as a Celtic person known as "a priest or natural philosopher". Preceding pages of evidence have presented mathematical knowledge and the innovation of the (Fibonacci) progressive arithmetic series; examples of mental exercises manipulating numbers for their own sake, much more than purely pragmatic uses of plain addition and subtraction for trade purposes. The concept of a planned layout for Stonehenge, the thinking behind numbers, a system of linear measures, circles, triangles and ovals that led to the new Stonehenge c.2500 BC general plan and the trilithons placements, these matters are evidence of original thought by a person of thoughtful disposition; an Ovyd. Linked with the noun Ovyd are the nouns oval, ovate, ovoid; words that continue in use today.

The noun 'Druid' has phonetic consonance with names such as those used by Dickens when he referred to the garden snail in "David Copperfield" as a 'I am a regular dodman', the phrase out of the month of Mr Peggotty. The Oxford English Dictionary volume II, pp 574 and 576 provides these definitions of 'dod' and 'doddery': - "Dod - A stalk, staff or club". "A reeds mace or cat's tail, 'typha latifolia', [a tall slender plant with an enlarged top]. "The noun Dodman: - Origin unknown; connected with dod; a snail, a hoddy doddy". More references include Francis Bacon AD 1626 who wrote "Animals that cast their shells, lobster, crab, dodman, tortoise". In 1674, Fairfax referred to

'snayl or dodman'. These terms appear to relate to the 'Long Man of Wilmington' surveyor, the Dod man, the Druid man, equipped with two staves with an enlarged top through which a hole had been formed, and potentially carrying a large backpack, in other words, a person having a strong association with building and construction. In the context of Stonehenge and hundreds of ancient monument sites, the Druid man was the major figure in the construction work. In today's world the surnames 'Dod' and 'Dodd' would seem to be a direct link.

Greece

Historical references to early communities descendent of the noun 'Druid' and *Derwydd.*

The noun Bard is well known, the man or woman of language, one who has linguistic ability and a good memory, a person able to conjure language and present a word picture in prose or poetic form to inform and entertain an audience. Alliteration and rhyming techniques materially aid learning and memory. Learning poetry and singing, these forms of rote learning fix subject ideas in one's in the Isles are few and far between, however we have a record by Diodorus of Sicily from about 40 BC. I quote the translation in full: -

> "Hecataeus of Thrace [who lived in the fourth century BC] had told of the mythology of the ancients and how opposite the land of the Celts, [i.e. Gaul in Western Europe] there existed an island not smaller than Sicily, and which situated under the constellation of the Bear is inhabited by the Hyperboreans, who are called by that name because their home is beyond the point where the north wind [the Boreas] blows. And the land is both fertile and productive of every crop, and since it has an unusually temperate climate it produces two harvests each year.
>
> Moreover, the following legend is told concerning it, [the land of the Brython]. Leto, mother of Apollo and Artemis (Zeus was their father) was born on this island, and for that reason Apollo the Sun god is honoured among them above all other gods; and the inhabitants are looked upon as priests of Apollo after a manner, since daily they praise this god continuously in song and honour him exceedingly. And there is a notable temple that is adorned with many votive offerings and is circular in shape.
>
> Furthermore, a city is there which is sacred to this god, and the majority of its inhabitants are players of the cithera [the harp]; and these continually play this instrument and sing hymns of praise to the god, glorifying his deeds.
>
> The Hyperboreans also have a language ..... peculiar to them, and are most friendly disposed towards the Greeks, and especially towards the Athenians and the Delians, who have inherited this goodwill from most ancient times. The myth also relates that certain Greeks visited the Hyperboreans and left behind them costly votive offerings bearing inscriptions in Greek letters. And in the same way Abaris, an Hyperborean, came to visit Greece in ancient times and renewed the goodwill and kinship of his people to the Delians.
>
> They also say that the Moon, as viewed from the island appears to be a little distance from the earth and to have prominences, like those of the earth, which are visible to the eye.
>
> The account is also given that the god visits the island every nineteen years, the period in which the return of the stars to the same place in the heavens is accomplished; and for this reason the nineteen-year period is called by the Greeks 'the year of Meton'. At the time of this appearance of the god, he both plays on the cithera and dances continuously the night through

from the vernal [Spring] equinox until the rising of the Pleiades [stellar group], expressing in this manner his delight in his successes. And the kings of this city are called Boreades, since they are descendants of Boreas, and the succession to these positions is always kept in the family."

STONEHENGE 2500 BC

My reasons for quoting Diodorus are the specific references to language and communication between an Isle in the far west [Britain] and Greece in the east. The classical Greek civilisation flourished early in the first millennium BC, several centuries before the early Roman civilisation metamorphosed into a military machine that conquered the Mediterranean area. The transmission of information concerning forms of activity at the notable temple that is adorned with many votive offerings and is circular in shape may well have arisen before Hecataeus wrote of ancient times. The activities he described at the circular in shape temple offer sound evidence of a spoken language, singing and music, knowledge and language skills are the characteristics of a Bard. In our twenty-first century AD, the wider community look to universities for original thought on a variety of subjects, as the reservoir of knowledge and learning and for teaching and the preservation of language. Evidence of these qualities is offered in the previous pages of this book and in references. Archaeological and anthropological knowledge garnered from a variety of sources, on-the-ground land surveys with aerial mapping, all these modern techniques have made possible this assembly of evidence indicating the Stonehenge collegiate community of c.2500 BC evidently had the qualifications that we think of as a University.

I consider I've demonstrated Stonehenge 2500 BC had the equivalent of Ovyds, Druids and Bards colleges specialising in philosophy, mathematics, language, calendars, architecture, archaeoastronomy, engineering, surveying. A university comprises a group of colleges with associated specialist faculties and schools led by professorial members and supported by members of staff.

STONEHENGE 2500 BC CAN RIGHTLY CLAIM TO BE THE WORLD'S FIRST UNIVERSITY

AND NOW TO A CHANGE OF TIME and PLACE

PARLIAMENT OF AUSTRALIA BUILDING FAÇADE

Image courtesy Wikipedia

Parliament House, Canberra, Australia is a unique building; the façade incorporates a series of elements that accord with the (Fibonacci) progressive arithmetic series numbers 1,2,3,5,8,13,21,34 in exactly the same manner as ancient Stonehenge in England about 2500 BC.

The wide Great Verandah has the form of twenty-three open doorways. Three central doorways have the same heights as the far left and right groups. A second element style is full height groups of four openings mid-left and mid-right of the centre having the same doorway width. All twenty-three doorways offer the appearance of an aesthetic well proportioned series of arches faced with pristine Paradise White Carrara marble.

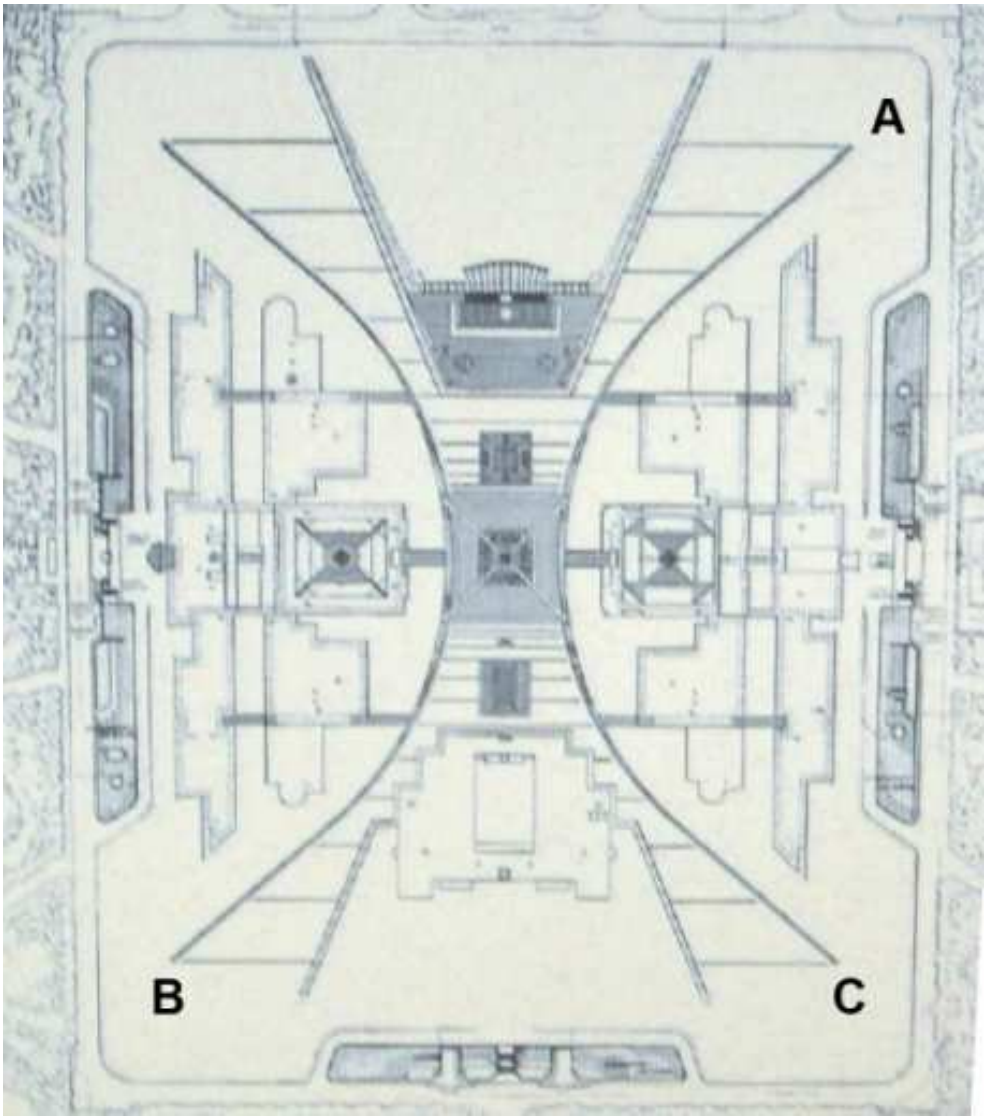
Summarising the observed Great Verandah design elements: -

One main doorway entrance has a window and coat of arms above. Two similar doorways on the left and right have no windows. This set of three doorways is positioned at the Verandah centre. Left and right of the central group are five doorway sets, each with windows above. Left and right of the central group are full height columnar spaces, a total of eight. Thirteen doorways have the same proportions; three in the centre, ten more to the left and right. There are twenty-three doorway entrances across the full width of the Verandah. Parliament House design façade adheres to 1,2,3,5,8,13,21,34 which are the first eight numbers of the Fibonacci progressive arithmetic number series. The oval Ceremonial Lake forming the Great Verandah forecourt has length to width dimensions in the ratio 8:13, the Golden Number Ratio. The design of Parliament House, Canberra, incorporates the progressive arithmetic series numbers **1,2,3,5,8,13,21,34.**

Parliament House Roof

Parliament House roof is a notable feature; a bird's eye view has the appearance of a matched pair of parabolic curves. Between the curved concrete parapets a grass covered roof was a favourite playground, children played roly-poly down its sloping surface.

Triangle ABC identified as shown has the properties where the hypotenuse AB divided by the shorter rectangle side BC = 1.62; the architectural design parameter Golden Ratio Number.


A
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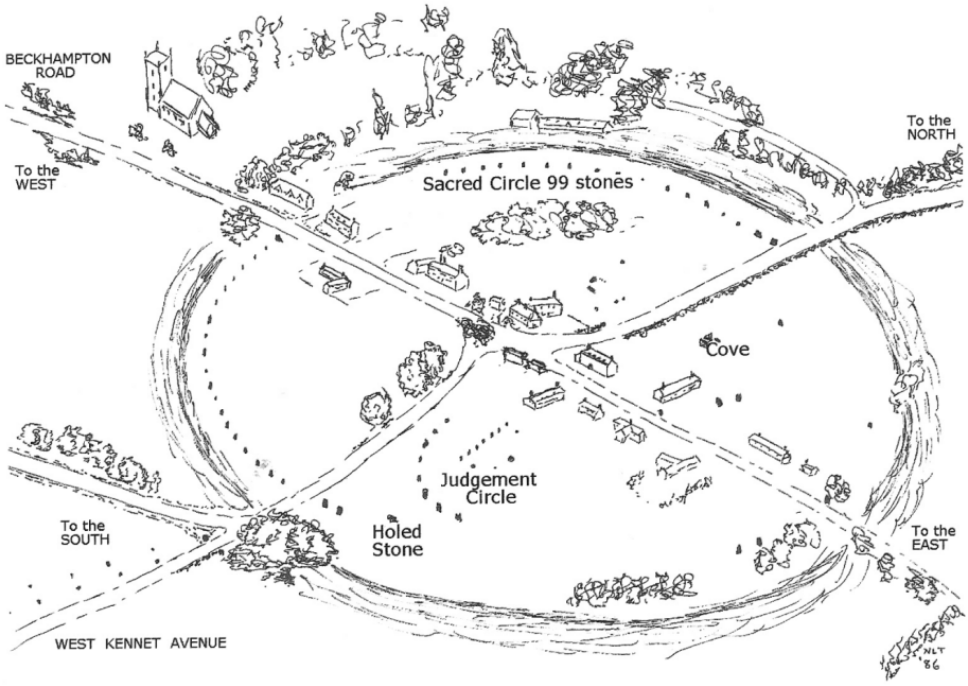
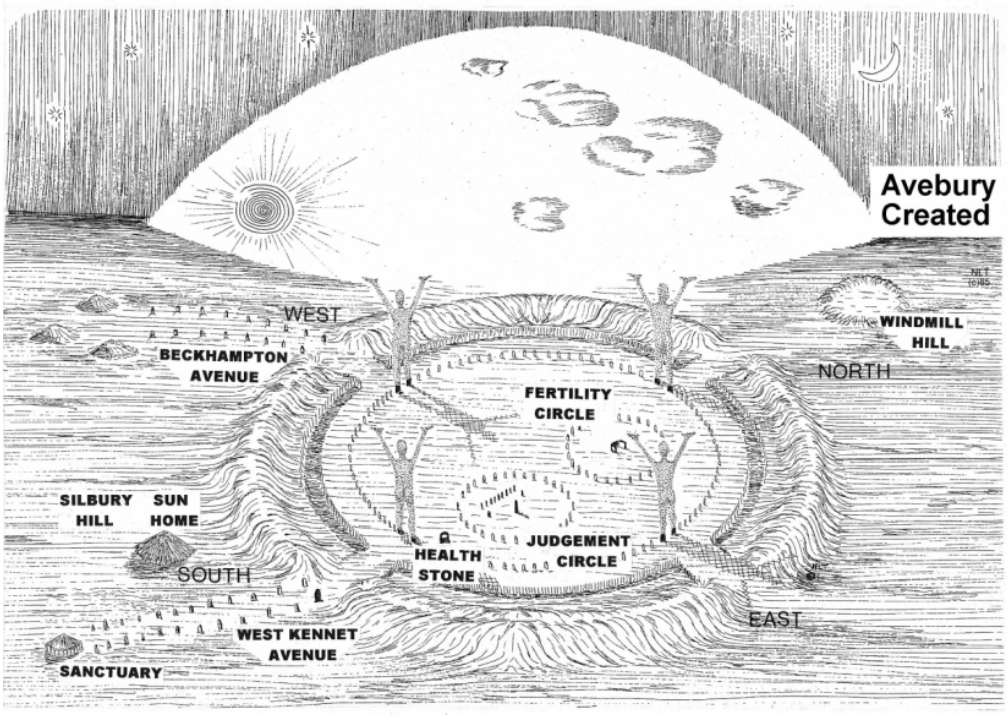


AVEBURY TODAY FROM THE AIR

Sketches by the Author



CHAPTER EIGHTEEN :: AVEBURY CREATED c.2600 BC

SUMMARY
The largest ancient monument in the country within an area rightly termed the metropolitan centre of Britain in the Neolithic Age four thousand and more years ago; Avebury ancient monument comprises a ring of ninety-nine large upright sarsen stone columns, a form of hard durable sandstone. Beyond the ring of standing stones is a deep ditch up to ten metres deep and four metres wide at the bottom. Further out is a six metres high embankment up to twenty-five metres wide at the base. From the north, east, south and west directions, four causeways cut across the embankment and ditch, allowing ready access into the flat central area. Avebury is considerably larger than Stanton Drew in Somerset, Stonehenge, Windmill Hill and Woodhenge in Wiltshire.

To appreciate the magnitude of the Avebury building task, it has been calculated about 150,000 tons of hard chalk was excavated to form the ditch using pick and shovel hand tools crafted from red deer antlers. The excavated material was carried from the ditch and placed beyond to form the embankment. Altogether about one hundred and eighty sarsen stones were brought overland from Marlborough Downs to Avebury, the largest stones estimated to have a mass approaching fifty tons.

Standing upright in a ring, ninety-nine standing stones enclose the flat central area. Beyond that, a ditch and an embankment were created. Four causeway entrances were formed to allow access to the central area. A great community effort was required to plan and construct Avebury, it reflects very well on their abilities and skills, it seems clear it was the centre of their interests. Why else should a group of people put so much effort into so great a project?

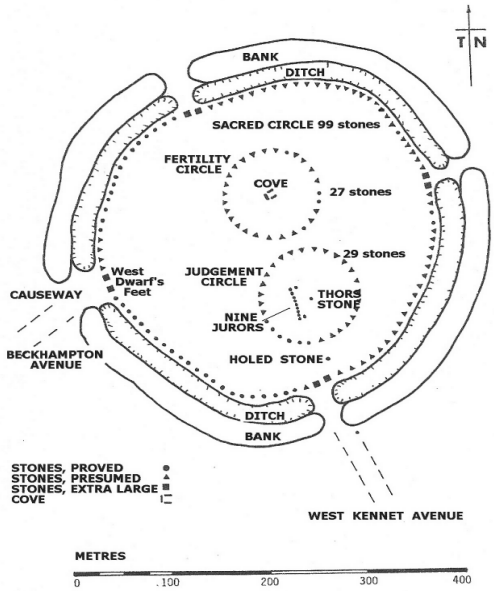
NORTH-WEST ENTRANCE

NINE JURORS

THE COVE FACES SUNRISE

THE DITCH & EMBANKMENT

Scattered threads observed during the centuries all indicate the Avebury area was a focal point of a peaceful ancient Brython, native 'British' communities were busy building community works and constructs. The ancient 'Britons' underlying native beliefs and religion were probably little altered until successive waves of invaders began around 500 BC. Austrian salt vendors migrated from Europe to the Isles in the mid-first millennium BC, hence the name 'Celts', conflict arose and a multitude of Iron Age hill forts and fortifications were created. The Roman invasion in 43 AD was followed by the Saxons around 500 AD and later by Viking raids in the eigth century and then the Normans in 1066 AD. Our information about pre-Celtic England is based largely upon bronze artefacts, earthenware pots and the remains of buildings. Written records relate virtually nothing about their day to day activities or their customs and religious beliefs. It seems the Neolithic Brythons were peaceful people whose energies were devoted to building great ancient monuments Avebury, Stonehenge and Silbury Hill. Iron Age hill forts and other evidences of warlike aggression arose after the arrival of foreigners.



THE DESIGN OF AVEBURY

In any event, the original builders of Avebury would have seen later communities living in the west of England as their descendants in spirit and belief systems. Even the Roman rulers and Saxon settlers failed to eradicate their prehistoric customs and beliefs. Myths and legends continued in circulation until the present day. Avebury represents a community's conviction of the creation of mankind's world myth by the ancient gods protected by the fertility deity, the god of justice and the goddess of good health
be they ancient or modern; a desire for prosperity, health and justice for an entire community.

Present-day Avebury village lies about twenty kilometres south-west of Swindon in Wiltshire, southern England. Rook nests seen high in the tall trees canopy are the visitor's first impression of the approaching village, the houses nestling in the quiet folds of the White Horse hills. Tall chimneys, perhaps with a wisp of smoke, thatched roofs and neat gardens characterise people's homes. Today's society is vastly more complex than even a century ago. We have cathedrals, churches and chapels, stadiums and great halls to provide a focus for community activities. The future and what life has in store are of deep concern. As individuals or as a family we pay insurance premiums to afford protection against the risk of storms and tempests, of accidents and the like. Our doctors and medical resources are able to care for us in the event of ill health or injury. We organise ourselves and pay for a full time police force to catch transgressors against our laws. Service contracts between employer and employee provide a degree of security in an uncertain world. The memories of our past, our forebears and loved ones are maintained in many ways; anniversaries are remembered.

SOCIETY

Sociology students are aware virtually every early society had a religion of some kind and most were polytheistic. Common sense tells us our forebears thousands of years ago had exactly the same concerns and there would have been no real difference in their basic needs yet the records tell us their society was very much less sophisticated than ours today. Focusing on the Avebury ancient monument, I intend to demonstrate the likely scope and nature of the prehistoric people's beliefs, the functions of Avebury in relation to other ancient neighbourhood sites and to draw a word picture of the happenings in Britain during the second and third millennia BC. The folklore of north-west Europe, Britain and Ireland, the symbolism and oral traditions of our distant forebears has been of major importance to me and assistance interpreting the unwritten past. Three core themes are presented as I develop my hypothesis concerning the reasons why Avebury was designed and built the way it was.

Window to the Past - Written Norse Traditions

We can now see there were similarities between Scandinavian traditions and those of the prehistoric people living in the south, west and northern Britain; the sea-going way of life, farming practices, oral traditions and their deities. Now I turn to historic Icelandic records written close to the end of the first millennium AD that recall Norse sagas and myths from earlier times. Icelandic poetry and verse, stories and sagas describe Norse ideals and customs, their laws and behaviour, their gods and myths. They tell of social values, customs and exploits of adventurers we call Vikings. The poetic metre, the forms of composition and storytelling conformed to strict rules, indicative of strong discipline amongst poets and storyteller Bards as generation succeeded generation, nurtured in their

own mould with little change in passing centuries. An Icelandic chieftain, Snorri Sturlusson 1179-1241 AD was a well-educated scholar and historian who had access to the writings of his contemporaries. In his desire to record the mythological stories of his forebears, he was unusual in those days for having an impartial attitude, free from the strong Christian bias of other writers. He drew from written records, from poetry and the traditional tales to describe the Norse pantheon of ancient gods in the following ways:-

Odin - was the highest and oldest of the gods, he ruled over all his kingdom and governed all things, he created heaven and earth and all that in them is….

Thor - the son of Odin and Earth, was loved and respected, he represented stability, he was invoked by man in the name of law and order, and with his hammer Mjollnir kept the giants at bay and was strong enough to grapple with the serpent Jormungand ….

Freyr - was third in the pantheon, a famous god who decides when the Sun shall shine and the rain come down, he was invoked for fertility, peace and plenty.

Snorri Sturlusson recorded the Norse myth of the creation of the world and how it was accomplished by three Norse deities, a piece of special interest. The story is told in a conversational style between a Swedish king and three wise men. Vibrant in concept, it has the same imaginative flavour as the ancient Irish and Welsh stories. It is seen as one of the group of Indo-European myths; the sacred cow, the rivers, the tree of life, all common elements. I offer a slightly abridged account of the Norse creation of the world story:- "In the beginning of time there was a great empty void. Then the gods created the cold realm of the north, followed by the hot lands of the south. From the cold north there flowed eleven rivers into the empty space; there they met the hot winds, the sparks and embers from the south. In the middle realm there was mildness and gentle airs. The evil frost giants from the north were hated for their wicked behaviour by the three gods Vodin, Vili and Ve, the rulers of heaven and earth. Eventually the three gods killed the evil frost giant Ymir and they carried his enormous body to the middle of the empty void, there they created the round Earth from him. Seas and lakes they made from his blood. His eyebrows were made into an enclosed stronghold named Midgard in the middle of Earth. They took sparks and embers from the hot south and placed them in the sky as stars. Ymir's brains were flung up to form the clouds. His skull was placed over the middle earth stronghold Midgard to form the sky above, the four corners supported forever by the four obedient dwarfs North East South and West. "Vodin, Vili and Ve made the first man and woman; Vodin gave them life, Vili gave them compassion and perception, Ve gave them the five senses. So the earth was made, surrounded by the deep seas and covered by the sky, inhabited by mankind, giants and dwarfs. The gods created their own realm high above Midgard and it is called Asgard, sometimes it is joined with man's earth by the rainbow bridge."

My representation of the Creation of Avebury on page 10 embodies every element of the Norse myth and the on-the-ground remains at Avebury. I found difficulty sketching a two dimensional illustration in such a way to offer a view of a three-dimensional impression of Midgard but I trust you will comprehend the illustration elements, both below and above an imaginary horizon line. The Sun is about to set in the south-west, midwinter solstice sunset about 2500 BC caused shadows. The four dwarfs North, East, South and West support the sky dome firmament above.

A Temple Named Avebury

Do not allow the English 'bury', the sense of internment and burial to affect your thinking. I aver 'bury' is a transliteration of the Cymraeg (Welsh) phrase 'Good morning' = 'b*o—re da*'. We know Avebury by its sixth century Saxon name; it had stood for three thousand years in England before Saxons invaded southern England. Strong archaeological evidence shows a vigorous Saxon settlement in the Thames valley in the AD 450's. Cerdic with his force of Saxon warriors landed near Southampton in 494 AD. The site of their landfall eventually became Hampshire. The northern and westward Saxon push was checked temporarily when King Arthur's British forces defeated the Saxons led by Osla Big-knife and Cerdic at the Battle of Badon (Bath) in 495 AD. Generations later, at the fateful Battle of Deorham in 577 AD (present day Dyrham), the Saxons eventually overran the entire West Country and the conquest of England was almost complete.

There are important links with Avebury's past. Nearby geographical features' names offer an interesting line of enquiry. Waden Hill for instance a kilometre south of Avebury lies within the triangle bounded by Avebury's southern causeway entrance, the Sanctuary stone circle on Overton Hill and Silbury Hill. South of Waden Hill is Wansdyke, an extensive ditch and embankment extending from Hampshire a distance of fifty kilometres south-east into Somerset. Further south is an elongated burial mound called Adam's Grave on maps today. In Saxon times it was called Woden's barrow. Etymologists consider all these names derive from the ancient British deity Woden, Vodin or Odin as he was named in Scandinavia. Elsewhere, other earthworks in southern England are called Grimsdyke. The name Grim is a bye name for Woden, having the meaning of an anonymous hooded person who walked about the countryside in disguise. Avebury's actual name before Saxon times is an open question. By the seventh century, Saxon influences would have become strong enough to initiate the name Avebury we know today. The last syllable *bury* is a distinctly Saxon Germanic noun meaning *place* in the general sense. The Old English *beorg* is akin to OE *byrgan,* in turn to Middle English *berien* and *buryen,* an internment burial place.

Another link with the past may have been the pronunciation of the first syllable *Ave.* In 1723 AD, Dr William Stukeley's name for the ancient monument was spelled *V'bury*, accent on the *V.* The Germanic pronunciation of *W* is close to the English *V*, hence today's name *Woden* would be pronounced closer to *Voden*, in other words *Voden's place*. Possibly the prehistoric name for Avebury was *Woden's Morning Temple Place.* Centuries passed from the prehistoric to Arthurian and Saxon times. Transliteration from *Woden's Morning Temple.* to *Voden's Place* is a plausible supposition. Since Stukeley's time four centuries ago, a name change from *V'bury* to *Ave-bury* today is equally credible.

Consider how the Norse myth of the world's creation, see how item by item the myth story precisely match elements of Avebury ancient monument's elements; the nine jurors, the north-west entrance feet of the 'dwarfs', the ditch too wide for a man to cross and Ymir's eyebrows embankment, two of the three standing stones of The Cove facing sunrise, all as illustrated: -

The Standing Stones

Aubrey and Stukeley, Atkinson and Burl opined the number of Avebury's sarsen stones comprising the outer ring numbered 98 or 99, perhaps 100. I consider the original intention of the designers was exactly ninety-nine**,** the symbolic regal thirty-three representing each stellar deity who created

Midgard, thirty-three massive stone columns to signify each deity; ninety-nine sarsen columns symbolically defined the sanctity of the sacred enclosure encompassed by their presence.

The Ditch & Embankment

The Norse god's creation of earth myth by Odin Thor and Freyr included a description of the surrounding deep sea, the ditch far too wide for a man to jump cross. Beyond the Avebury ditch is the embankment surrounding the entire area, closely paralleling the mythical Ymir's skull and eyebrows that formed the stronghold to protect Midgard. At night, stars shone like sparks and glowing embers in the darkness, in daytime the blue sky overhead covered Midgard, clouds floated in the blue sky above the earth much as Ymir's brains did a similar thing.

THE PURPOSES OF AVEBURY

A grand plan would have been in the minds of the Avebury hierarchy long before the work actually began. An indication of what may have been in the designer's minds is predicated in the previous paragraphs. Thus far the entire design would have represented earth's creation and a truly sacred site dedicated by the Neolithic builders to their deities, an earthly representation of the creation of the earth myth. What of mankind's daily needs for life on this earth? Good health, law and order, prosperity and good harvests are vital requirements. Inside the ring of ninety-nine sarsen standing stones are two smaller rings of stones and the stump of another single stone.

Two Inner Stone Circles

Within the ring of ninety-nine standing stones, in the northern sector are the remains of another twenty-seven standing stones ring. At its centre are two of the original three great stones whose open side faced the dawn sunrise. Stukeley named these three stones 'The Cove'. Norse and Celtic folktales often include the adjectival use of the number twenty-seven to describe a group of adventurers on a mythical voyage to distant lands, their mission successful. Other tales tell of three sets of nine, inferring a similar outcome. The use of twenty-seven standing stones to surround The Cove is presumed to have defined and enhanced the central feature. Because The Cove faced east to welcome the sunrise and linking this with the symbolism of twenty-seven, I concluded the northern ring was a focus for daily sunrise fertility ceremonies. The Norse myths attribute Freyr to a fertility role and for that reason the northern ring of twenty-seven stones I designated 'Fertility Circle'.

The Judgment Ring & Jury

Sufficient stones of the southern ring remain to assess there were originally twenty-nine standing stones forming the feature. Dr Stukeley visited the site in 1724 AD and noted a tall white quartz column in the centre of the ring, a particularly significant feature he called the 'Obelisk'. It had fallen to the ground when he viewed it but he pointed out that when erect it would have been the tallest. It has long since disappeared, presumably vandalised to build a farm barn or some such. To advance a functional reason for this particular southern circle design feature the answer probably lies in Norse traditions; the Icelandic 'Eyrbygga Saga' describes the first settlement on the west coast of Iceland in 884 AD at the head of Breida fijord. Chieftain Thorolf proclaimed an *helgistradr,* an assembly area and holy place. He built a temple to his namesake deity Thor. The saga describes how the field also held a *domhringr* or ring of stones within which trials were held and judgments delivered. Inside the *domhringr* was a tall stone called *Thor's steinn*. A similar stone circle can be seen in northern Poland, its existence indicating the migration route of Swedish Viking 'Goths' from

their home country to the river Danube one thousand years ago. In Sweden, today's tourist visitor to the north of the country can witness and marvel at Thor's Justice Ring, so named today.

The Icelandic 'Confederates Saga' dated about 1275 AD describes how Chieftain Odd's kinsman was killed in a fight with Ospak. On behalf of his kinsman, Odd made preparations for a court action against Ospak at the next *Althing* (the annual Icelandic parliament). Odd named nine of his nearest neighbours to be jurymen and conducted his own prosecution. The defence on behalf of Ospak was invited to respond to the charge of manslaughter of Chief Odd's kinsman. The trial consisted of Odd the prosecuting counsel, the defence counsel for Ospak; the accused and a counsel, the empanelled jury of nine. The judge was the highest and most respected Icelandic chieftain, the *Althing* Lawgiver.

Turning to ancient practices elsewhere in Britain there is a clear parallel in the arrangement of the *domhringr* and *Thor's steinn* in Iceland with similar rings of stones in Cornwall, Ireland, Wales and Scotland. Of nine hundred or so stone circles in the British Isles, a fair number still exist which consist of a tall central pillar surrounded by a ring of smaller stones. Amongst the most well-known is the central stone of The Hurlers on Bodmin Moor in Cornwall, Boscawen-un near Lands' End, Torhouskie in Wigtownshire Scotland, Currebeha in County Cork Ireland, The Hoarstones in Salop, Wales.

The Law Court

The presumed purpose of Avebury's southern ring of twenty-nine stones with its Obelisk at the centre was a ring of stones within which judgments were given and sentences awarded. In any civilised society to conduct a trial of an alleged offender the judge is aided by a jury and counsels for both the defence and prosecution. Within Avebury's southern circle of twenty-nine standing stones is another notable feature, a straight row of nine stones with additional stones offset at each end of the row to represent the advocates for and against the charges by Odd's counsel and the kinsman's defence counsel. I offer the proposition Avebury's southern ring of stones was a place for the administration of the community's laws. The missing quartz column 'Obelisk' would be the position for an accused. Observe how the prosecutor and defence with a jury of nine peers match with the numbers in the straight row of stones. The southern circle was a location where trials were conducted and judgments given, an outdoor courtroom for the administration of justice. The Norse god Thor fulfilled the role of preserving law and order. I aver Avebury saw the beginning of our 21st century world-wide legal practices.

Health

Situated just south of the southern Justice Circle, Dr William Stukeley observed and named the Avebury "Holed Stone" during his visit in 1723. In the intervening centuries, the monolith was vandalised and nothing remained above ground until Sir Alexander Keiller re-discovered the broken base in 1939. Many instances in the British Isles and Ireland link holed stones with a health legend, a common theme in most tales concern personal health in one form or another.

MEN-A-TOL HOLED STONE, Cornwall. Photo Author 1986.

Near the Cornish village of Lanyon is the famous Men-a-tol holed stone; stories about that stone assert "if a scrofulous child is passed

naked three times through the hole in a direction against the Sun, then the child will recover from its illness."

BALLYCLARE HOLED STONE, IRELAND At the holed stone of Kilghane, County Cork, Ireland, pregnant women would pass clothing through the hole to ensure an easier childbirth. There are many other references to holed stones, stories concern good health in one form or another. At Stenness on Orkney, Scotland as recently as the eighteenth century newly engaged couples used to plight their troth by grasping hands through the Hole of Odin Stone. Avebury's holed Health Stone would appear equally dedicated to a deity associated with good health, a 'temple' whose counterpart would be Norse goddess Eyr or Eir.

THE SANCTUARY c.2500 BC

Only a stone's throw from Avebury is the 'SANCTUARY'; a circular timber building at the terminus of 'West Kennet Avenue' , once an ancient processional way which linked the two ancient monuments; an avenue of parallel lines of standing stones 2¼ kilometres long, one *staen*. John Aubrey the antiquarian visited the Sanctuary ancient monument site in AD 1648 and described how he saw "a double circle of stones, four or five feet high, tho' most of them are now fallen down." Next century Dr William Stukeley followed in his footsteps, described the site and recorded "How rings of stones were destroyed in the winter of 1724 by a farmer from nearby West Overton ''to clear the ground for ploughing and to gain a little dirty profit'". Dr Stukeley called the ancient monument 'Sanctuary', a name by which has been known ever since.

The Cunnington Archaeological Report

For two centuries the remains of the ancient monument lay concealed and undisturbed beneath cultivated fields at the top of West Overton Hill in Wiltshire, in the Spring of 1930 Colonel and Mrs M. E. Cunnington commenced a scientific archaeological exploration of the area. The Cunningtons' first difficulty was to find the exact location of the ancient monument and its extent, all surface indications had been removed by farming activities. A study of Dr Stukeley's description of the monument's relationship to others in the vicinity enabled a site selection to be made, and for the dig to commence. On the third day, whilst excavating an exploratory trench, a stone hole was found confirming the correct identification of the site location. Work continued for the next five weeks and a series of post holes and sub-surface stone pressure marks were revealed.

Site Plan

The Wiltshire Archaeological Magazine, volume XLV, June 1931 contained a report on Cunnington's work; an excavation image is copied from the Wilts Magazine. A search to locate Mrs Cunnington's original manuscript is sadly said to have been 'mislaid in the Society's archives'. A considerable number of worked flints and many broken pieces of pottery were found during the course of excavations. The skeleton of a boy about fourteen years of age and a small pottery beaker was uncovered on the eastern side of the post and stone ring. A cross marks the position. Other discoveries were skeletal pieces of horse, ox, dog, pig, cat and red deer. Significantly I noticed no

sheep bones were recorded. Had radio carbon dating technique been available in 1930, carbonaceous material found in post holes and the skeletal items would have enabled a construction and habitation date for the Sanctuary to be estimated. No accurate date for the Sanctuary construction has been established; I opine the Sanctuary was probably constructed after 2500 BC

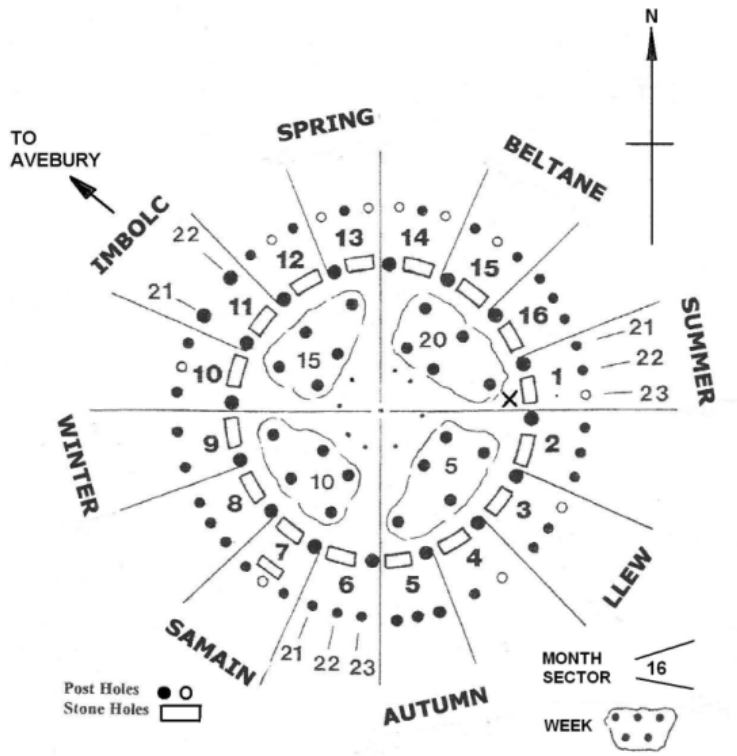
Sanctuary Sheep Temple Building

Homes usually comprised a circular outer wall assumed to be two metres high, a thatched roof sloped upwards about 30^0 rising to an apex about ten to twelve metres above ground level. The Cunnington illustration,clarified, supplemented, shows forty-five outer ring post holes, thirty-four of which were revealed at the time of the dig. Carefully analysing the spacing between observed posts and average arc lengths around the post ring, I added eleven more post positions, a total amounting to forty-five post pits in the outer ring; other authors concur with these deductions. The placement of the stones and posts shows a consistent fully symmetrical and elegant design exemplified by a building complete in itself and constructed as a single entity. It is a tribute so many actual positions shown by filled circles were revealed by the Colonel's archaeological team.

The next innermost ring comprised sixteen closely placed pairs of alternate timber posts and stone slabs. Any direct evidence of timber posts would have disappeared many centuries before Dr William Stukeley's visit. He recorded the observation, [the stones] "tho' most of them are now fallen down". Maybe the stone slabs were probably placed directly on the ground, perhaps not standing stone columns as at other places. They paired with post holes found by the archaeologist team.

THE SANCTUARY SUN CALENDAR DESIGN

Centred upon the small diameter middle post, the north-south and east-west cardinal directions divide the sixteen pairs of posts and stones into four sets, assumed to be the four quarters of the year, sixteen calendar months in four sets of four. Within the sixteen post and stone slab ring are four sets of five twin posts, grouped together and indicated by a wavy line drawn around each set of five. These twenty posts are taken to have been the means of counting four weeks each of five days.



On that basis, these twenty 'day' posts were counted for each of the sixteen months, the progressive count of twenty days in sixteen months become 20 x 16 = 320. The outer ring of forty-five posts is thought to have consisted of two or three intercalary days each month, to which were added twenty basic monthly days, counted on the four inner sets of five posts. Radial lines drawn from the centre of the

building tangential to the sixteen posts and outwards to the ring of forty-five posts divide the forty-five posts into groups of two and three posts. These month counts plus the intercalary days, 320 + 45 = 365 days of a solar year.

Month No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**		
Inner Posts	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**=**	**320**
Intercalary	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**=**	**45**
Days each Month	**23**	**23**	**23**	**22**	**23**	**23**	**23**	**23**	**22**	**23**	**22**	**23**	**23**	**23**	**23**	**23**	**=**	**365**

Midsummer

At Ireland's Knowth mound a thousand years before, the eastern passage alignment was the direction of equinox sunrise, a notable philosophical consistency. 'X' marks the spot where a boy's skeletal remains were found, a due east bearing. The customary choice for Summer as the first calendar month has been the direction of midsummer or midwinter sunrise at other sites. At the Sanctuary the first month Summer appears to have been the direction of sunrise at the equinox.

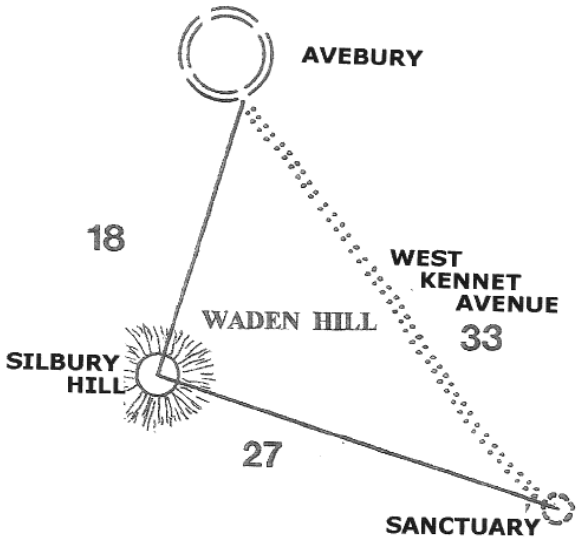
Samain Month

Supporting a tentative hypothesis, that the first month of the Sanctuary calendar was Summer month sector facing due east, a sub-surface stone compression mark was observed in sector seven. I concluded the elongated stone compression mark equated to Samain, the seventh of the sixteen months year, when excess stock were slaughtered to conserve fodder during the Winter. Animals were hand fed when confined to byres and sties, well protected from cold winds and snow. It is surmised the flat stone slab was a Samain slaughter stone, confirmation the sector was correctly identified as the seventh month.

Imbolc Month

A third consideration was sector eleven. The West Kennet Avenue processional way from Avebury's south-east causeway led across reasonably level ground to the Sanctuary, a distance of 2¼ kilometres, one *staen* or megalithic mile. Identified by opposing pairs of larger and smaller standing stones, thought to alternately represent men and women. Only a portion of the stones close to Avebury are still standing to identify the route, the balance having been demolished centuries ago during farming operations. Stone compression marks below ground have identified the Avenue continuation towards the Sanctuary site. Mrs Cunnington's plan shows several pairs of stones in what is presumed to be sector eleven leading towards Avebury. The pair of large post pits indicated in sector eleven was probably a framed arched doorway leading into the roofed building, a welcoming entrance to its interior. From Avebury, via West Kennet Avenue to the Sanctuary building leads me to suggest early Spring saw a procession of Ofyd priests and members of the community make their way from Avebury towards the Sanctuary.

A procession during the eleventh month would have marked Imbolc, the augury of the lambing season when pregnant ewes in the sheep flocks were identified and would soon drop their lambs in the weeks to come. The imminent increase in sheep numbers would benefit the entire community, an excellent reason for a celebration. The Celtic name *Imbolc* identifying the eleventh month has come to us via Irish myths and legends.



Sheep Temple

Summer month number one faced due east, Samain stone is the seventh month and the eleventh sector was Imbolc; it is concluded the Sanctuary had a strong Sun calendar purpose. Mrs Cunnington reported they found the skeleton of a boy aged about fourteen years, horse, ox, pig, red deer and cat bones but *no sheep or goat bones were recorded.* The absence of any sheep skeletal remains, the West Kennet Avenue entry to the building in Imbolc month led to the conclusion the Sanctuary calendar building was a temple sacred to sheep, the tangible symbol of the community's increasing wealth and prosperity each year. I consider the Sanctuary was a Sheep Temple in the design of a solar calendar, dedicated to the sheep flocks possessed by the Neolithic community in the Avebury area. To mark the Temple's dignity and important purpose, it would have been artistically rewarding to adorn the eleventh month entrance doorway with many sheep fleeces.

From the Avenue, its direction length and alignment the Imbolc month title is shown by the Sun calendar to have been sheering time, from which I concluded 'The Sanctuary' was a building dedicated to the sheep, the flocks being a measure of the community's wealth, a source of food and wool for clothing.

Lunar Calendar

The 1976 paper published privately by Mr Derrick Lees of Salisbury attributed both solar and lunar calendar properties to the Sanctuary ancient monument. His hypotheses were based upon a count of all the prone and erect stones shown on the illustration together with the more distant outer ring of smaller stones revealed during Colonel and Mrs Cunnington's excavation work.

Mr Lees concurred with my assessment that there were eleven stones missing from the total of forty-five in the outer ring, those stones I have termed intercalary day markers. In the course of our correspondence, Mr Lees offered his analysis of the lunar characteristics of the Sanctuary; he proposed a count of all 173 stones for twice times nineteen cycles = 6574 plus another 11 nights equals the lunar eclipse cycle 18 years and 11 nights, 6585 nights, the number of nights between minor lunar perturbations and the occurrence of a partial or total lunar eclipse. Knowing the lunar eclipse cycle frequency would have given an Ofyd in charge of the ancient monument an immense reputation with his lunar cycle knowledge and the ability to forecast a lunar eclipse.

Side measures of the triangle are 18, 27, 33 *furlangs* 68.4 metre units. Seen to be symbolically very significant; eighteen is twice nine, three times a family unit; twenty-seven is interpreted to imply success; thirty-three declares the entire site a sacred area.

CHAPTER NINETEEN :: SILBURY HILL TRIANGLE

"When I frequented this place, as I did for some years altogether, to take an exact account of it, staying for a fortnight at a time, I found out the entire work by degrees. The second time I was here, an avenue was new amusement, the third year another. So at length I discovered its mystery."

Dr William Stukeley's diary 1723 AD

SYNOPSIS

Three ancient sites at the corners of a triangle can be replicated anywhere. There are so many sites on the islands of Britain and Ireland, indeed anywhere on continental Europe and Scandinavia, a triangle of any shape or size can be conjured at will. Firm rules defining the triangle characteristics considerably lessen the possibilities of a random creation. A right-angled figure whose side lengths are related arithmetically define the unique character of a site. The triangle is clearly a unique geometric figure whose sides are in the ratio 33:27:18 and whose apices are the man-made Silbury Hill, Avebury, the Sanctuary calendar building.

Silbury Hill was probably constructed around 2700 BC, the Sanctuary calendar building and Avebury henge and stone features about 2500 BC. All three clearly relate to each other in time and space. Explanations are offered for each of the three sites, their relationships, functions and surveyed characteristics. Silbury Hill is the largest man-made earthwork in Europe. Formed in the shape of a traditional round house but with no ground level entry, its suggested purpose is an overnight resting place for the Sun deity, accessed from an Otherworld doorway below Earth.

The West Kennet Avenue of standing stones links Avebury and the Sanctuary building; it is considered to have been a processional way along which a congregation walked from Avebury to the Sanctuary Temple at the time of Imbolc, the augury of the lambing season in late January. Beckhampton Avenue of standing stones joined Avebury with numerous burial barrows to the south-west, a processional way to the land of the departed. Avebury's physical features item by item created about 2500 BC match the Scandinavian world creation myth recorded by the celebrated Icelandic scholar Snorri Sturlusson about 1200 AD. Avebury is thought to be a representation of the creation of mankind's world representing the rule of law, health and fertility.

Silbury Hill is a mystery that has intrigued many people for centuries. In its own right it is a remarkable work, the largest prehistoric man-made structure in Europe, comparable in size and design with the stepped pyramid at Sakkara in Egypt built a century later. Close to 40 metres high with a 165 metre diameter base, it has a flat top about 35 metres diameter, large enough to accommodate Stonehenge. The structure was built of five cylindrical layers of chalk blocks and earth, the sides smoothed to form a truncated cone with a volume estimated at 250,000 cubic metres.

ARCHAEOLOGY

There are no passages to its interior or other features that afford any visible external clue to its purpose. Exploratory excavations by antiquarians in past centuries and recent archaeological remedial work by English Heritage personnel aimed at revealing Silbury Hill's purpose have been inconclusive. Dr Atkinson reported a radio-carbon date for hazel and other plant remains from the core of the mound, I-4136 of 2145 bc +/- 95 years. Adjusted by a calibration correction of +430 years, the plant remains had an estimated date of 2575 BC. Five tests on small pieces of organic

matter from the mound, SI-910 averaged 2575 bc +/- 120 years, which afforded a C_{14} corrected construction date about 3100 years BC. Burl gives a date of 2750 BC, an assessment I have adopted, setting a rounded date of 2750 BC in this chapter and elsewhere.

An aspect of Silbury Hill's location in relation to Avebury and the Sanctuary deserves detailed examination and discussion. The actual choice of Avebury's position and the site of the Sanctuary sheep calendar temple building were secondary, presumably determined after 2750 BC about the time Silbury Hill was built, the concept of a right-angled triangle with sides in the ratio 33:27:18 was presumably well known. In relation to Avebury and the Sanctuary, the figure is almost a Pythagorean triangle with side lengths believed numerically significant. Each side dimension may be divided by three, two by nine, and the hypotenuse is a multiple of eleven and three.

Geometry

Waden Hill is a natural high ground feature inside the triangle, well above the elevation of the three corners. When an observer stands on the top of Waden Hill all three corners of the triangle can be seen simultaneously. Understanding the geographic and symbolic significance of the entire area enhances one's appreciation of the properties of the Sanctuary, Avebury and Silbury Hill.

Reference to the Ordnance Survey Department nineteenth century scaled maps of the area make it clear there were no other topographical or man-made features near the three sites, Silbury Hill, the southern entrance to Avebury nor the Sanctuary that would have given rise to other preferred choices for these two later sites. I recommend a close personal examination of the O.S. maps. Land contours, the geographical characteristics point to an intention to determine Silbury Hill, Avebury and the Sanctuary at the corners of a triangle whose side lengths were in the ratio 18:27:33. Silbury Hill, the apex of the triangle, has an included angle of 89^0, a right angle within a percent.

Why Sun Home

I offer this explanation of the presumed purpose of Silbury Hill, suggestions that meets all the features of the mound: shape, size, and its location at the metropolitan centre of ancient Britain early in the third millennium BC. It can readily be appreciated the inhabitants of southern England were well aware of the story concerning Newgrange, the magic dwelling place and reputed home of their Sun deity, the good god Dagda. Before 2750 BC it is presumed communities from a wide area around the future site of Silbury Hill may have wished to create a tangible home for their own Sun god. How big would have been a significant question. A scheme of that importance would have had wide appeal to everyone who worshipped the Sun deity. Neolithic people mostly lived in circular huts between five and ten metres diameter with a roof thatched with straw or other material, sloping down from the apex about 30^0 outwards to the perimeter. To create a home for a Sun deity, their domestic dwellings would have served as a model example. Silbury Hill is very close to the geometric shape of a prehistoric thatched roof circular dwelling in ancient Britain. The roof slope of a domestic thatched dwelling was determined by the ability of rainwater droplets to follow the strands of straw down the slope rather than fall vertically into the interior. A circular form of dwelling is the most economical use of building materials. These simple design elements are featured in Silbury Hill, there were however two differences between Silbury Hill and their own homes, its great size and the absence of an entrance doorway at ground level. Comparable in many ways with the third millennium BC Knowth and Newgrange passage mounds in Ireland, builders of

Silbury Hill about 2750 BC had no supply of large flat stones from a nearby river; only the small Winterbourne stream flowed nearby. To construct a rock-lined passage into the mound was clearly impossible. Nor was it necessary, as you will see. The question by what means the Sun deity could gain access to his dwelling for an overnight rest during the dark hours is answered by the following: -

"An ancient myth tells how the Sun rose above the eastern edge of the world in the morning, arced high up and crossed the sky during the day. Daylight prevailed all this time. Continuing his journey across the sky, Sun descended past the western horizon at dusk. At the moment of sunset, the orb disappeared below the western horizon. Even though his full light was not visible to mankind, there was still a dusky half-light after sunset. During this time the deity travelled from the western horizon underneath mankind's world back towards the centre of the Otherworld below. At nightfall, Sun entered a doorway to his home and closed the door. His light was unseen in mankind's world above the Otherworld. The deity rested during the dark of the night, below the land of men and women. Next morning, Sun arose and as he opened the door of his dwelling his shining light caused the pre-dawn glow in the eastern sky. His full morning glory was seen as he reappeared once again above the eastern horizon to illuminate mankind's world once again. A new day dawned."

To build a replica mound of Sun Home in mankind's Earthly world above the Otherworld, there was no necessity to construct a doorway and passage leading from mankind's world to Sun's resting place. His mythical night-time dwelling, Sun's Home had its entrance directly underneath the land of men and women in the Otherworld. Sun Home was created in the manner of the people's own dwellings. Round, a sloping roof covered in straw thatch, all of a grand scale and much larger than an earthly family's own home. The bright yellow thatch and conical shape was a spectacular sight, easily viewed by pilgrims as they approached from many miles away. Thus it is supposed the community achieved their objective to build a great mound, Silbury Hill; an overnight resting place for Sun, a home made by mankind for their deity.

Building Silbury Hill

Construction of Silbury Hill in southern England began about 2750 BC. The "Old People" clearly had the resources and a great conviction to embark on a massive building project of that kind. I asked myself two questions; "Why should prehistoric man wish to invest so much effort in the design and construction of Silbury Hill?" "How can one explain the daily behaviour of the Sun knowing nothing of modern astronomy? Where does the Sun hide in the dark time?" To explain the reason for Silbury Hill and its existence, folklore and mythic records hint to us how prehistoric mankind theorised about the daily passage of the bright Sun across the sky and its disappearance at night. I offer this hypothesis as the most likely reason they conceived the idea of constructing Silbury Hill more than four and a half thousand years ago to make a suitably large realistic thatched roof dwelling for the Sun deity to rest and recuperate during the dark time. The Egyptian stepped pyramid is reported to be the tomb of Pharaoh Djoser, an Egyptian divine person, a Sun deity.

I reasoned Silbury Hill was built to provide a suitably large place the Sun deity could enter from the Otherworld underneath and below mankind's world, to retire and rest there between dusk and dawn. It was a home for their Sun deity. Only its roof was visible above the ground in mankind's world, no visible doorway or passage entrance access to Silbury Hill was needed from mankind's world. No walls were required, no doorway, only a bright freshly renewed yellow straw thatched

roof to show the presence and position of the Sun god's overnight home. Constructed of chalk blocks in seven layers of drums in-filled with earth and rubble, the layers reach a height close to forty metres. Stepped terraces formed by each smaller drum built on top of the previous stage were filled with additional material to form smooth sloping sides. Eventually a purely geometric shape truncated conical appearance was achieved. The whole has a base diameter approaching 160 metres, a perimeter of seven furlangs. A flat top about 35 metres across is large enough to accommodate the Stonehenge ring of standing stones. The base circumference equates to two furlangs greater than Ireland's Knowth passage mound. The final appearance is that of a right truncated cone built of chalk blocks covered by a thin layer of earth with a volume close to 250,000m^3.

To achieve the final truncated conical profile, perhaps individuals each transported small quantities of chalk and earth filling to the site as a personal contribution towards the creation of a home for their Sun deity, now recognised as the largest man-made Neolithic mound structure in Europe, the Sun calendar followers' premier sacred site.

A Truncated Cone & A Truncated Pyramid

First of the major Egyptian pyramids, the Pharaoh Djoser stepped pyramid construction began in 2667 BC. Both ancient monuments observe the same layer on layer truncated design, the former based upon a circle, the latter on a rectangle. Both have strong associations with the Sun as a deity. It is considered the Silbury Hill design principles were the design basis for the Djoser pyramid construction commenced almost a century later. Pharaoh Djoser's stepped pyramid is situated in the Sakhara (Saqqara) necropolis south of Cairo. Work began about 2667 BC and was completed around 2648 BC. The stepped pyramid was founded on a rectangular base, the foundation first course measured 125 metres by 109 metres, a perimeter of seven furlangs.

Six layers of limestone rock cut into rectangular blocks rise reach a height of 62 metres. The stepped appearance clearly shows a layered general form, that of a rectangular based pyramid with a flat top. I posed the question, "Why should the builders of the first 'pyramid' at Sakhara construct a layered design with a flat top." I suggest the answer was demonstrated by Silbury Hill's designers almost a century earlier. Design principles adopted by Pharaoh Djoser's architect Imhotep were well suited to Egyptian abilities and sources of materials. Both ancient monuments have the same geometric layer on layer truncated design, the former based upon a circle, the latter on a rectangle. Both have strong associations with the Sun as a deity. Round Silbury Hill was built of cut chalk drums, the unique rectangular truncated Djoser pyramid was built of cut limestone blocks in six layers. Later centuries saw classically shaped square based Egyptian pyramids not truncated but with pointed apices, totally different geometric concepts formed of mass block construction. Egyptian archaeologists assert the stepped pyramid's principle purpose was to serve Pharaoh Djoser in the Afterlife. He was regarded as a Sun god and the pyramid was built to be his home in the Afterlife. Silbury Hill was the overnight home and resting place for the north-west Sun deity for all time. Two sets of very similar ideas link Silbury Hill and the Djoser stepped pyramid, basic geometric design principles and a Sun deity association.

Silbury hill today

Recent exploratory work on Silbury Hill by English Heritage consultants and contractors involved extensive excavations, tunnelling accompanied by much media speculation about burials and sacrifices. Nothing was found to support those wild theories. The very simplicity of Silbury Hill massive construct as a truncated cone with no special features is indirect support for my hypothesis the Hill was the overnight home of the Sun deity, accessed from the Otherworld below the world of mankind. There was no need for passages, walls or entrance doorways above ground level.

The Name *SILBURY HILL*; observe the Welsh word for 'Sun' is 'Heul' and a 'hill' is a good place to look at Sun's dawn light rays on a new day. Welsh for morning is 'bore', a short step to 'bury'. I opine the two syllables 'bury' and 'hill' point to a place name 'Morning Sun' or a close equivalent, a place to view the dawn sun's rays; which leaves the syllable 'Sil'; perhaps an English Ordnance officer recording the placename on his map sheet heard the prefix 'Sir' from the local Wiltshire person; "Sir, Bore Heul". In other words "Sir Bore Hill".

CHAPTER TWENTY :: ENGLAND'S SILBURY HILL & EGYPT'S DJOSER PYRAMID

SYNOPSIS

Silbury Hill in England is the largest man-made earthwork in Europe formed in the conical shape of a traditional round house but with no ground level entry, its suggested purpose was an overnight resting place for the Sun deity, accessed via an Otherworld entry below ground. Silbury Hill was constructed around 2750 BC in conical form; the Egyptian Djoser pyramid has strong symbolic Sun associations, layered design, rectangular pyramid geometric shape, similar linear distances. Records assert work on Egypt's first of the major Egyptian pyramids was commenced c.2667 BC and completed about 2648 BC.

ARCHAEOLOGY, LOCATION & GEOMETRY

Silbury Hill is situated in southern England a few miles from Stonehenge. A mystery that has intrigued many people for centuries, in its own right it is a remarkable work; the largest prehistoric man-made structure in the whole of Europe, comparable in size and design with the stepped pyramid at Sakkara in Egypt, built a century later.

Silbury Hill was built in the third millennium BC, Burl gives a date of 2750 BC, an assessment I have adopted, an even earlier date is quite possible. An aspect of Silbury Hill's location in relation to Avebury and the Sanctuary deserves discussion. Three sites, Silbury Hill, Avebury, the Sanctuary, land contours and geographical characteristics point to an intention to determine Silbury Hill, Avebury and the Sanctuary at the corners of a triangle. Waden Hill is natural high ground feature inside the triangle, well above the elevation of three corners. Only when an observer stands on the top of Waden Hill can all three corners be seen simultaneously. Understanding the geographical and symbolic significance of the entire area enhances one's appreciation of the properties of the Sanctuary, Avebury and Silbury Hill. Ordnance Survey Department nineteenth century scaled maps of the area make it clear there were no other topographical or man-made features. The hypothesis is advanced Silbury Hill was the overnight resting location for the solar deity. The construction of Ireland's Newgrange passage mound c.3200 BC dedicated to their Sun deity, Silbury Hill c.2750 BC and the Pharaoh Djoser stepped pyramid begun about 2667 BC and completed about 2648 BC; all three have strong associations with the Sun deity. It can readily be appreciated the inhabitants of Egypt sought a unique Afterlife pyramid home for Pharaoh Djoser. There was one major difference between Silbury Hill and the Djoser stepped pyramid; the former was conical, the pyramid a rectangular form.

A Truncated Cone & a Truncated Pyramid Two ancient monuments, Silbury Hill and the Djoser pyramid observe the same layer on layer

truncated design, the former based upon a circle, the latter on a rectangle. It is considered Silbury Hill design principles were the basis almost a century later for the Djoser pyramid constructed on a rectangular base; Djoser foundation first course measures 125 metres by 109 metres; five layers of limestone rock cut into rectangular blocks rise a height of 62 metres. The stepped appearance clearly shows a layered general form, that of a rectangular based pyramid with a flat top.

Posing the question, "Why should the builders of the first 'pyramid' at Sakhara construct a layered design with a flat top." I suggest the answer was demonstrated by Silbury Hill's designers a century earlier. Design principles adopted by Pharaoh Djoser's architect Imhotep were well suited to Egyptian abilities. Both ancient monuments have the same geometric layer on layer truncated design, the former based upon a circle, the latter on a rectangle. Both have strong associations with the Sun as a deity. Round Silbury Hill was built of cut chalk drums; the unique rectangular truncated Djoser pyramid was built of cut rectangular limestone blocks in layers.

Egyptian archaeologists assert the stepped pyramid's principle purpose was to serve Pharaoh Djoser in the Afterlife; he was regarded as a Sun god and his pyramid built to be his home in the Afterlife. Silbury Hill was the overnight home and resting place for the north-west's Sun deity for all time. Two sets of very similar ideas link Silbury Hill and the Djoser stepped pyramid, basic geometric design principles and a strong association with a Sun deity. Later centuries saw classically shaped square based Egyptian pyramids not truncated but with pointed apices, different geometric concepts formed of mass block construction.

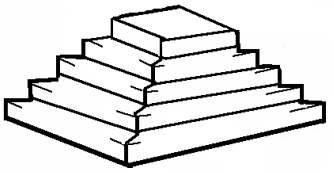
Symbolism

The literature asserts the original base perimeter of Djoser's pyramid is estimated to have been {[125+109]x2}=468m, a dimension that very closely equates to seven *furlangs*, seven times the 68.4 metres height of the Long Man of Wilmington in Sussex, England. The difference of only about 12m in seven furlangs, about 2%, regarded as another indication the Egyptian's regarded their site as an equally sacred place linked to regal qualities, heavenly, the same symbolic traditions as Silbury Hill.

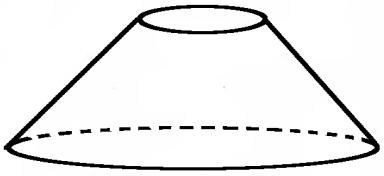
EGYPT'S MIDDLE KINGDOM

Egyptologists attribute the establishment of the Egyptian "Middle Kingdom" to about 1900 BC following the world-wide apocalyptic experiences two centuries earlier. The Moscow Papyrus as it is known has been dated about 1890 BC, a scribe recorded twenty-five mathematical examples linked with practical day-to-day arithmetical matters and significant geometrical problems. Problem 14 concerned the volume of the frustum of a square pyramid. Laid on a square base with sides of 4 linear units, the height was 6 units and the flat square top had sides of 2 units. The Papyrus quoted the answer as 56 cubic units, which is precisely correct.

Clearly the Egyptians had knowledge of mathematical formula to compute the frustum volume of a truncated geometric figure. About 1650 BC, scribe Ahmes copied further accumulated mathematical



STEPPED PYRAMID



SILBURY HILL

information from earlier records. The 'Ahmes Papyrus' as it is known described a ten-based counting system, fractions, multiplication and is said to include tentative approaches to geometry, trigonometry and possibly algebra.

Egypt Today

Egyptologists opine the Pharaoh Djoser stepped pyramid was the first very large man-made construct as they seek to maintain visitor numbers to Egypt, an aspect of advocacy by their tourist industry offering only a single point of view. Visitors may not be aware of the significance of Silbury Hill as it relates to the Djoser stepped pyramid. Both possess the same mythological Sun deity association and both have the same structure, a flat top layered geometric design and strong Sun symbolism.

SILBURY HILL: Today's English Heritage Excavations

Recent exploratory work on Silbury Hill by English Heritage consultants and contractors involved extensive excavations, tunnelling accompanied by much media speculation about burials and sacrifices. Nothing was found to support those wild theories. The very simplicity of the massive construct as a truncated cone with no special features is indirect support for the hypothesis Silbury Hill was the overnight home of the Sun deity, accessed from the Otherworld below the world of mankind. There was no need for passages, encircling walls or entrance doorways above ground level.

Physical Features

Based on a circular concept; the base perimeter of Silburt Hill measures seven furlangs and the mound has a side slope of 33° , both are well established symbolic prehistoric values, the value thirty-three symbolically indicative of the highest, most sacred and heavenly.

My Brython Measurements table relates Silbury Hill's *staen* perimeter length equals the Avenue 2¼ kilometres, one *staen,* one megalithic mile, a country mile-

BRYTHON MEASUREMENTS table

One 'finga' ≈ 27 millimetres, diameter of Monkton Farleigh barrow gold disc.
Five 'fingas' ≈ one 'fist', 133 millimetres.
Ten 'finga' ≈ 275 millimetres, the Stonehenge perimeter footsteps length, 360 degrees.
2½ 'fists' ≈ 'fut', 333 millimetres, Stukeley's "Celtic foot", 1/3rd metre.
2½ 'fut' ≈ 'ford', 830mm, a step forward, Thom's "megalithic yard".
2½ 'ford' = 'faethm', 2.07 metres, Prof. A. Thom's "megalithic rod".
33 'faethms' = 'furlang', 68.4 metres, Long Man of Wilmington's height, a furrow length.
33 'furlangs' = 'staen', 2¼ km = 1.40 statute miles, "a country mile".

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CHAPTER TWENTY-ONE :: STANTON DREW SOMERSET, ENGLAND

"We may be well assured that this whole countrywas well inhabited by the antient Britons."

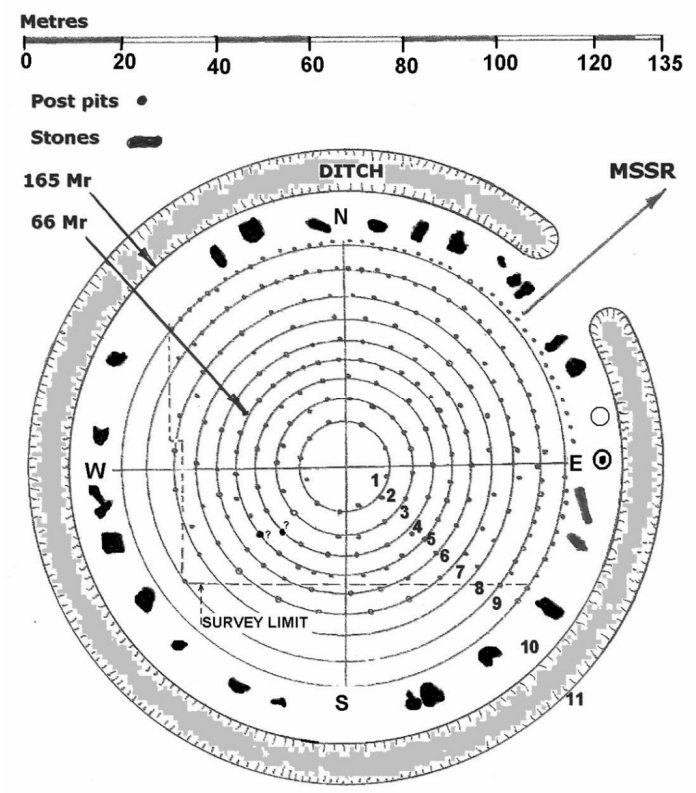
William Stukeley, *Itinerarium Curiosum*, 1776

SYNOPSIS

The decayed remains of more than three hundred and fifty timber posts were discovered in 1997 by a Somerset team of English Heritage archaeologists, a date of the massive timber building has been estimated between 3200 and 2500 BC. Nine concentric rings of posts, the largest a diameter close to 92 metres, the numbers of posts, the spacing and numbers has enabled me to conclude the building was the earliest Sun and Moon calendar building in Britain. Posts in rings one, two and three lend themselves to forecasting the Saros lunar eclipse cycle of 18.03 years and the 19 year Meton cycle when the heavens return to the same place on the same date of the year. The posts of rings four and six match the numbers required to tally the Sun calendar of sixteen months. All 354 posts in nine rings plus a second count of eleven posts in ring one equal 365, the days a year. More research is needed to more soundly establish any further number between posts 354 and 365 posts.

Major & Minor Standing Stones

For many years, three rings of standing stones have intrigued thousands of visitors to the ancient monument at Stanton Drew in Somerset, England. The central feature, the Great Circle is one of the largest in the country, a ring of twenty-seven standing stones about 113 metres diameter lies within an extensive grassed area. To the north-east, some 50 metres distant, is a smaller group of stones. Remnants of an avenue of stones from the Great Circle approach the north-east ring. At a distance of about 200 metres to the south-south-west is a third ring of ten stones, one third the size of the Great Circle ring. The entirety of this ancient site dating from the late Stone Age is an indication of its importance and primary significance in the life of the communities living in south-west Britain at the beginning of the third millennium BC. Antiquarian John Aubrey visited the site and mentioned his experience in his AD 1664 diary. Dr William Stukeley published a plan of the stone rings in AD 1776 following his visit to see the great standing stones. Folk tales originating in Christian times attribute mysterious pagan rituals to the stones; it is said the Devil lured a wedding party and their musicians to Stanton Drew on the Sabbath, the day when the Church of England forbade Sunday marriage ceremonies. Their sinful celebrations and dancing ended when the Devil turned the wedding party's three groups into stones - the Great Circle, avenue and North-East circle, the South-West circle [not shown].



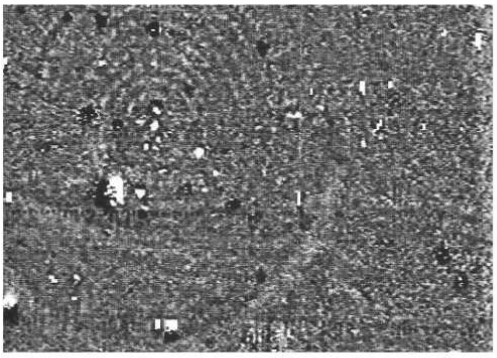
STANTON DREW c.2900 BC

ENCIRCLING DITCH, GREAT STONE CIRCLE, POST PITS

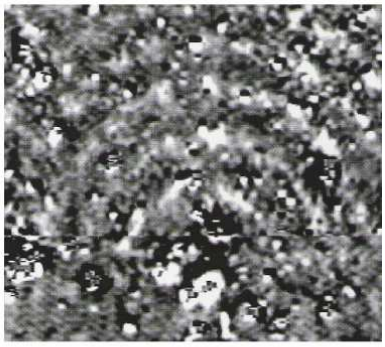
© Author 2007. Reconstruction of the Stanton Drew ancient monument assembled from various sources

Within & Without

In the autumn of 1997 an English Heritage team of archaeologists from the Ancient Monuments Laboratory made a magnetometer survey investigation for underground anomalies in the vicinity of the Great Circle. A magnetometer survey technique does not affect any archaeological evidence or its existence, whereas the more usual excavation techniques destroy the site forever. They found a wholly unexpected and extensive zone of underground anomalies within the Great Circle, the existence of which was previously quite unknown**.** Concealed under pasture, the survey revealed nine concentric rings of post pits, ranging in diameter from 19.5 metres to 92 metres. Some individual post pits appeared to be up to one metre diameter, spaced apart by the same amount. Beyond the nine post pit rings, the Great Circle of twenty-seven standing stones was supplemented by a find of two additional stones at the eastern segment of the circle. The survey results also showed a wide outer ditch surrounded the Great Circle, seven metres wide and 136 metres outer diameter. Typical of many henge monuments of that period, there was a broad gap in the encircling ditch facing the direction of midsummer sunrise, the direction of the avenue leading towards the north-east ring of stones. Centuries later, Woodhenge and Stonehenge had the same fundamental alignment design elements. The considerable importance of the magnetometer survey results led to a second survey in October of the nine post pit rings, this time using the latest caesium gradiometer survey equipment. Significantly improved definition of the nine concentric rings of anomalies was obtained. The September 1997 magnetometer survey revealed the presence of anomalies; a radio-carbon laboratory analysis and other processes are required to properly date the site.



Magnetometer survey



Caesium survey

Hopefully a future excavation exploration to recover pieces of carbonaceous material will enable an accurate date to be determined for the construction of the massive structure.

The Survey Evidence

Dr Andrew David of the English Heritage Centre for Archaeology, Portsmouth, kindly provided me with photocopies of the September magnetometer and the October caesium gradiometer surveys. These I have examined with great care. The caesium plot embraced the north eastern 80% of the area within the Great Circle of standing stones. Portions of both plots are illustrated. The team reported their mathematical analysis of nine rings of anomalies, from which they concluded the diameter of the innermost ring was 19.5 metres and the ninth ring 92 metres. It therefore followed all nine rings were probably timber post pits; the form and nature of any above ground timber structure is the subject of speculation. However, it is highly probable it was a very large roofed round house, built in the manner similar to the community's own domestic dwellings of those days. Clearly a great effort by the entire community would have been required to build such a large structure with more than three hundred and fifty posts, a thatched roof and any ancillary structures.

Following our correspondence, I attempted several post pit interpretation methods in order to assess the post pits comprising innermost ring one. As one seeks to interpret the white and grey smudges against the black background of the survey plot, there is a mental and visual tendency to include a marginal smudge or ignore another when endeavouring to estimate post numbers. For that reason and to achieve statistical accuracy, I made several assessments of each ring of smudges spread over successive months in 1998. Allowing a time lapse between each interpretation meant that on each occasion, I was able to achieve a fresh look at the evidence. Satisfactory results were eventually accomplished. The first step was to find a common centre point for nine rings of posts. Next, based upon that common centre, nine concentric circles were drawn to best approximate the rings of more notable white blobs on the survey plot.

Commencing with the innermost ring one, clearly defined white anomalies shown on the greyscale plot were marked on each drawn circle. The same technique was followed for rings two, three, four, five, six, seven, and eight and finally for rings nine. Attempts to delineate clearly evident rings, of the numbers of posts in each of the nine rings, eventually had a welcome degree of success. Post pits in rings one to four were examined in turn and the numbers of pits estimated and

recorded. An average pit spacing calculation, quadrant by quadrant, was cross checked against the entire ring average spacing to eliminate discrepancies or errors. Once a firm average spacing had been established, the presumed positions and numbers of posts pits in that ring were re-checked against the average value. The process was repeated on separate occasions a number of times until discrepancies were eliminated and consistence achieved. English Heritage was unable to survey the western and southern portions of the five outermost rings, an omission which should be rectified as soon as reasonably possible. For the present, I have made a limited extrapolation of the post pits in rings five, six, seven, eight and nine on the basis of known post pit numbers, the average arc length and spacing between post pits in each ring. The surveyed portions of rings five to nine served as a firm basis for calculating average spacing, which space values were applied to the un-surveyed western and southern arcs. The result of these calculations is portrayed in the illustration below where filled black circles show the post pits deduced from visible anomalies on the survey. The open circles indicate estimated post pit positions. Estimated numbers of post pits in each of the nine rings are: -

STANTON DREW

Nine post pit rings drawn Author 2005

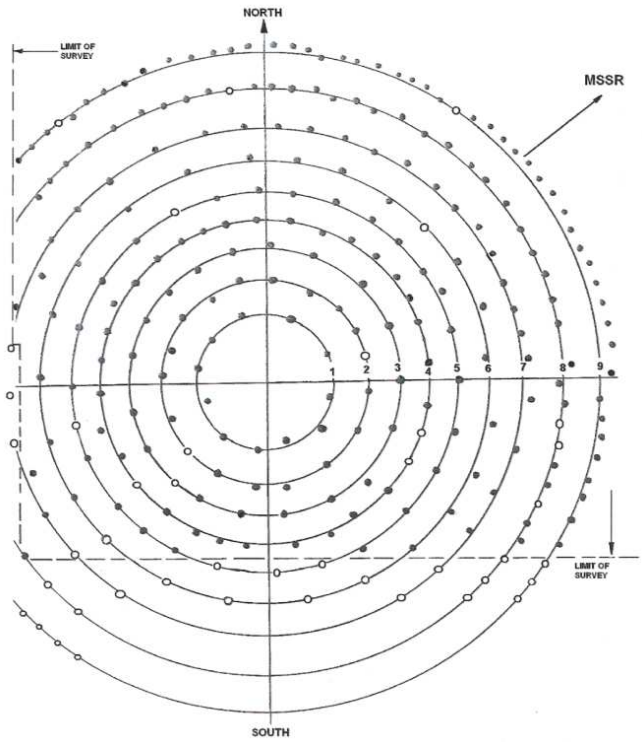
Open circles = Assessed positions Filled circles = Survey positions

Observe Saros eclipse cycle rings one 11 + two 18 posts, Meton cycle ring three 19 posts.

Ring No. 1 2 3 4 5 6 7 8 9

Post Pits 11 18 19 32 27 24 40? 78? 105?

The core of matters under consideration is is the number of posts in each ring. Matters become more complex from this point as I explain my development of the Stanton Drew Sun and Moon calendars hypotheses. A future archaeological excavation may be conducted and proof obtained to support my assessed post hole counts.



Astronomy students will recall exactly 223 lunar months elapse between occasions when the Sun, the Moon and the lunar cycle nodes return almost to the same relative positions. A partial lunar eclipse happens when the Moon, the Earth and the Sun are in alignment, an event that occurs every 6585.32 calendar days, or nights if you prefer. This elapsed time for 223 full Moons is 6585.78 solar days, eighteen tropical years, and eleven and one third days. I consider there were eleven significant posts in rings one and two of eighteen posts. The Moon eclipse cycle was reportedly known by the Babylonian and Chaldean astronomer Saros some time before 1000 BC. References name this lunar

phenomenon the "*Saros lunar eclipse cycle*"; a count of posts and spaces in rings one and two enabled the Saros eclipse cycle to be observed, recorded and the next event to be forecast. A tally of passing time could be kept to provide a means of forecasting the next lunar eclipse, eighteen years and eleven days after the last occasion. Two centuries before Stanton Drew was constructed, the ring of fifty-six Aubrey Holes was excavated at *Stone*henge about 3100 BC. Four counts around the Aubrey Holes fifty-six positions, 223 forward moves, equalled the 223 full Moons between eclipses. I concluded the (Saros) Moon Eclipse Cycle was well known to the builders of Stanton Drew ancient monument about 2900 BC. Five centuries later, Woodhenge was constructed c.2400 BC with eleven posts in ring one and eighteen posts in ring two. A century before that, Stonehenge was erected with five trilithons and nineteen bluestones at the centre, this horseshoe arrangement enabled a count of forward moves between standing stones to achieve counts of eighteen and eleven. 'Saros' was alive and well known in the third millennium BC at Stanton Drew, Brython.

In the same manner, after a careful selection of white and grey smudges against the dark background during repeated analysis attempts, I eventually concluded ring three comprised nineteen post pits. Nineteen (tropical) calendar years of 365.2422 days equals 6939.60 days. The passing of 235 lunar months of 29.53059 nights equals 6939.69 nights, a difference of only 0.09 days or a couple of hours. As a sequel to the lunar eclipse properties of rings one and two, it appears likely ring three of nineteen posts was intended as a prediction device anticipating the return of the heavens to the same place on the same calendar date. Woodhenge also had nineteen posts in ring three; Stonehenge had nineteen bluestone columns within the trilithons arrangement. Named *Meton Cycle* when the heavens return again nineteen year later to almost the same position they occupied before was named for the Greek astronomer Meton who reported the phenomenon in 432 BC. Nineteen was also the number of basic days every month, three weeks of five days and one short week of four days. A count of the intercalary days in sets of three, four and five complemented the yearly tally of passing days. These several heavenly phenomena were known in western Europe several millennia before Saros and Meton dwelt in Greece.

The Sun Calendar Months: Ring Four, Thirty-two posts, Sixteen Arches

On the basis of thirty-two post pits counted in ring four, it has been assumed they were joined by cross beams about five metres long forming sixteen pairs of posts. Sixteen Sun calendar months could have been identified on those lintels. Each odd numbered month archway may have been adorned with seasonal decorations; Summer could have had garlands of summer flowers, Llew at harvest time sheaves of barley or spelt wheat. Sprays of yellow and brown Autumn leaves adorned the arch at that time of year. Samain (Halloween) may have had sepulchral symbols, maybe ghosts and hobgoblins. Winter in recent times has seen the use of holly branches as a colourful decoration. Imbolc and lambs' fleeces may have recognised the imminent arrival of the lambing season in the eleventh month. In Spring, branches of newly formed sticky chestnut buds and green leaves may have adorned the thirteenth month archway. At Beltane, the fifteenth month, perhaps the arch was festooned with branches of white May blossom. One apparently missing post pit has been included, shown by an open circle. The survey illustration showed a white blob anomaly in that particular place, possibly caused by recent sub-surface disturbance. Durrington Walls southern circle ring four

also had thirty-two posts, sixteen pairs. Woodhenge ring four had sixteen massive posts; there were sixteen pairs of sarsen columns at Stonehenge. Sixteen months a year was the norm.

Ring Five, Twenty-Seven Posts

Ring one was probably the circumference of a central atrium open to the blue sky. Spectators could glance upwards to the heavens and witness white clouds skidding past against a blue background. Skeins of high-flying swans honking overhead may have evoked prayers from the congregation assembled below. The actual numbers of pits are considered reasonably certain, but why that particular number was chosen raised an important question. Ring five is thought to have been the apex of the roof, a circular ridge to a height of 15 metres above ground, comprising twenty-seven tall mature oak tree trunks about 400 to 500 years old. Observe ring five is midway between the innermost ring one and the outermost ring nine. It has a diameter between 55 to 60 metres, post were spaced approximately six to seven metres apart around a circumference of about 200 metres.

As an engineer I concluded twenty-seven posts of ring five had a purely structural engineering purpose, serving as supports for massive roof timbers and heavy thatch after wet weather ring five was required to afford strong structural support for the apex ridge line, essential for the stability of the entire building. Very tall posts were needed. The height of roof support timbers from ground level to the apex ridge required an intelligent solution. From the circular ridge line, it is presumed the roof sloped downwards in both directions until it reached ring one and ring nine perimeter posts of say two metres height. A sloping roof thatched with straw sloping at 30^0 supports my assessed post hole counts from ring five down to the outermost ring nine posts, the same from five to innermost ring one would required a ridge line elevation about 15 metres above ground level and 18-20 metre tall posts.

Consider an alternative case; had the roof sloped outwards and upwards at 30^0 from ring one, until outermost ring nine was reached, the height of support posts above ground would have been more than 25 metres, far too high for practical reasons. Not only was a height of 25 metres above ground needed but also an additional five metres or so would have been required to place posts in foundation pits to ensure stability of the entire structure. The availability of twenty-seven extremely tall oak trees of sufficient girth and height in southern Britain at that time is doubtful. Straight thirty metre tall oak tree central trunks of substantial girth are very rare. To find and fell twenty-seven 30-35 metre tall oak trees would have been almost impossible. Other less durable tree varieties were not acceptable propositions.

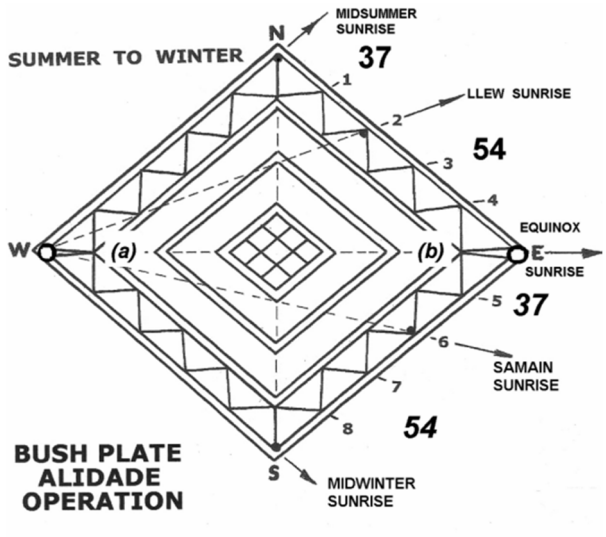
It has been concluded ring five was the roof ridgeline; the thatch sloped down to the inner and outer post rings. The total architectural and engineering design for such a magnificent building deserves special commendation. Twenty-seven posts in ring five proved difficult to assess in terms of a calendar function and was not pursued. When more accurate survey data provides an exact number, the purpose of ring five as a calendar element can be re-assessed.

Ring Six, Twenty-four Post Pits; the days/month

Resuming the posts count, to achieve a sixteen month calendar, the solar year of 365 days may be halved once and then halved again to make thirteen months of 23 days and three of 22 days. If for any reason, one summer month is increased to 24 days, then another shorter 22 day winter month is required. Ring Six of twenty-four post pits, twelve post pairs joined by a lintel was presumably a

count of the 12th and middle days each occasion of mid-summer sunrise midwinter sunset at the solstice. Equally, ring six may also have tallied the days every month, distinctions made between twenty-two, twenty-three or twenty-four days a month according to the season. The psychological reason to vary the number of days each month at Stanton Drew is explained in chapter 23 of my 'Irish Symbols 3500 BC'; Knowth kerb stone K15 showed twelve 'day' rings counted twice each month. A tradition that began before 3500 BC in Ireland continued to Stanton Drew and through the centuries to Mount Pleasant c.2400 BC, where ring two had twenty-four posts, and twenty-four posts in ring three at Durrington Walls, c.2400 BC.

The presumed method of counting a month of four weeks of five days plus two, three or four intercalation days is simple: - "Commencing at any particular chosen post number one, the first five-day week in Summer month was tallied on the first group of five posts. Following on, second, third and fourth weeks were counted until the twentieth day. At that time, if it was Summer and the first month of the year, perhaps four more intercalary posts were counted, a 24 day long month. For the next several months only three intercalation posts were tallied, months two, three and four, each of 23 days. When the cold season arrived, Winter month with only 22 posts were counted. It was made to seem the cold months passed quickly."



Rings Seven, Eight & Nine, the Moon Eclipse Cycle? The post pits count of rings seven, eight and nine are open to question. Considerable un-surveyed arc lengths of each ring meant the accuracy of counting pits was somewhat less than the counts of rings one to five. Nevertheless, on the basis of arc lengths and average spacing, in general terms post pit numbers are believed to be approximately 7th = 40, 8th = 78, 9th = 105 posts, a sum of 223 post pits, the eclipse cycle between full Moons.

If these numbers are reasonably correct, it is significant to observe the sum of post numbers in rings seven, eight and nine. At this stage of the Stanton Drew exploration, and until further archaeological work is conducted, this could have been another facility to count the 'Saros' lunar eclipse cycle of 223 lunar months between eclipses.

Rings One to Nine

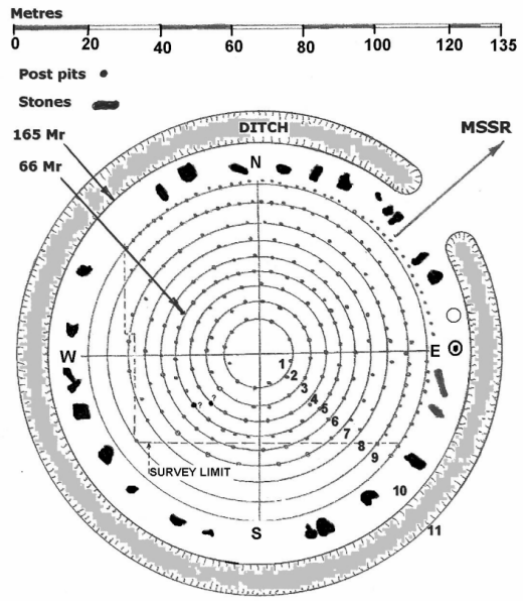
The sum of all the post pits from ring one to ring six is 131. Rings seven to nine are estimated to comprise 223 posts. Hence the total of all the Stanton Drew posts is probably 354, which equals the days or nights in a Moon year. Chapter 7 'Coligny Plaque', describes the Moon calendar in full detail about three thousand years later with the same features. Stanton Drew was probably and primarily a Moon calendar permitting a tally of Moon months and eclipse cycles. The exceptionally large ancient monument also enabled a tally of the Sun calendar days and months accomplished on post rings four and six.

FURTHER CONSIDERATIONS

You will appreciate the tremendous difficulty making assessments of the post numbers when estimates are based upon the caesium and magnetometer techniques. Such large numbers of post evidences, their magnetometer and caesium signal response variability has meant post positions and number estimates are open to question. The discussion on these pages is a second attempt following very clear uncertainties on the initial attempt. Principal concern revolved around rings one, two, three and six. Ring one posts may have numbered twelve and ring two just twenty, a sum of thirty-two, twice the months of a Sun calendar year. It is supposed rings one and two posts were paired as months one to sixteen. Ring two may have counted four weeks of five days, the monthly basic days in a similar manner to Mount Pleasant. Rings five and six may have numbered 27 and 34, a total of 61, the same as the intercalary day counts at Woodhenge and Stonehenge. These alternative numbers sum to 365 posts, the days in a Sun calendar year. These and other questions remain open until better data is provided following a newer excavation survey.

The Bush Plate Alidade, this reproduction left is illustrated to accompany the Stanton Drew Great Circle stones illustration. The four solar and quarterly events of the ancient calendar year and their azimuths were shown to be at 37 and 54 day intervals, 91 days each quarter of the year, eight events a year Midsummer dawn azimuth is tangential to the North-East circle. The next event 37 days later was Llew or Lugh, the harvest festival. A sunrise alignment from the centre of the monument passed through two stones shown black, the Llew festival. A further 54 days elapsed until dawn on midsummer's day, the due east alignment of which was determined by the open circle with a central dot, one of two newly discovered stone positions found in 1997.

The sunrise azimuths at Samain, midwinter sunrise and Imbolc almost touch three stones of the Great Circle. Samain may have been marked by a tangential alignment touching what appears to be a fallen stone. Midwinter dawn azimuth passes close to a Great Circle stone. The Imbolc azimuth, 37 days later, is almost tangential to another Great Circle stone. From Imbolc to Spring, followed 54 days later, due east of the centre point. As is often the case with standing stone rings of great antiquity, the present positions of tilted or fallen stones may differ slightly from the original placement intended. For that reason, I attribute little importance to slight discrepancies revealed by the illustration azimuths.



My interpretations are based upon the north alignment provided on the English Heritage survey plans and any small discrepancies in the interpretations may have arisen due to an error between the true north direction and that given by the survey plan. It seems evident the Great Circle stones, their numbers and design positions enabled four solstice, equinoctial and the quarterly festivals to be observed, eight events during the year. To select

which was the first month of the Stanton Drew Sun calendar was simple and straight-forward. From the Great Circle of standing stones, the Avenue leads to the north-east, coinciding with the bearing of sunrise at the midsummer solstice. The ditch and embankment causeway entrance was also in the same direction, a bearing of north 50^0 east.

On that basis I concluded the first month of the Sun calendar was Summer. Summer month and outer perimeter post pits did not reveal any perceptible magnetometer survey evidence to suggest a pair of extra large diameter doorway timber posts in the dawn direction at that portion of ring nine post pits circumference. If a timber archway portal existed at Stanton Drew, its discovery may have to wait for further field exploration. Two elongated Great Circle stones each side of midsummer sunrise azimuth could possibly have been part supports for an archway or portal entrance.

THE BUILDING, CONSTRUCTION AND DATE

The construction date quoted by English Heritage for the timber Stanton Drew calendar building lies within the range 3200 BC to 2500 BC. Until English Heritage is able to offer a calibrated radio-carbon date assessment, for the purposes of discussion I assumed a mean date of 2900 BC, placing Stanton Drew roughly midway between Ireland's Knowth 3500 BC and other calendar buildings constructed elsewhere in Britain later in the third millennium BC. Recognising there may be arguments both for and against the idea of a timber post building constructed above ground level complete with thatched roof and entrance porticos, I am however firmly of the opinion that such was the case. It seems barely credible to suppose the builders erected nine rings of individual short posts without adding a roof to preserve the structure. My observations concerning ring five are pertinent in support of the argument for a roofed building. The total number of post pits from ring one to ring nine demonstrates the vast community effort exerted to construct such a large 'calendar temple'. Large trees from nearby forests had to be felled and trimmed, transported across country by bullock teams or by sled and rollers to the site. An equal amount of timber was required for roof beams and rafters. The roof thatch itself was a very large project that probably required straw from a succession of harvests. Based upon architectural and engineering considerations, I estimate five or more building seasons would have passed between the commencement and completion of the building.

As a passing observation, the 92 metre diameter of the Stanton Drew timber building plus the outer Great Circle of Stones about 110 metres diameter, even the 10 metre wide ditch beyond with a diameter of 135 metres, places Stanton Drew directly comparable with the 40 metre high man-made mound of Silbury Hill, c. 2750 BC, the base of which has a diameter close to 165 metres. Stanton Drew was much larger than later calendar buildings having similar design principles such as Mount Pleasant, Stonehenge, Woodhenge and Durrington Walls. As such it demands further research and archaeological examination in the near future.

In the tradition of categorising ancient buildings by their circumference measured in furlangs, the outer edge of the encircling ditch at Stanton Drew is close to six furlangs, one less than the seven furlangs perimeter of Avebury's ring of ninety-nine sarsen columns.

What's in a name? Stone street in Kent, Stane street in Sussex, Stonehenge in Wiltshire, Stanton Drew in Somerset; *staen distance measures* at these locations tell me an amount of more archaeological work should be done to reveal Stanton Drew's full potential.

CHAPTER TWENTY-TWO :: ARMINGHALL & GRIME'S GRAVES, ENGLAND 3100 BC

"Sey forth thy tale, and tarry not the time." Geoffrey Chaucer, AD 1340-1400

Eight tall timber posts equate to eight festivals every year.

SYNOPSIS

A ditch and bank henge structure and eight timber posts were built about 3100 BC at Arminghall in Norfolk, England. Eight large posts were arranged within an oval whose major axis was the midsummer sunrise to midwinter sunset alignment. Faced towards the south-west, two posts were positioned with a wider than average space between, a unique design feature. The oval orientation of the eight post positions, linked with the midwinter solstice direction, established a north-east to south-west axis of the monument. Stanton Drew, Woodhenge and Stonehenge incorporated the same directions. Astride the monument's axis, posts on the north side could be equated to four markers for the two equinox and two solstice events in the Sun calendar. On the southern side of the axis, the second set of four posts could have served the purpose of marking the quarterly festivals. These eight annual events were integral to the ancient Sun calendar, dates identified in different ways at calendar building sites elsewhere.

For example, an individual petroglyph feature on Knowth stone K 15 comprise a long line alongside eight hoop symbols, interpreted as the two solstices, two equinox and the quarterly events, eight principal happenings every Sun calendar year. I am unaware if any other associated Sun calendar indications have been found at Arminghall or the surrounding area, its status and design match other Sun calendar buildings such as Knowth, Newgrange, Loughcrew, the Aubrey Holes at Stonehenge, the *Stendysser* in Denmark and *Le Grand Dolmen* in France. Many communities bordering the North Sea and Irish Sea clearly observed similar Sun calendar practices in those far off days, nearby Grime's Graves flint mining area of nearly forty hectares was a substantial industrial enterprise worked between c. 3000 and c. 1900 BC; production continued well into the Bronze Age.

ARMINGHALL

Wing Commander Insall of the Royal Air Force was flying his bi-plane in the vicinity of Norwich and surrounding area of Norfolk at an altitude of 2000 feet on June 12th 1929, looking over the edge of the cockpit towards the ground below, he observed dark ring patterns in the vegetation. This discovery followed his earlier recognition of the Woodhenge location some years before. It was later reported the outer ring [henge bank] marking was about one hundred and fifty feet diameter. Arminghall site is close to the course of the river Yare and adjacent to Whitehorse Lane, two kilometres south of the city of Norwich, north-west of Arminghall village. The proliferation of burial barrows and other Neolithic monuments in the surrounding area indicates Arminghall was a relatively important sacred site at the end of the fourth millennium BC; extended occupation periods are indicated; population numbered more than just a few families farming the surrounding areas and fishing in the rivers Tas and Yare.

By the summer of 1935 arrangements had been made to investigate the site by the then Mr Graham Clark, later Professor J G D Clark of Cambridge University Department of Archaeology &

Ethnology. An assembled team of archaeological workers excavated the site. Their work is reported in the 1936 paper to The Prehistoric Society. The central feature of the ancient monument had originally consisted of eight massive timber posts, each about three feet diameter, arranged in an oval. The flat central area was about 120 feet across, beyond that a 30 foot wide and 7 to 8 feet deep ditch had been excavated with an opening towards the south-west in the direction of mid-winter sunset. Beyond the inner ditch an embankment had been formed of soil and gravel, now almost depleted due to farming activity over the ages. Outside the embankment was a second but shallower ditch. Many centuries of intensive farming practices had obliterated any evidence on the west side of the ancient monument.

Survey results are illustrated, omitting only outlines of the actual rectangular area excavated and the sloping sides of post holes. The archaeological paper listed numbers of Neolithic artefacts, pottery, flint implements and the like. Subsequent to the main excavation work at the site in 1935, post pit samples taken in 1963 enabled a radio carbon C_{14} date to be determined, BM-129, 2490 +/- 150 years BC. Corrected by the requisite calibration period, the actual date of the ancient monuments construction is estimated to have been close to 3000 BC. Posthole 7 afforded the remains of a tree estimated to have been 120 years old when felled. Whether the eight post structure was roofed to protect it from deterioration due to weather and rot is not known, although it seems likely it was an oval building constructed in that manner to ensure its longevity. One can envisage an enclosed thatched roof building surrounded by walls formed of wattle and daub, or then again perhaps there were open spaces between the posts that would have allowed observers gathered on sloping sides of the embankment to have an excellent view of ceremonies conducted within the calendar temple building. From the posts plan oval arrangement and the wider opening between the pairs of posts nearest the south-west, it seems probable a portal opening framed that direction towards midwinter sunset.

The Design

Choosing the more obvious and straightforward features of the site, an attempt was made to reconstruct the designer's original intentions. The most obvious feature is the axis alignment north-east to south-west; midwinter sunrise to mid summer sunset, north 50^0 east, to west, 230^0. The wider opening between the south-west pair of posts in the direction of midwinter sunset, across the inner ditch and causeway confirm this aspect.

HENGE & POSTHOLES Drawings Author 1980 *sorry folks – the drawings were lost somewhere*

Simplified drawings show the post positions and geometry of the presumed design. Superimposed on the clarified inner and outer ditches and the embankment, an ellipse was drawn around and tangential to the outsides of the eight posts. Of the eight posts, only the southernmost post was found to deviate by a small amount from the geometric oval. Its major axis scaled at 152 metres length and the minor axis 132 metres. Determining an ellipse perimeter by graphical means is the only practical technique, the length found to be forty-five and a half metres. Converting the perimeter metric linear value to *faethm* ancient measurement unit = 2.07 metres; the oval perimeter was found to be very close to 22 *faethms*. Recall in Chapter Eight Woodbury & Heathrow how I discussed Little Woodbury farmstead building design; the perimeter of the building also measured

22 *faethms*, thought to have afforded a degree of sanctity to the home, less than a full 33 *faethms* measure, nonetheless a statement of the Arminghall site's sanctity in the eyes of the designer.

The crest of the embankment between the inner and outer ditches appears to have had a perimeter length close to 66 faethms Mr [equal to Mount Pleasant], a means of symbolically defining a sacred area. An audience standing on the embankment inner slope would have had an excellent view of proceedings being conducted within the oval of eight posts.

More fully discussed in chapter 23, 'Lines & Angles', the designed features of Arminghall in this Chapter 22, chapter 28 'Morton' in Scotland, chapter 23 at Newgrange in Ireland, chapters 12 'Woodhenge' and chapter 17 'Stonehenge' both in England, also chapter 24 Denmark's 'Tustrup' in are shown to have included a midwinter sunset alignment, indicative of widespread long standing traditions and perpetuation through the ages.

GRIMES GRAVES

Situated a few kilometres from Thetford and Arminghall, Norfolk's Neolithic deep-shaft flint mining area known as Grime's Graves was in operation from about 3000 BC to roughly 1900 BC. Situated near Thetford and managed by English Heritage, visiting details can be seen on the website. Some 433 mine shafts are known, the miner's objective three flint strata twenty metres or more underneath the chalk overburden. Resembling solidified treacle, the excellent quality flint was knapped to produce a variety of tools and weapons.

Left:
Base of the mine shaft open to the public.

Right:
A panoramic view, four hundred pits.

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CHAPTER TWENTY THREE :: LINES & ANGLES

To hold firm against the dragon in *faethm* dephs," Beowulf AD 725
"Full fathom five thy father lies" Shakespeare, *The Tempest* AD 1610
"Half a league, half a league, half a league onward," Tennyson, AD 1855

SYNOPSIS

The Ordnance Survey Department maps of Britain show many straight roads and tracks labelled 'Roman Roads'. I question why the term is applied to those routes. Roman Legions undoubtedly marched along these routes for four centuries after AD 43 but ancient places on those routes existed long before the Legions arrived on Britain's shores. They are not spaced apart in Roman linear distances but a more ancient measurement system. Other matters concern fathoms, leagues and compass directions. Folktales and maritime stories of sailing ships, of adventure and sea shanties abound with those words. Their origins are obscure but I intend to show they began long before written references were recorded. The use of 'staen measures' have been found in Britain, Ireland, France, Germany, the Netherlands and Denmark, dated as long ago as the 4th millennium BC.

PREVIOUSLY

Alfred Watkins, in his 1925 book *The Old Straight Tracks* initiated early twentieth century public interest in his 'ley lines' theory. Watkins cited many instances where three or more ancient places in England were situated in straight lines. Opportunistic 'disciples' of the ley lines subject eventually brought the whole idea into disrepute and his original hypothesis concerning straight tracks was lost to view.

Firmly founded on his original work and freed from uncertainty and ill- founded concepts, I offer an extensively expanded assembly of new data concerning ancient Brython tracks. The fundamental idea of straight routes of great antiquity became a reality when I found Stone Street from Canterbury to Hole Hill in Kent, Stane Street in Sussex, also Highcliffe Castle in Hampshire to Stonehenge were surveyed in whole number units I have called *stean, country* or *megalithic miles* and *leagues*. Stone Street is 10 *country miles* 22.5 kilometres length. From Chichester to Dorking is 11 *megalithic leagues*. From Highcliffe on the Hampshire coast to Stonehenge is 49.65 kilometres in a straight line, 22 *country* or *megalithic miles*. Canterbury city boundary in Kent and Hindwell palisaded enclosure in Wales had a perimeter of one *megalithic mile,* enclosing areas that equalled Avebury henge.

Many other places adhere to the same rules. Sixty linear measures examples are tabulated at the end of the chapter. Another feature relates one ancient site to another by angular bearings based upon sixty-four divisions of a circle. Measures quoted in the Domesday Book of AD 1086 are discussed. King Edward the First of England decreed new standards of linear measures in AD 1305; inches feet and yards but apparently omitted *faethms*, *furlangs* and *leagues*. In 1795 the Academicians of Paris devised a system of measures based upon their newly determined length the *metre;* Emperor Napoleon spread the new measures across Europe during his military campaigns. I aver the Metric System *metre* equals three *Celtic feet*, the ancient linear '*fut'* or 'foot' measure.

LINES & ANGLES

Feet and inches, miles and yards, centimetres, metres and kilometres, turn left, turn right, half right, how far? These are matters of day-to-day life. How tall are you? How far is it to the town? Which direction? We ask these questions every day, but how did our forebears two hundred generations past answer these queries? After all, they mostly had to walk and if they took the wrong track it was a penalty in sweat and effort.

I am about to embark on matters that will undoubtedly give rise to considerable scepticism in the minds of some. My concern relates to the exercise of intelligence by those who came before us without the accumulated knowledge that blesses us in the twenty-first century. Yet it seems to me they applied the same amount of common sense to solve the problems they faced, much simpler problems, simpler solutions but equally important.

The State Library of Victoria

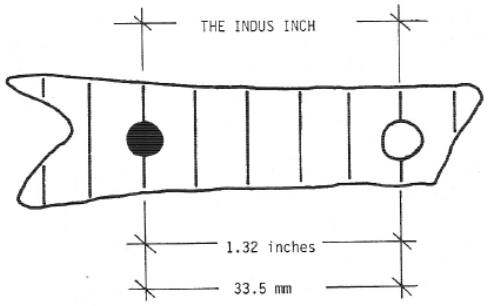
The State Library of Victoria possesses an almost complete set of one inch to the mile Ordnance Survey Department lithograph maps of Britain made early in the nineteenth century. A substantial proportion of O.S. six inch to the mile maps is also held. Much topographical information on these maps of southern England has been lost to view since the surveyors recorded what they saw two centuries ago. An explosion of building roads, houses and infrastructure in the two centuries since then has obliterated much evidence of an early countryside and its historic features.

Examination of these maps held by the Library, lithographed on paper made before chemical processes were employed in paper manufacture, allowed me to tease out evidences of prehistoric activity in southern England. My studies enabled me to compile over sixty instances of ancient tracks, each one carefully and accurately assessed. They show the Neolithic, Bronze Age and Iron Age inhabitants of ancient Britain used a *megalithic* [Alfred Watkin's term] system of linear and angular measures to establish the placement of stone circles, settlements, barrows and straight track routes. As I develop my case, first of all I ask you to consider a pointer here and there from more recent times. Summarising my researches of ancient routes sites and buildings showed the surveying abilities of ancient man in the British Isles during the millennia BC they were based upon a linear measurement values table from *Celtic feet* to *faethms,* to *country miles* and *leagues*: -

BRYTHON MEASUREMENTS table

One 'finga' ≈ 27 millimetres, diameter of Monkton Farleigh barrow gold disc.
Five 'fingas' ≈ one 'fist', 133 millimetres.
Ten 'finga' ≈ 275 millimetres, the Stonehenge footstep length.
2½ 'fists' ≈ 'fut', 333 millimetres, Stukeley's "Celtic foot" 1/3rd metre
2½ 'fut' ≈ 'ford', 830mm, a step forward, Thom's "megalithic yard".
2½ 'ford' = 'faethm', 2.07 metres, Prof. A. Thom's "megalithic rod".
33 'faethms' = 'furlang', 68.4 metres, Long Man's height, a ploughed furrow length.
33 'furlangs' = 'staen', 2¼ km = 1.40 statute miles, "a country mile".
2½ 'staens' = 'staen league', 5.65 kilometres.

Professor Alexander Thom concluded most ancient monuments he surveyed in the twentieth century employed two units of measurement; these he termed the *megalithic yard* of 0.829 metres and the *megalithic rod* of 2.07 metres. The relationship between the two units equalled 1:2½. Stukeley's 'Roman Prints' showed the 'Celtic foot' had a length of 332 millimetres. I observed this value, when multiplied by 2½, equalled 830 mm Thom's *megalithic yard*. This led me to conclude the Celtic foot was part of the same measurement system, also related by a 2½ multiplication factor. My perception of the 33 relationship between the *faethm*, *furlang* and *country mile* happened by chance. Observe the Old English terms *fōt* [pronounced close to 'foot'], *faethm*, [fathom]*, furlang* [furlong] are three linear units with phonetic consonance.



INDUS SHELL MARKINGS
Reproduction Author 1986
THE INDUS INCH

The ancient city Mohenjo-daro [mound of the dead] in the Indus valley of Pakistan was reportably inhabited during the period from 2500 to 1700 BC. The pre-Aryan inhabitants of Mohenjo-daro and those of nearby Harappa built their city buildings on the basis of a unit given the name the *Northern Foot*, ten 'Indus inches' of about 335 millimetres. Berriman described the shell fragment found at Mohenjo-daro in 1931 and how the 'Indus inch' [his term] was marked in five subdivisions. From the black dot to the open ring mark equalled 33.5 mm. The length between the black dot and the circle would not have been an easy task to measure accurately on fragile shell material.

Please do not place too much emphasis on Northern foot accuracy quoted in the literature. I do not wish to criticise the method of measurement nor the person who determined the value, however I should point out any slight inaccuracy of say plus or minus 0.20 mm in measuring the width of the first or sixth 'inch' line could materially change the basis of conclusions drawn from the quoted measure. For instance, if the value was actually 33.30 mm instead of 33.50 mm, then the measured value when multiplied by a factor of ten could result in a Northern foot of 333.00 mm, a value rounded off to 333 mm, ⅓ of a metre.

Sir Flinders Petrie, the renowned archaeologist reported one 'Indus inch' equalled two 'Sumerian *shusi'*. From which relationship one can show five subdivisions of the 'Indus inch' equalled two *shusi*. In the reverse direction, one *shusi* equals 2½ 'Indus inch' subdivisions, a significant arithmetical relationship ratio. The subjects of the Sumerian King Ur-Namu used the 'Sumerian foot' as the basis for the construction of the ziggurat of Ur in 2300-2282 BC. Their 'foot' had a length of 331 mm. Observe the 'Indus inches', the 'Northern foot' of 335 millimetres, the 'Sumerian foot' of 331 mm are clearly closely related to the Stukeley 'Celtic foot' of 333 mm.

Since the early Bronze Age, mine overseers in the Austrian Tyrol have used measuring rods of exactly 838 mm. Observe that 2½ times the *gaz* of 838 mm = 2.095 metres, only 1% more than Thom's *megalithic rod,* my *faethm* . Berriman observed 2½ x 10 'Indus inches' equals the length of the *gaz*, the traditional north-west Indian linear unit, standardised by the British in the nineteenth century at 838 mm. The ancient unit the 'Persian *arsh',* the Arabic *zara*, was equal to 1.04 metres and thus 2 *arsh* = 2.08 metres, another value very close to Thom's *megalithic rod* 2.073 metres. From Ireland, Britain, Scandinavia, Denmark and France to ancient India via Persia and Austria there is a consistency of linear measurements and relationships.

Against this background of ancient linear measurement units I have elected to use the terms *Celtic feet*, *short yards* and *faethm* or *megalithic rods* in this book to mean the identified values of 332 mm and 2.073 metres respectively. Note how thirty-three times the *faethm, megalithic rod* 2.073 metres equals a *megalithic dod* Md 68.4 metres, the *furlang*, *furrow length*, a *furlong*. Next the *furlang, megalithic dod* multiplied by 33 equals the *country mile, megalithic mile*, Mml, 2.257 kilometres, 1.4 statute miles. Next again, the *country mile*, multiplied by 2½ equals a *megalithic league*, Mlg, 5.64 kilometres.

Fathoms & Leagues

A curious and unexplained aspect of our pre-metric measures are the linear measures *fathom* and *league,* two words whose origins have considerable antiquity yet lack definition. Each has the

concept of a lineal dimension, one smaller and one larger. There is a conspicuous absence of any authenticated definitions of these lengths although they have continued in use for many centuries. I refer you to the literature.

The earliest reference I found is in the Beowulf saga, c.AD 725. I quote line 1394 "nē on foldan fæþm" where *fæþm* is employed with reference to a depth under the sea. A book of riddles c.AD 1000 used the word *faethmum.* Both are references to a depth or a distance. The concept was a linear dimension, about two metres in present day metric terms. The Old English spelling was *faethm*, the German *faden*, the Norse *fethm* and other instances saw the words *fethmos, fathmr.* There are many references to *faethms* in past centuries, but notably the unit length *fathom* was not defined in King Edward I measures statute of AD 1305.

Referring to the ancient linear measurement table quoted above where smaller and larger units were related by a 2½ factor, from 'Celtic foot' to *short yard* and then to *faethm*, the value was 0.332 x 2½ x 2½ = 0.332 x 6¼ = 2.075 metres, almost Professor Thom's statistically proven ancient British megalithic rod of 2.073 metres. In other words, the Professor's '*megalithic rod*' was the ancient measurement *faethm*, *faethmum, faethmos, faden* etc. I favour *faethm* as interchangeable with *megalithic rod*, 2.073 metres.

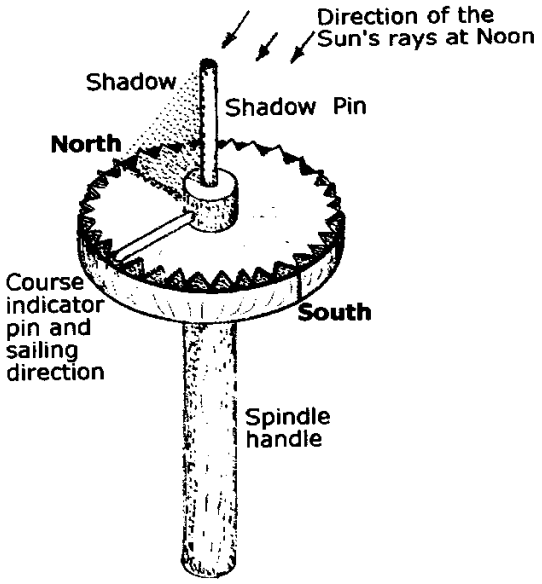
And now to the *league*, a noun used in Britain and Europe, mostly said to mean 'about three miles'. Variations were *leghe, leege, lewges, leukes.* In Europe the length varied between two and five miles and should not be confused with the *Roman league* equal to 1½ Roman miles, 2.220 kilometres.

For many centuries British Royal Navy Admiralty nautical charts indicated seawater depths in *fathoms*. The Admiralty *fathom* should not be confused with *faethm,* the former was a shorter measure. The Admiralty *fathom* was defined as six British statute feet, 6 x 0.305 metres = 1.83 metres. The simpler whole number 6.0 linked with the shorter English statute foot of 305 mm produced the 1.830 metre fathom. Instead of a 2½ x 2½ = 6¼ factor applied to a Celtic foot of 332 mm = 2.073 metres, the shorter Admiralty *fathom* differs from the longer *faethm* by 243 mm. Since 1968, seawater depths shown on up-to-date Admiralty charts are measured in metres. The British Royal Navy had a long established practice of measuring seagoing distances in (nautical) leagues, said to be three nautical miles, 3 x 6080 statute feet. This linear value is 84 metres less than the *megalithic league* of 5.64 kilometres. In general terms the two units, the megalithic league and the British nautical league of 5.56 km are almost the same linear value, effectively a continuation of nautical practice from centuries long past.

The celebrated author Jules Verne wrote his science fiction novel *Twenty Thousand Leagues Under The Sea* in which he described the adventures of Captain Nemo and his crew who voyaged in a submarine to mysterious places. Originally published in 1874, the book has been reprinted many times since that date and has been the basis for film and television features. Bear in mind his novel was written many decades before a real submarine was actually designed and built. Jules Verne chose his title to provide a nautical flavour to the book. *Twenty Thousand Leagues Under The Sea* encapsulates centuries of tradition beyond the edge of history and well into the prehistory of the maritime peoples of Ireland, Britain and Scandinavia. Jules Verne could hardly have known the noun *league* had such ancient antecedents**.**

Navigation & Surveying

In these days of the metric age where most things are milli, centi and kilo, only time and angles of direction are part of the sexagesimal system begun by the Stonehenge Brythons five thousand years ago. An unsuccessful attempt was made in Emperor Napoleon's time to divide time into tenths and hundredths, but conservatism and a sexagesimal system of hours minutes and seconds prevailed.



RECONSTRUCTION OF THE NORSE NAVIGATION DEVICE

Angles of direction have taken two paths. Until the twentieth century land surveyors used a sexagesimal system to divide a full circle into 360 degrees, in turn each division was sub-divided into 60 minutes and each minute into 60 seconds, very precise measures. With the advent of the metric system and pocket calculators, recent work is now done in tenths and hundreds of a degree instead of minutes and seconds.

The Irish legend "The Brendan Voyage" tells of the fabled adventurer Brendan who crossed the Atlantic about AD 500 in a wooden framed longboat, the hull covered with several layers of greased hide, sewn into place. Presumably he returned to tell the tale, otherwise the legend may not have survived in people's memories. How he navigated is an open question. The Norse explorer Eirik the Red navigated his way across the Atlantic Ocean from Iceland to Greenland in 982 AD. Eric returned home to tell his tale, five hundred years before Christopher Columbus' famed voyage to the New World in 1492. Eirik's son Leif Eriksson founded western Greenland's Brattahlid settlement in AD 1000. Another Norse settlement was made shortly thereafter in Newfoundland. How the Norsemen navigated voyages across the open ocean puzzled maritime historians until recently. A portion of notched disc was found in 1948 at Brattahlid, a deserted Norse settlement on the western coast of Greenland. A sketched reconstruction is illustrated showing thirty-two notches around the perimeter corresponding to north, east, south and west with subdivisions of the quadrants. An upright spindle passed through the centre of the disc with a vertical shadow pin projected above. A second course indicator pin projected sideways from the spindle towards the outer edge of the disc.The device served as the means of navigating ocean voyages centuries before the magnetic compass was invented. At the commencement of a voyage, the course pin was set on the desired bearing, for example; west-north-west by west from the Faeroe Islands to Greenland. The *steerboard* man would maintain the course. Directional checks were made every noon according to the shadow cast by the pin on the perimeter notches.

Six centuries later, British Admiralty maritime custom in the days of sailing ships followed the Norsemen's practices. The full circle was divided into sixty-four divisions; north at the top, then east on the right, south below and west on the left. Between north and east, the mid-way direction is north-east. Between north and north-east, the mid-way direction is north-north-east and the further division is north-north-east by north, and so on right around the compass. Sixteen subdivisions in each quadrant gave satisfactory directional results.

Junior officers on board Royal Navy sailing ships in the nineteenth century were required to learn by heart and recite sixty-four compass directions, an oral lesson termed "boxing the compass". Sixty-four divisions of a full circle served for centuries as the basis of setting a sailing direction and navigating routes around the world. I intend to show the ancient megalithic land surveyors applied the same technique when determining directions and site positions.

Where to Now?

To present these conclusions at the very beginning of this chapter before I have demonstrated my case may seem unusual. However, I see no other realistic option to portray the results achieved after thirty years work. You will be the judge of the validity or otherwise of my conclusions as you proceed with the account. You may enquire, "How could Neolithic man living several thousand years ago have such a measurement system and the ability to use it? Why would he want to design and survey the (ancient) monument sites and tracks using these chosen numbers?" Before attempting to answer those and many other questions, accompany me on a journey to Stonehenge and related monuments, tracks and routes connecting ancient places.

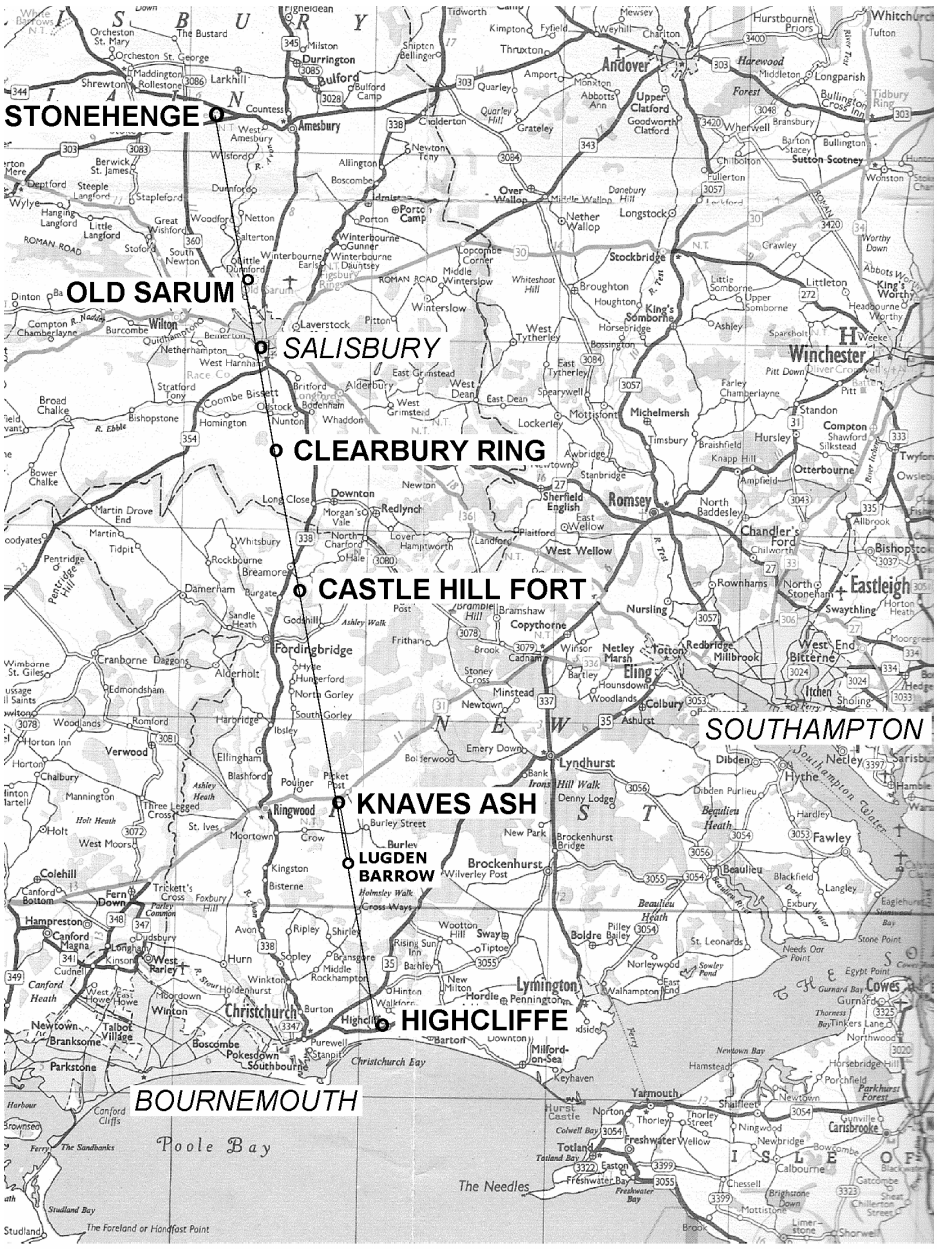
ENGLAND, STRAIGHT TRACKS

Stonehenge to Highcliffe Castle

Alfred Watkins book 'The Old Straight Track', published when he was aged seventy, pointed the way to an identification of many straight tracks in the Cotswolds, Radnor, Hereford and into the Brecon area of South Wales. Watkin's Straight Tracks, his 'leys', linked several ancient sites with others, with churches and isolated standing stones. One aspect of his explorations in need of attention was the construction date of archaeological sites located on this or that track. Extending his research to include places with known corrected carbon dates, I found numerous examples of straight tracks from Kent to Cornwall, Hampshire to Worcestershire linking one well-known site with another. The straight Roman roads named on the Ordnance Survey Department maps of Britain were well used by Caesar's Legions two thousand years ago, hence their description on today's maps. However, as Alfred Watkins did before me, I feel there is a need to correctly attribute these straight routes to the prehistoric inhabitants of Britain. Stonehenge in England is the first ancient place that comes to mind. You may recall the choice of its location was made some time before 3100 BC when fifty-six Aubrey Holes were excavated. I investigated a likely route between the Channel coast and Stonehenge. I obtained the earliest one inch to the mile Ordnance Survey Department maps between Stonehenge and Old Sarum, to Salisbury and further southwards, continuing all the way to the Channel coast. Having access to most first edition Ordnance Survey lithographic maps of each area, by means of draughtsman's dividers, I plotted accurately scaled *megalithic mile* intervals of 2.257 kilometres or 1.402 statute miles, southwards from Stonehenge to the coast. I found a continuous straight line passed through the following ancient sites: -

Place name	Kilometres	Statute miles	Staen
Stonehenge	0.0	0.0	**0.0**
Old Sarum			6.0
Salisbury cathedral			
Clearbury Ring	18.06	11.2	**8.0**
Castle Hill Fort	27.30	17.0	12.0
Knaves Ash	38.45	23.9	17.0
Highcliffe	49.65	30.8	**22.0**

A track way route whose length is 22 Mml and possesses very ancient antecedents poses the question "Why was the Stonehenge site chosen about 3100 BC to be exactly 22 staen, 22 *country miles* due north from Christchurch harbour and linked to Highcliffe by a straight track?"



HIGHCLIFFE TO STONEHENGE LINE 49.6 km

A little north of Knaves Ash on the Stonehenge to Highcliffe route, the old parish boundary coincides with and is defined by the route for a distance of 3.1 kilometres. At Lugden barrow, an ancient burial mound identified on the 1823 O.S map, the parish boundary changes direction to the east. From Lugden barrow the track continues southwards in a straight line to Highcliffe, a position

with a commanding strategic view of the wide expanse of the Channel. Highcliffe is now the headquarters of a golf club whose premises have a view of seagoing vessels and small craft arriving at nearby Christchurch harbour. Stonehenge to Highcliffe is 49.65 km in a continuous straight line, with 3.1 km of parish boundary coinciding along part of the way.

Counties of Wiltshire & Hampshire, Old Sarum

Old Sarum cathedral and its surrounding buildings were begun about AD 1100 at a location south of Stonehenge and directly on the alignment to Highcliffe. The Church authorities had intended to build an important cathedral at that location but a poor water supply meant the Old Sarum site was not a viable proposition; a change of plan was needed. More than a century passed until the year AD 1220. Bishop Poore is said to have had a vision where the Blessed Virgin who told him to build a new Cathedral "at a certain place to be given to him by the local people".

Salisbury cathedral was eventually built between AD 1220 and 1258 on a site at a distance of just 8.0 statute miles from Stonehenge; a distance is the same numerical value as the 8 megalithic mile, 8 staen from Stonehenge to Clearbury Ring, directly on the Stonehenge to Highcliffe route. Was this a curious coincidence or positive choice? You may recall King Edward I only decreed the 'statute mile' in AD 1305, *forty-seven years later.*

KENT Stone Street, Drawn Author 1990

Watling Street, the so-called Roman road from Canterbury to London, commences at the western end of Canterbury city ring road. The Street continues across England in a north-westerly direction, finally terminating at the pre-Roman British *Urnach*, once the large Roman city *Viroconium,* [pronounced *Uiroconium*] the present day village of *Wroxeter,* midway along the north-south border between Wales and England.

Canterbury

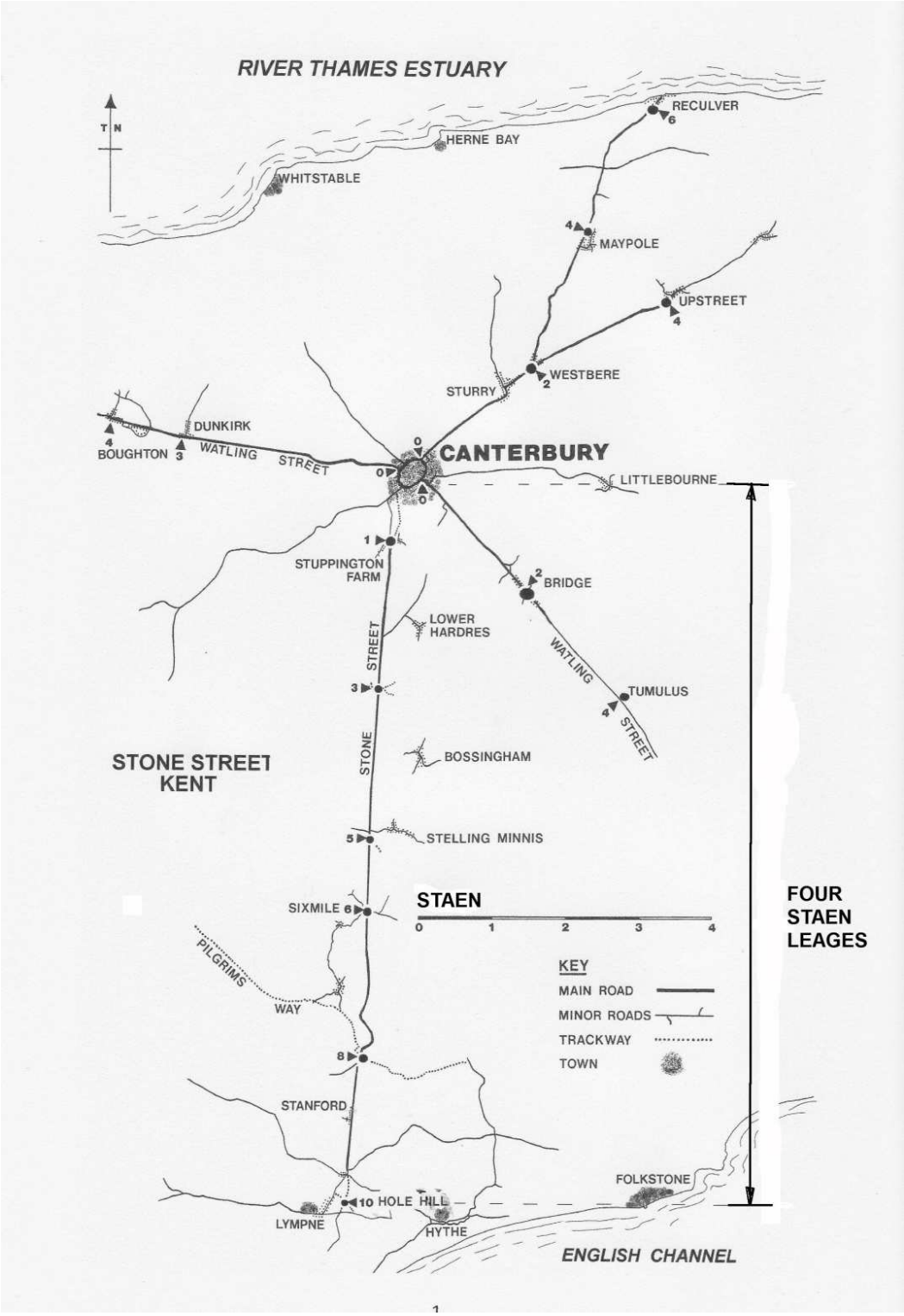
Ordnance Survey Department mapping began in the county of Kent, south-east England the land nearest France. It was a perilous time in Britain when Emperor Napoleon had made great headway with his European conquests, a cause for serious concern by the British military establishment.

Included in the volume of 'The Beauties of England & Wales' is a lithographed map drawn by G. Cole and published in 1806 that clearly shows what I consider to have been the original Canterbury city boundary. The Ordnance Survey Department map scaled six inches to one statute mile identifies an outline of the city wall boundary, approximately egg-shaped in plan and very close to 1.4 statute miles perimeter in length, one *megalithic mile* or a *country mile*. The long axis and taper is towards the south-west. Thought to have firstly been a palisade, it would have given the inhabitants and their stock valuable protection against marauding wolves and predatory wild bears in prehistoric times.

These features are viewed as positive choices by those prehistoric builders who established a settlement near the river Thames estuary and fresh water supply from the adjacent river Stour.

Stone Street, Kent

Before we look at the wider scene, consider local evidences of prehistoric habitation in Kent to the south of Canterbury. Twenty or so kilometres south of Canterbury is Hole Hill, a coastal high point on the Channel coastal cliffs. Footpaths approach the top of the Hill from the east, west and north. There is also an access road from the town of Lympne in the south. The coastal resort of Folkestone is about fifteen kilometres east of Lympne. Because of its commanding position with a wide sweeping view of the Channel, Hole Hill is a highly suitable place to view dawn Sun rise in the east.


RIVER THAMES ESTUARY
T N
RECULVER
6
HERNE BAY
WHITSTABLE
4
MAYPOLE
UPSTREET
4
WESTBERE
2
STURRY
DUNKIRK
4
BOUGHTON
3
WATLING
STREET
0
CANTERBURY
0
0
LITTLEBOURNE
1
STUPPINGTON
FARM
2
BRIDGE
LOWER
HARDRES
STREET
WATLING
3
TUMULUS
4
STREET
STONE
BOSSINGHAM
STONE STREET
KENT
5
STELLING MINNIS
SIXMILE 6
STAEN
0
1
2
3
4
FOUR
STAEN
LEAGES
PILGRIMS
WAY
KEY
MAIN ROAD
MINOR ROADS
TRACKWAY
TOWN
8
STANFORD
FOLKSTONE
10 HOLE HILL
LYMPNE
HYTHE
ENGLISH CHANNEL

Digressing for a moment from practical matters about the Hole Hill vantage point to think about the spoken word, it is relevant to consider the present day name Hole Hill and its possible derivation. Brythoneg (P-Celtic) was probably the Kentish people's language a thousand years ago, a language that eventually became modern Welsh. Today's Welsh noun for Sun is *Haul*, pronounced halfway between the English 'Heel' and 'Hole' and close to 'Hill'. Sunshine is *Heolwen*. If the Brythoneg name for the hilltop site was originally *Haul* or *Heolwen,* it is reasonable to consider the hilltop name was eventually translated into Saxon English as *Hole* place, Old English *Hole hyll* lookout. *Haul hyll* would have been an apt name for the most important place to observe dawn sunrise and foreign craft crossing the Channel from Gaul to ancient Britain. I know of no hole or cave in Hole Hill which otherwise accounts for its name.

Hole Hill, Kent

The 1816 Ordnance Survey Department map number 3, scaled one inch to one statute mile, shows Stuppington farm, 2.25 kilometres, 1.40 statute miles, south of the junction of Watling Street and Canterbury ring road. Commencing at Stuppington Farm, Stone Street (designated a Roman road) heads southwards to Hole Hill in a straight line. South of Stuppington Farm at an additional 2.8 miles is an intersection where three paths join the Street. After a further 2.8 miles, the road to Stelling Minnis and a path cross Stone Street.

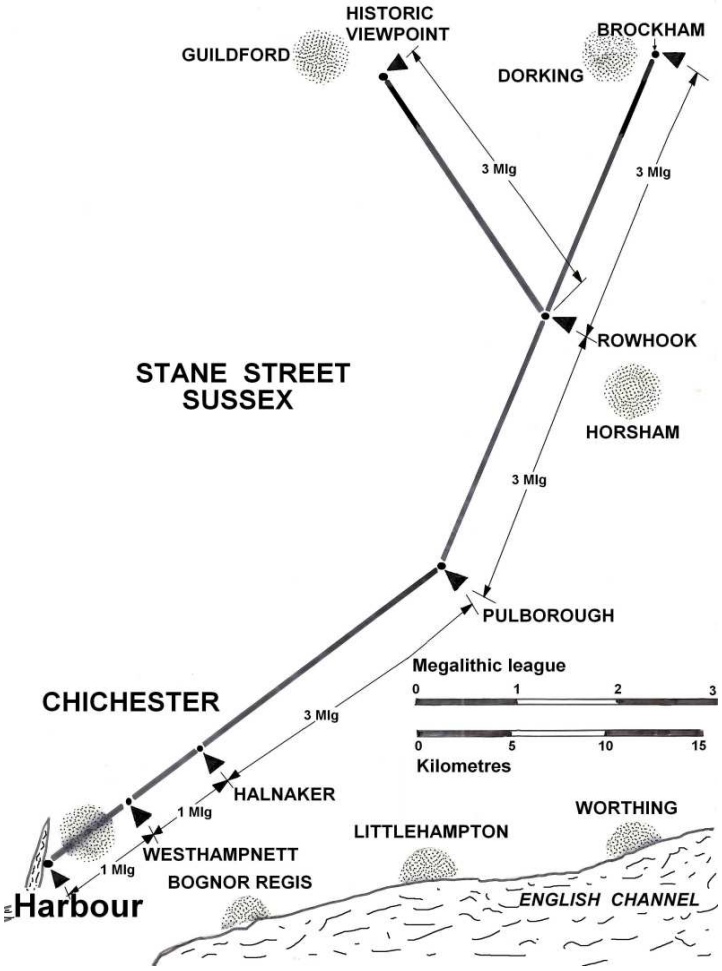
Next is Sixmile village at a distance of 8.4 statute miles from Canterbury. I asked myself the question "Why that name Sixmile for a village?" After an extended experiment with figures, I eventually discovered the distance from the junction of Watling Street and Canterbury ring road to Sixmile village could be converted from 8.4 statute miles to just six *country* or *megalithic miles,* 6 Mml. This most interesting discovery explained the highly probable derivation of the village name. You may wish to buy petrol at Sixmile service station on your next journey along Stone Street.

The pedestrian Pilgrims Way intersects Stone Street at 11.2 miles from Canterbury, 8 Mml. Finally at 14.0 statute miles, 22.5 kilometres, 10 megalithic miles, Stone Street ends at Hole Hill within sight of the waters of the Channel. The Kent illustration marks significant places along Stone Street, each place with an *Mml* number and an arrowhead, e.g. Hole Hill is *10 megalithic miles* from Canterbury ring road intersection with Watling Street.

The assertion Stone Street was originally a Roman road cannot be substantiated because significant places along the route are not at intervals of Roman miles nor Roman leagues. I consider Stone Street was surveyed and formed long before the first century AD arrival of the conquering Roman Legions in Kent.

Other Kent Routes

North-east of Canterbury, scaled map measurements reveal Westbere village is 2 Mml from the Canterbury ring road. From the fork along the route, Maypole village is next, just 4 Mml from Canterbury. Upstreet village is the same distance from Canterbury. Then 6 Mml from Canterbury is Reculver village. According to archaeologists, these settlements were established o n the river Thames estuary coastline during the Iron Age around 500 BC. From Canterbury to the south-east, Bridge village is 2 Mml away and there is an ancient tumulus at a distance of 4 Mml. Westwards along Watling Street and on the way from Canterbury to London, then Dunkirk village a 3 staen point, to be followed by Boughton at the 4 Mml post. You may care to satisfy yourself megalithic linear measurement principles apply along Watling Street and continue all the way to Wales. Take care to avoid the overwhelming evidences of sprawling suburbs of the twenty-first century.



COUNTY OF SUSSEX, STANE STREET,
drawn Author 2006

Commencing at the east branch of Chichester harbour, Stane Street track heads generally nor' nor' east from the coast, a route characterised by straight lineal increments of two, three, three and three *stean league* stages.

From Chichester harbour side, the first and second league distances identify with Westhampnett and Halnaker. On to Pulborough is a distance of three megalithic leagues. That portion of the track would have seen the export of iron ingots or ore from the Weald in the Iron Age and Roman times. From Pulborough to Rowhook near Horsham is also three megalithic leagues. At that point, the route divides into two branches. Continuing in a nor'nor'easterly direction, from Rowhook to Brockham near Dorking is another three leagues. From that point the track continued directly to London, once *Llyn Dinas* and later Londinium. The north-westerly west branch in another three leagues reaches an historic lookout close to Guildford.

Three league portions of Stane Street equate to distances about one days portage for a pedestrian traveller laden with goods. Roman leagues are known to be a standardised distance of 2.22 kilometres, not considered related in whole number units to three megalithic league segments, 3 Mlg = 16.8 kilometres. Mostly referred to as 'Roman roads', it is contended the original Stane Street track loci were determined in pre-Roman times longer than two thousand years ago.

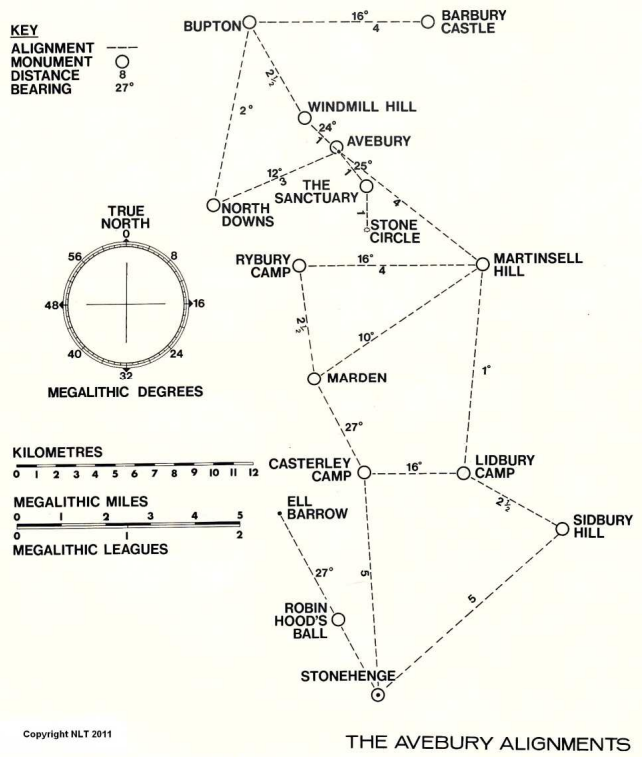
THE LONG MAN OF WILMINGTON

Situated on a South Downs hillside north of Eastbourne is the sixty-eight metre tall outline figure 'The Long Man of Wilmington'. The celebrated site is very close to mid-way between Stone Street in Kent and Stane Street in Sussex and is clearly related to the two Street routes. The figure and its provenance is amply discussed in Chapter Two.

ANGULAR MEASURES :: DISTANCES & BEARINGS

Complementary to the linear measurement system, I now propose to demonstrate there is evidence to show prehistoric mankind, during the third millennium BC, defined directions between places in terms of sixty-four divisions of a circle. These 1/64th units I have termed *megalithic degree* and given the symbol M^0. The bearings from an origin to a destination were founded upon the cardinal directions, north east south and west. For example north to east = 16 M^0, north to south = 32 M^0, and so on. The selected illustrations show routes or distant places from an origin, positioned so that the second from the first was determined at an angular bearing, true north being the base

reference. For instance, from Windmill Hill to Avebury is distant *one staen* at a bearing of 24/64ths or 24 megalithic degrees, 24 M^0, from true north. A survey date would have been about the middle of the third millennium BC. The Stonehenge to Highcliffe route bearing is 171^0 in the sexagesimal system, 30.4 M^0 megalithic degrees. For an inexplicable reason Stonehenge was not aligned exactly due north of Highcliffe, Christchurch harbour is actually due south of Stonehenge at 32 M^0. Highcliffe is the cliff top vantage point to observe vessels arriving and departing from the harbour.



Avebury

Illustrations have been prepared from the series of Ordnance Survey Department maps scaled six inches to one mile and one inch to one mile, maps that were surveyed in the nineteenth century by the Department. Twentieth century building development had not yet begun and archaeological references and data are clearly recorded on the maps. As a passing note, most surveyors will recall the Ordnance Survey Department maps of England and Wales were the first accurate survey maps to be made of any country. The need for maps of the required accuracy arose directly as a result of building of canals and railways early in the nineteenth century, the purpose of which was the transport of goods and supplies supporting the Industrial Revolution when Britain emerged from an agricultural economy to become the first industrialised country.

Avebury Alignments

Ancient places now called Hills and Camps are linked by distance and bearing as one makes one's way from Avebury south to Stonehenge.

Avebury was constructed about the middle of the third millennium BC, the largest ring of standing stones in Britain with a diameter approaching half a kilometre. It is the focal point of a number of adjacent ancient sites whose distances and angles are shown on the Avebury Alignments illustration. A detailed examination of the point to point relationships between any one ancient monument and another reveals many interesting ideas that warrant careful study. Note how the distance from Avebury to Windmill Hill is 33 faethm or 1 staen, the same distance as the length of West Kennet Avenue to the Sanctuary stone circle. From Windmill Hill to Avebury is 24 M^0 and from Avebury to the Sanctuary is 25 M^0. Avebury to North Downs is a distance of 3 Mml and 44 M^0. From Avebury to Rybury the direction is a bearing of 36 M^0. To Martinsell Hill from Avebury is 4 staen at a bearing of 23 M^0. Stonehenge to Silbury Hill is two staen [megalithic] leagues at a bearing of 9 M^0. Stonehenge to Casterley Camp is also 5 staen and 1 M^0 west of due north. There are several examples of 2½ and 5 staen alignments, a sufficient number for the term *one staen league* or *two staen leagues* to be created.

Although not shown on the Avebury Alignments illustration on the right and omitted for clarity reasons, the alignment from Castle Ditches to Martinsell Hill requires comment. The Casterley Camp illustration shows the distance from Castle Ditches to Bilbury Rings is just 4 staen. From there to

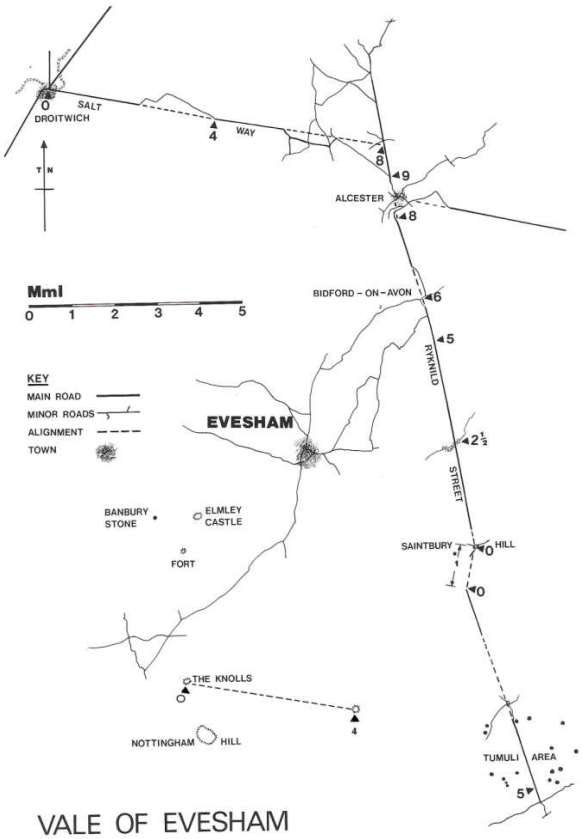
Yarnbury Castle is another 2 staen. Next, from Yarnbury Castle to Martinsell Hill is 12 staen. All these four locations together with Casterley Camp are on a straight line whose total length amounts to 18 staen. The calibrated radio carbon dates for many named ancient monuments are generally in the third and second millennium BC, some extending to the Iron Age in the first millennium BC.

The sum of evidence points firmly to the surveying and construction skills of Neolithic man arranging these places with purposeful intent in the third and second millennia BC. Bronze Age and Iron Age man continued long standing traditions.

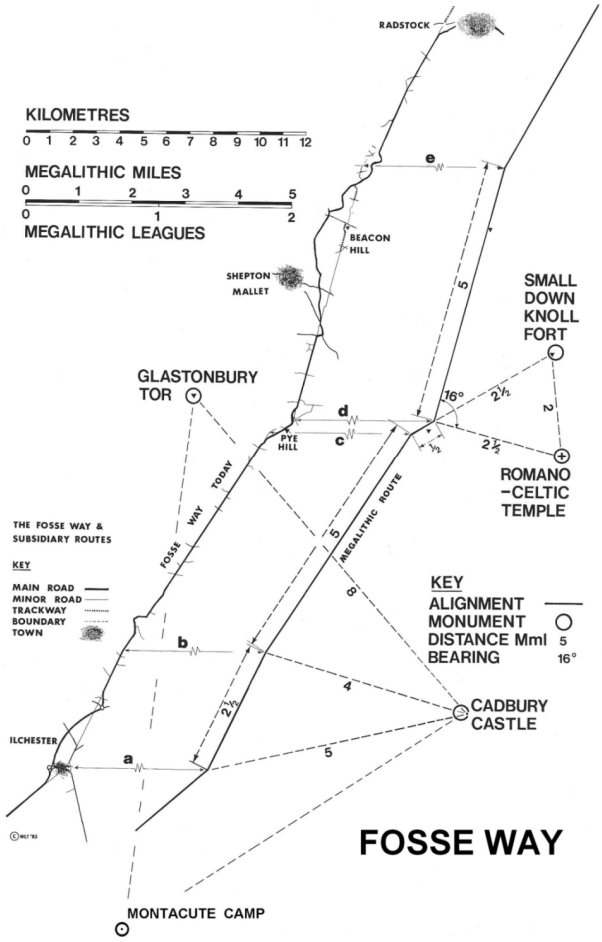
The Vale of Evesham, Worcestershire

Centred on Evesham, I offer for your consideration a number of significant ancient routes. Beginning at Droitwich, famous for its ancient salt mines, a walk eastwards along Salt Way meets at a junction with Ryknild Street, another so-called Roman road. A short deviation to the north about 2 *staen* sees the present day road re-joins Salt Way at a 4 *staen* post. Another deviation, also judged to a more modern happening occurs close to the 6 staen post. The end of Salt Way route finally meets Ryknild Street at the 8 staen point. From Saintbury Hill in the south, travelling north along Ryknild Street the first identified meeting place is the 2½ *staen league* post junction. The junction with Bidford on Avon at the 6 *staen* post. The town of Alcester is midway between the 8 staen and 9 staen posts, another so-called 'Roman' road commences at Alcester, heading eastwards.

South from Saintbury Hill is a 1 staen deviation from a straight route. Further south, between 2½ staen and 5 staen is a burial mound area with many tumuli recorded on the maps. The Vale of Evesham contours are in the range 45 to 60 metres above sea level. South west of Evesham is Bredon Hill rising to a height of 293 metres. On top of the Hill are three ancient sites Elmley Castle, Banbury Stone and a fort. You may wish to satisfy your curiosity about the distances between these places by using dividers and the scale shown. On top of Oxenton Hill at an altitude of 223 metres at a distance of 4 staen from The Knolls in an easterly direction is Beckbury Camp earthwork on the ridge of a 290 metre hill, a relationship considered evidence of planned intent. Geography overcame geometry in the instance of the Nottingham Hill enclosure, a 915 metres elevation Iron Age hill fort about three kilometres from The Knolls. Many sites shown on the Ordnance Survey Dept. 1975 map *Southern Britain in the Iron Age,* are clear examples of ancient measurement techniques in the centuries BC.



VALE OF EVESHAM



THE FOSSE WAY, SOMERSET

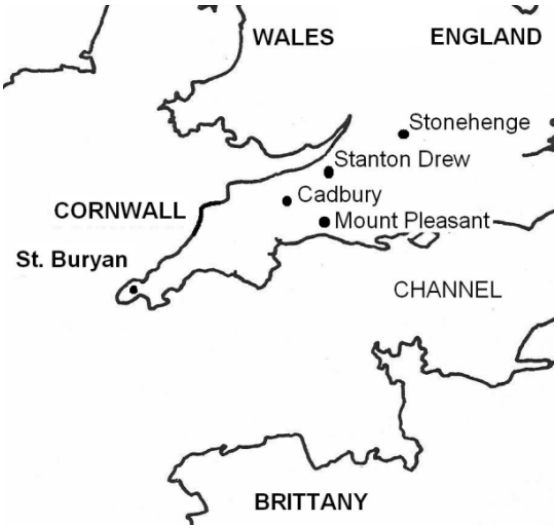
Further west, Fosse Way commences in Somerset, the start of a route extending all the way from the West Country across England in a north-easterly direction to Lincolnshire. Its construction and engineering has long been attributed to Roman Legions' work two thousand years ago and most maps describe Fosse Way as a Roman road. A study of the route's straight segments shows it was surveyed in megalithic linear and angular units, not in Roman units as one would expect if the Romans had initiated its construction. The Roman league equalled 1.38 English statute miles, close to the staen, country mile of 1.4 statute miles, whereas the megalithic league equates to 3.506 English statute miles. The illustrated sections of Fosse Way shown are measured both in staen, megalithic miles and megalithic leagues, distance stances that link the survey and establishment of Fosse Way to prehistoric times. Cadbury Castle is a vantage point on the hilltop above the village of South Cadbury in Somerset. Looking westward from the Castle, one sees the one time low lying marshy plain that was drained in the Middle Ages to provide good farmland. Fosse Way crosses the open land from the south-west to the north-east. Beyond the low lying plain and Fosse Way, in a north-west direction is Glastonbury Tor at a distance of 8 staen from the Castle.

Fosse Way Route Depiction

My method of portraying both the ancient Fosse Way alignment and today's roads and paths is a parallel presentation instead of two superimposed figures which would be too complex to represent on a single sheet and too cumbersome on separate sheets. Fosse Way Today is shown to the left and the Megalithic Route is shown to the right. 'Fosse Way Today' route begins with Ilchester at the lower left hand corner. From there the Way progresses to Pye Hill and on to Shepton Mallet as far as Radstock in the north east. The named features along the Way such as Beacon Hill are noted.

Parallel with 'Today's Route' plot and to the right is the 'Megalithic Route' plot. Its changes of direction relate to Ilchester, Cadbury Castle, the Romano-Celtic Temple and Small Down Hill Fort. Careful study of the scaled prehistoric route portions showed each segment's measurements conform to whole number linear units, staen and staen leagues. From Ilchester the route begins with a 2½ staen straight portion designated **ab**. Its bearing is determined by the distances from Cadbury Castle. Observe how from Cadbury Castle to **a** at Ilchester is 5 Mml staen and 4 staen to point **b.**

From **b** to **c** is a distance of 5 staen reached at Pye Hill. A ½ staen dog leg leads to point **d** which itself is defined by the 2½ Mml distance to the Romano-Celtic temple and the same 2½ staen distant to Small Down Knoll Fort. The distance between these two ancient places is 2 Mml. The next portion of the route from **d** at a bearing of 22 M^0 proceeds for a distance of 5 staen to **e**, then there



is a direction change at **e** leading to the town of Radstock 3 Mml further on and at a bearing of 5 M^0. You may care to pursue Fosse Way further to the distant north-east by studying Ordnance Survey Dept maps from Somerset to Lincolnshire.

The Cadbury Triangle

Legend and myth have long been associated with Glastonbury Tor, Cadbury Castle and Montacute. Created by Geoffrey of Monmouth the historical novelist in AD 1135, his imaginative *History of The Kings of Britain* described the adventures of King Arthur, his Knights, Camelot and Lady Guinevere and the supposed happenings in this area of the West Country. Six hundred year later Dr William Stukeley visited the area in AD 1723. Written in the English spelling convention of the times, his diary described:-

"Three remarkable hills, no ferpent or venomous creature fhould ever be found in this compafs. Camalet is a noted place where they say was King Arthur's palace.

"Hence I continued my journey along the Fofs, which I obferved paved with the original work in many parts: it is compofed of the flat quarry-ftones and on my left hand I faw the pleafant view of Montacute Hill."

Dr Stukeley went on to record the local Somerset people believed the area encompassed by Cadbury Castle Hill, Glastonbury Tor and Montacute had magical properties. He told of an eighteenth century fanciful story recounted by local people who believed the area was free of 'venomous creatures'. This seems highly unlikely, for the triangular area's marshy habitat would have favoured reptiles rodents and birds of all kinds before drainage works in the Middle Ages. Stukeley also noted he had been told the area was said to be an equilateral triangle whose three sides measured exactly twelve statute miles, additional legendary information quoted in support of the supposedly magical qualities of Glastonbury Tor, Cadbury Castle and Montacute. That assertion was not correct. From place to place, the Cadbury Castle, Montacute and Glastonbury Tor the true scaled distances are: -

Glastonbury to Cadbury	11.22	statute miles	= exactly 8 staen
Montacute to Cadbury	10.52		= 7½ staen = 3 staen league
Montacute to Glastonbury	14.02		= 10 Mml = 4 staen league

Possibly the reason myths and legends about Cadbury, Glastonbury and Montacute arose from beliefs the gods put them there when the earth was created. Three landscape features placed at special [whole number] 8 Mml 3 league and 4 league distances apart are unique. From early beginnings many centuries ago one can understand why magic qualities and myths arose such as the absence of the venomous serpents and a Cadbury Castle, Glastonbury Tor and Montacute Hill equilateral triangle.

Saint Buryan, Cornwall

The most westerly part of mainland Britain is the county of Cornwall, an area rich in ancient monuments and individual standing stones. Travelling westwards after leaving Penzance, the village of Saint Buryan is only six kilometres before one arrives at Land's End. Many interesting ancient features are nearby. St Buryan Church spire appears to be the focus for most features. The well-known Men-a-tol standing stone with a hole through its middle is situated on an alignment 20 M^0 to the south-east of St Buryan. Close by is The Merry Maidens stone circle and two standing stones

named The Blind Fiddler and The Pipers. A number of single standing stones and tumuli can also be seen elsewhere. From Saint Buryan Church spire the distance to Crows-an-wra cross roads is 33 faethm, one megalithic mile. From Boscawen-un to both these places is 24 faethm. The three sides form an isosceles triangle. Bartine Castle to the western standing stone is 24 faethm, also to Caer Brân. From St. Buryan church to the pair of standing stones beyond Tresvennack Piller is a bearing of 10^0 east of true north. Centred on Saint Buryan's spire, I found four instances where a stone/circle had been placed at 24 faethm distance. The angular displacement of one ancient item to another are shown on the line joining the locations, e.g. 6 M^0 A complex system of megalithic distances and angle directions combined to show specifically chosen linear and angular qualities had been incorporated into positioning the Saint Buryan ancient standing stones, stone circles and tumuli. The Ordnance Survey Dept. 1876 map shows these evidences of the prehistoric occupation of Cornwall, supplemented by a few more individual standing stones identified more recently. Two and a half thousand years ago, the surveying skills of the ancient people in the west of the country were applied equally as well as in the more easterly and northerly parts of the Island of Britain.

Before leaving Cornwall, matters of language deserve a mention. The Saxon name 'Corn-wall' has two syllables. The first is linked with a Celtic word perhaps meaning the land of the *Kern* or *Kernow* people. The second syllable *wall* is derived from the Saxon *waelesca* meaning 'foreigners' a Saxon name description of the original inhabitants, the native British. A short journey by boat from Cornwall northwards across the Bristol Channel is *Wales*, the name also derived from the same the Saxon appellation *Waelesca*. The native name for the country of the *Cymry* people is *Cymru*. Observ the Brythoneg (P-Celtic) language relationship: *Kernow* or *Curnow*, *Kymry* or *Cymry*.

Avebury Circle and the jurors' positions

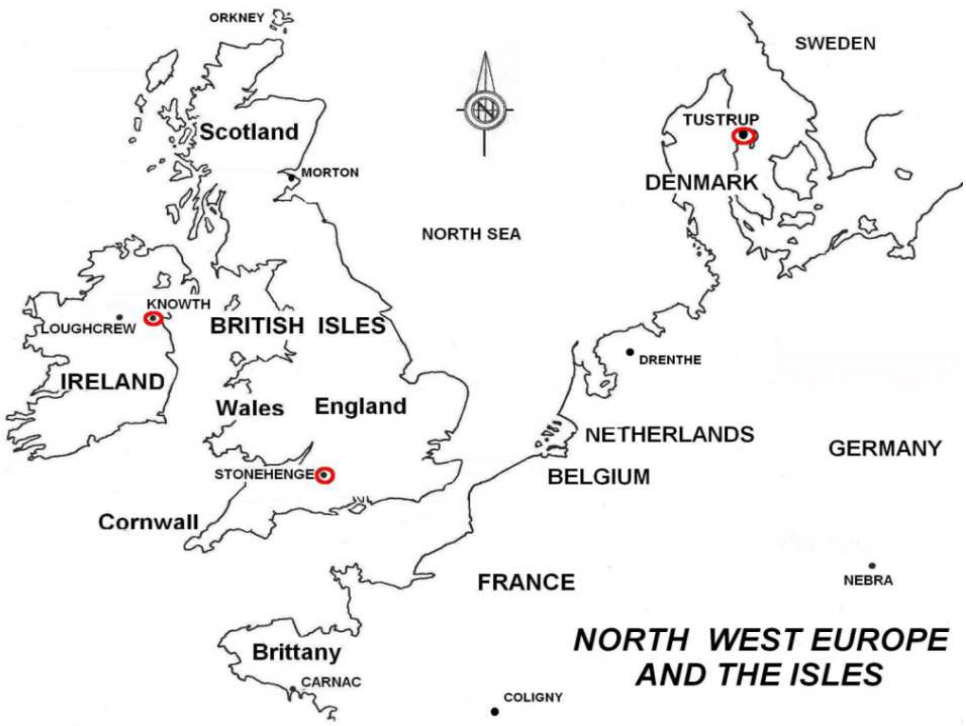
CHAPTER TWENTY :: FOUR TUSTRUP, DENMARK

Browse Google Earth for Denmark Jursland Tustrup to view the location .....

SYNOPSIS

'TUSTRUP' is mostly about the sea-linked peoples of Denmark, Ireland, Britain and north-west Europe, the sea-linked "Old People" who thought about life and its problems more than eight thousand years ago. They created mathematical ideas for future generations to think about; to play with numbers for mental creative pleasure. Observe and comprehend their thinking, writing, reading, demonstrated mathematical skills and knowledge.

For amusement, they had a bit of fun and played with numbers; one, two, three. Add the first two numbers together and it makes the third, one+two =three. And again, add the last two numbers together, two+three= five. 1,2,3,5. Try it again, three+five=eight. 1,2,3,5,8. Again, five+eight =thirteen. 1,2,3,5,8,13. Next is 21, then 34, 55 and 89 and so on. That string of numbers is usually known as the Fibonacci progressive arithmetic series; 1,2,3,5,8,13,21,34,55 and more ….. 'Tustrup' comprehensively debunks the conventional view mathematics first developed in the Middle East and Mediterranean countries. This ground-breaking hypothesis focuses instead on the sea-linked peoples of Britain and Denmark. Denmark featured the sophisticated progressive arithmetic series, geometry and linear measures thinking before 3100 BC. A contemporary of Tustrup stendysserne and several satellite dyssernes, the first Stonehenge c.3100 BC was the means to forecast eclipses of the Moon. Tustrup and Stonehenge c.3100 BC had the same basis of design, linear measures and mathematics.



'Tustrup' **c**omprehensively debunks the Classical historians conventional view mathematics first developed in the Middle East and Mediterranean countries, eventually to become known by western European sages society. This story concerns the sea-linked peoples of Britain and Denmark who featured a sophisticated progressive arithmetic number series, geometry and linear measures thinking before 3100 BC. The first Stonehenge 3100 BC was contemporary with Tustrup stendysserne and its several satellite dyssernes; Tustrup and Stonehenge had the same basis of design, linear measures and mathematics. Common features of structures in both places clearly demonstrate the transfer of complex mathematical concepts by and within the sea-linked peoples of the north-west, ideas eventually destined to arrive in Egypt's 'Old Kingdom' by about 2700 BC, the time of the first pyramid.

Founded on decades of research both here and in Europe, 'Tustrup' is a millennium earlier than Egyptian and Sumerian societies; a demonstration of simple mathematics about 3100 BC epitomising our distant ancestors' knowledge and skills. Messages from long ago were formed in stone for us to read. A first time visitor to Denmark and Jutland's coastal Tustrup *stendysserne* sees an assembly of large and smaller stones situated in the Djursland countryside near the peninsula's northern beaches. Several groups are perceived some 100 metres long. The "Old People" who designed and created the Tustrup *stendysserne* more than more than five thousand years ago were thinking people. Explanations and information to follow explain why each original stone placement was positioned precisely to meet a particular mathematical purpose in a grand scheme about 3100 BC demonstrating the cycle of life.

Numbers and imagination go hand-in-hand

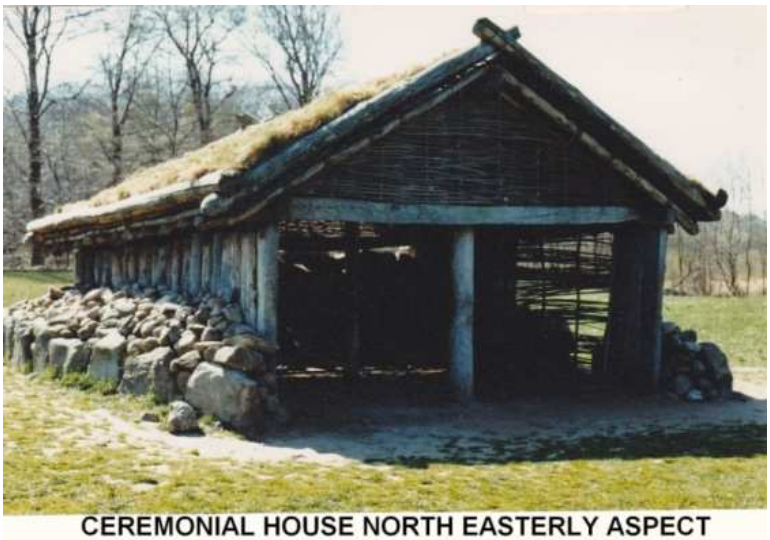
The celebrated Greek sage and mathematician Pythagoras conducted a school for students about 600 BC in the Greek city of Croton southern Italy. His most well-known mathematical teaching stated "the square of the hypotenuse (length) equals the sum of the squares of the other two sides (lengths)" meaning the respective side lengths defined a right angled triangle. As well as a 3:4:5 right angled triangle, more right angled triangles are defined by the squared side dimension Pythagorean rule. For example the end pediments at the Athens Parthenon in Greece employ a 9:40:41 triangle.

At this juncture it is pertinent to speculate from where and when Pythagoras obtained this philosophical mathematical knowledge to frame the specialist syllabus for his school. Was it his own invention or did he inherit the information from past chroniclers? It is said Pythagoras taught mathematics in a straight forward manner accompanied by philosophical aspects of the subject.

JUTLAND ARCHAEOLOGICAL SOCIETY, Their Journal 'KUML' 1955

Dr Kjaerum's 1955 archaeological report in Kuml, the journal of The Archaeological Society of Jutland, is the basis of this account of Tustrup *stendysserne* and its features, the Danish Neolithic period dated about 3100 BC. Included in his Kuml paper was an illustration that served to develop these illustrations. Named by Dr Kjaerum "Ceremonial House" the replica building recently reconstructed by Aahus Museum staff faces dawn in the north-east. The illustration was taken by the Author. At midsummer solstice the first rays of dawn sunlight illuminate the open ended structure.

A count of the kerb stones outside the 'House' reached twenty-seven, the same number of pottery vessels was found within the building. The traditional folktale and storyteller interpretation of the symbolism associated with twenty-seven implied fertility, success and plenty, in the "Ceremonial House" context the description would seem most relevant; an open side offering a welcome to mid-summer solstice Sun's rays at dawn; twenty-seven drinking cups to celebrate a new day.



CEREMONIAL HOUSE NORTH EASTERLY ASPECT

Western Ring, The Younger Generation

North-west from the passage mound is the western ring of seven inward leaning stones, on the sunset alingnment is an eighth stone prone on the ground. The noticeable inward lean of seven stones is presumed to be an intentional design characteristic. The inward leaning stones of the inner eastern and western stone rings warrant comment; the inward leaning stones are seen to number **'8'** and **'5'.** The 'leaning' attitude of the stones is suggestive of children who continue to be dependent on their parents an still 'lean' on them for support.

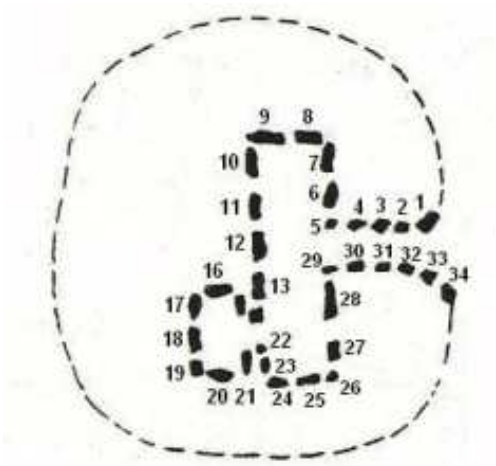
Eastern Rings

The eastern double stone circle feature comprises outer and inner rings. Five stones of the inner ring are shown leaning inwards. The outer ring comprises twelve upright stones. Another thirteenth stone prone lies in a field, marked by a ?, on the midwinter solstice sunrise direction.

Thirteen upright columns may represent older teenage children aged **'13'** able to stand on their own feet, still well supported on both sides by packing stones, their parents. These perhaps imaginative reasons offer answers why provide two leaning stones circles and one ring of upright stones; philosophical considerations comprise the progressive arithmetic series numbers, 5, 8 and 13. There is one Tustrup, two above ground structures, three stone rings. Twenty-one faethms [21 times 2.07 metres = 45m] is the linear distance between the Ceremonial House and the Mound.

Passage Mound & Interior

The passage entry opening welcomes the visitor to the inner chamber that is about twelve metres length, two metres width and one and a half metres high. Stooped like an aged person, I peered inside the mound to view the wall stones supporting the roof slabs and counted the entry and wall stone slabs. An illustration derived from a paper by Service & Bradbury shows there are 33 or 34 wall stone slabs, of which the small round column 22 may be a late addition. A full complement of 33 large stone slabs would be a symbolic declaration of the heavenly sanctity of the Tustrup mound. The position of



MOUND WALL STONES COUNT

With acknowledgement to Service and Bradbury

column 22 should be considered a specific choice to demonstrate the series and reach 34 of the number series. The passage mound functioned as a burial chamber; everyone's end-of-life situation. Progressive number series items 1, 2, 3, 5, 8, 13, 21, 34 were tallied. Next 34 + 21 = 55, then 55 + 34 = 89 at Stonehenge, later c.2500 BC in England on the western side of the North Sea.

Fibonacci, the Man

Leonardo da Pisa c.1170-1250 was a thirteenth century Italian mathematician mostly known 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 so-called 'Hindu-Arabic' number glyphs and decimal system into Europe, the progressive arithmetic number series named after him is described in "*Liber Abaci"* chapter twelve. The number series are said to relate to the growth of a rabbit population. The (Fibonacci) progressive arithmetic series numbers were the fundamental design basis of Tustrup c.3100 BC and Stonehenge c.2500 BC.

TUSTRUP *STENDYSSERNE* ITEMS

The (Fibonacci) Progressive Arithmetic Number Series

The *stendysserne* is seen as the first application in human history of the progressive arithmetic number series mathematical technique whose items match the progressive arithmetic series **1** to **34.** The entire *stendysserne* assembly within the oval is regarded as = **1.**

Of the components present, the Ceremonial House and the Mound are both aligned with and astride the midsummer sunrise – two distinct elements = **2.**

Three stone rings/assemblies are indicated, one grouping to the west, two concentric rings in the east = **3,** the inner ring of inwards leaning stones is an assembly of five megaliths comprising the group created = **5.** The western ring comprises seven inwards leaning stones and the eighth prone stone on the midwinter sunset alignment = **8.**

The south-eastern outer ring comprises thirteen larger megaliths where the gaps between each large megalith and the next are in-filled with small packing stones = **13.** The linear distance from the Ceremonial House to the Passage Mound is 21 faethms, **= 21.** The Mound wall slab illustration shows the entry; to the left and right are walled chambers, a total of thirty-four stone slabs= **34**.

In 1982 the low roof compelled me to walk in a slightly stooped manner like an aged person inside the passage mound chamber. If I had counted the wall slabs on that occasion perhaps this discovery of the Fibonacci series significance of the *stendysserne* design would have happened many years ago. The arithmetic sum of the Mound wall stones and linear distance from the Mound to the Ceremonial House is 34+21 = **55,** the ninth term in the series. Summing the mound wall stones and the oval cross axis plus the oval long axis the product is 34 + 55 = **89,** the tenth series item; series numbers **1,2,3,5,8,13,21,34,55,89;** five or six centuries before Stonehenge 2500 BC which also has an identical progressive arithmetic series numbers **1,2,3,5,8,13,21,34,55,89.**

Mathematics; Arithmetic, Geometry, BC

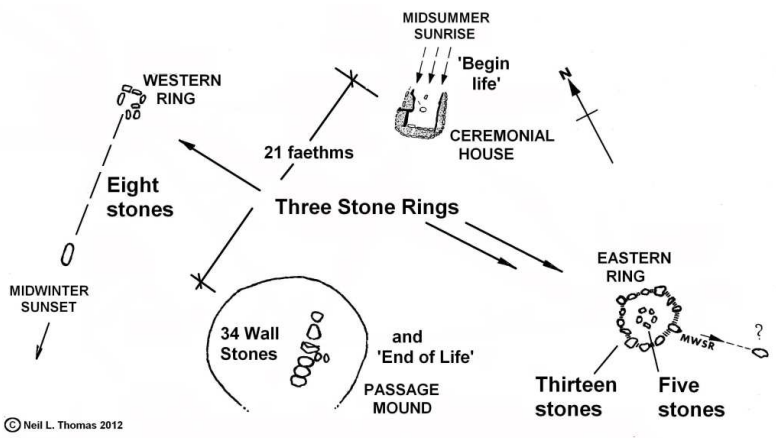
A simple arithmetic counting technique, the sequence of 1 2 3 4 5 6 7 8 9 etc. is a mathematical series ability possessed by even the most unsophisticated societies. Mathematics is often considered by Classical Greek and Egyptian scholars to have commenced and developed during the Egyptian civilisation in the third millennium BC, principally the six hundred years between 2800 and 2200 BC known as the Egyptian 'Old Kingdom' period. The 'Old Kingdom' endured until most Egyptologists assess as a period somewhere between 2345 and 2181 BC, a time in Egyptian history known for the construction of the famous pyramids and sphinx at Giza on the edge of the river Nile delta, massive projects involving very large numbers and geometry.

On the other hand, at Tustrup *stendysserne* c.3100 BC actual positions and numbers of elements show each feature and linear measurements are viewed as the first example of mankind's

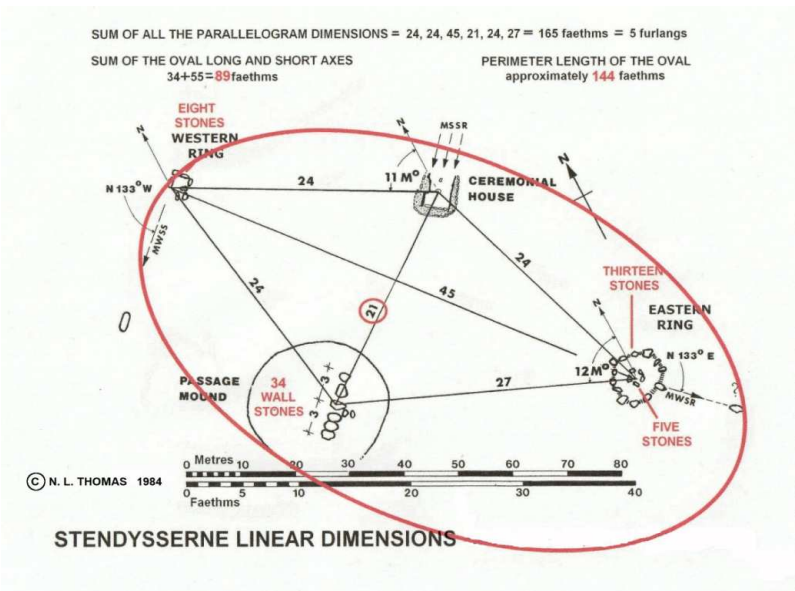
mathematical knowledge to a sophisticated standard. The combination of an oval geometric design integrated with a skewed parallelogram is clear evidence of innovative mathematical minds c.3100 BC.

Integral with simple counting, the use of the progressive arithmetic series, complex geometry and archaeo-astronomical knowledge shows the Tustrup community was clear thinking, well-educated and skilful. The combined application of those features to create a full scale 'monument' is direct evidence of the high level of skills and thought possessed by (Danish) mankind in the fourth millennium BC; the empathetic application is there for us to study, mathematical principles used to create an architectural design and demonstrate family values.

Henceforth the Fibonacci series should be termed the *"Tustrup progressive arithmetic number series"* in references.



TUSTRUP STENDYSSERNE FIVE FEATURES



STENDYSSERNE LINEAR DIMENSIONS

CHAPTER TWENTY-FIVE :: ORKNEY & DEE

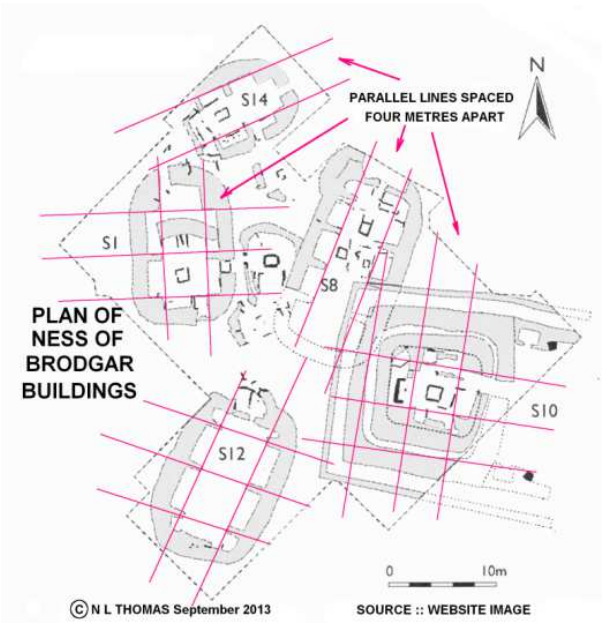
SYNOPSIS

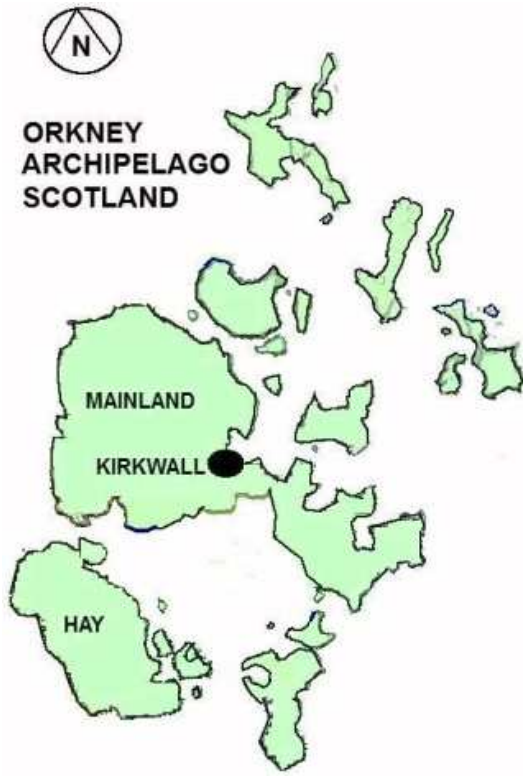
Scotland's Orkney islands reveal early knowledge of the writing techniques employing a line of zig-zags strokes to conut 1, 2, 3, 4, 5 and more; also the Sun and Moon calendar systems measures of passing time.

PART ONE :: ORKNEY ARCHEPELIGO

ORKNEY ISLANDS; BRODGAR & SKARA BRAE 3000 BC

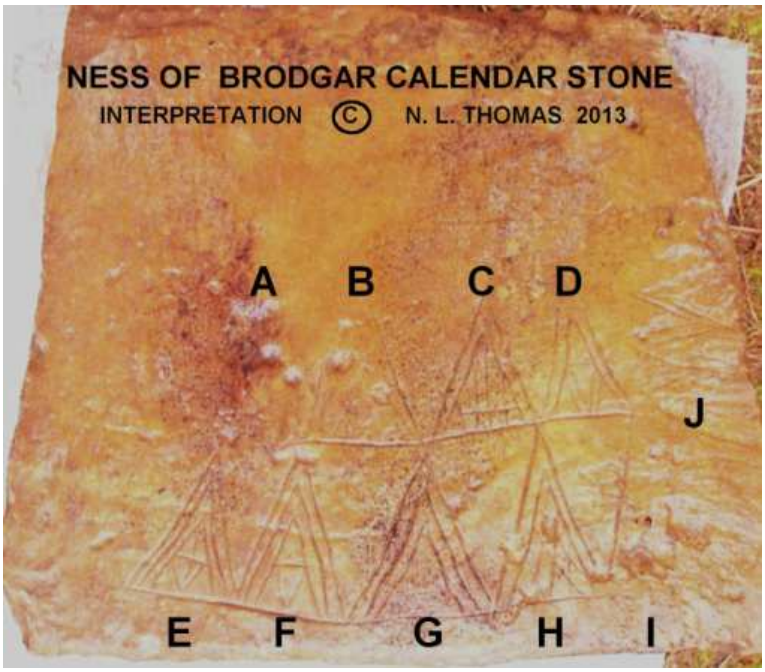
Orkney Islands lie north of mainland Britain, a scattered group of habitable islands settled in the past.; there is ample evidence of communities living in the Islands in the millennia BC, quite early in some parts. Fifteen kilometres west of Kirkwall on Orkney mainland is a particularly rewarding area of prehistoric activity; the Maes Howe mound, the Ring of Brodgar, Ness of Brodgar, Stones of Stenness Ring and Skara Brae village on the mid-west coast of the island.





NESS OF BRODGAR

Ancient sites are scattered across the landscape; the recently re-discovered Ness of Brogar is the subject of a major archaeological excavation project. Situated in the Orkney mainland, a number of large stone buildings comprising stone slab walls and stone tiled roofs are described.



A website site plan of gif quality is illustrated. With my annotations and employing a drawing scale 0 to 10 metres, a series of parallel lines were added as shown, others may be seen by default. It is reasonable to conclude the creators of the plan of the buildings employed the Brython Measurement table *faethm* = 2.07 metres as the design basis. With a human unit basis for measurements discussed in earlier chapters, the dimensions of buildings 'rooms' S1, S8, S10, S12 and S14 appear to be based on two square *faethm* modules, perhaps individual compartments for Ness residents. An average person could be accommodated in each room, warmly housed and protected from storms and gales blowing from the Atlantic Ocean.

THE NESS OF BRODGAR CALENDAR STONES

Two significant stones found in 2013 at the site featured calendar petroglyphs; the letters A, B, C, D, E, F, G, H, I, J superimposed on the jpeg images indicate the pictograph elements on the Ness of Brodgar stone. The Welsh Rhondda Calendar c.4270 BC has a column of vee lines, Ireland's Knowth c.3500 BC and Newgrange c.3200 BC mounds kerb stone megalith pictograph counts have similar glyphs demonstrating a unit count of one as **Λ** or **V**. The apex of the glyph is a point and the operator, not the sloping lines.

My interpretation of each item follows: -

A Two deep pock marks are seen to represent the Sun and Moon. The former pock mark is larger, more pronounced and may have radiating lines emanating. The Moon is very slightly to the lower right and less pronounced. Certain similar but smaller depressions elsewhere in the area could be naturally occurring events unrelated to human activity.

B A single **Λ** where the left stroke is feint appears to be a second attempt after a defective first attempt, is interpreted as a statement of equality. Onwards from **C**, each of the following C, D, E, F, G, H pictographs are enclosed by the same double nested **Λ** seen as an artistic device to show a continuation of an equality statement during the two halves of the year, Summer and Winter. The included angle of the **Λ** has significant associations. Measured by protractor it is seen to be close to 40^0, the angle between sunset and sunrise alignments at the solstice and equinox. Twice 40^0 is the

winter to summer solstice alignment difference = 80^0. Recall how both the Bush Barrow Plaque 1900 BC alidade and Nebra Sky Disc 1600 BC perimeter arcs exhibited the same 80^0 angle. The next chapter examines how the sunset watcher at Morton, Scotland, witnessed the same sunset alignment 40^0 angles between the solstice and equinox. These examples from west to east indicate archaeoastronomical traditions endured generation to generation, is this case employed as a basic artistic element in the entire design. Below and within the double vee **Λ** roof at **C** are a series of straight lines, four vertical lines intersected by two slanting lines giving a count of five.

The pair on the left are interpreted as Sunday an Moonday, the line of three on the right as Wodensday, Thorsday and Freyrday. The Ness pictograph conforms to the same principle as the Rhondda artefact and several Irish megaliths where there are identical groups of two and three:-

D The two nested **V**'s affirm the message of **C;** "Both Sun and Moon calendars have a five day week".

E From weeks to months; there are four vee points around the rhombus and one vertical line from top to base. The figure's geometry is seen as a statement there are four weeks in one month.

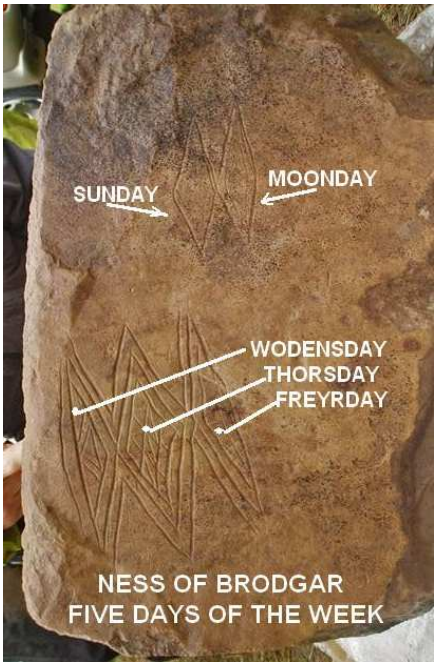
F In a similar manner, the second rhombus figure has four vee points without a vertical line, a statement there are four months in a quarter and four quarters in a year.

G There is one **Λ** = one year, seen as confirmation pictographs **F** and **G** are a joint statement; four quarters comprise one year.

H The double nested **Λ** has a group of straight lines within its compass. Intentional damage appears to have affected three vees intersected by straight lines at critical locations. For that reason the following comments should be taken in a generous spirit. Reading from left to right, there may have been two intersections, Sunday and Moonday. Next right, there is still a reasonably clear set of three intersections of backward sloping lines; Wodensday, Thorsday and Freyrday. The 2, 3, 4 **H** pictograph is assumed a confirmation of the **C** characteristics: 2+3 equals five days a week and 4 weeks a month, 64 weeks a year.

I Pictograph **I** is also damaged; nevertheless it too offers the same "Every year" message as **B**.

J To one side of the main pictograph, item **J** shows double parallel zigzag lines with four apices, seen to proclaim the common characteristic of both Sun and Moon calendars; there are four months a quarter and four quarters a year.



Days of the Week

A constant theme in the portrayal of the ancient Sun and Moon calendars petroglyphs is a group of five; two celestial elements and an associated group of three stellar elements. Always five in number, the sum equates to five days a week in both Sun and Moon calendars. The style of individual petroglyphs in the Ness of Brodgar artefact is uniquely a rhombus. At other sites in Wales, England and Ireland the basic glyph form varies slightly from a hoop, a curved line and a circle. As elsewhere, the symbolism portrays the five days of

the week in both calendars; I offer devised names for the single purpose of comprehension and cross references between sites. The Ness Week Days artefact may have been manufactured at any time during the occupancy of the Ness site but for the purposes of discussion a date around the latter part of the fourth millennium BC is suggested, say 3,300 - 3200 BC. The portion of the petroglyph labelled 'Thorsday' deserves special comment. Rhombus shaped, the double line vee perimeter encloses a single line perimeter within which are nine small rhombus unit shapes, the three centre units have cross lines, corner to corner. The design concept of 3 x 3 = 9 clearly has great antiquity. This pattern is almost identical with the Bush Barrow Plaque found near Stonehenge and dated about 1900 BC. Chapter 17 'Stonehenge' discusses the provenance of the Plaque and its purpose as an alidade. The acute longitudinal angle of the Plaque is 80^0, the arc between summer and winter sunrise at the solstice. The concept of three by three, nine items in a set, is the building block of the old Welsh game board '*Gŵyddbwyll'* I have named "Griffin and the Geese" played by Imperu Arthur in AD 495, the modern English version named "Fox & Geese", both are described in chapter 7 'Board Games'. Thirty-three play positions arranged in a cruciform manner are perceived as five sets of nine places overlapping at the edges.

From visual and measured examination of the illustrations, the Ness Week Days and Ness Calendar Stone petroglyphs singular vee angle is very close to 40^0, the angle between summer and winter dawn sunrise and due east at the equinox on latitude 59^0 north. An understanding of the sunrise & sunset angle difference between spring and summer, autumn and winter, a philosophical and artistic principal has continued in sunset observations at Morton, Scotland in chapter 28 'Morton', this Ness of Brodgar community and through the millennia to the Nebra community in eastern Europe.

Summing the evidences of petroglyph symbols as they relate to Ireland's Knowth kerb stone K15 , Newgrange passage roof stone symbols, England's Stonehenge geometric dispositions of trilithon columns and Holes, there is every reason to assert the Ness of Brogar community observed and employed the same Sun calendar of five day weeks, sixteen months a year, a time measure accepted by the sea-linked communities of the north-west.

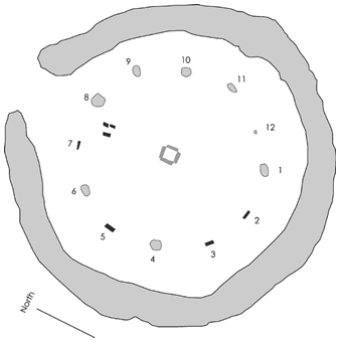
Ness of Brodgar Date

Parallel with these calendar artefacts discovered at the Ness excavation in July 2013, an equally significant archaeological event occurred the same month in Wales' Rhondda valley, an oak log artefact dated c.4270 BC. Chapter 27 'Rhondda Calendar' offers my analysis of its fifty vee lines nested into a column, the groupings describes an identical Sun and Moon calendar counts philosophy, the presentation sequence in the same manner.

I am unaware if any artefact or other means have so far established a calibated carbon date for the Ness of Brodgar stone settlement. Comparing the Rhondda Calendar c.4270 BC carved line markings and similar data on Ireland's Knowth c.3500 BC, Newgrange c.3200 BC, the Ness petroglyphs offer the same Sun calendar messages. In each case the presentation implication is that of a school blackboard or whiteboard, an advertising hoarding, a teaching technique device for an audience by visual and audio methods.

The Ness symbols appear to date later than the Irish symbol styles. Having regard to all these various factors I advance a best guess construction date for Ness and Brodgar Orkney settlements, say between 3500 BC and 3200 BC; between the Irish Boyne passage mounds c.3500 BC and the Danish Tustrup stendysser c.3100 BC;.

STONES OF STENNESS RING



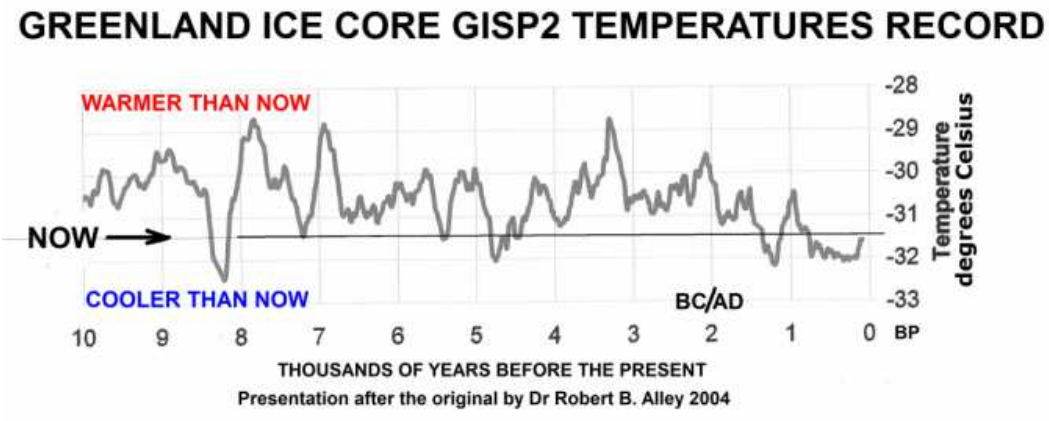
Within walking distance of the Ness of Brodgar is the Stones of Stenness Ring, numbering just twelve columns and with an entry access facing north. There is an absence of Sun calendar features such as mid-summer dawn sunrise, a mid-winter sunset direction or other alignments with solar links.The twelve month Moon calendar year, a northerly entry to the inner area, twelve tall stone columns; these factors considered together point to strong lunar associations for the Stones of Stenness Ring; it was a temple to the Moon goddess. Traditional linear measurements seem to have been known to the designers of the circle. The diameter is reported to be 44 metres on which basis a circumference calculated to be 66 *faethms*, 2 *furlangs*, the same as Woodhenge, Mount Pleasant, the Sanctuary and Durrington Walls southern circle, four southern England Sun and Moon calendar buildings.

SKARA BRAE

Situated on the mainland mid-west coast is the popular tourist destination Skara Brae village. A walk around and along the grassy route between individual rooms concentrates one's mind on living in modern day comfort. Equally important as the Ness of Brodgar, the village is a significant destination for visitors. I recommend an Internet website browse of < skara brae Scotland > for a most satisfactory account of the wind-swept site and its relationship to other sea-linked Scottish group settlements within the north-west European peoples' diaspora. Scara Brae has a suggested occupancy date c.3300-3100 BC.

ORKNEY CLIMATE

Climate change is a topical subject nowadays; to put matters into historical perspective the graph overleaf is offered for thought. Concerning why the Ness of Brodgar in the centre of Orkney Main Island was so storm damaged, why Skara Brae on the west coast became covered deep in sand can readily be re-assessed.

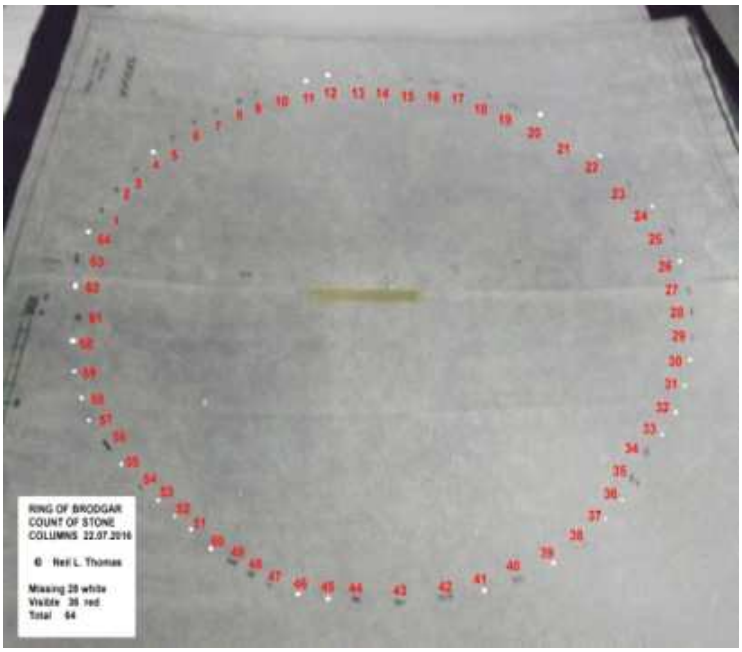


Dr Robert G. Alley's graph of Greenland ice core GISP2 temperatures during the last ten thousand years offers an answer; base line shown "NOW" predicated world temperatures around 2004. In the decades since that date, world temperature have risen, scientifically based estimates range about one and a half degrees Celsius. Concomitant with this temperature rise severe weather events; cyclones, gales, heat waves have been reported world-wide.

In fourth millennium BC Orkney Islands, warmer temperatures shown by the coloured zone timeline shown on the image; periods ameliorated by the Atlantic Gulf Stream would most likely have encouraged more pasture growth, better crop yields and cattle/sheep numbers. Human population increases enabled community projects to proceed apace. Later in the period it is supposed warmer climatic seasons caused extremely intense Atlantic Ocean gales to batter the Islands; Skara Brae village was covered in sand and the Ness of Brodgar battered and rendered uninhabitable, a date around 3200 BC is most likely.

THE RING OF BRODGAR

Image :: Courtesy Scottish Heritage



The Ring of Brodgar is comparable in size and significance to Avebury in southern England,; it once comprised sixty-four tall slender rock columns. Only a few miles west of Kirkwall by road, found in the central mainland area visitors can expect to be impressed by what they see close to the Ness of Brodgar and Maes Howe chamber mound. The Ring is supposed to have been erected between 2500 BC and 2000 BC and was thought to be the last of the great Neolithic

monuments built on the Ness. Seriously questioning that particular hypothesis in archaeologists' reports which were focussed on their personal acquaintance with Avebury c.2500 BC and its similar size; in my opinion the slightly smaller Ring of Brodgar was the product of fourth millennium endeavour – perhaps 3100 BC, contemporary with the Ness of Brodgar stone settlement. Reasons for believing a much earlier Mesolithic date for the Ring of Brodgar are these:-

The Ring of Brodgar destination for sea-going jorneys required coastal observations and open ocean-going navigation abilities; the Orkney archipelago harbour is a half-way refuge sea port from Wales Aber Dee sailing around northern Scotland across the North Sea on the way to Tustrup in Denmark in the east.

Eirik the Red's Viking voyages from Iceland, Greenland to Newfoundland around 1000 AD were made possible by the Norse navigation device illustrated having sixty-four notches around the perimeter. Sailing ships in Queen Elizabeth's day 1600 AD employed sixty-four sailing directions. British Royal Navy midshipmen 'boxed the compass', merchant ships officers recited the sixty-four divisions; north, north by east, north-east by north, north-east, etc., etc. Precedence for these techniques of historic times is predicated from prehistoric voyages from Orkney to Tustrup along the 57th - 59th latitudes in the fourth millennium BC. Navigation using the Norse compass navigation device ensured consistency and reliability.

Denmark's Tustrup 3100 BC coastal settlement was centred near an ancient monument of five stone circles, a burial mound and ceremonial house. Their lineal measures, numbers and geometric dispositions are interpreted as the progressive arithmetical series 1, 2, 3, 5, 8, 13, 21, 34, 55 where pairs of numbers as vulgar fractions equal the Golden Number Ratio 1.62, the architect's design rule for a building's proportions. Tustrup's five satellite dyssernes are dispersed at bearings of 3, 7, 9, 10, 19 sixty-fourths to true north around the stendysserne. This knowledge of sixty-four divisions of a circle is seen as evidence of a transfer of nautical navigation techniques during Scotland to Scandinavia voyages. A showing of sixty-four land divisions associated with sea-going voyages back and forth from Ireland to Orkney and Denmark, across the North Sea and back again from east to west established a nautical navigation tradition that has endured for millennia. Later in historic times Ireland's Dublin was founded as a Viking trading centre, their long-ships ships sailed the same routes, navigating across the seas with the sixty-four point device. The Ring of Brodgar with a five furlangs perimeter has a circular outer ditch of seven furlangs perimeter encompassing the whole. Compared with England's Avebury c.2500 BC which also has a seven furlangs perimeter, these linear values are additional evidence ancient measurement knowledge transferred from Ireland to Denmark before 3100 BC.

NORTHERN ROUTE

Beginning about 2000 BC, sailing coracles made sea voyages along the north Wales coast from Great Orme Head, carrying copper ore cargoes from the Great Orme Head mine to a destination, the estuary of the river Dee, Aber Dee, Clwyd. In a similar way, nodules of zinc ore, $ZnCo_3$ zinc spar, from the Gwynedd Moelyn mine near Snowdon were also shipped to be treated in a similar fashion to copper ore; the metal product was shiney yellow brass, sometimes termed 'false gold'. At Aber Dee, Wales copper ore was treated and reduced to metallic form in furnaces fuelled with charcoal derived from forest timber growing along the banks of Avon Dee. Export of crystalline ore and red

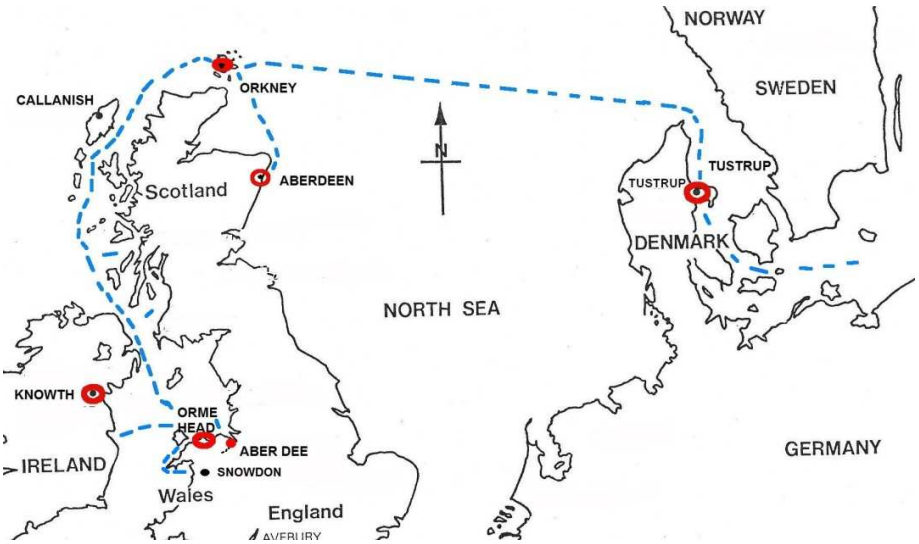
metal along a northern route began. Strong demand for metal shipments arose in Scandinavia and the Baltic, outstripping the production capacity of Aber Dee.

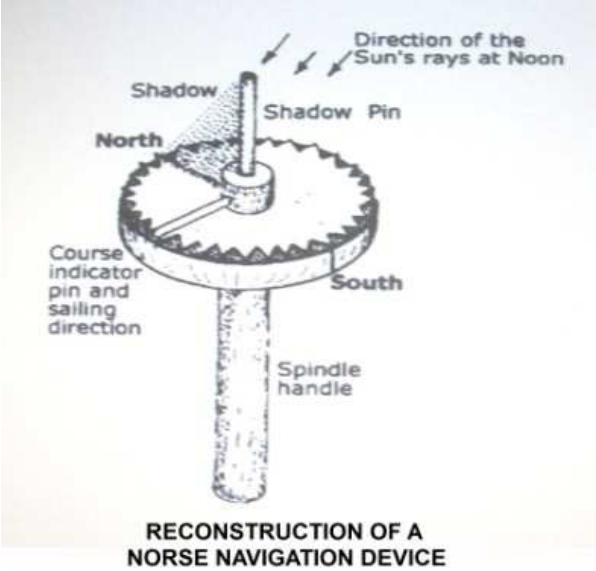
Another smelting site to refine copper ore to metal was initiated; a southern branch from Orkney enabled the creation of a smelting site employing charcoal made from forest timber growing in the Aberdeen hinterland. An industrial complex arose on a site now known as Ellon, a township settled and inhabited by immigrant Cymry with metallurgical knowledge and charcoal manufacturing experience. Development and naming of the area's creeks and rivers has an Old Cymraeg language flavour. A river now named Ythan , (originally '*y Llan'* = *'*of the village') flowed to an estuary and port whose name derived from north Wales. Clwyd's Aber Dee with 'n' added completed the noun Aber Deen**,** founded perhaps 1700 – 1500 BC, the location of **Aberdeen** city today. Copper and bronze trade along the northern route from Wales to Scandinavia continued for millennia.

Browse the Internet for an Earth view < Ellon Aberdeenshire Scotland

SEA-GOING NAVIGATION

Navigation along coastlines and at sea across open waters requires particular skills, mathematics and techniques. The means to accomplish voyages on a consistent basis was the ancient compass, a wooden disc having thirty-two notches around its perimeter. The vertical shadow pin enabled the north direction to be found every day at noon, the course direction pin set by the ship's navigator for the desired course on which to sail. An illustrations offer a view of my replica model based upon a Norse navigation compass artefact found last century at the western Greenland settlement Brattalid founded by Leif Eriksson, son of Eirik the Red.The artefact is dated about 1000 AD.





RECONSTRUCTION OF A NORSE NAVIGATION DEVICE

VIKING COMPASS

Predicated to have been employed by sea-linked peoples of north-western Europe before 3000 BC a device similar to my replica hand-made Viking compass with sixty-four notches around the perimeter. The Ring of Brodgar, 64 standing stones on Orkney's main island, harmonises with the compass. Use of the Norse navigation device enabled Leifr Eiríksson (970 – c. 1020) to establish L'Anse aux Meadows in 'Vinland' Newfoundland, Canada.

Sixty-four Directions

Siling ships in Queen Elizabeth the First's day employed the same sixty-four sailing directions. British Royal Navy midshipmen 'boxed the compass', merchant ships officers recited the sixty-four divisions; north, north by east, north-east by north, north-east, etc., etc. Precedence for these techniques of historic times is predicated from fourth millennium BC voyages from Orkney to Tustrup along the 57th - 59th latitudes.

ACKNOWLEDGEMENTS

The encouragement and help afforded by Professor James Fraser, the first Vice-Chancellor of The University of the Highlands & Islands was gratefully received. Desultory later communications with Dr Jane Downes and Mr Nick Card concerning the Ness of Brodgar archaeological project are ongoing.

The Royal Observatory, Greenwich England asks this question on their website. I quote their text:-

"Vikings did not use maps. They had lots of different ways of working out where they were and which direction to travel in. They looked at the position of the sun and the stars. They looked at the colour of the sea, the way the waves were moving and the way the wind was blowing. They looked out for birds and could smell if they were near land. It's very unlikely that they had a compass, although some Vikings may have used an instrument called a sun-shadow board to help them navigate."

Read more at:- http://www.rmg.co.uk/discover/explore/Vikings#jjC4cXokQplw5L85.99

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Current Archaeology **Issue CA 283 September 2013**
Issue CA385 January 2018

CHAPTER TWENTY-SIX :: SYMBOLS & NUMBERS

Sun calendar; five day weeks, four week months & sixteen months a year
Moon Calendar; five day weeks, six week months & twelve months a year

IRELAND'S BOYNE VALLEY PASSAGE MOUNDS COMPLEX

Within a bend of the river Boyne midway along the east coast of Ireland, the Boyne valley was presumably held in very high regard by the population as a sacred place. Planning construction of three passage mounds on high ground commenced well over five and half millennia ago, a triumvirate of three large earthen and rock mounds were built in the fourth millennium BC. Knowth mound has two passages aligned with sunrise and sunset at the equinox. Newgrange is south-west, directly aligned on a minor lunar standstill, north 56 degrees west and at a distance of 1.3 kilometres. The complementary Dowth mound is two kilometres distance, on a minor lunar standstill alignment north 59 degrees east. Knowth mound excavations produced radio carbon dated samples at the lower levels dated at 2795 +/- 165 years bc (UB - 357),2845 +/- 185 years bc (UB - 319) and 2925 +/- 60 years bc (UB -318) from which it would be reasonable to infer a Knowth construction date about 3500 BC, perhaps decades either way, clearly the oldest building in Europe. The mound passages have solar alignments. A number of other standing stones and earthworks within the bend of the river Boyne provide a series of solar and lunar alignments, the totality of which shows the area was constructed according to a precise astronomical plan described in the bibliography.

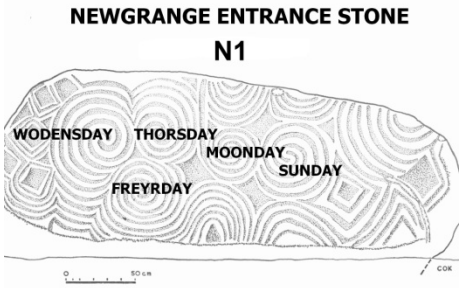
NEWGRANGE MOUND c.3200 BC

The great majority of visitors who choose to the Boyne Valley every year visit Newgrange passage mound as a first stop on their tour. A very popular destination, thousands of visitors witness Newgrange special features; a kiosk and linked facilities cater for the crowds.

NEWGRANGE PASSAGE MOUND 1986

NEWGRANGE ENTRANCE PORTAL AND STONE N1

The Newgrange Entrance Stone N1



Visitor's first point of call is the passage entrance leading into the mound; to view the imposing quartz stones facade, an entrance portal and doorway, the roof box opening over the lintel which admits midwinter's day dawn rays of the rising sun to illuminate the passage. The full design would have provided a form of calendar for the Neolithic inhabitants and three Boyne valley passage mounds; the supposed magic dwelling places for their triumvirate of deities.

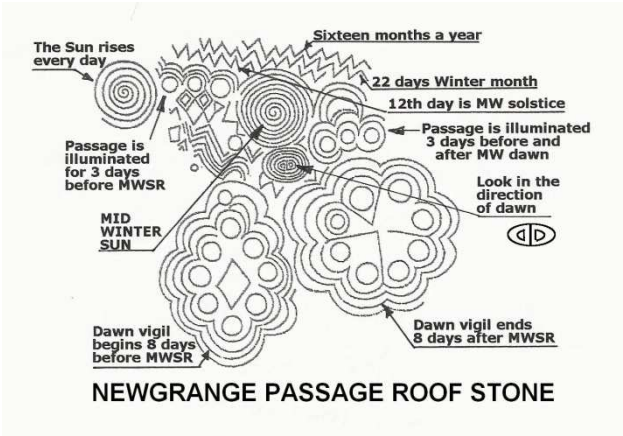
Much speculation about the petroglyph patterns on the face of Newgrange entrance stone N1 intrigue the public. 'Rock art' experts offer opinions of wondrous complexity. However, I consider the five whorls, two plus three, represent a statement of the five week days of the ancient Sun and Moon calendars, a common characteristic perhaps named the phonetic equivalent of Sunday, Moonday, Wodensday, Thorsday and Freyrday. Three clockwise whorls on the left are Wodensday, Thorsday and Freyrday; two clockwise whorls are Sunday and Moonday, sized appropriately.

Two radio carbon dates indicate the building was built about 3200 BC. Part way along the passage an upwards glance reveals the notable Newgrange passage roof stone forming the roof. The petroglyph describes the mound's purpose as a midwinter dawn observatory. Reading the petroglyph lines as we do today from left to right and down the page line by line in sequential form my interpretation of the roof stone message is the sunrise events around the midwinter solstice sunset; my interpretation aided by observations in Martin Brennan's book "The Stars & Stones".

Reading the Message

As we do today, the petroglyphs make sense when read from left to right and from the first line downwards:-

- top left a tight spiral represents the Sun. Every day of the year, the deity arose at dawn for sixteen months. Each zig and zag apex is a count of one. \/\/\/\/\/\/\/\/\ = 16.
- Winter month has only twenty-two days, \/\/\/\/\/\/\/\/\/\/\/\/\/\ = 22. The twelfth day is the midwinter solstice, \/\/\/\/\/\/\ = 12. The twelfth day is two weeks and two days after the beginning of the month, [two double diamonds and two vees].
- Before the actual midwinter solstice, for three days [000], the dawn Sun illuminates part of the long passage into the Newgrange mound.
- At dawn on the twelfth day [o] of Winter month, [count the six rows of two zigzags



= 12] the Sun [spiral] rose above the horizon and is witness to the midwinter solstice as the Sun's dawn rays illuminated the full length of the passage. For three more days, the early morning Sun illuminates part of the passage.

- Lower left, within a series of linked hoops, a ring of eight larger circles with a central rhombus indicates a set. In other words, the Sun priest began his dawn vigil 8 days (o) before mid-winter solstice sunrise.
- marking the equinox alignment. Because the established purpose of the mound was to recognise the equinox days, it is clearly logical to assert the incised designs were accomplished at the same time the mound was built.
- K74 on the west side of the mound has a similar artistic design of horizontal and vertical lines as K11, in this instance the equinox alignment of the setting sun is obviously shown by the twin vertical lines marked at the centre of the kerb stone, confirming the basic design intention of the mound builders.
- Lower right, the Sun priest maintained his vigil for eight more days after mid-winter solstice sunrise until the last day of Winter, a twenty-two day month. This account rests on the proposition that the first month of the year is that at mid-summer, thus the ninth month would be mid-winter. It also assumes the twelfth day of the first month is mid-summer sunrise, the twelfth day of the fifth month is the autumn equinox, the twelfth day of the ninth month is mid-winter's day, a twelfth day of thirteenth month is the spring equinox.

THE SYMBOLS

In any society there are those whose abilities place them above the majority of the community by virtue of their achievements and the respect in which they are held by the many. Researchers skilled in their fields have written about prehistoric society, its activities and classes of people. In general terms, the 'priestly' class is believed to have been the repository of knowledge whose abilities enabled them to become rulers of their society. Building was the responsibility of artisans; farmers formed the population majority and produced food needed by the community, the basic structure of society the world over. The literate amongst the early civilisations were clearly in the minority and it is to them we are indebted for the record of their life and times. Because several thousand years have elapsed between early Eastern civilisations and our age today, is true to say without any need for emphasis that virtually all the written records we are aware of were preserved in clay tablets and by inscriptions on stone. The importance of the Irish petroglyph inscriptions will be appreciated when comparisons are made. Evidently the Newgrange, Knowth and Fourknocks passage mound symbols shows a culture beginning 5500 years ago was already firmly established. Erin society was clearly in possession of a philosophy and calendar which presumably had taken generations to develop. In my next chapter 27 "Rhondda Calendar", I account for a south Wales Rhondda valley oak log carvings dated about 6300 years ago which had the sequence of days, weeks, months and quarters of the Sun year, a calendar that endured for four millennia until the Roman Empire and Julius Caesar's calendar.

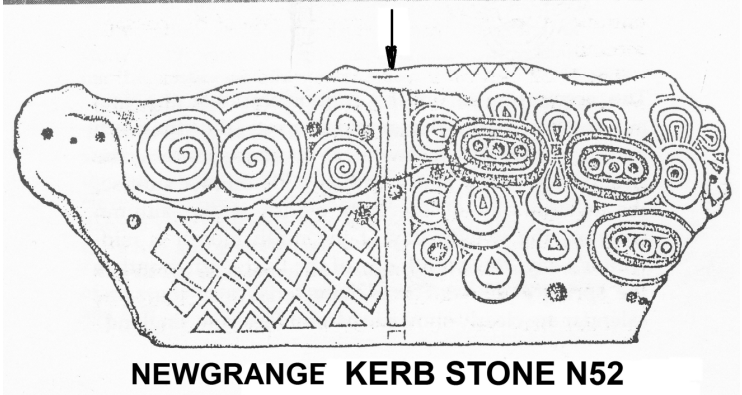
We read English by learning twenty-four alphabet letters and how to use these individual glyph symbols are grouped to form words. Each word has meaning, a sequence of words form sentences that tell the story. In ancient Ireland, thirty symbols were apparently used to tell of the sixteen

month calendar and the idea of the world we live in. Explained in terms of the sun, the moon, an imagined Otherworld outside and beyond our immediate perception, the interpretations placed on the thirty or more Irish symbols are stated on pages 478 and 479, each symbol, an explanation is given for each. In this and other chapters the petroglyph designs on stones and lintels are analysed. By employing the deduced meaning of each symbol, a meaning of each petroglyph at a number of other locations has been deduced.

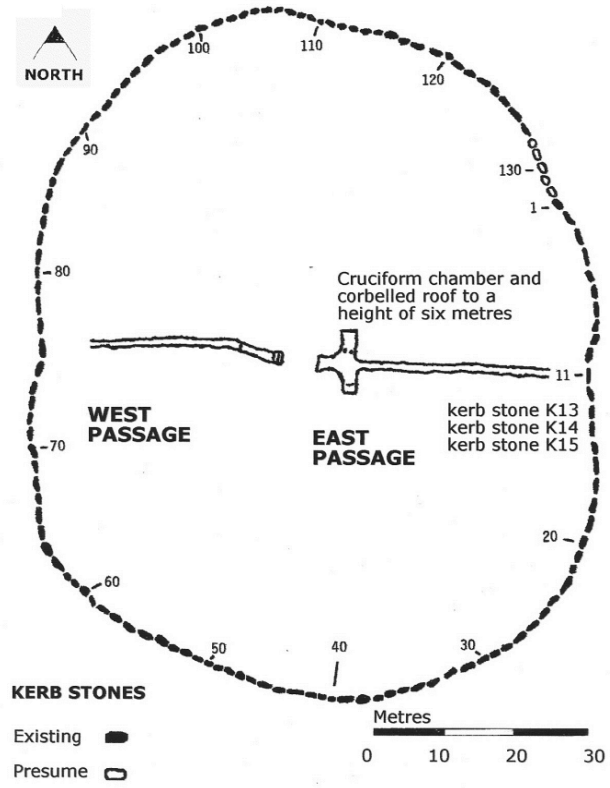
Newgrange Kerb Stones

A paucity of information exists concerning the original number of Newgrange kerb stones, the extent to which they were inscribed with petroglyphs similar to Knowth kerbstones. Newgrange quartz frontal feature took pride of place, an imposing architectural aspect of a magnificent mound. Perhaps earlier fashions had changed and kerb stones at Knowth nearby were sufficient. Two centuries later Newgrange had no requirement for petroglyphs describing the cosmos. Kerb stones chosen offer you particularly interesting examples are from the Knowth petroglyph selection. More illustrations and attendant interpretations, many linked to the Sun's behaviour, yet more concerning numbers and the symbolism associated with historically important myths and legends follow. Much work needs to be done to examine and interpret at least a hundred more kerb stones petroglyphs.

Newgrange Kerb Stone N52, Midwinter Dawn Alignment To complement Newgrange entrance stone N1 and its relationship to the midwinter's day dawn alignment of the passage, diametrically opposite around the other side is N52, is seen next. It too has spiral ornamentation and vertical parallel lines in the middle of the stone. The three spirals comprise two larger clockwise designs and one smaller more tightly wound anti-clockwise spiral, supposedly representing Summer and Winter suns. Spiral directions are the same as those on N1 entrance stone on the opposite side. N52 vertical lines complement the entrance stone N1 thus defining the mid-winter sunrise alignment passing through the passage mound. Interpreting messages on N52 left; paired spiral symbols represent equinox suns when days are of equal duration. Far left are three pock marks representing Wodensday, Thorsday and Freyrday. To their right, a left hand spiral with two larger pits perhaps represents the



NEWGRANGE KERB STONE N52



KNOWTH PASSAGE MOUND PLAN COUNTY MEATH, IRELAND

Sunday and Moonday. Above these pits a series of three or four arcs represent the Sun's path during day-time. Below the line, twenty-three geometric figures tally the days a month.

To the right of N52 are three particularly notable oval symbols, each consisting of three circles surrounded by double lines. Arguably, the adjacent dual and triple hoops are twelve in number, the number of Moon months in the lunar yearly cycle. Other ornamentation further embellishes N52.

Summarising the presentations, the left hand portion of N52 has firm Sun deity links, the right hand portion relates to the Moon deity.

KNOWTH MOUND & SATELITES

Welcome to the morning, farewell to the evening Illustrations courtesy Dr George Eogan

Knowth mound excavations produced radio carbon sample dates at the lower levels oft 2795 +/- 165 years BC (UB - 357), 2845 +/- 185 years bc (UB - 319) and 2925 +/- 60 years bc (UB - 318); from which it would be reasonable to infer a construction date of about 3500 BC, perhaps decades either way. Such dating makes Knowth passage mound quite clearly the oldest building in Europe. My use of the term 'passage mound' is descriptive of its general appearance and nature. Brochures and media references frequently use the term 'grave mounds', an erroneous assumption concerning their primary purpose. In my view all three mounds were 'homes' built to honour the 'Old Peoples' three principal deities. County Meath's newly re- instated Knowth passage mound is the illustration rear, two of several smaller satellite mounds at left are closer to the camera. Knowth mound is 1.3 kilometres north-west of Newgrange mound aligned on a minor lunar standstill, north 56 degrees west.

The complementary Dowth mound is also on a minor lunar standstill alignment, this time north 59 degrees east, two kilometres distant.

Three mound passages are aligned with solar events. Knowth's two passages into the mound are aligned with sunrise and sunset at the equinox. A midwinter solstice sunrise

passage features at Newgrange. A short passage into the Dowth mound is aligned with midwinter sunset at the solstice. Considered in relation to Newgrange, a number of other standing stones and earthworks within the bend of the river Boyne provide a series of solar and lunar alignments, the totality of which shows the area was constructed according to a precise astronomical plan. The full design would have provided a form of astronomical calendar for the Neolithic inhabitants, magic dwelling places for their triumvirate of deities. I hold a view Knowth, as the first and largest mound, was dedicated as home of the deity equivalent to the Sun. Two or three hundred years later Newgrange was built, legends assert it was the home of Dagda the Boyne river deity. Dowth mound followed as a man-made home for the Moon deity.

Knowth Passage Mound Kerb Stones

Surrounding the mound, 132 kerb large flat stones were set on edge, their purpose to stabilise the mound material to prevent settlement and spreading, hence the name 'kerb stones'. Taking into account the total perimeter measurement and an average spacing for 127 stones still in place, calculations indicate five kerb stones appear to be missing in the north-east quadrant shown by open circles. There are thirty-three kerb stones in three each of three quadrants defined by the north-south meridian and east-west equinox alignments, thirty-three kerb stones are presumed for the north-east quadrant. I employ Dr George Eogan's numerical kerb stone numbering system.

The choice of 132 kerb stones is seen as an important philosophical feature in the mound design; four times thirty-three is an example of the symbolism defining Knowth's highly sacred nature. Passages aligned east and west are fundamental elements. Knowth kerb stone K11 faces east; a vertical band inscribed on its exterior side indicates its cardinal purpose. Dawn sunrise illuminates the eastern passage and the west is lit at sunset. On the west side of the mound, Knowth kerb stone K74 has a narrow vertical band between parallel lines. An east-west line joining K11 and K74 bands define an east-west axis, hence it is reasonable to assume the petroglyphs were inscribed when construction began, a means of definition and cardinal direction.

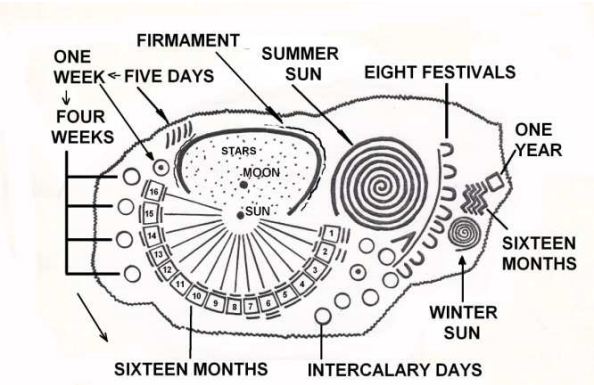
KERB STONE K15

Interpreting the petroglyphs on kerb stone K15 shows its unique statement; an exact 365 day, sixteen months, four week months, five day week solar calendar. A semi-circular group of 16 squares is considered to be a clear statement of the monthly divisions of the year. Originating at a common point, each ray ends at a rectangle incised on the stone. All but one square has one, two or three groove marks immediately adjacent.

The Professor's photographic illustration shows the flat face and a complex series of line designs. The right portion of the inscription was too dark to reproduce properly, but my diagrammatic illustration below provides the added detail. A fan shaped design, two spirals, twelve small circles, a series of hoops and zigzag pattern are major features.

My sketched K15 illustration shows pictograph elements, each item labelled to show their deduced meaning. On the basic month of four weeks each of five days, it is assumed the ray line is attributed with a value of twenty, squares are twenty-one. The groove marks would then be the means of counting twenty-two, twenty-three and twenty-four days a month. From left to right, I interpret the pictograph elements in these terms: -

- Five short strokes define the number of days in any week. Five rings mean five named days comprise one week.
- Sixteen rays equal sixteen months a year.
- The Sun cup mark and the Moon cup mark identify those celestial bodies.
- Parallel arched lines represent the firmament, the imaginary inverted bowl over mankind's world.
- The pecked zone within the firmament represents the starry night sky. Holes in the firmament allow the Sun's light to shine through during the night, these pin points of light become twinkling stars.
- Long summer days, warm weather is portrayed by the large loosely wound Sun spiral.
- Winter is the smaller tight Sun spiral, short days and cold weather.
- Eight hoops match the total of two solstices, two equinox and four quarter days, eight events brought together by the long line alongside the eight hoops. The adjacent **>** is thought to mean eight events occur each and every year.
- To the right, four rows of zigzags each with four changes of direction are a count of sixteen, the months a year. The adjacent diamond figure on the extreme right is a unit measure, read as one Sun calendar year comprises sixteen months.



KNOWTH KERB STONE K15 CALENDAR COUNTS

To interpret elements of the pictograph, first of all consider the loop and fan design. A deep cup mark is assumed to represent the Sun, sixteen rays originate from the common point. At the extremity of each ray is a square, adjacent to which are additional groove marks. Allocating a value of twenty to each ray and one to each square, plus one to each groove mark alongside the square, the sum of each of the sixteen elements amounts to: -

(16x[20+1])+(3+3+2+2+2+2+3+2+1+1+1+0+1+2+2+2+2) = 365

<Squares> <..... Groove marks .....>

To detect and interpret the rays, squares and marks in this way offers an immediate realisation


By kind permission of Professor George Eogan, dated August 2002

KNOWTH KERB STONE K 15

K15 is the Sun calendar year. The inscription offers a positive message; it is far more than just simplistic "Rock Art" of populist view. Knowth K15 is the second example of the Sun calendar of sixteen months a year; a first offering of allocation of days each month.

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16 = 16
Days	24	24	23	23	23	24	23	22	22	22	21	22	23	23	23	23 = 365

Five short stroke lines above the loop equate to five days a week. The loop is considered a representation of the firmament, the overarching bowl of the sky that protects mankind from the evil frost giants who prey on all living things. Within the loop, the speckled effect and deep indentation is thought to represent the night sky with twinkling stars and the Moon. Ten rings in two groups equate to two weeks of ten days. To the right, the large loose spiral is interpreted as the summer Sun, large and bright. Because the first month ray and square is next to the summer Sun spiral, it is concluded that month was Summer, the first month of the calendar.

Summarising the K15 petroglyph messages: -

- Both ray squares adjacent to the large spiral have 3 added grooves which I equate to 24 days for those two months, an apportionment of 24 days in a warm sunny month reflecting the innate psychological desire for summer month to last as long as possible. At the other end of the scale, the cold and wet winter months 8, 9, 10, 11 and 12 are short months, only 21 or 22 days. Fewer days in those months would make it appear the colder winter months passed as quickly as possible.
- There are ten small ring marks, two of which enclose added dot symbols. Ten rings are interpreted as days, counted twice equal twenty, four five-day weeks. Two rings with additional dot marks permitted a count of intercalation days required to correct any annual days count discrepancy.
- Ten rings plus two dots enabled a count to the twelfth day, the middle day of 23 day months. Ten rings plus two dots counted twice amounted to a full count of 24 days in two longer summer months.
- Month 6 of 24 days would have been the even numbered month between Autumn and Samain months. A 24 day month at this time of the year was harvest time, stock was slaughtered in this month for Samain sacrificial ceremonies. In other words, everyone was very busy and harvesters needed a 'long' month to do all the work.
- 24, 22 and 21 day months intercalary days were counted on rings 10, 11.

KNOWTH KERB STONE K13

My interpretation of Knowth kerb stone K13 petroglyphs:-

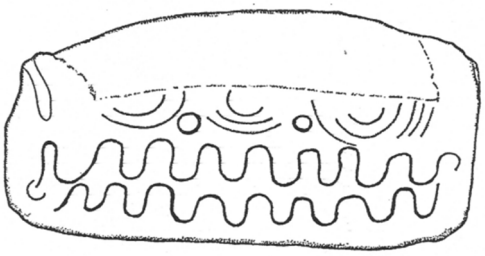
First the top left hand corner and reading from left to right, five rhomboids are numbered week days. Each upper half is more deeply incised the lower half less so; interpreted as one heavy, one light, in other words five night and day cycles. Next, two spirals, one smaller, one larger may indicate Winter and Summer days, the concentric circles and hoop symbol below may mean many days, every year. The fifth rhomboid leads to and connects with a larger and slightly incomplete diamond with a horizontal attitude; this is interpreted as a whole unit, a 'week' of five days. A lead line runs parallel to one side for a short distance and then terminates at a figure of four concentric squares or

weeks implying a basic month of twenty days. Adjacent and below is a further small double square, thought to mean two more days a month. On the right and at the edge of the damaged area are the vestiges of two vees which may have indicted two further days, thus making a possible total of twenty-four days, the maximum number of days in Summer month.

From the 'month' symbol, two parallel lines proceed towards the lower right in a zig-zag route, the last part of which has four triangles on one side, assumed to indicate a count of four; four months a quarter of a year.

The reading route ends in an enclosing diamond with a second internal diamond sub-divided into four. This symbol element is read to indicate a whole year; within it are four quarters, those portions of the year. A second zig-zag parallel path then commences leading to the beginning of a wavy line. The last diamond touches the wavy line, and within is a small spiral which may be supposed to be the symbol for start or commencement. Following the wavy line, a count will show there are sixteen bends and these are seen as the months of the year. The inverted vee of double lines between bends two and four defies explanation. At the eighth bend, a diamond with a dot in the centre touches the wavy line and this could be interpreted as 'half the year' symbol.

After the sixteenth bend are a series of hoops at the commencement of the long straight line. The exact number is uncertain because that part of the stone was damaged; my interpolation has been made on the basis of spacing and sizes and sixteen hoops is seen as a fair approximation. The number and proximity of sixteen hoops next to a straight line is seen as a final re-statement of the number of months in a year. Damage to the upper portion of the stone precludes any deductions concerning the four smaller tight spirals and several individual remaining geometric figures. It is possible the left and right spirals may represent the summer and winter solstice, the joined centre pair of spirals the equinox events.

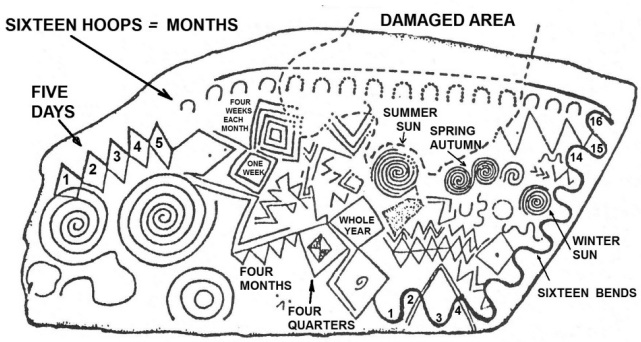


The entire design is assumed to be a statement of the relationships of days, weeks, months, quarters and the whole solar year of 365 days.

KNOWTH KERB STONE K14,

The Symbolic Thirty-Three

Sadly, the upper part of the kerb stone has been severely damaged that precludes realising its full potential. A wavy line begins at the lower left defined by the **C** bracket, followed by a series of thirty-three bends. Each bend is a unit count. The number is presumed to be a statement of the number thirty-three, sanctifying the passage mound by such an affirmation.

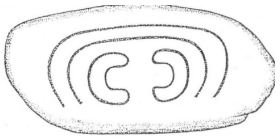


KNOWTH MOUND KERB STONE K13

Concerning the two small circles and the segments of concentric curved lines above the wavy line, the two passages into the Knowth mound are aligned in the equinox sunrise and sunset so these two circles may represent solstice days. The curved lines may be parts of spirals denoting the rising and setting sun on these days.

KNOWTH KERB STONE K36, Four seasons

Damage to the top right hand corner of the stone makes a full interpretation too difficult. To the left, a series of '**c**'s around a 'sun' symbol circle indicate many days in a year. Next right is a curve and **U** surrounding a 'sun' circle confirming the plural. Next right again rows of wavy lines; three plus two, five changes of direction considered to be a statement of a count, five days a week. Below and between the three vertical parallel lines are two vee patterns. The left hand design is interpreted as a count of four weeks leading to a diamond; seen as one whole month has four weeks. On the right side are four more vees and a diamond, thought to tell of four parts and a whole: four months comprise a quarter of the year. The right hand vertical line joins with the start of the route to be followed, the parallel zig-zag lines with four changes of direction. These four changes of direction are seen as counts of four; four 'quarters' a whole year. Next is the upright diamond presumably signifying an entity, a whole year. Within it is a double diamond divided into four parts, a symbol which could represent either four seasons or four quarters comprising the whole year. The incised petroglyph design is seen as a statement of the Sun calendar; the days, weeks, months and quarters of the sixteen month year.



KNOWTH KERB STONE K38

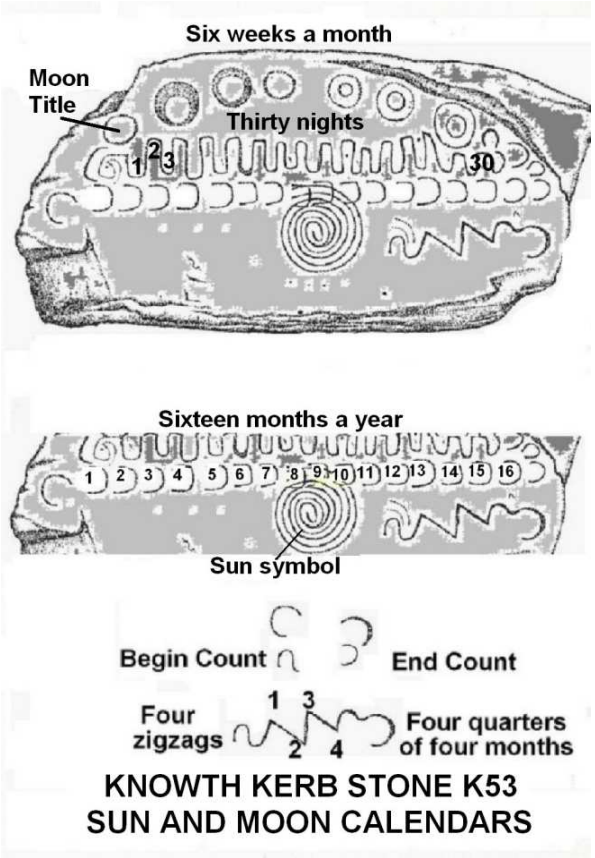
KNOWTH 38, The Firmament

Two cees; forward and backwards, indicate the beginning and end of every day, dawn and dusk. Above is the double line hoop, very similar in style to that on Knowth kerb stone K15, the firmament discussed earlier.

KNOWTH KERB STONE K53,
Sun and Moon Months

The large stone slab Knowth kerb stone K53 illustrated shows significant petroglyph markings. The uppermost row of seven circles portrays the behaviour of the Moon and its relation to the Sun calendar: -

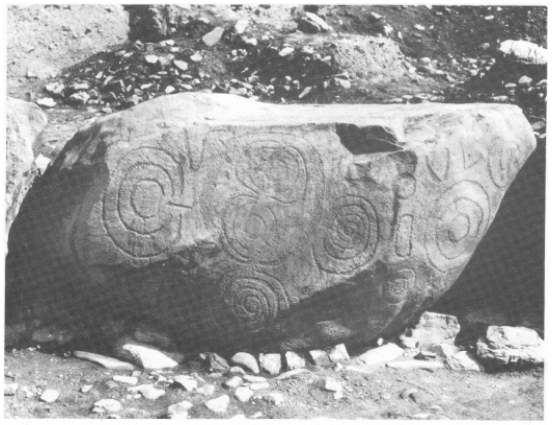
At the top left is a single circle defining the Moon stellar body, a title. Symmetrical about a vertical centre line are six are more concentric circular elements. Each circular element portrays phases of the Moon, from a full orb waning to a new Moon, a waxing and return to full Moon again.



Six phases each of five days a week equate to a Moon month. Two sideways hoops indicate 'begin' and 'end'.

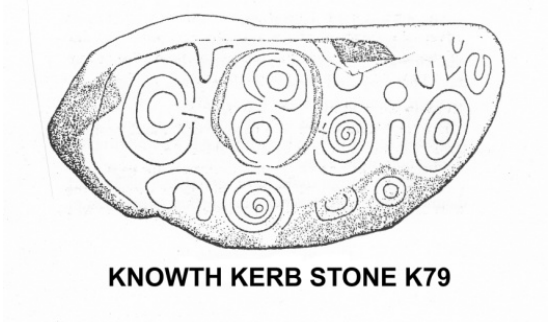
The centre wiggly line begins and ends with sideways hoops and a flourish image. Along the line, numbers indicate one to thirty, the Moon month nights. The actual period is 29.503 days as we know. The lower row of sideways hoops is also contained by two **C** end brackets, between are sixteen hoops and an overlaying Sun spiral portraying the number of months in a Sun calendar year. Conjunction of a Moon behaviour presentation and a Sun year statement, two calendars on the same monolith showed observers an explanation of the two celestial bodies and how their behaviour cycles relate to each other. **C** symbols at both ends of the row indicate start and finish.

Knowth kerb stone K 65 design has a simple story to tell; the pattern of the sun's behaviour every day: (O to the left is a day title; centre two celestial days (OO) Sunday and Moonday, then right three stellar days (OOO) Wodensday, Thorsday and Freyrday. Below the line every day the Sun rises and sets; at dawn the Sun rises and begins its path across the sky. At mid day, it reaches the highest point in the sky and its image is reflected in the waters of the river Boyne below.



The Sun continues on its journey across the sky until dusk when the day ends and it sinks below the horizon. Night is the time of darkness after the departure of the deity to the Otherworld.

KNOWTH KERB STONE K79, The Universe



The interpretation placed on the Knowth kerb stone K79 echoes that of the calendar stone K15. The lower left hoop symbol indicates beginning the long line adjacent showing the start of the story and continuity, of wholeness, leading the way along. To the left are the three concentric hoops with a directional line interpreted to mean 'sunrises endlessly illuminate our world'. On the right hand and opposite is a symbol also with a directional line indicating the Sun shines every day on mankind's world. A second Sun symbol below next to the start symbol implies the orb's circular path around the Otherworld and outside the firmament, first lighting this world and then sinking below the horizon, going further around to the Netherworld below. The shaded picked semi-circular areas are interpreted as the firmament enveloping and surrounding this world. Within these arcs are two multiple symbols. The upper of the two is presumably a day (O) in mankind's world and the lower part is the Netherworld below. The inner circles are seen as the day symbols and the semi-circles as dawn and dusk each day.

Having completed the interpretation of the left hand portion of the incised petroglyph design and crossing to the right, these symbols are seen as representing the idea of the constantly renewed daily cycles. One day (O) leads to (OO) two days Sunday and Moonday, then to three days

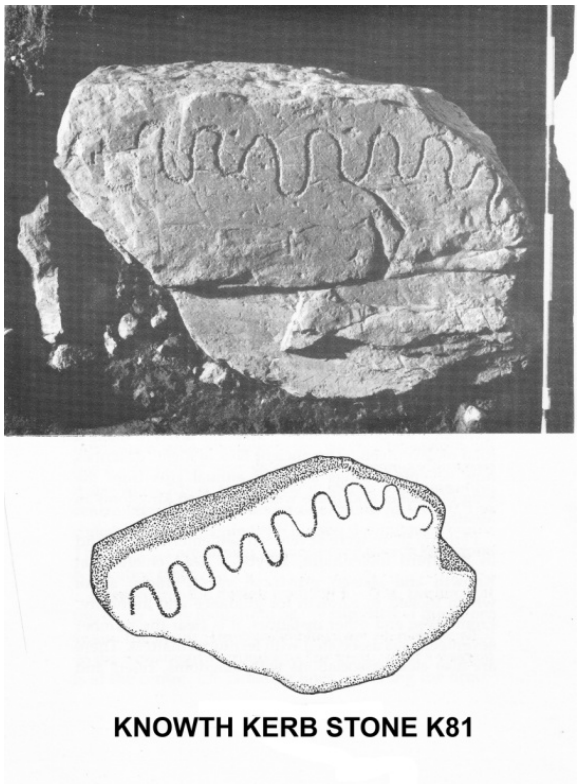
Wodensday, Thorsday and Freyrday then a vee **V** and two hoops **UU** meaning many many days, and so on. Days come and go, life goes on and on. Lastly at the top right the double hoop finish symbol signifies the completion of the story. The whole design would have served as a blackboard diagram, aiding the teacher's instruction to his class of students in the mysteries of the movements of the Sun's movement across the heavens.

Ofyd could have told the story of Knowth kerb K79 this way:-.

"The world we live in is on the top, the Netherworld is below. All is surrounded by the firmament. Each day the sun god begins his journey around the world, his light shines out at dawn, then the Sun goes down at the end of the day passing down and underneath our world to re-appear the next day. Every week two celestial sky gods, Sun and Moon, are succeeded by three stellar deities, Wodensday, Thorsday and Freyrday, one whole week, on and on. The end of one week is the beginning of the next, world without end."

KNOWTH KERB STONE K 81, Seventeen

The wavy line of seventeen bends is interpreted as a statement of the symbolism associated with the number seventeen; symbolism exemplified in the Book of Leinster where a portion of the Mythological Cycle describes how 'Partholan and Nemed between them cleared sixteen plains, which together with the "old Plain of Elta" fashioned by God before any invaders arrived, make a total of seventeen." The ancient Book of Rights describes how seventeen kings accepted annual gifts from the king of Cashel and there were seventeen kingdoms in Meath. Perhaps there were seventeen Erin settlements in the third millennium, maybe a head chieftain at Knowth and sixteen provincial vassal chiefs all of whom looked to Knowth for guidance and authority. From these and other instances it is clear the number seventeen was associated with territorial matters. There are also allied associations with kingdoms, rulers and deities elsewhere in Irish and Welsh legends. It is therefore reasonable to infer that the inscription on kerb stone K81 is a symbolic statement of territorial and government matters.



Seventeen is an indivisible prime number and midway between one and thirty-three, which latter number frequently used adjectivally to elevate a being , a place or occasion to regal heights. Seventeen would therefore appear to have a degree of regality, it would also seem to be a symbolic adjective with an implied sense of regality or divinity. The term "year and a day" is sometimes used in a myth or legend to define how long the heroic voyager's party stayed away or dwelt in another realm. The total time reaches into the seventeenth month, a sixteen month year and the first month of the next year. This use of the symbolism linked to the term 'seventeen'

gives added definition and lustre to their adventures and a touch of the Otherworld.

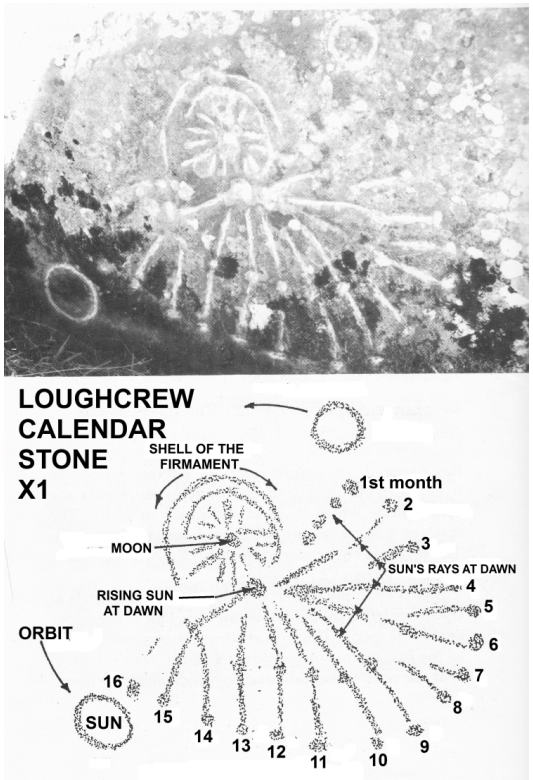
LOUGHCREW, Slieve na Calliagh,

The Sun Calendar Stone Photographs: Author with added annotations 1986

Forty miles to the west of Knowth is the long ridge of hills known as *Slieve na Calliagh*, the 'Hills of the Witches', a Christian name give to a prehistoric area of evident considerable sacred importance in earlier times. Of importance in the context of this book is a ring of stones termed X1 with a single centre stone featuring a weather worn pictograph illustrated next. The concave side containing the incised design faces north. The symbols are similar to those on Knowth kerbstone K15. Interpreting the design from left to right, the circle at the lower left is thought to be the Sun, at the upper centre the Moon. Twin arc lines are seen as the shell of the firmament surrounding the earth, man's domain is at the centre, the radiating lines indicating the firmament can be seen in all directions.

About noon on a day in May 1982, camera equipped I endeavoured to photograph the north facing surface of the central stone showing the inscribed design. A very large Hereford cow found me of great interest, what I was attempting, meanwhile breathing heavily on my head. For that reason the reproduced image is of mediocre quality and I seek your understanding and tolerance forming an opinion of the illustration. The rising sun is the deep depression at the centre, from which are seen radiating lines, admittedly somewhat irregular in arrangement, which lead to an inner ring of small depressions and then out further to the sixteen slightly deeper depressions totalling sixteen altogether. The story to be told would clearly be very similar to the Knowth account of sixteen months of the year, the sun rises at dawn to shine each new day.

The Sun and Moon circle around within the Otherworld; outside the firmament man's domain is lit during the day, at night the light shines through the small holes in the firmament to become the stars. The similarity of the two designs at Slieve na Calliagh and Knowth points towards a common philosophy for two distant communities, each contemporary with the other about 3500 BC. The ray design tells of the Sun's orbit, the firmament concept, sixteen months a calendar year, features identical with the Knowth kerb stone K15 pictograph. The annotations shown are self-explanatory; the Loughcrew people thought and acted in the same way as their neighbours on the east coast. No date has been given to Loughcrew stone circle X1 central prone megalith.



LOUGHCREW CAIRN F, STONE C1, The Lunar Months Cycle

The simple inscription on Cairn F stone C1 shows nine vertical columns of hoops. Knowing that each hoop represents a group of events, in this instance the number of days in a lunar cycle, the total of sixty-two hoops multiplied by 29.503 days per lunar

month equals 1829.2 days. This period compares with five solar years of 365.25 days per year, a total of 1826.3 days. The insignificant difference of three days in five years does not detract from the assertion that stone C1 design appears to be a statement of the number of lunar months in five solar years. From the presence of such a design, it may be inferred the ancient inhabitants of Ireland had a lunar calendar of twelve 29/30 day months at the same time as a solar Sun calendar of sixteen months of 22/23/24 months very early in their settlement of the country.

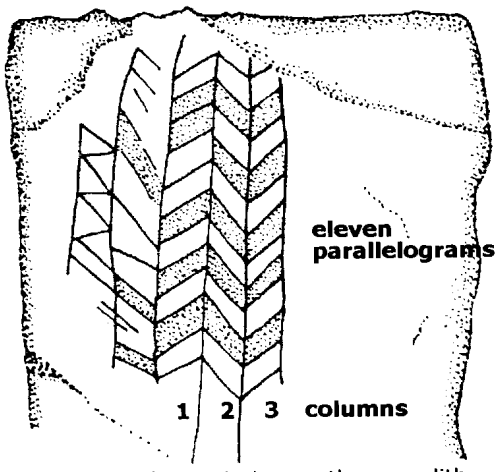
Cairn F stone C1 petroglyph is a public statement of the five year relationship between Moon and Sun calendrical systems; a tabulation of the Moon calendar's twelve month years compared with five years Sun calendar. Two extra intercalary 'months' were added such that five Moon calendar years of 1820 nights (354 x 5) nights plus added intercalary 'months' (2 x 27/28) equal five Sun calendar years totalling 1825 days. Sixty named months ∩, twelve months a year repeated five times, plus two ∩ intercalary months.

Ireland's Loughcrew Cairn F, Stone C1 petroglyph offers proof an inscription showing the lunar calendar five year cycle of sixty hoops ∩ with two larger hoops ∩ in relation to the Sun calendar system was known in Ireland; three thousand years before the French Coligny Calendar Plaque was fabricated in bronze about 100 BC to show identical Moon calendar characteristics, chapter nine, page 127.

FOURKNOCKS MOUND

Illustration Author 1986

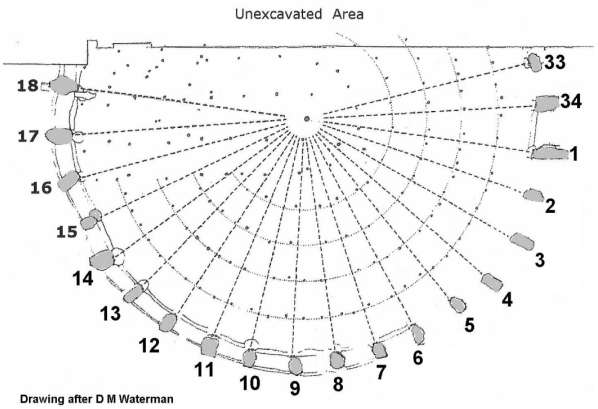
Fourknocks mound is part way along the road returning from Newgrange and Knowth on the way back to Dublin. Near several cottages, close to the side of the road; covered in grass the dome shaped mound has a protective iron grill blocking the doorway to prevent entry by unauthorised intruders. A call at the nearby cottage for the key to unlock the padlocked door enables a *bona fide* visitor to gain entry to the mound and inspect the interior. The mound construction follows a conventional corbelled principle, a large capstone at the apex covers all, providing protection from the weather. A layer of soil and grass covers the stonework. The voluminous chamber houses a considerable number of large and smaller stone slabs, arranged more or less in a ring around a small central open space. A radio carbon date, D-45, 1530 +/- 140 years BC, suggests a carbon date about 1800 BC for the mound. It seems highly likely the mound was constructed in memory of a *branan* or important chieftain. There are six vertical lines with chevron patterns between; the central inscription of thirty-three parallelograms is interpreted as an indication the numerical symbolism regal tradition was alive and well about 1800 BC in eastern Ireland.



The petroglyph inscription on the monolith indicating the sacred nature of the mound by illustrating the symbolic number 33.

The Petroglyph

Petroglyphs inscribed on the assembly of stone slabs within the mound are worthy of study. Of significance in the collection of patterns and



designs inscribed on the Fourknocks stone is one petroglyph particularly worthy of examination. The flat monolith inscription shows six vertical lines with chevron or parallelogram shaped zones between the lines. These zones are mostly alternatively pecked or clear with a few indeterminate areas.

Standing back for a moment and taking a critical view of the inscriptions, it appears there are two differing standards of execution. The view was formed because the two left hand lines and the inscriptions between were not part of the original design since the muddled appearance and somewhat haphazard and cramped manner of execution point towards a lesser and later addition to the original pattern. I have been unable to deduce if any message was intended by that part of the petroglyph. For that reason I concentrated my attention on three columns between four lines at the centre and right. Three central vertical columns seem to have been made by one person, two columns to the far left have a haphazard appearance and may have been added later, they are away from the centre of the stone and are not balanced by inscriptions on the blank right hand side. Concentrating discussion on the three central columns, it can be seen each has eleven parallelograms, some picked and others unornamented. The significant count of three columns each of eleven, a total of thirty-three, is particularly important.

Thirty-three as a number was represented on Knowth kerb stone K14 and has long been used in folktales to embellish a story as late as the Welsh *White Book of Rhydderch* in the fourteenth century AD. Both three and eleven separately were equally symbolic, the multiplicand thirty-three particularly so. It has frequently been used to imply supra-human attributes regal authority and deification. The central portion of the design is thought to be an affirmative statement of the number thirty-three, a means of asserting the stone and that its immediate area was associated with the deities; in other words the place was a sacred site.

THE NAVAN MOUND :: PLAN Annotations and drawing by the Author 2000

Archaeological research papers describe the Navan mound, its excavation and the important building revealed below its cover of earth and rubble. Forty metres diameter, the Iron Age timber post building at Emain Mancha in County Armagh is dated about 600 BC. Two-thirds excavated in 1994, the well-defined building plan sees a carefully executed symmetrical circular design of five rings of timber posts. Outermost ring five is estimated to comprise 34 posts. A perceived feature was the clear view had by an observer standing between the outermost ring pairs of posts, looking in towards the centre post. The disposition of posts forming rings two three and four appears to allow a clear view from the perimeter inwards to the centre. The excavation plan showed twenty perimeter posts, those numbered one and 18 are diametrically opposite each other. There are seventeen spaces for spectators between posts . Posts 33 and 16, 34 and 17 adhere to the same principle. Unexcavated posts 19 to 32 pair with posts 2 and 16.

The purpose of the Navan building may have been to commemorate popular beliefs in the settlement of Erin described in the mythical tale *Lebor Gabala Erenn*. I suggest the building could be interpreted to represent two worlds, the Otherworld and a new land settled by Cessair, Partholon and Nemed and their descendants. The outermost post ring semicircle has seventeen spaces between eighteen posts, the number of plains settled by the newcomers to Erin**.** The opposite semicircle should also have seventeen spaces between post pairs. Envisage a head priest and sixteen lesser priests standing between post pairs, each individual representing an Otherworld deity who dwelt on the seventeen vacant plains of Erin. Seventeen chiefs representing the settler tribes of Cessair, Partholon and Nemed stood between posts of the other semicircle. At a given signal, seventeen chiefs of the seventeen provinces and seventeen mythical Otherworld beings faced towards the centre post of the building. Seventeen Otherworld beings walked towards the centre post of the Navan building, symbolising their welcome to immigrant tribes of settlers to Erin.

A choir sang hymns accompanied by music, harps strummed and trumpets sounded, the community joined in the singing. The mythical Otherworld beings and tribal chiefs approached the centre post, there to join together in celebration of the settlement of Erin. By meeting and greeting, the ceremony would have marked the arrival on the beaches of Erin and settlement of seventeen plains. The Ofyd High Priest, representing the highest of all the ancient deities would direct the assembly of sixteen lesser priests and seventeen chiefs, a total of thirty-three beings, to celebrate the ultimate achievement and successes of the peoples of Erin. To account for the Navan building in this way, its design and possible function, answers some questions but raises a few more. Nonetheless, the numbers involved and the size of the grand structure infer its sacred nature as a Temple commemorating the settlement of Ireland in the pre-historic past. Forty metre diameter approaches the typical size of more Neolithic and Iron Age buildings, a linear length that converts to a perimeter of six furlangs, another indication of traditional architectural design.

STORYTELLERS' TRADITIONS

Celtic Bards, oral storytellers had an extensive repertoire of myths and legends. There are many references of bards in Wales, Brittany, Cornwall, Ireland and Scotland who could remember dozens of tales learnt over the years and who entertained their audiences with a fresh tale every evening around the croft or cottage fireplace. Their skills and wonderful memories derived from trained

minds and an innate native ability. Heroes, kings and queens have direct equivalents in many stories from Ireland, Wales and Scotland. Variations in the tasks to be undertaken, the difficulties to be overcome by the hero until he was able to rescue the princess and her maidens, Otherworld beings, ogres and dwarfs, all these showed the nature of the myth, legend, the storyteller and his trade as he travelled across Celtic lands.

Historians mostly assert immigrant 'Celtic' settlers came from Europe; salt vendors from the Austrian Alps crossed the Channel and arrived in the Islands of Britain and Ireland during the first millennium BC. The immigrants came to lands already well settled by 'Brythons', [early Britons] and 'Goidels', early 'Eren' , two peaceful and industrious ancient peoples who had farmed the Isles for three millennia before the 'Celts' arrived. As is the nature of humanity, these native Isles people absorbed the salt seller newcomers and a mixed society grew out of the blending. Becoming known in recent times collectively as Celts, the Brythonic [Welsh] and Goidelic [Irish/Scots] became known by the newcomers pseudonym. A frequent theme in most Celtic tales is the use of certain selected numbers to offer the listener an abbreviated adjectival meaning to describe a hero, a reward attained and success of a mission. Of these numbers thirty-three was the paramount value. By associating that number in an adjectival manner to describe a person, a game, a place, the elevated kingly or royal nature of the person was immediately understood and appreciated by the audience without unnecessary superfluous persiflage. Quoting thirty-three in this adjectival way shortened the time to tell the tale. In another sense, an audience mental vision of the circumstances was immediately fully established. Thus enhanced, the telling of the tale was made more entertaining without the tedium of endless words and flowery phrases. In other societies and cultures, a king was described to his audience by the use of laudatory phrases, endless praise, flowery compliments and flattery. Listeners to that protracted telling of those tales heard the mellifluous words and were informed how great was the regal person so described.

SYMBOLISM & NUMBERS

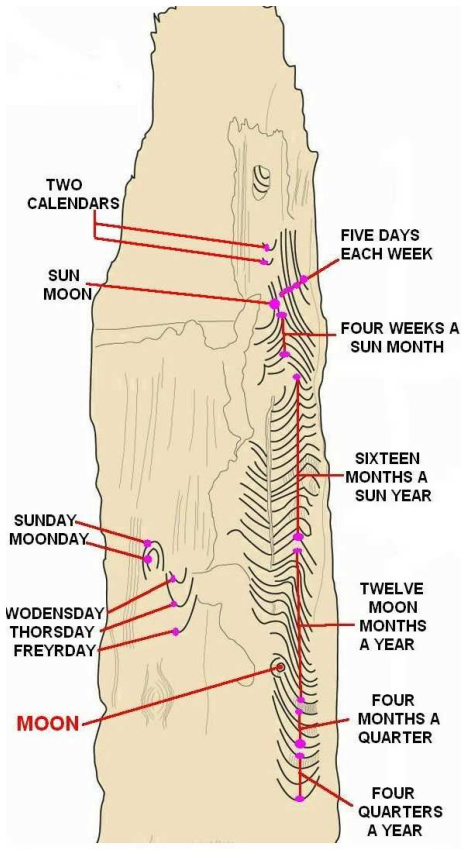
One can appreciate the Celtic folktale or story and its tangible elements, yet should also be aware of unspoken customs beneath the surface, particularly with earlier tales. Odd numbers with symbolic meanings were quoted and used to define or augment the qualities of a person or place. The principle qualities of certain numbers were broadly: -

- The pre-eminent odd number was thirty-three. Its use as an adjective implied the person or place was regal or royal, very highly placed, was sacred, or of the Otherworld. It indicated having reached the ultimate, to imply ascent to Heaven.
- Twenty-seven was often the number of adventurers, three groups of nine, who were successful in their mission, they achieved fulfilment.
- The primary number seventeen is midway between one and thirty-three. Its adjectival use indicated the hero or heroine was halfway towards a supreme achievement.
- Thirteen was not the unlucky number we think of today. The story's style and substance usually indicate a symbolic sense. Instances describe a chief with twelve surrounding supporters, a definition of their legitimacy.

- Eleven described a smaller successful group, an heroic team leader and ten adventurers, a fundamental team, head and two sets of five [a hand].
- Nine indicated humanity as a whole, three sets of the basic family group of three, three generations of the family group.
- Seven in olden times was y not symbolically significant. Re-telling folk tales nowadays, writers quote seven this and that. I believe this newer practice only came to Britain and Ireland with Christianity.
- Five had symbolic value in the sense of the middle and four surrounding areas, the fundamental Celtic territorial land division. The High King ruled the pre-eminent centre; f0our vassal Kings answerable to the High King ruled surrounding provinces.
- Three defined the basic family unit: man, woman and child.

WALES

To remind you of the great antiquity of the **Λ** and **V** counting technique, I offer the following sequence of examples. Events in the south Wales Rhondda valley saw a length of oak tree trunk recovered from a peat bog beside a stream flowing through the Rhondda valley mid-year 2013 AD, the oak log carbon dated to c.4270 BC. Presumably the log had been prepared for an important function to serve local communities. The artefact was first described in news reports as the "Maerdy decorative wood carving timber, a votive offering, a fence post". Browse the internet for a view.



RHONDDA CALENDAR

A series of lines carved onto the timber surface are illustrated in the log monochrome image. When I saw the line markings on September 9th 2013 I read the writing; a statement of the Sun and Moon calendar systems. Now my re-named "Rhondda Calendar", on the left are two hoops and three **U**'s, indicative of five events; suggested day names are Sunday, Moonday, Wodensday, Thorsday and Freyrday. Across to the right are two **U**'s, taken to mean there were two forms of calendar; Sun and Moon. Five stroke **** lines are the number of days each week group. Below is a group of four vee lines; four weeks a month. Next are sixteen vee lines; the number of Sun calendar months a year. Twelve Moon calendar months a year follow below, ending in a small circle identifying the Moon. To complete the sequence, two groups of four wavy lines are interpreted as four months a quarter year and four quarters a year; sets comprise a sixteen month Sun calendar year.

All this more than six thousand and more years ago in Wales.

IRISH SYMBOLS **Lebor Gabala Erenn**

Lebor Gabala Erenn is an account of the settlement of Ireland by five successive waves of tribes. Mythical Ireland was uninhabited when the first settlers arrived on its shores. Cessair was the first tribe in the most distant past, there was only one plain to settle, the Plain of Elta. Then the Partholon arrived and cleared four more plains, a sum of five. The Nemed followed and cleared twelve more plains on which the people could settle. At that stage there were seventeen plains or settled areas. The quoted use of number 'seventeen' was a symbolic indication the settlers were half way to their goal of prosperity and a good place to live. Two more waves of settlers followed; the Fir Bolg and the Tuatha De Danann.

The poem embodies the symbolic significance of thirty-three in its structure. Observe how the first fourteen lines concern only the land and its peoples. Any who disagree with the quoted number of nouns in each line of the poem should, bear in mind the text has been translated from Gaelic to English and thus "Ranked the showery wood" could be two or maybe three nouns depending upon the translator. Other lines could be the reverse. The fifteenth line has an entirely different context and only one noun, the final and thirty-third noun 'incantation'. The 'cunning' bard had successfully completed the difficult task of describing the regal worth of the land and its peoples by employing thirty-two nouns. Adding the last line and another single noun he attributed sacred value to the land of Erenn. I quote a translation of the poem in *Lebor Gabala Erenn*, the 'Book of the Taking of Ireland', words that exemplify the continuity of myths and legends throughout the ages: -

"I seek the land of Ireland,	2 nouns per line
Coursed by the fruitful sea,	2
Fruitful the ranked highland,	2
Ranked the showery wood,	2
Showery the river of cataracts,	2
Of cataracts the lake of pools,	3
Of pools the hill of the well,	3
Of a well a people of assemblies,	3
Of assemblies the King of Temair;	2
Temair, hill of the peoples,	2
Peoples of the Sons of Mil,	2
Of Mil of ships of barks;	3
The high ship of Eriu,	2
Eriu lofty, very green.	2
An incantation very cunning ..."	1
	33

On the next page is an illustration from my “Irish Symbols of 3500 BC” published on 1988 and re-printed in 1994, reproduced here for convenient reference. The individual glyphs represent the various interpretations quoted in preceding pages; the Sun and Moon calendars, the firmament arc overhead., counting, solar and lunar behaviour patterns, altogether thirty or more glyphs each with individual meaning.

GLYPH NUMBER SYMBOLS TODAY

IRISH SYMBOLS OF 3500 BC ©NLT 1987 p 1 of 2 15

IRISH SYMBOLS, FOURTH MILLENNIUM BC (See examples in chapters 3 and 4)

Definition	Symbol	Comment
A count of one	I Λ ▲	one, alternative symbols
A set of units counted as one	∩	one month consists of four weeks
A count of five items, for example; instances are given from three to twenty-two and thirty-three	∧∧∧ ∧∧∧	each change of direction is counted as one K 13, K 36, K 38, K 53
A long line parallel to a row of other symbols indicates a whole consists of many parts	———	sixteen months comprise one calendar year, K 13
Begin	⊛	an instruction, K 13
End	⊛	an instruction
A single day	○	K 15, K 43
Two days	◎	Sunday, Moonday?
Three days	◎	Wodensday, Thorsday, Freyrday? K 65
A group of days	◎	
An entity; a whole night and day, a week, a month, a quarter	◇	K 13, K 36
Half of a whole	◇	K 13
Three diamond shapes meaning a count of three whole items, e.g: three nights and days	◇◇◇	
Four weeks comprise one month	◇	K 13
Four quarters in a year, four seasons in a year	◇	K 13, K 36

On continental Europe today, observe how many Friday market stall holders handwrite the price of an item like this: **€**Λ9, the unit one an upstroke and downstroke Λ followed by a nine; the meaning nineteen Euros. English-speaking countries have seen the Λ become 1 with a much shortened up

stroke with a foot serif if written in Arial font, e.g. £19 or $19. At this point you may care to briefly review my explanations concerning Ireland's passage mounds Newgrange c.3200 BC and Knowth c.3500 BC; the petroglyphs inscribed on stone slabs.

YESTERDAY

Please understand the counting method was a count of an apex point and the next apex, not a count of four slanting strokes. Lines and columns of Λ and V vee symbols are the realistic origins for writing our modern number glyphs 1, 2, 3, 4, 5, 6, 7, 8, 9, formed from a series of joined Λ V vee symbols. The tabulation offers a demonstration how mutations evolved from zig-zags to the 1, 2, 3, 4, 5, 6, 7, 8, 9 glyphs occurred. Kindly accept and allow for the limitations of handwritten and typed glyphs used to illustrate the discussion.

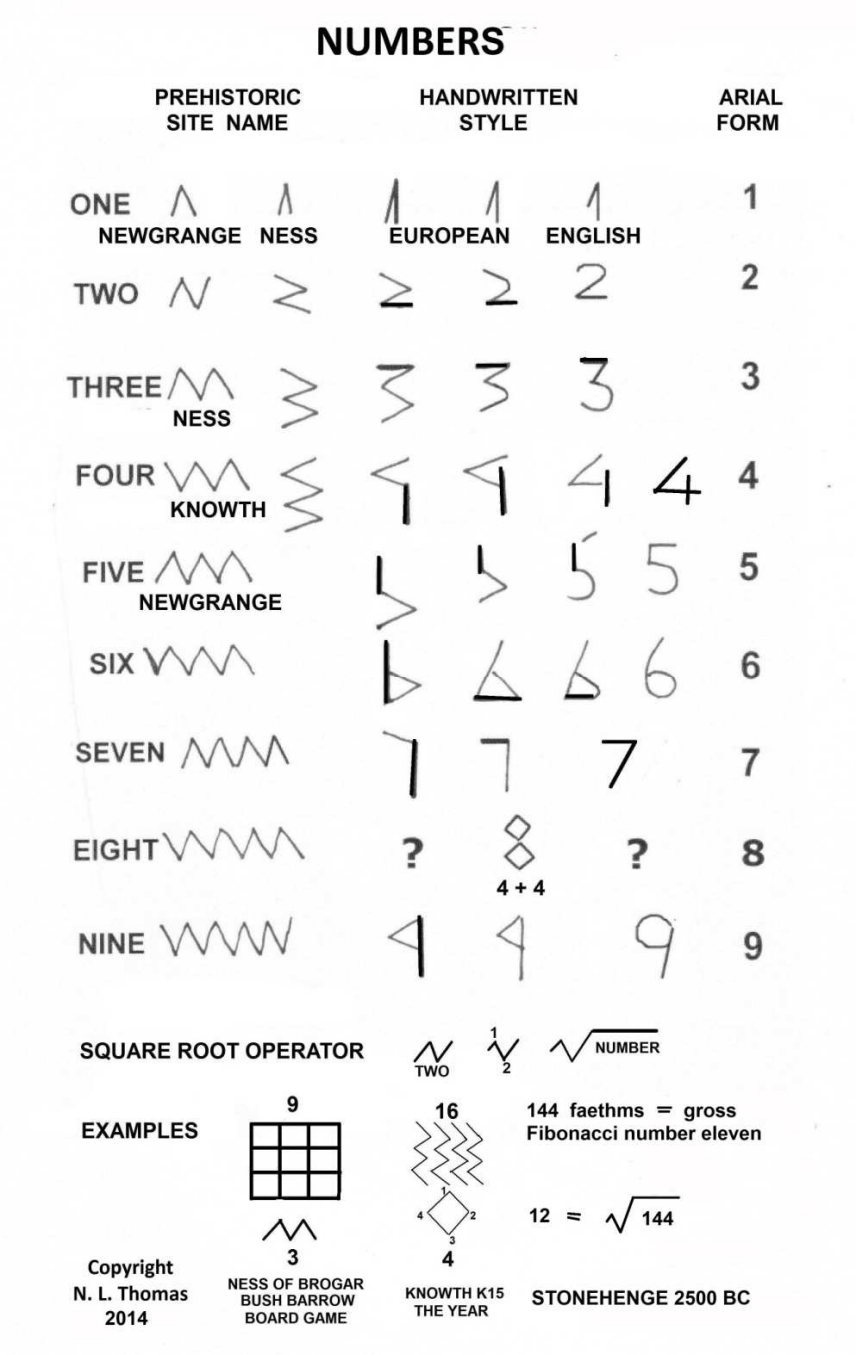
LINES & COLUMNS

Forward and backward sloping lines in a horizontal line manner were joined to form a vee Λ, a count of one, unity in a line. Two joined vee apices Λ and V in a line became a count of two Λ/, in a column two joined apices Λ and V rotated through 90^0 becomes **Z**; round the first apex point and the result is the glyph 2. Three follows in a similar manner, turn **/\/** clockwise through 90^0 and it becomes a column; then **3** and eventually rounded to **3**. An interim mode illustrated on the next page doubled the thickness of the upper or lowest angled line to become a horizontal line shown in glyphs **2** and **3** for example.

Unique

So far as I am aware, I emphasise no other Roman, Egyptian, Indian, Arabic number glyph systems departed from a continuous line technique. By changing from a line to a columnar number, the new method allowed a number group to be defined by a single glyph; the series of glyphs 1, 2, 3, 4, 5, 6, 7, 8, and 9 represented disparate sets or groups of digits items in a concise way. Glyphs **4** to **9** saw a second innovation. It became tedious to draw a long column of many sloping lines for glyphs 'four', 'five', 'six', 'seven' and 'nine'. A series of zigzag lines were replaced by one long bold vertical line with a rounding of the remaining point. For example five is seen to become a bold

downwards line with a curve below, followed by a short rising stroke similar to an acute accent over the é in the word précis. I witnessed elderly people hand writing with chalk on a blackboard the number five in exactly that way; a firm down stroke **/** followed by a loop **ɔ** in a clockwise manner, lift off the chalk from the blackboard, then complete the clockwise movement by adding the short acute accent ´ element as a final gesture. With time and custom this became the '5' we write today, the short horizontal uppermost line is considered an aberration.



Four, six and nine Ч are other instances of the heavy vertical line, the latter a rounded **ɔ** followed by a vertical l. Predicated for the numeric glyph eight; the individual symbol is two tilted squares each with four points, shown here as a column.

Square root

That right angled triangles were known to the "Old People" is a fact clearly shown by the four Stonehenge Station Stones corner positions; a classic example of two 5:12:13 right angled triangles. The mathematical principle of 'squared' values leads logically to the reverse mathematical idea; that

they also knew of the concept 'square root'. These days our modern convention employs the square root operator glyph **√**, a rudimentary short up stroke, a slanting downward forward stroke, a slanting elongated forward rising stroke, which is clearly the old **Λ/** glyph for two. An added heavy line **-----** (continued horizontally and above the numerical value of nine or sixteen) defines of the roof over the number to be subject to the square root operation.

THE PHOENICIANS, MEDITERRANEAN, 1500 BC

Conventional wisdom asserts the eastern Mediterranean based Phoenicians were the first civilised society to devise a system of numbers, the foundation stone of their society for use in trade and commerce. Quoting from Wikipedia shown in 2012: - "The Phoenician numeral system of the second millennium BC consisted of separate symbols for 1, 5, 10, 20, and 100. The sign for one was a simple vertical stroke **I**. Other numbers up to nine were formed by adding the appropriate number of such strokes arranged in groups of three **III**. The symbol for ten was a horizontal line **-** or a tack **>**. The sign for twenty could come in different glyph variants, one of them being a combination of two ten tacks; approximately Z-shaped. Larger multiples of ten were formed by grouping the appropriate number of 20s and 10s. There existed several glyph variants for hundreds. The hundred symbol could be combined with a preceding numeral in a multiple groups of "4" and "100" yielded "400".

THE GREEKS AND ROMANS, MEDITERRANEAN, 1000 BC

Ancient Greece and Rome succeeded the Phoenicians. The Greek numerical glyphs and their representations are discussed elswhere. In the hey-day of the Roman Empire, the Roman numerical symbols were widely use throughout the Mediterranean Empire. An individual glyph began with a simple vertical stroke with added serifs to denote **I,** two was **II** and three was **III**, four was **IIII** or one less than five **IV,** then followed five as **V** and six as **VI,** seven **VII**, eight as **VIII,** nine was one less than ten **IX** and ten was **X.** Next came fifty as **L**, then **C** one hundred**,** one thousand was **M.** Europeans employed Roman numerals from the first to the eighth centuries. You can readily appreciate the difficulties of rapid arithmetical division and multiplication in a numerical system of that kind. Halving and quartering were not concepts that lent themselves to the Roman system.

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CHAPTER TWENTY-SEVEN
THE RHONDDA SUN & MOON CALENDARS

The World's First Writing demonstrating Two Calendars, the Three R's Reading, 'Riting and 'Rithmetic all in one

SYNOPSIS

An oak tree trunk log 1.7 metres long was found deep in a peat bog mid-July 2013; the location the Rhondda valley, Wales. The artefact has been assessed and found to have a calibrated carbon date of c.4270 BC. Knife cut markings on the wood surface are interpreted as evidence of Sun and Moon calendars, the first comprehensible writing and reading in human history six thousand three hundred years ago, a statement of five day weeks, four weeks a month, the sixteen month Sun calendar year, the twelve month Moon calendar. The same Sun and Moon calendars are seen to have continued in the lives of the north-west sea-linked peoples throughout the ages for four millennia until Roman times in Britain, the first century AD.

THE FIRST CALENDARS, TODAY & RECENT PAST

The monochrome image representation to follow was made by consultant archaeologist Dr Richard S. Jones of Heritage Recording Services, Wales. The image illustrates the knife cut carvings made on the oak log, interpreted by this Author as the first calendar, the first writing in human history c.4270 BC.

With the occupation of Britain onwards from AD 43, the Roman Julian calendar was imposed on England and Wales as part of the establishment of the Roman Empire's Province of Britannia in the first century anno Domini. It is known prehistoric forms of calendar were an anathema to the Roman way of life and were successfully owtlawed by the governing administration. The inaccuracies of the Julian calendar initiated by Julius Caesar in 46 BC had become seventeen days out of synchronisation with real time by AD 1582. Pope Gregory issued a decree requiring his Roman Catholic Church clergy observe a revised calendar beginning that year. The Gregorian calendar is now employed world-wide as a basis for a multitude of tasks. Nonetheless, hindsight helps us understand the old deities and their names still continued to an extent in the memories of the north-west sea-linked peoples.

Shown by a series of wavy line markings, the visible appearance of the "Rhondda Calendars" oak tree log knife cuts, their number and sequences indicate two significant things. Firstly, the very pattern and numbers of items indicate a written message was made about 4270 BC for subsequent interpretation, a concept to be read and understood.

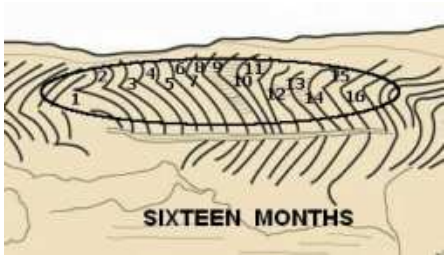
"Maerdy decorative wood carving timber,a votive offering, a fence post"

< ---------- approximately 1.7 metres ---------- >

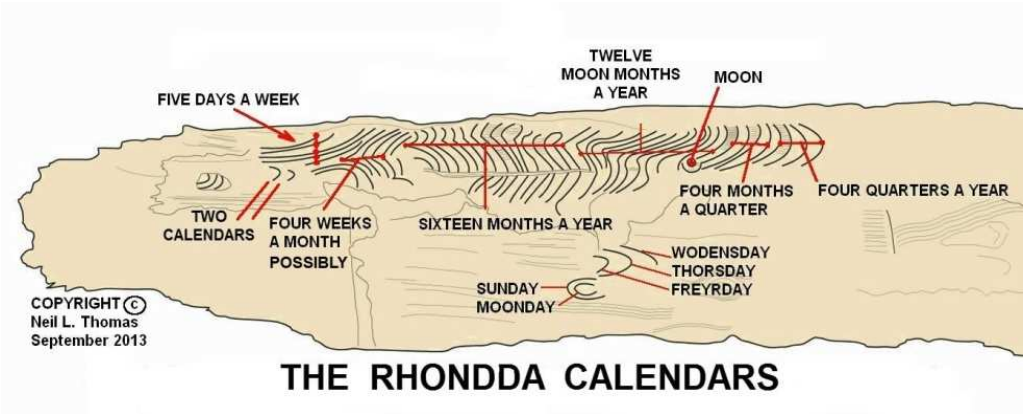
Images: Current Archaeology CA283,
National Geographic Magazine August 2013.

My reading of the "Rhondda Calendars" message matches the Irish Boyne valley petroglyphs on the Knowth and Newgrange mounds c.3500 BC, also England's Stanton Drew c.2900 BC, Mount Pleasant c.2400 BC, Stonehenge 2500 BC, Woodhenge, Durrington Walls c.2300 BC, Coligny Plaque 100 BC all of which exhibit the same Sun and Moon calendar systems first described in detail in my 1985 "Stonehenge Sunsets & Thirty-Three" and my Monash University PhD thesis manuscript titled "The Proto Civilisation of Albion & Erin" 1991.

An email arrived on September 9th 2013 from the London based "Current Archaeology" magazine. As soon as I saw the illustrations I read the writing; from lower centre to upper right across the image, first are two ∩ 'hoops' to represent days, perhaps named philologically similar to the celestial bodies Sunday and Moonday. To their immediate right are three wide hoops, the three heavenly deities perhaps equivalent to Wodensday, Thorsday and Freyrday. The group represents five days every week. I explain in my book "Stonehenge Sacred Symbolism" chapter 20, a vee glyph **Λ** = one, a hoop glyph ∩ = is the multiple recurrence. Almost identical petroglyph groups of 2 + 3 = 5 are seen on the Irish Knowth kerb stones K14, K65, K78 and K79, dated c.3500 BC and many English sites.



At left of the row of marks is a group of five lines read as a statement; the number of days each week. A little below are two ∩ in a reversed curve, a statement there were two forms of calendar, the Sun and the Moon. Along the column, next right is a group of four lines that culminate in sharp **V** points. This first nested group is seen as a count of four weeks every Sun calendar month.

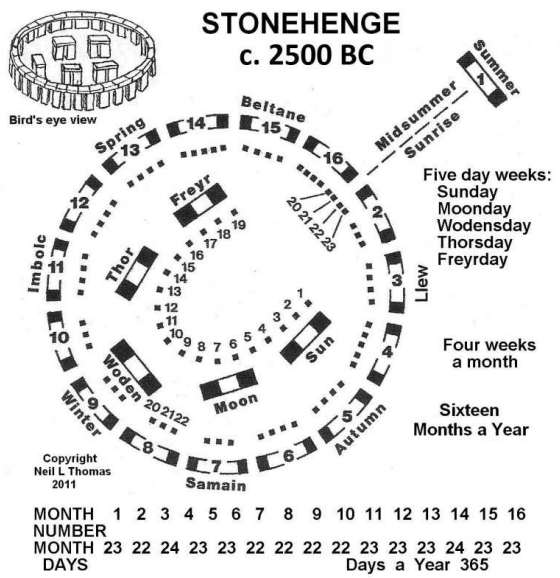


Further right, a column of vee lines and their apices count to sixteen, the months of the Sun calendar year. Next right are twelve lines, read as months in the Moon calendar year, those lines portrayed in slightly different ways without any clearly defined **V** apex.

The twelfth Moon months line ends with a small circle identified as an image of the Moon, signifying an end to a count of twelve Moon calendar months. Next right are two sets of four lines also illustrated in a to portray the four months a quarter year and four quarters a year.

STONEHENGE SUN CALENDAR

The numbers of apices on the Rhondda Calendars artefact precisely match the Sun Calendar counts of stone columns and pillars of England's 3rd millennium Stonehenge and timber post counts at Woodhenge, Durrington Walls, Mount Pleasant, Stanton Drew. In other words, the series of vees and lines in the upper portion precisely describe prehistoric Sun calendar characteristics, seen to have been in use for more than four millennia before Julius Caesar's 45 BC calendar with seven day weeks and twelve months a year was imposed on the people of Brython after AD 43. The Stonehenge Sun calendar c.2500 BC is about mid-way between the Rhondda Calendar c.4270 BC and the Roman Julian calendar, two milestone events in history. Illustrated next, the image shows the Sun calendar composition; five day weeks, four weeks a month, 23 day months, sixteen months a year of 365 days. Today's Gregorian calendar is another event along the way.



STONEHENGE SUN CALENDAR

WRITING

The fifth millennium Rhondda Calendars can rightfully claim to be the earliest writing in human history, in this instance immediately capable of interpretation and with comprehensible meaning. The groups of ∩ and **U, Λ** and **V** glyphs clearly display the Sun calendar days, weeks and months a year and a Moon calendar count of twelve months a year.I assert the Rhondda Calendars oak log artefact is considered to be the first evidence of writing in human history, a millennia before Sumerian, Egyptian and Middle East civilizations usually thought of as the cradle of civilisation.

Media reports mostly interpreted the carved lines on the oak log as another example of primitive 'art' made by a Mesolithic people comparable to 'rock art' found in many locations around the world. Rock art petroglyphs and other forms of expression usually take the form of animalistic and stylised patterns. This artefact offers an extensive specific message; able to be interpreted and comprehended six thousand three hundred years later.

Learning to Read and Write

The process of learning to read the writings of the "Old People" has been gradual. Even since my book "Irish Symbols of 3500 BC" was published in 1988 my ability to interpret signs and signals

progressed. Out of cyberspace came the picture of the Rhondda timber artefact. It appeared on September 9th 2013 and I read the inscriptions almost immediately, the Rhondda Calendar signs and symbols called for action, I had to obey the wishes of the "Old People" and higher being a while longer. A final observation; "writing is a method of recording information" is the usual definition of the skill. A 1999 an issue of 'Archaeology Magazine' reported the earliest Egyptian glyphs constituted an early form of writing dated about 3400 BC. Another source says it is generally agreed the earliest writing in human history arose about 3200 BC in Sumer, the Mesopotamian city state between the Tigris and Euphrates rivers in what is now Iraq. Those opinions are now outdated.

A Community Assembly

One can reasonably conclude thoughtful community leaders in earlier times had conceived the singular principles of two formal calendars, generations before 4270 BC. To continue the calendar tradition, a display of this nature carved into an oak timber probably served as a means of teaching an audience the basics of two forms of yearly calendar. The idea of a making a display for educational purposes, indeed the concept of instructing an audience about two forms of calendar is notable. Seen as a means of counting the year's passing progress in the latter part of the fifth millennium BC, the principles continued into the fourth millennium BC and Irish petroglyph symbols of c.3500 BC, on to Stonehenge about 2500 BC.

A teacher preparing his/her talk to a community assembled to learn about the two forms of calendar would necessarily have had greater backgound mental knowledge than just the simple portrayal of a five day week, four weeks a month, a sixteen month Sun calendar year and a twelve month Moon calendar. Whatever form and to what extent the increased background knowledge existed in the teacher's mind is unknown but an indication had to wait for the numerous petroglyph displayed on the Boyne Vallet passage mounds in Ireland eight centuries later. The principle points to realise are the identical presentations of number and form of the sixteen month Sun calendar and the Moon calendar five day week and twelve month year. The Rhondda Moon calendar numbers are identical with the Stonehenge Moon Calendar 2500 BC, the Coligny Moon calendar presentation four millennia later in chapter seven 'Coligny Moon'.

CHAPTER TWENTY-EIGHT :: MORTON

SCOTLAND ≈ 5,800 BC

"Where shall I begin, please your Majesty?" he asked. "Begin at the beginning,"
the King said, very gravely, "and go on 'till you come to the end; then stop."
Lewis Carroll 1832-1898

SYNOPSIS

My quest for evidence of thinking mankind with whom we can empathise, a search for ideas that show positive thought, was answered by this find on an archaeological site in Scotland dated around eight thousand years before the present.

In the nineteen sixties, U.K. archaeologist Dr J. M. Coles and his team excavated an area about thirty metres by twenty metres on a Scottish coastal beach. In search of habitation indications, they found a series of post hole pits buried in the sand dunes. Facing east to the North Sea, the site was on the edge of Tentsmuir forest in Fife, latitude 56^0 north.

Interpreting the numbers and arrangement of the principal assembly of post holes indicated a rudimentary dwelling or shelter large enough to accommodate a person in the prone position. Its features included three posts in a north south alignment, their overall distance a little over two metres. From the central post position, viewing the sun set via narrow slots between three pairs of outer posts, an observer may have watched the direction of sunset on four significant occasions in the year. The azimuths of midsummer sunset, the two equinoxes and of midwinter sunset about 5800 BC coincide with sight lines from the central post of the shelter towards identified distant locations in the western hills inland from the coast. I concluded the sunset observer sought to determine four calendar dates, midsummer solstice, autumnal equinox, midwinter solstice and the spring equinox, events that occur at intervals of ninety-one days. The Morton site findings are considered a first instance in the field that has become known as archaeo-astronomy.

PREHISTORIC SCOTLAND :: FIRTH OF TAY MORTON SITE

Archaeologist Dr John M Coles and his team found evidence of prehistoric mankind's activity in the coastal zone of the Tentsmuir forest in Fife, south-east Scotland, a few kilometres north of celebrated Saint Andrew's University. Their work in 1967-70 revealed several groups of post hole pits scattered over an area roughly twenty metres by thirty metres, situated on rising ground inland from the sandy beach. In those far-off days, the site was equally windy as it is now, a coastal zone pounded by North Sea waves.

Dr Coles' report on the project was published in the Proceedings of the Prehistoric Society**,** the source of this illustration edited by the Author's addition of place names: -

ARCHAEOLOGICAL FINDINGS

Dr Coles listed finds of fish and animal bones, flint knapping flakes and stone tools. The excavators found several scattered groups comprising only a few post holes, perhaps small shelters for one person on a temporary basis while the occupant was knapping flints. Presumably these shelters were roofed and had walls to protect those within from the rain and cold east winds coming off the North Sea. Material recovered from several post holes led to the conclusion numbers of birch trees had been used to construct several simple shelters using small numbers of posts. The birch posts varied from about fifty millimetres diameter with a few up to seventy millimetres diameter, indicative of a cold climate eight millennia ago with a short growing season.

The Morton Date

Charred material close to the Origin post indicates it waa a used fireplace. Carbonaceous material excavated from post holes enabled the site to be dated as an early Stone Age settlement of the sixth millennium BC. Dr Coles reported a carbon date for Morton T47 II, to be 6790 bp, 4820 bc. This value

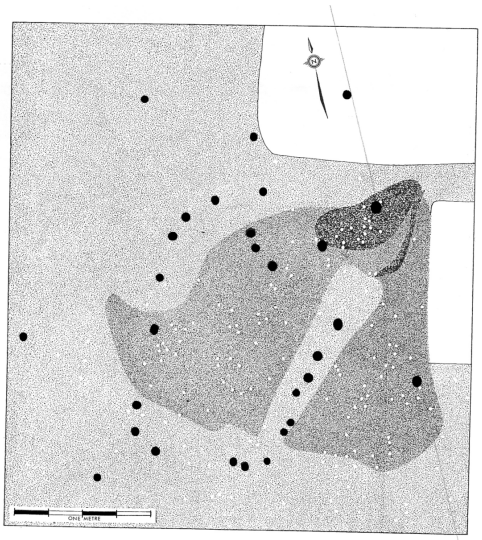


Fig. 26
Site A, Morton. Plan of occupation II at T47 *et al.*, with sleeping-place marked by oblong of stake-holes, with other stake-holes set apart, hearth and scatter of artefacts within and to the east of the shelter. Date: 6790 B.P. ± 150 (with occupation III). For symbols used, see fig. 18.

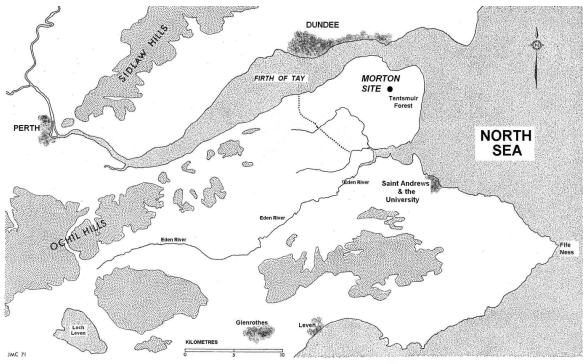
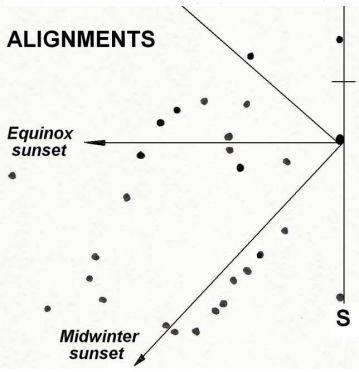


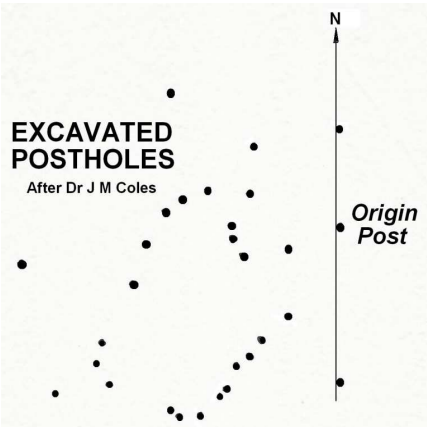
Fig. 1
Map of east Fife, Scotland, showing the position of Morton and other sites noted in the text. Land over 500 feet O.D. is stippled. The dotted line marks the two-hour territorial limit for Morton.



when adjusted by a calibration correction of 1000 years, affords a date of about 5800 BC. Other items indicated occasional habitation between 6000 BC and 5500 BC.

Main Feature

A significant group of twenty-nine post holes was located, twenty post holes placed quite close together with another nine close by. That principal structure was evidently rather more than a simple wind shelter. The posts pits plan scaled diagram prepared by Dr Coles above and reproduced illustrates its significance: -



The method presumably used by Neolithic mankind to

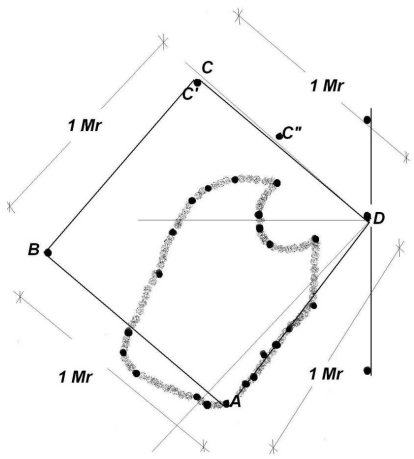
determine true north involved noting the first glimpse of the dawn Sun as it rose over the North Sea. At the end of the day, the direction of the setting Sun as the last glimpse faded in the west was recorded. The bisector of the angle between these two directions would be true north, with south in the reverse direction. My examination of the relative positions of twenty post holes showed three adjacent posts in a true north-south line, the overall distance between posts N and S slightly more than two metres.

PRINCIPAL GROUP OF POST HOLES

& M ORTON GEOMETRY

The arrangement of these posts led me to question why the chosen design had been constructed. My considered conclusion is shown by this illustration. Observe the figure defined by A B C D is very close to a square whose sides approximate slightly in excess of two metres. Dr Coles scale line, applied to measure four sides of the square and the distance along the cardinal line NS offers a value of 2.1 metres, close to a faethm or megalithic rod: -

SUNSETS: REFRACTION, CURVATURE & PARALLAX



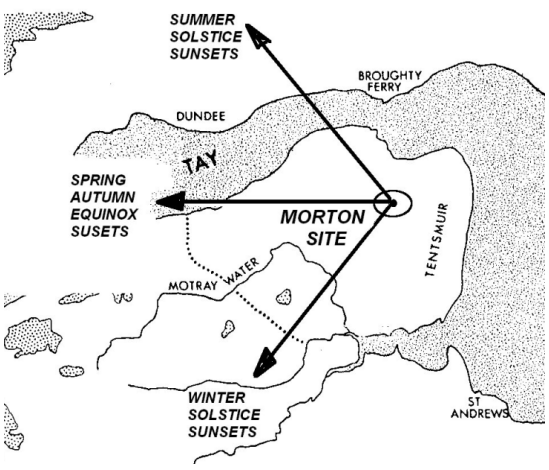
Complex gravitational forces between the Earth and the Sun, the Moon and the other planets caused the Earth's declination angle to decrease from 24.11 degrees about 4000 BC to 23.81^0 by 1000 BC. These effects continue today, the present angle is 23.5^0. About the time Morton was occupied between 6000-5500 BC, I calculated the declination angle would have been close to 24.30^0. Variations of the Earth's declination angle leads to changes in the azimuths of sunset and sunrise as the millennia pass. Sunset and sunrise bearings at the Morton latitude of 56.4^0 north about 5800 BC were calculated, based upon a 24.30^0 declination angle. Allowance was made for refraction of the Sun's rays passing through the atmosphere at low elevations and for the curvature of the earth. The elevation of the nearby hills west of the Morton was allowed for in the extensive calculations.

At Morton latitude, the azimuths of the setting Sun at midsummer and midwinter solstice differ by almost a right angle. The last glimpse of the setting sun as it disappeared behind the side and near the top of Ben y Gloe at midsummer, occurred at an azimuth of 313 degrees and 15 minutes. Midwinter sunset however was much further south at an azimuth of 221^0 46'. Twice a year at the equinox, sunset occurred at an azimuth of 269^0 45', nearly due west. These corrected bearings are illustrated on the figure.

I observed these bearing, when centred on the middle post of the three posts aligned north and south, matched sight lines passing between three pairs of closely spaced pairs of post holes to the west. In other words, from the centre origin post D, the direction of midsummer sunset passes between posts A' and A". The equinox sunset direction, as seen from the origin post, lies between posts B' and B". Also the midwinter solstice sunset direction from the origin post lies between C' and C". In each instance, the small gap between pairs of posts is of the order of five centimetres. When an object is viewed through a 5 cm aperture at a distance of two metres from the observer, the field of vision angle is one and a quarter degrees.

At Morton latitude the enlarged orb refracted at sunset is close to a 1¼^0 field of vision. Thus the ability to witness sunset at the solstice and equinox through slots in the building's wattle and daub walls and beyond to pairs of posts would have been quite satisfactory. These three directional alignments are considered to be intentional features of the building's design. Each sighting direction is seen to pass from the origin post, through a gap in the walls, and between distant pairs of posts.

To witness a last moment of sunset at each of the four solar events every year, it is presumed the sunset watcher would have kept station at dusk for several days both before and after each event. Counting days from the previous quarterly sunset the Observer would have known of the coming ninety-first day. Towards evening, with his right cheek against the origin post to observe the setting Sun along the sight line through the distant post pairs, the Observer had an ability to consistently and accurately determine the last rays of the setting Sun at that azimuth on that day. Four solar observations at intervals of 91 days each year could have been repeated in future years. Thus a simple form of calendar was devised. Midsummer, autumnal equinox, midwinter, spring equinox dates were known. Every now and then a day's adjustment had to be made to attain 365¼ days, an adjustment not thought to be a problem causing any real concern to the Observer and his small group. Dealing only in whole days, it is presumed Morton man unconsciously made any corrections 91 days after each witnessed event by recommencing counting again from the first day of the new cycle. Looking at the Sun is dangerous and difficult unless a shield of some kind gives eye protection. The walls of a simple building would have provided a degree of assistance to the Sun observer at dusk, supplemented perhaps by a suitable eye shield viewer such as a thin sliver of semi transparent flint. It is assumed the observer only intended to witness the last flash as the orb sank below the western horizon. Bear in mind the last flash of the Sun, as it sets below the horizon, presents far less danger to a viewer's eyes than an attempt to observe the bright orb high in the sky. In the long term, it seems there was minimal risk of eyesight damage to the Observer.



AN HYPOTHESIS

An enclosed wattle and daub building whose length and breadth suited a prone full time observer would have provided protection against the elements. Charcoal found near the origin post D indicted the likelihood of a Sun watcher's cooking fire and a means to keep warm at the cold midwinter solstice

sunset. The archaeological discoveries of fish and animal bones, of flint knapping at a number of other smaller shelters, indicated the likely concept of a small tribal group hunting and fishing in the neighbourhood. To make good use of their time, flints were knapped to maintain the supply of new tools, a pattern of activity which could well have been typical of the tribe's four visits to the site every year. Their supply of food probably consisted of North Sea fish and game caught in nearby Tentsmuire forest.

Assembling the Morton site characteristics, it is suggested a shaman or tribal chief watched for sunset in the west over Craigfoodie Hill and Sidlaw Hills at the winter and summer solstice, the autumn and spring equinox. The interval between these solar events is 91 days, plus or minus the adjustment of a day to achieve accuracy.

The tribal chief's knowledge of the Sun's behaviour and measurement of a year's passing would have ensured his place as head of the tribe and those family groups living in nearby areas. The Sun watcher of 5800 BC was clearly a thinking and knowledgeable person whose skills extended well beyond those needed for a simple hunting and gathering lifestyle. If the features of the Morton structure have been correctly interpreted, the Neolithic sunset watcher had mental abilities, design skills and astronomical understanding, very much earlier in the history of European mankind than has previously been postulated.

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CHAPTER TWENTY-NINE :: EUROPE

SYNOPSIS

France's Brittany peninsula village of Carnac has ancient sites nearby; long rows of upright stones are seen whose purpose was previously unknown. The Ménec site comprises eleven paprallel rows extending about 1.65 kilometres; line rows commence in groups of 2, 3, 4, 5 and 16 which are the same Sun and Moon calendar characteristics as the Rhondda calendar discussed in chapter twenty-seven. Menec, Kermario and Kerlescan have been surveyed by Thom and Thom who found they exhibit the same linear measurement characteristics as Denmark's Tustrup, Stonehenge and elsewhere in Britain. Carnac is viewed as a constituant part of a common culture spread across western Europe, Britain and Ireland six thousand years ago.

FRANCE, BRITTANY, CARNAC stone rows,

Jutting westwards from the Frech mainland Brittany peninsula reaches into the Atlantic Ocean's warm waters of the Gulf Stream. The village of Carnac is situated on the south coast; important locations nearby named Ménec, Kermario and Kerlescan feature unique groups of long rows of ancient standing stones. References attribute their construction to the Neolithic period between 4500 BC and 3300 BC.

Ménec comprises about 1500 standing stones, each ranging in height from roughly half a metre to nearly four metres, eleven more or less parallel rows in generally east west configuration stretch for 1650 metres. At this point in the chapter I refer you to chapter 27 'Rhondda Calendars', page 67 where comparable events appear; close in time and only 450 kilometres distant as the crow flies from France to Wales, a boat journey.

To refresh your recollections, a preserved oak tree log 1.7 metres long was found mid-July 2013, deep in a peat bog located in the Rhondda valley, Wales. Assessed to have a calibrated carbon date of c.4270 BC, the artefact had knife cut markings on the surface are interpreted as evidence of Sun and Moon calendars, the first comprehensible writing and reading in human history. Observe two nested hoop marks identified as days; Sunday and Moonday. Three hoop marks are the days Wodensday, Thorsday and Freyrday, the combination five days a week, then four weeks a month, four months a quarter, four quarters a year, sixteen months a year, the same as the column of knife cuts on the Rhondda oak log.

MÉNEC

My annotated Ménec illustration shows a series of distinguishing features of Ménec ancient monument; eleven rows numbered from north to south, ringed groups of stones identified with numbers comprise identified groups. Apparently missing stone's positions are shown by two open circles. A north direction is indicated, derivation from page 63 'Megalithic Remains in Britain & Brittany' by Professor Alexander Thom and Dr Archie S. Thom.

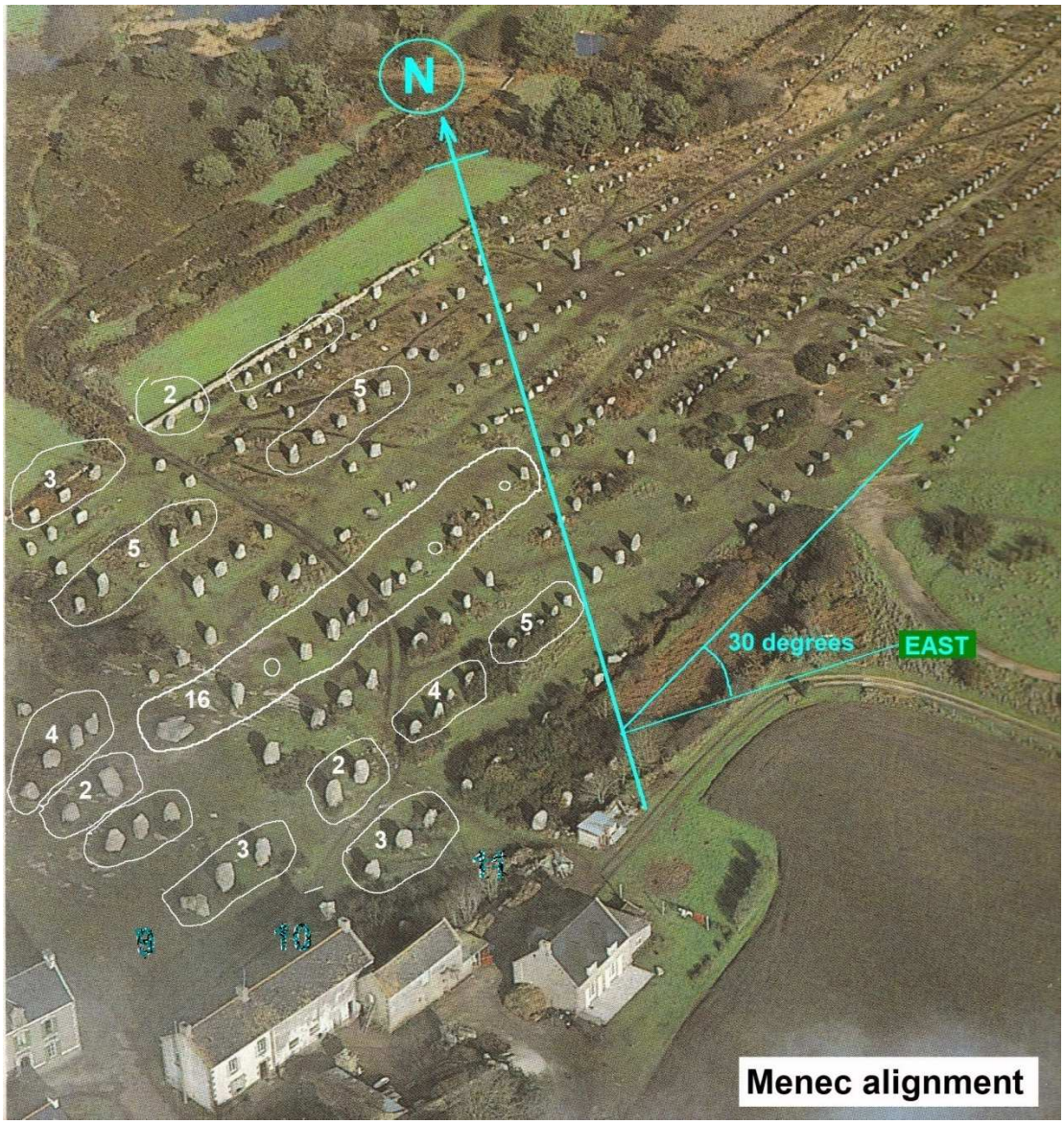


Illustration derived from 'Thom & Thom' 'Megalithic Remains in Britain & Brittany', anotations by Author. The view is an aerial photograph with perspective from a low flying aircraft.

DISCUSSION

Examine the identified grouping of stone columns, ringed by loops in sets of two, three, etc:-

Groups of 2 Three pairs of standing stones are identified, adjacent to groups of three stones. Drawing a parallel from the Rhonda Calendar artefact interpretation, the pairs of stones equate to Sunday and Moonday.

Groups 3 Three sets of standing stones are identified, adjacent to groups of two stones. Drawing a parallel from the Rhonda Calendar interpretation, the sets of stones equate to weekdays Wodensday, Thorsday and Freyrday.

Groups 4 Two groups of four stones are identified; close inspection readily identifies many more, seen to represent a count of four weeks a Sun calendar month.

Groups 5 Two groups of five stones are identified; close inspection readily identifies many more five stone elswhere, seen as a count of the days a whole week, two celestial dieities Sunday and Moonday, three stellar deities Wodensday, Thorsday and Freyrday.

Groups 16 Beginning with a larger than average stone at the west end = Summer month; the encircled group of sixteen includes two open circles; the assumed places of two missing stones identified on the basis of spaces and proportion. The prehistoric Sun calendar (Rhondda Calendar) had sixteen months a year of 365 days, demonstrated by Stonehenge, Woodhenge and several more Neolithic Age sites in Britain and Ireland. These parallels in number and position are far more than coincidental; the conclusion may safely be drawn the Ménec standing stones alignment was initially based as an expression of the ancient Sun calendar with Summer the first month of the year. Much more work is yet to be done to determine how far to the east these characteristics continued.

KERMARIO ROWS

A tribute to the model maker of the Kermario rows of granite columns, the next illustration offers an opportunity to analyse Kermario rows of stone groups in the same way as Ménec stone rows.

Sets of two, three, four and five, of twelve and sixteen stone columns are seen, the equivalent of the prehistoric Sun and Moon calendars five day weeks, months a year; two stellar deities, three celstial deities, Sun Moon Woden Thor and Freyr.

KERMARIO ROWS

Your Author has formed the view the Kermario upper row groups follow the Sun Calendar days weeks and months groupings whereas the lower sets are representative of the Moon Calendar groups.

KERLESCAN ROWS

In a similar manner, again a tribute to the model maker of the Kermario rows of granite columns, the Kerlescan model plan view illustration above offers an opportunity to analyse stone groups in the same way as Menec stone rows.

Sets of two, three, four and five, of twelve and sixteen stone columns are seen, the equivalent of the prehistoric Sun and Moon calendars five day weeks, months a year; two stellar deities, three celstial deities, Sun Moon Woden Thor and Freyr.

Your Author has formed the view the Kerlescan right hand side row groups follow the Sun Calendar days weeks and months groupings whereas the l eft hand side sets are representative of the Moon Calendar groups.

Ménec, Kermario and Kerlescan Stone Rows, Brittany Peninsula, France

It is predicated the three Ménec, Kermario and Kerlescan stone columns rows were conceived and erected about the same period as the Mesolithic and Neolithic cultures in the island to the north-west, Britain; Avebury, Stonehenge, the timber calendar buildings of the fourth millennium BC .

FRANCE, LE GRAND DOLMEN, BAGNEUX,

At Bagneux near Saumur on France's river Loire stands one of the truly large dolmens. Its size can be judged by the large capstone at the north-western end that has an estimated mass of 85 tons. The lack of dateable material makes it difficult to be precise, but it is considered the Loire group of dolmens was probably built before 3000 BC. Access to *Le Grand Dolmen* fourteen metres by four metres interior can be had via the one metre wide doorway at the southern end of the dolmen. Each design portion of the dolmen appears to closely adhere to the reconstruction lines scaled to the megalithic values illustrated on the diagram, ½, 1½, 2, 5 and 10 faethms. Le Grand Dolmen's north-west south-east orientation is a midsummer solstice alignment. Individual stone slab lengths in the design; 2 Mr, 2 x 5 Mr, 2 x 10 Mr and 2 x ½ Mr sum to 33 f*aethms*, one *furlang*, 68.4 metres.

Bibiliographical reference source; '**H*istorical Dictionary, geographical and biographical Maine-et-Loire and the former province of Anjou'*** *by* Célestin Port , H. Siraudeau and Co., Angers, 1965.

CHAPTER THIRTY :: EVOLUTION
CHEDDAR MAN :: SOMERSET ≈ 10,000 BP
RED LADY OF PAVILAND :: WALES ≈ 30,000 BC

DNA haplogroup I

SYNOPSIS

Ten thousand years ago west of England's Cheddar Gorge was occupied by a *homo sapiens* hunter-gatherer group. An individual known as 'Cheddar Man' was interred in Gough's cave 10,000 years before the present. His DNA has been interpreted this year 2018 to reveal his form and appearance.

A south Wales Gower Peninsula coastal cave explored by Daniel and John Davies and Mary Talbot in 1822 was further explored a year later by Professor Buckland who found the skeletal remains of 'The Red Lady of Paviland' as it was then named; the oldest human burial evidence in Europe. The bones were those of a *homo sapiens* male aged in his late twenties or early thirties. Dated to a period about 33,000 years ago, his lifetime preceded the Ice Age peak 25,000 years ago.

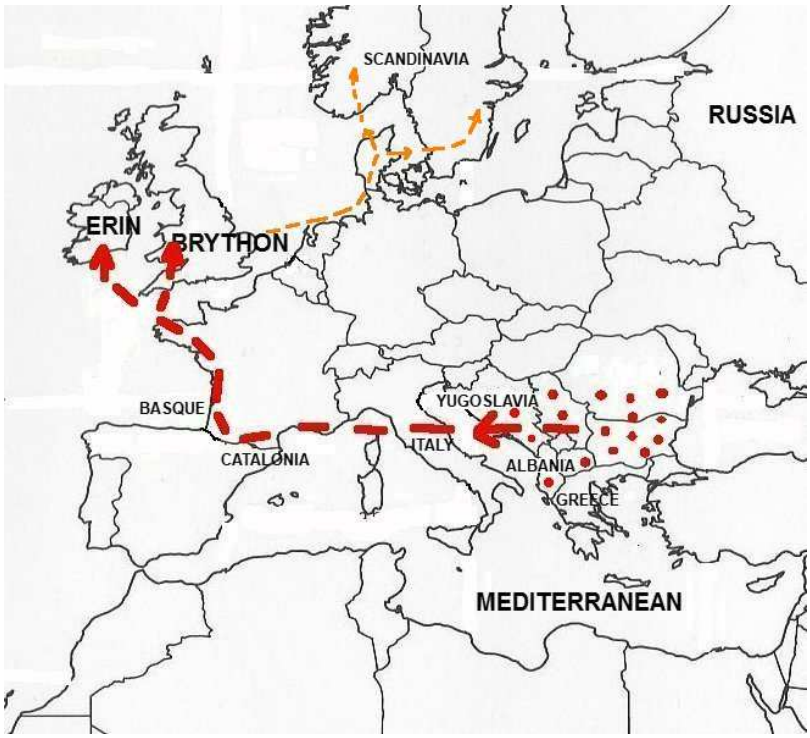
The likely migration route by *homo sapiens* from African continent origins into Palaeolithic Europe is outlined. The DNA haplogroup I is identified in eastern Europe, Wales, Ireland, Scotland and Scandinavia and its relevance to 'Celtic' population characteristics mentioned.

HUMAN EVOLUTION

The generally accepted theory of human evolution predicates *homo sapiens* developed half a million years ago in the central African continent great rift valley. Migration from Africa northwards to the Middle East occurred, the cultivation of cereal crops in the Tigris and Euphrates river valleys was a major agricultural advance enabling *homo sapiens* mankind to prosper for millennia.

Seemingly independent of that process a *homo Neanderthal* species evolved in Europe. The Neanderthal genome project papers of 2010 and 2014 considered interbreeding between *homo Neanderthal* and *homo sapiens* species occurred between 40,000 and 60,000 years ago; circumstances indicate Neanderthals and modern humans share 99.7% of their DNA and hence were closely related. Indications are the Neanderthals became extinct about 40,000 years ago, caused perhaps by climate change and advent of the Ice Age.

The Ice Age peaked around 25,000 years ago during which period much of the European continent was covered by ice and snow up to four hundred metres thick. The climate warmed eventually and glaciers thawed; living conditions for animals and humans improved permitting *homo sapiens* to migrate from the Middle East to western European destinations along the fertile northern Mediterranean coastline route with its temperate climate. An alternative migration route from the Middle East northwards through continental Europe to Scandinavia and the Baltic Sea area is seen as too cold and relatively inhospitable, far less likely.



THE DNA HAPLOGROUP I MIGRATION ROUTES 30,000 BC

The *homo sapiens* DNA haplogroup I is considered to have originated in eastern Europe (shown by the red dotted zone). As is the nature of mankind, hunter-gatherer groups in pursuit of food followed the movement as their quarry sought to escape at day's end. In the general theme of "Heritage & History" with a sub-title "Ten Thousand Years in Ireland, Britain & Western Europe", interest lies in their westward migration during ten millennia BC. Why should hunter-gatherers wish to pull up stumps and begin to move westwards was a question. A plausible answer is linked with the day to day behaviour of the Sun; in straight forward terms, the orb appears every morning, arcs overhead during day time and drops below the western horizon at day's end. Where does it go? In valid terms, it is presumed curious hunter-gatherer groups followed the orb to see where it went

past a distant horizon's edge; one day's travel, and another next day, and on and on, new hunting grounds along the way.

Those readers among us who have pursued their heritage may have been informed they came via their distant ancestors' deoxyribonucleic acid molecule analyses (DNA). Beginning in the Middle East Tigris and Euphrates river lands and cereals cultivation, a migration route to the west initiated tens of millennia ago. A sign post along the way from south-eastern Europe is shown by the red dotted area in the illustration; Bosnia, Yugoslavia, Croatia, Albanian and Herzogovina populations whose DNA analyses shows DNA hapologroup I elements. This group is strongly featured in the west as 'Celtic', indicative of a westwards migration from south-eastern Europe along the northern Mediterranean coastline to the western Isles and Atlantic seaboard.

A second sign post is a cave in south Wales explored by Daniel and John Davies and by Mary Talbot in 1822. A year later in 1823 Professor Buckland revealed skeletal remains in the cave, those of 'The Red Lady of Paviland' as it was then named; the oldest human burial evidence in Europe. The Gower Peninsula bones were those of a *homo sapiens* male aged in his late twenties or early thirties. Nearby were several carved mammoth bones; red ochre dust had been sprinkled on the remains, indicative of ceremonial practices. Recent assessments date the remains about 33,000 years ago.

CHEDDAR GORGE, Shropshire

Ten thousand years ago England's Cheddar Gorge was occupied by *homo sapiens.* A hunter-gatherer group member now known as 'Cheddar Man' was interred in Gough's Cave, his skeletal remains provided source material for a 2018 DNA analysis that enabled the conclusion to be drawn he was blue-eyed and a tanned skin.

WALES, IRELAND, SCOTLAND

Contemporary attitudes and popular opinions term the peoples of Wales, Ireland and Scotland as 'Celtic' and generally relate deoxyribonucleic acid molecule analyses DNA haplogroup I characteristics and the term 'Celtic'.

SCANDINAVIA

Speculate about the population of Scandinavia; Ice Age conditions 25,000 years ago were more severe in northern latitudes and persisted longer, sea levels in those times were well below today's levels. North Sea zone was heavily forested mostly with pine tree species, a characteristic of pine species is yellow sap that exudes from the trunk forming globules, occasionally encasing a fly or other insect. Today's stormy weather wave action brings amber pebbles to East Anglian shores, valuable pickings for beach scavengers, especially when an insect is seen preserved for all time within the fossilized sap stone. Even 15,000 years ago, human occupation of Scandinavia clearly occurred much later than in more temperate zones. On the western edge of the European continent, Ireland's and Britain's climate moderated by the warm waters of the Atlantic Ocean's Gulf Stream flowing from equatorial regions north to the waters of Iceland and Greenland. Scandinavia scarcely benefits from its passing. Popular websites reporting principles are based on Scandinavian populations DNA analyses which indicate a high percentage of DNA hapologroup I characteristics in Danish, Norwegian and Swedish residents compared with 'Celtic' populations of the British Isles. On that basis, it is suggested a select population migration <u>to</u> the British Isles <u>from</u> Scandinavia happened.

As indicated in my illustration, it is my opinion Scandinavia was settled by DNA hapologroup I peoples between 15,000 and 10,000 years before the present by sea-going inhabitants from the Isles. A line of orange dashes from Brython along the North Sea southern shore and the Netherlands illustrates the idea towards Scandinavia. Britain welcomed settlers from many sources since thoes early days, a circumstance which diluted the DNA hapologroup I people as a percentagwe of the entire British population. I have shown Scotland 7,800 years before the present was the site of a Sun observer who created a simple roofed shelter on the Tentsmuire forest promontory beach near St Andrews University. He or she recorded the direction of the setting Sun at the solstice and equinox over the hills inland and across the firth of Tay, west of Dundee. The presence of well established hunter-gatherer groups in northern Brython is clear.

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CHAPTER THIRTY-ONE :: LENGTHS & TIME

Faethm Lengths & Five Day Weeks

SYNOPSIS

In the manner of an epilogue to summarise all that has gone before, two principle matters reported upon are measurements of length and time, back grounding the matters discussed in these "Heritage & History" chapters. Britain's eighteenth century Industrial Revolution led to the British Imperial System of Measurements; the means of serving as a foundation for most steam engine designs, bridges, roads, city utilies services railways. A multiplicity of inventions arose, engines and devices were measured in horsepower, feet and inches, sixteenths of an inch. Multiplication factors were twelve, sixteen and twenty. All that changed with metres and tens, deci and milli this and that; the metre was scientifically defined in 1793 by French Academicicans as one ten-millionth of the distance from the equator to the North Pole. See the website for a more accurate modern definition. Earlier I showed how three Celtic feet equals a modern Metric metre.

METRIC UNITS

The International System of Metric Units System came into use last century in most countries of the world. It is worth noting the International Metric System energy units are named for nineteenth century engineers and scientists;

power = Watt,
energy = Joule,
electrical current = Ampere,
electrical voltages = Volt,
frequency = Hertz, to name only a few.

LENGTHS ENGLAND & WALES, The Domesday book 1086 AD

Linear measures used in recent centuries and recorded in historic times include those stated the 1086 AD Domesday Book; volumes translated by Darby and his Associates, the text provides verifiable evidence.

King William the Conqueror of Normandy defeated the English Saxon King Harald at the Battle of Hastings in 1066 AD. Years passed, the Normans extended and consolidated their rule over England, Wales and France, building castles and establishing themselves as the new rulers of the country. Based in London, King William granted portions of land to his loyal followers. By 1085 King William was absolute ruler of England and a major portion of France. His advisers saw the need to establish a sound basis of land valuations and population numbers for taxation purposes. The King decreed a survey of England, the population and land areas should be recorded, the first such detailed survey and unique in European history. Gathering the data was completed by 1086, an assembly of information is known as the Domesday Book.

Asingularly important survey of England, it is a valuable record of the time, the first population and land ownership survey. Written in Latin, the population numbers and classes, names of villages

and measures of land holdings were recorded by literate clerics and others able to write. Analysed by Darby and his associates, the result of their diligent work is a seven volume set published in 1964. Their land holding descriptions quote only two English measures 'furlongs' and 'leagues'; shorter and longer measurement values. The authors state, "We have assumed the Domesday 'league' comprised twelve 'furlongs'."

It is understand the authors made their twelve times linear measures multiplication factor assumption on the basis of Roman linear measurement system, a factor of twelve was practised. The correctness of their decision is underlined in the following discussion:-

King Edward's Statute, 1305 AD

In Romanised England between 45 AD and 410 AD, commercial trade and quantity measures were conducted in Roman and Greek measurement units. Following the Saxon invasions during the fifth and sixth centuries, then the Vikings during the eighth century and Normans in the eleventh century, it is well known a multiplicity of measurement systems was employed by agricultural and trades people in England by the thirteenth century. The year 1305 AD saw advisors to King Edward the First of England recommend a new English consolidated system of measurements, both linear and weight measures. The new linear measures became:-

3 barleycorns		One inch, 25.4 mm
12 inches	=	One foot, 305 mm
Three feet	=	One *ulna* (yard), 915 mm
5½ *ulna*	=	One rod, 5.03 metres
40 rods	=	One furlong, 201.17 m
8 furlongs	=	One statute mile, 1.609 km
& 4 rods width x 40 rods length	=	One acre, 4046.9 m^2
One quarter of an acre, 10 rods	=	1011.73 m^2

King Edward's advisors recommendation that 5½ ulna or 16½ feet should equal one rod seems a curious relationship until one realises that:-

16½ statute feet of 304.79 mm	= 5.029 metres, 1 statute rod
15 Northern feet of 335 mm	= 5.025 metres, 2 My approx
15 Celtic feet of 333mm	= 4.995 metres, approx. 2 faethms

In other words, 5½ *ulna* or 16½ statute feet is within a percent of 15 'Northern' or 'Celtic' feet, almost 2 faethm. This relationship 5½ *ulna* or 16½ statute feet appears to be the reason why King Edward's advisors chose the curious 5½ relationship between the *ulna* and the *rod.* Evidently the age old traditional agricultural linear measures were still in use, although disguised under new slightly different names. Part of the reason for acceptance of King Edward's new linear measures was continuity, a redeeming feature seen by farmers and landowners that ensured the acceptance of the 'new' measures. Nothing had really changed, the Celtic foot 333mm continued.

The Quarter Acre

The emotive term 'his own quarter acre' was an area of land cultivated by Medieval freeholders and peasants alike, an area of cultivated land sufficient for the basic food needs of a family in England's climate. Such a vital element of agricultural life had been a strong fundamental tradition for ages past and to a degree is still with us today. In Edwardian statute terms, the quarter acre was 1 statute

rod width and 40 rods length, that is an area of 5.03 metres x 201.17m (40 x 5.03) metres = 1011.9 m^2.

Returning to ancient linear measures, a portion of land two *ford* width and three *furlangs* length is an area of 4.97 m x 3 x 68.4 m = 1021.9 m^2. Landholders who practised in ancient units may not have been concerned about a 10 m^2 imperceptible difference, or only 1%. Their real estate boundaries were not changed, only the arithmetic measure. There was no reason to reject the new Edwardian measures in England. The old width, 2 *faethms* = 4.98 metres, the old length, compared with the new 1 rod = 5.02 metres, the new length 40 rods = 201.19 metres, 3 *furlangs* = 205.2 metres were evidently close enough for practical purposes in the minds of farmers and landowners. No boundary hedges and fences had to be moved. The sacrosanct traditional quarter acre concept continued in peoples' minds. King Edward's advisors who devised the 1305 AD Statute Measurement system clearly had a pragmatic view of their chances of success.

The Roman Linear Measurement Table BC/AD

Three *pes* equations are part of the traditional Roman linear measures table, I have included them to illustrate two matters, firstly the 2½ x 10 = 25 and also the relationship between the *pes, decempeda* and *stade:* 25 x 25 = 625 *pes.* I have been able to determine the likely origins of two 2½ x 10 relationships in the Roman measurement table; they probably derived from a knowledge of ancient British measurement practices. The Roman *league* (1½ Roman *miles*) equalled 2.220 km, only 37 metres shorter than one staen of 2.257 km. It appears likely the Romans chose to adopt the ancient staen as an acceptable linear unit but termed it their Roman mile multiplied by a one and a half multiplication factor.

12 *uncia* (inch)	**=**	**One *pes*, (foot), approx 296 mm**
10 *pes* (feet)	=	One *decempeda*, (perch), 2.96 metres
* [25 *pes*	=	A linear measure of 7.40 metres]
12 *decempeda*	**=**	**One *actus*, 35.4 metres**
* [2½ x 10 *pes*	=	A linear measure of 74.0 metres]
* [2½ x 74.0 metres	=	One *stade* (furlong), 185 metres]
625 *pes* (25 x 25)	=	One *stade*, (furrow long), 185 metres
5000 *pes* & 8 *stades*	=	One Roman *mile*, 1.48 kilometres
1½ Roman *miles*	=	One Roman *league*, 2.22 kilometres

It is interesting to observe a Roman *pes* of 295 mm was shorter than a 333 mm Celtic foot. Twice the Roman *actus*, 70.8 metres, was slightly longer than the furlang of 68.4 metres. Their *stade,* 185 metres, was slightly shorter than three times the furlang, 205.2 metres. The human concept of three broadly similar and related units is clear.

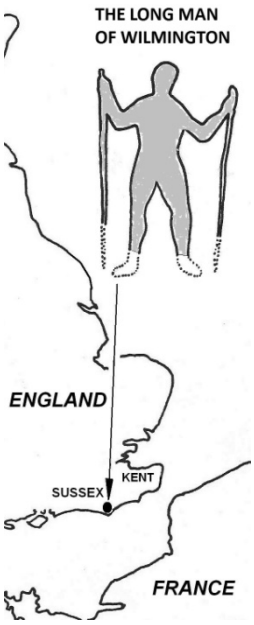
Now a return to the Domesday Book 1086 AD: -

Very strong natural conservatism by farmers and landowners knew the worth of their holdings, both in terms of monetary value and the physical area of land. Any change in their personal understanding of the worth of their land would have been strongly resisted. Which poses the question, "Which linear measurement values were used by the native British farmers before the Domesday Book in 1086?"

At this point it seems reasonable to examine two Domesday Book measures, their *fathom* and the *league*, units already in general use by the wider community.

As I explain in Chapter 23 'Lines & Angles',
the outline figure of the Long Man of Wilmington portrayed on the South Downs near Eastbourne was measured by the Secretry of the Sussex Archaeological Society at my request; the outline figure is 68.13 metres from head to toe. This length I suggested, was the ancient recognised standard, the *furlang* = 68.4m. Three times 68.4m equals 205 metres, close enough to a *statute* furlong of King Edward's statute measure 201.3 metres, dated 1305 AD. Comparing the three furrow long lengths, three furlangs of 204 metres, the Roman *stade* of 185 metres, all of similar magnitude.

The Domesday Book translators' adoption of the twelve factor, 12 x 185 metre furlong to Roman *league* 2.22 km was a reasonable one in the absence of any Domesday Book clue to the linear measurement standards in use in 1085-86 AD. A future reappraisal of the Domesday Book text could consider the furlong measure was probably almost correct and their league measures slightly overstated the actual land values.



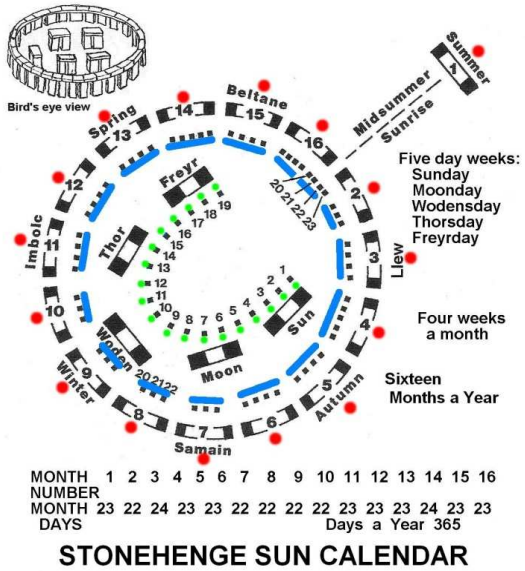
Observe how the 2½ factor has reappeared:-
2½ acres, medieval = 1 hectare, metric

BRYTHON MEASUREMENTS table

One 'finger' ≈ 27 millimetres, the Monkton Farleigh barrow gold disc.
Five 'fingers' ≈ one 'hand', 133 millimetres.
2½ 'hands' ≈ 'fut', 333 millimetres, Stukeley's "Celtic foot" 1/3rd metre
2½ 'fut' ≈ 'ford', 830mm, a step forward, Thom's "megalithic yard".
2½ 'ford' = 'faethm', 2.07 metres, Prof. A. Thom's "megalithic rod".
33 'faethms' = 'furlang', 68.4 metres, Long Man of Wilmington's height, a furrow length.
33 'furlangs' = 'staen', 2¼ kilometres = 1.40 statute miles = a 'country mile'.
2½ 'staens' = 'staen league', 5.65 kilometres.
Together with the progressive arithmetic number series:-
1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, etc.
ad infininitum and the '*golden ratio number*' = 8/5, 13/8 = 21/13 etc **=1.62**

TIME

The International Metric System fundamental time unit is the second; a short interval defined as the duration of 9,192,631,770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of a cesium 133 atom. Equally; one sixtieth of a minute.

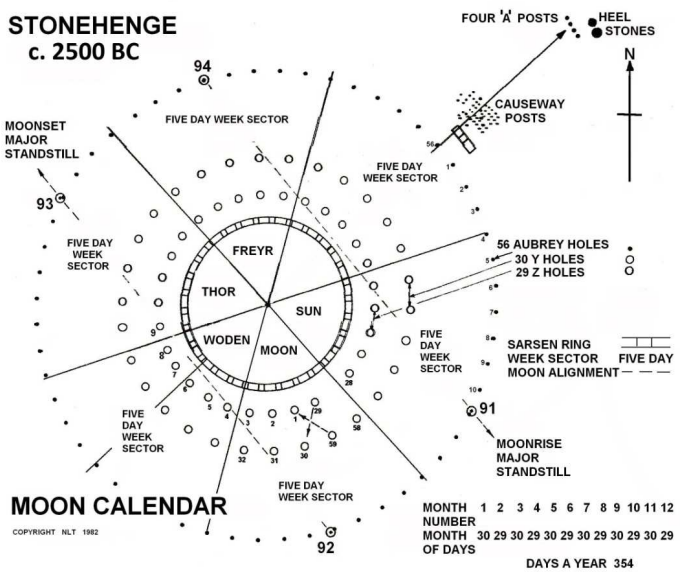


60 seconds a minute, 60 minutes an hour, 24 hours a day is our twenty-first century time system. In real life, a second is close to one human heartbeat; the doctor gently places his/her fingers on one's wrist and looks at the wrist watch second hand; one, two, three, …… sixty, sixty-one, sixty-two sixty-three, sixty-four, sixty-five, sixty-six, sixty-seven, sixty-eight, sixty-nine, seventy, seventy-one, seventy-two:-

"OK, about right, you'll live".

Hands & Feet

The thumb and fingers on one's hand number five, two hands are ten. What better than to have five days as a group called a 'week'? Two 'weeks' are ten days, four weeks a month, sixteen months comprise a Sun calendar year of 365 days with a day adjustment here and there. In the same way, a Moon calendar of five day weeks, six weeks a month, twelve months a year of 354 days followed, logically a dependent of the 354 + 5+ 5 + 1 = 365 day Sun calendar. Hands and feet are decimals, batches of ten, a preferred choice:-



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CHAPTER THIRTY-TWO :: THREADS

"If in other sciences, we should arrive at certainty without doubt and truth without error, it behoves us to plan the foundations of knowledge in mathematics." Roger Bacon, c.1214 - c.1294

"Philosophy is written in this grand book - I mean the universe - which stands continually open to our gaze, but it cannot be understood unless one first learns to comprehend the characters in which it is written. It is written in the language of mathematics, and its characters are triangles, circle, other geometrical figures, without which it is humanly impossible to understand a single word of it. Without these, one is wandering about in a dark labyrinth." Galileo Galilei, AD 1564-1642.

"To know the myths is to learn the secret of things. In other words, one learns not only how things came but also where to find them and how to make them re-appear when they disappear." Philosopher Mircea Eliade 1907-1986.

Threads Woven into a Broad Cloth

SYNOPSIS

Patterns of ancient monuments and artefact characteristics are described; numbers, linear lengths and distances, forms and shapes consistently used throughout the millennia.

THREADS

The broad cloth of human heritage and history is made of a series of threads woven in and out of the bolt. This book unrolls the bolt to examine single threads individually, a middle portion only ten thousand years length. Much came before, a great deal is on the horizon, yet to be unrolled. These observations relate to threads woven into the bolt:-

'Celtic Bards Chiefs and Kings' book was written by George Borrow, 1801-1883. From his 1860 manuscript I quote from page 34, "To give some account of the poetic literature of the Welsh, we commence from a very early period, quoting from a Welsh triad: "These are the three artificers of poetry and record amongst the nation of the Cymry. The dignitaries spoken of in the triad refer to the three orders, termed respectively Bardd, Ovydd and Derwydd, or Poet, Philosopher and Druid, which constituted what is called Barddas or bardism. The motto of this institution was "*y gwir yn erbyn y byd*" or "the truth against the world," from which it would appear that bardism was instituted for the purpose of propagating truth."

Peoples' achievements identified in chapters one to thirty-one, the ancient monuments and artefacts form and nature, required communication on a wide scale; language, vocabulary, comprehension, a consistent comprehension by individuals on a wide scale. This exists today with the world-wide understanding of English in various forms. In the Isles and western Europe's prehistoric times both Sun and Moon calendars' form and substance offer clues to the nature of a means to communicate on a wide scale. Another quantum is linear measures, values and their occurrence. You are invited to form your own opinion of the means by which people chose a vocabulary and spoken language form to communicate.

Diodorus of Sicily wrote about 40 BC, “The Sun god is honoured among them above all other gods; and the inhabitants (Bardd, Ovydd and Derwydd) are looked upon as priests of Apollo after a manner, since daily they praise this god continuously in song and honour him exceedingly. And there is a notable temple that is adorned with many votive offerings and is circular in shape (Stonehenge). Furthermore, a city is there which is sacred to this god, and the majority of its inhabitants are players of the cithera (the harp); and these continually play this instrument and sing hymns of praise to the god, glorifying his deeds, (with my insertions in parenthesis).”

Ovyds philosophical ideas and principals, ideas conjured by Bards into poetry with choral music, Druids performance and achievements, these are enduring memorials of the past. These traditions continue with us to this day.

For most of us these days school includes subjects such as language, mathematics, the basis for most of the things we enjoy in a comfortable life. Shopping, where we go, writing letters and texting; all these include words, numbers, addition, subtraction and multiplication. How we learn things these is answered readily; personal instruction - person to person contact for extended periods, the teacher and the pupil. Where – at school, a formal learning place. When – a while ago for many of us, you and me. We learn life’s lessons by repetition; “Mama”, “Daddy”, speech itself and the words we use every day. It has always been that way. School children learn poetry by memorising the words, line by line, verse after verse. Actors learn their words in a play by heart; to do their part in a performance and entertain the audience. Musicians play classical piano pieces by celebrated composers; a series of treble and cleff notes, semi-quavers and longer notes, bars, sequences, a long duration of intense learning and recollection to perform without fault for the audience pleasure. Orchestra conductors perform prodigious memory feats.

Life’s circumstances mean my mind has an engineering basis of English and a small vocabulary of Welsh, French, German, Danish, Latin words and forms. Training enabled me to comprehend the meaning of an object being reviewed, to see a pattern of related factors, to read an engineering or architectural drawing. These pages are a statement of the principal design elements found to characterise Neolithic, Bronze and Iron Age learning and practice in Ireland, Britain, Denmark, France, Germany and Western Europe from 5800 BC. Information is provided as a guide, an aid to evaluation and interpretation of artefacts and prehistoric sites, to perceive the meaning and reason why a large or small object was formed and assess its genuine nature. My objective offering you these notes is to help, to aid the search for an answer to why, what, where, when, who and how the “Old People” saw life.

But what of long ago? How, where and when did our distant forebears reach an understanding of life’s fundamentals? It’s my contention that was the method used by the Ovyd philosopher priests, the Bards of poetry and language, the Druids of practical applications, the triad of learned ‘Old People’ who built Stonehenge 2500 BC. They memorised their language, the rules of arithmetic and geometry, carrying their knowledge with them in their minds. They did not need written words; well trained minds and good memories to remembered life’s essentials. When learning became far more complex, only then was there a need for the written word, alphabets, chapters, books, libraries and computers.

The Rule of Law

Humanity prospers because we co-operate in groups to achieve completion of an objective. In order to do so, each participant complies with an agreed set of behavioural rules towards others. The first example of any note was chapter 18 Avebury, the ancient monument in southern England where a ring of standing stones enclosed a line of nine stones adjacent to a tall central quartz pillar, page 326. This arrangement I have termed the 'Judgement Circle', an event dated about 2500 BC.

Mention was made in chapter 12 Bronze Age, where the Caergwrle Bowl featured as the means of consolidating truth and honesty between many concerned with aspects of second millennium trade in bronze axes and artefacts from the western Isles and across Europe from west to east.

You may wish to browse the internet for the basis of Britain's legal system 'King John's Magna Carta' dated from 1215 AD.

Calendars

Four millennia of the Sun calendar, five day weeks, four week months, sixteen month years; the Moon calendar of five day weeks, six week months, twelve month years from 4270 BC to 61 AD characterised time keeping in north-western society in the Isles and Gaul.

Numbers & **Symbolism**

Imagination is a quality that distinguishes our human species, the ability to accomplish what we imagined. Today our world proceeds at constant rush, we often give only a cursory glance or momentary consideration of this or that. Symbolism has largely taken a back seat, but in earlier times it was an important element of day-to-day life. One can appreciate a folktale or story and its tangible elements yet one should be aware of unspoken customs beneath the surface, particularly with earlier tales originating in prehistoric times. Odd numbers attributed with symbolic meaning were quoted and employed as adjectives. The adjectival symbolism associated with each particular number was used to define or augment the important qualities of a person or place in a succinct way. Whole numbers, the fundamental idea stems from our hands, one thumb and four fingers, five digits, with five more on the other hand and ten more toes below. The principle symbolic qualities of these numbers were broadly: -

1. The pre-eminent odd number was thirty-three. Its use as an adjective implied the person or place was very highly regarded, royal, sacred, of the Otherworld. It indicated having reached the ultimate, to imply ascent to Heaven.
2. Twenty-seven was often the number of adventurers, three groups of nine, who were successful in their mission, they achieved fulfilment.
3. The prime number seventeen is midway between one and thirty-three. Its adjectival use indicated the hero or heroine was halfway towards a supreme achievement or half way to Heaven.
4. Thirteen was not the unlucky number we think of today. Thirteen's adjectival sense and use is often hard to identify, however the story's style and substance usually indicate a symbolic sense. Instances describe a chief with twelve surrounding supporters, a definition of their legitimacy.
5. Eleven described a smaller successful group, an heroic team leader and ten adventurers, the fundamental team, the head and two sets of five.

6. Nine indicated humanity as a whole, three sets of the basic family group of three, three generations of the family group.
7. Re-telling folk tales nowadays, some writers quote seven this and seven that. Seven's significance only came with Christianity to the western Isles and north-west Europe. Seven in olden times was not symbolically significant. Its use arose as the denominator of the ratio 22/7; the ratio of the circle's circumference to the diameter.
8. Five fingers on one's hand, five days a week, five had symbolic value in the sense of the middle and four surrounding areas, the fundamental Celtic territorial land division. The High King ruled the pre-eminent centre. Four vassal Kings answerable to the High King ruled surrounding provinces.
9. Three defined the basic family unit: man, woman and child.

Archaeological Interpretation, Fibonacci series

The object under review today may be a large site like England's Stonehenge or Avebury or a single rock carved with petroglyphs or wooden artefact marked with man-made glyphs. Researchers should be aware of many aeons of certain customary numerical features.

In the millennia anno Domini, a selection of numbers were attributed with particular qualities and regarded as special. For example, Tustrup and Stonehenge were designed about five thousand years ago; built on a mathematical basis, the (Fibonacci) progressive arithmetic number series **1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610, 987,** was the basic philosophy. Numbers of stones or columns and the distances between principal features or groups matched those numbers. Thirteen and eight, one hundred and forty-four are examples. Sets of numbers were equally favoured linked to the Sun and Moon calendars. Five day weeks, 16 months a Sun calendar year, 23 days most months. A Moon calendar comprised five day weeks, 30 day months, 12 months a year; these numbers became endowed with popularity.

Beware of the trap of interpreting an archaeological site or an artefact with blinkered modern eyes and mind. To do so can lead to unforeseen erroneous conclusions that become the accepted populist multi-media version of the truth. For example: -

(1) It has often been repeated the five Stonehenge trilithons **U** shaped arrangement and nineteen bluestones within their embrace resembles a horseshoe. Two things contradict that idea, first horses were almost unknown and iron horse shoes were certainly absent in the Stone Age. Employing the term 'horseshoe' clouds the ability to analyse logically.

(2) Concerning the Bush Barrow Plaque found near Stonehenge in Wiltshire; antiquarian excavators uncovered the gold artefact found resting on the breast of a skeleton. Dated about 1900 BC, the perfectly flat rhombus shaped gold sheet item was subjected to an un-authorised alteration to a slightly dished shape in semblance of an item of steel armour, quite unknown in the Neolithic era. The myth persists.

(3) The Caergwrle Bowl exhibited in the National Museum of Wales was viewed by early antiquarians as a bowl, a vessel to hold liquid. In recent years the artefact was termed a boat because of its oval shape. The boat concept is stupid. In my view the valued Bowl was a toasting cup to serve wine at commercial dealings requiring truth and honesty, feasts to celebrate a

coronation or naming a new born royal child, ceremonies similar to those held at Scotland's Edinburgh Castle annual Military Tattoo and London's Apothecaries Society dinner.

(4) The discovery of the Nebra Sun Disc some years ago in Germany is an important factor supporting the extent of archaeoastronomical knowledge possessed by early European communities. The initial well-publicised information concerning the Disc was based upon an assumption gained by viewing it upside down, another unfounded 'boat' suggestion. A perimeter arc was assumed to be at the bottom of the disc and was said to represent the sea. The Disc should be viewed with the arc at the top of the Disc to portray the ancient concept of a firmament, the protective roof over mankind's world. The erroneous interpretation failed to appreciate thirty-three gold foil appliqué stellar objects on the bronze disc; stars, Sun, Moon and the firmament. Not understanding the highly symbolic numerical significance led to the conclusion the disc is a portrayal of the sky, in reality it is defined an intensely sacred item linked to the Sun and Moon calendars, sunrise and sunset winter and summer alignments, the firmament and stellar appearances.

(5) A principal feature of almost all prehistoric sites of significance is the latitude and azimuths of solstice and equinox sunrise and sunsets. Lunar phases, major and minor moonrise and moonset bearings may offer valuable information leading to a better interpretation of the site and its purpose. These bearings depend on an accurate knowledge of true north.

A site or artefact, a circumstance should be viewed from its prehistoric creator's point of view and from the Age in which it was conceived. Only then should a modern-day archaeologist offer an opinion concerning its ancient provenance and original purpose.

Counting

1. The 'Old People' thought and acted in whole number terms; there were no quarter days in Leap Years, no decimals to umpteen places.

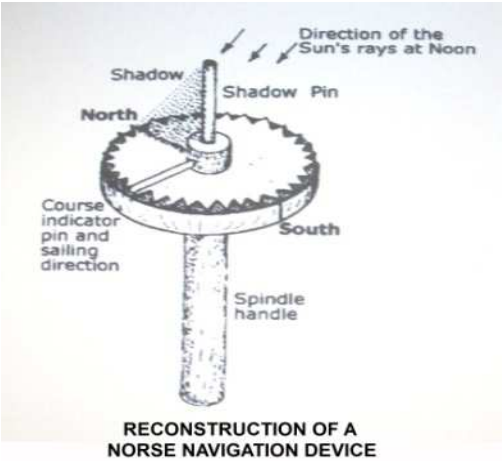
2. Thirty-three; the number was consistently employed as an adjective to imply a sacred site or person. It was also employed as a multiplicand of linear dimension values.

3. Sixteen elements in a common grouping, sixteen items in a cartouche, a group within a perimeter declared that number of months were the number of Sun calendar months a year. Similarly a group of eight items relate to the two solstice, two equinox and four quarterly festivals, annual events. Twelve elements in a common grouping were a declaration of the Moon calendar months. Twelve items in a cartouche, a group within a perimeter, these were the number of months in the Moon calendar. Six pairs in a cartouche declare the same connotation, six pairs of 30 day months and 29 day months.

4. A group of five elements, two plus three, indicated a week of five days in both Sun and Moon calendar systems. Four groups of five indicated a four week Sun month.

5. Linear features were measured from edge to edge, corner to corner, in unitary lengths of *fut*, *ford*, *faethms, furlangs, staen miles* and *staen leagues.* Perimeters and circumferences were framed in multiples of the pi ratio 22/7.

6. A principle of counting individual columns, posts, vee apices was the essence of the Sun calendar philosophy method; count an item, then the next. For example, Stonehenge embodied the



RECONSTRUCTION OF A NORSE NAVIGATION DEVICE

VIKING COMPASS

arrangement of sarsen columns, bluestone pillars and trilithons which tally the Sun Calendar days, weeks, months and years.

7. A counting principle of forward moves was the essence of Moon calendar philosophy, a count of the move forward from one item to the next. Stonehenge employed 56 Aubrey Holes and the **U** arrangement of 19 bluestone pillars and 5 trilithons to tally the Saros Moon eclipse cycle of 223 full Moons and 18 years and 11 nights.

8. Outer or inner tangential lines around a ring or beside row of posts or columns offer guidance in items 1, 5, 6, 7.

Designed Sizes of Monuments and Artefacts

Linear Measures are discussed at length in chapters 2 Sport, 23 Lines & Angles, 31 Lengths Time.

Stonehenge is a classic case discussed previously in chapter 17. The Nebra Sky Disc, chapter 6 Myths & Legends concerned the bronze disc and its discovery in eastern Germany. The bronze smith was initially faced with a series of critical questions. How big to make the disc, an artefact reported to be 32 centimetres diameter, very close to one Celtic foot 332mm; it seems the bronze smith held a Celtic foot linear measure in mind as a first thought. The number of celestial items on the disc, their individual dimensions, each item, a view presented to an audience, aesthetic considerations required thought, a sequence of element design details came together as a beautifully executed artefact.

Threads shown by the Nebra Sky Disc are pointers to the extent of knowledge and philosophical beliefs about the Sun and Moon, the firmament, number symbolism, bronze metallurgical knowledge, smithing techniques and skills, linear measures from far away in the western Isles and Scandinavia many hundreds of kilometres to western Europe, a diverse peoples.

Angular Measurements

Between Avebury and Stonehenge in southern England there are a great many Neolithic sites known variously as ‘castles’, ‘camps’, ‘barrows’, ‘ditches’ and ‘rings’. Each site can be seen related to others nearby both in direction and distance. Degrees of alignment are a cardinal bearing North, East, South and West or sixty-fourths of a circle; for example $27M^{0}$ = 27/64ths. True north is an essential factor assessing angular measurements. The principle of sixty-four divisions of a circle continued into Viking and our own times. Navigation of the Atlantic Ocean from Scandinavia to Newfoundland was achieved by Eric the Red in 982 AD using a handheld wooden disc device with sixty-four notches around its periphery. In the eighteenth and nineteenth century the British Royal Navy trained its junior officers to recite the sixty-four points of the compass, a mnemonic practice known as “boxing the compass”.

Another method of measuring angles is seen at Stonehenge c.2500 BC. A ring of thirty sarsen columns and thirty spaces between amounted to sixty divisions. An outer touching circumferential locus dimension of 99 metres means each column+space arc sector = 1.65 metres. The average

man's foot measures 28 centimetres from heel to toe. The arc length of 1.65m divided by 28cm heel to toe movements creates exactly 6 divisions. A simple calculation shows 60 column+space and six divisions per arc sector, 60 x 6 = 360 degrees. This unique example of a 360^0 degrees protractor is the second known instance of the sexagesimal angular system applied in ancient Britain. The first is the 33^0 side slope of Silbury Hill, c.2750 BC inferring the highly sacred nature of the Hill as the overnight resting place for the Sun deity. The sexagesimal system's written origin is dated about 1000 BC, its origin and use erroneously attributed to the Babylonians.

Cardinal Directions

True north was a cardinal principle in prehistoric designs. I have found numbers of instances where formal Reports in official Journals cite north arrow signs and other devices that do not designate true north. It is unclear whether true north, magnetic north or another presumed direction is intended. Magnetic north at any site may vary year by year due to precession of the Pole, century by century. The consequence of this is an inability to form valid conclusions concerning the site at seasonal times of the year. A site plan should always include a true north direction determined by a licensed land surveyor. On that factual basis, solstice and equinox sunrise and sunset bearings will materially aid evaluation of the site and its archaeoastronomical characteristics.

Right-Angled Triangles

There are many examples of right-angled triangles as the geometric basis for an ancient monument's design size and shape. At Stonehenge c.2500 BC, the Station Stones describes a pair of 5, 12, 13 figures. A short distance away Woodhenge was also based on a 3, 4, 5 triangle. Elsewhere I analysed 9, 12, 13 and 9, 40, 41 triangles as the basis of Neolithic stone circles designs, artefacts, also classical buildings such as the Parthenon. Exceptions are approximations to an exact right-angle triangle, a figure showing other obvious criteria may explain a departure from the strict rule. Silbury Hill was a clear example with sides of 18, 27 and 33 *furlangs*, the numbers 6, 9, and 11 multiplied by three. The Greek philosopher Pythagoras learned of these qualities; to be taught at his school about 500 BC.

Ovals

Artefacts and site elements seen to be based upon an oval or ovate shape may be assessed by the application of my Unitary Oval numeric dimensions multiplied by *finga, fut*, *faethm* and *furlang.* Woodhenge timber posts structure, Canterbury settlement site, Hindwell Enclosure, Hindwell and Canterbury settlements ovate shaped boundaries equate to 33 *furlangs*, an accuracy of a per cent.

Stonehenge sarsen column trilithons are enclosed within an oval whose unit dimension is the *faethm* of 2.073 metres, the 13 x 8 *faethm* oval perimeter measures 33 *faethms*; oval on-site axes measurements are 17 metres and 27 metres. The Caergwrle Bowl long and short axis dimensions are another example; 18.2cm x 11.2ccm x depth 70mm, dimensions multiplied by the standard unit 14mm are in the ratios 13:8:5. The Coligny Plaque Moon calendar lettering is factored on the *finga* 14mm. Rome's Coliseum arena is an oval, as are sports ovals in many countries today. The Marylebone Cricket Club's ground in London, England is named 'The Oval'.

Circles

Our forebears found the vulgar fraction twenty-two over seven, 22/7 it is accurate to within a half a percent compared with the decimal value:- pi = π = 3.14159 2653 5897 9323 8462 6433 ……..> > etc. The fraction 22/7 is much easier to remember and apply.

CHAPTER THIRTY-THREE :: APPENDICES

SUMMARY
Date & dating, carbon dates, principles for your information.

CARBON DATES
A few moments reflection at this point of completing this book, the range of subjects discussed, the scope of individual chapters led me to realise much of "Appendices" would be better positioned at the end of each chapter's subject discussed. Blanket data such as carbon dates herewith:-

Dating Nomenclature
The conventional dating technique used to state ages of ancient and modern artefacts has been used in the preparation of this book. For the benefit of readers not familiar with the subject, the following definitions and abbreviations explain the usage: -

AD upper case initials, without full stops and following the numerical date number mean 'Anno *Domini', Latin for the "Year of Our Lord" since the birth of Christ. CE means the Common Era, a* term favoured by other than Christian societies, the basis is identical.

BC upper case capital initials signify 'Before Christ', without full stops and following a numerical date number are the accepted year of his birth. Following the atmospheric atomic bomb testing in the 1950's and slight changes in the percentage of atmospheric radio-active carbon, that date has been adopted as a base date for BC determinations.

BCE Before the Common Era is used by other than Christian societies, the basis is identical.

bc lower case initials also mean the years before the basic reference date, in this case a numerical value uncorrected by a radioactive carbon assessment or other calibration methods.

BP upper case initials, without full stops and following the numerical date number mean 'Before the Present'. Such values should be interpreted with care since the 'Present' date may be just last year when the dating technique was applied to an item, or more than a generation ago if the assay was made years earlier. A discrepancy of ten or twenty years is virtually of no importance if the event was believed to have happened 10,000 years ago. On the other hand, if the event happened say 50 years ago and was reported at that time as 1000 BP, then by now the BP date could be 1050.

That's all folks 322 pages 135,000 words 26/11/2021

Edition 22/11/2021

HERITAGE & HISTORY sub-titled 'Six Thousand Years in Ireland Britain and Europe' tells of the origins of our civilisation from its beginning in graphic terms. Previously unsuspected wide ranging activities of the sea-linked prehistoric people are identified; humanity's first writing was formed in Wales, number glyphs came from Ireland, thirty-three symbolised the highest, heavenly and regal. Sun and Moon calendars with five day weeks endured for more than four millennia; they forecast when the next lunar eclipse would happen. Of mankind's measurement of time and length; long straight tracks across country were formed in accurately measured lengths, right angled triangles, ovals, linear measures were employed by architects, engineers, surveyors and artisans to create Stonehenge and timber buildings. Druids, Bards and Ofyds were the intelligentsia; symbolism was strong, story telling a feature of life. Knowledge was handed from one generation to the next by rote learning in poetry and song. Good farming practices and ample harvests sustained a growing population. Summer and winter sports were enjoyed, cricket, football and baseball games derived from Stonehenge pillars and lintels constructs. Board games were a feature of life.

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Monash University Review

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ISBN 978-0-6486587-5-7
Edition 03/11/2021

ISBN 978-0-6486587-1-9 to be revised

A common culture existed across Britain, Ireland and western Europe six thousand years ago. Writing came into being in Wales 4,270 BC, Irish symbols portrayed Sun and Moon calendars 3,500 BC. Arithmetic and geometry developed in Denmark 3,100 BC, Scandinavians navigated the oceans using a sixty-four point compass. The Bronze Age 2,000 BC inaugurated mining, widespread copper and tin industries and commerce in Britain and across Europe. Five day weeks Sun and Moon calendars endured for four thousand years in the western Isles and Europe until the beginning of the Roman Empire two thousand years ago. This book tells about how things were done in prehistoric times.