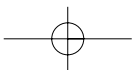
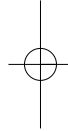
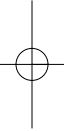


Civilization One



Previous books by Christopher Knight

(co-authored with Robert Lomas)

The Hiram Key

The Second Messiah

Uriel's machine

The Book of Hiram

Previous books by Alan Butler

The Bronze Age Computer Disc

The Warriors and the Bankers

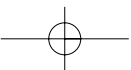
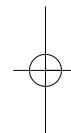
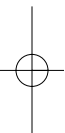
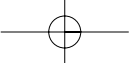
The Templar Continuum

The Goddess, the Grail and the Lodge

Christopher Knight has worked in advertising and marketing for over thirty years, specializing in consumer psychology and market research.

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CIVILIZATION ONE

THE WORLD IS NOT
AS YOU THOUGHT IT WAS

**Christopher Knight
and Alan Butler**

Watkins Publishing
London

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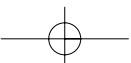
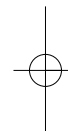
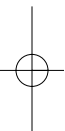
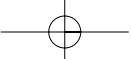
For my grandchildren Sam, Isabelle and Max (plus others yet to arrive). May your childhood wonder and questioning stay with you for life.

CK

For my Father, John Butler, and in memory of my Mother Mary.

AB

A CD of Megalithic music has been composed and performed by De Lorean to accompany this book. Samples of *Civilization One – The Album* can be heard and copies bought at www.civilizationone.com.



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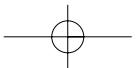
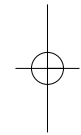
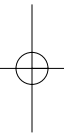
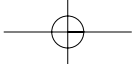
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Peter Harwood, our technical expert.



Introduction

The super-culture

Was there a super-advanced culture in prehistory? If not, how can it be that the supposedly unsophisticated people of Stone Age Britain possessed a fully-integrated system of measurement based on a deep understanding of the solar system?

The history of human development from hunter-gatherer to city dwellers once seemed comfortable and predictable. All of the available evidence supported the accepted picture of a smooth social evolution largely driven by the ingenuity of people living in the Middle East. But then, over several decades, an eminent professor of engineering, Alexander Thom, annoyed the world of archaeology by making a startling claim. He maintained that he had found that the structures left by late Stone Age man had been built using a standard unit of measure that was so precise that he could identify its central value to an accuracy that was less than the width of a human hair. The idea that these simple people from prehistory could have achieved such accuracy flew in the face of all the worldview of most archaeologists. Not surprisingly, Thom's findings were almost universally dismissed as some kind of mistake.

Professor Thom called his discovered unit the 'Megalithic Yard', but he died (in 1985) without ever being able to explain why people from

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the Neolithic Period, or late Stone Age, circa 3500 BC might have been motivated to establish such a measure or how they could have consistently reproduced such incredible accuracy.

Even today there are many tens of thousands of these Megalithic stone structures strewn across the British Isles and the western fringes of Europe. Our initial quest was simple: we wanted to find out if Thom really had found a prehistoric measure or if he had been deluded by the huge amount of data he collected from his surveying of sites from the islands of northern Scotland down to Brittany on the west coast of France. We reasoned that if Thom's Megalithic Yard was imaginary, it should be a meaningless value, but if it was indeed a genuine Neolithic measure, it should have some physical reality behind it and some kind of scientific means of reproduction.

The consequences of knowledge

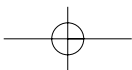
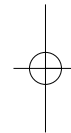
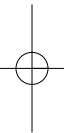
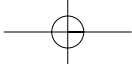
Our investigation led us to a rediscovery of the science behind this prehistoric unit: we can now demonstrate both its mathematical origin and its means of reproduction, using the mass and spin of the Earth. In identifying the precise origin of Thom's Megalithic Yard, however, we soon found that we had nudged open the door of a virtual treasure chest of lost knowledge.

Our approach has been to apply forensic techniques to archaeology across a span of cultures from prehistory (before 3000 BC) and the earliest times of written history (after 3000 BC). We have found that there is a completely identifiable 'DNA' associated with the oldest and purest system of science that appears in the most unexpected places. Even units of measure that are believed to be relatively modern, from the pound and the pint to the gram and the litre, turn out to be thousands of years old and linked to the very dimensions of the solar system.

INTRODUCTION

We have tried to keep our story as short and as clear as possible. A basic knowledge of arithmetic is all that is required to follow our investigation in detail, so please have your calculator to hand if you wish to check our findings step by step. Additional information, frequently asked questions and new developments are available on our website: www.civilizationone.com.

If you feel comfortable with the old idea that human development was a smooth evolutionary journey from ignorant caveman to urban sophisticate, be prepared to be shocked. The world is not what you thought it was.



CHAPTER 1

The Great Wall of History

The invention of writing

Forget the wheel – it was the invention of writing that changed our world forever.

The first wheels were used for turning clay pots and were later attached to axles to improve the efficiency of moving across dry ground for agriculture and warfare. This certainly helped in the production of food and aided its distribution to the growing communities that became the earliest cities, but major movements of people and goods relied mainly on sea lanes and inland waterways for thousands of years. The use of writing, however, had an immediate effect on commerce. Some of the earliest documents created were concerned with ships' manifests and other documents of trade. Lunar calendars existed from as early as 20,000 BC, carved on bone or antler, but 'real' writing developed extremely quickly in Sumer and Egypt circa 3000 BC. It was this ability to record information without relying on the honesty and memory of others that really drove mankind forward to begin an age that we define as the beginning of civilization, circa 3200 BC.

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The first great breakthrough in communication had happened nearly two million years earlier when our distant ancestors, *Homo erectus*, developed a larynx position lower in the throat than other primates. This piece of evolution cost these creatures their ability to breathe and drink at the same time, but it allowed them to generate a far wider range of sounds than had previously been possible. With a vocabulary of thousands of discernible sounds, spoken language is thought to have developed very quickly.

The simplest form of vocal communication may have been a hunting ploy, for example to imitate the sound of an animal and then point to its direction. Over time true language developed as abstract sounds were used to represent objects and actions and then assembled into sentences to express complex issues such as human emotions. Language allowed for information to be passed on from one person to another but the next stage of development was to make a record of human knowledge and experience by drawing a representation of the subject matter. We can see that the drawings on the walls of prehistoric caves are a kind of proto-writing. Any mark that records a specific meaning, either to the originator or to others, can fairly be called basic writing. The first writing systems were made up of hieroglyphs, which were used like a cartoon strip of pictures to contain information. These early writing methods came into use just over 5,000 years ago and slowly developed into abstract notation where the marks have a meaning that can only be understood by those people trained in the process of encodement and decodement – reading. But it seems that sophisticated meaning has been communicated by ‘writing’ for a great deal longer than has been thought.

Dr Michael Rappenglueck of the University of Munich has shown how a 16,000-year-old drawing of a horse in the caves at Lascaux in France is actually a carefully recorded lunar calendar.¹ What, at first

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view, looks like a very attractive drawing of horse, is now thought to be a means of keeping track of the phases of the Moon. This surely qualifies as writing.

This level of intelligence in Palaeolithic Man is hardly surprising. As a species, *Homo sapiens* has not changed significantly either mentally or physically, for well over 100,000 years. We may have moved from the Stone Age to the Internet Age but each human being is no different today to their forebear 500 generations in the past. We must also remember that while most of us have lives that have been shaped by the technological revolution, there are some groups of people around the world who still live as simple hunter-gatherers in a genuinely Stone Age existence, for example some Australian Aborigines and tribes in some parts of South America.

The remarkable Sumerians

Given that speech has been around for so long, it would be surprising if communication through drawn symbols only arrived so very recently. The earliest form of writing that is generally accepted as such emerged more or less at the same time as the wheel. Both were invented by the remarkable Sumarian people, who arrived in the land now known as Iraq from an unknown location more than 5,000 years ago. The Egyptians devised their earliest hieroglyphic system very shortly afterwards (probably within 200 years), just when Upper and Lower Egypt were united into a single kingdom.

The so-called cuneiform (from the Latin *cuneus* meaning 'wedge') characters developed by the Sumerians were made by pressing wedge-shaped sticks into wet clay. These Sumerian tablets may look rather unimpressive to us today but these 'talking' patterns were thought to

¹ <http://news.bbc.co.uk/1/hi/sci/tech/975360.stm>

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have powerful magic by ordinary people. At first, the content of these documents was very basic, but as time went by improvements added layers of sophistication until around 800 BC when the Greeks created a full alphabetic writing system that finally separated consonants from vowels. The period immediately before these early records were left by the Sumerians and the Ancient Egyptians has become a virtual wall, separating what we call 'history' from everything that happened before – which we label 'pre-history'. Everything that occurred before the advent of true writing is now considered to be myth and legend because every piece of human knowledge had to be transmitted by word of mouth from generation to generation.

The Great Wall of History

This 'wall' effect actually says a great deal more about current thinking than it does about the people who occupied our world before history began. Being human, we tend to view ourselves, and our society, as being somehow definitive – the measure of 'rightness' by which to gauge others. During the 19th and the first half of the 20th centuries, there was an egocentric worldview in academia whereby white, Christian, male explorers would travel to see the 'inferior' races who did not live 'properly'. One English naturalist wrote of his disdain for a group in Tierra del Fuego who shouted at him from a canoe:

‘Viewing such men, one can hardly make oneself believe that they are fellow creatures, and inhabitants of the same world. We often try to imagine what pleasures in life some of the lower animals can enjoy: how much more reasonably the same questions may be asked concerning these barbarians.’

These were the words of the young Charles Darwin, a man who went on to realize how all humanity has sprung from lower animals.

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Today, academia is much more objective and less judgemental than in previous generations, but the ideal of anything approaching real empathy is frequently as distant as it ever was for much of archaeology. But, we would argue, if we really want to bring into finer focus the landscape that lies beyond the Great Wall of History, we must undergo something of a fundamental shift in our mind-set.

The subject matter of this book requires readers to open their minds to a softer, more yielding worldview that dissolves preconceptions and temporarily allows the mind to roam freely over the subject matter, thereby allowing consideration of possibilities that might otherwise be missed. The principle that appears to underpin standard academia these days can reasonably be called 'stepping stone' logic, where deductions are often only encouraged in a strictly linear fashion. By this mode of reasoning one can only proceed by confirming each step before looking for an incremental way forward. While it sounds entirely sensible, it can blind the researcher to factors that are outside their expectations. Albert Einstein is famously said to have observed that 'Imagination is more important than knowledge'. Surely the great man has to be right: true insights come from thinking outside the box rather than simply ticking procedural boxes in a neat row.

A very famous archaeologist once said to Alan that all of his findings must be dismissed because his starting point was, in his opinion, wrong. How foolish. Even if someone does start with an error it is entirely possible that subsequent discoveries could be right if validated without reliance on the original premise.

The mode of reasoning that we invite you, the reader, to adopt while reading this book is one we call the 'tepee method'. This is a multi-dimensional approach to logical deduction rather than a classical linear 'stepping stone' process. It simply requires that each piece of evidence is seen in its own right and is not forced to conform to any

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preconceived notion of what *should* be. Even where different elements of evidence appear to be mutually exclusive, we suggest that they should be allowed to coexist until the time comes for a final analysis. With the tepee method each strand of evidence is considered to be a potential supporting stick – and only if there are eventually enough of them that work together does the argument stand. We believe that this is the only approach to examining the distant past that is likely to produce a cogent picture, one that does not pick and choose which facts it prefers to accept as ‘real’. As we conducted our research there were many occasions where we felt the urge to reject a finding as a coincidence because it did not fit with what we expected to see. We suspended our judgement and eventually, as a new picture emerged, we were very glad that we had not tried to force our preconceptions on the evidence.

Any readers who feel unable to open their minds right up at this point should close the book now.

The Ancient Egyptians

The Great Wall of History has distorted the way most people view the past by telescoping events so that the Ancient Egyptian civilization is often thought of as being extremely distant, whereas in terms of the span of the existence of our fully-developed species, it was actually extremely recent.

The huge array of artefacts and records left by the Ancient Egyptians provides a wonderfully strong picture of their lives and achievements. We know the names of kings right back to King Menes who unified the two lands of Upper and Lower Egypt in approximately 3100 BC and ruled from the capital of Memphis at the head of the Nile Delta. This great civilization left us beautiful structures such as the Giza pyramids and the Sphinx – and we can even medically examine the physical remains of Egypt’s rulers and leading citizens, carefully

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preserved by skilful mummification. Archaeologists have estimated that the Egyptians embalmed huge numbers of bodies. Though seeming to be a massive number, some claim that as many as 730 million people may have been mummified between the time of King Menes and the 7th century AD, when the practice was ended.² Although many mummies have not survived the scorching heat of northern Africa, it is believed that several million are preserved in yet-to-be-discovered tombs and burial places. As recently as June 1999 a burial ground containing almost 10,000 mummies was discovered near the town of Bawiti, southwest of Cairo.

We know what these people ate, with whom they traded, as well as when and against whom they went to war. One 5,000-year-old Egyptian mace head contains a record of a great victory in which no less than 120,000 prisoners were taken, together with 400,000 oxen and 1,422,000 goats that were liberated from the enemy.³ King Khufu, who built the Great Pyramid, was even kind enough to leave us a dismantled boat that has now been rebuilt. As a result, we can be sure that the Egyptians used only wood, rope, reeds and the like for their craft, which contained no metal.

These people also left detailed records of their gods and their religious practices. The famous Book of the Dead is a large collection of funerary texts from various dates, containing magical formulae, hymns, and prayers believed by the ancient Egyptians to guide and protect the soul of the deceased on its journey into the land of the dead. The texts tell us of a belief that happiness in the afterlife was dependent on having led a life in keeping with a principle known as 'Maat' – which meant doing good to all others.

² <http://nabataea.net/items.html>

³ http://www.math.buffalo.edu/mad/Ancient-Africa/mad_ancient_egypt.html

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The dark side of the Wall

These examples make the point that our knowledge of the Ancient Egyptian people on this side of the Great Wall of History is very extensive – but we know only very limited amounts of what happened on the dark side of the wall. For example, the Greek historian Herodotus, referred to as the ‘father of history’ for his nine-volume work written in the early 5th century BC, observed of Egypt that ‘there is no country that possesses so many wonders, nor any that has such a number of works which defy description’. Herodotus is considered to be the starting point of Western historical writing, although the accuracy of his facts has often been doubted by modern scholars because they seemed to be laden with exaggeration. However, archaeological finds have begun to show that this Greek chronicler was extremely accurate. For example, Herodotus had described the great city wall of Babylon as having buildings placed on top of it and yet still having ‘enough space between for a four-horse chariot to turn’. This seemed unlikely to experts but remains have been discovered indicating that the wall was of such a width.

Thanks to early scribes and historians like Herodotus we have a rich knowledge of the last 5,000 years, but what do we know of cultures that blossomed before this time?

After 100,000 years of what is assumed to be virtual stagnation, humans began a completely new way of life in what is known as the Neolithic Revolution. It began approximately 12,000 years ago when people across the Middle East, Europe and Asia quite suddenly abandoned their nomadic hunter-gatherer existence and began to opt for permanent settlements. They began to cultivate rice, wheat, rye, peas, lentils and other plants, and to domesticate animals such as cattle, sheep, pigs, and goats. Technology also began around this time with the manufacture of pottery vessels for cooking and storing food, stone

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sickles, and grinding stones to turn grain into flour.

The term 'Neolithic' means new Stone Age, and it refers to the time when the first farmers tilled the soil, planted, watered and harvested their crops and cared for their newly-domesticated animals all the year round. In the British Isles the Neolithic Period can be said to span from approximately 6000–1500 BC. This new lifestyle was more labour-intensive than hunting and gathering but also more certain, and it may be the case that the Neolithic Revolution was caused by the need to produce more food as a result of an increase in population. According to standard interpretations of the available evidence, the world had created the platform upon which civilization would eventually be built, but from our perspective these early farmers were still very crude and unsophisticated because they existed on the dark side of the Great Wall of History. However, there was one Stone Age culture that appears to dramatically upset such a neat paradigm.

Builders and artists

On the western fringes of Europe there was a culture that left tens of thousands of structures that still stand today. From parts of Scandinavia and the Baltic, down to northern Spain and especially throughout the British Isles these long-departed people built with enormous stones and are therefore remembered as the Megalithic builders – a name that literally means 'giant stones'. The terms 'Neolithic' and 'Megalithic' tend to be used interchangeably because it was these new Stone Age people who built the giant stone monuments. In the fifth and fourth millennia BC these supposedly primitive builders created huge circles and other structures using stones weighing up to 350 tonnes, such as the 20-metre-high 'Le Grand Menhir Brisée' in Brittany. On the banks of the River Boyne in Ireland they left a beautiful circular construction now known as Newgrange, a massive structure and 1,000 years

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older than the Great Pyramid in Egypt. But these people left very little else to tell us about their lives and beliefs. They had no writing as such, while most of their artefacts that were not stone or pottery have long since rotted to nothing in the damp European climate.

Particular and highly important members of the Megalithic builders have been named after the pottery fragments found around their encampments. They are sometimes simply called the 'Grooved Ware People' on account of the grooved patterns they chose to etch into the wet clay of their cooking utensils.

For thousands of years the massive stone structures these people so painstakingly created stood in silence. They were known as 'fairy mounds' by rural folk or sometimes uprooted by more pragmatic farmers to clear the land or to use the stone for their own building requirements. Few people gave any thought to the age or purpose of these giants in stone, until archaeology evolved as a serious discipline in the late 1800s. Even then, most early archaeologists were more interested in the exciting potential offered by excavations in places such as Egypt and Mesopotamia than in the British Isles and Europe.

The heavenly architects

It is now known that these mysterious people from the other side of the Great Wall of History had a significant interest in astronomy, and many of the larger Megalithic sites have been shown to have solar, lunar and stellar alignments. From the Ring of Brodgar in Orkney in the far north of Scotland, to Stonehenge in southern England and to the stone rows of Brittany in France, specialists have come to recognize that these people spent a lot of time observing the movements of the heavens. Newgrange in Ireland, for example, has a single shaft that was carefully constructed to allow the light of Venus to penetrate a central chamber once every eight years on the winter solstice, shortly before dawn.⁴

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Venus moves in such a way that it has a predictable 40-year cycle, made up of five patterns of eight years, giving the engineers who designed and built the Newgrange observatory a calendar so accurate that it can only be beaten today by the use of atomic clocks.

Alexander Thom and Archaeoastronomy

So, it is possible to understand something of the abilities and interests of the Neolithic culture, even without the benefit of writing. One man above all others was the pioneer of a discipline that is now known as ‘archaeoastronomy’ – his name was Alexander Thom.

Alexander Thom was born in Scotland in 1894. He became a student at Glasgow University and later returned as a lecturer in engineering. During the Second World War he worked for the British government but in 1945 he moved to Oxford University, where he became Professor of Engineering, a post he held until his retirement in 1961. His investigations into Megalithic sites spanned 50 years and did not end until very close to his death in 1985.

Thom’s interest in Megalithic structures began in his native Scotland, where he noticed that such sites appeared to have lunar alignments. In the early 1930s he decided to study some of the sites and began a process of careful surveying that was to take him almost five decades. In addition to his lecturing, Alexander Thom was a highly-talented engineer in his own right and he taught himself surveying, which enabled him to look at more Megalithic sites – and in greater detail – than anyone before or since.

From his first survey at Callanish, in the Hebrides off the west coast of Scotland, Thom realized that far from being crudely erected these structures had been carefully designed. He began to appreciate that the

⁴ Knight, C. and Lomas, R.: *Uriel’s Machine*. Arrow, London, 2000.

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prehistoric engineers had an advanced knowledge of geometry and astronomy and must have been highly-skilled surveyors.

Thom continued his careful surveying before publishing an article in 1951 in the *Journal of the British Astronomical Association* entitled 'The solar observations of megalithic man'. The results of his careful measuring of Megalithic sites were also published in three articles over several years in the *Journal of the Royal Statistical Society*, the first appearing in 1955 and also in his three books.

The approach taken by Professor Thom was entirely different to that adopted by any archaeologist. Looking at the scale and obvious planning involved in Megalithic sites, Thom had been forced to conclude that the planners and builders must have been very able engineers – just like himself. He knew that their level of knowledge was far below his own but he had no reason to doubt their intellectual ability and ingenuity. He therefore carefully analyzed what remained of each site and then tried to imagine what it was that the builders had set out to achieve. Once he had a picture in his mind of what he thought their plan had been, he went away to create his own solution to the assumed problem. Having drawn up his own design he then returned to compare the site layout to his own blueprint.

Mind-set and vision

This simple yet radical approach was a stroke of genius. Thom quickly developed a total empathy with the Megalithic builders. After all, who else can better understand the mind-set of an engineer than another engineer? Here was a leading academic who had changed his thinking to look at the other side of the Great Wall of History. Thom did not assume anything about the Megalithic builders other than to acknowledge that they must have been skilled engineers. Unlike the archaeologists of the day he was not searching for more clues to confirm

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existing theories and he had gathered data for many years before he even attempted to make sense of it.

Thom developed an understanding of the Megalithic mind and found that he could predict the location of missing stones; on further inspection, he would usually reveal the socket hole that confirmed his expectation. This engineer had a view of the landscape beyond the Great Wall of History that was denied to standard archaeologists who were limiting themselves to increasing numbers of similar excavations. Reassembling broken pots and analyzing discarded food items in rubbish heaps can indeed be very revealing about the realities of day-to-day life in the Neolithic Period, but it tells us virtually nothing about the aspirations of the builders and sheer enthusiasm for knowledge that appear to have emanated from the souls of these people.

The Megalithic Yard

Thom made detailed studies of every site he explored and developed a new statistical technique to establish the relative positions of the stones. Slowly, something totally unexpected emerged from the amassed data. It appeared that the vast majority of these prehistoric sites, from the islands off northern Scotland down to the coast of Brittany, had been constructed using a standard unit of measurement. According to Thom, the units he discovered were extraordinary because they were scientifically exact. Virtually all known units of measurement from the Sumerians and Ancient Egyptians through to the Middle Ages are believed to have been based on average body parts such as fingers, hands, feet and arms, and were therefore quite approximate. Thom identified a unit that had been used in an area that stretched from northern Scotland to western France, and appears in Neolithic structures built during the 4th–2nd millennia BC. His definition of this unit of length was that it was equal to

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2.722 feet/82.966 centimetres.⁵ He named this unit a ‘Megalithic Yard’ because it was only a few inches less than a standard yard. He found that this Megalithic Yard had been used in multiples, including half and double forms as well as being divided into 40 sub-units that he called ‘Megalithic Inches’.

In 1955, after analysing the data from the surveying of 46 circular stone rings, Thom concluded that they had been laid out as multiples of a standard unit of measurement that had been used throughout Britain.⁶ Alexander Thom and his son Archie, who had begun to assist him in his work, eventually arrived at a definitive length for the Megalithic Yard of 2.722 feet \pm 0.002 feet (82.96656cm \pm 0.061cm).⁷

Thom found small variations in the length of his Megalithic Yard but the distribution of error was utterly consistent, centring on a tiny range – not a fuzzy zone as would be expected from an ancient measure. The distribution graph of variations kept powerfully centring on a single point.

The engineer was utterly perplexed, since he could not begin to explain his own findings. He was well aware that even if there had been a priesthood that cut poles to the required length and then passed them on over the tens of thousands of square miles involved and across many generations, such uncanny accuracy could not have been the result. In 1968 he wrote:

‘This unit was in use from one end of Britain to the other. It is not possible to detect by statistical examination any differences between the values determined in the English and Scottish circles.

⁵ Thom, A.: *Megalithic Sites in Britain*. Clarendon Press, London, 1967.

⁶ Thom A.: ‘A statistical examination of the Megalithic sites in Britain’. (1955) *Journal of the Royal Statistical Society*, A118, 275-91.

⁷ Thom and Thom: *Megalithic Remains in Britain and Brittany*. Oxford University Press, Oxford, 1978. Chapters 3,4, 6, 7 & 8.

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There must have been a headquarters from which standard rods [a rod could be of two types, but in this context they are pieces of wood cut to represent the Megalithic Yard] were sent out... The length of rods in Scotland cannot have differed from that in England by more than 0.03 inch [0.762 mm] or the difference would have shown up. If each small community had obtained the length by copying the rod from its neighbour to the south the accumulated error would have been much greater than this.’⁸

At that time Thom’s data could not be explained by any mechanism known to be available to the people of the late Stone Age other than to assume that all rods were made at the same place and delivered by hand to each and every community across Scotland and England. Eventually he would find the unit in use from the Hebrides to western France, which makes the central ruler factory theory look most unlikely. He also found it impossible to imagine why these early communities wanted to work to an exact standard unit.

Although he could not explain it, Thom stood by his data. While he was puzzled, many people within the archaeological community were not. For most archaeologists it was a simple case of an engineer playing with something he did not understand and getting his facts wrong. This was not an unreasonable response because the culture that produced the Megalithic structures had left no other signs of such sophistication. Thom’s data was accepted but its interpretation was almost universally rejected. However, when the Royal Society under the auspices of Professor Kendal was asked to check his work in order to find the error, it responded by stating that there was one chance in a hundred that Thom’s Megalithic Yard had *not* been employed on the sites surveyed.

⁸ Thom, A.: *Megalithic Sites in Britain*. Oxford University Press, Oxford, 1968.

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Despite the fact that a number of leading archaeologists has subsequently identified accumulations close to whole number (integer) multiples of a unit of approximately 0.83 metres.⁹ Thom's work is still largely ignored on the basis that it is wholly inconsistent with scholarly opinion of the abilities of Neolithic Man. A failure to explain how this culture could have achieved such an accurate system of measurement has caused the archaeological community to disbelieve Thom's findings and put them down as some kind of statistical blunder. A suggestion was put forward that Thom's extensive data might reveal nothing more than the average pace or footstep of all the people involved in the building of these structures. After all, if enough data is collected and examined it is bound to produce an average, assuming that people paced out large distances and used their palm-widths for smaller ones. At first this explanation sounds very reasonable, even probable. But Professor Thom was not a fool – and he would have been a very poor mathematician to make such a basic mistake. The reality is that the 'human pace' theory is not a possible solution to the finding of a standard unit for two reasons. First, because the human stride varies far more than the small deviations found and second, because the distribution curve would be an entirely different shape. This 'solution' to the data is simply wrong.

The difference in approach between Thom and the general archaeological community is fundamental. In simple terms, archaeologists are experts in the recovery and cataloguing of manufactured artefacts that allows them to understand rates of development and influences between groups. They dig up the remains of human settlements and

⁹ Heggie, D. C.: *Megalithic Science: Ancient Mathematics and Astronomy in Northwest Europe*. Thames and Hudson, London, 1981. *See also*: Renfrew, C. & Bahn, P. G.: *Archaeology: Theory, Methods and Practice, Second Edition*. Thames and Hudson, London, 1996.

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piece together some idea of the community involved from written records and from lost or discarded items. This process works well in places such as Egypt where there is an almost boundless supply of artefacts and documents to give us an insight into the lives of its people. However, the procedure is less than satisfactory when considering the structures of Megalithic Europe because there are few artefacts to be retrieved and no written records at all.

Dr Aubrey Burl, the highly respected archaeologist whom Thom quoted extensively, confirmed to us that he did not believe in the reality of the Megalithic Yard, stating that he had excavated many Megalithic sites but had never found the measurement. This statement reveals a collision of techniques since it is difficult to itemize one specific Megalithic Yard at any ancient site. This is because the unit in the sense Thom often found it only reveals itself from the careful gathering of huge amounts of data extracted from every site.

Although individual standing stones have been shown by Thom to have moved very little over the centuries, an entire site must be meticulously catalogued before the Megalithic Yard really makes its presence felt.

Douglas Heggie of Edinburgh University gives the arguments against the validity of the results claimed by Thom in their most complete form in a book, where he questions the validity of the statistical approach.¹⁰ Heggie suggested that having 'found' what he thought was the Megalithic Yard, Professor Thom, particularly in his later work, might have had his findings coloured by the expectation of certain results. He also questioned how Thom had decided on the point on any given stone in any structure from which to take his measurements. From his own approach to assessing Thom's work Heggie came to the conclusion that if the Megalithic Yard existed at all it probably only did so in Scotland, and even then to a much less accurate degree of

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tolerance than Professor Thom had claimed.

Douglas Heggie is a highly respected professor of mathematics and Alexander Thom was a highly respected professor of engineering – so who is right? Most archaeologists prefer to side with Heggie, almost certainly because the whole idea of a prehistoric unit of measurement is at odds with their view of Neolithic achievements. But archaeologists who have carefully reviewed Thom's work in the field have a different view. For example, Tony Crerar, a researcher and engineer in Wales and Euan Mackie, an honorary Research Fellow at the Hunterian Institute in Scotland are strong supporters of the concept of the Megalithic Yard. Dr Mackie has recently said of Thom:

'By exact surveying and statistical analysis he (Thom) demonstrated that most stone circles could have been set out much more accurately than previously supposed. Most are truly circular with diameters set out in units of a 'megalithic yard' of 0.829 metres or 2.72 feet. Other circles had more complex shapes like ellipses and flattened circles, whose dimensions appear to be based on pythagorean triangles, also measured in megalithic yards. By similar means he showed that many standing stone sites pointed at notches and mountain peaks on the horizon where the Sun or Moon rose or set at significant times. Not only does a sophisticated solar calendar seem to have been in use, but the Moon's movements may have been studied carefully, even up to the level of eclipse prediction.'¹¹

There were question marks over the Megalithic Yard but the challenge laid down by the late Professor Alexander Thom still remained.

¹⁰ Heggie, D. C.: *Megalithic Science: Ancient Mathematics and Astronomy in Northwest Europe*. Thames and Hudson, London, 1981.

¹¹ Mackie, E. W.: July 30th 2003, see: <http://www.dealbhadair.co.uk/athom.htm>

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In our opinion there were only two main possibilities:

1. Thom's data gathering and/or his analysis were flawed, and the Megalithic builders did not use the Megalithic Yard as a standard system of measurement.
2. Thom's data and his analysis were both correct. The Megalithic builders did use this standard unit of measurement and it was applied with great accuracy.

'Stick to Facts, sir!'

It is a matter of record that the academic establishment prefers a gentle evolution to revolution in its thinking. No academic authority enjoys having its finely-tuned paradigm challenged. But it is time to put the Megalithic Yard to the test. So, was there a way forward to resolve the authenticity or otherwise of Thom's findings? Was it possible to investigate the suggested Megalithic Yard? The problem was that there was still a relative absence of informed opinion regarding this subject. The situation brought to mind the words of Mr Gradgrind in Charles Dickens' *Hard Times*:

'Now, what I want is, Facts... Facts alone are wanted in life. Plant nothing else, and root out everything else. You can only form the minds of reasoning animals upon Facts: nothing else will ever be of any service to them... Stick to Facts, sir!'

Facts can be tricky things, as the point of view of the observer will always have a bearing on them. However, we came to the view that the only way to resolve the matter was to try to put some more facts on the table: facts that could help everyone concerned to have a more informed view. To do this we decided that we needed to try and discover how the Neolithic people could have produced the Megalithic Yard to such a high degree of accuracy across so large a geographical

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area and over such a long period of time. If we could find a realistic explanation of how the Megalithic unit of 0.8296656 metres could be created, it would justify a reappraisal of the existing paradigm of prehistory and potentially repair a substantial hole in the Great Wall of History.