# MEGALITHS AND NEOLITHIC MAN

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*European Neolithic societies have traditionally been viewed as homogenous, barbaric, farming communities organized as regionalized chiefdoms. Their visible remains are principally their graves, which were often built using large blocks of stone. In France and Britain, some more unusual stone structures are to be found. This article focuses attention on the peoples of Neolithic Britain, looking particularly at their cultural achievements and social structure. Evidences of an advanced culture are found, in sharp contrast to conventional views. Evolutionary theories of man's cultural development are shown to be totally inadequate and an alternative explanation of the characteristics of European Neolithic societies, based on the Biblical framework of history, is discussed.*

## 1. Introduction

A journey of only about twenty-five miles allows the writer to visit Arbor Low, a man-made structure in the uplands of Derbyshire. The monument is situated near the brow of a hill and is surrounded by a bank which is over 2 m. high and about 80 m. in diameter. Whithin the bank is a 10 m. wide ditch, a central circular area, and a ring of over forty large and heavily weathered, recumbent stones. In the centre of the 40 m. diameter ring is a cove or U-shaped setting of stones. From the top of the bank, there are very fine views of the surrounding countryside, and the distant horizon is almost unbroken. Much of the land is farmed and there are few evidences of human habitation.

It is hardly possible to visit the site without wondering how and why it was built. What purpose did it serve? What was the significance of the bank, the ditch, the stone circle and the cove? Why was it built in what is now such an isolated part of the country? How was the large labour force necessary for such a structure assembled and organised? How could the uplands of Derbyshire support a population of sufficient size to undertake such a venture? It is easy to ask questions, but very difficult to supply answers!

Whilst Arbor Low is undoubtedly an extraordinary structure, it is by no means unique. Other mounds and rings exist not only in Derbyshire but throughout the British Isles. Together they represent the visible remains of an enterprising community that flourished in prehistoric times. The word megalith is derived from the Greek *megas* (great) and *lithos* (stone), and has been coined to describe the nature of the constructions. Archaeologists have devoted considerable time and attention to studying the monuments and graves, and can claim a measure of success. Neolithic peoples were resopnsible for building these distinctive structures, primarily in the second and third millenia BC. They were organised into regionalised farming communities and, rather than build villages and towns, they generally followed a nomadic way of life. They burried their dead with great care, and most of the information that we have of their abilities and customs is derived from the construction of the graves and the goods placed inside the tombs.

The absence of written records means that our knowledge of these people is very limited. It is the purpose of this article to review some of the developments in archaeological thinking arout Neolithic man in the British Isles, to identify some social and cultural characteristics of particular interest, and to relate these findings to the Biblical framework of history.

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## 2. The Megalithic Structures

Megalithic burial mounds are widespread in Europe: Italy, Sicily, Malta, Spain, Portugal, France, Holland, Denmark, Sweden, Germany, England, Wales, Scotland and Ireland all contain distinctive remains of Neolithic man. Although there are regional differences, nevertheless the constructions have many common features.

The magnificent Maltese temples were built with great skill and are considered to be the earliest known, free-standing roofed stone buildings anywhere in the world.

The Iberian peninsula furnishes numerous examples of a Neolithic society which buried its dead in elaborate tombs. Some burial chambers were cut into solid rock; others were passage graves roofed with massive capstones and the whole enclosed with a mound of smaller stones and soil.

In France, the Neolithic communities built passage graves and practised collective burials. They also erected long mound or gallery graves. In addition, other megalithic stone structures were built, ranging from single standing stones, like Le Grand Menhir Brisé, to complex alignments like those at Carnac in Brittany.

Both passage graves and gallery graves are found in Britain, although the passage graves are concentrated in the far west and north of Scotland. A particular feature of the British Neolithic constructions is the large number of stone circles that are scattered in profusion throughout most of England, Wales, Scotland and Ireland.

An excellent review of the relevant information is provided by MacKie[1], and reference to his work should be made as a helpful introduction to the subject.

It is highly significant that much of this megalithic construction work either preceded, or was contemporary with, the building of ziggurats in Sumeria and pyramids in Egypt. The results of many radiocarbon dating tests indicate that the European megaliths must be regarded as of independent origin, and cannot be considered as derived by diffusion from the Sumerian or Egyptian civilisations.

It is hardly possible to survey these archaeological monuments without being impressed by the enterprise,

skill and determination of their builders. Undoubtedly their origins are shrouded in mystery. Who built them? Why was there such a widespread interest in grandiose megaliths? Myths and legends about the circles and alignments abound, for ignorance fosters speculation and superstition. This article draws on recent research into these structures with the intention of taking a fresh look at these Neolithic peoples, their culture and their achievements.

### 3. Megaliths and Archaeological Theories

Archaeologists are accustomed to thinking of the comparatively slow evolution of human culture: from the Palaeolithic hunter and cave-man to the Neolithic farmer, followed by the Bronze Age and Iron Age societies. In the absence of historical records on which to build theories, presuppositions have exercised a dominating influence in the study of prehistory. Furthermore, scholars are very dependent on the discoveries made by slow and tedious archaeological excavations and, in North-western Europe, a picture of the Neolithic peoples has emerged primarily from a study of graves and their contents.

The recognition of certain distinctive traits in the grave goods has led, for example, to the identification of successive waves of immigration in Britain. For many years, the Neolithic and Early Bronze Age people have been regarded as little more than barbarians, although the magnificence of some of the daggers and ornaments found in the more recent graves testify to the fact that they were far from being savages. It is generally believed that the megalithic structures provided each family group or local community with a religious base which stabilised their nomadic way of life.

During the last twenty-five years, however, a major new factor has been introduced, primarily by Thom[2,3], but also by Newham[4,5], Hawkins[6], and Hoyle[7]. Thom has devoted many years to surveying the megalithic structures of Britain and northern France, and has come to some remarkable conclusions. He believes that the level of technological expertise and conceptual thinking which the megalith builders possessed is far beyond that of the primitive neolithic farming culture envisaged by most archaeologists.

Thus, Renfrew writes: "These findings have created a great furore among British archaeologists, some of whom are reluctant to believe that the barbarian inhabitants of prehistoric Britain were capable of such ingenuity."[8] MacKie has a similar comment: "Thom has not gone unchallenged by the archaeological world. His conclusion that there was a highly skilled class of professional astronomer-priests and wise men in existence when the standing stones were built simply does not fit with the picture of late Neolithic Britain which has been built up over many decades by many hands and from a great variety of archaeological evidence. This was a picture of a relatively simple society, barbarian and rural, probably with chiefs and a ruling hierarchy of some kind but with no sign of the sophisticated, semi-civilised priesthood that Thom's work should imply."[9]

The radical nature of Thom's conclusions is well expressed by Barber: "Thomism is severely, even paradoxically, at odds with our archaeological view of the Neolithic period. They cannot be reconciled by any adaption of the latter but rather demand a completely new Neolithic overview. Apart from Thomism, nothing else in archaeology or outside it, in related subjects like the history of cosmology, demands change of the Neolithic paradigm. Therefore we archaeologists are not unreasonable in demanding the highest possible levels of credibility of tests of these theories . . ."[10]

However, despite the challenges, Thom's work is slowly gaining acceptance among professional archaeologists. So strong is the evidence and so compelling are the conclusions, that outright opposition is now a totally unacceptable position to adopt. The following discussion of neolithic culture draws extensively on Thom's findings.

### 4. Features of Megalithic Culture

A study of surviving remains of the megalith builders allows some estimate of their social order and culture to be made. Of necessity, the following discussion covers the different points briefly, but references are given to books or articles where the subject is treated in greater depth.

#### 4.1 Widespread cultural links.

##### 4.1.1. Extensive use of the Megalithic Yard.

After accurately surveying many of the stone structures of Britain and Brittany, Thom made use of a statistical technique to analyse their dimensions. Were the stone circles and alignments laid out with the assistance of measuring rods? The test results were positive, and Thom has concluded that the dimensions are quantised. Is there a connection between the length units that have been identified between the different sites? Thom has found that measuring rods of 0.892 m. were employed in Brittany, England and Scotland to lay out the stone rows and stone circles.[11] This unit of length has been named the "Megalithic Yard." Evidence has also been found for the use of the "Megalithic Rod," which equals 2½ megalithic yards, and the "Megalithic Inch," which equals 1/100 megalithic rod.

A helpful discussion of this work is provided by MacKie,[12] who has this comment on the implications of Thom's findings. "The metrology and geometry that the circle builders used in their projects was highly organised to the extent that the lengths of the measuring rods were standardised at a single centre: if the rods had been copied from one region to the next errors should have accumulated and the actual variation between the rods of different areas should have been much greater. If it is correct, this deduction must have very important implications for the social organisation of Late Neolithic and Early Bronze Age Britain since it is scarcely conceivable that such a situation could have come about unless there was one major training centre for the wise men of that period where the appropriate knowledge and skills were taught by the wisest of the order and from which 'graduate' astronomer-priests and magicians were sent out all over the country."[13]

This is exactly the conclusion of Thom.[14]

4.1.2. Pottery design.

Archaeological investigations have always given an important place to pottery analysis. This is because the design and structure of pottery serves as an easily recognisable identification label for each distinct social group. Numerous samples of pottery have been recovered from the burial mounds and other neolithic sites in Britain and, despite local variations, there is a general uniformity of this type of material culture.

MacKie summarises the position as follows: "The finds which have been made over the years in the chambered mounds of the far north include the kind of early Neolithic pottery that such sites have yielded everywhere in Britain. In spite of regional variations in the round-based pottery bowls, the material culture of the whole of Britain at that time is remarkably uniform and does not by itself provide many clues as to whether the society of the time was divided into distinct classes or not."[15]

Such findings imply a countrywide cultural stability in these prehistoric times. In whatever way the people may have organised themselves regionally, they did not lose a sense of national identity.

4.1.3. Axe industries.

A notable feature of neolithic Britain was the intensive mining of flint and stone from many different parts of the country. These excavations provided raw materials for the construction of axes, weapons and tools for domestic uses, and several dozen sites have now been identified as prehistory mines.

In south-east England, flint tools were popular and were obtained by mining in chalk. One frequently mentioned site is Grimes Graves in Norfolk, and archaeologists have been looking more closely at this area in recent years. Excavations have revealed that the miners went about their work in a systematic way.[16] They sank shafts through the chalk, through inferior flint deposits, until the best quality flint seam was reached at depths approaching 15 m. This preliminary earthworking required the removal of over 600 tons of chalk. Horizontal galleries were then cut into the chalk to remove the flint. Their simple but effective picks were made from deer antlers. Blocks of flint were transported to the surface and roughly shaped into axes before being despatched. When the useful lifetime of a mine was over, the shaft was made safe by filling it with chalk rubble, and another shaft was sunk some distance away so that flint extraction could continue. Good quality flint was prized because it was hard enough to stand up to rough treatment and it was also capable of being flaked and ground to the desired shape.

In the west and north of Britain, suitable igneous or metamorphic rocks were in common use. Important mining centres were: Great Langdale in Westmorland (a greenish volcanic tuff), Graig Lwyd in Caernarvon (augite-granophyre rock), Tievebulliagh Hill in County Antrim (porcellanite) and the Penwith area in Cornwall (greenstone). In many cases, petrological examination of stone axes has enabled their source to be identified and it is clear that axes were transported considerable distances throughout Britain.[17,18]

It is concluded that the neolithic mining industry points to the existence of a society with an effective communications network and extensive trade routes. The mining industry came into existence to satisfy the market for flint and stone axes, and the economic links within the country were such that mining became a successful way of life for many people. A comment about specialised craftsmen and distributors is made in section 4.4.

4.1.5. Conclusion.

This discussion of cultural links has focussed attention on three quite different aspects of British Neolithic culture. Evidences of social interaction and influence, communication and trade have been identified. The indications are that the communities were not insular and they did not aim to be self-sufficient. There were extensive cultural contacts, and more than simple farming interests were needed to maintain them.

4.2. Advanced conceptual thinking.

4.2.1. Megalithic geometry.

Hand in hand with Thom's discovery of the Megalithic Yard has come the recognition of complex geometrical patterns in the lay-out of the stone circles. Truly circular rings are to be found throughout Britain, and there are also a significant number of flattened circles and ellipses. In his analysis of these complicated shapes, Thom has concluded that they are based on Pythagorean triangles with dimensions in megalithic yards. Notable examples, which illustrate well the geometrical principles employed by those laying out the rings are Avebury, Woodhenge, Long Meg and her daughters and Castle Rigg.

Thom's summary of his own conclusions is sufficient to indicate that the megalith designers were accomplished mathematicians. "He (megalithic man) had an extensive knowledge of practical geometry, and used the 3,4,5 right-angle triangle extensively. He also knew the 5,12,13 right-angle triangle, the 8,15,17 and the 12,35,37. There is a suspicion that he also knew the 9,40,41. He had in addition discovered many other triangles with integral sides that satisfied very closely the Pythagorean relation. These triangles were used in a peculiar geometry, in which he constructed rings, set out in stone, of various shapes: circular, egg-shaped, elliptical, etc. These constructions were made according to two rules: all linear dimensions had to be integral multiples of the unit, and the perimeters had to be multiples of 2½ units."[19]

Thom's arguments on megalithic geometry have been cautiously accepted by some professional archaeologists, as is illustrated by these comments of Forde-Johnston. "In recent years views on stone circles have been greatly influenced by the work of Alexander Thom. His careful survey of a large number of sites has revealed, among much other information, the fact that many of them are not truly circular but are, nevertheless, carefully laid out, displaying a hitherto unsuspected knowledge of geometry among the builders. He has been able to demonstrate that there were several

different types of oval arrangement, each clearly based on sound geometrical principles."[20]

4.2.2. Megalithic astronomy.

The megalith builders were very conscious of the movements of the sun and moon in the sky, and their interests may have extended as far as predicting lunar eclipses. This is the conclusion of Thom after studying many of the stone circles and alignments in Britain. Stones were erected to study the sun and moon and to make predictions about their future motions. The following summary is taken from the preface of Thom's book *Megalithic Lunar Observatories.*

"As the investigation advanced it became evident that I was not dealing with monuments oriented for some ritualistic purpose but rather with the remnants of a scientific study of the Moon's motion. When this is recognised it will be found that a great mass of material falls into place. We must no longer assert that these people could not possibly have known this or done that. It has proved much more fruitful to ask ourselves how a trained scientific mind would have approached their problems, always bearing in mind the kind of facilities which were available."[21]

Thom's reference to a "trained scientific mind" is the key to understanding the significance of his conclusions, and why they are so controversial among archaeologists. The movements of the sun and moon are highly complex, and it must be understood that unless measurements are made intelligently, they might just as well not be made at all. Thom's research into the astronomical use of the megalithic circles and alignments leads to the inference that their designers were remarkable for their intellectual prowess.

"Anyone who makes a detailed study of the more advanced sites like Temple Wood and Ballymeanach will realise that the people who built them possessed a highly developed knowledge of the complicated movements of the Moon in the sky, and that they must have employed some form of extrapolation. The implications are far-reaching. The design of the necessary sectors, whether obtained by pure reason or by some complex empirical operation, demanded a highly trained intellect. The discipline necessary could not have arisen out of nothing. There must have been behind it a school or a system of mathematical reasoning . . ."[22]

The fact that there was not just one structure, but many observatories up and down the country is an indication that the investigation is not concerned with only a pocket of human brilliance and initiative, but rather with people of high intellectual capabilities who were fairly common in the British Isles.

4.2.3. Conclusion.

Neolithic societies are considered illiterate, primarily because they are supposed to be primitive, but also because no written records have ever been found. However, despite this lack of evidence on literacy, there were among the British Neolithic population a number of inventive, resourceful, numerate, enquiring, practising scientists. The evidences for this are found nationwide, and indicate that a high level of conceptual thought was present in their society.

"When we think of the conditions under which these people worked and the limited material aids which they could employ we begin to appreciate what they did achieve. There are hundreds of sites throughout Britain which can surely teach us a great deal more if they are examined in an unbiased manner. Whatever we do we must avoid approaching the study with the idea the Megalithic man was our inferior in ability to think."[23]

4.3. Sophisticated technological ability.

The intention to build astronomical observatories had to be translated into practice. It takes wise men to conceive of such projects, but it requires skilled draughtsmen, managers and artisans to accomplish the plan. Designs had to be prepared, manpower needed to be organised, the right materials had to be used, and the construction work needed to be closely controlled. An illiterate, innumerate farming community would not even know where to begin such a task!

There is no doubt that Stonehenge in Wiltshire is the outstanding construction of megalithic man, and even today, when in a state of obvious ruin, it still evokes a sense of amazement at the resourcefulness of the builders. The history of Stonehenge has been much discussed and it is generally agreed that there were several stages of development. It is still a matter of debate as to whether the building of the massive stone circle took place in the Late Neolithic or the Early Bronze. However, since there is a clear continuity of cultural interests and abilities linking all the phases of Stonehenge's construction, the outcome of the debate does not affect the argument of this article.

Fig. 1 illustrates the main features of the monument. The outer perimeter is marked by a ditch with, when it was originally dug, two gaps for access. The chalk from the ditch was thrown up to form the bank, which is a circular structure having a diameter of about 98 m. Inside the bank are 56 roughly circular pits, known as the Aubrey holes, which form a ring of about 88 m. diameter. Two other rings of pits have also been discovered, but they are not visible in the photograph. The great stone circle, often called the sarsen circle, is the most striking feature of Stonehenge, and when it was built there were 30 upright and 30 lintel stones. Five huge trilithons formed a horseshoe inside the sarsen circle, but only three are standing today. Another peculiarity of Stonehenge is the presence of the smaller stones, known as the bluestones, which once formed a circle of uprights within the sarsen circle and a horseshoe of uprights within the trilithons. Whilst other stones, holes and structures could be mentioned, this brief description of the monument is sufficient to introduce a discussion of the technological expertise of the builders.

4.3.1. The transport of the stones.

The sarsen stone used for the outer circle of uprights and lintels and for the trilithons is a very hard form of sandstone. It is found on the Marlborough Downs, about 18 miles north of Stonehenge, and so, it is deduced, the massive stones must have been transported by

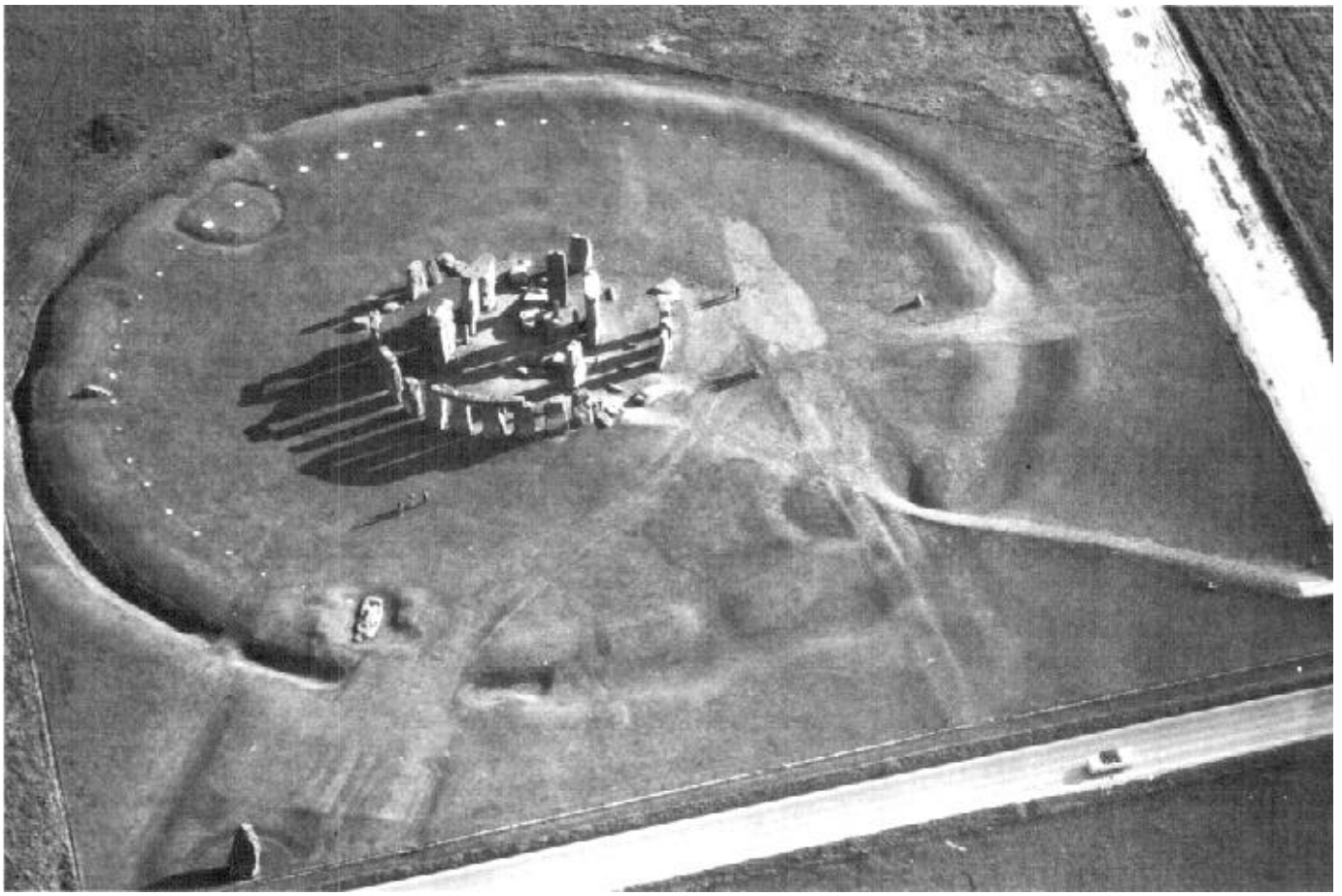

**Figure 1. Stonehenge: an aerial view from NNE.**

men. "The problem of engineering and man-power involved in this astonishing feat may be the better appreciated by realising that some of the heaviest stones of the monument weigh in the region of fifty tons, and had to be moved with only the simplest forms of rope, lever, roller and sledge."[24] Atkinson has discussed the techniques employed, the route and the problems that had to be overcome. "On this basis it can be calculated that the smallest requirements for the transport of the eighty-one sarsens to Stonehenge would be 1,500 men working for five and a half years, and working, moreover, without more than a few days rest between trips."[25]

The bluestones have provided a completely different perspective on the builders of Stonehenge. Petrological examination of the dolerite rocks has allowed their origin to be traced to the Prescelly Mountains of North Pembrokeshire in Wales. "There can be no question of the stones having been carried even part of the way towards southern England by ice during the Pleistocene period, and their appearance at Stonehenge can only be explained as the result of deliberate transport by man. The question to be answered is therefore quite clear: by what route, and by what means, were these eighty-odd stones, weighing up to four tons apiece, brought from Prescelly to Stonehenge, a distance as the crow flies of some 135 miles?"[26] A number of clues suggest that the stones were brought from the Prescelly Mountains to the coast at Milford Haven, then shipped around the south coast of Wales to the River Avon. Transport would have continued by river, with comparatively short overland hauls.

The very existence of these megaliths at Stonehenge, therefore, testifies that the builders possessed sufficient engineering and sailing skills to transport large blocks of stone over considerable distances. Manpower was necessary, but without the intelligent use of means, and a working knowledge of the geography of southern England and Wales, the stones would have been left where they were.

### 4.3.2. The tooling of the stones.

Sarsen stone occurs naturally as polygonal slabs, and it is very rare for pillar-like shapes to be found. Therefore, it is probable that the giant stones were roughly shaped before transportation. A widely used method in antiquity was to drive wooden wedges into preformed cracks in the rock, soaking the wedges in water and leaving the rock to split apart as a result of the expansion of the wood.

The stones were tooled to the correct shape and surface finish by pounding them repeatedly with stone mauls. "In view of the relatively advanced level of

technology exhibited by many other aspects of the design and construction of Stonehenge, it may seem surprising that so apparently primitive a method should have been used for dressing the stones. In fact, however, no other method is possible in the absence of modern mason's tools of steel, and the pounding process is dictated entirely by the intractable nature of sarsen. It is not generally realised that sarsen is the most difficult of all British rocks to work, and requires from two and a half to three times the effort to produce a comparable result on granite, itself considered to be one of the least tractable of all building stones."[27] Various degrees of tooling and polishing the stones have been detected by the archaeologists. Those surfaces seen from within the sarsen ring have been carefully smoothed, the sides of the uprights are coarsely dressed, whilst the outer faces are frequently very rough.

"Few visitors to Stonehenge have any true idea of the immense labor and patience involved in the tooling of the stones. Experiments made . . . by a professional mason in 1923 showed that the process of pounding a sarsen with a stone maul removed about six cubic inches an hour, entirely in the form of sand and dust. If we assume that on the average a thickness of two inches has been dressed away from all the surfaces of the uprights and lintels, the total volume of stone removed would be of the order of three million cubic inches. It would take a force of fifty masons, working ten hours a day and seven days a week, a period of some two years and nine months to finish the dressing of the stones alone . . ."[28]

### 4.3.3. The geometry of Stonehenge.

The sarsen circle and the trilithon horseshoe have easily recognisable shapes. Thorn *et al*[29] have considered the geometry of the different rings around the sarsen circle, the circle itself and the horseshoe of trilithons, and have concluded that the dimensions of the construction were carefully planned.

Probably the simplest example to consider is the geometry of the sarsen circle. The inside faces of the uprights are of interest, since they were given the most attention in dressing. The inside perimeter of the circle is 45 megalithic rods in length, to within three centimetres. "This divides into thirty segments, each of one rod in length and separated by gaps of half a rod, and it is remarkable how well the surviving stones fit this scheme."[30]

For a detailed discussion of the geometry of Stonehenge, Thorn's paper should be consulted. MacKie has judicious comments on this and on astronomical alignments.

### 4.3.4. The erection of the stones.

The probable methods employed by the builders are helpfully discussed by Atkinson.[31] It is known that holes were carefully prepared to receive the uprights, and it is almost certain that the megaliths were hauled into position with the assistance of sheerlegs. It is also thought that timber cribs were used to raise the lintels to the required height. As has been noted in section 4.3.3., the sarsen circle was laid out according to a geometrically precise plan. To raise thirty uprights, averaging 26 tons each, successfully into their appointed positions was a considerable achievement.

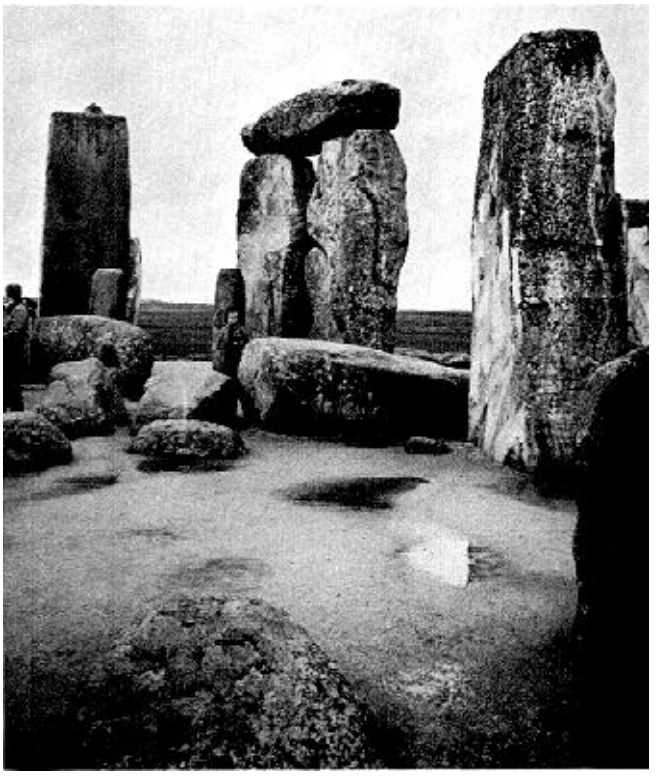

**Figure 2. Trilithon stones at Stonehenge.**

Of particular interest is the way the uprights and lintels were interlocked to achieve stability in the construction. Each upright was tooled to provide tenons into which the lintels could fit. An example of this feature is seen in Fig. 2, where the tenon on stone 56, one of the trilithon uprights, is prominent. At the foot of this stone is its fallen lintel, complete with two mortices. It is probable that the tenon and mortice pairs were tooled immediately prior to final positioning.

Furthermore, the lintels on the sarsen circle were given additional stability by providing them with interlocking tongue and groove joints. One of the lintels near the entrance has a good example of a tongue projecting from it, and is illustrated in Fig. 3. "The lateral movement of the lintel for trial fittings and for its final setting in place would be effected with levers as before, swinging each end of the stone sideways a few inches at a time."[32]

In spite of the gentle gradient of the ground at the Stonehenge site, and in spite of the difficulties of setting enormous blocks of stone accurately in the ground, the builders achieved a remarkably high standard in the positioning of the lintels. "Evidently great care was taken to get the upper surfaces of the lintels horizontal, and level with each other. There can be no doubt that this object was achieved with considerable accuracy, in spite of the size and weight of the stones and the primitive equipment of the builders. The maximum error from a mean horizontal plane of the tops of the surviving uprights . . . is less than 7 inches, and it is quite

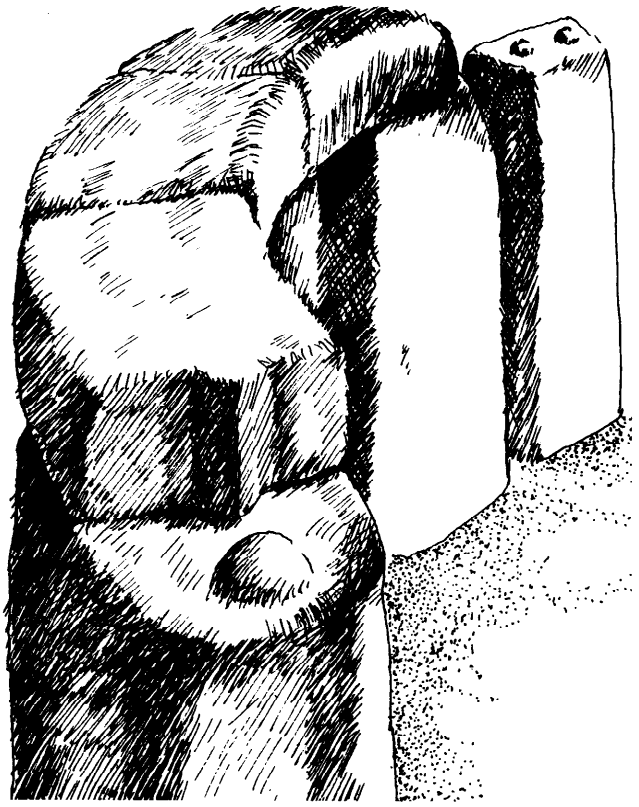

**Figure 3. The entrance stones of Stonehenge. (Based on Plate VA of Reference 24.)**

possible that the major part, at least, of such errors were compensated in the final shaping and fitting of the lintels themselves. Certainly this has been done in the case of the entrance lintel (stone 101), on the under side of which the visitor can see quite clearly a rebate worked about an inch deep on the end of the stone, to lower it by that amount upon its supporter (stone 1)."[33]

### 4.3.4. Final dressing of the stones.

The more Stonehenge is studied, the more apparent becomes the inventiveness and expertise of the architects. Three other aspects of their work are noted in this section.

The circle of lintels was tooled to shape and not left as a thirty-sided polygon. The curvature of each horizontal block is best seen by looking along the line of the lintels over the entrance, as in Fig. 3. It follows that the builders were concerned about the finer details of their monument, and were not merely enthusiasts for erecting great stones.

Atkinson has these additional comments about the dressing of the circle uprights. "Seen in elevation the stones taper towards the top, the amount of taper, for any one surface, averaging 5 ins. In many cases this taper is not straight, but convexly curved, a device known under the name of *entasis* from the columns of Greek temples and later buildings in the classical style. Its purpose there is to create an optical illusion of straightness (since a taper which really was straight would appear, paradoxically, as concave), and it is not impossible that the *entasis* of the Stonehenge uprights, though ruder and exaggerated in form, may be a deliberate attempt to create this illusion by the same means."[34]

The lintels of the trilithons "show a very subtle refinement, in that they are some 6 ins. wider at the top than the bottom. This means that the sides are inclined slightly towards the ground, probably with the intention of creating the illusion that they are vertical. If they were in fact vertical, their height would make them appear to recede."[35] Such corrections for perspective certainly have interesting implications for the architectural consciousness of the builders.

### 4.3.5. Conclusion.

There is no doubt that Stonehenge exhibits an extraordinary variety of mechanical, mental and aesthetic skills. It is often said that Stonehenge is unique, which is true; but it is important to realise that it is not out of context. It has been chosen as the subject of discussion in this article because it exhibits so many facets of Megalithic man's expertise, but many of the achievements of the builders of Stonehenge are also to be found at other sites. A study of Avebury, Silbury Hill, Woodhenge, the New Grange Mound, Maes Howe, and other major constructions gives independent confirmation that their builders were talented engineers and architects.

Thom, who has devoted much time to a systematic study of the megaliths, has made this general comment. "It is obvious that behind all this must have lain a solid background of technological knowledge. Here I am not thinking only of his knowledge of ceramics, textiles, tanning, carpentry, husbandry, metallurgy, and the like, but of his knowledge of levers, fulcrums, foundations, sheerlegs, slings, and ropes. Involved in his linear metrology was his knowledge of how to make accurate measuring rods, shape the ends, and use them accurately. There is evidence that he did not use the slope length on the ground, but the horizontal distance, as does a modern surveyor, and that he could 'range in' a straight line between mutually invisible points. There was also his ability to build and use boats: he travelled freely as far as Shetland, crossing the wide stretch of open water north of Orkney, as well as the exceedingly dangerous Pentland Firth and the North Channel between Kintyre and Ireland. This involved a knowledge of the tides and tidal currents that rule these waters."[36]

### 4.4. Complex stratified societies.

The skills required to build sophisticated megalithic structures come as a result of specialisation. The projects needed theoreticians, designers, architects, surveyors, master-builders, administrators, stonemasons, engineers, etc. A simple semi-nomadic farming community does not generate these skills for, in order to survive, agricultural expertise must be encouraged above all else. Professions and trades are only possible when the society is more complex and differentiated, whereby men can afford to devote themselves to specialised occupations. It is clear that mining was a

major industry in many parts of the country (section 4.1). Miners, stone-masons and travelling salesmen could make a living in Neolithic Britain. This is an independent witness to the existence of professions and to a degree of interdependence in the social structure of those times.

Furthermore, a simple farming community does not have a lot of spare man-power. Any farmer knows that there is always something to do to tend his animals and his land. Yet megalithic constructions required vast resources of man-power: enormous quantities of earth were moved; stones were transported from one place to another and placed in position; etc. Millions of man-hours have been estimated for the building of Stonehenge alone! Figures of this magnitude are staggering, for there is no way that the neolithic society, as it has been generally understood, could have satisfied these massive labour requirements. In those cases where there are historical records of societies which undertook large scale building projects, it is found that there was a strong sense of national cohesion, a stratified society, and a powerful and affluent leadership.

Any investigation of megalith building in Britain will conclude that interest in this type of construction lasted for over a thousand years. Few of the sites were occupied for all of this length of time, and the building activity was certainly not continuous in any particular place. Nevertheless, some essential ingredients of megalithic society can be found throughout the period, and this implies a continuity of culture and a stability of the social order. The megalith builders did not come and go in a generation, but they had a profound influence on the national life of Britain for a long time. Here again, such continuity and stability is incompatible with traditional views of neolithic man. Insular, regionalised communities may retain local practices and customs, but, with the passing of time, they will tend to diversify and any initial uniformity of culture will be lost.

The picture, therefore, is one of an advanced, near-civilised culture in Neolithic Britain, and is inconsistent with evolutionary views of the development of human society.

### 4.5. General comments.

Evolutionary presuppositions about the development of human culture are deeply entrenched in the thinking of most archaeologists, and many of their conclusions are, in reality, no more than expressions of preconceived ideas. With the British Neolithic, such a heavy emphasis has been placed on farming as a significant evolutionary innovation, that many other aspects of its cultural life have not been given the attention they deserve. The concept of a stratified society is one which does not fit easily into this evolutionary picture, and the megaliths are almost considered to be activities that were done in the people's spare time.

The general public is supplied with artist's impressions of what the megalith builders looked like. Fig. 4 is redrawn from the official guide-book to Stonehenge and Avebury,[37] and illustrates the men who were responsible for the construction of the sarsen circle and the trilithons. They are represented as tribesmen with comparatively simple lifestyles and technological abilities. In another popular work,[38] the builders of Stonehenge and the miners at Grimes Graves are pictured as men of a wild, unkempt appearance, clothed only in skin loincloths and indistinguishable from most representations of Palaeolithic troglodytes. So striking is the in-

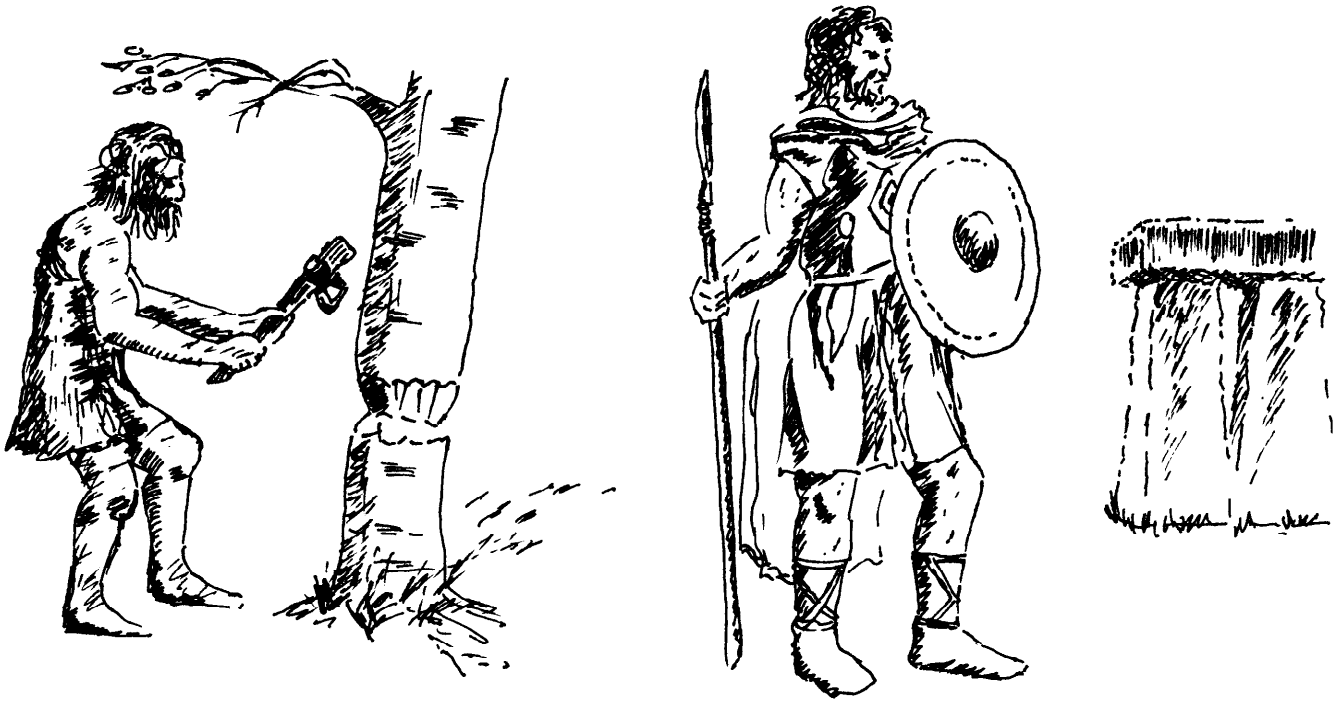

**Figure 4. An artist's impression of the builders of Stonehenge. (Based on illustrations in reference 37.)**

congruity between the facts and these illustrations that the latter are reduced to the level of cartoons.

However, in the light of Thom's work and the visible achievements of the megalith builders, there are some fundamental questions to be answered. If these people were so clever and resourceful, why did they not build cities and start a civilisation akin to Sumeria and Egypt? How did they get their knowledge and why was it so widespread in Britain? Why did they want to build megalithic structures and use up so much valuable man-power? What benefits did the megaliths bring to their society? How do we interpret this aspect of prehistory within the whole framework of our understanding of the human race? These are some of the questions that are discussed in the following sections.

## 5. The Quest for Explanations

Probably the greatest danger facing students of the past is the snare of speculation. It is so easy to confuse the fruits of a vivid imagination with the conclusions of a mature judgment. Even where there are written records to guide the historian, he must still be very careful to proceed with his work with a sober mind.

Comments have already been made about the evolutionary presuppositions of prehistorical studies, and how preconceived ideas have coloured scholarly thinking about the past. Whilst it is not possible to remove presuppositions from our thinking, it is important to realise that they are there and that they do guide our studies in certain directions.

As has been noted earlier, a new model is needed for the British Neolithic society, because the conventional views have been unable to assimilate the findings of Thom. To my knowledge, only two serious attempts have been made to provide such a model.

### 5.1. The Egyptian priests theory of Ivimy.

Ivimy[39] has proposed that megaliths betray the presence of an outpost of Egyptian priests in England, and that this group used their astronomical skills to maintain a position of leadership over the 'natives' of the land. He accepts the conventional views about the indigenous inhabitants of Britain, and attributes all the evidences of sophistication to the influence of the few highly skilled immigrants.

Whilst Ivimy's work contains much of interest, it does illustrate the point made above about a vivid imagination. The evidences that we have do not suggest a localised occurence of genius, but bear witness to a relatively high level of culture throughout the whole nation. A pocket of Egyptian priests might have been able to hold the allegiance of people in their immediate vicinity, but it does not seem realistic for them to have initiated vast building projects in other parts of England, Scotland and Ireland.

Furthermore, whilst it is possible for intellectuals and theoreticians to inject new ideas into society and to draw up plans which might be described as 'visionary' or 'in advance of their time', those plans will remain on the drawing-board unless there are the resources, skills and interest in the population at large for bringing them to pass. Without a society that was capable of undertaking the task, Ivimy's Egyptian priests would have been powerless to effect anything of significance in Britain.

### 5.2. The professional religious élite theory of MacKie.

MacKie is the first professional archaeologist to have taken the findings of Thom seriously and has sought to build a model of the neolithic society which is consistent with this evidence. His ideas have been published in *Science and Society in Prehistoric Britain.* "The question that this book attempts to answer is this. Is all the varied archaeological evidence which is now available about the Britain of some 4,000 years ago explained best by assuming that the population of that time was essentially rural, homogenous and organised into something like chiefdoms? Or can we on the other hand construct a more plausible picture by supposing that it was a much more organised, stratified and technically competent society evolving towards the proto-urban stage?"[40]

MacKie argues strongly for a stratified community, with a ruling intelligentsia who were responsible for the organisation of the people and the building of the megaliths. He summarises the argument of his book as follows. "In the previous chapters I have tried to show that the archaeological evidence surviving from the Britain of 3,000—1,500 BC will support two major explanatory social hypotheses of kinds not hitherto considered seriously, if at all, by prehistorians. The first hypothesis depends almost entirely on the work of Alexander Thom together with a little similar work by other hands and one excavation designed to test his specific interpretation of one site. It supposes that considerable achievements were made at that time in 'intellectual' matters, namely elements of what was later called Euclidean geometry, of field surveying and exact measurement to a high degree of skill, and of observational astronomy of a systematic and advanced kind. A corollary of this is here taken to be that such achievements are only credible in a stratified Neolithic society, one which was organised to allow specialised groups to pursue these activities for the whole of their time, supported by mass labour when necessary and always by surplus food. The second major hypothesis follows from this and is that Middle and Late Neolithic society, in southern Britain certainly and probably elsewhere, was indeed organised in this way and that groups of wise men—perhaps a theocratic élite—lived a life apart in special ceremonial centres or monasteries which can be identified both by their unusual nature and also by specific evidence from artifacts and food refuse."[41]

MacKie's arguments are powerful and the book is well worth reading in full. Although he can be criticised on some points for unwarranted speculation, it is my opinion that MacKie has provided the best analysis of Neolithic Britain that has yet appeared in print.

### 5.3. Fundamental questions.

The existence of a society so radically different from what has generally been supposed has still to be explained. How did the people gain an interest in astronomy? Where did their advanced knowledge come from? What

are the implications for the evolution of culture? Why did they choose to build megaliths rather than towns? From our present knowledge of archaeology, it is impossible to answer these questions. Any discussion lies in the realm of hypothesis and speculation.

The problem faced by archaeologists with an evolutionary approach to origins is only partly how to explain the existence of a comparatively small group of intelligent leaders. It is also necessary to explain how the whole society was relatively advanced in technology, skill and resourcefulness. An illustration may help to clarify this point, based on the building of the English railway system in the Nineteenth century.

The innumerable cuttings, embankments, tunnels and viaducts were all constructed by a large and hard-working labour force. Millions of tons of earth and stone were moved. However, there is no doubt that manpower alone would never have succeeded in completing the task. The railway network was a product of an enterprising, industrial society and the construction work bears witness to the technical expertise of the builders. Without a large number of skilled personnel, drawn from many different trades and professions, no progress could have been made. It is one of the arguments of this paper that the construction of megaliths in prehistoric Britain required the existence of a society of many talents, and that cultural stratification was not merely at the level of a few leaders, distinguishing them from the homogeneous masses, but it was to be found throughout that society. Any hypothesis which is concerned to explain the origins of the British Neolithic must be prepared to accept a society which was capable of actually building the megaliths.

As it happens, it is very difficult to find any evidence at all which has a direct bearing on these fundamental questions. MacKie's hypothesis is that professional priests emigrated from the Mesopotamian region in the fifth millenium BC and gained an influential dominion over most of Neolithic Europe. The specialised knowledge of these priests was passed from generation to generation, and used to advance their position in society.[42] No doubt, this hypothesis will be discussed in the literature, but it must be realised that it lacks any positive archaeological support and that it is defended only by circumstantial evidence.

On the basis of field evidence alone, it would not be appropriate to make any comments about the origins of the British Neolithic, but merely to note its advanced cultural characteristics. However, despite the lack of historical documents produced by that society, our knowledge of prehistory is not exclusively determined by the results of archaeological excavation. A reliable general history of early man is given in Genesis 1-11. The quest for explanations should not be placed in abeyance before considering the Biblical information relevant to the cultural achievements of early man and the way men came to inhabit different parts of the earth.

### 6. A Biblical Perspective

The Biblical framework for the social history of the human race divides the time into three unequal periods: antediluvian, postdiluvian preBabel and postdiluvian postBabel.

Antediluvian culture (Genesis 4-6) included the family as the social unit and the husband as the head of his house; the ability to speak rationally and coherently; the practice of livestock and arable farming; the owning of personal property; the ability to make fire, to sew and to make clothes; the building of cities; the existence of a stratified society which included sedentary and nomadic people, farmers, professional musicians, and craftmen in metal and in wood. Other skills can also be deduced: the practice of building boats and fishing; the cultivation of vines and the fermenting of wine; an understanding of accurate mensuration and the prizing of precious metals and stones.

All these features appear within ten generations from the first man, and there can be no doubt that traditional evolutionary theories about human cultural development are totally misconceived. Antediluvian man was essentially 'modern' in his resourcefulness and conceptual abilities. It did not take him long to make brass and iron objects by smelting ores, and he was capable of embarking on large-scale building projects.

After the Flood had devastated and restructured the whole of the earth's surface, the human population began again to multiply. Since they were descended from the family of Noah, all the people spoke with the same language. The consensus was to remain as one nation in the earth and not to allow division and fragmentation to take place. As numbers increased, they migrated to the Mesopotamian region and made their base there. A city was to be built in brick and also an enormous monumental tower. Their aim was to make a name for themselves, and in so doing they sought to preserve a sense of national unity.

In this brief description of events immediately following the Flood, there is no suggestion of any degeneration from the culture of the antediluvian period. They did not hesitate to commence extensive building projects and there was no lack of expertise to achieve their aim. However, although men were culturally advanced, they were spiritually dead. Before God, they were in the darkness of unbelief and their motives were utterly corrupt. Their desire to build a city and a tower was, in reality, an expression of defiance to Almighty God. Despite the recent judgment of the Flood, they persisted in the ways of their fathers and sought for independence and self-sufficiency. They would not have the Lord to rule over them and they grasped the reins of power for themselves. Their project of building a large tower was an important means of achieving this aim. The leaders aspired to an absolute rule, with no fragmentation of society into dissenting groups. Their goal was totalitarian world government.

In the mercy of God, this society was broken up. At this time the different languages were brought into being, the one nation became many, and the people were forced to migrate over the face of the earth. In some places, principally Sumeria and Egypt, civilisations sprang up quickly and Custance[43] has noted that the abilities and achievements of these societies exhibit a continuity with the culture of antediluvian and

postdiluvian men as recorded in the Bible.

These things being premised, it is now necessary to assign a place for Neolithic man and, in particular, the British Neolithic, within this general scheme. It is certain that the people were postdiluvian, for there has been no worldwide flood since the building of the megaliths. It is also certain that they were contemporaries or near-contemporaries of the early Sumerians and Egyptians. Therefore, they are postdiluvian postBabel people.

In the opinion of the writer, the spread of Neolithic peoples over the earth was a direct consequence of the judgment at Babel. The extended timespan that is normally assigned to the migration of Neolithic man across Europe is a direct result of the radiocarbon dating method. However, as has been shown elsewhere,[44] the C-14 dates need to be calibrated and, in real time, the Neolithic period before the rise of civilisations was probably comparatively short, of the order of generations.

Neolithic man carried with him the knowledge of civilisation, of technology, of a structured society and of the Tower of Babel. If there was any significant continuity of culture, at least some of the community must have retained and transmitted their knowledge to others. These people went out into an hostile and untamed earth, and this forced them to be hunters and nomadic farmers until they had mastered their environments. The existence of relatively advanced technology and a complex social structure among them, therefore, should not be regarded as nonsense and out of the question. The Biblical history provides a context in which advanced cultural features do make sense. It is not the argument of this section that the Bible *requires* such characteristics in neolithic societies, for it has no direct reference to the subject. Nevertheless, *consistency* is essential to a coherent Biblical understanding or origins, and this consistency is observed.

Is it possible to link particular cultural characteristics of the British Neolithic with social practices which are found in the Book of Genesis? For example, can anything be learned from burial customs? Abraham and Sarah were buried in a cave; Rebekah was buried under a pillar or standing stone; and Deborah, Rebekah's nurse, was buried under an oak tree: the evidence is meagre, to say the least. It might be deduced that burial practices were different according to the social status of the deceased, but it is impossible to make a convincing case from so few instances, and to justify connections between the practices of an independent nomadic family and those of peoples living in other parts of the world.

However, despite the lack of any explicit connections, it appears to the writer that one cultural affinity is worthy of consideration at the level of hypothesis. This concerns the widespread practice of megalith building in the early history of many societies, whether civilised or not. Megalith building took many different forms, but there was undoubtedly a common interest in this type of construction. To recognise that these people were descendants of those who scattered from Babel provides substance to the idea that the desire for megalith building was deeply rooted in many national groups and that its origin should be traced back to Babel itself.

The Tower of Babel was an expression of opposition to God: a declaration of human independence and self-sufficiency. Such a rebellious spirit did not depart from men as they scattered from the Plain of Shinar. When they found a land in which to settle, their thinking continued along the same lines. They did not humble themselves to seek the Lord, but persisted in building structures that were echoes of Babel. Any connections with the burial of the dead, idol worship or astronomical observations should not efface the motto of the builders: "Let us make a name, lest we be scattered abroad upon the face of the whole earth." (Genesis 11.4) The continuity of the Neolithic cultures indicated above may be regarded as a success for the idea of the megaliths being a means of achieving social cohesion.

Finally, why was there an absence of towns in Neolithic Britain? Towns are built when people can guarantee their supplies of food, for this enables them to stay indefinitely in the same place. If the food supply is uncertain, a nomadic existence is to be preferred. It has been shown that the inhabitants of Neolithic Britain were certainly capable of building towns. Since this was not their practice, it may be inferred that the countryside could not support a settled community—other than the few cases cited by MacKie. What is the explanation for this?—for the British countryside today can easily support settled communities. The writer does not have a clear answer to this question. He suggests that the climate in N. W. Europe was significantly different in Neolithic times from today, and that this impeded the formation of sedentary societies. A similar suggestion was made in a previous article[45] and is consistent with the situation described above.

### 7. Summary and Conclusions

Recent studies of the British Neolithic peoples have unveiled aspects of their cultural attainments which have fundamental implications for our understanding of those times. This article has sought to gather together several different strands of evidence, concentrating on those which are indicative of sophistication in technological skill and social structure.

Since these evidences are incompatible with the traditional models of social life in the British Neolithic, it is necessary to reconsider all the data and to formulate alternative models. The work of MacKie has been briefly discussed and commended as a significant step forward. MacKie argues for a stratified society ruled by a religious intelligentsia.

Even if these new views of the British social structure are only partly correct, the traditional evolutionary approach to the development of human culture must be discarded. A Biblical perspective on the origins of this society has been discussed, based on information supplied in the book of Genesis. In particular, this concerns the people who were dispersed to different parts of the earth after commencing to build the Tower of Babel. Consistency between the Biblical information and the archaeological evidences has been noted, to the extent that the Christian student finds no tension in his mind as

he pursues his investigation of the peoples of prehistoric Britain.

One important lesson that should be drawn from this revised interpretation of the past concerns the danger of placing too much importance on a limited range of archaeological artifacts. The traditional picture of British Neolithic society is very dependent on the study of graves and gravegoods, and inadequate attention has been given to other sources of information. The consequence has been that an artificial picture has predominated. This danger of selectivity leading to erroneous conclusions must be very carefully watched when studying nomadic peoples, because they leave behind so little for archaeologists to recover and study. For example, consider the life of Abraham, who led a nomadic way of life. He was a civilised man and he enjoyed the benefits of civilised life. He was wealthy and powerful, so that he had personal dealings with the Pharaoh of Egypt and the king of the Philistines, and he also defeated other kings on the battle field. He was one of the important people of his day—and yet his burial chamber was all that he left for posterity. An archaeologist could have little idea of the significance of this man from a study of his grave. Other nomads may have been just as civilised as Abraham, and yet have left just as little tangible evidence of their advanced culture.

Attention has been drawn several times in this article to the importance of presuppositions in the study of the past. In the study of early man, evolutionary views have predominated and archaeologists generally appear to be unconscious of the fact. A proper discussion of Thom's work has been seriously impaired by a commitment to evolutionary principles, and the resistance to the new ideas has been largely a result of prejudice rather than rational thought. The evidences for the British Neolithic being advanced in social structure and cultural attainments are now very strong, and it is time for the facts relating to neolithic peoples in other parts of the world to be re-examined.

### Acknowledgements

Figs. 1 and 2 are crown copyright and are reproduced by kind permission of the Controller of Her Majesty's Stationary Office. I wish to thank Mr. Franco Onesti for drawing Fig. 3 and also Mr. Rowland Price for sketching Fig. 4.

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## A Rapid Post-Flood Ice Age

*(Continued from page 37)*

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