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The Construction and Use of Categories of Neolithic Pottery from Wales

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Richard Garvin Peterson

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ABSTRACT

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THE CONSTRUCTION AND USE OF CATEGORIES OF NEOLITHIC POTTERY FROM WALES

by Richard Garvin Peterson

The thesis examines the Neolithic pottery from Wales and attempts to write a history of practices concerned with its construction and use. This work is undertaken from the standpoint that contingency, that is the constraints and possibilities of the history of objects, has a major role in their construction and use.

The thesis begins with an examination of some ideas about contingency and history in archaeology, biological science, material culture studies, and philosophy to build a pragmatic methodology for the study of the material. This methodology is particularly based upon the ideas of Stephen Jay Gould and Richard Rorty.

A discussion of the evidence for the Neolithic period in Wales is then followed by the application of this methodology to five regional study areas within Wales. Localised narratives about the construction and use of Neolithic pottery are produced for each region. The methodology is then applied to the study of the material from Wales as a whole to produce a more general narrative. This narrative is then related to the discussion of the period as a whole, and to previous categorisations of the Neolithic and the Neolithic in Wales.

The thesis allows to addition of more precise chronological resolution and some social interpretation to a body of evidence which has previously been marginalized within British Neolithic studies.

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for
Julia Roberts

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'Of course I do; the priest adores the sin. No sin no priest. The doctor needs the wound. Fallen creatures thrive on gravity; that which pulls us down is the spur that raises us up. Materialists and spiritualists alike seem to have missed the point; as long as we are human we are both. After death one side or another will be right but presently, and presently is all we have, we are both.' -Jeanette Winterson, Art & Lies.

1 Introduction

This thesis uses what is known about the Neolithic pottery of Wales to create a history of the meaning and use of that material. The thesis is divided into two parts. Part one deals with some parts of the history of archaeology, philosophy and science, and attempts to draw these ideas together into a methodology suited to explaining the pottery I am studying. Part two uses this methodology to tell my story of Neolithic pottery in Wales.

When I began this thesis I had many disparate interests, some personal, some professional, some academic, and some popular. As a result of the things people have said to me and other work that I have read, my own idea of what I was doing has changed. I want to begin by listing briefly as many of those interests as I can remember.

Firstly, I had a desire to know one part of the subject in detail. I wanted to be able to claim to know all about the Neolithic pottery of Wales. Secondly, I had been enthused by the idea of 'structured deposition', the idea that there was meaning in a great wealth of detail, and that this meaning could be extracted. Thirdly, I had an interest in the design of the pottery. I wanted to know how pottery was devised to work and exist in the world. Fourthly, I wanted to write history. I wanted to tell the story of Neolithic pottery in Wales, at least as I saw it, rather than advance tentative and unconnected suggestions. Lastly, I had an interest in the idea of historical contingency. By contingency I mean the idea that the nature of objects, ideas and systems, owes more to the constraints and possibilities of their history than to any universal system of laws.

My approach has not been constructed from any theoretical first principles. It has grown out of these interests, and others I have acquired as I have learned. I'm not apologetic about this as I could not have worked in any other way. When I began the project I knew too little about archaeological theory to imagine a proper theoretical grounding for pottery studies. As my ideas changed I have ceased to believe that there is any 'right' theoretical foundation to all pottery studies, or indeed to all archaeology.

I have investigated the Neolithic pottery of Wales from the standpoint that the most important influence on the meaning, form and use of the pottery is its history. In order to

clarify the theoretical background to my work I brought together two traditions of research which rely on the concept of contingency.

The first of these traditions is an aspect of evolutionary biology. In this tradition, historical constraints and possibilities are held to have as much effect upon the development of organisms and species as natural selection has in fitting them for their present environment. For example; whales are adapted by natural selection to live in the sea, but the manner of that adaptation is affected by their terrestrial vertebrate ancestry having left them with enlarged lungs at the expense of gills and a four limbed internal skeleton. It is a tradition with a long history in continental Europe, which was introduced to Anglo-American biology as part of a critique of the increasingly sterile nature of explanations relying entirely upon the 'laws' of natural selection (Gould & Lewontin 1979). The idea that natural selection is a universal law which explains change, rather than a historical process to be explained, is referred to by critics such as Stephen Jay Gould as adaptationism.

The second of these traditions is that sort of philosophy, known as historicist or ironic, which regards what we know as a product of our history. In *Contingency, Irony, and Solidarity* (1989a) Richard Rorty offers us a view of how we think based on historical happenstance. Rorty argues that everything around us is the outcome of particular historical events. This includes the ideas we have about the world, the language in which we communicate them, and our sense of who we are. This contingency of our own ideas means that the attempt to absolutely test theories for scientific truth or intellectual rigor will lead into a circular argument. Our descriptions of the world owe their form to the research which preceded them. Comparing them to this preceding body of knowledge confirms this relationship, but it does not tell us that they are true. Rorty would argue that there *is* a real world in existence which we are attempting to describe. Truth is a property of language, descriptions of the world can be true or false, but the world itself cannot. In Rorty's terms ideas become established not particularly because of their relationship to 'truth' or logic but because our own intellectual history makes them particularly useful or *resonant* to us.

Gould has given us a description of nature in which contingency is central. Rorty has given us a description of culture in which contingency is also central. I have integrated ideas which were important to both to discuss the Neolithic pottery of Wales in terms of its own history. I would argue that, following from the pragmatic approach to truth which I have adopted from Rorty, both of these approaches are necessary. Any critique of the organic

analogy must operate within the same set of descriptions as the analogy itself. Or rather, it must if it is to have any relevence or influence to change the minds of people who are used to working within that way of seeing the world. A dismissal of the organic analogy on the grounds that material culture has been shown to be meaningfully constituted by language-like rules is a dismissal of a whole way of seeing the world, not a critique of the details of the organic analogy. A similar point can be made about criticisms of the textual analogy. To dismiss the textual analogy for material culture on the grounds that you can prove that material culture is Man's way of adapting to the physical or social environment is to change the question, rather than critically examine the answer.

The common strand in my two critiques will be the recurring idea of contingency and the importance of history. I have used historical examinations in chapter one to integrate the two ways of thinking about contingency I referred to above, with changing ideas about archaeological theory and about material culture. Everything I have discussed has been chosen on the basis of its relevance to one or another strand of my argument, this is in no sense a total history of these ideas. Rather than look for a grand logical synthesis, I have looked for a set of ideas which I find useful for trying to understand the physical evidence for the meaning and use of Neolithic pottery. I have looked at six different topics to examine the content, impact and relationships of these ideas.

Most of these topics are to do with binary oppositions which have been established in our classifications of theories. As with everything else which is encountered by human beings, thinkers and their ideas have been placed in categories. These associations are part of the way in which we understand ideas. There are many of these two-fold categories. My first category is to do with the nature of truth. At the beginning of *Contingency, Irony, and Solidarity,* Rorty describes thinkers in terms of their beliefs about truth. On the one hand, are those who regard truth as something which is found in the world, and, on the other, are those who regard truth as something which is made by human description (Rorty 1989a, 3-5).

My second category is to do with the nature of theory. Introducing a critique of human sociobiology, Stephen Jay Gould brings to our attention another way of dividing up thinkers, on the basis of their attitudes to theory:

> 'Ludwig van Bertalanffy, a founder of general systems theory and a holdout against the neo-Darwinian tide, often argued that natural selection must fail as a comprehensive theory because it explains *too* much -a paradoxical but perceptive statement.. ...Similarly the arguments of Christian fundamentalism used to frustrate

> me until I realised that there are, in principle, no counter cases and that, on this ground alone, the theory is bankrupt.' (Gould 1978, 530)

Gould is stating very plainly his view that theories which explain absolutely everything are not authoritative and resonant because of this ability, but are instead glib and lifeless. By contrast, when Leslie White is discussing the work of Franz Boas, he sees Boas' concentration upon culturally specific explanation as his major weakness. In White's view Boas has failed anthropology by not providing a universal radical explanation for the things he discusses, and by leaving them floating in comfortable middle class American cultural relativism (White 1960, vi). The difference between Gould and White is not expressible in terms of politics or subject. Both of them stand explicitly on the left of American scientific thought, and both work with evolutionary ideas. Nor is it expressible in Rorty's terms, for both of them regard truth as something which is found in the world. The difference here is between those people, like Gould, who think theories take their strength from a detailed integration of a lot of closely related specifics, what might be described as gaining authority through information; and those, like White, who think theories take their strength from an ability to unite wildly disparate cases under general rules, thus gaining authority through theory.

My third category is to do with how the mind, the material world and the body are thought of interacting. It is possible to divide up thinkers on the basis of their attitude to mentality. For example; Robin Collingwood, castigating claims that psychology could replace history, set out his views on how the mind was related to the body:

> '..the dogma got about that reason and will were only concretions of sense and appetite. If that were so, it followed that logic and ethics could disappear, and that their functions could be taken over by psychology. For there was no such thing as "mind"; what had been so called was only "psyche".' (Collingwood 1939, 65)

Gordon Childe had very different views on the links between intellect and the senses:

> 'And the exercise of power must react upon the controller. The sight of the bright flame bursting forth when a dry bough was thrust into glowing embers, the transformation of the bough into fine ashes and smoke, must have stimulated man's rudimentary brain. What these phenomena suggested to him is unknowable. But in feeding and damping down the fire, in transporting and using it, man made a revolutionary departure from the behaviour of other animals. He was asserting his humanity and making himself.' (Childe 1941, 50)

The difference between Collingwood and Childe could be expressed in terms of the difference between those people, like Collingwood, who think of the mind and its

activities as separated and opposite to the body and the material world, and those people, like Childe, who think of them as being inextricably entangled.

My fourth category is much more specific to archaeology. People who think about material culture can be classified into those who think material culture is like an organism and those who think it is like a text or like a language. Not everybody who describes material culture explicitly adopts one or other of these metaphors, but they have influenced the categorisation of all Neolithic pottery.

My fifth category has been particularly important in evolutionary thought. People who think about evolution are divided into those who believe that evolution involves progress, and who devote time to thinking about what progress means and how it can be defined, and those who cannot see any evidence of progress, and regard evolution as a process of undirected change.

The sixth technique I used to examine the history of these ideas was to look at the scale of question which they had been used to investigate. Ideas are more than descriptions of the world, they are also the impetus to actions. These actions are as much a part of someone's theoretical standpoint as are the descriptions classified in the previous paragraphs. Scale of examination and scope of study are things which are often thought of as a methodological gloss applied to a basic theoretical position. Sir John Lubbock and General Pitt-Rivers shared many of the same ideas and are now often considered as roughly equivalent people, representatives of the Victorian evolutionary anthropological tradition. Lubbock's main concern was with social customs and their survival and transmission, Pitt-Rivers' with styles and items of material culture and their transmission. This could be regarded as a decision about the scale at which to apply a general body of theory called 'Darwinism'. However, George Stocking has shown how Pitt-Rivers' concern with the evolution of objects led him to stress natural selection and development from single prototypes. By contrast, Lubbock's need to move human history from savagery to civilisation, without the intervention of God, led him to stress the rationality of savage man, and to favour independent invention (Stocking 1987, 150-181).

The question of scale does not only affect the results of the enquiry. Lubbock's and Pitt-Rivers' ideas on what the evolution of culture meant were very different because of their different experiences of research. The use of ideas is thus a part of the contingent history of ideas.

We use these categories, and many others like them, to find our way around strange ideas and arguments. In order to find out what we think, we relate the unfamiliar to disputes which we know and about which we have an opinion.

In finding out what we think in this way we tend to do two things. We mark off one side of a two-fold division as right, and we associate that good way of thinking with a set of attitudes which we hold. Each of these attitudes is also expressed as the good part of an either/or argument. This has the consequence that, for example, a belief that the truth is something which is made by human description becomes logically connected in our minds with a belief that material culture is like a language. If we adopt the first proposition we tend to adopt the second, until we have a set of opinions which are good and are linked together and strengthened by their goodness. This group of opinions *is* logically connected in our minds but the connections are those of the history of our own education. When we change our minds these connections can circumscribe us. We don't preserve ideas which *were* useful from theories which have become bad because they were associated with ideas we have rejected. Also, we are not sufficiently critical of theories which have become good because they are associated with ideas we have adopted.

This evaluating of ideas by association is part of the way in which we come to know things. So when we encounter ideas together which our education has caused us to view as opposites we are often shocked. This shock can be a positive thing, a fruitful change to our opinions. Or it can be a negative thing, a recognition (and dismissal) of a logical inconsistency in the argument. As I suggested above, we should regard these inconsistencies as being in our, or our subject's, history, rather than being in some universal system of logic. Discarding ideas because we have thought about them, and don't like them, can only help our understanding. Discarding ideas by accident, as part of a process of thinking about something else, will not.

I have written a history of the meaning and use of the Neolithic pottery of Wales. It is contingent not only in having the history of the material as its central core, but in recognising and using the contingency of our ideas about culture to build a broad theoretical base to support the historical approach taken. It does not claim to be *right* by being grounded in a proper, logically consistent, understanding of a particular theoretical position. Hopefully it is *resonant* by uniting different traditions and approaches through a common concern with history.

If this work is followed up, then the French and the German philosophers might stop using "positivism" as a bogeyman to frighten their students, and British and American philosophers might be able to stop giggling nervously at the mention of the word "hermeneutics". - Richard Rorty, Texts and Lumps

2 The Contingency of Nature and the Contingency of Culture

This study looks at the origins of two apparently diverse uses of the idea of contingency: Richard Rorty's philosophy and Stephen Jay Gould's evolutionary theory. It compares these different kinds of explanation with archaeological thinking to construct a methodology for a contingent, historical account of the Neolithic pottery of Wales.

I have looked at four different, but interconnected, traditions of thought. My interest in them is solely in terms of their utility to my argument. Rather than being a history of thought, this chapter is a reader about contingency. I have included biological evolution, to explain Gould's vision of a contingent nature; a certain kind of philosophy, to examine the background to Rorty's view of the contingency of ideas; archaeological theory, to show how changing ideas about the past contrast with the ideas in the first two disciplines; and, the study of material culture, to show how ideas in all three disciplines had an impact on the study of Neolithic pottery in Britain. The study has been carried out using the six categories established in the introduction; so this chapter is also a reader about the nature of truth, the relationship between theory and information, the mind and its relation to the world, metaphors for material culture, the idea of progress and scales of enquiry. All of the categories have not been used for each thinker, as not everyone is interested in the same problems. There is little in Isobel Smith about the nature of truth, or in Friedrich Nietzsche about the meaning of material culture.

2.1 The Origin of Species

Charles Darwin is a central figure in this investigation. He was the originator of the materialist evolutionary tradition of which Gould is a part. He was also the inspiration for the evolutionary anthropology and archaeology which underpins many of our systems of categorisation in archaeology. A large part of this investigation will be concerned, implicitly and explicitly, with how these two traditions have adapted and changed Darwin's ideas in different ways. What I think Darwin believed is an important starting point for this process.

Unlike many of his younger colleagues, the nature of truth was an issue for Darwin. It was important in his early debates with the high Anglican establishment figures at Oxford who

had been his mentors. Darwin followed Comte and regarded the truth as a correspondence with physical reality, rather than an attribute of the word of God. His biographers recount his delight at encountering *Positive Philosophy* in 1838:

> 'He sat absorbed in it at the Athenaeum, revelling in the covert swipes at Whewell, praising its tone as "capital".' (Desmond & Moore 1991, 260)

Truth, for Darwin, was something which could be found in the world.

Darwin was a theorist; he saw his mission as being to explain change:

> 'How do those groups of species, which constitute what are called distinct genera, and which differ from each other more than do species of the same genus, arise? All these results, as we shall more fully see in the next chapter, follow from the struggle for life.' (Darwin 1872, 73-74)

However, it is clear that he thought of the authority for his theories as coming from the vast amount of information he was able to bring to their defence. He referred to the *Origin* as a 'brief abstract' of his ideas with 'a few facts in illustration' (Darwin 1872, 27-28). Unlike A.R. Wallace, the co-discoverer of natural selection, he did not regard it as a universal law explaining all change. He was happy to allow a wide range of possible alternative causes, including random mutation, developmental correlation[1] and sexual selection, for particular historical changes. He protested several times in later life at the reduction of evolution to the operation of a law of natural selection:

> 'Can Sir Wyville Thomson name any one who has said that the evolution of species depends only on natural selection? As far as concerns myself, I believe that no one has brought forward so many observations on the use and disuse of parts as I have done in my "Variation of Animals and Plants under Domestication"; and these observations were made for this special object.' (Darwin 1880, 32)

Darwin took his authority from information, not from any universal system.

Darwin believed that to separate mind and body was wrong. One of the reasons he so approved of Comte was because of his opposition to metaphysical ideas of mentality. Desmond & Moore (1991, 38) trace this interest in the material basis of mind back to his days as a medical student in Edinburgh, where he was a pupil of the Lamarkian evolutionist Robert E. Grant and a member of the radical Plinian Society. This long standing conviction added to his disagreements with Wallace in later life. Wallace, committed to an adaptive reason for all evolutionary change, could see no such advantage

[1] Developmental correlation arises when parts of the body change, not for adaptive reasons, but because their development is linked to the development of another part. There is no gene for the right index finger, there is (probably) a set of genes which control the development of the digits; consequently adaptive changes to the right index finger involve non-adaptive changes in the other digits.

in the vast increase in brain size which accompanied the evolution of humans and came to regard mentality as something apart from evolution, divine and distinct from nature. Darwin saw this as a fundamental difference between himself and Wallace (Gould 1980, 43-51).

Darwin does not seem to have been very involved with the applications of 'social Darwinism' by his anthropological friends. He viewed culture and nature as being subject to similar processes but he had worked by taking earlier social theory and applying it to the natural world:

> 'In the next chapter the Struggle for Existence amongst all organic beings throughout the world, which inevitably follows from the high geometric ratio of their increase, will be considered. This is the doctrine of Malthus, applied to the whole animal and vegetable kingdoms.' (Darwin 1872, 29)

As well as Darwin's acknowledged debt to Malthus' population theories, Stocking (1987, 145) and Schweber (1977) have pointed to a more general influence from the economics of Adam Smith and Victorian laissez-faire capitalism. Darwin did not regard cultural change as part of the same process as natural evolution, but he clearly regarded ideas developed for the description of culture as relevant to the description of nature.

Darwin believed in progress, both in society and in nature, but as early as 1837 had identified that variation by adaptation to specific environments gave him no mechanism for overall progressive change:

> 'It is absurd to talk of one animal being higher than another... We consider those, where the intellectual faculties most developed, as highest. - A bee doubtless would [use] ...instincts.' (Darwin's notebooks for 1836-1844, *in* Desmond & Moore 1991, 232)

This is the first statement of one of the central problems of modern evolutionary theory. The definition and mechanism of progress has been a central concern from Darwin onwards. By the time he came to write the *Origin* he had replaced his earlier relativism about 'higher' animals with the first of many attempts at a universal standard for progress. Darwin's definition was based on increasing internal organisation of the adult stage of the organism (Darwin 1872, 123). He placed the motor for this trend to increasing complexity in the overcrowded Malthusian world he had imagined for nature:

> 'There is no exception to the rule that every organic being naturally increases at so high a rate, that, if not destroyed, the earth would soon be covered by the progeny of a single pair.' (Darwin 1872, 75)

He saw this intense competition for space as forcing each new species which arose to do so by the extinction of its less complicated near relations. It is still far from clear in any of Darwin's work how this mechanism serves to answer his earlier, extremely cogent, critique of the idea of progress. As I show below, this question of a theoretical mechanism for progress and the desire for an unambiguous definition of progress has been of repeated concern both to evolutionary biology and evolutionary social science.

The scale of at which Darwin's theories about evolutionary change operated was exclusively at the level of the individual organism. The struggle for existence was between individuals, and was most intense between individuals of the same species (Darwin 1872, 75-84). Natural selection did not act upon groups or species but acted upon individuals to produce groups and species. Random variation, which produced the different individuals which natural selection chose, operated upon parts of organisms (Darwin 1872, 58-62).

2.2 Victorian Anthropology after Darwin

Following the publication of *The Origin of Species* in 1859, 'Darwinism' began to make its way into a vast number of disciplines. Evolutionary change had been increasingly discussed before the middle of the nineteenth century but with Darwin's plausible mechanism in place evolution became a major topic in many fields. The social sciences, where much of the mechanism had first come from, were particularly quick to develop the idea of 'Darwinism' in varied ways. I am concerned here with the tradition of evolutionary anthropology which displaced the earlier descriptive Ethnology in the years after 1859. I am going to look in detail at the work of three men: Col. Augustus Henry Lane Fox (later Lieut.-Gen. Pitt-Rivers); Sir John Lubbock (later Lord Avebury); and Edward Burnett Tylor.

Broadly speaking, all three men followed Darwin, and indeed Anglo-French science as a whole, in accepting Comte's vision of truth as something which was found in the world. Stocking (1987, 161) regards Tylor as having being 'influenced' at times by the German idealist tradition, with its view of scientific knowledge as being constructed in the mind, but in developing his evolutionary theory he returned very firmly to his empiricist, anti-idealist roots.

Lane Fox took his authority from theory to a quite extraordinary degree. He began his career in anthropology as a collector of material culture from many parts of the world. He ordered this material on the basis of a highly dogmatic understanding of natural selection as a 'law' which explained all form and all change (Bowden 1991, 47-56):

> 'If the principles which I have enunciated are sound, they must be applicable to the whole of the arts of mankind and to all time.' (Lane Fox 1868, 435-436)

Lubbock seems to have taken information as authoritative. He was in much closer contact with Darwin than either Lane Fox or Tylor and had a thorough understanding of the biological version of Darwinian evolution. However, his anthropological work drew on a variety of traditions. In *Prehistoric Times* (1865) he began with a piece of geological information, also vital to biological evolution, concerning the antiquity of humans. From this starting point he developed a history of the changes leading to modern society, drawing on both evolutionary beliefs about society and the evidence of migrations drawn from the earlier ethnographic tradition. By the time he came to write the *Origin of Civilisation* (1870) the evolutionary tradition had become the dominant framework for his work, but it never became the universal explanatory system that it did for Lane Fox and Tylor.

At the beginning of his researches Tylor was strongly influenced by the descriptive ethnology of Dr James Cowles Pritchard. As he became interested in laws of human development this tradition tempered the extent to which, in early work such as the *Researches into the Early History of Mankind* (1865), he was prepared to use evolution as a general law of explanation (Stocking 1987, 157-159). Later in his career Tylor moved away from the idealist position of Pritchard, perhaps because he felt its conflict with his Unitarian background. He developed the 'doctrine of survivals' explicitly to tie all ethnographic data to a universal evolutionary framework for the mental development of humans.

Lane Fox's view of culture was highly materialistic; it was totally bound up in the artefacts which he collected so avidly. Physical anthropology, material culture and social change were all evidence about the same process. They were to be explained using the same theory. Lane-Fox was extreme, even amongst his contemporaries, for the entirely integrated view he had of material culture and social change; to him they were inseparable (Bowden 1991, 54-56). Lubbock's attitude to culture was very different. His interest had always been in social institutions, and in the evolution of 'civilisation' as a set of mental attributes (Stocking 1987, 154-156). With his interest in folklore, Tylor also sited culture in the minds of people, rather than in their interaction with the world. Both Tylor and Lubbock may have been influenced in this direction by the Duke of Argyll's critique *Primeval Man* (1868). The Duke objected to human evolution not so much for 'the origin of industrial arts' but in the realm of 'spiritual progress' (Argyll 1868 *in* Stocking 1987,

160-161). In attempting to demonstrate the evolution of the mind, Lubbock and Tylor concentrated on the history of mental phenomena and reinforced the Duke's division between mental and material culture.

As part of their interest in evolution, all three men adopted an organic analogy for culture. Lane Fox seems to have gone beyond analogy; his individual artefacts struggled for existence in the same way as Darwin's individual organisms:

> '..so by a precisely similar process of natural selection... ..many ancient types of tools and forms of ornament are in like manner retained.' (Lane Fox 1869, 70)

Lubbock did not so much view culture as evolving like an organism but to see it as the product of the evolution of individual minds (Stocking 1987, 155). This evolution, while a continuation of Darwinian evolution, was not a physical process but rather a sorting out of increasingly useful ideas. The wild guesses of rational savages described the world less efficiently than more recent attempts at science. The truer an idea was, and hence the nearer to modern civilised thought, the more efficiently it performed and the more likely it was to be selected (Lubbock 1870, 104). Tylor was also concerned with the development of the human mind. He referred to it as 'mental evolution' and stressed that he had developed it independently of Darwin's ideas (Stocking 1987, 162-163)

All three men defined evolution as progress. Tylor's 'rough scale of civilisation' (Tylor 1871, 32) ran from savage to European. Lubbock regarded Utopia as a natural predicted consequence of evolutionary laws (Stocking 1987, 152). Tylor and Lubbock were both Liberals; and their definitions of progress included some idea of greater common freedom. Although General Pitt-Rivers occasionally claimed to be a Liberal (Bowden 1991, 40) his major concern with progress was establishing that it ought to happen in a lawful way and without revolution (Bowden 1991, 56).

Lane Fox saw evolution as acting at the scale of the individual artefact, producing classes of material exactly equivalent to species and genera. Lubbock seems to have regarded it as something which acted at the scale of individual minds and ideas, producing cultures which were equivalent to species and genera. Tylor had it acting within minds, acting on languages and myths to produce cultures.

2.3 On the genealogy of culture

Friedrich Nietzsche is important in this study because of the central place he has in the background to Rorty's contingent, pragmatic view of how we think:

> 'In particular, it seems best to think of Heidegger and Derrida simply as post-Nietzschean philosophers.. ...rather than to view them as initiating or manifesting a radical rupture.' (Rorty 1991b, 1-2)

An attempt to present 'what Nietzsche thought', even in relation to my six specific topics, is a problematic exercise. As a consequence of his vast influence and ambiguous style almost every aspect of Nietzsche's thought is the subject of debate. The status of the *Nachlass*, fragments unpublished at the time of his mental collapse in 1889, which were subsequently edited by his sister Elisabeth Förster-Nietzsche into *The Will to Power*, is particularly disputed. I have followed Hollingdale (1996, 86-87) in considering this work as a reflection of the anti-Semitic and pan-German pre-occupations of the editor, rather than any final epitome of Nietzsche's thought.

Nietzsche railed against the notion that the accepted truths of his day were absolute things which were found in the world. In *On the Genealogy of Morality* (Nietzsche 1887) he sought to demonstrate the origins of our social truths in the particular history of the West, not in any transcendental morality. Does this belief imply that Nietzsche believed that all truths were created by human history? Nehamas (1996, 240-242) argues that it does not, that pragmatists such as Rorty are wrong to ascribe their contingent view of truth to Nietzsche, and that Nietzsche did have his own universal vision of what the truth was. I have not accepted this argument as it seems to me that Nietzsche did not, or could not, ever define any theory of what truth was. I follow Rorty in taking the historical deconstruction of truth practised by Nietzsche as indicating that he believed that each culture made its own truths.

Nietzsche clearly regarded universal theories as incompatible with his genealogical, perspective based, view of the history of Western thought:

> 'I mistrust all sytematizers and I avoid them. The will to a system is a lack of integrity.' (Nietzsche 1889, 470)

However, his own development of a universal description of this history in terms of 'the will to power' and 'slave' and 'master' moralities (Nietzsche 1887) became an increasingly obvious form of universal theory. While the publication of *The Will to Power* as a core testament of Nietzsche's ideas is generally agreed to be a fraudulent Nazi production (Behler 1996, 288), the idea of a 'will to power' forms a core part of the development of Nietzsche's ideas. Ultimately, he found authority in theory.

The defining characteristics of civilisations or cultures for Nietzsche were their ideas and ways of thinking: the 'slave morality' of the Judeo-Christian tradition (Nietzsche 1887); or

the Apollonian and Dionysian principles of the Greek world (Nietzsche 1871). Aspects of Nietzsche's thinking about power, and its relationship to the constructed character of knowledge, foreshadows the concerns of Michel Foucault (1976). However, Foucault's concern with the embodiment of power is not prefigured in Nietzsche. True, for once, to his early idealist education, Nietzsche located culture firmly in the mind.

Nehamas has pointed out how Nietzsche's attack on the truth of historically accepted beginning for progress and his abolition of God removes all the standards used to measure progress (Nehamas 1996, 225). Nietzsche believed that without the framework of western thought; the idea of progress was without any content.

Nietzsche's ideas on change in society operated almost exclusively at the scale of the group; the Greek aristocrats; or the aristocratic race, the Aryans (Nietzsche 1887, 14-19, for example). While Nietzsche's ideas on the re-creation of the world through its redescription operated, as an aristocratic phenomenon, in the mind of the individual, his description of the existing world was as the product of reified parts of society, 'the slaves' in all their forms.

2.4 Early Culture History

During the early part of the twentieth century the evolutionary ideas which had dominated archaeological thinking began to be replaced by a tradition based on the notion of the 'culture'. In English speaking archaeology this tradition is most associated with the early work of V. Gordon Childe. In this section I have examined only this early work, I consider the later development of his ideas below (see section 2.7).

Trigger considers that the major influence which Childe's Marxism had on his early work was in those parts of the German idealist tradition which had been preserved by Marx (Trigger 1980, 54: 178). The idealist depiction of scientific truth as something made by human activity was only accepted by Marx as defining the products of bourgeois science. Marxist science would find the truth behind this false consciousness. Childe may have doubted how often Western science would find the truth, but he was in no doubt that truth could be found in the world.

Childe is often portrayed as the first theoretical archaeologist, but at this early stage in his work his commitment to a specific theoretical position is not clear. I feel that the authority of his early work lies in the presentation of information. The explanatory device of the culture was a methodological tool adopted from Kossina. Childe specifically did not adopt

Kossina's racist theoretical underpinning for the *Kulturgruppe*. The emphasis in both *The Dawn of European Civilisation* (1925) and *The Danube in Prehistory* (1929) is on the information of European prehistory, rather than any universal theoretical system for explaining it. By contrast, *The Aryans* (1927), is much more theoretically driven. A theory about language is use to structure a search for the ultimate origins of the speakers of Indo-European languages (Trigger 1980, 37-40). However, most of Childe's work at this stage shows a concern with locally specific utility, rather than universals:

> 'In practice, the significance attachable to correspondences must be admitted to vary. Abstract common traits -"the polishing of stone" or "the practice of agriculture" - are very much less illuminating than concrete agreements - a definite type of stone implement or the cultivation of a specific grain.' (Childe 1929, vi)

At this stage, Childe maintained a strong division between the material, the 'culture' or culture group', and the society it represented. Unlike Pitt-Rivers, his concern with material things did not lead him to unify material and people under a single paradigm:

> '..."culture group" or just a "culture". We assume that such a complex is the material expression of what would to-day be called a "people".' (Childe 1929, vi)

At this early stage in his work Childe did not think of cultures, or the societies they represented, as evolving in a way analogous to organisms. Childe seems to have had very little belief in a society's internal capacity for change. The diffusion of new ideas from some external source and invasion by some external group of people were his two models for culture change (Trigger 1980, 44-49).

Childe believed strongly in progress as a natural phenomenon; as this passage from the introduction to the *Dawn* shows:

> 'The monuments of early man are but insignificant bits of flint and stone, bronze and baked clay. Yet such fragments embody concretely the achievement of our spiritual ancestors. In such rude implements are revealed the preconditions of our gigantic engines and of the whole mechanical apparatus that constitutes the material basis of modern life. Progress is an indivisible whole in which the invention of a new way of hafting an axe formed a necessary prelude to the invention of the steam engine or the aeroplane. In the first innovations the germs of all subsequent improvement were latent; and the first steps on the path of discovery were the hardest. Thus the achievements of our nameless forerunners are in a real sense present in our cultural heritage to-day.' (Childe 1925, xv)

What was lacking at this stage of Childe's thinking was any thought about how we might define progress, or how we progressed, both of which were major concerns in his later work.

Childe saw change happening at the scale of the artefact type, rather than the individual artefact:

> 'Where stratigraphical or geological evidence is lacking, we must have recourse to typology. This depends on the assumption that types evolved (or degenerated) regularly.' (Childe 1929, viii)

A collection of these types went together to make up a culture group, the main object of Childe's study.

2.5 Early Classifications of Neolithic Pottery

During the beginning of the twentieth century the material which we recognise as Neolithic pottery was separated from the generality of Prehistoric pottery to be studied and classified. I have considered two fairly developed examples of this process: E. Thurlow Leeds' report on his excavations at Abingdon (Leeds 1927); and Stuart Piggott's corpus of British Neolithic pottery (Piggott 1931). These papers form the basis for all our modern categories of Neolithic pottery. Both divided Neolithic pottery into two classes: the earlier round based material, the 'Windmill Hill culture' in Leeds' terms and 'Neolithic A' in Piggott's; and the later, coarser, more heavily decorated material, the 'Peterborough culture' in Leeds and 'Neolithic B' in Piggott.

Neither Leeds nor Piggott were interested in metaphysical speculations about the meaning of truth. In terms of my division of thinkers on this basis they fall by default into the category of thinking of the truth as being found in the world.

In explaining his pottery Leeds was working with a very pure version of the culture history model. However, this theoretical justification is largely secondary to his supporting of his conclusions about the Abingdon material by information from continental archaeology:

> 'Moreover, it is from the dolmen of Junçaes that there come two-handled round-bottomed vases, which, in addition to a deep hollow neck, have the carination decorated with a band of diagonal incisions in exactly the same manner as some of the Abingdon vases.' (Leeds 1927, 458).

Piggott *was* concerned with finding a system to explain the changes in the pottery he studied. He can be regarded as feeling a need for some kind of theoretical framework to explain his information. He looked at the development of vessel forms in terms of the

evolution of leather prototypes, which he thought of as moving from simple bags to vessels with increasingly complex wooden stiffening around the neck to aid carrying and pouring (Piggott 1931, 80-82). However, Piggott did not have a strong commitment to a general theory about evolution to explain artefact change. Alongside this evolutionary account of reasons for change is a larger emphasis on a descriptive account of the pottery, defined as British by its presence in a geographical area and Neolithic by its presence in an archaeological stratum. Questions of what the Neolithic was and what it meant for this material he left to Childe's companion paper on the continental affinities of the pottery (Childe 1931). Both Leeds and Piggott can be regarded as taking their authority primarily from information.

With his emphasis on invasions and changes in population corresponding to changes in ceramic style, Leeds seems to have been postulating a fairly uncomplicated unity of pottery and culture and society. Culture was not a thing in the mind separate from the material:

> '...the Peterborough pottery gradually encroached on the territory of the Long Barrow race, and that, if not actually themselves beaker-makers, as indeed the finds at Peterborough and West Kennet might suggest, at any rate preceded that people by so little that they may be said to have initiated the conquest...' (Leeds 1927, 460)

Piggott maintained a strong separation between culture, in this case the society existing in the past, and 'ware', its ceramic products, and was considerably more sparing with terms like people and race (Piggott 1931, 87-88, for example).

As the quotation from Leeds in the paragraph above demonstrates, in common with Childe, he had little belief in a primitive society's internal capacity for change. At this stage Piggott clearly thought of pottery as something which evolved like an organism:

> '..its form does vaguely suggest a very degenerate descendant of the Peterborough tradition. The zoned ornament, the pseudo-cord lines, and the hollow moulding above a sharp shoulder and hemispherical base all point in that direction, and although the family likeness is slight, it is perhaps sufficient to allow us to put this orphan into the Peterborough family, if only as a very distant cousin.' (Piggott 1931, 133)

In contrast with Childe, Leeds seems to have had no strong belief in generalised progress. His vision of the prehistoric past was of a changing mixture of barbarian peoples. Piggott's partial use of evolution, and his interest in mechanisms of change, led him to think in terms of progress as one of those mechanisms; the later vessels are different because they

perform better. When the pottery seemed to get worse rather than better over time, especially upon the introduction of the coarser 'Neolithic B' styles, this was evidence of a discontinuity in evolution, an introduction of a foreign product by diffusion (Piggott 1931, 70-72).

For Leeds, everything in prehistory happened at the scale of the 'race', by the mechanism of invasion and population displacement. Changes in the pottery were a symptom of this process, not a cause. Piggott looked for the reasons for change at the scale of the individual artefact, in terms of its function for an assumed task. In his consideration of the change in the leather bags presumed to be models for 'Neolithic A' pottery, parts of the artefact, in this case the neck, are being modified to fit their task as well as is possible (Piggott 1931, 80-82).

2.6 The Modern Synthesis

The rediscovery in 1900 of the work of Gregor Mendel on genetics changed the models of biological evolution greatly. The synthesis of Mendelian genetics with natural selection, known as 'the modern synthesis', appeared to solve many difficulties in the Darwinian account of evolution. Sir Ronald Fisher stated:

> 'That an independent study of Natural Selection is now possible is principally due to the great advance which our generation has seen in the science of genetics.' (Fisher 1929, vii)

The genetic mode of natural selection involved the gradual substitution of individual chromosomes under adaptive pressure from the environment. This small scale change, the classic experimental examples involved changes in eye colour in the fruit fly *drosophila*, was extended over the aeons of geological time to become the paradigm for all change in biological evolution. The possibility which Mendelian genetics had afforded of studying this aspect of evolution quickly changed to the dominance of this explanation for change over all others.

Sir Ronald Fisher developed the statistical models of biology used to study this form of evolution and his *Genetical Theory of Natural Selection* (1929) was a core text on the subject until the 1960's. Julian Huxley, grandson of Darwin's colleague Thomas Henry, was a leading figure in the application of the 'modern synthesis' and worked hard to disseminate it as the popularly understood theory of evolution.

Fisher had no interest in the nature of truth, although he certainly thought of it as something which a competent investigator would be able to find in the world:

> 'The inexactitude of our methods of measurement has no more reason in statistics than it has in physics to dim our conception of that which we measure.' (Fisher 1929, 24)

Huxley also believed that the truth awaited discovery in the world:

> 'But science takes no account of likes and dislikes; its business is to find out the truth, to discover what things are, and how they work.' (Huxley 1926a, 11)

Fisher regarded evolution as a law which explained change, and spent much of his life trying to establish the statistical mechanics of its operation, particularly with his 'Fundamental Theorem of Natural Selection' (Fisher 1929, 22-51). Ultimately this theory was the basis of all of Fisher's thought. Huxley also saw evolution as happening through the adaptive operation of natural selection: 'The fundamental attribute of living beings is adaptation to environment.' (Huxley 1926b, 22) However, he was interested in surveying the history of change through life. Evolution might have operated through a single mechanism but the results of that mechanism were a varied and complex history which had to be explained.

Fisher followed Darwin in regarding the mental world of people as inflexibly linked to their evolution and existence in the world:

> '...that those mental and moral qualities most peculiar to mankind were analogous, in their mode of inheritance, to the characters of the human and animal body.' (Fisher 1929, 189)

Fisher was led by this integrated vision to an extreme eugenic view of human society. For example, he ascribes the extinction of peerages to the habit of impecunious peers of marrying heiresses. The heiresses, inheriting wealth because their mothers did not produce sons, also inherited the gene for bearing daughters, leading to the extinction of the noble line (Fisher 1929, 191). Although the *Genetical Theory* is a major statement of statistical biology, just under half of the book is devoted to a simplistic hereditarian analysis of British social class, with access to wealth held to indicate genetic worth; a kind of proto-sociobiology. Huxley took the opposite view, arguing for a strong separation between what went on in the mind and what went on in the world:

> 'Any such construction must take account of many separate parts of reality. In the first place, it must consider those realities inherent in the mind of man.. ...in the second place it must consider those realities which are independent of man and his mind -the ascertainable body of hard fact.. ...between the inner felt, and the outer known.' (Huxley 1926b, 12)

As biologists with a strong interest in society, both men tended to see culture in terms of organic analogies. Fisher referred to society as 'the aggregate of social adaptations' (1929, 193). Huxley often wrote about specific types of material culture as analogous to groups of species:

> 'What could be more striking than the parallel between the rise of the mammals to dominance over the reptiles, and the rise of the motor vehicle to dominance over that drawn by horses?' (Huxley 1926b, 41)

Fisher seems to have been something of an agnostic on the subject of progress:

> 'Against the rate of progress in fitness must be set off, if the organism is, properly speaking, highly adapted to its place in nature, deterioration due to undirected changes either in the organism, or in its environment.' (Fisher 1929, 51)

Huxley, by contrast, thought long and hard about the existence of progress, and the mechanisms by which it occurred. He was well aware of the problem I showed Darwin considering above; that adaptation to specific environments could not generate progress:

> 'A man is not better adapted to his environment than the flea which lives on him as a parasite...' (Huxley 1926b, 22)

He dealt with this partly by following Darwin in defining progress as an increase in complexity, but allowed that many people would not find this a satisfactory definition. However, his chief strategy was to look, by use of selective examples, at a series of changes through time: increase in size; increase in complexity; increase in organisational harmony; increase in self regulation; increase in associative memory; and increase in 'psychical faculties' (Huxley 1926b, 35-36).

Fisher maintained a strict correspondence between the parts of the organism varying under natural selection and the genes which controlled their production. Evolution operated at the scale of the gene, by chromosome substitution. Even the structure of human society owed its form to the strict hereditability of single genes. Huxley was much less convinced of the eugenic part of the argument, but he held the same view of the scale at which evolution operated:

> '..whenever a difference between varieties or species is found.. ...we can be reasonably sure that the difference of character was originally brought about by mutation in a single factor.' (Huxley 1926a, 30)

2.7 Economic Functionalism and Developed Culture History

By 1930 models of change in prehistory which were based entirely on population movement were beginning to be replaced by an attempt to understand how ancient

societies might have worked. The work of Dorothy Garrod and Grahame Clark, and the later work of Gordon Childe, drew on information about ancient environments and the conclusions of Functionalist anthropologists to try and reconstruct the way cultures operated. This tradition saw the beginning of a more sophisticated use of the organic analogy for culture in archaeology. Questions of the meaning of adaptation and progress began to be debated and an attempt was made to develop a body of theory to relate material culture to these processes.

Neither Garrod nor Clark were concerned with the meaning of truth, regarding it, as Childe did, as awaiting discovery in the world:

> 'The scientific attitude is shown by forming judgements on the facts unbiased by personal feeling.' (Childe 1941, 2)

While all three of these archaeologists helped to bring a new framework of explanation to the subject, the emphasis *was* largely one of explanation. Functionalism and adaptation were not laws which generated the material being studied. In *Environment, Tools and Man*, her inaugural lecture as Disney Professor, Dorothy Garrod was particularly careful to stress the idiosyncratic nature of each particular cultural adaptation and to reject a simplistic environmental determinism; 'Man' she stated, 'has mastered his environment' (Garrod 1946, 27). Archaeology's empirical, data collecting traditions meant that all of these workers took their authority from the information available about specific adaptations.

The functionalist tradition maintained a strong distinction between the products of the world, explainable functional adaptations, and the more problematic mental and social world of each culture. Clark and Garrod tended to follow this tradition, maintaining that the different types of enquiry needed different approaches:

> 'My concern is that the natural sciences should not go on to monopolise a field which does not strictly belong to them -the study of man as reflected in the work of his brain and his hands.' (Garrod 1946, 10)

Childe had developed a more holistic view of the power of adaptations to influence culture; he saw the mind as created and moulded by its interaction with the material world. It would be confounded by worldly phenomena, and shaken into new sorts of world view and abstract ideas; for example, concerning copper metallurgy:

> 'The sameness between the shapeless lump of raw copper, the liquid in the crucible, and the well formed casting, must at first have been difficult to grasp. Man was here controlling a remarkable process of physical change. He would have to adjust

> whatever naive ideas of substance he entertained in order to recognise identity through its several stages.' (Childe 1941, 117)

Childe, Garrod and Clark all followed this interest in environmental adaptation by finding an organic analogy for culture useful. Dorothy Garrod tried to move the classificatory basis of Palaeolithic archaeology from something which had been developed as analogous to geological stratification to something akin to evolutionary biology:

> 'For the old diagrams modelled on geological sections we should substitute something more closely resembling the phyla of the palæontologist, a kind of family tree showing the inter-relation of the various Palæolithic cultures..' (Garrod 1928, 261)

Grahame Clark stuck even more closely to the palaeontological metaphor:

> 'Genetically speaking the Mesolithic and Neolithic civilisations must be regarded as divergent branches from the same stem rather than successive generations.' (Clark 1932, 7)

The three workers had rather different attitudes to progress and change. Gordon Childe believed strongly in the reality of progress. He worked hard to demonstrate its existence, to define what it meant and how it worked. He recognised the archaeological equivalent of the problem that had concerned Darwin and Julian Huxley in biology:

> 'It is unscientific to ask, "Have we progressed?" if only because no two people need give the same answer; the personal equation can hardly be eliminated.' (Childe 1941, 3)

Childe's answer was also akin to that provided in biology; his two basic indices of progress were the organisational complexity of economic relations of production, and rising population levels. Dorothy Garrod and Grahame Clarke were less convinced of the existence of universal progress. Their emphasis was on the explanation of change through a variety of processes (Garrod 1938, 19-42, for example). Clark regarded progress as a particularly unhelpful idea when considering the Mesolithic period:

> 'To an apostle of "progress" in the nineteenth-century sense there may be something hopeless and uninspiring about Mesolithic times, and the cultures of this period are frequently referred to as "decadent". Scientifically speaking, however, concerning ourselves only with form and process, the Mesolithic has an interest of its own which amply repays its study.' (Clark 1932, 7)

Childe thought of the scale at which changes happened in two slightly contradictory ways, on the one hand was an increasing ability for individuals to adapt to circumstances:

> 'On the long view what is profitable is the capacity for adaptation to changing circumstances. Such adaptability is bound up with the growth of a nervous system, and ultimately of a brain.' (Childe 1941, 21)

On the other hand the progress and complexity of societies were measured in terms of their performance at the larger scale. Increasing population and more complex internal organisation were measures of the success of a society, considered as an organism. Garrod and Clark tended to work at this level more consistently, looking for explanations of change at the level of the culture:

> '...culture streams do not run parallel and independent; such a view of human history would be absurdly artificial. They are perpetually meeting and influencing each other, and sometimes come together to produce a new facies.' (Garrod 1938, 1)

2.8 Being and the History of Being

Martin Heidegger's ideas are important to this study for three reasons. Firstly, I find his earlier work on categories of being a very useful way of examining our inter-relationships with the material world. Secondly, his later work on the history of being, and particularly its origin in language, stands behind much of the thought that was important to the development of contextual archaeology. Heidegger's ideas are also important in the development of Rorty's contingent view of culture. Rorty's critique of Heidegger's later work has special relevance for the textual analogy for material culture in archaeology.

Heidegger's work might be summed up as an attempt to simplify Western philosophy by clearing away redundant concepts and categories which had grown up during the history of that thought (Guignon 1993). Heidegger thought of philosophy as a subject which had become side-tracked early in its history. It had moved away from the study of how we know about things in general, Being in Heidegger's terms, to a particularised account about the different existence of many different theoretical constructs. Most of Heidegger's work can be thought of as an attempt to understand and overcome this historical process.

Heidegger, at least for part of his life, was an ardent reader of Nietzsche. Jacques Derrida developed Heidegger's ideas about language as a central part of his thinking. Heidegger is therefore regarded as part of the tradition of thinkers who have led us to the view that the truth is something which is made by people. However, Heidegger himself had no such pragmatist or post-modern views about truth. As Frede (1993, 66) has pointed out, he never lost his belief in the universally central nature of what he called Being, or even his faith in God. These are the beliefs which Rorty regards as a central part of a view of truth which regards it as something to be found in the world:

> '...if one clings to the notion of self-subsistent facts, it is easy to start capitalising the word "truth" and treating it as something identical either with God or with the world as God's project.' (Rorty 1989a, 5)

At various stages of his career Heidegger regarded the world as either God or Being's project (Caputo 1993), and the truth as something which was there to be discovered in it.

Heidegger's concern to simplify Western thought led him to an impatience with universal theories developed in the 'side-tracked' disciplines of science and philosophy:

> 'What is messing up the real problematic is not just naturalism as some people think but the overall dominance and primacy of the *theoretical*.' (1919 Freiburg lectures in, and translated by, Sheehan 1993, 78)

However, his concern with concrete examples to develop the way in which Being is should not lead us to regard Heidegger as taking his authority from information. Everything which Heidegger did was driven by theoretical concerns. His simplification of philosophy was to be entirely through the understanding of Being, and in his later works through the history of Being. The universal theoretical aspects of this study of Being are brought out by Rorty in his comparison of Nietzsche's Will to Power and Heidegger's Being, universal projects claiming to re-describe the whole world in their own terms, with Marcel Proust's fiction, a private project re-describing the protagonist's life in its own terms (Rorty 1989a, 96-121) .

In his work up to and including *Being and Time* (1927), Heidegger attempted this simplification of Western thought as a search for a 'fundamental ontology'. This 'fundamental ontology' would be a system of understanding purged of all the relics of the historical side-tracking of Western thought. Heidegger located the point at which this diversion first occurred in Aristotle's shift in the interest of Greek thought from the category of being to the category of existence. Being is to do with how we encounter and understand objects; existence presupposes that what we encounter and understand has an objective existence outside of, and distanced from, that encounter. Heidegger regarded this distancing perspective as creating all the theoretical clutter from which he wished to save Western thought. All the categories and oppositions of traditional philosophy were rejected, including the split between things of the mind and things of the world. This unified account of material items and mental categories as aspects of 'Being's' encounter with the world is one of the useful parts of Heidegger's ideas for an enquiry concerned with material culture. However, in his later work Heidegger began to get more interested in a historical account of the world. His interest shifted from one centred on Being's encounter with the world to one centred on the history of Being. This history of Being was connected with the primacy of language; a concept of a Saying: a 'soundless voice' with the

power to summon those aspects of Being which have been forgotten or concealed by history (Heidegger 1959, 124). Language, its structure, meaning and sound, became reified as the voice of Being in the world:

> 'Man acts as though he were the shaper and master of language, while in fact language remains the master of man.. ...For strictly, it is language that speaks. Man speaks first when, and only when, he responds to language by listening to its appeal.' (Heidegger 1971, 215-216)

Heidegger's bizarre attitude to language has had severe ramifications in our attempts to use social theory based on his work to understand archaeology.

As I stated above, Heidegger's attitude to material things in the world, and the way we encounter them, is the most useful and revolutionary part of his thought. Heidegger says that our primary understanding of things is based on how we use and encounter them in everyday life. Things are defined by what they do and how they behave, in Heidegger's terms they are ready-to-hand. This understanding is a temporal, historical process which is continually on-going because we are always in a state of having such encounters (Heidegger 1927, 99). Heidegger saw universal, detached categories of things as a secondary phenomenon, caused by the break-down of our everyday understanding of things. When a tool fails to do its job it confounds our ready-to-hand understanding of it in terms of that job; it forces itself on our notice as an uninvolved object, a thing like all other things. Heidegger referred to this distanced understanding of things as a present-to-hand understanding. Present-to-hand understandings of things were a valid part of specific enquiries, especially problem solving traditions like natural science, what Heidegger was insisting on was their secondary nature, derived from a ready-to-hand understanding.

Heidegger emphatically did not believe in progress as an inevitable process in society. A good case can be made (see Rorty 1991b, 41-49) that he specifically believed the opposite, that the pre-Aristotelian Greeks had a clearer, more primordial, understanding of Being that our derailed Western culture. However, what is also clear is that he did not regard this degeneration as inevitable either. Heidegger's history of Being is a history of changing understandings, not a directed process.

In most of Heidegger's work his enquiry was concerned with how things affected a self-conscious entity called Dasein. Dasein was something which was aware and had Being, but it was characterised by being concerned with how and why it was in this state. Dasein cared about the subjects which were of over-riding importance to Heidegger. Heidegger's ideas operated mostly at the scale of Dasein's involvement with the world. During

Heidegger's middle life, when he first became interested in the history of Being, this scale seems to have shifted. The history of Being became less of an individual project and more the project of the German people (Caputo 1993, 277). After the war it became the project of language.

2.9 Evolution returns to Anthropology

During the 1950's there was a renewed interest in the idea of evolution in anthropology, particularly in the United States. This work developed into two slightly contrasting styles; one, associated with Julian Steward, and largely concerned with finding similar processes at work in divergent societies; and another, associated with Leslie White, Marshall Sahlins and Elman Service, which was more concerned with unifying human cultures within a single grand evolutionary scheme. These traditions, particularly the works of Julian Steward, were an important part of the background to the later work of the American New Archaeologists.

White and Steward shared a strong commitment to the positivist view of truth as something to be found in the world. They were also certain of the privileged position of science as a methodology for finding this truth, and as a model for effective anthropologists:

> '..they are nonpsychologistic and culturological; they attempt to adhere strictly to the point of view and techniques of science, eschewing free will and other metaphysical explanatory devices.' (White 1960, xi)

The application of evolutionary theory to try and systematise the diverse data of Anthropology was what linked Steward and White's ideas. Steward distinguished his approach, with its emphasis on theoretical explanation, from what had gone on previously in Anthropology:

> 'In cultural studies it is important to distinguish a scientific generalizing approach from a historical, particularizing approach. The former attempts to arrange phenomena in orderly categories, to recognise consistent interrelationships between them, to establish laws of regularities, and to make formulations which have a predictive value.. ...My purpose in this collection of essays is to develop a methodology for determining regularities of form, function, and process which recur cross-culturally among societies found in different cultural areas.' (Steward 1955, 3)

Sahlins and Service, who followed White and stressed the dominance of theory even more than Steward, referred to:

> '..the intellectual sterility of Boasian empiricism and its so very restricted historical concerns.' (Sahlins & Service 1960, 2)

White and his followers took their authority from the predictive power of their 'specific' and 'general' theories of evolution. Steward was more critical of this approach:

> 'It is difficult to conceive the kinds of understanding that Leslie White, an uncompromising culturologist, hopes to gain by dealing with culture in general rather than cultures in particular. Yet White, like so many social scientists, seems to believe that a truly scientific formulation must explain all modes of behavior. I conclude this Introduction therefore by emphasizing that my own objective is to formulate the conditions determining phenomena of limited occurrence.. ...no cultural phenomena are universal.' (Steward 1955, 8)

His authority came from information.

Steward and White did not develop an integrated view of material and mental culture. '..eschewing free will and other metaphysical explanatory devices' they concentrated on 'cultures as thermodynamic systems whose principle function is to harness free energy' (White 1960, xi). By strongly emphasising those aspects of culture related to economic and ecological adaptation as the base of all human society, culture in the mind became a separated and derived phenomenon:

> 'We may view a culture system as a series of three horizontal strata: the technological layer on the bottom, the philosophical on the top, the sociological in between. These positions express their respective roles in the culture process.' (White 1949, 366)

The second big difference between the styles of evolutionary change adopted by Steward and those adopted by White and his followers is in their attitude to analogies between culture and biology. Steward was explicit that any analogy was at the broadest possible level and that the mechanisms of biological evolution had no privileged status in explaining cultural change:

> 'But cultural evolution is an extension of biological evolution only in a chronological sense.. ...The nature of the evolutionary schemes and of the developmental processes differs profoundly in biology and in culture.' (Steward 1955, 12)

Sahlins and Service, expanding on White's ideas, argued just the opposite. They held that the prevailing use of the same terminology in both disciplines pointed to an underlying unity of process:

> 'In fact, recognition of the homologous aspects of biological and cultural evolution has long been implicit in evolutionary anthropology and in its terminology, even

> among those such as Steward who explicitly disavow the biological analogy. What else can better justify the use of such terms and ideas as "adaptation", "specialization", "ecology" and the like in both anthropology and biology? (Sahlins & Service 1960, 10)

Steward saw evolution largely in terms of local adaptive processes, what Sahlins (1960, 12-44) referred to as specific evolution, and he recognised that these local adaptations gave no mechanism for generalised progress. However, while Steward rejected evolution as a cause of progress he still believed strongly in its general existence:

> 'This brings us to the question of progress, which is the second characteristic attributed to both biological and cultural evolution.. ...the concept of progress is largely separable from evolution, and it may be approached in many ways.' (Steward 1955, 13-14)

Marshall Sahlins also devoted much thought to this question of the meaning of and mechanisms for progress. He followed Steward in accepting that there was no mechanism for progress in the local adaptations of specific cultures, but unlike Steward, and following Darwin and Huxley, Sahlins thought of progress as an essential part of evolution:

> 'On the one side, it [evolution] creates diversity through adaptive modification: new forms differentiate from old. On the other side, evolution generates progress: higher forms arise from, and surpass, lower.' (Sahlins 1960, 13)

Sahlins followed Huxley in dividing the process of evolution into two: 'specific' evolution created diversity through adaptation; 'general' evolution generated progress through the appearance of 'higher' forms. The idea of general evolution was problematic, that any such process existed depended on the existence of general progress and on the validity of the ranking of forms. This brought Sahlins back to the problems of definition which Huxley had faced in biology, although his treatment was rather more simplistic:

> '...a man is more developed than a mouse, a mouse than a lizard, a lizard than a goldfish, a goldfish than a crab, a crab than an amoeba.[2] All of these are contemporary, no one is ancestral to the other; they are present termini of different lineages. In what sense can we speak of evolutionary development of one over the other? To anticipate again, the same question appears when we look at contemporary cultures.. ...what are the criteria for deciding which is higher on the evolutionary scale, and which lower?' (Sahlins 1960, 18-19)

[2] This sort of blob to superman ranking of organisms is one of the most persistent features of progressionst evolutionary models. In this case, as with most such examples, details are fuzzy; which kind of goldfish is more developed than which kind of crab? Even in Sahlins' own energy capturing and organisational terms, depending on the exact species chosen; lizard, man, crab, goldfish, mouse, amoeba is an equally plausible ordering (Kamodo Dragon, Homo Sapiens, Spider Crab, Koi Carp, Fieldmouse, Amoeba), which indicates the fatuity of the exercise.

Sahlins collapsed Huxley's many indicators of progress into two variables for ranking forms regardless of their history:

> 'The study of all-round progress requires criteria that are absolute, that are relevant to all organisms regardless of particular environments. The development of higher organisms can be conceived in functional, energy capturing terms: higher forms harness more energy than lower. Or the criteria of general progress may be structural, the achievement of higher organisation.' (Sahlins 1960, 20)

Steward saw evolution as taking place on a variety of levels in society:

> '..it is clear that cultural and social interaction take place on difference levels. National, community, and family levels were selected for illustration, but there are no doubt other levels which will have greater significance for certain problems.' (Steward 1955, 61)

What Steward was interested in was the similar processes at work at a vast number of different levels. No one segment of society was the basic unit of cultural evolution. In general, in the work of White and his followers, the unit of evolution is the culture, variously defined. Sahlins, with his split of evolution into two types, had to classify these cultures in two different ways:

> 'However, the context is very important: a difference in taxonomy is required in examining these two aspects of evolution. Concerned with lines of descent, the study of specific evolution employs phylogenetic classification. In the general evolutionary outlook emphasis shifts to the character of progress itself, and forms are classed in stages or levels of development without reference to phylogeny.' (Sahlins 1960, 13)

Phylogeny, in this case, refers to the evolutionary ancestry of a culture. Although Sahlins was categorising cultures in two different ways, all change, in either mode, was thought to occur at the level of the culture.

2.10 Decorative style zones

From the 1940's onward the emphasis of archaeology, especially British archaeology, shifted from the search for rules which explained change to a description of changes undergone. The idea also became current that the material aspects of culture were easily explicable in 'economic' terms and were separated from a much more obscure part of culture to do with the mental life of people in the past, which could not be satisfactorily explained by archaeology at all. This had the effect of focusing the study of material culture in prehistoric periods on to the cataloguing of complexes of pragmatically defined types or attributes of artefacts. These complexes of artefacts and the changes between them were arranged to form the datable framework of prehistory. In Neolithic pottery studies

this tradition began to become important with the recognition by Stuart Piggott of Grooved Ware as a separate style of late Neolithic pottery (Warren *et al* 1936, 191-201). By the end of the 1950's it was the only way in which Neolithic pottery was considered.

During this period, questions of the meaning of truth were not the province of archaeologists, particularly not those engaged in writing pottery reports. I think we can justifiably assume, in the absence of any speculation on the subject, that for people like Stuart Piggott, Isobel Smith and Ian Longworth, the truth was something which could be found in the world.

The gradual abandonment of the theoretical models for explaining change which Stuart Piggott had used in his earlier work can be seen by comparing that work with the treatment of pottery in his *Neolithic Cultures of the British Isles* (1954). By 1954 Piggott had moved from the evolutionary approach he had adopted to the early Neolithic pottery in 1931. He still thought of pots as evolving but he replaced pottery forms A - J, the products of idealised combinations of evolving traits, with Hembury, Windmill Hill, Abingdon, East Anglian and Whitehawk wares, the products of local devolution from their own continental connections (Piggott 1954, 66-75). With the passing of time Piggott's commitment to the authority of information was growing stronger. Isobel Smith's treatment of Peterborough Ware in her PhD. Thesis (Smith 1956) relied even more strongly on specific information about parts of the pottery. Smith's three categories of Ebbsfleet, Mortlake and Fengate were based on groups of decorative motifs and changes in rim form linked by their geographical associations (Smith 1956, 78-117). When Wainwright and Longworth came to expand on Smith's work on the Grooved Ware tradition they too worked with pragmatic definitions between styles, as, for example, with this group of attributes for the definition of the Durrington Walls style:

> '... eight features can be chosen which are confined to the Durrington Walls style or are absolutely rare elsewhere and which have a currency beyond that of individual sites:
>
> 1. Rims with internal moulding of type 13 or vertical bevel, type 24.
> 2. Internal incised decoration beneath the rim.
> 3. Grooved spirals or concentric circles.
> 4. Vertical plain or decorated cordons to divide the body surface into panels.
> 5. Vertical single or multiple incised lines to divide the body surface into panels.
> 6. Incised or grooved filled triangles.
> 7. Twisted cord.
> 8. Whipped cord.' (Wainwright & Longworth 1971, 242).

The emphasis was now firmly on what was helpful in the archaeologist's encounter with the information, not on predicting the form which the data might take.

With the decline in interest in mechanisms for change and the concentration on the material as it existed in the present, as a set of information distributed about a series of archaeological sites, the integration of material and mental culture was almost bound to suffer. Wainwright and Longworth (1971) considered their material as a collection of pottery in the present, thinking little about its context on the Henge at Durrington Walls, Consequently a highly structured set of information, which has been subsequently used to construct quite detailed statements about social life in the Neolithic (Richards & Thomas 1984), appears in their account as 'refuse', telling us little about a society beyond the economic capacity to produce pottery.

Piggott began his career with at least a modified view of material culture as analogous to biological organisms. With the development of the geographical style zone approach to pottery studies, material culture lost many of its more dynamic metaphors. In Piggott's work, ideas of diffusion and influence became the predominant models for explaining changing pottery styles. Binford criticised the way in which the described changes were presumed to flow the one from the other as the aquatic model of culture (Binford 1968a). This move by Piggott and Smith away from the earlier functionalist use of variations on the organic analogy was the revival of a third tradition which saw material culture as neither text nor animal but as collected objects which existed in the present. This view involved an acceptance of Binford's characterisation of the archaeological record as 'present statics' but a denial that there was any rigorous way to move from these statics to 'past dynamics'. Despite all of the theoretical consideration of my two metaphors in the last thirty years an increasing percentage of pottery studies have taken this 'middle way' of pragmatic present based description. While this lack of a grand narrative may have made them less resonant in the short term it has meant that whatever resonance they acquired they have sustained through disciplinary upheavals.

As evolutionary models and the organic analogy became marginalized within pottery studies the framework for any narrative such as 'progress' was lost. Isobel Smith's work on the sub-styles of Peterborough Ware is an account of the changes observed in a pragmatically defined set of traits. To create progress from such information it would have been necessary to have some theoretical link between the traits, progress was no longer an issue in pottery studies.

2.11 Culture as a Functionalist Organism

The return to a highly theorised version of archaeology, strongly influenced by biological theories of evolution, had begun with the work of White, Steward, Sahlins and Service referred to above. Sally and Lewis Binford in the United States, and David Clarke in Britain, strengthened and broadened this tradition. They linked the ideas developed by the earlier evolutionary tradition with a positivist philosophy of science and a sophisticated set of theoretical models for culture drawn from systems theory.

The Binfords had an uncomplicated view of the nature of truth, and the possibility of finding it in the world:

> 'The shift to a consciously deductive philosophy, with the attendant emphasis on the *verification* of propositions through hypothesis testing, has far reaching consequences for archeology.' (Binford 1968a, 14: my emphasis)

David Clarke regarded the whole notion of 'truth' as considerably more problematic:

> 'These "facts" turn out to be observations in which the nature of the observer and his intentions play a large part in which "facts" are observed and recorded.. ...On some occasions this variety of aims and interpretations is a strength rather than a weakness in that no single view or interpretation of a set of data can ever be wholly comprehensive or "true".' (Clarke 1978, 19)

Despite this recognition of the constructed nature of truth at the beginning of *Analytical Archaeology*, he then gave the problem little more consideration. It is possible to regard the book as an attempt to standardise the kinds of archaeological truths that were being constructed, to make archaeological terminology more compatible. Unfortunately, Clarke did not return to this topic.

Science, for the Binfords, took its authority from universal theory:

> 'High probability statements covering a broad range of phenomena are the aim of science...' (Binford 1968a, 20)

Although this theory was about the manipulation of information, the authority given to the work comes from it having been developed within the framework of the theory:

> 'Archeological theory consists of propositions and assumption regarding the archaeological record itself - its origins, its sources of variability, the determinants of differences and similarities in the formal, spatial, and temporal characteristics of artifacts and features and their interrelationships. It is in the context of this theory that archaeological methods and techniques are developed.' (Binford & Binford 1968, 2)

Clarke also held similar views on the need for a universal theoretical context to make archaeology academically rigorous. Archaeology ought to move towards:

> '...the development of higher category knowledge or principles that synthesize and correlate the material at hand whilst possessing a high predictive value. The development of increasingly comprehensive and informative general models and hypotheses.' (Clarke 1978, 20)

Traditional archaeological thinking on both sides of the Atlantic had raised the split between things of the mind and those of the world to the status of a disciplinary axiom. It was an axiom which denied that any contemporary social theory would be of use in the understanding of past societies. In reacting against what they saw as the limitations of this position the early New Archaeologists were often driven towards an integrated view of material and mental culture:

> 'The position being taken here is that different kinds of phenomena are never remote; they are either accessible or they are not. "Non-material" aspects of culture are accessible in direct measure with the testability of propositions being advanced about them.' (Binford 1968a, 22)

However, the science-based rhetoric of the social theory being used in the New Archaeology often led to defeatism about understanding past societies or to a prioritising of those cultural processes which could be convincingly demonstrated in the material evidence:

> 'We fully appreciate that these entities and processes were once historical and social entities but the nature of the archaeological record is such that there is no simple way of equating our archaeological percepta with these lost events.' (Clarke 1978, 11)

Both Clarke and the Binfords worked with the concept of adaptation to explain how their complex societies functioned and changed in relation to the environment and each other:

> 'The internal setting of subsystems within the system constitutes what we intend by "cultural morphology"; the external setting of the integrated system then comprises "cultural ecology" - the mutual relationships between such systems and their environment, and the adaptive change of these systems with time and space.' (Clarke 1978, 85)

However, the adoption of systems theory led to a distancing of the direct organic analogy. Cultural adaptation was a specifically different mechanism from adaptation in the biological world:

> 'Culture is all those means whose forms are not under direct genetic control..
> ...which serve to adjust individuals and groups within their ecological communities.'
> (Binford 1968b, 323)

The difference between the systems models developed by Clarke and those developed by the Binfords was, at least initially, that Clarke regarded units such as the culture as having a real existence, or at least a real enough to be useful existence, in society. The Binfords tended to regard them as purely methodological constructions.

This more complex view of the operation of societies, and a concern for explaining change within these subsystems, rather than through history in total, led Binford to a more critical view of the idea of progress. He explicitly criticised Braidwood's work for its reliance on generalised notions of progress (Binford 1968b, 321-322). Progress was something which was to be explained, rather than assumed:

> 'The question to be asked then is not why agricultural and food-storage techniques were not developed everywhere, but why they were developed at all. Under what conditions does increasing the supply of available food have adaptive advantage?'
> (Binford 1968b, 327)

However, David Clarke still clung to the generalised notions of progress at the highest level, the definition of which had been of such concern to Service, Sahlins and White:

> 'As cumulative systems, culture systems have become cumulatively more efficient in their role of enabling the hominid species to survive, multiply and spread across the globe.' (Clarke 1978, 88)

Binford viewed change at the scale of the adaptation of systems:

> 'Changes in the effective environment will produce changes not only in the boundaries of the ecological community but also in the internal organisation of the community. Both of these changes in turn set up conditions favoring adaptive adjustments among the components of the community.' (Binford 1968b, 323)

By analogy with biological evolution, the subsystems could be considered as the parts of the organism varying under natural selection, and the system as the total organism changing through time. Clarke saw all systems as trying to find equilibrium at three scales. Firstly, within the subsystem; secondly, between the various subsystems; and lastly, between the system as a whole and its environment (Clarke 1978, 84-148). Change occurred because of delays in these systems attaining equilibrium feeding back into the systems and creating fresh instabilities.

2.12 Replacing texts with signs

Jacques Derrida is important to this study because of the way in which his critique of Heidegger was developed by Rorty into a major part of the contingent, pragmatic view of how people think. Derrida's ideas were also important in the development of much of the post-Structuralist version of contextual archaeology. As with Nietzsche and Heidegger, any attempt to present a simple account of Derrida's ideas is difficult. Partly this is because of the complexity and wide range of these ideas and partly because there are conflicting opinions amongst those people who use his ideas as to what constitutes a correct usage.

The way in which I want to get at Derrida's ideas about the nature of truth is to look at what he calls the 'dream at the heart of [conventional] philosophy':

> 'If one could reduce their play to the circle of a family or a group of metaphors, that is to one "central," "fundamental," "principal" metaphor, there would be no more true metaphor, but only, through the one true metaphor, the assured legibility of the proper.' (Derrida 1982, 268)

According to Derrida, the idea of finding the truth is always based on some form of this process of creating of a language which can be used to describe absolutely everything. This is the process of 'closing' an argument or a description by referring everything in a logically connected fashion to everything else. One of Derrida's obsessions is the impossibility of this process. No matter how much the attempted description is claimed to be total, there will always be possible descriptions outside it:

> 'Beyond the philosophical text there is not a blank, virgin, empty margin, but another text, a weave of differences of forces without any present center of reference.' (Derrida 1982, xxiii)

Everything about Derrida's writing negates the idea of the truth as something which is there to be discovered in the world.

However, Derrida was working within a philosophical and linguistic tradition which placed the emphasis upon universal explanations. Both Nietzsche and Heidegger had found the temptations of this tradition irresistible when attempting to redescribe the world in contingent terms. They had come to see their redescriptions as a new universal system. In all of Derrida's work it is possible to see a tendency for words like *différance* to acquire some of the overtones of universal explanation which Being had for the early Heidegger. However, even in his early works, Derrida kept an awareness of the historical contingency of what he was doing:

> 'If words and concepts receive meaning only in sequences of differences, one can justify one's language, and one's choice of terms, only within a topic and an

> historical strategy. The justification can therefore never be absolute and definitive. It corresponds to a condition of forces and translates an historical calculation.' (Derrida 1967, 70)

It is indicative that while Heidegger's work became more and more focused upon a way of describing the world as it was encountered by Dasein, Derrida's later work has flowed in a vast number of different directions and styles. Despite this, there is still a widespread sense of his ideas as a universal system for 'reading' and deconstructing the world. It is possible to find examples of both the historically contingent and the universalising Derrida in his work, sometimes in the same passage. In this instance, from *The Post Card*, Heidegger's universal language of Being is castigated but the primordial *différance* survives unscathed:

> 'For to coordinate the different epochs, halts, determinations, in a word the entire history of Being with a destination of Being is perhaps the most outlandish postal lure. There is not even the post or the *envoi*, there are posts and *envois*. And this movement (which seems to me simultaneously very far from and very near to Heidegger's, but no matter) avoids submerging all the differences, mutations, scansions, structures of postal regimes into one and the same great central post office. In a word (this is what I would like to articulate more rigorously if I write it one day in another form), as soon as there is, there is *différance* (and this does not await language, especially human language, and the language of Being, only the mark and the divisible trait),' (Derrida 1980, 66)

The postal metaphors which Derrida developed in *The Post Card* bring out his ideas on the relationship between the material and technological world and the world of the mind very clearly. The epistlatory novel, the detective novel, and the communication of the Western philosophical tradition, for instance, are all inextricably linked to certain kinds of material culture and technological organisation:

> 'In any case, the past and present of the said institution are unthinkable outside a certain postal technology, as are the public and private, that is secret, correspondances which have marked its stages and crises, supposing a very determined type of postal rationality, of relations between the State monopoly and the secret of private messages, as of their unconscious effects.' (Derrida 1980, 104)

For Derrida the idea of the text is central to human culture. We discover what it is to be human by playing about with cultural differences and oppositions, thought of as being analogous to the web of differences and oppositions making up the possible meanings of a text:

> '..it is only on the basis of *différance* and its "history" that we can allegedly know who and where "we" are.' (Derrida 1982, 7)

Derrida can also give the impression that he believes those problems in traditional philosophy which his work has been so successful in inverting and marginalizing permeate every aspect of the everyday world. All of the world can *only* be described through the interplay of signs, and if the 'logocentrism' of traditional thought, the search for a self-contained 'closed' argument about truth, has permeated all our language, then the initially linguistic analysis of the differences between signs is the central part of a campaign to radically redescribe the world. Rorty (1991, 85-128) and Norris (1989, 189-203) both discuss the extent of Derrida's commitment to a view of the world as entirely in the thrall of the textual 'discourse of philosophy'.

Derrida's ideas operate at a personal scale, his redescriptions are contained within fictional love letters or peculiar pieces of typography. Their implications may appear profound for the wider world, the traditions of Western philosophy are constantly being subjected to playful deconstruction. However, the global, primary nature of this tradition is also subjected to the personal deconstruction, millions of people, even in the West, live outside of that tradition:

> 'They can never have heard the name of p. and of S.[3] (hey, I see them as very chirpy, suddenly). Via all kinds of cultural, that is postal, relays they pay their tax, and no need for that to be taxed with "platonism," and even if you have overturned platonism (look at them, turn the card, when they write upside down in the plane).' (Derrida 1980, 100)

2.13 Evolution as an historical process

By the late 1970's the 'modern synthesis' in evolutionary biology had become thoroughly outdated. Several attempts were made to rethink evolutionary change during this period. One of the most well known is the sociobiology developed by Edward Wilson (1975). It was partly in critical response to the unhelpfully universal assumptions of sociobiology, and particularly the human sociobiology of the final chapter of Wilson's book, that Richard Lewontin and Stephen Jay Gould began to develop a radically different, contingent model of evolutionary change (Gould 1978; Lewontin 1979). In their joint paper on the subject (Gould & Lewontin 1979) they criticised the basic assumption by biology of the absolute primacy of adaptation as an evolutionary force. These ideas have subsequently been developed, particularly by Gould, into a theory of evolution with an explicitly historical

[3] p. and S. stands, at least partly, for plato and Socrates, 'fathers' of the Western philosophical tradition, but it also refers to the standard abbreviations in analytical philosophy for 'predicate' and 'Subject'.

underpinning. Gould is important because of the way his thinking allows a contingent account of change to be developed within the organic analogy for culture. It is possible to criticise the determinism and adaptive bias of models in this tradition entirely on their own terms. The biological analogy, as usually used in archaeology, is a partial and outdated account of evolution.

While both Gould and Lewontin have been quick to recognise that science is a part of society and not a privileged position from which to gather objective truths, they have also been at pains to stress their belief in the existence of truths to be found in the world:

> 'In advancing it [a belief in the culturally determined nature of science], however, I do not ally myself with the overextension now popular in some historical circles: the purely relativistic claim that scientific change only reflects the modification of social contexts, that truth is a meaningless notion outside cultural assumptions, and that science can therefore provide no enduring answers.' (Gould 1981, 22)

The development of a contingent model of evolution was an attempt to get beyond what Gould and Lewontin saw as the restrictive nature of the universal application of adaptation to explain change. They sought to replace the over-reliance on adaptation with an array of different mechanisms: random genetic drift; change caused by changes to a linked part of the organism; varied adaptive solutions to the same problem; secondary utilisation of parts developed for another reason in an organism's history; and the constraints of the organism's form on the range of solutions possible to a problem (Gould & Lewontin 1979, 156-163). They saw evolution as seeking to explain the history of the development of a species through a consideration of as wide a range of mechanisms as possible. Their authority came very strongly from the varied information of Natural History:

> 'A pluralistic view could put organisms, with all their recalcitrant, yet intelligible, complexity, back into evolutionary theory.' (Gould & Lewontin 1979, 163)

Given the rhetoric of 'hypothesis testing' associated with the organic analogy for culture in processual archaeology, it is interesting that one of Lewontin and Gould's primary objections to an adaptationist account of evolutionary change is its resistance to this testing. The style of argument they are used to within Natural History works by testing hypotheses but the presumption of a universal mechanism of 'adaptation' renders these hypotheses as banal 'just-so stories' (Gould 1979, 530-531).

Gould, in his popular writing, has touched upon aspects of cultural change. He is specific in stating that cultural change is not analogous to biological evolution for three basic reasons. These are: the speed at which cultural change occurs; the direct inheritance of

favourable traits which is possible in cultural change; and the way in which biological groups, once separated, cannot rejoin, unlike cultural traditions. He also specifically denies that adaptation has a role to play in the explanation of cultural change:

> 'The proper unity lies not in the false application of these overt rules (like natural selection) to alien domains (like technological change), but in seeking the more general rules of structure and change themselves.' (Gould 1991, 66)

However, his model of cultural change as a system is still one of descendent lineages. Gould does not view cultures as analogous to organisms but he regards cultural change as contingent and historical in the same manner as biological evolution.

The other main strand of Gould's thinking is his explicit denial of the notion of progress in evolutionary change:

> 'We wish to replace the grand, but vague and noisome notion of progress with a question almost risibly limited by comparison - but imbued with the twin virtues of definition and testability: if you were handed a chart of clade diversity diagrams with unlabled axes, would you know whether you were holding the chart upside down or right side up?' (Gould, Gilinsky & German 1987, 1437)

He has confronted Huxley and Darwin's dilemma about the definition of progress and its mechanisms by side-stepping it. Natural selection is to specific local environments and is not a mechanism for generating increasingly efficient organisms; however efficiency is defined (Gould 1993, 300-312). The difficulties which have been experienced by Darwin, Huxley, Childe, Sahlins, White and Steward in defining progress are indications that progress is not useful in describing the history of life. There is no 'general' evolution generating progress, only 'specific' evolution generating change (Gould 1989, 23-45).

For Gould evolutionary change happens at the level of the organism, a unity whose constraining history of linked parts means that it cannot be atomised into traits which can vary independently under natural selection (Gould & Lewontin 1979, 593-597). He was also critical of the emphasis on adaptive change at the level of the gene (particularly Dawkins 1976):

> 'If bodies were unambiguous maps of their genes, than battling bits of DNA would display their colours externally and selection might act upon them directly. But bodies are no such thing. There is no gene "for" such unambiguous bits of morphology as your left kneecap or your fingernail. Bodies cannot be atomised into parts, each constructed by an individual gene. Hundreds of genes contribute to the building of most body parts and their action is channelled through a kaleidoscopic series of environmental influences: embryonic and post natal, internal and external.

> Parts are not translated genes, and selection doesn't even work directly on parts.' (Gould 1980, 76-77)

For Gould, change is something which happens to individual organisms as a whole during their development, when these changes are preserved, for a variety of historically determined reasons, new species arise.

2.14 Culture as a Structured Language

The post-processual archaeology which was developed by Ian Hodder and others from the early 1980s was a direct response to the 'New' archaeology (see section 2.11 above). It was an attempt at a new vocabulary for archaeology, which would pull the subject back into line (see especially Hodder 1982b). It dealt with many of the problems it found in the 'New' archaeology by recasting the subject to make those concerns marginal. Hodder was very critical of the positivist philosophy of knowledge that had been placed at the centre of the method of the 'New' archaeology and, in discarding the science-based language of his predecessors, discarded a lot of the characteristic method without much debate of its details. This was probably an inevitable part of the removal of these ideas but it would perhaps have limited some of the problems we are now finding with post-processual archaeology if more of the details of processualism - particularly the adaptationist view of culture - had been addressed in their own terms.

Ian Hodder's view of truth is strongly influenced by early idealist philosophers of history such as Dilthey, and particularly Collingwood. He follows Dilthey in thinking of the arts and sciences as very distinct branches of knowledge, in need of their own separate procedures and language. According to Hodder, archaeology falls into the arts side of this division, and arrives at the truth through the practice of hermeneutics, a self correcting spiral of interpretation and critical thinking. To Hodder, archaeological data is an important constraining part of this process:

> 'I do conclude from these examples that it is possible to make statements about past meanings which can be strengthened or weakened by consideration of the evidence. On this basis it is possible to prefer one hypothesis, which fits the data better, over another.' (Hodder 1992, 21)

Hodder states that we can reconstruct a version of the past in the present, and presumably it will be a truthful one.

John Barrett retains the idealist division between the arts and the sciences, and places archaeology with the arts. He too is concerned with hermeneutics as a procedure of discovery but he has adopted Giddens' critique of its lack of concern with power and

ideology. His modified hermeneutics allows him to become much less idealist in his vision of culture and to see archaeology and history as accounts constructed in the present, rather than reconstructions of the past:

> '...we cannot deny the real nature of historical conditions. It is those conditions we must confront in a self critical way. We will not achieve this by continuing with the methodological obsession to give an archaeological record meaning. Here history simply appears as a by-product. We should instead set out to make history. By that labour we will necessarily encounter our evidence, and by working with it we will discover something of its significance within the context of social practice.' (Barrett 1988, 14)

For Barrett the truth in archaeology is made in the present.

Michael Shanks and Christopher Tilley (1992, 20) ally themselves with Nietzsche's vision of the truth as a 'mobile army of metaphors'. Tilley also follows Derrida in seeing truth as a construction, something sited in the play of an all-pervading linguistic 'discourse'. They, like Barrett, think of a modified hermeneutics as a useful way to proceed in archaeology. They see the truth as created in the present, not found in the past:

> 'To the contrary, there will be no correct stories of the past that are not themselves a product of a politics of the truth. There can only be better and worse re-presentations of history: his [sic] story.' (Tilley 1989, 193)

Post-processual archaeology took its authority from theoretical rules and procedures. The central place of theory in all kinds of human thinking was stressed:

> 'Theory and social practice are fused and the oppositions between fact and value, object and subject are demolished. The theory of practice argues that theory is transformative and is potentially revolutionary. It asserts that we do not passively observe, contemplate the world, but that we create it. Science cannot, therefore, be separated from society.' (Hodder 1992, 3)

Barrett and Shanks and Tilley are also concerned that archaeologists recognised what they see as the dominance of all contemporary life by the structures of 'discourse', and that they think critically about how their work fits in with this:

> 'The text that the archaeologist writes will consist, in part, of a tissue of "quotations" drawn from the material record and meaningfully activated in fresh constellations in relation to a particular argumentative frame of reference. The assignation of meaning of the quotations drawn from the archaeological record requires a self-reflexive problematic.' (Tilley 1989, 193)

For Hodder culture is something which exists in human minds and language, and which patterns a set of material things. Material culture may be 'active' in the sense of containing information about the structure of a culture, but it is not significantly involved in the formation of those structures:

> 'I understand this to mean that there are ideas and concepts embedded in social life which influence the way material culture is used, embellished and discarded... ..but whether material culture is functioning as a tool or as information, it is organised by concepts and ideas which give it meaning.' (Hodder 1992, 12)

I think that Hodder is following the idealist tradition of Collingwood in seeing the mind as being a realm separable from the world.

Barrett is very quick to reject this sharp division between the mind and the physical world. He replaces the idea of culture existing in the mind with the idea of it as a thing created in the world:

> 'The material world contains acculturated structures drawn upon and invested with meaning by human action. Archaeological evidence should not be treated as a static outcome of past dynamics (a record). Instead it is the surviving fragments of those recursive media through which the practices of social discourse were constructed.' (Barrett 1988, 9)

For Barrett the cultural text does not pattern that material, but instead the patterns in the material are part of culture. Shanks and Tilley share this view of the interconnected nature of material and mental culture:

> 'Material culture, as a structured and structuring resource, as an integral element actively and recursively involved in social life, plays an important role in the continuation and transformation of meaning frames.' (Shanks & Tilley 1992, 132)

One of the central concerns of post-processual archaeology was to get beyond what was seen as the restricting nature of the organic analogy for culture. This was seen to have led to the reduction of all cultural change to responses to external, usually environmental, pressures. Hodder put forward an alternative view of material culture as structured like a language:

> 'Each aspect of the material culture data, whether burial, settlement pattern, wall design or refuse distribution, can be interpreted in terms of common underlying schemes.' (Hodder 1982a, 212)

However, because of Hodder's view of culture in the head as a force organising material culture in the world, he also tends to treat the patterns in the material as an adaptation to 'culture'. To Hodder, material culture is structured because use has been made of particular

kinds of things to achieve certain social ends. The patterning of artefacts is a secondary result of the need for the legitimation of religious power, or the resistance to the patriarchy. Material culture is no longer an adaptation to the environment or the need of systems to be in equilibrium but it is still an adaptation to an external culture:

> '...the reconstitution of the settlement structure in a ritual setting associated with a dominant group may indicate that knowledge about ritual and the symbolic significance of daily activities was controlled by high-status individuals and contributed to their legitimation.' (Hodder 1982a, 227)

Barrett claims to have got beyond the two models of material culture I have considered. He believes material culture neither adapts like an organism nor is structured like a text:

> '...the model of archaeological evidence as a text is inadequate. I do not believe such texts are capable of adequate translation. But more importantly this model does not accurately represent the relationship between human action and material conditions.' (Barrett 1988, 6)

However, Barrett's view of how 'human action' works is a highly linguistic one. He sees culture as the product of structured actions, in line with Giddens' theory of structuration (Giddens 1979, 98). These structures of power relations are maintained and exist within 'discourse':

> 'In discourse meaning is located in the particular employment of a code; it is grounded in the context of usage.' (Barrett 1988, 10)

For all Barrett's attempt to get beyond the textual metaphor for material culture, his metaphors for the workings of the world ground him once again in linguistic theory. Christopher Tilley has written on how it is impossible to escape language in this context, while he would follow much the detail of Barrett's technique, he is aware that it does not constitute an escape from the textual analogy:

> 'We could say that material culture is a material language with its own meaning product tied to production and consumption. Endless permutations of such arguments could be produced, but none of them can escape language. Thinking about material culture inevitable involves its transformation into linguistic concepts. However much we might try to escape from language, we are trapped in its prison house. So, although it might appear a laudable aim to escape a linguistic frame, this is an impossibility. There can be no meaningfully constituted non-linguistic semiological system.' (Tilley 1989, 192)

As a result of his emphasis on a specific historical context for the meaning of systems of signs Hodder has rejected any vision of generalised progress. The 'New' archaeologists had

begun the rejection of generalised progress by demanding specific mechanisms for its occurrence, rather than accepting it as an explanation. Post-processual archaeology attacked the generalised cross-cultural bases of these specific mechanisms, making them even more specific and contingent. Progress had become a peripheral concern of 'New' archaeology, and for most post-processual writers 'progress' as an explanation has become so marginal as to be hardly worth debunking. Post-processual archaeology is concerned with the description and explanation of changes within a local context.

This emphasis on local historical accounts has led to a specific and distinctive way of working, which is probably the most widely adopted part of contextual archaeology. Work in this tradition tends to start with the details of a particular assemblage of artefacts, analyse this detail in terms of its structure, and use this structure to make statements about the society of which it is a part (in the materialist version) or a reflection (in Hodder's idealist version). The encounter with the details of the artefacts is entirely in terms of the theoretical perspective outlined above but the discussion of the society is built outwards from the specific detail of the case:

> '...we will first present a series of analyses of the designs on these vessels and then go on to interpret the results in terms of the sociocultural context of the production and use of the pots.' (Shanks & Tilley 1992, 156)

Even a pan-European account, such as Ian Hodder's (1984) of tombs and houses in the European Neolithic, builds from a detailed analysis of the architecture of individual sites.

2.15 Material culture as symbols

This post-processual, bottom up, approach has been one way in which pottery studies have been integrated into wider archaeological concerns. In detail, this has taken the form of a statistical examination of the repeated associations between different categories of finds, features and areas of the site. The study of 'structured deposition' has been particularly useful in showing pattern in material which was previously held to be unstructured 'refuse'. This approach was pioneered by Colin Richards and Julian Thomas in their 1984 paper *Ritual Activity and Structured Deposition in later Neolithic Wessex*. Material culture was held to be a set of symbols structured in the same way as a language. These symbols could have been manipulated and used in various ways in the past. The deployment of this language of symbols would lead to the repeated association of certain types of material culture. These associations survive in the archaeological record and can be extracted to give an account of ritual behaviour.

Richards and Thomas' paper is concerned to extract the detail of events at a particular site, Durrington Walls in Wiltshire, during the late Neolithic period. While they touch on the theoretical background to their ideas the main concern is with the detail of the associations at the site. In later works Julian Thomas has developed the theoretical ideas which lie behind this work in much more detail. In *Time, Culture and Identity* in particular he considers how we can develop the symbolic understanding of material culture in much more far reaching ways. In this work Thomas' view of truth is very similar to that established by Richard Rorty. The existence, or non-existence, of things is not in question, but our reactions to them are:

> '...this does not mean that the material things which we recognise would not exist at all if we were not here to see them. Rather it means that they would not be recognised as parts of a significant world, let alone studied by science.' (Thomas 1996b, 17)

In many ways Richards and Thomas are more concerned with the detail of the information from the site than the more traditionally empirical work of Wainwright and Longworth (1971). The desire to explain the detail of this one site, and not to get side-tracked into providing universal markers to detect the presence of ritual archaeologically, means that much of the authority of this paper come from information. However, this information is ordered and explained in terms of a set of universal principles. The material things being studied are symbols, and:

> 'These symbols may be structured in a way that once conveyed complex ideas. This structure may alter according to context and meaning, but should conform to certain underlying rules.' (Richards & Thomas 1984, 192)

The underpinning of the analysis lies in the theoretical consideration of material as active symbols rather than in the information being analysed.

There is little explicit concern in the Durrington Walls analysis with the question of whether these symbols are mental templates which pattern material or whether they are created in the world through the use of the material. In a later analysis on material from the henge at Balfarg in Fife, Richards seems to hint at a view of culture as a thing in the mind which patterns material in the world:

> 'It should be noted that to offer an interpretation of the material patterning is quite different from understanding the nature of the henge and the practices which occurred therein.' (Richards 1993, 187)

In *Time, Culture and Identity* Thomas is very concerned to develop Heidegger's ideas about the worldliness and materiality of Being. This has led him to a different account of

how it is that material culture becomes meaningful. For Thomas the meaning of material culture is a product of its encounters with the world:

> 'knowledge is thus produced, reproduced and circulated through active relational involvement, rather than being hidden away in human braincases.' (Thomas 1996b, 19)

As with most post-Processual archaeology the linguistic analogy for material culture was a central part of the Durrington Walls study. Material culture was thought of as operating as an active set of symbols. It was meaningful and acted as a system of communication:

> 'The symbolic properties of material culture have been stressed by anthropologist (Leach 1966) and archaeologist (Hodder 1982a) alike. Indeed the notion that all forms of material culture contain symbolic meanings is undisputed.' (Richards & Thomas 1984, 191)

In a later piece of analysis, based on the same categories established for the work on Durrington Walls, Colin Richards was more explicit about a text-like nature for this system of communication:

> 'A further indicator of the way a "grammar" of the decorated/undecorated distinction is employed to create a complex design structure is demonstrated in the deconstruction of design structure on three of the complete smaller pots.' (Richards 1993, 186)

In *Time, Culture and Identity* Heidegger's vision of existence, of Being, as a process of encountering the world through time is very important. People's selves are created through their relationships with the world. They construct themselves by explaining these relationships in language:

> 'In that it must insert itself into networks of the symbolic system in order to become a "Self", the subject is always fundamentally absent from itself, always dispersed and fragmented in webs of signification. The self is constructed in language.' (Thomas 1996b, 46)

The worldly nature of this construction means that the language in question will be a contingent thing, specific to a particular context.

Ritual Activity and Structured Deposition followed a general post-Processual trend by beginning with specific detail. The first section (Richards & Thomas 1984, 192-204), which analyses Grooved Ware distribution on the site, began by considering the detail of the decoration on the pottery. It worked out from this to consider distribution of the pottery at Durrington Walls. The second part of the analysis also considers distributions within the site, in this case concerning animal bones. Further work using the technique of structured

deposition has tended to follow this emphasis on within site analysis (e.g. Pollard 1992; Richards 1993). In *Time, Culture and Identity* Thomas is concerned to bring together a number of possible different scales of analysis together, while being careful not to link them in any specific mechanistic way, as:

> 'The scale of archaeological entities is contingent, a dimension of the historical process in itself.' (Thomas 1996b, 95)

He saw that focusing on one particular scale reinforced particular kinds of interpretation and that there was a need for more than detailed, site specific reinterpretation:

> '...there is little point in our constructing a radical re-interpretation of a particular site, involving subtle readings of gender and ethnic identities, if it can have no impact on a large scale understanding of the past which is still written in terms of "cultures".' (Thomas 1996b, 98)

Consequently the 'three histories' of *Time, Culture and Identity* focus at a series of scales and levels, from pan-European to site specific.

2.16 Language and Culture as an historical process

Richard Rorty's thinking provides the basis for a criticism of the limits of what has been seen as a contextual and contingent tradition in archaeology. I want to use his ideas to show the limits of the textual analogy in its own terms as I used Gould's to show the limits of the organic analogy.

Rorty's view of the truth is as something which is created by people, not something which exists in the world. Truth is a property of language, of the description of the world. He distinguishes between a belief in the existence of the world, and a belief in the existence of truth:

> 'Truth cannot be out there - cannot exist independently of the human mind - because sentences cannot so exist, or be out there. The world is out there, but descriptions of the world are not. Only descriptions of the world can be true or false. The world on its own - unaided by the describing activities of human beings - cannot.' (Rorty 1989a, 5)

What it is important to note about Rorty's view of truth is that he regards this contingent, created truth as just as powerful an idea as the more traditional vision of truth as a correspondence to reality. It is the only kind of truth that we have, and recognising its historical character does not give us any 'philosophical' reason for abandoning our belief.

Rorty has explicitly criticised the search for what he calls 'final vocabularies' (Rorty 1989a, 73-95). By 'final vocabulary' Rorty means the attempt to produce a description of the world

which is both all-encompassing and eternal. The idea of a last and ultimately correct description of the world Rorty regards as incompatible with a belief in the contingency of our culture and ourselves. He sees the pragmatist account of the development of language and the psychoanalytical account of the development of ourselves as leaving us with no option but to regard our ideas about the world as a temporary part of our history. He is also careful to caution against the temptation to see the 'discovery' of this contingency as allowing us to construct an inverted final vocabulary based on everything which conventional final vocabularies are not. He is particularly critical of the idea of the universal importance of 'the discourse of philosophy' (Norris 1989), and hence of the idea of the universal application of Derrida's 'discoveries' about the slipperiness of signs:

> 'I find Heidegger and Derrida among the most powerful and fascinating writers of my time. They speak to my condition. But I doubt very much that they speak to a universal human, or even a universal Western, condition. My own imagination is filled with the same images as fill theirs.. ...powerful, but not universally compelling, images. Their power over me, I take it, comes from the way I happened to acquire them, the way they happened to interlock with, and eventually to symbolize, my own idiosyncratic hopes and fears.' (Rorty 1989b, 205)

Rorty's model of the self is one of what he calls a 'centerless web of beliefs' (for example, Rorty 1991a, 175-196). He holds that our selves are created out of our encounters with and reactions to other people and things around us. I think that this argues for a very integrated view of human culture. There are not individuals, existing in consciousness, or language, meeting in an external world of reactions called culture. Neither is their culture, existing in language, or discourse, or text, and patterning an external world of things called material culture. Rather there is a centreless web of associations made up of all of these things, and with clear priority given to none. This is tied to the idea of the non-existence of anything about the individual which is outside culture and cultural history:

> 'There is no human nature which was once, or still is, in chains. Rather, our species has - ever since it developed language - been making up a nature for itself.' (Rorty 1991a, 213)

Rorty has been quick to debunk many of the details which stand behind the textual analogy for culture, largely by questioning our ideas about how language works. Rorty's view of language and how it might be thought of working is based on the ideas of Donald Davidson (especially Davidson 1984). Following the later works of Ludwig Wittgenstein, Davidson sees language as a tool, not as a set of rules:

> 'there is no such thing as a language, not if a language is anything like what philosophers, at least, have supposed. There is therefore no such thing to be learned or mastered. We must give up the idea of a clearly defined shared structure which language users master and then apply to cases.. ...We should give up the attempt to illuminate how we communicate by appeal to conventions.' (Davidson 1984, 446)

He analyses the way in which people come to understand language in terms of a historical practice of guessing and adjusting ideas, what he refers to as 'converging on passing theories' (Davidson 1984), rather than the learning of an ahistorical set of grammatical rules. Davidson particularly concentrates on the way in which people come to understand grammatically nonsensical bits of speech such as malapropisms and metaphor as illustrating this historical process. Rorty regards Davidson as having de-mystified language, to have turned it into another historical contingent human phenomenon, rather than Heidegger's all-pervading universal voice of Being. Rorty suggests that language is just another way of getting on with the world, rather than a universal model for how we organise culture. He has explicitly criticised the notion that the linguistic oppositions and contradictions detected in 'discourse' really do pervade, describe and constrain everything about our world and culture (Rorty 1991b, 119-139).

Rorty also has fundamental doubts about the validity of dividing the way in which the humanities and sciences proceed:

> 'I shall be urging that we avoid Dilthey's suggestion that we set up distinct parallel metavocabularies, one for the *Geistes-* and one for the *Naturwissenschaften.* We should instead assume that if a philosophical doctrine is not plausible with respect to the analysis of lumps by chemists, it probably does not apply to the analysis of texts by literary critics either.' (Rorty 1985, 2)

In Rorty's view, truth is a part of description, not of correspondence to external reality. Facts are descriptions of events, not the events themselves. This description is the same process in whatever discipline it occurs:

> 'The hardness of fact in all these cases is simply the hardness of the previous agreements within a community about the consequences of a certain event.. ...When the die hits the blank something causal happens, but as many facts are brought into the world as there are languages for describing that causal transaction.' (Rorty, 1985, 3-4)

In the past philosophy has tried to simplify language to get at the 'direct' response of human senses to reality. Rorty sees this desire as the result of thinking of language as an entity interposed between ourselves and the world. As I described above Rorty wishes to

see language as a tool used by people, as a way of getting on with the world. The process of description in both the humanities and sciences is the same one.

Perhaps surprisingly, Rorty retains his belief in progress, although it is such an idiosyncratic Rortyish type of progress that it is doubtful whether Huxley or Childe, for example, would have accepted it as such. The traditional view has depended upon the idea of some external truth or standard against which to measure progress. This is what Darwin, Huxley, Childe and others searched for. Nietzsche argued that as there was no external truth, progress was an empty idea. Gould and Lewontin came to the conclusion that the external truth or standard actively contradicted the idea of progress. Rorty moves around this dilemma in a different way by arguing that a contingent truth is a valid measure of our progress. Rorty's view is that progress is a matter of politics, something which is neither helped nor hindered by 'philosophical underpinnings', and his Liberal politics incline him to see and to hope for progress:

> 'Followers of Dewey like myself would like to praise parliamentary democracy and the welfare state as very good things, but only on the basis of invidious comparisons with suggested concrete alternatives, not on the basis of claims that these institutions are truer to human nature, or more rational, or in better accord with the universal moral law, than feudalism or totalitarianism.' (Rorty 1991a, 211)

Just as Rorty sees the contingent nature of our beliefs and hopes as no reason to stop fighting for the better world that they promise, he regards a Whiggish view of our past as an inevitable part of the same progress.

Part of Rorty's view of history as progress comes from his view of language as a tool used by people to enable them to shape the world to their ends. Rorty regards this contingency of language as a part of the same process by which Darwin showed the contingency of the natural world and Freud the contingency of the self (Rorty 1989a, 3-44). What Rorty is offering here is a view of language as a human adaptation, new vocabularies are adopted because they enable us to describe our situation better

In Rorty's view culture is organised, or ought to be organised, in the communication between people. This is the level of the pragmatic compromise that allows the private, self-created individual to assume a public face, in the liberal search for the greatest good for the greatest number. Rorty is not interested in finding a theoretical basis for describing how societies *work*, he has Utopian practical suggestions for what they might *do*.

2.17 Contingency, materialism and change

Throughout this reader I have tried to avoid making too many invidious comparisons between ways of seeing the world. Most of the ideas which I have presented have contributed something to my vision of how material culture might be studied. What I will do in the next chapter is present a critical synthesis of these ideas and develop a methodology that allows me to study the Neolithic pottery of Wales in the light of those ideas.

Is there any thing whereof it may be said, 'See, this is new'? - Ecclesiastes 1:10, Authorised Version

3 The Life of Pots

3.1 Introduction

In order to build up the kind of descriptive theories I have argued for, I need to compare the information I have about the pottery through time and through space. I need to look at how the evidence for the meaning and use of pottery changes. I have chosen to do this on the basis that the producers and users of all of this pottery would have faced a series of decisions during the creation, life and destruction of these vessels. Specialists studying stone tools have had an interest in understanding the choices made during the use of the artefact for a long time. The production, wear and re-use of stone tools is well understood and forms a common background to all studies of these artefacts. In pottery studies, while a similar amount can be known about all stages of the life of the object, this information is likely to be sub-divided amongst various specialists. A ceramic petrologist will know about the selection of raw materials used; a working potter and/or an ethnologist will know about the mixing of clays, building and firing; a 'pottery specialist' will know about the possible meaning and probable variation of shape and decorative style; and an archaeological scientist will know about what the pot contained and some details of how it was used. What I will do in this section is present a critical synthesis of all those ideas I considered in my first chapter. I want to consider each of my introductory categories one last time, this time to indicate which of the alternatives I feel happiest with, and how I think that these might help the study of Neolithic pottery.

3.2 Truth

Nietzsche's account of truth, of the 'mobile army of metaphors', the product of a society's history, seems to me as good a description as we are going to get of 'truth' as an abstract quality. However it also seems to me that it is a description of truth which doesn't sit very well with our habitual behaviour in an intellectual discipline. However much we are aware of the constructed nature of truth, we tend to work in a way which presupposes that there is an absolute truth to be found. We proceed by questioning, evaluating, to reveal that which we did not know in advance. We are chary about identifying the answers we come to with an absolute truth, but the act of enquiry presupposes the external nature of our answer. We regard it as a mark of good intellectual practice to have no conscious control or input into the answer which our enquiry produces. In other words, we behave as if there was an independent truth to be found.

There are two possible ways of dealing with this problem. The first is to try to rid your subject of its traditional procedures and methodologies; to say that, without external truth, reason is pointless, or even dangerous. I haven't followed this line because I find it very hard to imagine the kind of pottery study I am working on without those traditional procedures. It is possible to write about the past without using the strongly structured rules of evidence and procedure which mark out traditional archaeology, but the two styles of writing are so dissimilar that it is hard to use this work to influence mainstream archaeology. I wish to conserve many of the rules of procedure which we use to evaluate 'the truth' because most of the information which I use makes no sense without them. I am thus led towards a pragmatic compromise with the idea of truth, something like Rorty's distinction between descriptive truth and the existing world. I have created the truth, but it is the only truth I have and it is true for all that. In the rest of this thesis I have talked about evidence *for* events in the past, following Thomas (1996b, 35-37) in his description of the working of the archaeological imagination.

3.3 The Authority of Theory and the Authority of Information

Since the work of the early New Archaeologists the idea that there is no way in which data can be independent of some theoretical standpoint has become commonplace in archaeology. The choice has ceased to be between a 'theoretical' and a 'descriptive' archaeology but between a mature discipline which recognises this dependence on theory and articulates its theory properly, and 'mere' dilettante description:

> 'The undisciplined and questionless accumulation of data has in itself no more value than the collection of engine numbers or cheese labels...' (Clarke 1978, 21)

However, as the Processual archaeologists themselves found out, the idea of theory as a set of predictive general rules can be fatally weak. When we reach the situation in which all phenomena relate to the same set of universal generating principles, research becomes banal in the extreme. Processual archaeology ultimately fell from favour not because its central premises were wrong, although they probably were, but because it had reduced thinking about archaeology to an unexciting and profitless exercise. As Gould and Lewontin have shown in biology, this is not a problem which is unique to the New archaeology. I think that any system which claims to explain everything will tend to turn the study of details into unexciting hack work.

However, there is a different way of thinking about theory and description. It is one hinted at by Rorty when he refers to thinking as a process of re-description. There may be no description of data that does not depend upon theory but the inverse of this statement also

applies, there is no theory, however abstract, which is not a description of the world. We have held for some time that we cannot proceed by collecting information in a neutral fashion and then synthesise our theories. Neither can we devise a theory and then apply it to the world. Theories are descriptions, stories which we tell as we struggle to understand what we encounter. What we encounter as information is, of course, already woven into other stories and descriptions, so our authority must come from both. In my collection of information I have facts that reflect research carried out in many different traditions. My own methodology is a blend of analytical techniques developed within early archaeological science (Shepard 1968: Hodges 1962), functionalist analysis of vessel design developed within the Processual tradition (Howard 1981, Van As 1984), cognitive and structuralist studies of pottery production (Van der Leeuw 1984: DeBoer 1984), and post-Processual analysis of pottery deposition (Richards & Thomas 1984). The re-describing all of this information could not have been done in terms of one of these viewpoints, but only by regarding them all as coherent and internally consistent world views.

3.4 The mind and the world

The necessity for some variant on a materialist view of human action has been one of the rare connecting threads in archaeological thought during the second half of the twentieth century. The dissenters, such as Hodder and Collingwood, are distinctly in the minority in my historical survey. The problem with the way that someone like Hodder thinks about material is its limiting effect on what we can say about culture. On this view pottery is a secondary derived thing, an imperfect reflection of a mental template. Finding a way of knowing about the mental template behind the material remains is very difficult. I find it much more hopeful, and helpful, to proceed as if material culture and culture are all bound up together in the world. However, this more materialist kind of post-Processual archaeology can also raise problems in trying to deal with pottery in the world. Although Barrett, and Shanks and Tilley, for example, stress the material nature of culture and the way in which culture is inextricably entangled in the world, they also presume fundamental organising principles 'behind' this engagement with the world. The structure of the pottery is still derived from systems of signification. It is not that describing pottery in terms of signs is necessarily wrong. The problem is that I find a poor fit between theory about the play of differences in written texts and technical and analytical information about material things produced in a non-literate society. To get around this clumsiness I want to propose a different way of thinking about how the human mind and the world relate to pottery.

Sander Van der Leeuw looked at the decisions faced during the life of vessels in his 1984 paper *Dust to dust: a transformational view of the ceramic cycle*. Van der Leeuw was looking for universals in human decision making. He was trying to impose the 'order' of earlier cross-cultural models of pottery form and function, while still replacing their environmentally determined mechanisms with a more human model of pottery design. His interest was to take decision making in the manufacture of pottery and to go on to build a general model applicable to all types of human organisation involved in the production of pottery:

> "Each of these specific models is formulated in a language derived from a specific situation, and such language is not applicable to the general model. On the other hand, however, it is possible to devise a general language which is applicable to specific situations, because parts of that language may be kept free of the bias of any one specific situation." (Van der Leeuw 1984, 719)

Van der Leeuw is very clear about why he feels such a 'general language' is necessary. A culture specific approach will falter because of the difficulty of truly knowing a prehistoric culture:

> "As long as it is assumed that the perceptive framework of each group of humans is specific, this approach will be very difficult to apply within archaeology, because of the limitations of the archaeological data-set which makes the testing of hypotheses so difficult." (Van der Leeuw 1984, 717)

I would argue that, like Ian Hodder, Van der Leeuw is wrong to separate 'culture', as a perceptive thing done in the mind, from the material on which it is supposed to act. In both the materialist and idealist schemes pottery is made to do things. These tasks can be 'functional' or 'symbolic' depending upon your preference. We have tended to categorise pottery on the basis of what it does - how does it work as a container? - what kind of sign is it? We have also tended to assume that pottery was categorised in these ways in the past. What I would suggest is that we think about the process of design as one of continuous modification of previously categorised things. Pottery is not produced and then categorised once its function or meaning has been discovered. Neither is an abstract job or social relation imagined and a vessel designed to fill this need. It is impossible to imagine a task without imagining some thing, some existing part of the world, which is, or could be, appropriate to it. Design is a process of modification, nothing is designed absolutely from scratch. As we *can* study the details of these modifications, we can study the history and the traditions of using pottery. These contingent, culture specific histories can be studied at different scales: within sites; between sites; and across wider areas of the country.

There will be a certain similarity in procedure with design based methods of pottery typology advocated in the past, for example the "techno-analytical method" (Van As 1984). I am keen to adopt what I see as the strengths of this kind of approach, in particular the attempt to describe pottery in terms of the human actions associated with it. The problem with most of this kind of work has been an excessive emphasis on adaptive economic functionalism.

> "In general we can only go so far as to identify a pot as a storage jar, a cooking pot or a water jar, and in many cases we can only speculate about its original function." (Van As 1984, 132)

The rather simplistic vision of a process of solving technological problems *en route* to a perceived perfectly functioning vessel often renders the new insights of this method extremely banal, for example:

> "The use of different tempering materials caused the change in decoration technique, since the grog-tempered Neolithic B pottery was not suited to painting." (Van As 1984, 161)

I wish to broaden the approach to deal with more than just the production of the pots. I believe that the idea of the pot which is under production is inextricably linked with, indeed is expressed in terms of, pots which already exist and are already being used. Therefore it follows that decisions about all stages of the use of the pottery are equally important in categorising the pots.

3.5 Material culture as a text or as an organism

John Barrett (1988, 6) held that he had found a way of describing material culture which removed us from the necessity to think in terms of either of these two metaphors. However, as Tilley has pointed out, Barrett's view is still heavily dependant on a linguistic analogy for culture:

> 'Endless permutations of such arguments could be produced, but none of them can escape language. Thinking about material culture inevitable involves its transformation into linguistic concepts. However much we might try to escape from language, we are trapped in its prison house.' (Tilley 1989, 192)

I think that Tilley is right to say that we cannot escape the linguistic analogy by Barrett's route. Where he is wrong is to assume that therefore no escape is possible from the prison house. Davidson's work has shown, following Wittgenstein, that the rules and patterns which we ascribe to language are a description of language, not an absolute property. If there is 'no such thing as language' we have no need to reify certain parts of our description of language as underpinning the whole of human consciousness.

If we adopt Rorty's view of language as one of many historical tools which human beings have used in their encounter with the world we can see that there is nothing fundamental in the linguistic analogy for material culture. It should be a tool to aid in our explorations, when it helps us devise new ways of describing the world we can use it happily, but when it becomes clumsy, or sits badly with the descriptions already woven around our information, we can discard it in search of a more useful tool. What is true for one metaphor is also true for the other, the organic analogy for material culture had got to be such a cumbersome and ill-fitting object that it had been all but completely abandoned. However, if the recasting of evolutionary theory that has gone on in the biological sciences allows us to see something useful again in the organic analogy there is nothing to stop us taking it up again. If we see descriptions as tools then our choice is between the useful and clumsy theories, not the right and the wrong ones. As I pointed out above, I use information and methodologies in my study based on both of these metaphors. What I have tried to do is to use the study of the history of changes in the material to look for different ways of talking about material culture.

3.6 Progress

For much of the time covered in my survey the question 'do we progress?' seemed to be moving towards a compatible resolution. The lack of any external standard of truth might cause us, with Nietzsche, to view the notion of progress as hollow. Or we could follow Gould and Lewontin and come to the conclusion that the idea of progress was actively contradicted by the evidence of our work. However, I think that Rorty's view of the necessity of an idea of progress to our particular contingent situation is a very pertinent description of my beliefs. I may believe with Gould that our history is one of undirected change rather than absolute Whiggish progress, but I am glad that we have changed in the ways in which we have and I have strong opinions about which future changes would be right, and would constitute progress, and which would not.[1]

However, in terms of the study of the past, the search for progress remains a very clumsy tool. The unanimity with which the idea of progress has been allowed to slide from all kinds of historical study seems to me the best argument for not reviving it.

3.7 Scale

The initial scale of this study is the individual decision. These decisions are embedded in the world and in the history of the people who made them. These ties are what has allowed

[1] Gould himself seems to have begun to think in these terms, at least with respect to recent history (e.g. Gould 1993, 206-217)

If we adopt Rorty's view of language as one of many historical tools which human beings have used in their encounter with the world we can see that there is nothing fundamental in the linguistic analogy for material culture. It should be a tool to aid in our explorations, when it helps us devise new ways of describing the world we can use it happily, but when it becomes clumsy, or sits badly with the descriptions already woven around our information, we can discard it in search of a more useful tool. What is true for one metaphor is also true for the other, the organic analogy for material culture had got to be such a cumbersome and ill-fitting object that it had been all but completely abandoned. However, if the recasting of evolutionary theory that has gone on in the biological sciences allows us to see something useful again in the organic analogy there is nothing to stop us taking it up again. If we see descriptions as tools then our choice is between the useful and clumsy theories, not the right and the wrong ones. As I pointed out above, I use information and methodologies in my study based on both of these metaphors. What I have tried to do is to use the study of the history of changes in the material to look for different ways of talking about material culture.

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me to build the decisions up into traditions and ultimately into a history of the Neolithic period in Wales. The limits of the study are also inherent in these choices about scale. My choice of which decisions to study has been based on that information which was available and also by a concern to balance the information across the whole period of use of the vessel. Questions in which I was originally interested have been allowed to slide from view, either because they were very difficult to answer on the surviving evidence, or (and more frequently) because they were repeat questions, drawing on evidence already used to answer a different question and so over-represented that evidence.

I have described these decisions as building into traditions, and used these 'traditions' as one of the central units of my analysis. I have chosen the word 'tradition', despite reservations about its connotations of conservatism and stasis, as the best, shorthand approximation for the knowledge and rules which categorise a pot at that particular stage in its life. In the analysis which follows 'tradition' should perhaps be thought of as a neologism incorporating, among other concepts, 'practice', 'habit', 'style', 'technique' and 'meaning'. Each group of pots which have evidence for a tradition has been given a unique number, so that I speak, for example, of the group 8 tradition of pottery use.

Perhaps the most important change of scale in this thesis, compared to more traditional pottery studies, is the abandonment of analysis at the scale of the vessel. A specific prehistoric vessel was a blend of a mass of different traditions and practices. In order to study these traditions I have had to stop trying to fossilise them into vessel types. The attempt to make a single set of categories out of all of this disparate evidence would have had the effect of fragmenting the history into unintelligibility.

3.8 The life of pots

In looking at how decisions build up into traditions and categories, I have chosen to build up accounts of the history of each vessel. I have divided the life of the pots into a series of stages, at each of these stages an infinite number of questions and choices would have been faced. I have deliberately chosen questions which will apply well to all the styles of pottery I am studying. In this sense what I am doing can be regarded as complementary to a standard typological approach, which emphasises the differences between styles. I have also deliberately stuck to largely secondary and non-destructive tests. I have tried to keep to questions which can be answered without further laboratory work. One of the ways in which this history could be extended would be by further analytical work to consider different questions

On a more general level, the type of information which can be gathered from the experimental reproduction and use of the pots is of a specific sort. Experimental work like this can never show you how a pot was made or used. It cannot really even show how a vessel could not have been made or used, we have no guarantee that the difficulties we encounter in attempting the reconstruction predetermine our solutions, or even that they were identified during the Neolithic period as difficulties at all. I have tended to try and avoid using my experimental work to produce general statements of the 'round-bottomed, flint tempered pots, thicker than 15 mm at the base were used as cooking pots' variety, but rather to use it to illuminate my guesses about specific aspects of specific pots - 'I know from looking at the sherd that they can't have done that to get this affect, if I was attempting to produce the affect I would try this'.

A study by Hillary Howard (1981) of material from Windmill Hill, indicates the potential of an integration of petrology, ethnography and experimental reconstruction. Howard's work was based on the 'ceramic ecology' of Frederick Matson (1966). The emphasis of this kind of work is also on decisions made during artefact production. Howard's concerns were twofold, to produce histories of ceramic production at particular sites and to place these histories in a wider framework of generalised types of pottery production. Howard's emphasis is largely functional:

> "In Britain, neolithic pottery has been classified into fine wares for serving food, everyday wares for cooking and food preparation, and heavy duty wares for storage (Clarke 1976, 464). Despite the laudable application of this general functional model.. ...no attempt has been made to define the precise physical correlates of each category." (Howard 1981, 8)

and her interest was almost solely in the production of pottery, nevertheless this paper demonstrates the enormous possibilities of this kind of account:

> "The majority of local vessels were made by two pottery groups... One group exploited the Marlborough Downs Clay-with-flints, whilst the other preferred or held rights to a sandy Brickearth. Clays and tempers were collected and prepared in late summer before harvest, and production took place at the site after the crops were cut and threshed. The potters could thus take advantage of favourable climatic conditions and abundant dry fuel... The same two potter groups made sporadic use of local alluvium, perhaps during late spring and early summer (both the Kennet and the Winterbourne would have been subject to extensive winter flooding), to replace pots broken and urgently required before the next production season." (Howard 1981, 25)

Different assumptions about the nature of Neolithic society and subsistence would change a lot of the detail of this history. The potential for many very rich histories of this kind is obvious.

The detail of the data collected relating to the pottery in the study is summarised in Appendix B, to allow easy reference to the data discussed in chapters 5 to 10. In this section I will also briefly introduce the largest and most convincing groups, to give a background to the more detailed analysis in the later chapters.

3.9 Raw material selection

All the questions in this first section are to do with the selection of raw materials. Information of this kind is usually presented in terms of the geology of the area around the find spot. I wanted to use this to look at decisions which we could identify. As an example I want to consider the use of a rock type from a very localised location as an inclusion (such as the serpentine/gabbro complex in the sherds from Trefignath, see section 5.3 below). In the first instance I am interested in the decision to remember this specific location and re-visit it as a source of pottery temper, rather than any claimed functional or symbolic purpose of the particular rock in the particular vessel. The process of adding tempering material to pottery is a potentially very useful one for my kind of investigation. The number of different substances added to the clay in this way mean that attempts to ascribe functional uses or symbolic meaning to particular inclusions will tend to founder on the vast number of possible combinations. Considered as a single event this kind of decision almost always evades a convincing explanation. When it is considered as part of an historical process connections and traditions show up and its meaning becomes much clearer.

i) What is the least distance the clay could have travelled?
   a) No distance, the clay could be local to the site.
   b) Within a day's travel.
   c) Within a week's travel.
   d) More than a week's travel, the clay could not be obtained locally.

A question designed to split off only those vessels where the clay is definitely coming from elsewhere. Ethnographic accounts suggest that most contemporary potters seek both clay and tempering inclusions within a days travel of the production site (Arnold 1981, 35). This has been used in the past (Howard 1981, for example) to suggest that inclusions and clays from further afield must be the products of exchange of finished vessels and/or their contents. However, I envisage some of the people who made the material I am

working on as mobile pastoralists who might have held very different views on what was 'local' to the settled modern potters in the ethnographic accounts collected by Arnold. Specific information about exact locations of clay sources is difficult with even the best coverage of the drift geology and well preserved thin section evidence so I have grouped the information into one of four possible answers. In practice it was only possible to answer this question for a small percentage of the vessels studied.

ii) What is the least distance the inclusions could have travelled?

a) No distance, the inclusions could be local to the site.

b) Within a day's travel.

c) Within a week's travel.

d) More than a week's travel, the inclusions could not be obtained locally.

One of the problems with the study of inclusions is the difficulty of distinguishing mineral particles present in the clay in its natural state from those deliberately added. I have only worked in this section with inclusions which I am satisfied have been added to the clay by the potter. Given good thin sections it is much easier to be more specific about rock inclusions, especially as solid geology is usually better recorded than the overlying drift. However, many types of rock still occur in a wide range of places and giving a specific geographic source for inclusions such as shell or grog is extremely difficult, so I have used the same broad categories as for the clay.

iii) What kind of inclusions were used

A count of the number of different examples of stone, plant, shell, or grog inclusions in each vessel from thin section (where available) or hand lens examination.

iv) What percentages of fine, medium and coarse inclusions were used?

The look and feel of the inclusions would have given the potter vital clues about their usefulness. As the sherd selected for thin-sectioning or hand-lens examination may not be entirely representative of the whole vessel the answers to this question will be expressed to the nearest ten percent (giving a ratio of three figures such as 10:40:50). In the appendix lists these figures have been arranged into nine groups of regularly recurring combinations (see appendix B.1). These groups were then used to help define the traditions of raw material collection.

v) What is the percentage of laminar inclusions to granular inclusions?
For the same reason these percentages will be expressed to the nearest ten percent. In the appendix lists these ratios have been gathered into five groups of recurring combinations (see appendix B.1).

Traditions where locally available stone was used as the main tempering material included groups 5, 10, 25, 13, 34, 30 and 1. Those where shell was used as the main inclusion were groups 16, 17, 18 and 9. Plant material, probably charred chaff or chopped grass, was used in groups 26, 27 and 28.

3.10 Construction

I have not attempted to cover all the possible decisions anyone could make when building a pot. This would obviously be impossible. My concern is with those choices which were made during the Neolithic amongst the material I am studying (see figure 3.1). It will not always be possible to answer these questions solely from the examination of the pot. The answers to questions in this section will often be based on a combination of evidence from the vessel itself and experimental knowledge of what works well when trying to produce certain shapes.

i) What kind of rim is being built?
With the decisions involved in the shape of the pot I have decided to split the vessel into the four broad zones shown and to consider the different choices made within each of these zones. These zones overlap with one another. In considering the shape of the body I have considered the form of the whole vessel, including those areas like the rim and neck which are also considered separately. For my purposes the rim of the vessel is the top part of the body which forms the mouth. It is not any additional detail moulded onto this area which is considered separately below. This classification of parts of the pots has grown up out of my repeated attempts to build a descriptive system that would describe all the Neolithic pottery of Wales. The overlapping zones type of description seems to me to provide an acceptable amount of standardisation while avoiding the problems I found with the more separated description of parts. The chief of these problems was that it was always possible to redescribe pottery in a number of different ways without violating the rules of the descriptive system, particularly with vessels lacking in clear divisions. The overlapping zones work by elevating overall body shape above things like rim and neck angle in the descriptive hierarchy. They are, of course, only one possible description of the vessel shapes, but they provide a standardised system on which to base this study.

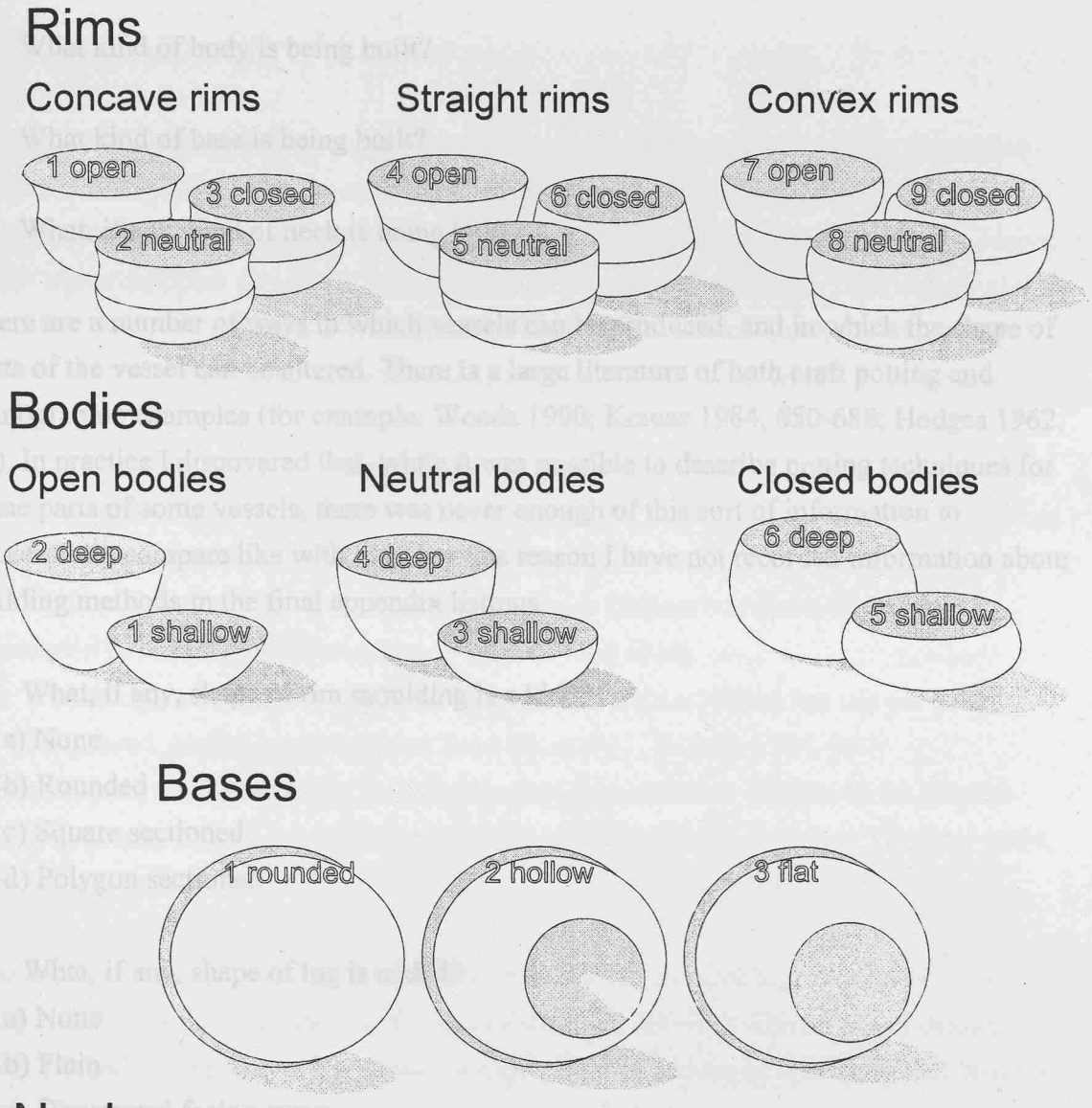


Figure 3.1: Neolithic pottery forms

ii) What kind of body is being built?

iii) What kind of base is being built?

iv) What, if any, kind of neck is being built?

There are a number of ways in which vessels can be produced, and in which the shape of parts of the vessel can be altered. There is a large literature of both craft potting and ethnographic examples (for example: Woods 1990; Krause 1984, 650-688; Hodges 1962, 60). In practice I discovered that, while it was possible to describe potting techniques for some parts of some vessels, there was never enough of this sort of information to successfully compare like with like. For this reason I have not recorded information about building methods in the final appendix listings.

v) What, if any, shape of rim moulding is added?
   a) None
   b) Rounded
   c) Square sectioned
   d) Polygon sectioned

vi) What, if any, shape of lug is added?
   a) None
   b) Plain
   c) Downward facing curve
   d) Upward facing curve
   e) Double curve
   f) Horizontal handle
   g) Vertical handle

The larger construction groups generally belonged in the early Neolithic, see section 10.4 and figures 10.1 and 10.2 for more details. Groups 9 and 21 were shallow and deep variants on an open concave-rimmed form. Groups 16 and 5 were also shallow and deep variations, in this case of a concave, upright-rimmed form. Groups 14 and 27 formed another set of similar traditions; deep and shallow versions of a straight-sided open rimmed form. Group 4 vessels were shallow and had upright straight-sided rims, while those in group 7 were shallow but with closed convex rims.

3.11 Decoration

Once again, my concern was not with everything it was possible to imagine, but rather with the history of choices actually made. It is in the consideration of decoration that my scheme of classification differs most from both conventional typologies and more recent structuralist and post-structuralist examinations of pottery decoration. I am uneasy about applying grammar, which is a description of language, to material culture. Most pottery design grammars are based indirectly on Chomsky's model of language as something with innate 'deep' structural properties (for example DeBoer 1984, 550-571). The intention in this kind of work is to reduce variability to a set of comprehensible rules. There are two problems with this, firstly the temptation to regard the rules as expressing something real and deep about the nature of the decoration rather than treating them as one possible description of it. Secondly it is not at all clear from DeBoer's account that he has succeeded in reducing the decoration to a set of rules at all:

> 'Although a complete account of Shipibo-Conibo decoration has not yet been achieved, partial solutions have been advanced.' (DeBoer 1984, 550)

DeBoer's partial solution deals with two lines of decoration on the rim of the Shipibo-Conibo vessels, chosen because they are 'simple and readily manageable' (DeBoer 1984, 569) and ignoring a large area of decoration on the shoulder of the vessel.

Hardin (1984) has considered the different ways in which ethnologists have dealt with decoration as design. She has identified five different levels at which pottery design has been studied. These are: whole vessel, which covers questions of symmetry and how the vessel is divided up. Configuration, a repeated set of design elements, such as a line of whipped cord impressions, considered as a unit. Motif, which is the linking of several elements, such as twisted cord impressions linked to form a chevron. Element, which is the basic design unit and fundamental shape, which is identified with single dots, lines and curves. Hardin's work is concerned ethnographically with how different groups of potters react to descriptions of their work based on these design levels. The very difficulty of defining units in design and the variation between different groups of potters in how they categorise their designs shows how difficult it would be to apply a design grammar approach over a chronological sequence like the material I am studying.

In order to shift the emphasis in the study of decoration I have subsumed a lot of the detail normally used to separate out pottery styles into generalised questions about actions. These are designed to highlight traditions and discontinuities between styles.

i) Is the pot decorated?
   a) The surface is changed.
   b) The surface is unchanged.

ii) When does the decoration take place?
   a) While the fabric is still plastic
   b) After some drying

iii) What is used to make this change?
   a) Parts of the body.
   b) Parts of animals.
   c) Parts of plants.
   d) Stone.

(interestingly, one of the most useful of possible decorative substances, other bits of decorated pottery, are never used)

iv) What changes do the tools making the change undergo themselves?
   a) Combination with other things of the same kind.
   b) Modification.
   c) No change.

v) What sort of decoration is used?
   a) Clay is removed.
   b) Clay is pushed aside.
   c) Clay is added.

vi) How is the decoration organised?
   a) The whole pot is decorated in the same way. (unified)
   b) Parts of the pot are decorated or different parts of the pot are decorated in different ways. (divided)

There were three large decoration tradition in which the surfaces of the vessels were unified. Group 11, where the pottery was left plain; group 14, where the surfaces of the vessels were grass-wiped; and group 8, where the surfaces were burnished. The surfaces of vessels in groups 1, 4, 23, 10, 12, 7 and 16 were divided with various kinds of impressed decoration, while the surfaces of vessels in group 6 were divided using incised decoration.

3.12 Firing

The next of the categories, to do with the drying and firing of the pottery, is one of the most difficult to get at. The clay was obviously drying out gradually during the whole process described so far, indeed it must be partially dry for some aspects of the construction and decoration to work at all. However, before firing, the pot must be thoroughly dried. Excavated evidence for pottery production sites in the Neolithic period in Britain is almost unknown and ethnographic accounts indicate a vast range of possibilities.

There are two types of water in plastic clay, the first kind is the water chemically combined with the clay minerals as hydrous and hydrated aluminium silicates. The second kind is the water held between the plates of the clay mineral crystals. Pottery is dried to remove the large amount of water trapped between the crystals. Clays dry in different ways depending upon their porosity. Fine plastic clays take longer to dry than coarse porous ones and shrink more while drying. However these finer clays are stronger in the dry state and can be handled more easily before firing (Shepard 1968, 18). The drying of pottery requires a prolonged dry atmosphere, either outdoors or under cover. In upland areas of Wales, the need for the pottery to dry almost certainly means that pottery production was a seasonal summer activity. Although Woods (1990, 202) reports quite successful test firings in the depths of Leicestershire winters, my experience is that failure rates are much higher and more unpredictable in damp conditions.

All of the evidence that we have for the kind of firing which a particular pot has undergone is contained in the traces of chemical reactions visible in the vessel fabric. The chemical changes which occur in fired clay and its impurities are complex and depend upon a number of different variables. Fortunately it is possible to infer information about some of these variables from other evidence than sherd cross sections and so make more definite statements about firing conditions.

Clays pass through two chemical changes in the range of temperatures reached in open firings. These are dehydration and oxidisation. As clay is not a pure substance these stages happen to different compounds in the clay at different temperatures and in different ways. The temperature ranges of these processes vary accordingly. Dehydration occurs to the clay minerals themselves as they are converted from hydrous and hydrated forms of aluminium silicate to anhydrous forms. The plasticity of the clay is lost as the crystalline structure breaks down and the clay minerals are no longer free to move against one

another. Oxidation occurs on the carbon and iron compounds present in the clay as impurities. The oxidisation of carbon compounds occurs before the iron can begin to oxidise and it is the completeness or otherwise of the removal of this carbon which provides the characteristic dark core to partially oxidised sherds (Shepard 1968, 20-21).

The amount of carbon oxidisation is influenced by five factors: the porosity of the fabric; the kiln atmosphere; the temperature of the firing; the duration of the firing; and the rate of firing (Hodges 1962, 63-64). Shepard has established (1968, 74-91) that open firings of the kind under discussion here are all rapid in terms of the rates discussed by Hodges. The porosity of the fabric can be established by measurement and is roughly proportional to the amount of the inclusions in the fabric (see below, section 3.13). The temperatures reached during firing can be established from the behaviour of clays and some inclusions, and their visibility in thin section (Tite 1972, 230). Shell is converted from aragonite to calcite at temperatures of around 500°C, this change is accompanied by expansion in volume. This can be done deliberately to obtain calcite for inclusions. However, if shell has been added to a vessel as an inclusion that vessel will not survive the expansion of the inclusions within its walls (Steptonatis 1984, 83). Any vessel which has been tempered with shell and has survived the firing process must have been fired at temperatures at or below 500°C. At or above temperatures of 700°C to 850°C the optical properties of clay minerals change and they become isotropic, causing them to appear as extinct black areas on the thin section slide when viewed in crossed polarised light. If there have been calcite inclusions in the clay these will begin to decompose at temperatures greater than 750°C, leaving the characteristically shaped voids (Peacock 1977, 30).

The two remaining variables are the duration of the firing and the atmosphere in which the pottery was fired. In open firings the firing atmosphere is largely controlled by the type and amount of fuel used in the firing (Hodges 1962, 63). The duration of the firing is also dependant on the type and amount of fuel used. Shepard (1968, 79: 84) and Rye (1981, 102) record temperature curves for firings with a variety of different fuels. I have used these to distinguish between broad types of fuels on the basis of temperatures reached and firing duration. Although reconstruction of firings involves so many variables I hope to have reduced the amount of circular argument to a minimum. The chart below is based on Hodges (1962, 61) and Rye (1981, 116), modified in the light of my experimental work.

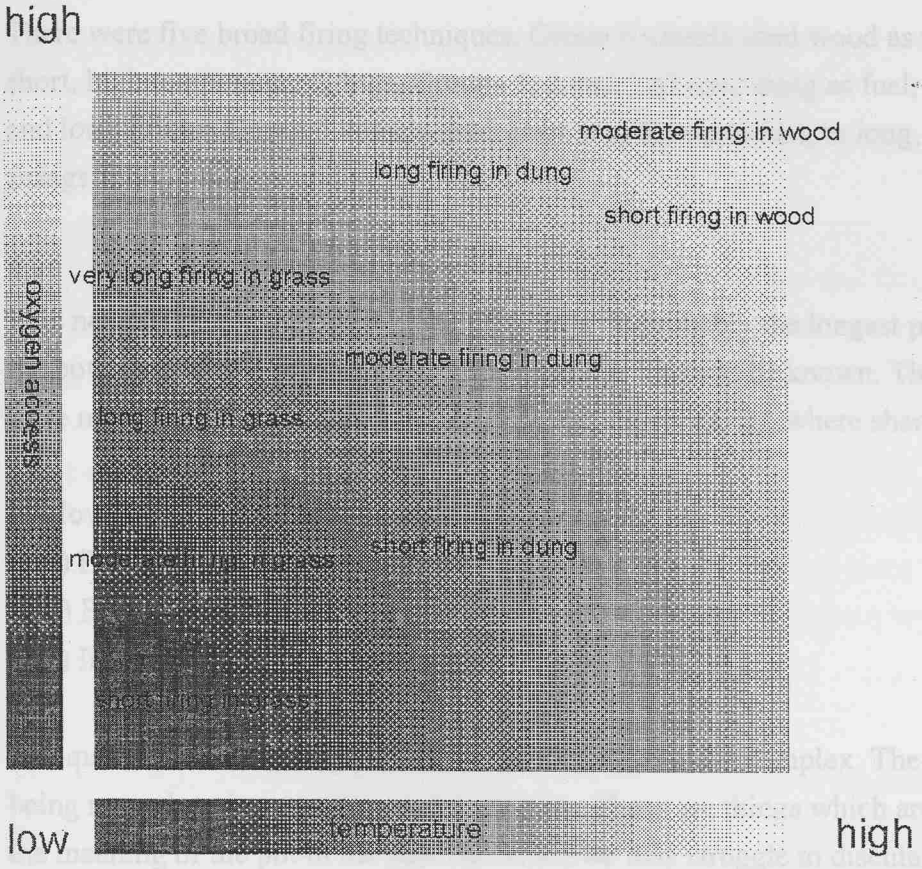


Figure 3.2: firing traces in pottery

In the light of this work, two of these factors are particularly susceptible to being considered in the light of questions about actions. These are:

i) What kind of fuel is predominantly used?
   a) Wood
   b) Dung
   c) Grasses

In practice, all of my firings have contained a layer of grass, as a retardant to allow the fire to build up to temperature slightly more slowly than it would otherwise. In this question I am concerned with the bulk of the fuel, used to keep the temperature up to firing levels.

ii) How long does the firing take?
   a) Less than 20 minutes; a short firing
   b) 20-60 minutes; a moderate firing
   c) 60 minutes or more; a long firing

There were five broad firing techniques. Group 6 vessels used wood as the main fuel, in short, high temperature firings. Groups 1, 2 and 3 all used dung as fuel; in short, moderate and long firings. Group 5 vessels used grasses as the main fuel, in long, low temperature firings.

3.13 Use

This next section is the one which has to do with probably the longest period in the life of the pot, it is also the one about which the least is liable to be known. Those vessels which were modified after firing can be identified relatively easily, where sherds survive.

i) How is the pot modified after firing?
   a) Perforated to aid repair.
   b) Perforated for other reasons.
   c) Incised decoration after firing.

The question of the movement of artefacts is rather more complex. The vessel may be being moved, or its contents, or the raw clay. These are things which are fundamental to the meaning of the pot in the past but which we may struggle to disentangle. I have considered the coherence of the group of raw materials as the key to this. Any single type of raw material may be being transported but if the whole raw material group is coming from a single outside source then my assumption is that the vessel has been transported in its finished state.

ii) How far has the vessel been transported?
   a) Not transported at all
   b) Within a day's travel
   c) Within a week's travel
   d) More than a week's travel

How the pot may have been used has been a classic area for ethnographic comparisons and experimental reconstructions in the past. Testing for these attributes without the destruction of the original sherds is also difficult. Some of the answers to the sections below are based on physical properties known to be affected by specific clays and inclusions, together with some testing of my replica vessels. My emphasis will be on possibilities for specific vessels, in the light of my experimental experience, rather than seeking general correlates for specific tasks.

iii) How porous is the vessel?

The vessels were grouped into three broad categories.

a) Not porous

b) Porous

c) Very porous

The permeability of a vessel, that is the ease with which gasses and fluids pass through it, is largely related to its porosity. Porosity itself is directly related to apparent porosity, which is the number of pores which break the surface of the vessel. In modern ceramic studies apparent porosity is usually measured experimentally by the following procedure (Shepard 1968, 127). The mass of the dry test piece W (kg) is obtained. The test piece is then boiled in water for two hours to saturate it, it is cooled in the water and the mass of the saturated test piece S (kg) is obtained. The volume of the test piece V (m^3) is then measured by displacement. The apparent porosity P (kgm^{-3}) is given by the following formula:

$$P = \left[\frac{S-W}{V}\right]100$$

This procedure would be too destructive to be used on sherds of Neolithic pottery and still yield meaningful results. I have substituted an estimation based on the number of pores visible at x20 magnification.

iv) How well does the vessel stand thermal stress/shock?

a) Well

b) Moderately

c) Poorly

If pottery vessels are used for cooking on open fires the resistance to heat damage will probably have to be within certain tolerances. Vessels fail due to thermal stress when their constituent parts expand at such markedly different rates as to split them apart. Failure due to thermal stress can be minimised by using inclusions, such as grog or calcite, with a similar coefficient of expansion as the clay, and by keeping the size of the inclusion particles small. Thermal shock is caused by the build up of thermal gradients within the body of the vessel because clay is such a poor conductor of heat. At a specific temperature the clay will suffer an instantaneous loss of strength. The amount of strength lost is proportional to the elasticity of the clay. Sherds which contain relatively large inclusions with a similar coefficient of expansion to clay are the most elastic. Therefore, generally speaking, vessels in which the large inclusions have a similar coefficient of expansion to clay will have been the most resistant to heat damage (see Steptonatis 1984, 95-116).

Vessels which are not very heat resistant can still be used for cooking, provided that the heating is done slowly.

v) How well does the vessel stand physical blows?

a) Well

b) Moderately

c) Poorly

The mechanical strength of a sherd can also be relate to the amount and size of inclusions in the fabric. The fewer inclusions and impurities there are in the clay, and the smaller these inclusions are, the better the vessel will stand up to physical blows.

vi) What is the capacity of the vessel?

The amount which a pot can hold relates in a variety of ways to how it may have been used. I don't want to make specific statements correlating certain capacity vessels with specific tasks but neither do I wish to exclude capacity entirely. Capacity has been calculated in litres in all cases where a reasonably accurate body shape could be reconstructed. This information was used to group these vessels into one of five size groups (see appendix B.5): very small (0-2.5 l); small (2.75-5.5 l); medium (5.75-8.5 l); large (8.75-12.5 l); and very large (12.75 l and above).

Use traditions can be sorted into broad general kinds of use. Vessels in groups 6, 17, 8, 2, 21, 9, 4 and possibly group 5 were used for rapid cooking on open fires. Vessels in groups 11 and 14 were small and do not appear to have been used for cooking at all. Group 12 vessels were large and also not used for cooking. Vessels in group 10, 23, 7 and 22 were used for slow cooking, possibly with ritual connections.

3.14 Deposition

All of the questions above help to see how pottery may have been used and understood during the Neolithic. In order to arrange that information into connected narratives, it is necessary to have some idea of the places and times that the evidence came from. I need to know the location of pottery, its associations, what kind of site it came from, how these sites relate to one another, and hopefully, a detailed enough chronology to allow me to distinguish between successive and contemporary styles. All of which brings me to the contents of chapter 4, and a consideration of the nature and chronology of the Neolithic period in Wales.

'Only 17 more practice days to go - one St. Patrick's day, 351 practise days' - Guinness advertisement, London, St David's day 1999

4 The Neolithic period in Wales

4.1 When was Wales?

Wales as a political entity is a modern construct. The cultural identity of Wales is also of relatively modern origin (Williams 1985, 164-6). Earlier studies of the area have tended to stress this fact, dissolving the modern boundaries and regarding the regions of Wales as part of a larger Irish Sea province (Lynch 1970, for example). It is true that much confusion has been spread in the study of later periods by the uncritical acceptance of Wales as a cultural unit. It is not clear how relevant this argument is for the Neolithic period. Even if the fantasies of Iolo Morgannwg had been a true reflection of early mediaeval Wales, it has never been seriously suggested that this, largely literary, culture had anything to do with the earlier periods of prehistory discussed here. It seems more relevant to note how this rejection of a Welsh Neolithic has taken the form of a wholesale importation of explanations from other, more densely studied, regions of Britain. It is not clear that a 'Welsh Neolithic' is any more a modern imposition than is the discussion of this same material as a backward outlier of the English Neolithic travelling up the Severn to meet a similarly retarded branch of the Irish Neolithic (see particularly Savory 1980, 222).

What is clear is that the area now known as Wales does have a distinct geographical character, mountainous and peninsula-ridden. Studies which have, for convenience, taken this geographical region as corresponding to the modern political boundaries of Wales (Gibson 1995 for example) have succeeded in explaining the material within their study areas. It has often been the case that the search for English and Irish parallels to material, especially the pursuit of passage graves and Severn-Cotswold tombs, has obscured more local traditions (M. Leivers *pers com*). It is not the case that either approach corresponds to the 'reality' of Neolithic activity in the area. Studies at any level will tend to stress the homogeneity of the area studied, to subsume finer detail, and to obscure broader links. However, the study of Wales in its Irish Sea context is well-established, what I want to do is to look at what different light is shed by a more localised analysis

I am going to follow this example of studying the material from the modern counties of Wales as a unit. Rather than describe this material as belonging to the 'Welsh Neolithic', I have referred to the Neolithic period in Wales, or the Neolithic of Wales, or to Neolithic

pottery from Wales. I have also studied this material as a set of five, more localised study areas, based on groupings of pottery producing sites (see figure 4.1). These areas are: Anglesey and north-west Wales; the upper Severn valley; the Usk valley; the Vale of Glamorgan; and west Wales.

4.2 What was the Neolithic period?

'The Neolithic' is a problem. It has been variously defined: the development of a polished stone tool technology (Evans 1872, Kendrick 1925); the introduction of a settled mixed farming economy (Piggott 1954); the beginnings of monumentality (Bradley 1993); or the creation of a new ideology based on aspects of all of these things (Whittle 1996). Julian Thomas (1988, 62-5, for example) has questioned in particular the uncritical assumption that the presence of one of these indicators implies the complete package. His review of the settlement evidence for the period in Britain (Thomas 1996a) seems particularly relevant to Wales. Few of the Neolithic buildings from Wales seem to have been used as dwellings, and the later evidence in particular appears to indicate that settlements were transitory. Sites such as the possible hilltop enclosure site at Clegyr Boia (Williams 1953) are apparent exceptions to this statement. At this site, at least two relatively substantial buildings containing hearths were discovered associated with a large quantity of pottery. It is tempting to look at Clegyr Boia as the norm for settlement in the Neolithic in Wales. It seems to fit the traditional model explicitly criticised by Thomas:

> '.. presented as being composed of "small social units based on an isolated farmstead" (Megaw & Simpson 1979, 86)' (Thomas 1996a, 2)

In fact, Clegyr Boia is super-normal. More pottery was deposited on this rocky knoll in Pembrokeshire than has been recovered from the whole of the rest of Wales. If this level of pottery use was standard in Megaw & Simpson's isolated farmsteads, and if all farmsteads were on prominent natural features such as Clegyr Boia, even the most haphazard program of research would have encountered more examples. The timber buildings on Clegyr Boia were probably part of the process, noted by Bradley (1993, 25-38), of developing the monumental character of striking natural landscape features. Although this need not preclude their having been habitations, it implies that they were a special kind of habitation.

By contrast, the definition of Neolithic pottery has always been fairly straightforward. Whatever definition of the Neolithic has been in vogue, Neolithic pottery has always begun with the first pottery vessels and ended with the first pottery style consistently associated with bronze artefacts. I have excluded Beaker pottery from this study for reasons of methodological convenience. Beakers span the Neolithic/Bronze Age transition,

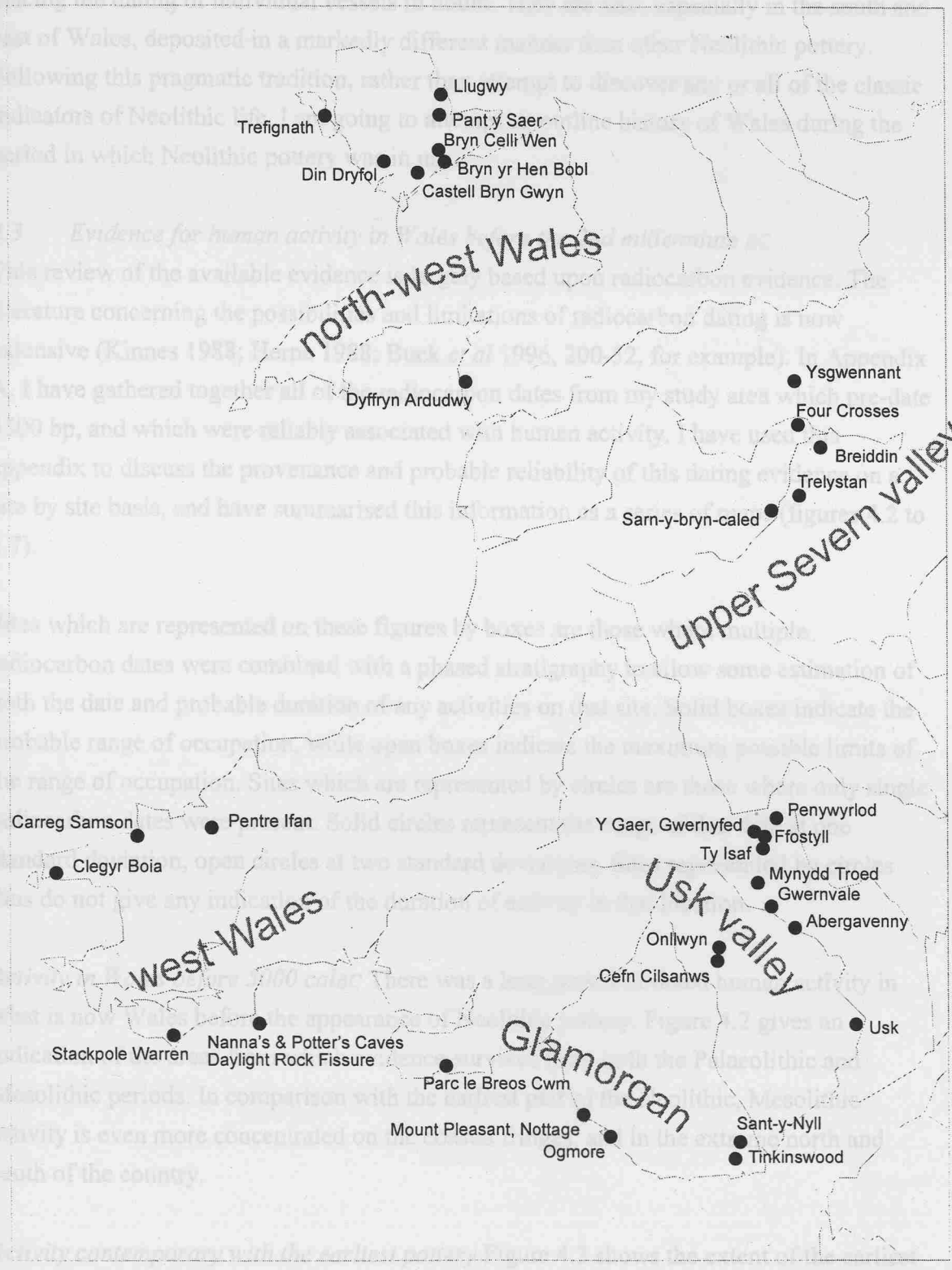


Figure 4.1: Neolithic pottery from Wales

placing the dating of individual vessels in doubt. They are also, especially in the south and east of Wales, deposited in a markedly different manner than other Neolithic pottery. Following this pragmatic tradition, rather than attempt to discover any or all of the classic indicators of Neolithic life, I am going to attempt an outline history of Wales during the period in which Neolithic pottery was in use.

4.3 Evidence for human activity in Wales before the 2nd millennium BC

This review of the available evidence is largely based upon radiocarbon evidence. The literature concerning the possibilities and limitations of radiocarbon dating is now extensive (Kinnes 1988; Herne 1988; Buck *et al* 1996, 200-52, for example). In Appendix A, I have gathered together all of the radiocarbon dates from my study area which pre-date 3500 bp, and which were reliably associated with human activity. I have used this appendix to discuss the provenance and probable reliability of this dating evidence on a site by site basis, and have summarised this information as a series of maps (figures 4.2 to 4.7).

Sites which are represented on these figures by boxes are those where multiple radiocarbon dates were combined with a phased stratigraphy to allow some estimation of both the date and probable duration of any activities on that site. Solid boxes indicate the probable range of occupation, while open boxes indicate the maximum possible limits of the range of occupation. Sites which are represented by circles are those where only single radiocarbon dates were present. Solid circles represent the range of that date at one standard deviation, open circles at two standard deviations. Sites represented by circles thus do not give any indication of the duration of activity in that location.

Activity in Wales before 5000 calBC There was a long period of dated human activity in what is now Wales before the appearance of Neolithic pottery. Figure 4.2 gives an indication of the areas from which evidence survives from both the Palaeolithic and Mesolithic periods. In comparison with the earliest part of the Neolithic, Mesolithic activity is even more concentrated on the coastal fringes, and in the extreme north and south of the country.

Activity contemporary with the earliest pottery Figure 4.3 shows the extent of the earliest Neolithic occupation of Wales. The sites were clustered in the lowland areas, around the coast and along the Usk and Severn valleys. There is some evidence for activity at this date in each of my five study areas. Three of these sites, Gwernvale, Trefignath and Penywyrlod (Britnell & Savory 1984; Smith & Lynch 1987), were part of the early phases

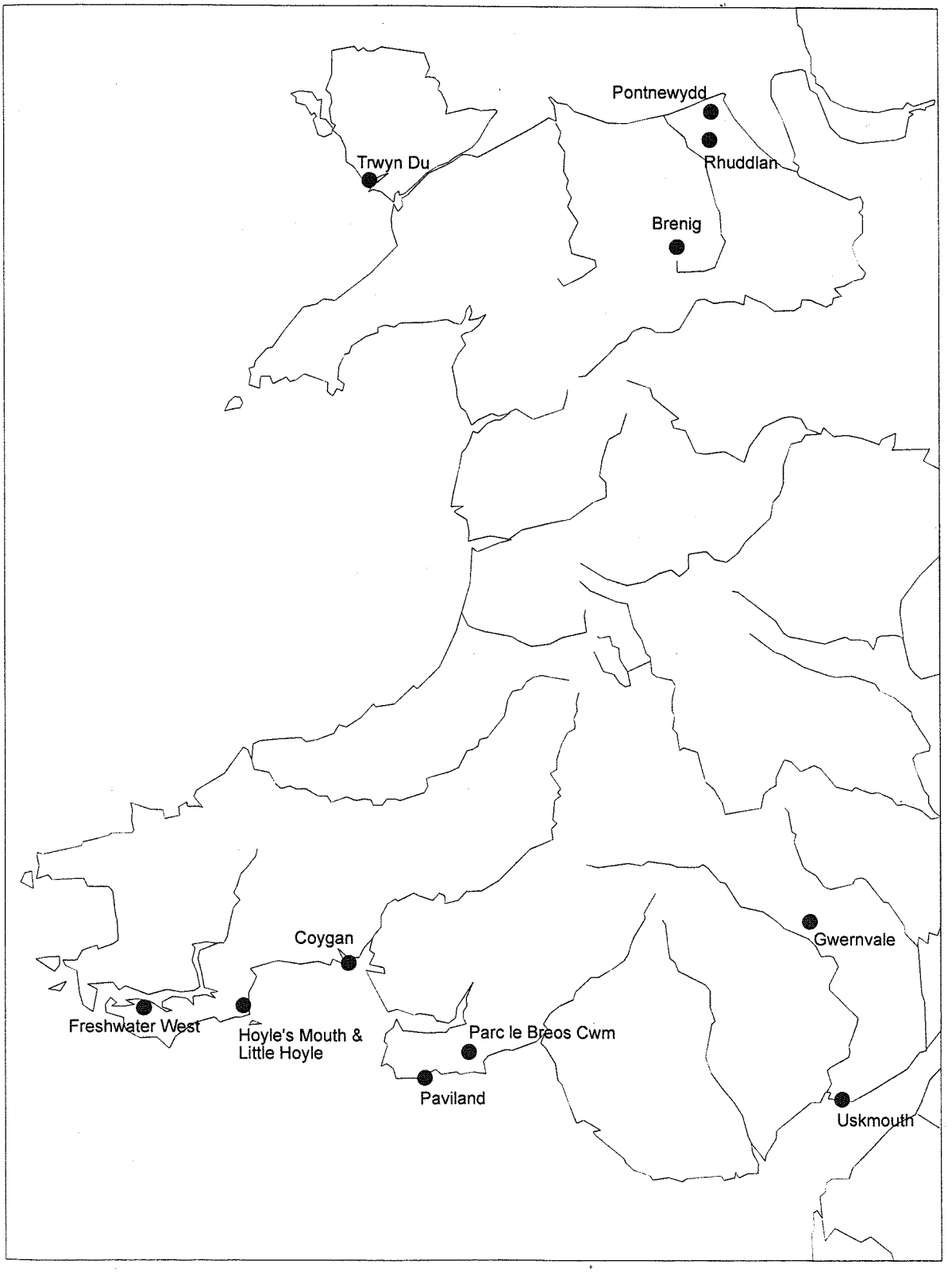
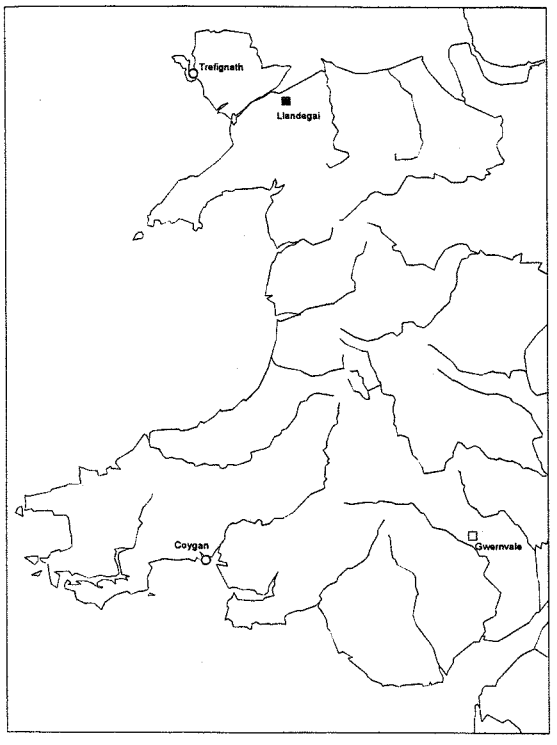
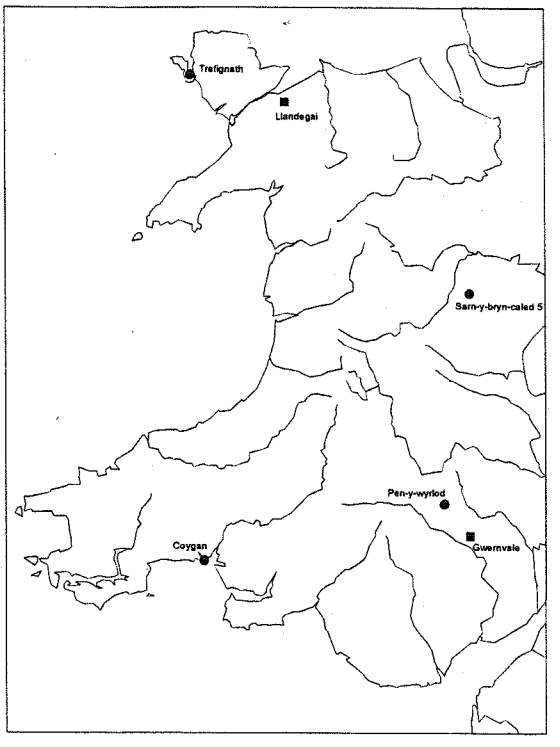


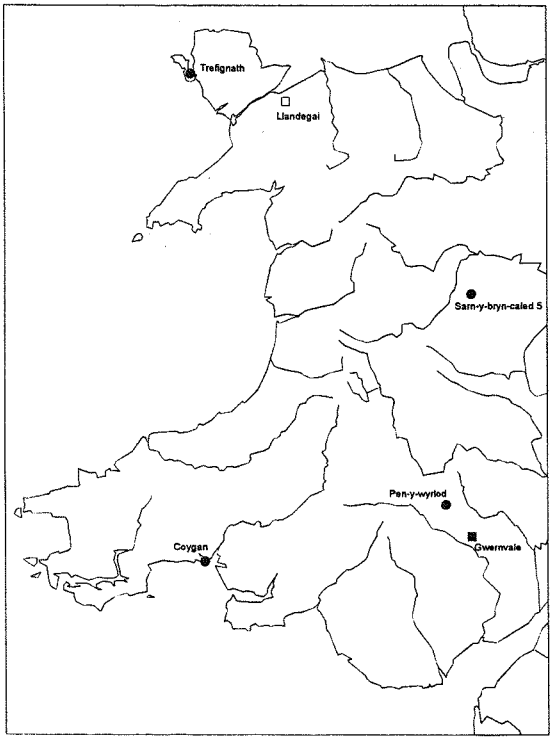
Figure 4.2: Radiocarbon dates from Wales predating 5000 BC



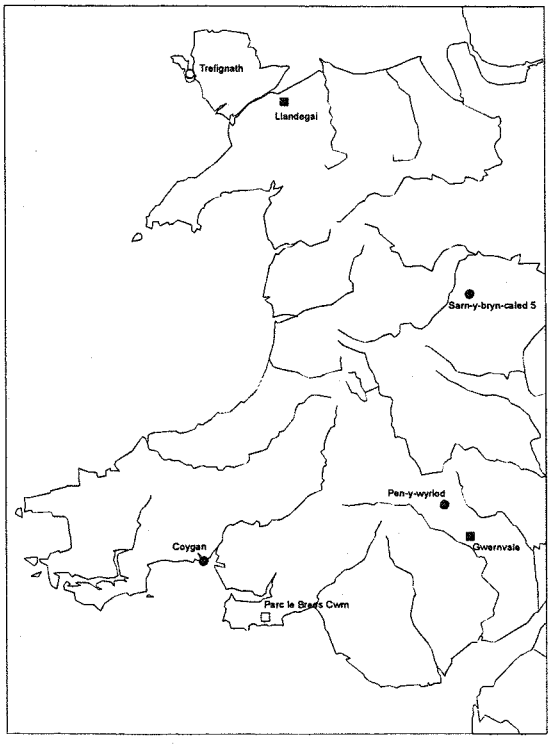
Radiocarbon dates from Wales at 4000 BC



Radiocarbon dates from Wales at 3900 BC



Radiocarbon dates from Wales at 3800 BC



Radiocarbon dates from Wales at 3700 BC

Figure 4.3: Radiocarbon dated activity in Wales 4000-3700 calBC

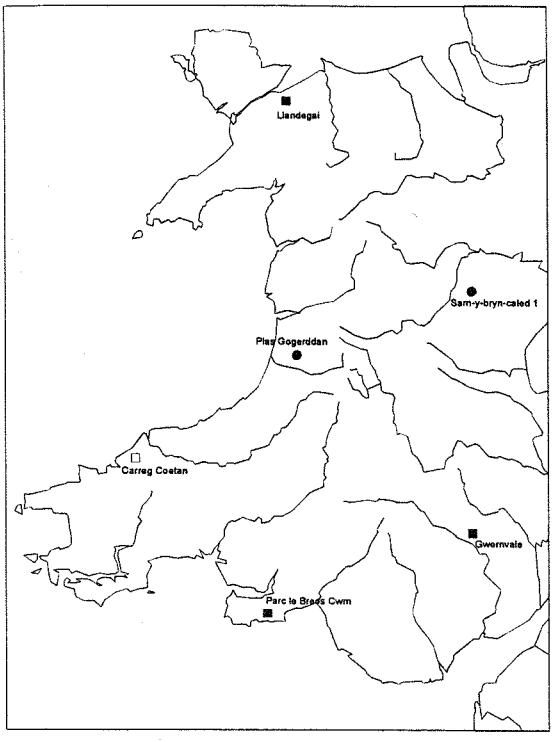
of chambered cairns. There was evidence for substantial timber structures at Gwernvale and Llandegai (Britnell & Savory 1984, 138-9; Lynch 1976, 65), and a group of posts at Trefignath (Smith & Lynch 1987, 7). It is also probable that the buildings at Clegyr Boia belong to this period. The single date from the cursus at Sarn-y-bryn-caled 5 came from a layer above the primary ditch silts (Gibson 1994, 171). These earliest Neolithic sites were thus generally monumental and in lowland locations. They all lay on or close to probable major communication routes.

By contrast, the single date from the pit at Coygan Camp (Wainwright 1967, 14) indicates that some Early Neolithic activity was more ephemeral.

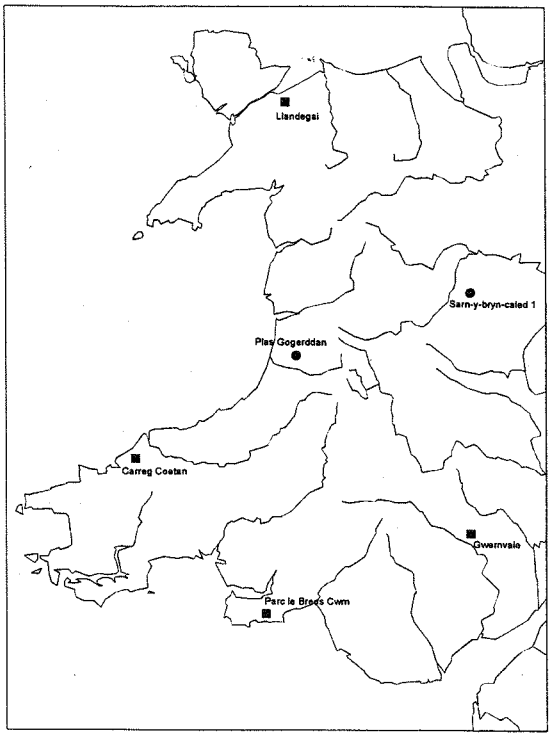
Early Neolithic consolidation In figure 4.4, the pattern noted in the preceding paragraph can be seen to have continued into the middle of the 4th millennium calBC. The sites at Carreg Coetan (Barker 1992, 20-1) and Parc le Breos Cwm (Whittle & Wysocki 1998) continued the emphasis on complex, labour intensive monumental structures, although the presence of the single pit at Plas Gogerddan (Murphy 1986) hints at smaller scale, more ephemeral, activities. There was still occupation in all five study areas and, as at the beginning of the period, this activity was in lowland areas and close to communication routes. In these two early periods there was a strong emphasis in particular on the construction and use of chambered cairns. Activity pre-dating the henge monuments at Llangedgai also belonged in this phase (Lynch 1976, 65).

The dates for the ring ditch at Four Crosses, with its central burial pit (Warrilow *et al* 1986), show the beginnings of a smaller scale tradition of monument building around 3300 calBC. The single date for an outlying post at Sarn-y-bryn-caled 1 indicates that this post was almost certainly not part of the later timber circle at this site, but rather an earlier, smaller scale, structure.

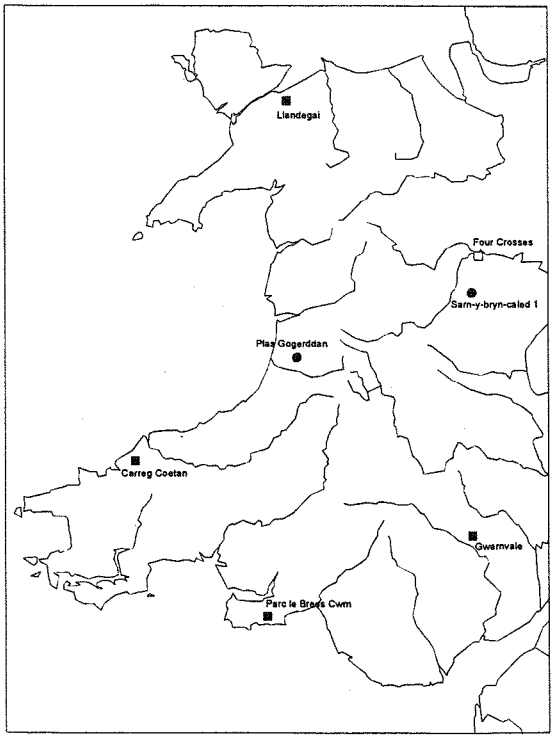
The middle Neolithic As can be seen in figure 4.5, by the beginning of the 3rd millennium calBC, all of the chambered cairns of the earlier periods appear to have gone out of active use. The new sites which arose in this period were more varied. The dates at Capel Eithin (Lynch 1991, 294-5) relate to a series of timber structures. Those at Moel-y-Gerddi were from a series of hearths (Dresser 1985, 373), sealed by Iron Age contexts, while the single date from Ogmore came from a blown sand deposit without any structural evidence at all (Hamilton & Aldhouse-Green 1999). Evidence of more substantial structures was provided at Sarn-y-bryn-caled 2 with dates from the phase 2 silts of a small pennanular



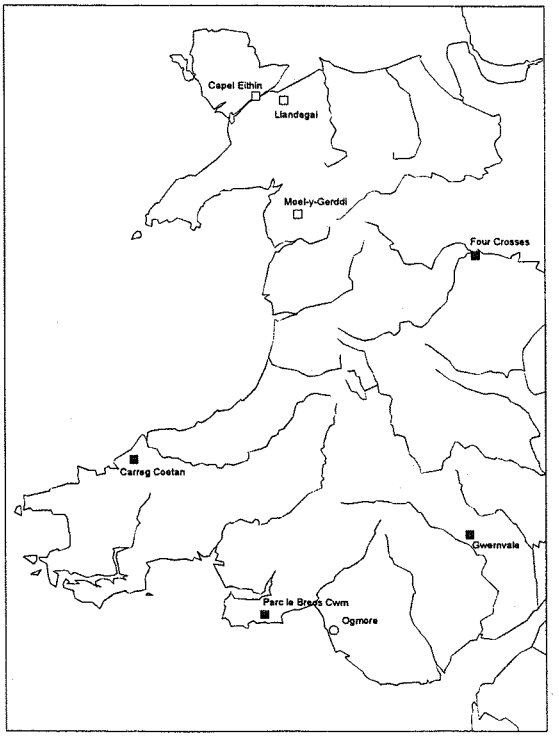
Radiocarbon dates from Wales at 3600 BC



Radiocarbon dates from Wales at 3500 BC

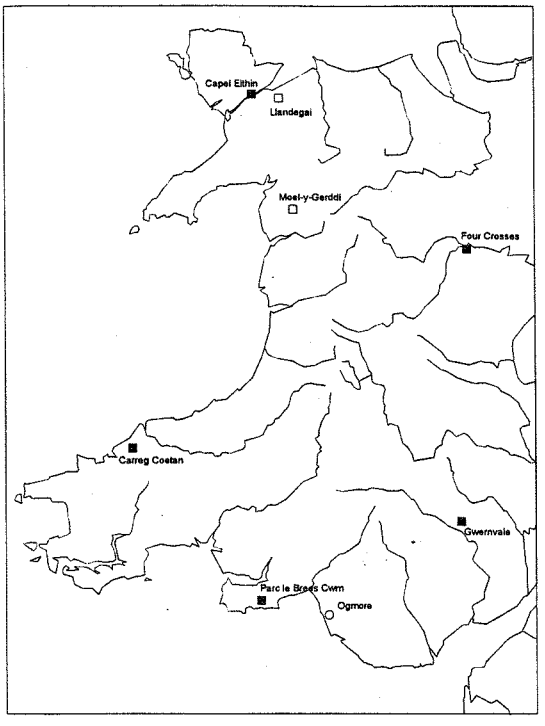


Radiocarbon dates from Wales at 3400 calBC

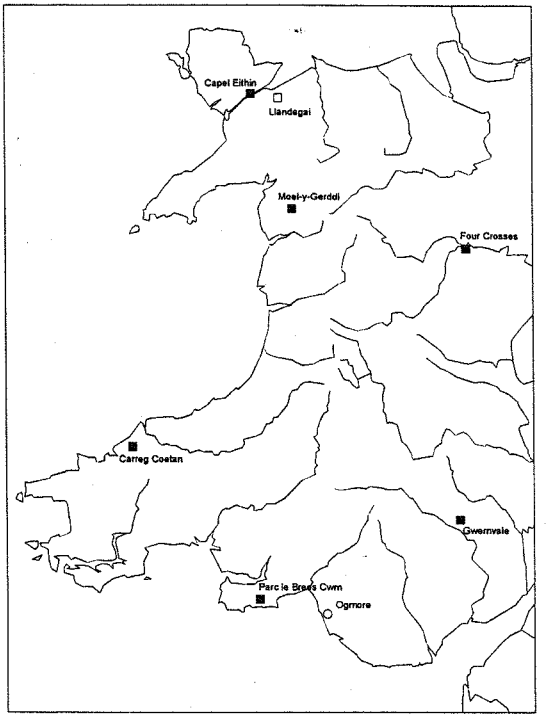


Radiocarbon dates from Wales at 3300 calBC

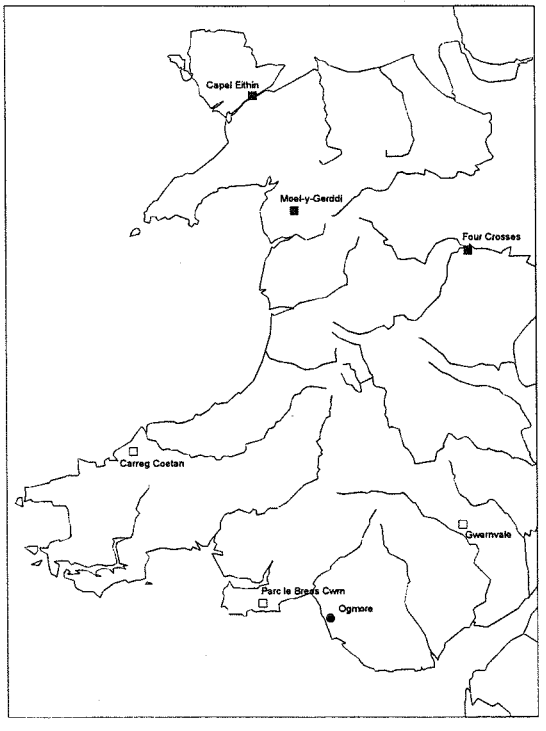
Figure 4.4: Radiocarbon dated activity in Wales 3600-3300 calBC



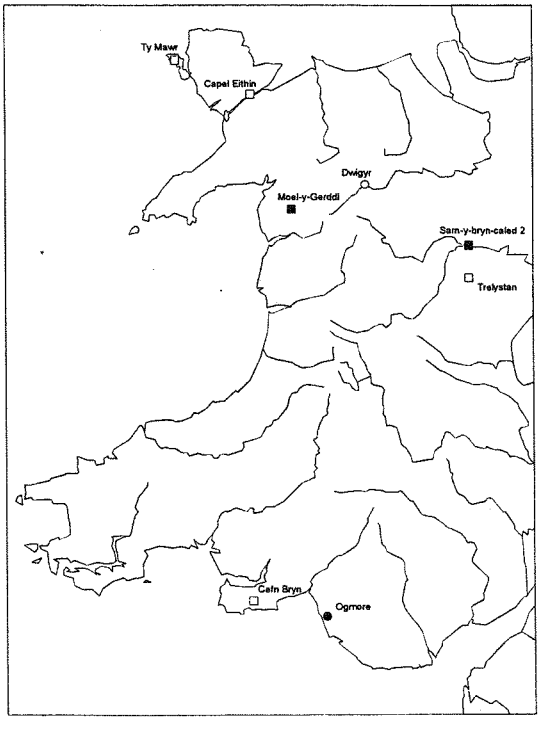
Radiocarbon dates from Wales at 3200 calBC



Radiocarbon dates from Wales at 3100 calBC



Radiocarbon dates from Wales at 3000 calBC



Radiocarbon dates from Wales at 2900 calBC

Figure 4.5: Radiocarbon dated activity in Wales 3200-2900 calBC

ring ditch (Gibson 1994, 159-61). The Four Crosses ring ditch probably also continued in use until around 3000 calBC.

The general lowland distribution pattern continued, although Moel-y-Gerddi appears to be an exception at *c* 500m OD. However, it would still have overlooked Tremadog Bay, continuing the link to major communication routes.

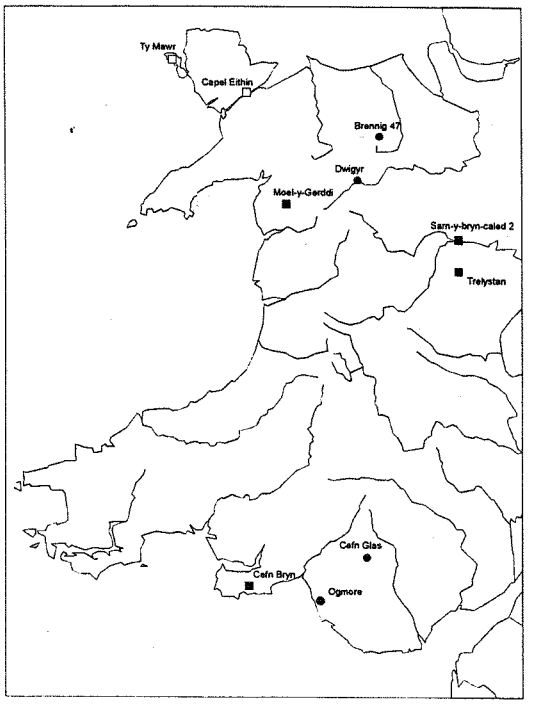
The late Neolithic The most striking pattern in figure 4.6 is an apparent northwards drift of activity. By 2500 calBC it is possible that there was no dated occupation of South Wales, and certainly of south-west Wales, at all. While it is likely that some of this pattern may be the result of the relatively small sample of dates from Wales as a whole, it probably reflects a general trend away from the South. Together with this move into the North came, for the first time, a significant amount of activity in the upland areas of Wales.

Despite this general trend there were two new sites in the South at the beginning of this period. A collection of pits, postholes and hearths at Cefn Bryn (Ward 1987) and charcoal from a 'floor' associated with worked stone at Cefn Glas (Otlet 1977, 417).

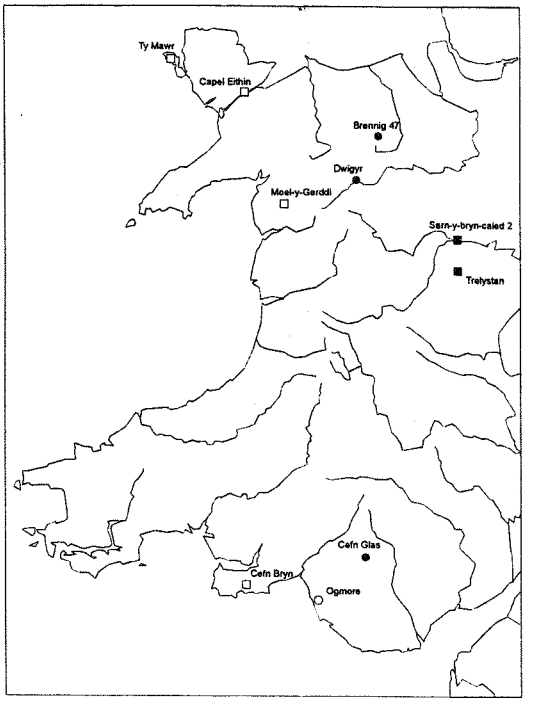
The new sites in the North were also largely ephemeral in nature: a single pit on a later site at Dwigyr (Lynch 1991, 395); part of a surface sealed beneath a later cairn at Brenig (Lynch 1993, 206); and a pair of hearths at Ty Mawr (Lynch 1991, 394). Only the buildings at Trelystan (Britnell 1982) were more substantial, and even these were slight when compared to earlier timber structures. The evidence of this date from Capel Eithin (White 1981; Lynch 1991, 394-5) also relates to a grouping of pits and hearths.

The Neolithic/Bronze Age transition On radiocarbon evidence there does not appear to have been continuous activity across this later 3rd millennium calBC period. As can be seen in figure 4.7, at around 2400 calBC and in contrast to the preceding section, there was a dearth of dated sites anywhere in Wales. This episode was then succeeded by a re-establishment of the pattern of northern upland occupation seen at the end of the Neolithic.

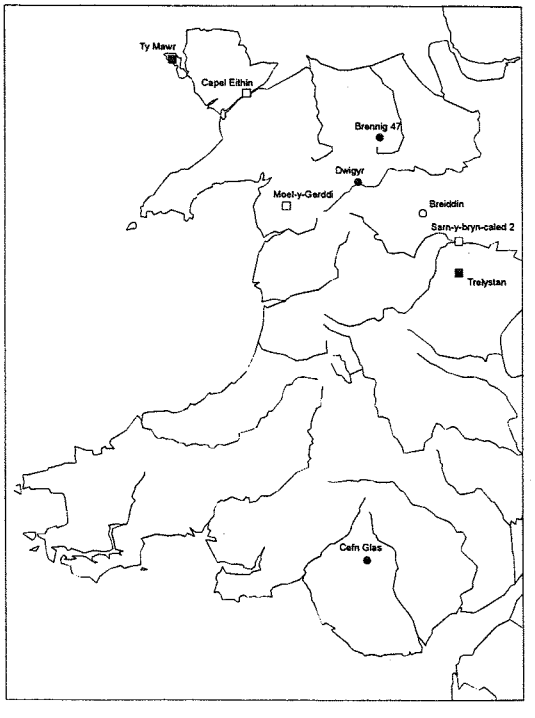
There was radiocarbon evidence of activity on two sites in South Wales. At Parc le Breos Cwm there was a series of late deposits of human remains in the passage of the chambered cairn (Whittle & Wysocki 1998, 175). The dates at Corn Du come from a 'surface' preserved beneath a later cist (Dresser 1985, 379).



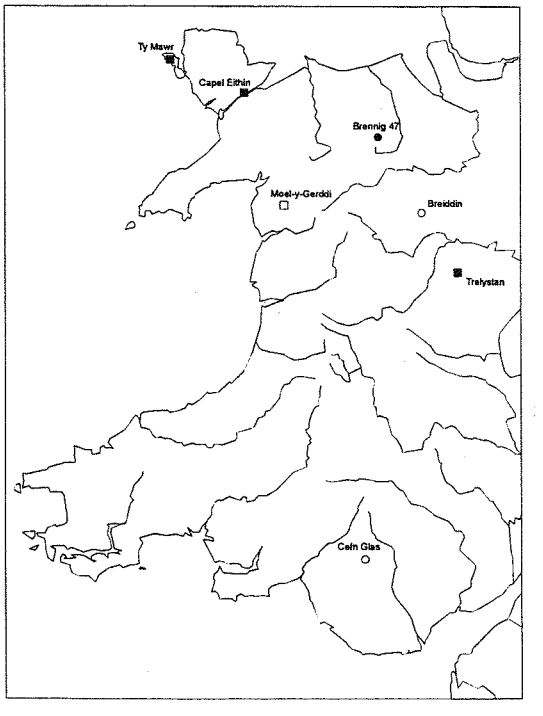
Radiocarbon dates from Wales at 2800 calBC



Radiocarbon dates from Wales at 2700 calBC

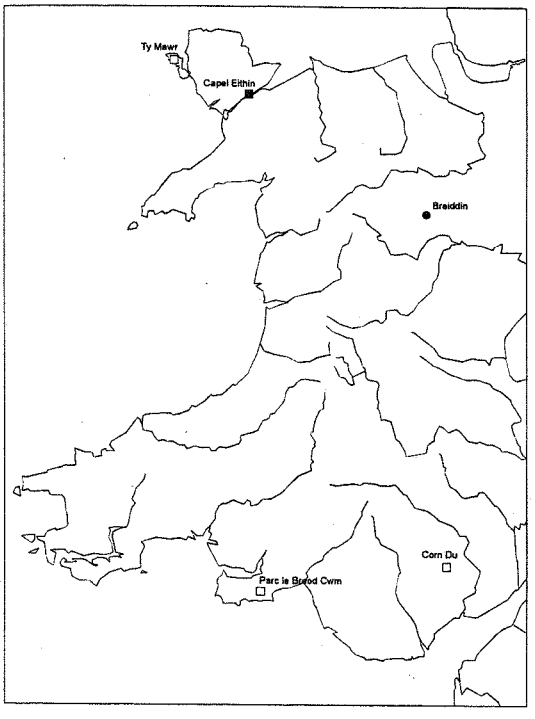


Radiocarbon dates from Wales at 2600 calBC

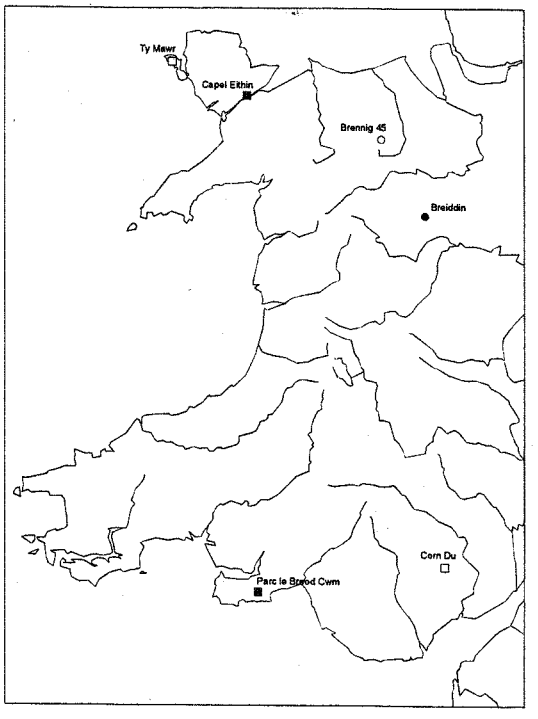


Radiocarbon dates from Wales at 2500 calBC

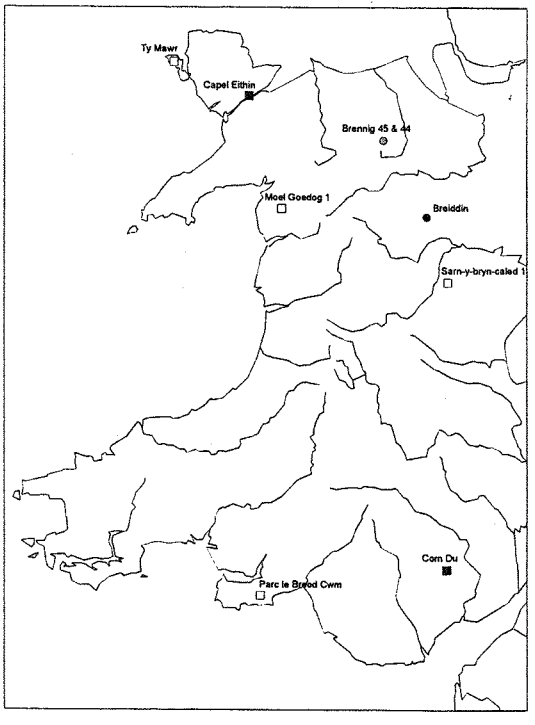
Figure 4.6: Radiocarbon dated activity in Wales 2800-2500 calBC



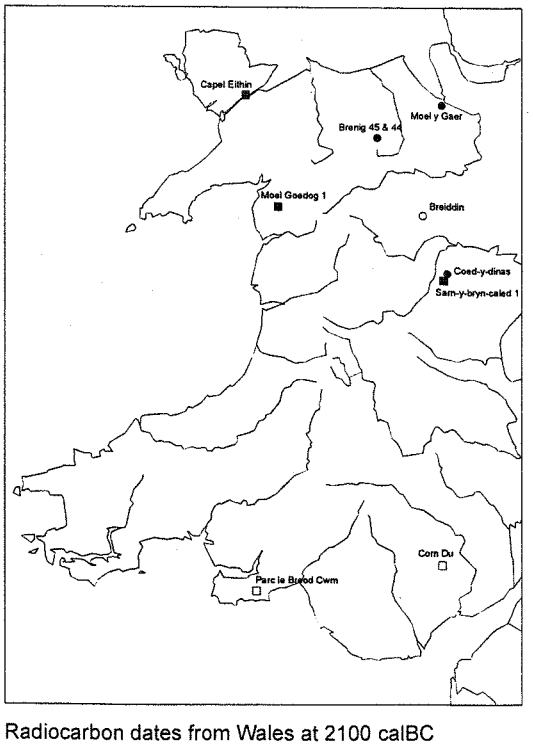
Radiocarbon dates from Wales at 2400 calBC



Radiocarbon dates from Wales at 2300 calBC



Radiocarbon dates from Wales at 2200 calBC



Radiocarbon dates from Wales at 2100 calBC

Figure 4.7: Radiocarbon dated activity in Wales 2400-2100 calBC

There were two dates from ephemeral sites in the North: a pit at the Breiddin (Burleigh, Hewson & Meeks 1976, 34); and a 'surface' at Moel y Gaer (Otlet 1977, 414). However, there were also dates for a number of more substantial and monumental structures: a series of urn burials associated with the stone circle at Moel Goedog 1 (Callow, Barker & Pritchard 1963, 35); a ring cairn at Brenig (Lynch 1993, 270); the Sarn-y-bryn-caled 1 timber circle and a nearby small ring ditch at Coed-y-Dinas (Gibson 1994, 150-9; 165).

4.4 An outline chronology for Neolithic Activity in Wales

Bringing the trends identified in the preceding section together, it is possible to create a few general statements about the character and sequence of Neolithic activity in Wales. All of these statements have to be tentative, given the relatively small amount of securely dated sites. The sequence of events is perhaps on the firmest footing (see figure 4.8). The earliest Neolithic sites in Wales were relatively substantial timber structures, either free-standing, as at Llandegai, or preceding the construction of chambered cairns such as Gwernvale. Also of this date, or very shortly after it, were cursus monuments and the first phases of chambered cairns. This first Neolithic began shortly after 4000 calBC and lasted until *c* 3700 calBC. The succeeding phase of the early Neolithic was dominated by the use of chambered cairns and henge monuments and by the apparent lack of any substantial timber buildings. By 3300 calBC small ring ditches were also being built, alongside an increasing amount of evidence for small-scale temporary habitation, in the form of stake shelters, hearths and pottery scatters. After 3000 calBC there was no evidence for any other kind of activity in Wales than these transient occupations, until the Beaker period. At this point, *c* 2300 calBC, there was renewed activity in the long abandoned chambered cairns. At a slightly later date two new, although probably related, monument traditions arose, the building of stone or timber circles, and the building of ring cairns and ring ditches.

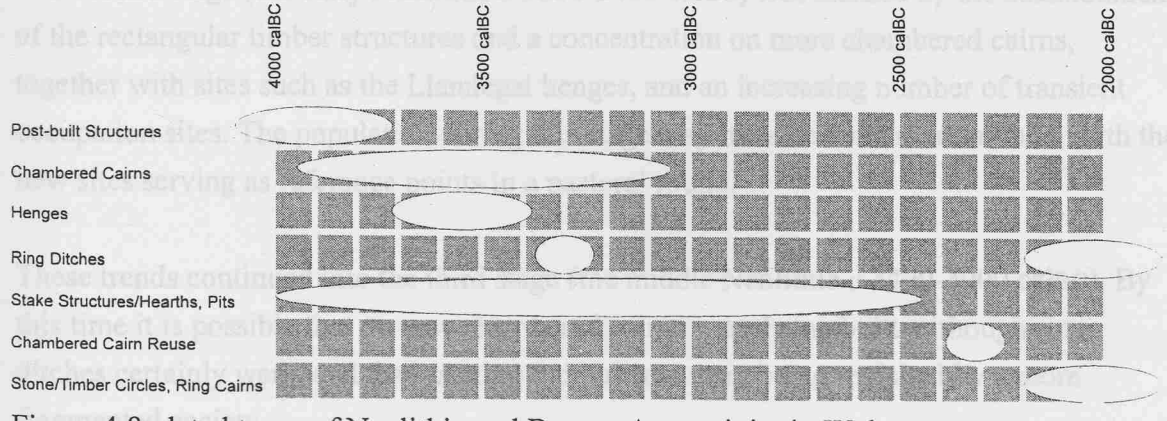


Figure 4.8: dated types of Neolithic and Bronze Age activity in Wales

What this sequence means for the character of the Neolithic society which left these remains is less clear. Evidence for subsistence regimes in this period is limited, the pit at Plas Gogerddan produced carbonised remains of both wild and domesticated species, indicating both some degree of arable agriculture and a reliance on gathered foods by *c* 3500 calBC, while evidence from Coygan Camp from the beginning of the period indicates only wild foodstuffs. This sort of evidence is so patchy as to be almost useless in a detailed argument about subsistence strategies over the timescales considered here. The evidence for the traditional sedentist model of Neolithic life is almost completely absent, but firm support for alternative visions is also rare. Evidence from pottery thin sections (Darvill *in* Britnell 1982, Gibson 1994, Musson 1991, and Warrilow *et al* 1986; Jenkins *in* Smith & Lynch 1987) does seem to indicate a very mobile population at all periods of the Neolithic. Skeletal analysis from Parc le Breos Cwm (Richards and Wysocki *in* Whittle & Wysocki 1998) shows a population which appears to have been mobile, and to have lived largely on large land animals, both of which might be taken as indicators of pastoralism.

My personal view is that these trends are best explained by regarding the Neolithic in Wales in four main stages. During the first of these (the first Neolithic *c* 4000-3800 calBC) the population was at most seasonally mobile and a large amount of energy was invested in a kind of ritualised sedentism; the building of large stone structures and especially, rectangular timber post structures. Whether these last are regarded as 'houses' depends upon how convincing the individual contextual evidence from sites such as Llandegai and Clegyr Boia appears. It may be that they fulfilled the role of a 'house' in a group of associated ideas which made up what we perceive as 'the Neolithic', without being residential dwellings. Even at this early stage there were some transient occupation sites.

The second stage (the early Neolithic *c* 3800-3400 calBC) was marked by the abandonment of the rectangular timber structures and a concentration on more chambered cairns, together with sites such as the Llandegai henges, and an increasing number of transient occupation sites. The population during this stage may have become more mobile, with the new sites serving as reference points in a pastoral round.

These trends continued into the third stage (the middle Neolithic *c* 3400-3000 calBC). By this time it is possible that no new chambered cairns were being built, although ring ditches certainly were, and that existing monuments were being revisited by a more fragmented society.

During the fourth, and longest, stage (the late Neolithic *c* 3000-2400 calBC) the population appear to have become both entirely mobile, and to have ceased to feel the connection with the earlier monuments. The shift of occupation into the uplands and the North noted above occurred during this phase. All of the evidence from this long period of time was for small-scale transitory occupations, implying a fragmentary, pastoral society with a very different relationship with the landscape than the earlier monument builders.

5 Anglesey and north-west Wales

5.1 *Introduction*

In this section I will examine the evidence for how people made and used pottery during the Neolithic period on Anglesey and north-west Wales (see figure 5.1). For this study I have used pottery from six sites with medium sized assemblages: Trefignath (Smith & Lynch 1987); Pant y Saer (Scott 1933); Llugwy (Baynes 1909); Bryn yr Hen Bobl (Hemp 1936); Dyffryn Ardudwy (Powell 1973); and Bryn Celli Wen (Edmonds & Thomas 1991). I have also used the results of the analysis of the pottery traditions from these sites to discuss traditions at two sites with pottery assemblages too small to be sensibly studied in their own right: Din Dryfol (Smith & Lynch 1987); and Castell Bryn Gwyn (Wainwright 1962). Pottery from the unpublished sites at Llandegai (Houlder 1968) and Capel Eithin (White 1981) was excluded because of the problems with the stratigraphy and dating of these sites.

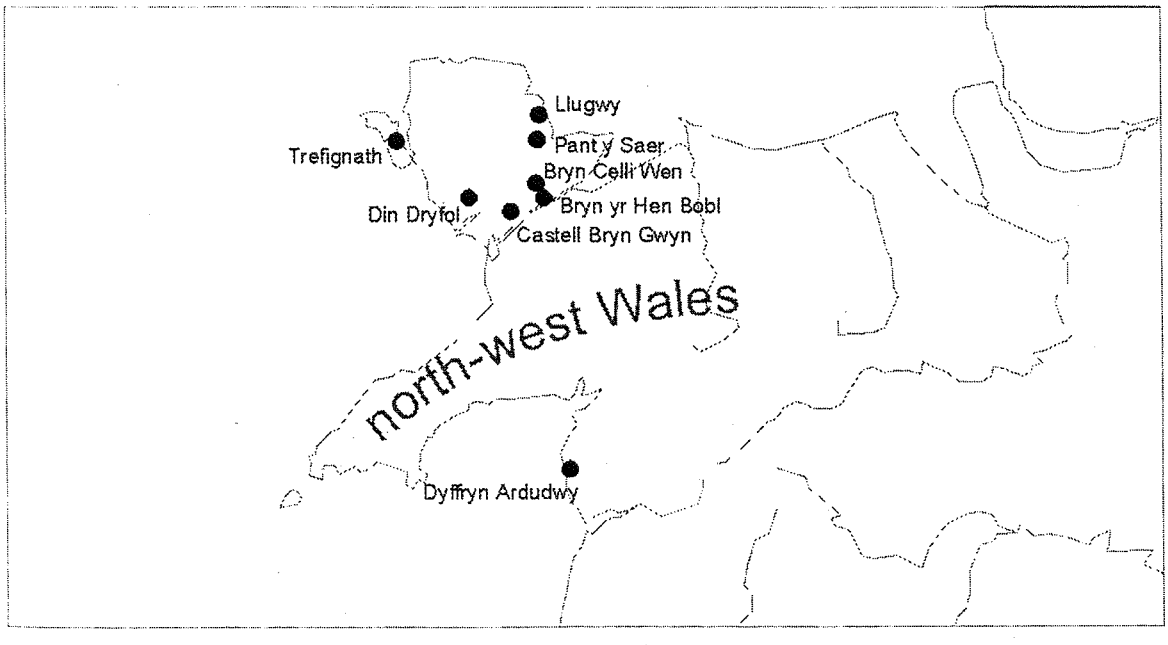
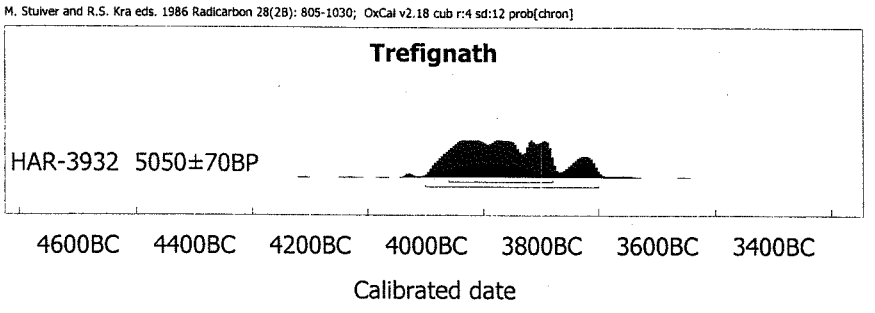


Figure 5.1: Neolithic pottery from north-west Wales

I have followed the methodology outlined in chapter 3 to study the pottery as a set of evidence for activities which people performed. I began by looking at the variability of pottery use and manufacture on a site by site basis, setting up a series of independent descriptions for each site. I then restudied the material as a single assemblage to set up a more unified description for the whole study area. To balance the twin problems common to all typologies, of over generalisation (lumping) and over differentiation (splitting), a fusion of the results of these two analyses is presented in this section.

5.2 *Chronological Framework*

The pottery is conventionally dated in a range from c.4000 to 2500 calBC, and several of the vessels may be considerably younger (see section 5.3, below). There was a single radiocarbon date of 5050 ± 70 bp (HAR-3932) associated with the chambered cairn at Trefignath (Smith & Lynch 1987, 10 & figure 8).



A more exact chronological framework was an obvious necessity for any discussion of changing traditions and meanings. By using the detailed phasing at Trefignath, together with the less specific chronological information from the other sites, it is possible to suggest a six phase framework for the pottery.

The Trefignath pottery can be sorted by context into four chronologically successive groups (see section 5.3, below). Additionally, the vessels from Phase II can be divided into those consistently associated with earlier traditions and those associated with later traditions. Therefore the five phases are: 1 - earlier than the Phase I cairn at Trefignath; 2 - contemporary with Phase I; 3 - contemporary with early material in Phase II; 4 - contemporary with late material in Phase II; 5 - contemporary with or later than Phase III. This allowed the phasing of those traditions which included vessels from Trefignath.

The Pant y Saer pottery all appears to be relatively early in date but can be divided into two chronological phases (see section 5.4, below). Phase 1 material was all stratified within the body of the cairn, while phase 2 pottery came from the chamber.

The Dyffryn Ardudwy material can be divided into four chronologically successive groups (see section 5.5 below): Phase 1 includes all the material from the pit in the forecourt of the western chamber; The pottery sealed beneath the blocking of the eastern chamber dates to phase 2; Phase 3 material was found in a disturbed context in the eastern chamber, with the single vessel associated with the intrusive cremation burial dating to phase 4.

Some attempt can be made to link these separate sequences together. In traditional terms the middle Bronze Age vessel associated with the intrusive cremation at Dyffryn Ardudwy should be later than the Food Vessels from phase 5 at Trefignath. Phase 4 at Trefignath and Phase 3 at Dyffryn Ardudwy were probably broadly contemporary and mid to late Neolithic in date. Phases 1, 2 and 3 at Trefignath; Phases 1 and 2 at Dyffryn Ardudwy and Phases 1 and 2 at Pant y Saer probably cover the same part of the earlier Neolithic.

I have tentatively suggested the following ordering for a phasing covering the whole of north west Wales: Phase 1, incorporating Trefignath 1 and Pant y Saer 1; Phase 2, incorporating Trefignath 2, Pant y Saer 2 and Dyffryn Ardudwy 1; Phase 3, incorporating Trefignath 3 and Dyffryn Ardudwy 2; Phase 4, Trefignath 4 and Dyffryn Ardudwy 3; Phase 5 being equivalent to Trefignath 5; and Phase 6 to Dyffryn Ardudwy 4. This phasing covers the period from the beginning of the Neolithic until the middle of the Bronze Age but is not particularly well focused except in the earlier part of the Neolithic. The table below relates this local phasing to the more general scheme established in chapter 4.

Postulated Neolithic and Bronze Age phasing

	first Neolithic		early Neolithic	middle Neolithic	post Neolithic phases	
	phase 1	**phase 2**	**phase 3**	**phase 4**	**phase 5**	**phase 6**
Pant y Saer	ps1 ps2 ps3 ps7	ps5 ps6				
Trefignath	tfR tfS	tfH tfL tfU tf145 tf200 tf265	tfD tfE tfM tfN	tfG tfK tfV tfW	tfA tfB tfC	
Dyffryn Ardudwy		daA daB daC daD	daE daF	daG daH		daJ

With this postulated chronology as a guide, I will now look at how people made and used pottery on the six main sites, beginning at Trefignath, where the chronology is most secure.

5.3 *Trefignath*

Trefignath lies near the east coast of Ynys Gybi, facing the mainland of Anglesey, at NGR SH 259 805 (see figure 5.1). The site was excavated in the late 1970's by Christopher Smith (Smith & Lynch 1987, 1-88). It is a chambered cairn (see figure 5.2) built in three distinct episodes: The first phase was probably a simple box chamber in a round cairn; Phase II involved the creation of a short trapezoidal cairn containing an east facing chamber, around and to the east of the Phase I monument; Phase III further enlarged this trapezoidal cairn to the east with the addition a third chamber. During the excavation no distinction was made between the pre-monument surfaces beneath these various phases,

which were unified as context 12 (Smith & Lynch 1987, 7). All finds were three dimensionally recorded, so it was possible to reconstruct what should have been three distinct old land surfaces, and to ascribe much more of the pottery to distinct phases.

The stratified pottery at Trefignath is distributed as follows (see figure 5.2): Vessels R and S pre-date the whole monument; Vessels H L U and sherds 145, 200 and 265 pre-date Phase II; Vessels D E K M N and W[1] pre-date Phase III; and Vessels A B and C pre-date the final blocking of the monument, with Vessels G and V being residual in this context. When the typological distinction between Vessels D E M and N and Vessels K and W is taken into account this is equivalent to the five phase division mentioned above.

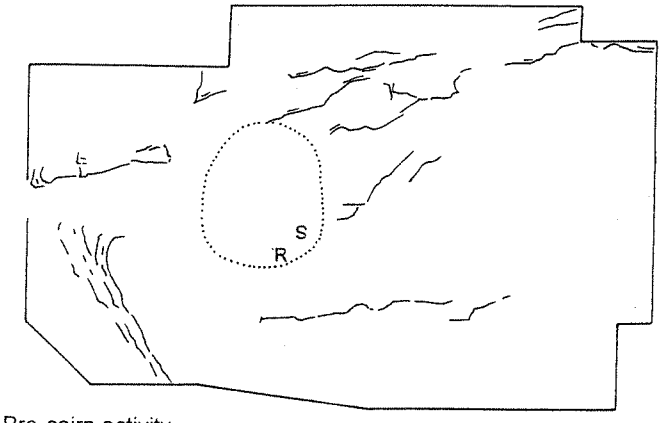
The pottery is traditionally classified as follows (Smith & Lynch 1987, 77-79): Vessels R S H L U D E M N J F Q and T are early Neolithic bowls of the Irish Sea Ware group, and sherds 145, 200, 265 and 439 probably also belong in this group; Vessels K and W are Grooved Ware; Vessels A B and C are listed by Smith as Peterborough Ware but have been re-assessed as early Bronze Age food vessels (Alex Gibson, *pers comm*). I have retained these vessels in this study, as I have vessels from other sites which I now believe to be Bronze Age to demonstrate the differences between late Neolithic and Early Bronze Age pottery.

Raw Material Selection There was evidence for five different styles of raw material collection.

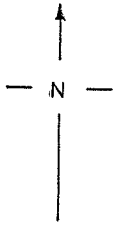
Vessels H J Q R and S, in group 10, were made from clay and inclusions from up to a day's travel away. The clay was mixed with mostly medium and large granular stone fragments and grog. In group 7, vessels D and M and sherds 145 and 265, the clay and inclusions came from up to a day's travel away and was mixed with small granular stone fragments and grog. The group 9 vessels, E F L N T U and sherd 200, were made using inclusions and clay came from places up to one day's travel away. The clay was mixed with large pieces of burnt shell and grog.

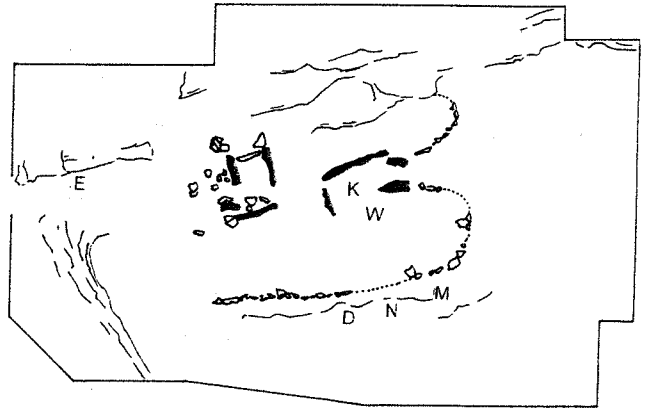
Vessels W and K in group 8 were made from clay and inclusions from up to a day's travel away. The clay was mixed with medium or small granular stone fragments and grog. Vessels A B C G V and sherd 439 were all part of the group 1 tradition. The inclusions

[1]Smith lists the sherds of vessel W as unstratified (Smith & Lynch 1987, 18). My examination of the stratified sherd 249 from the central cairn leads me to reconstruct it as part of Vessel W, allowing vessel W to be placed in phase II.

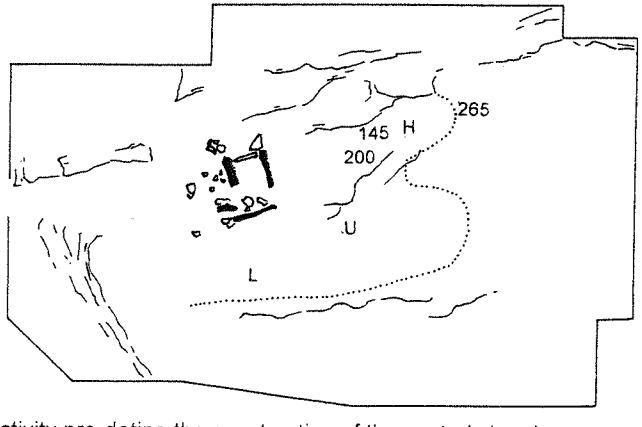


Pre-cairn activity

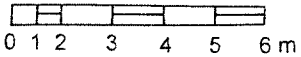


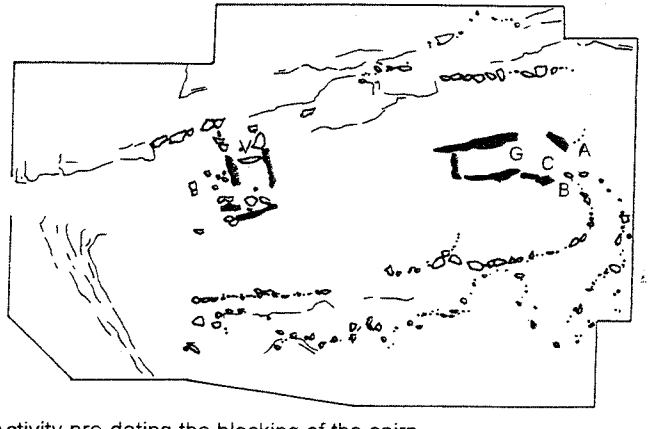


Activity pre-dating the construction of the east chamber



Activity pre-dating the construction of the central chamber





Activity pre-dating the blocking of the cairn

Figure 5.2: Trefignath chambered cairn (after Smith & Lynch 1987)

and clay could all have been found locally. The clay was mixed with large granular stone fragments and some grog.

the phasing of the raw material gathering traditions at Trefignath

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
group 10	tfR tfS	tfH			
group 7		tf145 tf265	tfD tfM		
group 9		tfL tfU tf200	tfE tfN		
group 8				tfK tf W	
group 1				tfG tfV	tfA tfB tfC

For the earliest pottery production at Trefignath the acquisition of raw materials was a complicated activity, involving trips to different locations to acquire specific types of clay and inclusions. The detailed rules about looking for distant and difficult clay sources and multiple types of inclusions which led to the three early traditions (groups 10, 7 and 9) were redundant from a purely technical point of view. They probably served both to deliberately over-emphasise the difficulty and special nature of pottery production and to distinguish different kinds of contemporary pottery.

This variety of traditions seems to simplify in the later stages of the site, although this is in part the result of fewer vessels having survived from the later phases. What is clear is that the technical difficulty of acquiring the raw materials became less important. The group 8 tradition in phase 4, and particularly the group 1 tradition in phases 4 and 5, involved less travelling and to less difficult locations to find the raw materials. The inclusions in the group 1 tradition also seem to have been less intensively prepared, without the carefully graded sizes of the earlier traditions.

The movement from early technical complexity to later simplified standardisation follows a pattern often seen in the introduction of new technologies; an early radiation of complex, partly experimental, designs or procedures followed by the domination of a few survivors.

Construction Seven different ways of constructing pottery were in use at Trefignath. Not all of the pottery from the site is covered in this section, as only those vessels where a substantial part of the pot survived could be discussed meaningfully.

Vessel U in group 14 had straight sided open rims and a shallow open body with a rounded base, and neither rim mouldings nor lugs. Vessels J, L and M in group 20 had open concave rims on shallow neutral bodies with rounded bases and neither rim mouldings nor lugs. Vessel E in group 16 had a neutral straight-sided rim on a shallow neutral body with

a rounded base and neither rim mouldings nor lugs. Vessel D in group 19 had a straight-sided open rim on a deep open body with a rounded base with neither rim mouldings or lugs. Vessel G, which was probably part of group 13, had an open convex rim with an angular rim moulding. Vessel B in group 18 had an upright, straight-sided rim on a deep neutral body with an angular rim moulding. Vessels A and C in group 12 had upright concave rims on deep open bodies and flat bases, with angular rim mouldings and no lugs.

the phasing of construction traditions at Trefignath

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
group 14		tfU			
group 20		tfL	tfM		
group 16			tfE		
group 19			tfD		
group 13				tfG	
group 18					tfB
group 12					tfA tfC

The evidence for construction traditions at Trefignath is limited by the low numbers of well-preserved vessels. Despite this limitation it is possible to discern a number of general trends in techniques of construction. The earliest well preserved vessels at Trefignath were round based, with open rims (see figure 5.3). It was not until phase 3 that the first flat based pottery appeared, together with closed and neutral forms. Rim mouldings were not used until phase 5. The two early traditions (groups 14 and 20) were essentially variants of the same technique, group 20 having straight sided rims and group 14 having curved rims.

Decoration There were four different styles of decoration represented.

Vessels D E H J L M N R U and sherds 145 and 265, in group 11, were unified because the surface of the pot had not been changed. Vessel F in group 14 was unified because the surface of the vessel had been changed in the same way all over, by grass wiping. The surface of vessel K in group 2 was changed while the clay was plastic and further decoration was added while the clay was drying. The decoration was executed using parts of plants to push aside the clay, and, in the case of the later decoration, stones. The decoration unified the surface of this vessel.

The surface of vessels B and G in group 1 was changed while the clay was still plastic. The decoration was executed using combined parts of plants to push aside the clay. The decoration divided the surface of these vessels. The surface of vessels A and C, in group 16, was changed while the clay was still plastic. The decoration was executed using parts

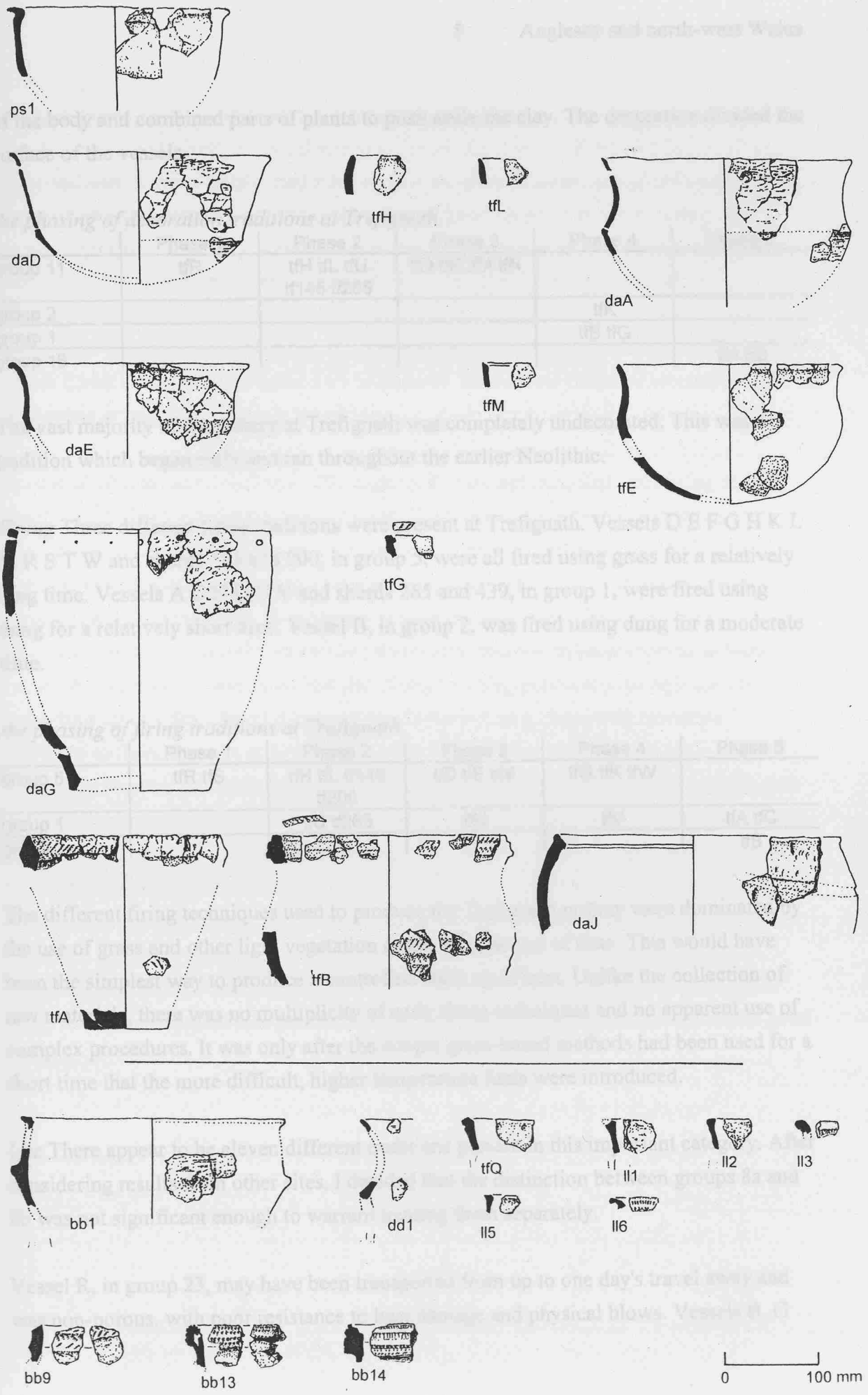


Figure 5.3: Pottery construction groups from north-west Wales (after Hemp 1936; Lynch 1969; Powell 1973; Scott 1933; and Smith & Lynch 1987)

of the body and combined parts of plants to push aside the clay. The decoration divided the surface of the vessels.

the phasing of decoration traditions at Trefignath

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
group 11	tfR	tfH tfL tfU tf145 tf265	tfD tfE tfM tfN		
group 2				tfK	
group 1				tfB tfG	
group 16					tfA tfC

The vast majority of the pottery at Trefignath was completely undecorated. This was a tradition which began early and ran throughout the earlier Neolithic.

Firing Three different firing traditions were present at Trefignath. Vessels D E F G H K L M R S T W and sherds 145 and 200, in group 5, were all fired using grass for a relatively long time. Vessels A C N Q U V and sherds 265 and 439, in group 1, were fired using dung for a relatively short time. Vessel B, in group 2, was fired using dung for a moderate time.

the phasing of firing traditions at Trefignath

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
group 5	tfR tfS	tfH tfL tf145 tf200	tfD tfE tfM	tfG tfK tfW	
group 1		tfU tf265	tfN	tfV	tfA tfC
group 2					tfB

The different firing techniques used to produce the Trefignath pottery were dominated by the use of grass and other light vegetation over a long period of time. This would have been the simplest way to produce a controlled build up of heat. Unlike the collection of raw materials, there was no multiplicity of early firing techniques and no apparent use of complex procedures. It was only after the simple grass-based methods had been used for a short time that the more difficult, higher temperature fuels were introduced.

Use There appear to be eleven different traditions present in this important category. After considering results from other sites, I decided that the distinction between groups 8a and 8b was not significant enough to warrant treating them separately.

Vessel R, in group 23, may have been transported from up to one day's travel away and was non-porous, with poor resistance to heat damage and physical blows. Vessels B, G

and S, in group 12 were not modified after firing and were porous, with poor resistance to heat damage and moderate physical strength. Vessel L, in group 4, was not modified after firing and was possibly transported from up to 1 day's travel away. It would have been porous, with good resistance to thermal stress and good physical strength. There were traces of a residue internally. Vessel E, in group 8a, was not modified after firing and was probably made locally to the site. Vessels F, T, U and sherd 200, in group 8b, were not modified after firing and were possibly transported from up to 1 day's travel away. It would have been porous, with good resistance to thermal stress and moderately strong. Vessel E was medium sized, around 6 l in capacity. There were traces of secondary oxidisation externally on vessels E and U.

Vessels D, M and sherds 145 and 265, in group 9, were not modified after firing and possibly came from up to 1 day's travel away. They would have been non-porous, with good resistance to thermal stress and moderate resistance to physical blows. Sherd 265 and vessel M have traces of residue and external secondary oxidisation. Vessels K and N in group 14, were not modified after firing and were probably made locally to the site. They would have been porous, with moderate resistance to thermal stress and physical blows. Vessel W, in group 16, was modified after firing by being perforated through the rim. It came from up to 1 day's travel away and would have been porous, with moderate resistance to thermal stress and physical blows. Vessel V in group 10 was not modified after firing and was probably made locally to the site. They would have been porous, with poor resistance to thermal stress and poor resistance to physical blows. Vessels A, C, and H, in group 7, were not modified after firing. They were non porous, with poor resistance to heat damage and moderate strength, and vessels A and C were small in size. Vessel J, in group 1, was not modified after firing and came from up to 1 day's travel away. It would have been very porous, with poor resistance to thermal stress and moderate strength. Vessel Q, in group 15, was not modified after firing and came from up to 1 day's travel away. It would have been non-porous, with moderate resistance to thermal stress and good strength.

the phasing of use traditions at Trefignath

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
group 23	tfR				
group 12	tfS			tfG	tfB
group 4		tfL			
group 8		tfU tf200	tfE		
group 9		tf145 tf265	tfD tfM		
group 14			tfN	tfK	
group 16				tfW	
group 10				tfV	
group 7		tfH			tfA tfC

Two points stand out about the use of the earliest vessels at Trefignath, those in groups 12 and 23. They were badly adapted to repeated utilitarian use by any modern standard, they would not have stood physical blows well and would have to have been heated very carefully if being used for cooking. However, they were obviously subject to such use, they had been in contact with heat after firing often enough to develop secondary oxidisation of the surface towards the base, and vessels R and S appear to have traces of organic residues on their inner surfaces. This underlines the moral that the technical properties of pottery alone are a poor guide to its function. All the vessels from Phases 1 and 2 have evidence of use for cooking, despite a range of physical properties.

The three traditions which began in phase 2 were closer to the functional ideal for cooking vessels, they appear to have been built to be good at resisting thermal stress and physical blows, and it may be that expectations had changed in this period or more physically stressful ways of cooking had been introduced.

Vessels in the group 14 tradition, which began in phase 3 and continued into phase 4, would have been less well suited for use in cooking, being only moderately heat resistant and strong. Other later traditions, such as groups 10 and 7, continued this trend, and probably had a largely ritual function. This would not rule out their occasional use for cooking, but this cooking would have to be carefully controlled, and may have formed part of the ritual use of the vessel.

5.4 *Pant y Saer*

The site is a chambered cairn on the north-eastern side of Ynys Môn (at NGR SH 509 824, see figure 5.1). It was excavated between 1930 and 1932 by W. Lindsay Scott (1933, 185-228). Like its near neighbour Llugwy, the chamber at Pant y Saer is partially sub-terranean. The chamber consists of a very large capstone, supported on three upright stones over a rock-cut pit. This chamber is surrounded by the remains of a complex earth

and rubble mound. Prior to Scott's excavations the chamber had been investigated on a number of occasions (Scott 1933, 187, 205), consequently, except for the extreme south west corner, material from the chamber was disturbed.

The site produced parts of eight separate vessels (Scott 1933, 211-214). Vessels 1, 2, 3, 4 and 7 were found in the mound material outside the north chamber wall. Vessels 5 and 6 were found within the chamber, in the deposits disturbed by earlier excavations and vessel 8 was discovered in the blocking on the north side of the chamber passage. Vessels 4 and 8 could not be traced and hence do not appear in any of the analysis below. The only vessels which were sealed in their original Neolithic context were vessels 1, 2, 3 and 7, which must be contemporary with, or earlier than, all the other material from the site.

All of the pottery from Pant y Saer is usually regarded as belonging in the Irish Sea Ware group (Lynch 1976, 63-65) and as dating to the early part of the Neolithic. In the chronology which I have suggested for the Anglesey Neolithic all of the Pant y Saer pottery belongs in phases 1 and 2.

Raw Material Selection There were four different traditions of raw material collection at Pant y Saer.

The clay for vessel 5, in group 7, was mixed with small and medium pieces of crushed stone, which were entirely granular in texture. The inclusions for vessel 3, in group 22, came from up to 1 day's travel away from the site. The clay was mixed with largely medium sized pieces of crushed stone and burnt shell, together with some small and large pieces. The inclusions were granular and laminar in texture in roughly equal proportions. Vessels 1, 2 and 5, in group 18, were made with inclusions from up to one day's travel away from the site. The clay was mixed with small, medium and large pieces of burnt shell. The inclusions were entirely laminar in texture. The inclusions for vessel 6, in group 2, could have been found on the site. The clay was mixed with mostly large pieces of grog, which were all granular in texture.

the phasing of raw material gathering traditions at Pant y Saer

	phase 1	phase 2
group 22	ps3	
group 5	ps7	
group 18	ps1 ps2	ps5
group 2		ps6

At Pant y Saer the collection of raw materials seems to have followed a variety of patterns. There were some styles of working which involved distant sources for inclusions and the combination of different kinds of inclusions (group 22 for example). Other traditions, such as group 2, were much less complex. The four traditions represented quite distinct 'recipes' for pottery production.

Construction There is insufficient evidence from Pant y Saer to create discrete groups of construction traditions at the site. However, some grouping can be attempted in the light of the material from the rest of Anglesey.

Vessels 1 and 2 probably belong in group 4, they had upright, straight-sided rims and vessel 1 had evidence of a shallow, neutral body with a rounded base. The vessels had a rounded rim moulding and no lugs. Vessel 7 may have been part of group 6. It had an upright straight-sided rim and no rim moulding or lugs. Vessel 3 belongs in either group 5 or group 16, it had a concave, upright rim and no rim moulding or lugs. Vessel 5 had a concave, open rim with no rim moulding or lugs. It would have been part of group 9, 19, 20 or 21.

The earliest pottery styles were all neutral shapes, with both curved and straight sided rims, with the single open pot (vessel 5) being slightly later in date (see figure 5.3). The small amount of evidence from Pant y Saer and the probable short chronology of the site makes any detailed discussion of construction traditions impossible.

Decoration Two traditions were present at Pant y Saer.

The surface of vessel 5, in group 8, was changed while the clay was drying. The vessel was burnished, using an unmodified pebble to push aside the clay. The decoration unified the surface of the vessel. Vessels 1, 2, 3, 6 and 7, in group 11, were unchanged and therefore the surface of the vessel was unified.

the phasing of decoration traditions at Pant y Saer

	phase 1	phase 2
group 11	ps1 ps2 ps3 ps7	ps6
group 8		ps5

The majority of the pottery at Pant y Saer was completely plain. This style seems to have been the earliest on the site, with the single burnished pot, vessel 5, being slightly later in date. The ubiquity of the plain pottery makes any meaningful comparisons with other

traditions difficult. All of the pottery at Pant y Saer was unified by its decoration, or lack of it.

Firing Two different techniques were used on the Pant y Saer pottery.

In group 1, vessels 1, 2 and 6, were fired using dung as the main fuel over a short period of time. Vessels 3, 5 and 7, in group 5, were fired using grass as the main fuel over a long period of time.

the phasing of firing traditions at Pant y Saer

	phase 1	phase 2
group 1	ps1 ps2	ps6
group 5	ps3 ps7	ps5

These two firing traditions represent a simple and a more complex way of firing. The dung based technique, group 1, would have given higher temperatures and a more complete oxidisation than group 5 but would have required more care in the initial stages of the firing to ensure an even rise in temperature. Vessels fired with grass would have been darker in colour and slightly softer.

Use There were five different traditions represented.

In group 17, vessel 3 was not modified after firing. It would have been very porous, with good resistance to thermal stress and moderate strength. Vessel 7, in group 22, had not been modified. It would have been non-porous, with moderate resistance to thermal stress and moderately strong. There were traces of residue internally and secondary oxidisation of the exterior of the vessel. Vessels 1 and 2, in group 8, were not modified. They would have been porous, with good resistance to thermal stress and moderate strength. Vessel 1 was large, around 11.5 l in capacity, and both vessels showed signs of secondary oxidisation externally. Vessel 6, in group 19, was not modified after firing. It would have been porous, with good resistance to heat damage but poor physical strength. Vessel 6 had traces of a residue internally. In group 9, vessel 5 had not been modified. It would have been non-porous, with a good resistance to thermal stress and moderately strong.

the phasing of use traditions at Pant y Saer

	phase 1	phase 2
group 17	ps3	
group 22	ps7	
group 8	ps1 ps2	
group 19		ps6
group 9		ps5

Pottery from two of these traditions shows evidence for use as cooking vessels, those from group 22 and group 8. As was the case at Trefignath, there was no automatic correlation between technical properties which would have made the pot easy to cook in, and its use for cooking.

5.5 Dyffryn Ardudwy

Dyffryn Ardudwy is a composite chambered cairn on the coastal plain of Merionethshire (NGR SH 588 228, see figure 5.1). It was excavated during 1963 by T.G.E. Powell and Glyn Daniel (Powell 1973). The earliest portion of the monument was a portal dolmen with an east facing forecourt within a small oval cairn. A pit was discovered on the south side of the forecourt of this western chamber. The forecourt was covered by the much larger rectangular cairn associated with the east chamber (see figure 5.4). The east chamber was then blocked by further stonework and an earth and stone 'bank feature' (Powell 1973, 8-15).

Vessels A, B, C and D were all placed in the pit in the west chamber forecourt. Vessels E and F were sealed beneath the small bank outside the east chamber and were associated with no other class of finds. Vessels G and H were found in the disturbed fill of the east chamber and were associated with worked stone (Powell 1973, 9-14). Vessel J was found at the edge of the disturbance in the east chamber fill, closely associated with cremated human bone, and *contra* Powell 1973, 17, it seems likely that vessel J originally contained this material.

Vessels J, E, F, G and H were not stratified in any Neolithic context on the site. Vessel J was considered by Lynch to be problematic, possibly being related to Food Vessels or similar to Neolithic material from Irish wedge tombs, while Vessels F and G were considered as being related to the Lough Gur class of flat based Irish Neolithic pottery (Lynch 1969, 154-155). As it has been shown (Sheridan 1995, 18) that this class is made up of material better considered as Grooved Ware together with wrongly recorded Bronze Age material from the Lough Gur site itself, the Irish connections of the Dyffryn Ardudwy material should be re-examined. Vessel J is probably best regarded as a middle Bronze

Age barrel shaped Urn which accompanied the later cremation at the back of the East chamber. Vessels F, G, and H may also be Bronze Age or may be late Neolithic flat based pottery.

Raw Material Selection I have identified five different traditions of pottery production at Dyffryn Ardudwy.

In group 32, vessels A and C, the inclusions were obtained locally. The clay was mixed with fine and medium fragments of charred plant material (Roberts *in* Powell 1973, 44), with equal proportions of laminar and granular pieces. Vessels B and E, in group 46, were tempered with locally available inclusions. The clay was mixed with fine, medium and coarse fragments of charred plant material, both laminar and granular in texture. Vessel D, in group 54, was also tempered using charred plant material. In this case the inclusions were predominately coarse and both laminar and granular in texture.

In group 55, vessels F G and H, were tempered using inclusions obtained from around 1 days travel away, sources near Cader Idris or Pwllheli are suggested by Roberts (Powell 1973, 44). The clay was mixed with granular medium sized pieces of crushed stone. Vessel J, in group 56, also contained inclusions from around 1 days travel away, probably from Castle Rock, Criccieth. The clay was mixed with mostly granular medium sized pieces of crushed stone and burnt shell.

the phasing of raw material traditions at Dyffryn Ardudwy

	phase 1	phase 2	phase 3	phase 4
group 32	daA daC			
group 54	daD			
group 46	daB	daE		
group 55		daF	daG daH	
group 56				daJ

Construction Five different traditions of vessel construction are discernible.

Vessels A, B and C, in group 16, had concave upright rims on shallow neutral bodies with rounded bases and neither rim mouldings or lugs. In group 27, vessel D had a straight-sided open rim on a deep open, round based body with no rim mouldings or lugs. Vessel E, in group 21, had an open concave rim on a deep open body with a rounded base and no rim moulding or lugs. Vessels F and G, in group 45 had closed straight-sided rims, deep closed bodies and hollow bases, with neither rim moulding nor lugs. In group 50, vessel J

had a closed straight sided rim, a deep closed body and a flat base, with a rounded rim moulding and no lugs.

the phasing of construction traditions at Dyffryn Ardudwy

	phase 1	phase 2	phase 3	phase 4
group 16	daA daB daC			
group 27	daD			
group 21		daE		
group 45		daF	daG	
group 50				daJ

Decoration Seven different styles of decoration were present at Dyffryn Ardudwy.

In group 13, the surface of vessels A and B had been burnished with an unmodified pebble while they were drying. The only parts of the vessels had been burnished, dividing the surfaces. The surface of vessel D, in group 8, had also been burnished with an unmodified pebble while the clay was drying, but in this case the entire surface had been treated. In group 15, the surface of vessel C had been changed while it was still plastic, using modified parts of plants to wipe the whole surface of the vessel. The surface of vessel E, in group 11, was unchanged, unifying the vessel.

The surface of vessels F and G, in group 17, had been changed while they were still plastic, using a worked bone point to remove clay. The decoration divided the vessels. In group 1, the surface of vessel H had been changed while it was still plastic, using combinations of parts of plants to push aside the clay and divide the surface. Vessel J, in group 19, was decorated by using parts of the body and a bone point to push aside the clay and a worked stone point to remove clay, while it was still plastic. This complex arrangement of decorative techniques divided the surface of the vessel.

the phasing of decoration traditions at Dyffryn Ardudwy

	phase 1	phase 2	phase 3	phase 4
group 13	daA daB			
group 8	daD			
group 15	daC			
group 11		daE		
group 17		daF	daG	
group 1			daH	
group 19				daJ

Firing Four different types of firing had been used to produce this pottery.

Vessels B C D E F and G, in group 1, were fired for a short period of time using dung as the main fuel. Vessel A, in group 5, was fired for a long period of time using grass as the main fuel. In group 3, vessel H was fired for a long period of time using dung as the main fuel. In group 2, vessel J was fired for a moderate period of time using dung as the main fuel.

the phasing of firing traditions at Dyffryn Ardudwy

	phase 1	phase 2	phase 3	phase 4
group 5	daA			
group 1	daB daC daD	daE daF	daG	
group 3			daH	
group 2				daJ

Use Seven traditions can be seen which cover the use of the vessels.

In group 8, vessels B and C were not modified after firing. They were porous, with good resistance to thermal shock and moderately physically strong. They were medium sized, contained traces of residues internally and showed signs of secondary oxidisation on the bases. Vessel A, in group 27, was not modified. It was porous, with good resistance to thermal shock and moderately physically strong. It was medium sized, contained traces of residues internally and showed signs of secondary oxidisation on the base. In group 3, vessel D had a perforation through the rim. It was porous, with good resistance to thermal shock and good physical strength. It was small, and showed signs of secondary oxidisation on the base.

Vessels E and J in group 5 were not modified. They were porous, with moderate resistance to thermal shock and good physical strength. They contained traces of residue internally and vessel E showed signs of secondary oxidisation on the base. In group 7, vessel F was not modified. It was non porous with poor resistance to thermal shock and moderate physical strength. It was large in size with traces of residue internally. Vessel H, in group 14, was not modified. It was porous, with moderate resistance to thermal shock and was moderately physically strong. There are traces of residue internally. In group 12, vessel G was not modified. It was porous with poor resistance to thermal shock and moderate physical strength. It was large in size with traces of residue internally.

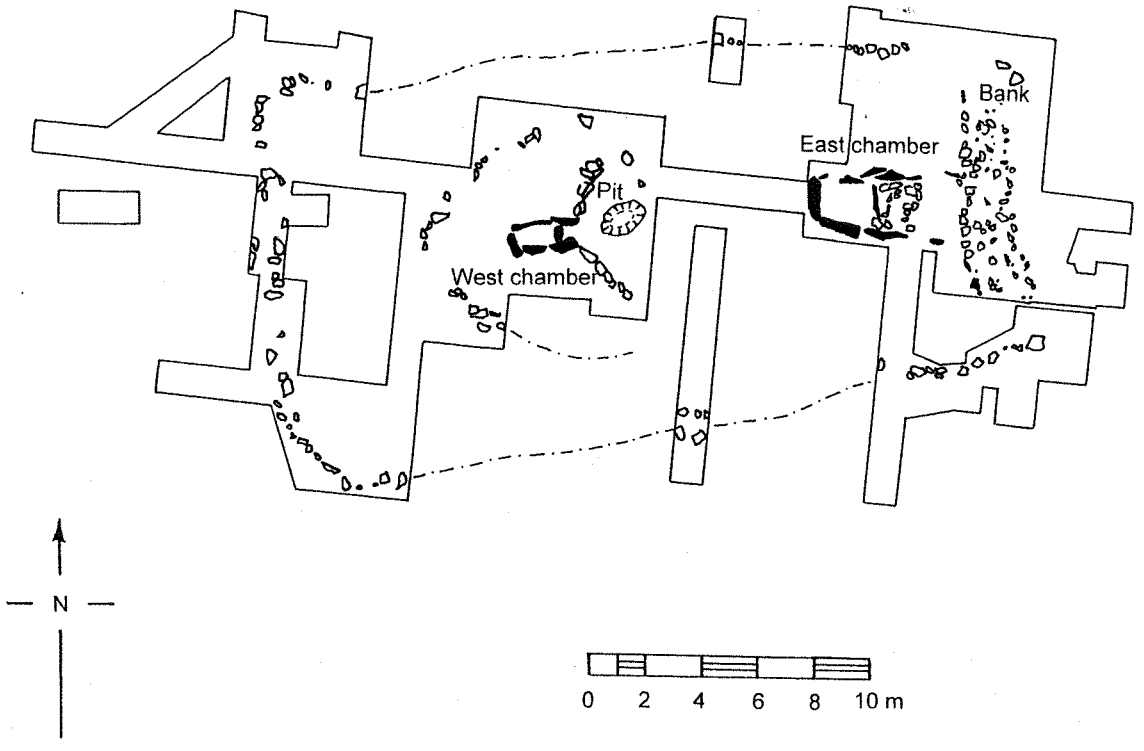


Figure 5.4: Dyffryn Ardudwy chambered cairn (after Powell 1973)

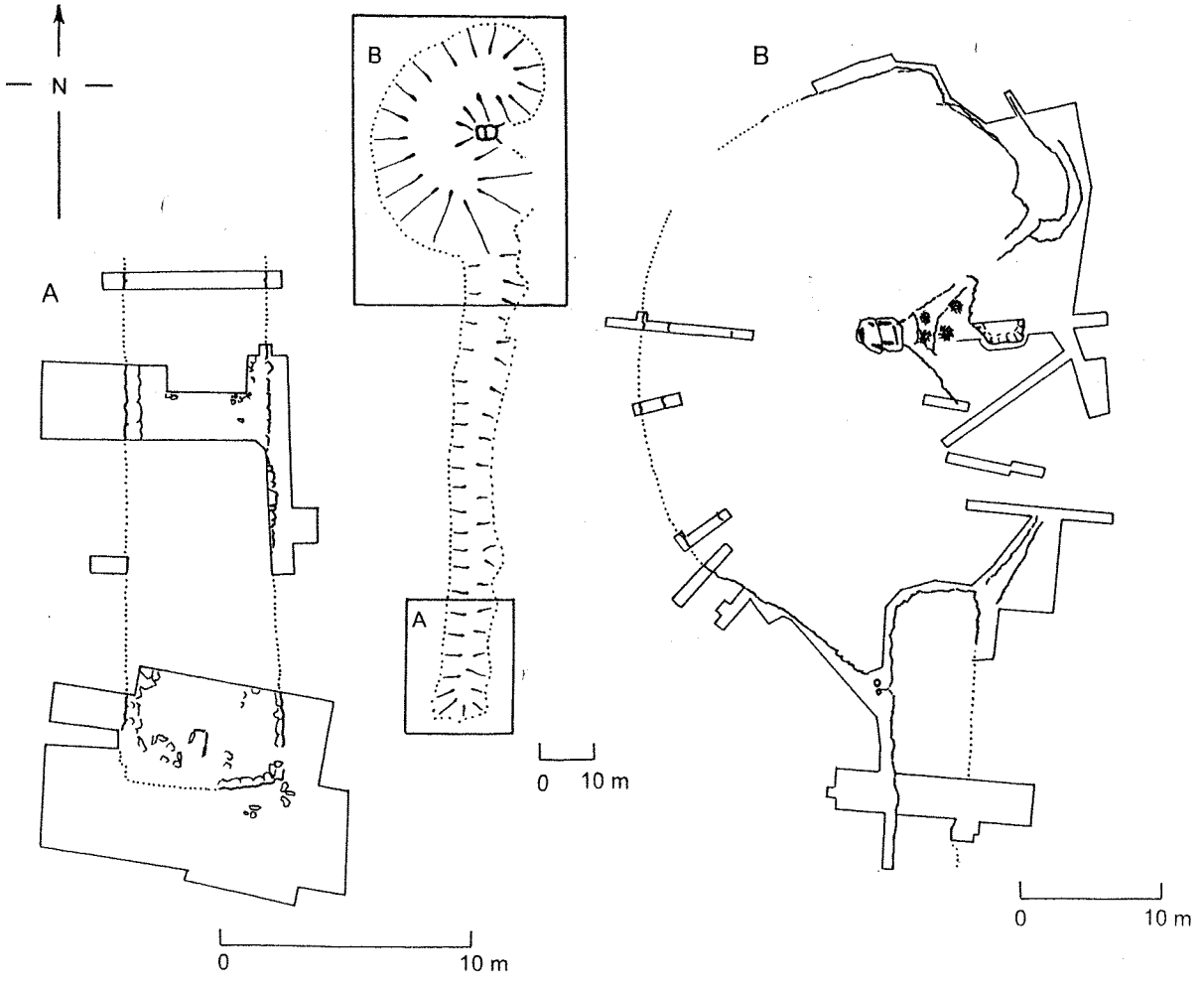


Figure 5.5: Bryn yr Hen Bobl chambered cairn (after Hemp 1936 and NMW archive sources)

the phasing of use traditions at Dyffryn Ardudwy

	phase 1	phase 2	phase 3	phase 4
group 8	daB daC			
group 27	daA			
group 3	daD			
group 5		daE		daJ
group 7		daF		
group 14			daH	
group 12			daG	

5.6 *Llugwy*

The site is a chambered cairn near the north-west coast of Anglesey (NGR SH 503 861, see figure 5.1). It is usually referred to in the literature under the English spelling of Lligwy. The site was excavated in 1909 by E. Neil Baynes, details of any covering mound are unclear (Baynes 1909) but the chamber consisted of an irregular pit cut into the bedrock, covered by a large sub-rectangular capstone supported on eight uprights. Within the chamber Baynes noted a layer of paving separating upper and lower deposits, unfortunately the stratigraphic information which would allow the pottery to be related to these layers has been lost. Only vessel 7 can be certainly ascribed to the upper layer.

The vessels were early Neolithic bowls of the Irish Sea ware group, with the exception of vessel 6, which is almost certainly Grooved Ware (Lynch 1969, 157). Vessel 7 is usually considered as the rim of a beaker, but sherds in a similar fabric not described by Lynch seem to me to form part of a carinated bowl, which includes the rim described as vessel 7 (NMW accession numbers 42.395/7, /8, /10, /14, /17 and /18).

Raw Material Selection There is evidence for the use of eight different traditions at Llugwy.

In group 52, represented by Vessel 9, the inclusions were local to the site. They were largely medium sized pieces of grog, granular in texture. Vessel 7, in group 16, was tempered using inclusions which came from up to one day's travel away from the site. The inclusions were equal proportions of fine, medium and coarse pieces of shell which were granular and laminar in texture in roughly equal proportions. In group 17, the inclusions used in vessel 2 came from up to one day's travel away from the site. The majority of the inclusions were medium and coarse pieces of shell which were granular and laminar in texture in roughly equal proportions. Vessel 1, in group 18, was tempered using inclusions from up to one day's travel away from the site. The inclusions were fine, medium and coarse pieces of shell and were laminar in texture.

In group 19, the inclusions used in vessel 4 came from up to one day's travel away from the site. The inclusions were coarse pieces of shell which were granular and laminar in texture in roughly equal proportions. Vessel 5, in group 20, contained inclusions from up to one day's travel away from the site. The majority of the inclusions were fine pieces of shell which were granular and laminar in texture in roughly equal proportions. In vessel 6, in group 21, the inclusions came from up to one day's travel from the site. They were fine and medium pieces of shell and grog, mostly granular in texture. Vessel 3 and 8, in group 23, were tempered with inclusions from up to one day's travel from the site. These were fine and some medium pieces of shell and stone, granular and laminar in texture in roughly equal proportions.

The wide variety of different raw material gathering traditions at Llugwy may be somewhat deceptive. Groups 16, 17, 18, 19 and 20 represent a similar use of shell with different processing techniques leading to different sizes of inclusions. I have kept the groups separate at this stage because these different processing techniques seem to recur at other sites: group 16 at Bryn yr Hen Bobl and Castell Bryn Gwyn; group 17 at Din Dryfol; and group 18 at Pant y Saer.

Group 23 shows the deliberate selection of inclusions from a variety of distant sources, in contrast to the tradition represented by group 9 of using grog as the only inclusion.

Construction There was only reliable evidence for five vessels at Llugwy. The following groupings were suggested by comparing this evidence for vessels from other local sites (see section 5.8 below).

Vessel 1 had a straight-sided open rim, with no rim moulding and no lugs, placing it in one of groups 14, 27, 28, 29 or 30. Of these five, only group 14 is known elsewhere on Anglesey (at Trefignath and Bryn Celli Wen), hinting that vessel 1 probably belongs in this shallow, round based group. Vessel 2 had a straight-sided upright rim, with a rounded rim moulding and no lugs, putting it in either group 4, group 36 or group 37. Group 4 is present at Pant y Saer, and vessel 2 probably belongs in this group of shallow neutral, round based vessels. Vessel 3 had a concave open rim, with no evidence for rim moulding or lugs. Vessel 3 belongs in either group 9 (which occurs at Din Dryfol), group 19, group 20 (both of which occur at Trefignath) or group 21 (which occurs at Dyffryn Ardudwy).

Vessel 4, in group 5, had a concave upright rim on a deep neutral body with a rounded base, with no rim moulding or lugs. Vessel 7 also had a concave upright rim without moulding or lugs and belongs in either group 5 or group 16 (which was present at Trefignath and Dyffryn Ardudwy)

Decoration There were three different traditions visible at Llugwy

In group 4, the surface of vessel 7 was changed while the clay was still plastic, using unmodified parts of animals to push clay aside. The decoration divided the surface of the vessel. The surface of vessel 6, in group 6, was changed while the clay was drying, using a worked stone point to remove clay. The decoration divided the surface of the vessel. In group 11, vessels 1, 3, 4, 5, 8 and 9 (and probably 2), were unchanged, and consequently their surfaces were unified.

Firing Four different traditions were present at Llugwy.

In group 1, vessel 9 was fired using dung as the main fuel for a short period of time. Vessel 3, in group 2, was fired using dung as the main fuel for a moderate period of time. In group 3, vessels 1, 2, 6 and 8 were fired using dung as the main fuel for a long period of time. Vessels 4, 5 and 7, in group 5 were fired using grass as the main fuel for a long period of time.

Use Four different traditions can be discerned at Llugwy, however, these were largely based on physical characteristics of the pottery. None of the Llugwy vessels were modified after firing.

Vessel 8, in group 2, was very porous, with good resistance to heat damage and was physically strong. Vessel 3, in group 18, was also very porous, with moderate resistance to thermal stress and shock and good physical strength. In group 4, vessel 9 was porous, had a good resistance to heat damage and had good physical strength. It showed secondary oxidisation of the outer surface near the base. Vessels 1, 2, 4, 5 and 7, in group 8, were porous, had a good resistance to thermal stress and shock and were moderately physically strong. Vessels 4, 5 and 7 showed secondary oxidisation of the outer surface near the base. In group 9, vessel 6 was not porous, had a good resistance to thermal stress and shock and was moderately physically strong.

From a point of view of mechanical suitability all of the Llugwy pottery could have been used for cooking. As we have seen at other sites however, this is not a sure guide to a vessel's intended use. At Llugwy, only vessels 4, 5 and 7 in group 8 and vessel 9 in group 4, show unambiguous evidence of exposure to heat after firing.

5.7 *Bryn yr Hen Bobl*

The site is a large chambered cairn on the south-east side of Anglesey (NGR SH 518 690, see figure 5.1). It has a long history of exploration, culminating in the excavations carried out by Wilfred Hemp between 1929 and 1935 (Hemp 1936).

The monument consists of a rectangular megalithic chamber contained within a large kidney shaped cairn. (see figure 5.5) On the south side of this cairn and bonded into it is a long low terrace or tail structure. This consists of a low rubble and dry-stone bank around 5m wide, 0.6m high and 100m long. The structure of the cairn appears to be very complex. Hemp found evidence of a number of internal stone walls, which are especially numerous in the area of the forecourt. The side of the chamber which faces the forecourt was blocked by a large stone which was probably pierced by two 'portholes' . This would have allowed the placing of items into the chamber from the forecourt but not physical access for people. There was an area of dry-stone walling in the south-west corner of the chamber which may have originally been open to allow access (Lynch 1969, 117-9). If this was the original entrance to the monument it seems likely that the earliest mound was smaller and contained a simple box chamber which faced south. When this mound was enlarged, and the forecourt added to the eastern side of the chamber, the line of the original entrance, and a possible 'processual way' leading to it, were commemorated and monumentalised by the construction of the terrace structure.

The rather confused nature of Hemp's final report means that this reconstruction must remain conjectural. Findspots for the pottery were apparently recorded in at least some cases, but insufficient information survives to reliably ascribe locations to sherds. Lynch has pointed out (1969, 164) that the material originally published by Piggott (*in* Hemp 1936) as a collection of unrelated sherds can be considered as the remains of a relatively small number of vessels. I have followed her reconstruction

Raw Material Selection Four different traditions were followed in procuring raw materials for the pottery from Bryn yr Hen Bobl.

Vessels 1, 3, 4, 5, 6 and 7, in group 16, were tempered using inclusions from up to 1 day's travel away. The clay was mixed with fine, medium and coarse, granular and laminar pieces of crushed shell (and, in the case of vessel 6, grog).

In group 11, vessel 8 was tempered with inclusions from up to 1 days travel away. The clay was mixed with medium, mostly laminar pieces of crushed shell. Vessels 9 and 10, in group 13, contained inclusions which could have been local to the site. The clay was mixed with medium and coarse granular pieces of crushed stone. Vessel 12, in group 25, was also tempered with inclusions which could have been local to the site. These were fine, medium and some coarse pieces of granular crushed stone. In group 14, vessels 13 and 14 were tempered with inclusions which could have been local to the site. The clay was mixed with mostly coarse, granular pieces of crushed stone and grog.

Unlike at other sites on Anglesey the raw material gathering traditions used were all relatively simple. There were no clear associations between the raw material gathering traditions and events later in the life of the vessels.

Construction The evidence for construction traditions at Bryn yr Hen Bobl is slightly obscure. In comparison with vessels from other sites five different traditions can be described.

In group 8, vessel 1 had a concave closed rim, a shallow closed body and a rounded base. There was a rounded rim moulding and a plain lug. Vessel 3 had a concave open rim, without rim moulding or lugs, placing it in either group 9 (present at Din Dryfol), group 19, group 20 (both at Trefignath) or group 21 (at Dyffryn Ardudwy). Vessel 6, in group 10, had a straight-sided open rim, with an angular rim moulding and no lugs.

In group 11, vessels 9 and 10 had closed concave rims, on closed deep bodies with flat bases. The vessels had angular rim mouldings and no lugs. Vessel 12 had a closed concave rim with an angular rim moulding and no lugs, placing it in one of groups 11, 18 or 26. Group 11 seems the most likely, placing vessel 12 along side vessels 9 and 10, although it may belong in group 18 along with vessel B from Trefignath.

Decoration Evidence for seven different decoration traditions was present.

In group 3, the surface of vessel 1 was changed while it was still plastic. It was decorated using combinations of different parts of plants. Clay had been pushed aside and the

decoration unified the vessel. The surface of vessel 4, in group 4, was changed while it was still plastic. It was decorated using parts of animals and the clay was pushed aside. The decoration divided the vessel. The surfaces of vessels 3, 6, 7 and 8, in group 11, were unchanged and consequently the vessels were unified.

In group 1, the surfaces of vessels 5 and 12 were changed while they were still plastic. They were decorated using combinations of different parts of plants to push clay aside. The surface of vessel 14, in group 5, was changed while it was drying. The vessel was decorated using modified plants and stones. Clay was removed and pushed aside. The decoration divided the vessel. In group 16, the surfaces of vessels 9 and 10 were changed while they were still plastic. The vessels were decorated using combinations of different parts of plants and parts of the body. Clay had been pushed aside and the decoration divided the vessels. The surface of vessel 13, in group 7, was changed while it was still plastic. A bone point was used to push aside the clay and thus divide the surface of the vessel.

Firing Four different firing techniques were used on the Bryn yr Hen Bobl pottery.

Vessels 1, 3, 5 and 6, in group 5, were fired using grass as the main fuel for a long period of time. In group 6, vessels 7 and 8 were fired using wood as the main fuel for a short period of time. Vessels 4, 9,10 and 13, in group 1, were fired using dung as the main fuel for a short period of time. In group 2, vessels 12 and 14 were fired using dung as the main fuel for a moderate period of time.

Use There are indications of six different styles of pottery use. None of the vessels from Bryn yr Hen Bobl were modified after firing.

In group 4, vessel 8 would have been porous, with a good resistance to thermal stress and physical blows. Vessels 1, 3, 4 and 6, in group 8, would have been porous, with a good resistance to thermal stress and moderately strong. Vessel 1 was medium sized, around 7.75 l capacity. Vessel 5, in group 21, was non porous with good resistance to both heat damage and physical blows. In group 9, vessel 7, would have been non-porous, with a good resistance to thermal stress and moderate resistance to physical blows.

Vessels 9, 10, 13 and 14, in group 10, would have been porous, with a poor resistance to thermal stress and physical blows. Vessels 9 and 10 were large, around 9.5 l capacity. In

group 14, vessel 12 would have been porous, with a moderate resistance to thermal stress and physical blows.

There was no clear evidence for exposure to heat after firing on any of the sherds from Bryn yr Hen Bobl, so this discussion has to be one of potential use, which as we have seen at other sites on Anglesey, is not always a reliable guide to actual use. The clearest distinction in potential use is that the earlier group 8 would have been easy to use for cooking while the later group 10 would have been difficult. This was a function of the differences in inclusion gathering and firing techniques noted above.

5.8 *Bryn Celli Wen*

Bryn Celli Wen is a medium sized hilltop enclosure which was discovered during landscape survey in 1990 and subsequently partly excavated between 1991 and 1993 (Edmonds & Thomas 1991a: 1991b: 1992: 1993). It is around 500m east of the chambered cairn of Bryn Celli Ddu (see figure 5.1) at NGR SH 513 704.

The site is oval or sub-rectangular in shape and is enclosed by a ditch which varies considerably in character (see figure 5.6). The ditch is interrupted, consisting of pits and ditch segments up to 6m long, and has been repeatedly re-cut. Some ditch segments were extremely shallow, others were up to 1.5m deep. There is a large assemblage of Neolithic worked stone from the site, including a fine polished flint axe, and a fragmentary collection of prehistoric pottery. One feature of the activity on the site appears to be the burying of large stones in ditch segments. On the south side of the enclosure this took the form of the destruction and burial of a large standing stone. The pottery from the site was found as fragments of early Neolithic vessels from topsoil above truncated ditch segments and within an interior pit, and a group of sherds from a single Mortlake style Peterborough Ware vessel (number 14) from the fill of the ditch segment containing the destroyed standing stone.

Raw Material Selection Eight different styles of raw material collection appear to have been used at Bryn Celli Wen.

In group 2, the inclusions used in vessel 3 could have been local to the site. The clay was mixed with mostly coarse, granular pieces of crushed grog. Vessels 5 and 6, in group 3, contained inclusions which could all have been local to the site. The clay was mixed with fine and medium pieces of granular stone and grog. In group 1, The inclusions used in vessel 11 could all have been local to the site. The clay was mixed with coarse pieces of

granular stone and grog. In group 4, the inclusions tempering vessel 1 could also all have been found locally. The clay was mixed with mostly coarse fragments of laminar crushed stone. Vessels 7, 9 and 10, in group 5, were all tempered using local inclusions. The clay was mixed with mostly fine pieces of granular crushed stone. In group 6, vessel 14 contained entirely local inclusions. The clay was mixed with medium and coarse pieces of two types of granular stone and grog.

Vessel 2, in group 11, was tempered with inclusions from up to one day's travel away. The clay was mixed with mostly medium, laminar pieces of crushed shell. In group 12, the inclusions in vessel 13 all came from up to one day's travel away. The clay was mixed with mostly fine and some medium pieces of two types of granular crushed stone.

It is difficult to see any strong trends in the collection of raw materials at Bryn Celli Wen. This is largely because of the lack of chronological information and the fragmentary nature of the pottery.

Construction There is insufficient evidence from Bryn Celli Wen to study traditions of vessel construction. Two vessels can be described in the light of information from other sites.

Vessel 13 had a concave closed rim, a rounded rim moulding and no lugs, and probably belongs in the group 8 tradition, which is present at Bryn yr Hen Bobl. Vessel 1, in group 14 had a straight-sided open rim, a shallow open body and a rounded base, with no rim moulding or lugs.

Decoration There was evidence for two traditions of decoration.

In group 10, the surface of vessel 14 was changed while it was still plastic using parts of animals and whipped cord. Clay had been pushed aside and the decoration had divided the vessel. The surfaces of vessels 1, 3, 5, 6, 7, and 10, in group 11, were unchanged and consequently they were unified.

Firing Five different firing traditions can be identified at Bryn Celli Wen.

In group 1, vessels 5 and 6 were fired using dung as the main fuel for a short period of time. In group 2, vessel 1 was fired using dung as the main fuel for a moderate period of

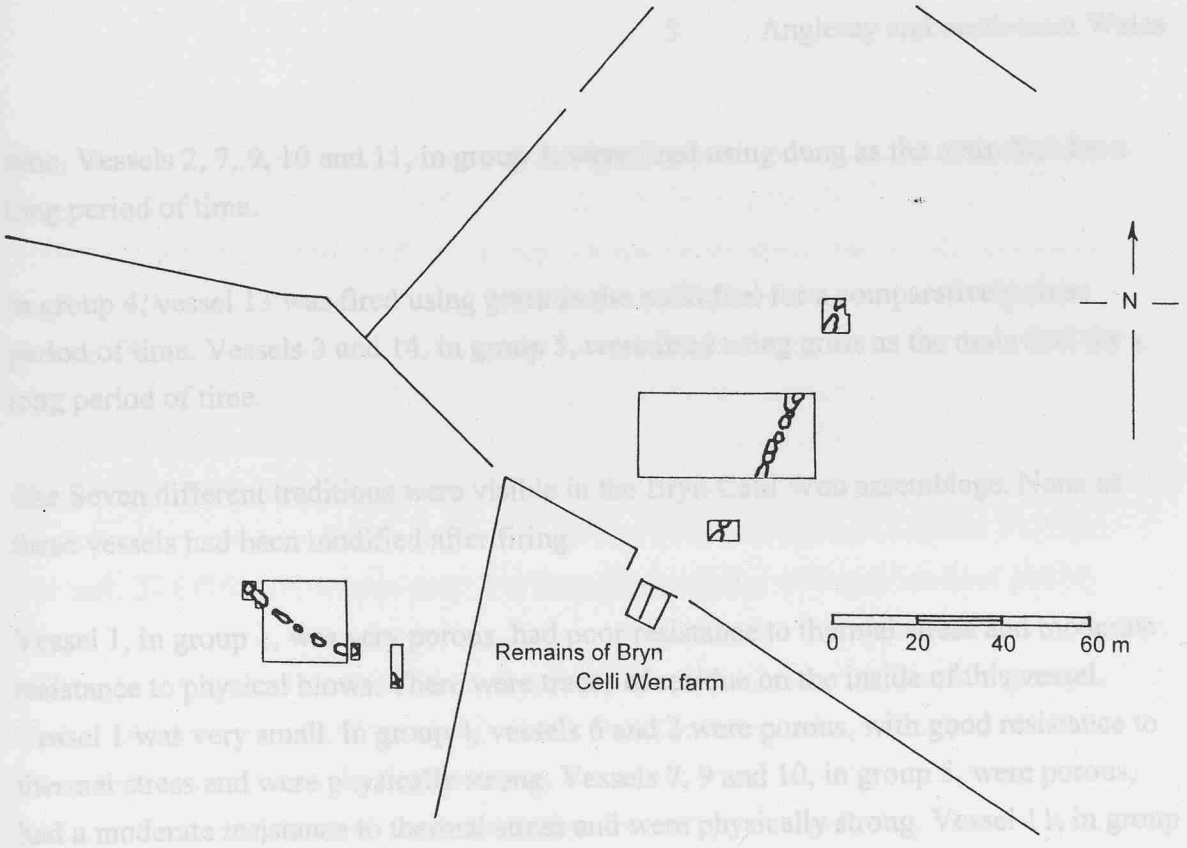


Figure 5.6: Bryn Celli Wen enclosure (after Edmonds, Thomas & Peterson 1993)

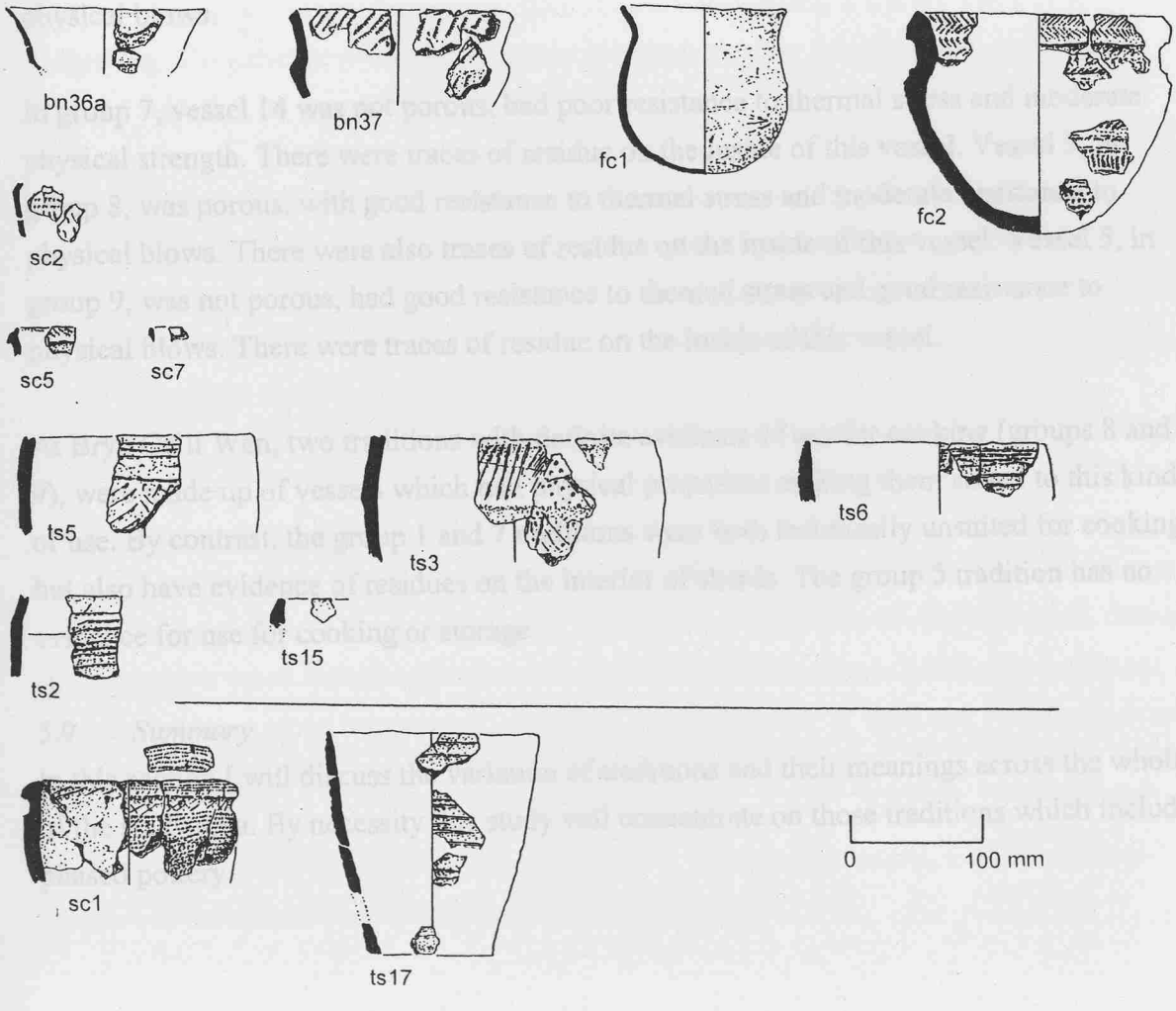


Figure 6.2: Pottery construction groups from the upper Severn valley (after Britnell 1982; Gibson 1994; Musson 1991; and Warrilow *et al* 1986)

time. Vessels 2, 7, 9, 10 and 11, in group 3, were fired using dung as the main fuel for a long period of time.

In group 4, vessel 13 was fired using grass as the main fuel for a comparatively short period of time. Vessels 3 and 14, in group 5, were fired using grass as the main fuel for a long period of time.

Use Seven different traditions were visible in the Bryn Celli Wen assemblage. None of these vessels had been modified after firing.

Vessel 1, in group 1, was very porous, had poor resistance to thermal stress and moderate resistance to physical blows. There were traces of residue on the inside of this vessel. Vessel 1 was very small. In group 4, vessels 6 and 2 were porous, with good resistance to thermal stress and were physically strong. Vessels 7, 9 and 10, in group 5, were porous, had a moderate resistance to thermal stress and were physically strong. Vessel 11, in group 20 was porous, with a moderate resistance to heat damage and poor strength. Vessel 13, in group 6, was very porous, and had good resistance to thermal stress and poor resistance to physical blows.

In group 7, vessel 14 was not porous, had poor resistance to thermal stress and moderate physical strength. There were traces of residue on the inside of this vessel. Vessel 3, in group 8, was porous, with good resistance to thermal stress and moderate resistance to physical blows. There were also traces of residue on the inside of this vessel. Vessel 5, in group 9, was not porous, had good resistance to thermal stress and good resistance to physical blows. There were traces of residue on the inside of this vessel.

At Bryn Celli Wen, two traditions with definite evidence of use for cooking (groups 8 and 9), were made up of vessels which had physical properties making them suited to this kind of use. By contrast, the group 1 and 7 traditions were both technically unsuited for cooking but also have evidence of residues on the interior of sherds. The group 5 tradition has no evidence for use for cooking or storage.

5.9 *Summary*

In this section I will discuss the variation of traditions and their meanings across the whole of the study area. By necessity this study will concentrate on those traditions which include phased pottery.

Raw Material Selection There were four different styles of raw material selection in use on Anglesey during phase 1, groups 5, 22, 10 and 18. They probably all involved some travelling to find raw materials and groups 10 and 22 involved the use of more than one kind of inclusion. Inclusions tended to be fine or medium, with stone based inclusions having been well rounded, both probable indications of intensive processing. Shell was used in groups 18 and 22, and stone in groups 5, 10 and 22, with grog only being present in small quantities in group 10. More effort was being invested in the collection of the raw materials than was required to produce successful pottery. As I suggested in the site by site analysis, this may have been a deliberate attempt to emphasise the technical difficulty of the task. The different recipes may also have distinguished different kinds of pottery.

There were eight different traditions in use during phase 2, new traditions in groups 32, 54, 2, 7, 9 and 46, and groups 10 and 18 which were continuing phase 1 traditions. The emphasis on travel to find raw materials and the use of multiple types of inclusions continued in some of the phase 2 traditions. One of the new traditions, group 7, required clay from coastal marshes and the use of heavily processed stone from distant sources, together with grog. However, the simpler, purely grog tempered tradition of group 2 arose. The use of grog increased during this phase, four of the traditions having some grog tempering. The other new tempering material introduced was the plant material used at Dyffryn Ardudwy in groups 32, 54 and 46.

One new raw material selection tradition, group 55, arose during phase 3, and groups 7, 9 and 46 continued from phase 2. In contrast to the use of fine stone and grog inclusions in group 7, group 9 vessels were made with coarse fragments of shell and grog and clay from a terrestrial source. However, in both cases raw materials were coming from up to a day's travel away from the site. The use of plant material continued at Dyffryn Ardudwy together with a use of medium sized granular crushed rock in group 55.

Only the group 55 tradition survived as late as phase 4, when three new traditions arose. Group 8 continued the practice of travelling to find raw materials. Stone from a source up to a day's travel away was used with grog and had been quite intensively processed. Group 1 represents a much more pragmatic raw material selection regime. Local clay and stone was used, coarse stone fragments together with grog. The use of shell and plant inclusions appears to have entirely ceased by this period.

No new traditions are certainly datable to phase 5. The group 1 tradition survived from phase 4 in the three Food Vessels from Trefignath.

The single vessel from phase 6, vessel J from Dyffryn Ardudwy, belongs in group 56. This represents a complete break with late Neolithic and Early Bronze Age practice, using medium pieces of laminar shell and granular stone from two different sources, up to one day's travel away.

the phasing of raw material selection traditions in north-west Wales

	first Neolithic		early Neolithic	middle Neolithic	post Neolithic phases	
	phase 1	**phase 2**	**phase 3**	**phase 4**	**phase 5**	**phase 6**
group 5	ps7					
group 22	ps3					
group 10	tfR tfS	tfH				
group 18	ps1 ps2	ps5				
group 32		daA daC				
group 54		daD				
group 2		ps6				
group 7		tf145 tf265	tfD tfM			
group 9		tfL tfU tf200	tfE tfN			
group 46		daB	daE			
group 55			daF	daG daH		
group 8				tfK tfW		
group 1				tfG tfV	tfA tfB tfC	
group 56						daJ

Construction There is only one construction tradition which is securely dated to phase 1, group 4. All group 4 vessels had upright straight sided rims, shallow neutral bodies and round bases.

In phase 2, five new ways developed of constructing pottery. These new styles, groups 27, 7, 14, 20 and 16 were all round based bowls. Groups 7, 20 and 16 were curved rimmed styles (see figure 5.3) and groups 14 and 17 straight rimmed styles This phase was dominated by open pottery, but it also saw the introduction of the first closed shape, Trefignath vessel H, in group 7. No rim mouldings or lugs were present on any phase 2 pottery. The only distinction between group 14 and group 27 was the shallower and more open form of the group 14 vessels.

The group 20 and group 16 traditions continued into phase 3, with three new traditions arising, groups 19, 21 and 45. As in earlier phases, the assemblage is dominated by curved rimmed and round bases bowls, mostly open or neutral in form. However, deep forms are more common, in groups 19, 21 and 45, and flat (group 19) and hollow bases (group 45) appear for the first time, introducing more variety into the repertoire of vessel styles. Lugs

and rim mouldings were entirely absent from vessels which could be securely linked to phase 3.

The group 45 tradition of vessel construction persisted into phase 4 and one new tradition arose, group 13. Where evidence survived, vessel shapes were deep and flat bases the norm. Group 13 vessels had angular rim mouldings and no phase 4 vessel had lugs.

Two new traditions arose in phase 5, groups 18 and 12. Group 12 vessels were very open in shape, with almost conical bodies, flat bases and straight rims with angular rim mouldings. Trefignath vessel B, in group 18, had a concave closed rim with an angular rim moulding and a deep neutral body.

Vessel J from Dyffryn Ardudwy, the single phase 6 vessel, was part of group 50. It had a closed, straight-sided rim on a deep closed body with a hollow base, continuing the trends established in the late Neolithic and Early Bronze Age.

the phasing of construction traditions in north-west Wales

	first Neolithic		early Neolithic	middle Neolithic	post Neolithic phases	
	phase 1	**phase 2**	**phase 3**	**phase 4**	**phase 5**	**phase 6**
group 4	ps1					
group 27		daD				
group 7		tfH				
group 14		tfU				
group 20		tfL	tfM			
group 16		daA daB daC	tfE			
group 19			tfD			
group 21			daE			
group 45			daF	daG		
group 13				tfG		
group 12					tfA tfC	
group 18					tfB	
group 50						daJ

Decoration The only decoration tradition present in phase 1 is group 11. The surfaces of all of these vessels were unchanged. This tradition persisted until phase 4, but the bulk of the vessels came from the early phases.

Along with many group 11 vessels, three new decorative traditions appeared in phase 2, groups 13, 8 and 15. These two traditions are very distinct. Group 8 vessels were burnished over the whole surface of the vessel, decorated while the clay was drying with stones which had not been modified. Group 13 vessels were burnished only over part of

the vessel, dividing the surface. By contrast, Group 15 vessels were grass-wiped, unifying the surface.

In phase 3, together with group 11 vessels, was a single group 17 vessel, decorated by using a bone point to remove plastic clay and divide the surface of the vessel.

No group 11 vessels were securely phased to later than phase 3. Group 17 continued into phase 4 along with two new traditions, groups 1 and 2. The single vessel in group 2 was decorated using combined plant fibres to push aside the clay while it was still damp and burnished with a stone as the clay was drying. The vessels in group 1 were all decorated by pushing aside the clay with combined plant fibres while it was still damp.

The group 1 decoration techniques survived into phase 5, alongside the new group 16 tradition. All the vessels were decorated using combined plant fibres, together with parts of the body in the case of group 16, to push aside the clay while it was still damp.

In phase 6, the group 19 decorative tradition involved the use of parts of the body, bone points and worked stone to both remove and push aside clay and divide the surface of the vessel. All of the later decorative techniques seemed to involve the increasingly complex division of the vessel's surface.

the phasing of decoration traditions in north-west Wales

	first Neolithic		early Neolithic	middle Neolithic	post Neolithic phases	
	phase 1	**phase 2**	**phase 3**	**phase 4**	**phase 5**	**phase 6**
group 11	tfR ps1 ps2 ps3 ps7	tfH tfL tfU tf145 tf265 ps6	tfD tfE tfM tfN daE			
group 13		daA daB				
group 8		daD ps5				
group 15		daC				
group 17			daF	daG		
group 2				tfK		
group 1				tfG daH	tfB	
group 16					tfA tfC	
group 19						daJ

Firing Two firing traditions were in use during phase 1, groups 5 and 1. As can be seen from the table, these groups continued through until phase 5. Groups 2 and 3 which are not reliably phased to earlier than phase 4 and 5 respectively, are widely occurring on unphased vessels and it seems likely that these two techniques were also common from early in the Neolithic. Throughout the majority of the Neolithic on Anglesey, vessel firing

was a choice between one of four contemporary techniques, using either dung or grass for various periods of time.

Dung is a more technically complex fuel to use than grass, as it heats up quicker and less evenly. It burns at a higher temperature, giving a harder and more oxidised fabric. In general, the group 3 tradition produced hard orangey red fabrics, the group 1 tradition hard pinkish or greyish buff fabrics with dark cores, and the group 5 tradition slightly softer dark greyish brown fabrics. The presence of all of these variations from early in the Neolithic argues that, as with raw material selection, the simplest solution was not always the favoured one.

the phasing of firing traditions on Ynys Môn

	first Neolithic		early Neolithic	middle Neolithic	post Neolithic phases	
	phase 1	**phase 2**	**phase 3**	**phase 4**	**phase 5**	**phase 6**
5	tfR tfS ps3 ps7	tfH tfL tf145 tf200 daA ps5	tfD tfE tfM	tfG tfK tfW		
1	ps1 ps2	tfU tf265 daB daC daD ps6	tfN daE daF	tfV daG	tfA tfC	
3				daH		
2					tfB	daJ

Use Pottery was used in five different ways during phase 1, groups 17, 22, 23, 8 and 12. None of the vessels in these groups had been modified after firing, and they all showed evidence of use for cooking, in the form of residues and the secondary oxidisation of the base. In terms of the technical properties of the fabric; group 22 and 23 vessels would have been best suited, and group 17 vessels least well suited for the storage of liquids. Vessels in groups 17 and 8 would have been easiest to heat without danger of breakage and those in groups 12 and 23 the hardest. All the vessels would have been moderately strong, with the exception of those in group 23, which were weak. As I noted in the site by site analysis, the technical properties of the pottery are somewhat at variance with the evidence for use. However, by combining the two kinds of information, I can suggest a set of possible patterns of use.

Vessels in all groups had been used for cooking, but given the difficulty of using the group 12 and group 23 vessels in particular, it may be that the cooking done in these vessels was an occasional, formalised representation of cooking, rather than a day to day process. Group 23 vessels may additionally have been used for the storage of liquids, as their physical properties appear to prioritise impermeability over other attributes, such as

strength. Alternatively they may have been designed to cook a specific liquid substance. Group 22 vessels could also have been used to cook liquids, but would be more suited to everyday use as cooking vessels. Vessels in groups 17 and 8 were probably used for the everyday cooking of drier foods over open fires, and for the storage of dry goods.

Group 8 continued into phase 2 alongside six new traditions, groups 27, 4, 3, 21, 7 and 9. There was evidence that all of these vessels, except the single example from group 27, had been used for cooking. Group 27 vessels were identical in physical characteristics to those in group 8, but had been perforated beneath the rim after firing. On the same basis as used for the phase 1 pottery, I would suggest that group 4 vessels were used for the storage of dry goods and for cooking over open fires. Group 3 vessels had the same physical properties as those in group 4, but were perforated beneath the rim after firing. Group 21 vessels would have been ideally suited for both the storage and cooking of liquids. Group 7, like the earlier group 22 vessels, may have been for the storage of liquids but were obviously used at least occasionally for cooking over slow heat. Group 9 vessels were used for the cooking of liquid foods over open fires and possibly for the storage of liquids.

Pottery continued to be used in the groups 7, 8 and 9 traditions in phase 3, alongside two new traditions, groups 5 and 14. No phase 3 vessels were modified after firing, and all were used at least occasionally for cooking. Vessels in the group 14 tradition could have been used for the storage or cooking, they were not ideally suited to any of these tasks, but were not so fragile as to require undue precautions in general use. Similarly, vessels in group 5 could be regarded as multi-purpose vessels, although they would have been slightly more robust and may have had a specialist use as containers.

The group 14 tradition continued into phase 4 and two new traditions arose, groups 16 and 10. The single vessels in the group 16 tradition is only distinguished from those in group 14 by having been perforated near the rim after it was fired. Like them it may have been a general purpose vessel. Vessels in the group 10 tradition were poorly adapted for culinary use, and have no evidence for having been used for cooking, although group 10 vessels from other areas of Wales were used as cook pots. In phase 4 there is also a reappearance of vessels which can be classified as belonging in group 12. It seems unlikely that this is a genuine survival of a tradition of use. It is probably better to think of these later group 12 vessels as a new class of non-utilitarian pottery, which was also used occasionally for a specialised kind of cooking.

Groups 12 and 7 survived into phase 5, and group 5 into phase 6, but no new traditions arose. Although the sample of securely phased vessels is now much smaller it is interesting that the robust, general use pottery and specialist high temperature cook-wares of the earlier periods had entirely given way to pottery whose primary function appears to be non-utilitarian.

the phasing of use traditions in north-west Wales

	first Neolithic		early Neolithic	middle Neolithic	post Neolithic phases	
	phase 1	**phase 2**	**phase 3**	**phase 4**	**phase 5**	**phase 6**
group 17	ps3					
group 22	ps7					
group 23	tfR					
group 8	ps1 ps2	daB daC tfU tf200	tfE			
group 12	tfS			tfG daG	tfB	
group 27		daA				
group 4		tfL				
group 3		daD				
group 21		tf145 tf265				
group 7		tfH	daF		tfA tfC	
group 9		ps5	tfD tfM			
group 5			daE			daJ
group 14			tfN	tfK daH		
group 10				tfV		
group 16				tfW		

6 The upper Severn valley

6.1 *Introduction*

There are five sites in this study area, which centres on the cluster of pottery producing sites in the upper Severn valley (see figure 6.1). The sites are Ysgwennant (Day 1972), The Breiddin (Musson 1991), Four Crosses (Warrilow *et al* 1986), Trelystan (Britnell 1982) and Sarn-y-bryn-caled (Gibson 1994). The large Peterborough ware and Grooved ware assemblage from Walton (Gibson 1999), which lies between Severn and Usk valleys, was first reported after I had completed the initial data collection for the thesis and was not included for this reason. The small unstratified assemblage from Ffridd Faldwyn (Arnold 1987 & O' Neil 1942) has also been excluded from the study.

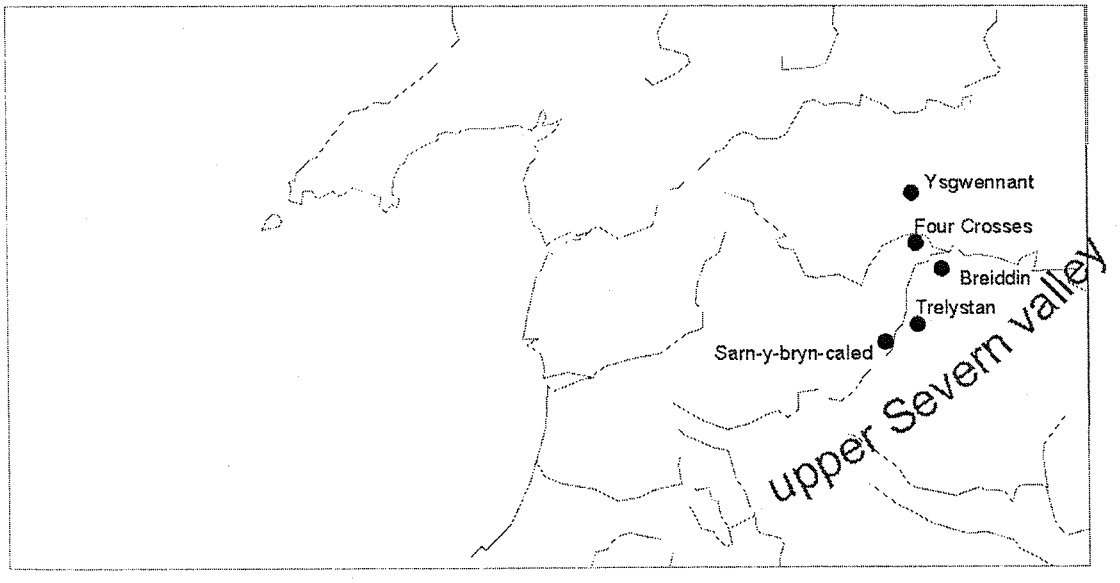
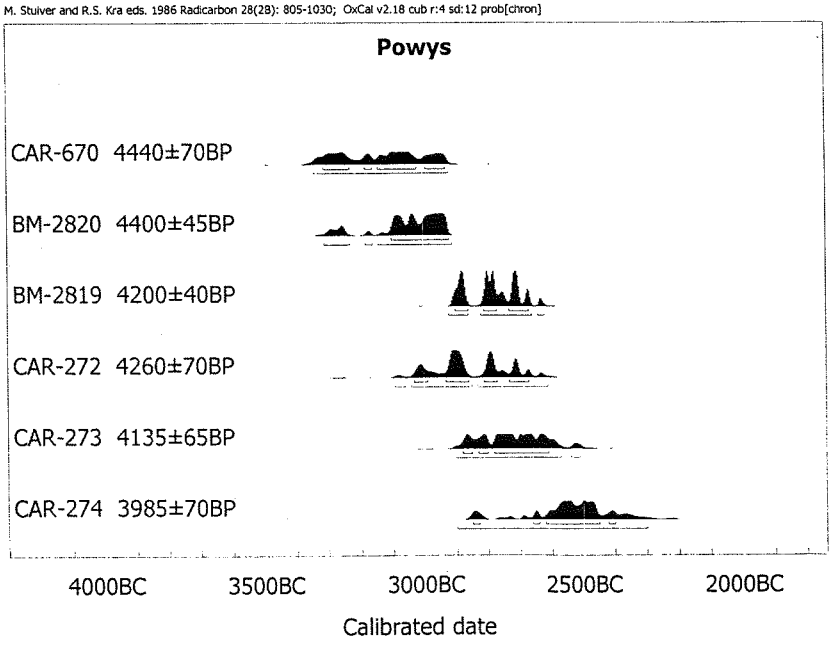


Figure 6.1: Neolithic pottery from the upper Severn valley

6.2 *Chronological framework*

Only four of the sites in my study group have pottery which is securely stratified in Neolithic contexts. Fortunately, three of these sites have radiocarbon dates directly associated with the pottery. Four Crosses and Sarn-y-bryn-caled are the only two sites where stratigraphy allows pottery to be phased unambiguously. At Four Crosses the deposition of Vessel 1 predates that of Vessel 2 (Warrilow *et al* 1986, 64-67). At Sarn-y-bryn-caled site 2 the deposition of Vessel 6 predates the deposition of Vessels 5 and 7 (Gibson 1994, 159-61). The pottery from Trelystan appears to be of a single phase. Vessels from all the contexts which produce pottery are made, used and deposited in similar ways.

Radiocarbon evidence can be added to this phasing. A date of 4440 ± 70 bp (CAR-670) was associated with phase 1 at Four Crosses (Warrilow *et al* 1986, 64-67). At two standard deviations this places this phase in the range 3335-2880 calBC. The recut in the ditch at Sarn-y-bryn-caled site 2 (Gibson 1994, 159-61) produced two radiocarbon dates: 4400 ± 45 bp (BM-2820); and 4200 ± 40 bp (BM-2819). Even at two standard deviations these dates do not overlap. When calibrated, BM-2820 gives a series of ranges between 3290 and 2920 calBC, while BM-2819 gives a series of ranges between 2880 and 2620 calBC. I have assumed that the charcoal used for BM-2820 was from old wood and that the true date for phase 2 at Sarn-y-bryn-caled site 2 lies in the range 2880-2620 calBC. There are three radiocarbon dates directly associated with pottery from Trelystan (Britnell 1982, 135-40), from two pits and a hearth in Structure B (see below). These are: from the hearth, 3985 ± 70 bp (CAR-274); from pit 14, 4135 ± 65 bp (CAR-273); and from pit 13, 4260 ± 70 bp (CAR-272). When calibrated at two standard deviations, these dates give a series of ranges from 3030 to 2300 calBC. Given the ephemeral nature of Structure B and the unitary nature of the pottery assemblage it seems unlikely that the use of the Trelystan pottery spanned such a period. The calibrated date ranges overlap at three points: 2880-2855 calBC; 2665-2650 calBC; and 2615-2620 calBC, and I would suggest that the Trelystan pottery was deposited within one of these date ranges, probably one of the later two.



Using the combination of the radiocarbon evidence and direct stratigraphic relationships it is possible to construct an approximate chronological framework for the pottery from the upper Severn valley, although detailed resolution is only possible for the middle and late Neolithic. The pottery from The Breiddin and Vessel 1 from Ysgwennant are almost

certainly early Neolithic in date and have been ascribed to a rather amorphous phase 1. Four Crosses vessel 1 predates vessel 2 and, on radiocarbon evidence, predates material from Sarn-y-bryn-caled and Trelystan. It is possible that Four Crosses 2 and Sarn-y-bryn-caled vessel 6 are contemporary but they are so distinct in style of manufacture, use and deposition that I have chosen to regard them as successive phases. Actions represented in vessel 6 at Sarn-y-bryn-caled recur in vessels 2, 3 and 8 from the same site, but not in the stratigraphically later vessels 5 and 7, which are more similar to material from Trelystan, confirming the division of this material suggested by the stratigraphy and radiocarbon dating.

	early Neolithic	middle Neolithic		late Neolithic	
	phase 1	phase 2	phase 3	phase 4	phase 5
Approx. date range calBC	pre 3500	3200-3000			2700-2600
The Breiddin	bn36a bn37				
Ysgwennant	yt1				
Four Crosses		fc1	fc2		
Sarn-y-bryn-caled				sc2 sc3 sc6 sc8	sc5 sc7
Trelystan					ts1 ts2 ts3 ts4 ts5 ts6 ts7 ts8 ts9 ts15 ts16

6.3 *Ysgwennant*

The site at Ysgwennant, Llansilin is a largely natural mound 10km west of Oswestery (SJ 189 305) which contained several beaker period burials. Fragments of two Peterborough Ware bowls also survived from unstratified contexts. The excavations were carried out, initially as a rescue project, by local amateur workers between 1962 and 1965 (Day 1972).

Raw Material Selection The pottery from Ysgwennant was made by using relatively simple raw material gathering traditions. Vessel 1 belongs in the group 43 tradition, tempered with coarse granular grog fragments, while Vessel 2, in group 10, used coarse granular pieces of local stone and grog.

Construction Evidence of construction traditions is limited in this pottery. Vessel 1, with its open concave rim and lack of rim moulding or lugs, probably belongs in the group 9 tradition, also known at the Breidden. Vessel 2 is too fragmentary to discuss meaningfully, although the presence of a rounded rim moulding might point towards the group 24 tradition present at Sarn-y-bryn-caled.

Decoration Vessel 1 appears to have been burnished over the whole outer surface, putting it in the group 8 tradition. The surface of Vessel 2, in group 10 had been divided by complex decoration with whipped cord and bird bone impressions, applied when the clay was still plastic.

Firing Vessel 1, in group 5, was fired using grasses as the main fuel, over a long period of time. Vessel 2, part of group 2, was fired using dung as the main fuel for a moderate length of time.

Use Vessel 1 is part of the group 4 tradition. It was not modified after firing and shows no direct evidence for use in cooking. In terms of its physical properties the vessel would have been porous and strong, with good resistance to heat damage. Vessel 2, in group 23, was also not modified after firing. It would have been non-porous and not strong, with poor resistance to heat damage.

6.4 *Breiddin*

The site is a Late Bronze Age and Iron Age hillfort. It was first excavated in the 1930's, and was extensively investigated between 1969 and 1976 (Musson 1991). The Breiddin itself is a steep sided and craggy hill formed from a volcanic intrusion on the east side of the upper Severn valley (NGR SJ 292 144). The hill was fortified by two lines of stone bank defences along the shallower south-eastern side and a larger earth bank and ditch. The presence of the pottery points to Neolithic activity on the hill but, unlike at Ffridd Faldwyn (Arnold 1987), there was no evidence for an early enclosure. All of the Neolithic pottery was preserved in old land surfaces beneath the ramparts of the Late Bronze Age monument. It is impossible to see any phasing in these Neolithic contexts and none of the pottery sherds were securely associated with other material.

Raw Material Selection The decisions made in gathering together the raw materials to make the pottery from The Breiddin show an extreme example of the tendency noted elsewhere in the early Neolithic to deliberately complicate this aspect of pottery manufacture. Vessels 36a and 37 both belong in group 53, a tradition of travelling long distances to acquire both clay and inclusions and of using coarse, laminar stone inclusions from two or three distinct sources.

Construction (see figure 6.2) Vessel 36a is part of the group 9 tradition. It would have had an open concave rim on a shallow open body with a rounded base, without rim moulding

or lugs. Vessel 37, in group 16, would have had a concave upright rim on a shallow neutral body with a rounded base. Vessel 37 had neither rim mouldings nor lugs.

Decoration Vessel 37 is part of the group 3 tradition, marked by the use of whipped cord over the whole surface of the vessel, with the decoration having been pushed into the clay while it was still plastic. Vessel 36a is part of the wide ranging and long lasting undecorated group 11 tradition. Both vessels are treated in a way which emphasises the unity of the surface of the vessel.

Firing The firing of the vessels was in the group 5 tradition, a long slow process using grasses as the principle fuel source. As noted elsewhere, this is both the least wasteful and technically the most simple of the possible firing techniques.

Use There is no direct physical evidence for the uses of either vessel from The Breiddin, but physical characteristics allow Vessel 36a to be put in the group 18 tradition and Vessel 37 in the group 28 tradition. Both vessels would have been extremely porous but Vessel 37 would have had poor resistance to thermal and physical stress, in contrast to Vessel 36a which would have been strong and moderately heat-proof. Both vessels were very small in size.

6.5 *Four Crosses*

The pottery from Four Crosses comes from one of a group of eight Neolithic and Early Bronze Age ring ditches (Warrilow *et al* 1986). The ring ditches were on a gravel terrace in the valley of the river Vyrnwy. Site 5, which produced the two Neolithic vessels, was a large three phase ring ditch at the north edge of the gravel terrace (NGR SJ 275 192). In phase 1 a large central grave pit was dug at the centre of an oval ring ditch, in phase 2 a smaller circular ring ditch was associated with a second shallower burial pit, in phase 3 a large outer ring ditch surrounded the existing monument and a central mound was constructed (see figure 6.3). Phase 1 dates to the middle and late Neolithic, phase 2 to the Beaker period and phase 3 to the Early Bronze Age (Warrilow *et al* 1986, 64-8).

Vessel 1 was discovered at the base of the phase 1 central grave pit. It had been deposited whole and was associated with a crouched adult inhumation, animal bone and charcoal (identified as oak). Radiocarbon analysis of the charcoal gave at date of 4440 ± 70 bp (CAR-670). Vessel 2 was discovered on the stabilised surface of the fill of the phase 1 ditch. At this stage the ditch was reduced to between 0.2 and 0.5 m deep. Vessel 2 appears

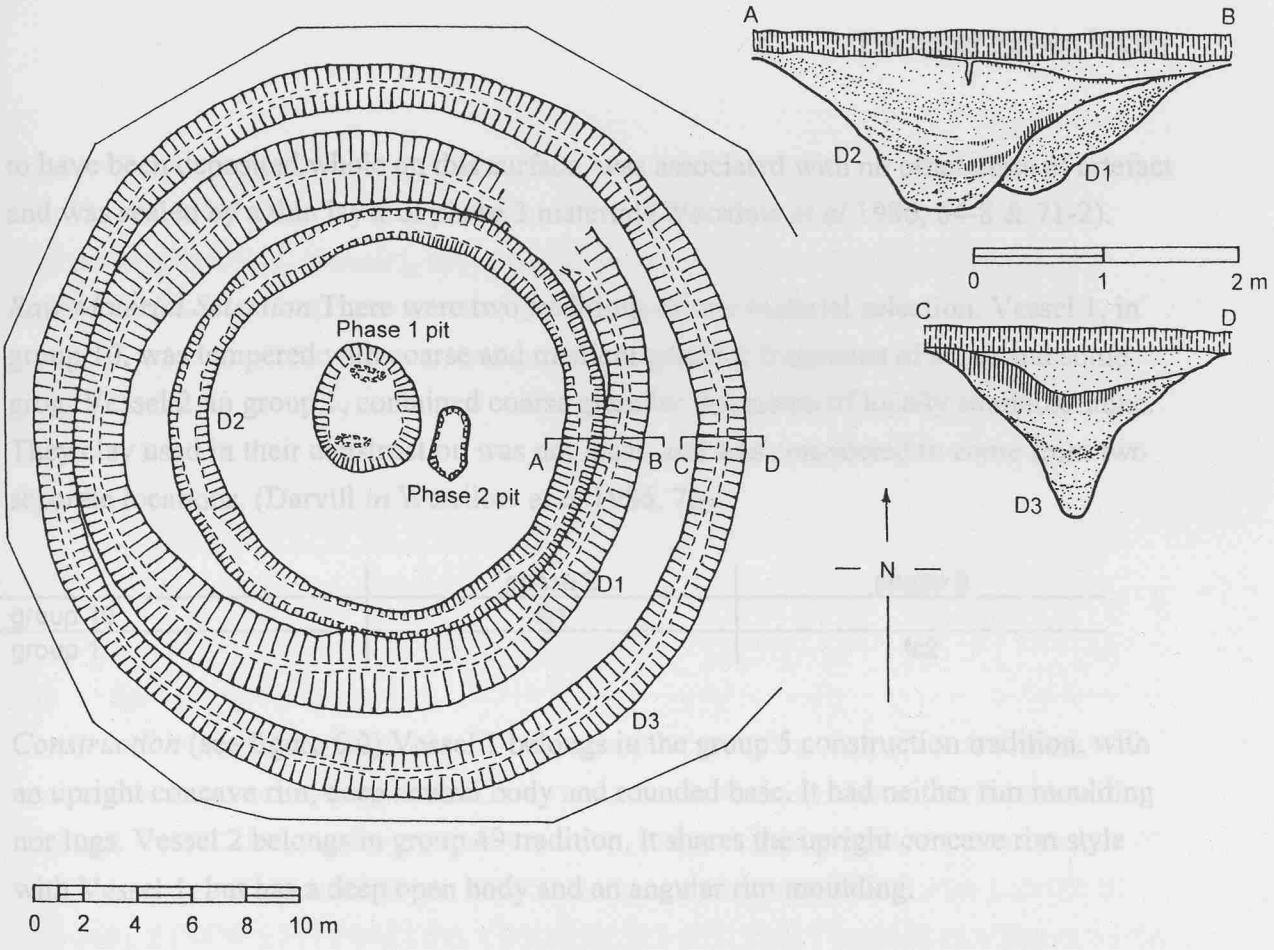


Figure 6.3: Four Crosses, site 5 (after Warrilow *et al* 1986)

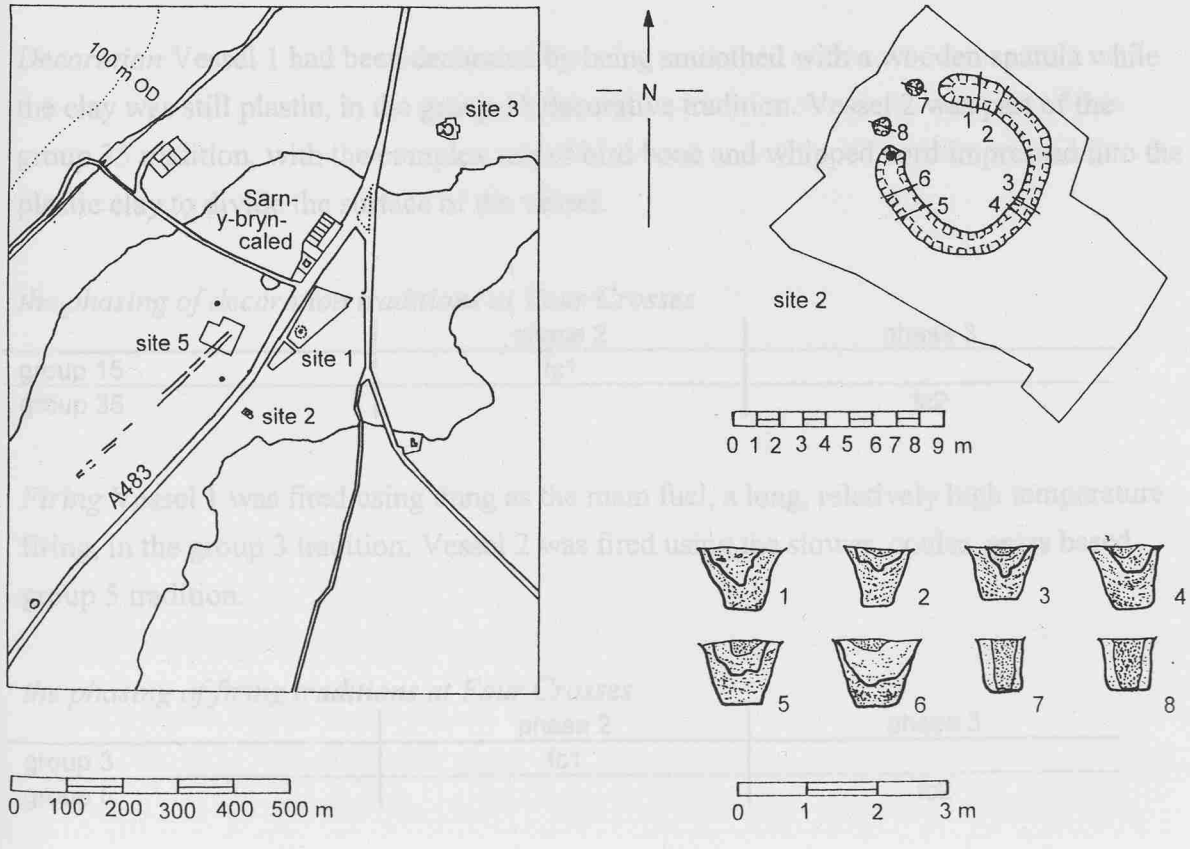


Figure 6.4: Sarn-y-bryn-caled cursus complex (after Gibson 1994)

to have been deposited whole on this surface, was associated with no other class of artefact and was sealed by a thin layer of phase 3 material (Warrilow *et al* 1986, 64-8 & 71-2).

Raw Material Selection There were two traditions of raw material selection. Vessel 1, in group 10, was tempered with coarse and medium granular fragments of stone and some grog. Vessel 2, in group 1, contained coarse granular fragments of locally available stone. They clay used in their construction was not local, and was considered to come from two separate locations. (Darvill *in* Warrilow *et al* 1986, 76).

	phase 2	phase 3
group 10	fc1	
group 1		fc2

Construction (see figure 6.2) Vessel 1 belongs in the group 5 construction tradition, with an upright concave rim, deep neutral body and rounded base. It had neither rim moulding nor lugs. Vessel 2 belongs in group 49 tradition. It shares the upright concave rim style with Vessel 1, but has a deep open body and an angular rim moulding.

the phasing of construction traditions at Four Crosses

	phase 2	phase 3
group 5	fc1	
group 49		fc2

Decoration Vessel 1 had been decorated by being smoothed with a wooden spatula while the clay was still plastic, in the group 15 decorative tradition. Vessel 2 was part of the group 35 tradition, with the complex use of bird bone and whipped cord impressed into the plastic clay to divide the surface of the vessel.

the phasing of decoration traditions at Four Crosses

	phase 2	phase 3
group 15	fc1	
group 35		fc2

Firing Vessel 1 was fired using dung as the main fuel, a long, relatively high temperature firing, in the group 3 tradition. Vessel 2 was fired using the slower, cooler, grass based group 5 tradition.

the phasing of firing traditions at Four Crosses

	phase 2	phase 3
group 3	fc1	
group 5		fc2

Use There was no direct evidence for how these vessels were used. Neither had been perforated after firing. Vessel 1, in group 14, would have been porous, with moderate resistance to heat damage and physical blows and was very small in size. Vessel 2, in group 23, would have been non porous, not good at resisting heat damage and not physically strong.

the phasing of use traditions at Four Crosses

	phase 2	phase 3
group 14	fc1	
group 23		fc2

6.6 *Sarn-y-bryn-caled*

The Sarn-y-bryn-caled complex is made up of a pit circle, four ring ditches, two penannular ring ditches and a cursus and lies on the west side of the upper Severn valley (figure 6.4). The sites were excavated between 1990 and 1992 prior to the construction of the Welshpool relief road (Gibson 1994). Neolithic pottery came from sites 1 (NGR SJ 219 049), 2 (NGR SJ 218 048) and 3 (NGR SJ 222 053). Site 1 centred on a timber circle, around 17.5 m in diameter, with a south facing entrance. No pottery was directly associated with this circle but timbers from the monument radiocarbon dated to between 3730 and 3660 bp. Site 2 was a penannular ring ditch between 7 and 8 m in diameter with a north-west facing entrance flanked by two large posts. The ditch had been recut to form a second phase of the monument. Charcoal from the recut gave two radiocarbon dates: 4200 ± 40 bp (BM-2819); and 4400 ± 45 bp (BM-2820). Site 3 was a complex of two Beaker period ring ditches, with one residual sherd of Neolithic pottery in the lower ditch silts of the larger ring ditch (Gibson 1994, 157-65).

Vessel 1 was found in an unstratified position on the sub-soil surface north of site 1. Vessels 2 and 3 were found in pit 115, an isolated feature 26 m north of the timber circle at site 1. Vessel 6 came from the phase 1 basal silts of the site 2 penannular ring ditch and Vessels 5 and 7 from the phase 2 recut, where they were associated with the two radiocarbon dates above. Vessel 8 was represented by a single residual sherd from site 3 (Gibson 1994, 157-65).

Raw Material Selection Two different selection traditions were in use during Phase 4 at Sarn-y-bryn-caled.

Vessels 1, 2, 3, 5, 6 and 7 belong in the simple group 1 tradition, using coarse granular fragments of local stone and grog. Vessel 8 belongs in a slightly different tradition, group 21, using fine and medium fragments of laminar shell and granular grog.

the phasing of raw material traditions at Sarn-y-bryn-caled

	phase 4	phase 5
group 1	sc2 sc3 sc6	sc5 sc7
group 21	sc8	

Construction (see figure 6.2) Vessels 1 and 2, and probably vessel 5, belong in group 24. These vessels were built with upright concave rims on a deep, neutral body and, where the evidence survives, had rounded rim moulding, round bases and no lugs. Vessel 7, which may belong in group 34, would have had a straight upright rim and neither rim moulding or lugs.

the phasing of construction traditions at Sarn-y-bryn-caled

	phase 4	phase 5
group 24	sc2	sc5
group 34		sc7

Decoration There were four decorative styles in use at Sarn-y-bryn-caled.

Vessel 2 was part of the group 10 tradition, in which the surface of the vessel was divided by pushing the clay aside with bird bone and whipped cord. Vessels 3 and 8 were part of the group 6 tradition. In this case the vessels were decorated by using worked stone points to remove clay as it was drying, dividing the surface of the vessel. Vessel 6 was part of the undecorated group 11 tradition. Vessel 5 belonged in the group 16 tradition, in which the surface of the vessel was divided using whipped cord and fingernail impressions, while the clay was still plastic. Vessel 1 was decorated by using fingernail and bird bone impressions to divide the surface of the vessel, the group 23 tradition.

the phasing of decorative traditions at Sarn-y-bryn-caled

	phase 4	phase 5
group 10	sc2	
group 6	sc3 sc8	
group 11	sc6	
group 16		sc5

Firing Three different ways of firing were represented.

Vessel 2 was fired using dung as the main fuel, over a long period of time, in the group 3 tradition. Vessels 3, 5, 6 and 8 were fired slowly, using grass as the main fuel, in the group 5 tradition. Vessels 7 and 1, were both fired using dung as the main fuel for a short period of time, in the group 1 tradition.

the phasing of firing traditions at Sarn-y-bryn-caled

	phase 4	phase 5
group 3	sc2	
group 5	sc3 sc6 sc8	sc5
group 1		sc7

Use Pottery was used in four different ways at Sarn-y-bryn-caled.

Vessels 2, 3 and 6 were part of the group 10 tradition of pottery use. These vessels were not modified after firing, were porous, and had poor resistance to both heat damage and physical blows. Vessel 6 at least appears to have been used for cooking, despite these limitations. Vessel 8 belonged in the group 8 tradition of pottery use. This vessel was not modified after firing, was porous and was good at withstanding heat and moderately strong. Other group 8 vessels show plentiful evidence of use for cooking, despite no such evidence surviving on Vessel 8. Vessels 5 and 7 belonged in group 12, they were not modified, were porous, had a poor resistance to thermal stress but were moderately strong. Vessel 1, was part of the group 30 tradition. It had been perforated after firing and was otherwise similar to group 10 vessels in its properties and had been used for cooking. Vessel 1 was small in size.

the phasing of use traditions at Sarn-y-bryn-caled

	phase 4	phase 5
group 10	sc2 sc3 sc6	
group 8	sc8	
group 12		sc5 sc7

6.7 *Trelystan*

The Neolithic structures at Trelystan (Britnell 1982) were sealed beneath two round barrows above the east side of the upper Severn valley (NGR SJ 277 070). The earliest phases are represented by a large pit grave, a group of smaller pits and two structures, all apparently of late Neolithic date (see figure 6.5). The pit grave contained the carbonised remains of a timber coffin, radiocarbon dated to 4345 ± 65 bp (CAR-282), but no pottery. It seems likely (see section 6.2, above) that this date is too old, and that Structure B represents the first use of the site The pottery was distributed amongst the buried soils

beneath the barrows, the small pits and the two structures. Structure A was beneath the north east edge of Barrow II and was made up of eight pits and a hearth surrounded by between 40 and 50 stakeholes. Structure B was beneath the west side of Barrow I and consisted of a slot-edged hearth associated with three pits and surrounded by approximately 25 pointed stakeholes. To the east of Structure B was a group of three more small pits (Britnell 1982, 133-41).

The Neolithic sherds represent an assemblage of around nine vessels, within the Durrington Walls sub-style of Grooved Ware, together with three less diagnostic vessels. Vessels 1 and 2 came from within the hearth of Structure B and were associated with a radiocarbon date of 3985 ± 70 bp (CAR-274). Vessels 3 and 4 came from pit 13, within Structure B, and were associated with charcoal radiocarbon dated to 4260 ± 70 bp (CAR-272). Vessel 5 came from pit 14 in Structure B, associated with a radiocarbon date of 4135 ± 65 bp (CAR-273). Vessel 6 came from pit 15 in Structure B. Vessel 7 came from the buried soil to the east of the Structure B hearth. Vessel 8 was represented by a single sherd from the buried soil beneath Barrow I and Vessel 9 by a single sherd from pit 11. Vessels 15 and Vessel 16 came from the buried soil beneath the centre of Barrow I, while Vessel 17 was residual within the body of Barrow II.

Raw Material Selection Three different raw material selection traditions were in use at Trelystan.

Group 52, which was used for Vessels 1, 2, 3, 4, 5, 6, 7, 8 and 15, involved the mixing clay from a source up to 1 week's travel away with medium sized granular grog inclusions. Group 44, which was used for Vessel 9, involved mixing the same clay with large and medium sized laminar and granular grog pieces. Group 8, used for Vessels 16 and 17, mixed clay from the same source with medium sized granular grog and stone pieces, the stone also being from up to one week's travel away.

Construction There is evidence for the use of five different construction traditions (see figure 6.2).

Vessel 5, in group 30, was made with a straight-sided open rim on a deep neutral body with a flat base and neither rim moulding or lugs. Vessel 17, in group 28, was also made with a straight-sided open rim on a deep open body with a flat base and neither rim moulding or lugs. Vessel 6, in group 34, had an upright straight-sided rim on a shallow neutral body with a rounded base and neither rim moulding or lugs. In group 42, Vessel 3

had a closed straight-sided rim on a deep closed body with a flat base and neither rim moulding nor lugs. In group 47, Vessels 2 and 15 had closed curved rims which probably, certainly in the case of Vessel 2, belonged with deep closed bodies and flat bases. They had neither rim moulding nor lugs.

Decoration Eight different ways of decorating pottery were in use at Trelystan.

Vessel 2 belonged in the group 32 decoration tradition. The pot was unified by using a worked stone point to remove clay while it was plastic. The group 33 tradition was represented by Vessels 1 and 16, which were divided by using finger impressions and added strips of plastic clay. Vessel 7, in group 7, was divided by using a bone point to push aside the clay while it was plastic. Vessel 3, in group 34, was divided by using bone and worked stone points to push aside and remove plastic clay. Group 36 was represented by vessels 6 and 17, which were unified by using worked stone points to remove drying clay. Group 6 included Vessels 5 and 9, which had been divided by using stone points to remove drying clay. Vessel 8, in group 37 had been decorated in the same manner, but strips of plastic clay had been added. Vessel 4 may have belonged to group 36, 37 or 6, as the surviving evidence is unclear. Vessel 15 belongs in the undecorated group 11 tradition.

Firing All of the Trelystan pottery except Vessel 17 belonged in the group 5 firing tradition. It had been fired slowly, using grasses as the main fuel. Vessel 17 had been fired using dung as the main fuel for a moderate length of time, in the group 2 tradition.

Use There was evidence for nine different types of vessel use at Trelystan.

Vessel 1 had been perforated after firing. It was not porous, was moderately heat-proof, moderately strong and belonged in group 29. Vessels 3 and 5 belonged in group 17, they were not modified after firing, were very porous, were heat resistant and moderately strong. They appear to have been used in cooking, probably of dry foods over open fires, and were small or medium sized. Vessel 7 in the group 2 tradition was similar but was stronger.

Vessel 15 in the group 10 tradition was porous and was neither heat-proof nor strong. Group 14 was represented by Vessel 17, very small, porous and moderately strong and heat resistant. Group 19 was represented by Vessel 2, porous and heat resistant, but physically weak. Vessels 4, 6 and 8 belonged in group 8, porous and heat resistant and moderately strong. All of the vessels in group 8 appear to have been used in cooking.

Vessel 16 in group 23 also appears to have been used for cooking, despite having poor heat-resistance and strength and being non-porous. Vessel 9 belongs in the group 9 tradition. It was non-porous, heat resistant and moderately strong, and had been used for cooking, probably of liquids.

6.8 *Summary*

In this section I will discuss the variation of traditions and their meanings across the whole of the study area. This part of the study will necessarily concentrate on those traditions which include phased pottery.

Raw Material Selection In the upper Severn valley, these traditions were extremely localised, each site having its own way, or set of ways, of collecting raw materials. They were also very strongly phased, few traditions ran on from one phase to another.

The phase 1 traditions were very different to one another. Group 53 was extremely complex, probably as a deliberate statement about the difficulty of pottery production, and group 43 was as simple as was possible. This contrast may be a result of the long, undifferentiated nature of the upper Severn valley phase 1, compared with other study areas.

Group 10, which began during phase 2, used very commonly available stone and grog, but, on the evidence of the clay used was not a local tradition.

The very common late tradition, group 1, with its use of coarsely processed local stone and grog, began in phase 3, and continued into phases 4 and 5.

There were two traditions in use during phase 4, group 21, with its use of shell and grog, and the continuing group 1.

Group 1 also continued into phase 5, along with three new groups, 44, 8 and 52, all of which used clay from a source up to 1 week's travel away, along with grog, and, in the case of group 8, stone inclusions from a distant source. At Trelystan at least, wilfully complex potting recipes were not solely an early phenomenon. It may be that in these cases the pottery itself was being produced at some distance from its place of deposition. At Trelystan:

> '..a source for all or most of the pottery should be sought to the east and south east of the site, and indeed some distance from it (20 km +).. ...The possibility that the

settlement and the barrows were actively foci within a transhumance subsistence system might account for the presence of vessels made from distant clays when nearer sources were probably available.' (Darvill *in* Britnell 1982, 194)

A similar case can be made for pottery from Four Crosses (Darvill *in* Warrilow *et al* 1986, 76) and from The Breiddin:

'...a source in North Wales [for Vessel 37] is most likely.. ...It is unlikely that [Vessel 36a] is a local fabric.. ...very suggestive of periodic visits to the hilltop by mobile groups.' (Darvill *in* Musson 1991, fiche 13.1, 193-4)

It is notable that exchange mechanisms, and presumably the transhumance patterns associated with them, ran in two directions, both further into Wales and out to Shropshire.

the phasing of raw material traditions in the upper Severn valley

	early Neolithic	middle Neolithic		late Neolithic	
	phase 1	phase 2	phase 3	phase 4	phase 5
group 43	yt1				
group 53	bn36a bn37				
group 10		fc1			
group 1			fc2	sc2 sc3 sc6	sc5 sc7
group 21				sc8	
group 44					ts9
group 8					ts16
group 52					ts1 ts2 ts3 ts4 ts5 ts6 ts7 ts8 ts15

Construction As in other study areas, evidence for construction traditions is limited to a few vessels. Construction traditions in the upper Severn valley were strongly phased, but were less localised than traditions of raw material selection (see figure 6.2).

Concave rim forms, shallow bodies and round bases were used during phase 1, with no rim moulding or lugs. Group 9 vessels were open in profile and group 16 vessels neutral.

Group 5, in phase 2, introduced deeper body shapes, while retaining the concave rims, round bases and lack of moulding in the phase 1 styles. Group 49 vessels, in phase 3, also had deeper bodies with concave rims, but introduced angular rim mouldings.

Group 24, in phase 4, followed the general trend of vessel shape development. These vessels had upright, concave rims on deep neutral bodies with round bases, but with the new development of rounded rim mouldings

Group 24 continued into phase 5 but the four new styles beginning at this time, groups 30, 42, 34 and 47, saw a major break with previous styles: flat bases; straight-sided rims; and closed forms were all new introductions into the area at this time.

the phasing of construction traditions in the upper Severn valley

	early Neolithic	middle Neolithic	late Neolithic		
	phase 1	phase 2	phase 3	phase 4	phase 5
group 9	yt1 bn36a				
group 16	bn37				
group 5		fc1			
group 49			fc2		
group 24				sc2	sc5
group 30					ts5
group 42					ts3
group 34					sc7 ts6
group 47					ts2 ts15

Decoration These traditions appear to less restricted in both locality and phase than any other group of traditions, except those to do with firing techniques. Decorative style can be transmitted very easily, both across time and space, but this transmission does not necessarily imply continuity of meaning. In particular, the survival of burnishing as a decorative technique from phase 1 to phase 5 probably does not imply a particularly meaningful connection between the two vessels in question. However, some changes through time did take place.

The three phase 1 styles, groups 3, 8 and 11, were all concerned to unify the surface of the vessel, using burnishing, simple impressed decoration or by leaving the surface unmodified.

The single phase 2 style, group 15, also unified the surface of the vessel, with simple incised decoration. Group 10, which arose during phase 3, saw the first use of more complex impressed decoration which divided the vessel's surface.

Group 10 continued into phase 4, alongside the new group 6 tradition. This was part of the shift from decorating by impressing objects into plastic clay, during phases 1 to 4, to the use of sharp points to remove partially dry clay, during phases 4 and 5. Another decorative technique introduced during phase 5 was the practice of adding clay, in the form of horizontal cordons, to divide the surface of the vessel. The organisation of decoration into complex configurations also appears to be a late trait. Phase 1 and 2 vessels had decoration which was much less structured.

the phasing of decorative styles in the upper Severn valley

	early Neolithic	middle Neolithic		late Neolithic	
	phase 1	phase 2	phase 3	phase 4	phase 5
group 3	bn37				
group 11	bn36a				
group 8	yt1				sc7
group 15		fc1			
group 10			fc2	sc2	
group 6				sc3 sc8	ts5 ts9
group 36					ts6
group 37					ts8
group 32					ts2
group 7					ts7
group 34					ts3
group 16					sc5
group 33					ts1 ts16

Firing The vast majority of pottery from the study area appears to have been fired using the same simple, grass-based technique. As was the case north-west Wales, this was the first method used and it was not until phase 2 that the first use of more complex, higher-temperature methods occurred. However, at all sites in the upper Severn valley at least half, and usually a large percentage, of the pottery was fired in the group 5 tradition.

the phasing of firing techniques in the upper Severn valley

	early Neolithic	middle Neolithic		late Neolithic	
	phase 1	phase 2	phase 3	phase 4	phase 5
group 5	bn36a bn37 yt1		fc2	sc3 sc6 sc8	sc5 ts1 ts2 ts3 ts5 ts6 ts7 ts8 ts9 ts15 ts16
group 3		fc1		sc2	
group 1					sc7

Use Pottery was used in three different ways during phase 1, groups 4, 18 and 28. None of the vessels in these groups had been modified after firing. There is no direct evidence for use as cooking vessels on any phase 1 pottery, but the technical properties of the vessels can be discussed. In these terms; none of the early pottery would have been well suited to the storage of liquids, with the group 4 and group 18 vessels well suited to storage of dry goods and the group 4 vessels best suited for cooking over open fires.

As I have noted elsewhere, the technical properties of the pottery can be somewhat at variance with the evidence for use. I would suggest the following patterns of use. Group 18 vessels were used for slow cooking and for the storage of dry goods. Group 4 vessels

were used for storage of dry goods and cooking over open fires, they would have been sufficiently impermeable to allow the cooking, if not the storage of liquids.

Two new traditions arose during phase 4, groups 8 and 10. Vessels in group 8 would have been well suited to cooking over open fires, probably including the cooking of liquids, and the storage of dry goods. All of the vessels in this group except one show evidence of having been used for cooking. Vessels in group 10, by contrast, would have been very poorly suited either for storage or cooking, and show no obvious evidence of such use.

Vessels continued to be used in the group 8 and 10 traditions into phase 5, when seven new traditions developed. Vessel 7 from Trelystan, in group 2, would have been well suited to use for cooking over open fires or the storage of dry goods, but not well suited for slow cooking of liquids. Vessel 9, in group 9, has distinct evidence of use for cooking and would have been well suited to cooking of both dry and liquid foods over open fires. Vessel 2, in group 19, has no direct evidence of use, but would have been well suited to cooking over open fires and poor as a storage vessel. Vessel 16, in group 23, has strong evidence for use for cooking, despite being both fragile and not heat-resistant. As suggested elsewhere (see section 5.9, above), group 23 vessels may have been used for the ritualised cooking of a liquid. Vessel 1, in group 29, was perforated after firing and had no direct evidence for use in cooking. In terms of its physical characteristics, it would have been particularly well suited to the storage of liquids, but was probably heat-resistant enough to be used in most kinds of cooking. The vessels in group 17 appear to have been used for cooking, probably for dryish foods, over an open fire. Those in group 12 show no evidence of any such use, they may possibly have been used as storage vessels for dry goods, but an entirely 'non-domestic' function cannot be ruled out.

the phasing of use traditions in the upper Severn valley

	early Neolithic phase 1	middle Neolithic phase 2	phase 3	late Neolithic phase 4	phase 5
group 4	yt1				
group 18	bn36a				
group 28	bn37				
group 14		fc1			
group 10				sc2 sc3 sc6	ts15
group 8				sc8	ts4 ts6 ts8
group 23			fc2		ts16
group 2					ts7
group 9					ts9
group 19					ts2
group 29					ts1
group 17					ts3 ts5
group 12					sc5 sc7

7 The Usk valley

7.1 *Introduction*

The pottery which I will consider in this chapter comes from a group of sites which cluster along the valley of the River Usk in South East Wales (figure 7.1). The sites in question are: Abergavenny (Probert *et al* 1969); Cefn Cilsanws (Webley 1958); Ffostyll (Vulliamy 1923); Y Gaer, Gwernyfed (Lloyd 1958); Gwernvale (Britnell & Savory 1984); Mynydd Troed (Crampton & Webley 1966); Onllwyn (Webley 1956); Penywyrlod (Britnell & Savory 1984); Ty Isaf (Grimes 1939); and Usk (Peterson 1992).

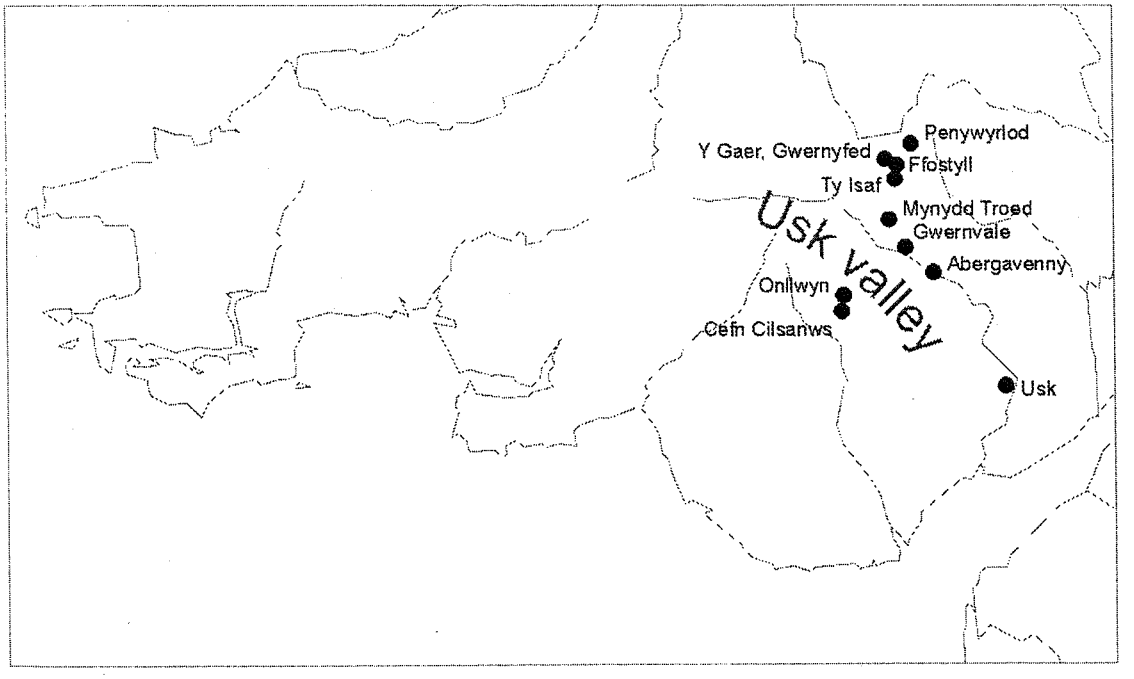


Figure 7.1: Neolithic pottery from the Usk valley

7.2 *Chronological framework*

Of the sites in the study area, only Gwernvale and Ty Isaf have well-stratified assemblages which might allow phasing, and only Gwernvale has a definite chronological sequence associated with ^{14}C dates.

Pottery from Gwernvale can be divided into three broad phases, related to a series of radiocarbon dates for the site (see section 7.7, below). Vessels 1 to 17 pre-date the building of the cairn, and probably pre-date 3700 calBC. Vessels 18 to 24 came from within chamber 2, and vessels 25 to 31 were associated with the final closing of the cairn, sometime after 3100 calBC.

The chronology at Ty Isaf is less well defined (see section 7.11, below). I have assumed for the sake of this analysis that chamber III is the primary part of the cairn. Vessels 10, 11, 12 and 13 from the lowest layer in this chamber would thus have been the earliest material on the site. Pottery from the upper layers of chamber III and the two side chambers I and II, vessels 1, 2, 3, 4, 5, 6, 7 and 9, would have been slightly later in date than this.

It is not easy to mesh these two sequences together. A number of traditions which are represented at both sites fall early in the Gwernvale sequence (construction groups 5 and 21 and use group 22). This could suggest that both Ty Isaf phases cover the same period as Gwernvale phase 1.

	first Neolithic before 3700 calBC		early Neolithic	middle Neolithic post 3100 calBC
site	phase 1a	phase 1b	phase 2	phase 3
Ty Isaf	ti10 ti11 ti12 ti13	ti1 ti2 ti3 ti4 ti5 ti6 ti7 ti9		
Gwernvale	gv1 gv2 gv3 gv4 gv5 gv6 gv7 gv8 gv9 gv10 gv11 gv12 gv13 gv14 gv15 gv16 gv17		gv18 gv19 gv19 gv20 gv21 gv22 gv23 gv24	gv25 gv26 gv27 gv28 gv29 gv30 gv31

Using this suggested sequence as a guide I will now examine how people made and used pottery in the Usk valley.

7.3 *Abergavenny*

The single vessel from a rescue excavation on Flannel Street in Abergavenny was discovered in a context containing both Roman and medieval material, and was clearly residual (Probert et al 1968, 171-2).

Raw Material Selection The Abergavenny vessel belongs in the group 1 tradition. This was a common middle and late Neolithic way of working, involving the use of locally available stone and grog.

Construction The vessel was constructed in the group 37 tradition, with a straight-sided upright rim on a tall neutral body with a rounded base and rounded rim moulding. There was no evidence of lugs.

Decoration The vessel was decorated in the group 1 tradition. The surface was divided. Pieces of twisted cord were impressed into the plastic clay to form motifs.

Firing The firing was carried out using dung as the main fuel for a relatively long period of time, in the group 3 tradition.

Use There is no direct evidence for how the Abergavenny pottery was used. In terms of its physical characteristics it belongs in the group 7 tradition, was non-porous, poor at resisting heat damage and moderately strong.

7.4 *Cefn Cilsanws*

The site at Cefn Cilsanws was a small stake shelter discovered close to a cairn cemetery in the Brecon Beacons (Webley 1958, 79-80). The site was 4 km north of Merthyr Tydfil, at the head of the Taff valley (NGR SO 025 099), between two peaks at approximately 450 m OD. The pottery came from patches of an old land surface, on the south-west side of the small stake structure. Parts of at least three different vessels were discovered in this material, associated with worked stone and charcoal. The function of the structure is unclear, the lack of a hearth, the flimsy and irregular nature of the stake walling and the exposed position of the site, makes Webley's suggestion (1958, 87) that the site is a dwelling very unlikely to be true.

Raw Material Selection All three vessels from the site belong in the group 1 tradition. They are all tempered with coarse, granular, locally available stone and grog.

Construction There is little conclusive evidence about construction traditions at Cefn Cilsanws. Vessel 1 has an inwardly curved, upright rim, without rim moulding and may belong in group 46.

Decoration Vessels 1 and 2 were both decorated. Vessel 1 belongs in the group 4 tradition, in which the surface of the vessel was divided. The decoration was produced using a bird bone while the clay was still plastic. Vessel 2 was decorated in a similar way using a bone point and belongs in the group 7 tradition. Vessel 3 appears to have been completely undecorated, and thus belongs in the group 11 tradition.

Firing All three vessels belong in the group 5 firing tradition. They were fired using grass as the main fuel, in a long, low temperature firing.

Use All three vessels belong in the group 10 tradition. In terms of physical characteristics this group was porous, and neither strong nor heat-resistant. In spite of these disadvantages, Vessel 1 has evidence of being heated regularly after firing, presumably in cooking.

7.5 *Ffostyll*

The pottery is from excavations carried out in the early 1920's, in one of a group of three long cairns, in the parish of Llanelieu, near Talgarth (Vulliamy 1921 & Vulliamy 1923). The site in question is the most southerly of the three cairns (NGR SO 179 349) which lies at approximately 330 m OD in the foothills of the Black Mountains. It is referred to by Vulliamy as Ffostill South and appears elsewhere in the literature and museum catalogues as Ffostyll South and Ffostill C. The cairn is a badly disturbed long cairn, constructed of old red sandstone. One chamber survived at the northern end of the cairn, and was reported to be filled with 'cremated bone' (Vulliamy 1921, 304), while a large area of disturbance at the southern end also produced cremated bone, presumably from a second, destroyed chamber.

The single vessel which survives from the site came from excavations in the disturbed area to the east of the northern chamber (Vulliamy 1923, 321). It was associated with more cremated bone and worked flint but cannot be regarded as having been *in situ*.

Raw Material Selection The vessel belonged in the group 1 tradition, common throughout the middle and late Neolithic. The fabric was tempered with coarse, granular, locally available stone.

Construction There was insufficient evidence to categorise the vessel as only the round base survived.

Decoration The surviving portion of the vessel was undecorated, but not enough of the vessel survived to allow it to be confidently placed in the group 11 tradition.

Firing The vessel was part of the group 5 tradition. It had been fired in a slow, low temperature fire, using grasses as the main fuel.

Use The vessel was entirely free of secondary oxidisation or residues; which suggests, as a large part of the base survived, that it was not used for cooking. In terms of its physical

characteristics it belongs in group 23. It would not have been strong or heat-resistant, but would have been relatively impermeable.

7.6 *Y Gaer, Gwernyfed*

The site is a small Early Iron Age hillfort near Aberllynfi (NGR SO 175 376). The Neolithic pottery came from a small pit truncated during the construction of the rampart (Lloyd 1958, 66-67). Only a very small area of the site was excavated, so that the extent and character of Neolithic activity on the hill was unclear. All of the sherds were from a single vessel, which was presumably originally deposited, along with charcoal, in the pit.

Raw Material Selection The vessel belongs in group 50, tempered with fine, medium and coarse shell and stone inclusions, from up to 1 weeks travel away.

Construction The vessel is part of the group 31 tradition, It was made with an open, straight-sided rim on a shallow open body with a round base and a rounded rim moulding, but no lugs.

Decoration The vessel is completely undecorated and consequently belongs in the group 11 tradition.

Firing The vessel was fired using dung as the main fuel, in a high temperature firing, for a moderate length of time, putting it in the group 2 tradition.

Use There was no direct evidence for how the vessel had been used. In terms of physical properties the vessel belongs in the group 17 tradition, very porous but resistant to heat and moderately strong.

7.7 *Gwernvale*

Gwernvale is a trapezoidal long cairn with at least three lateral side chambers. It lies by the side of the A40, 0.5 km to the west of Crickhowell, on a terrace on the north side of the Usk valley (NGR SO 211 192). A salvage excavation was carried out at the site in 1977 and 78, associated with the widening of the A40 (Britnell & Savory 1984, 43-159). The long cairn seals a number of earlier Neolithic and Mesolithic features, including two rectangular wooden structures (figure 7.3).

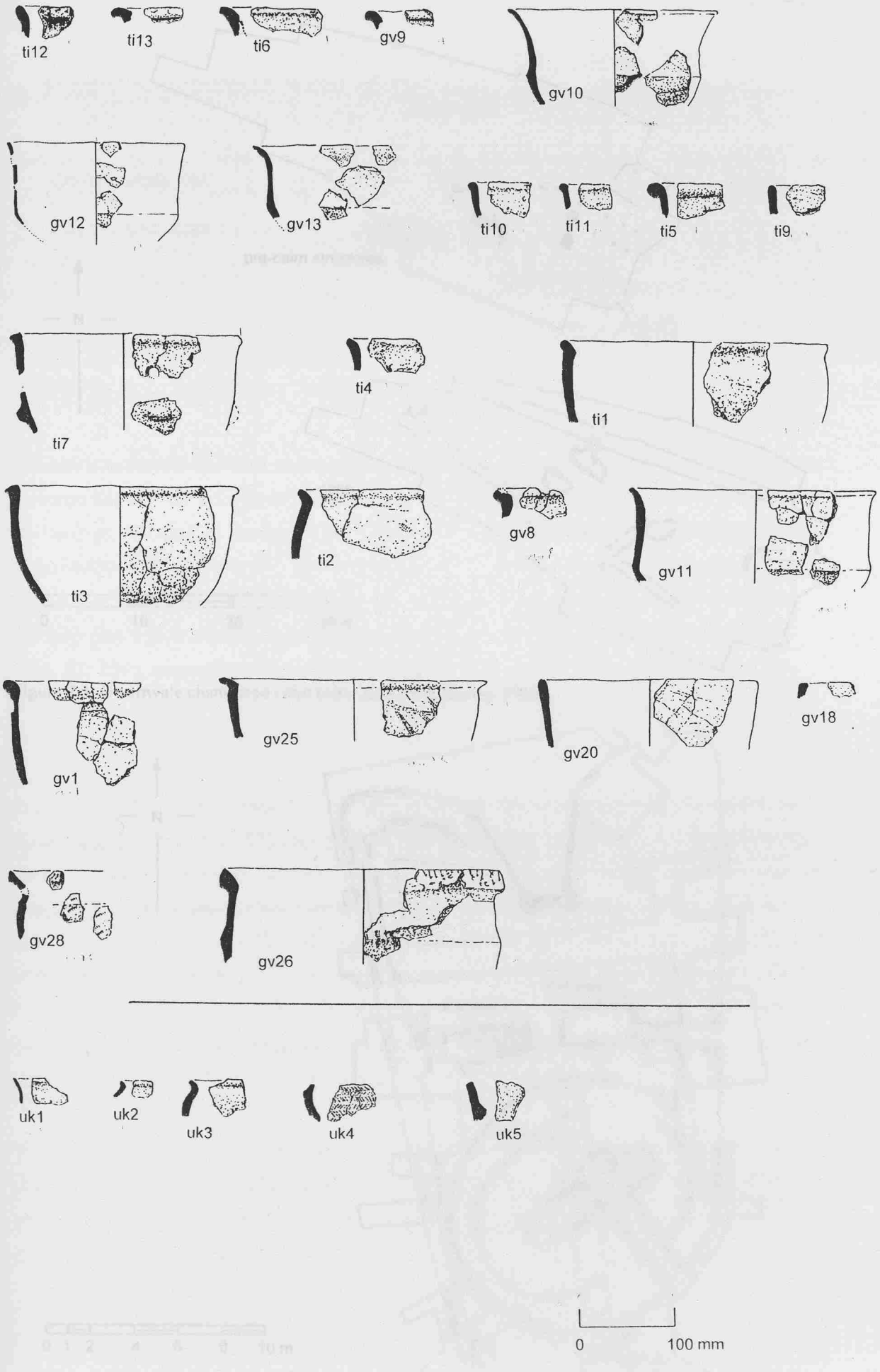


Figure 7.2: Pottery construction groups from the Usk valley (after Britnell & Savory 1984; Grimes 1939; Peterson 1992)

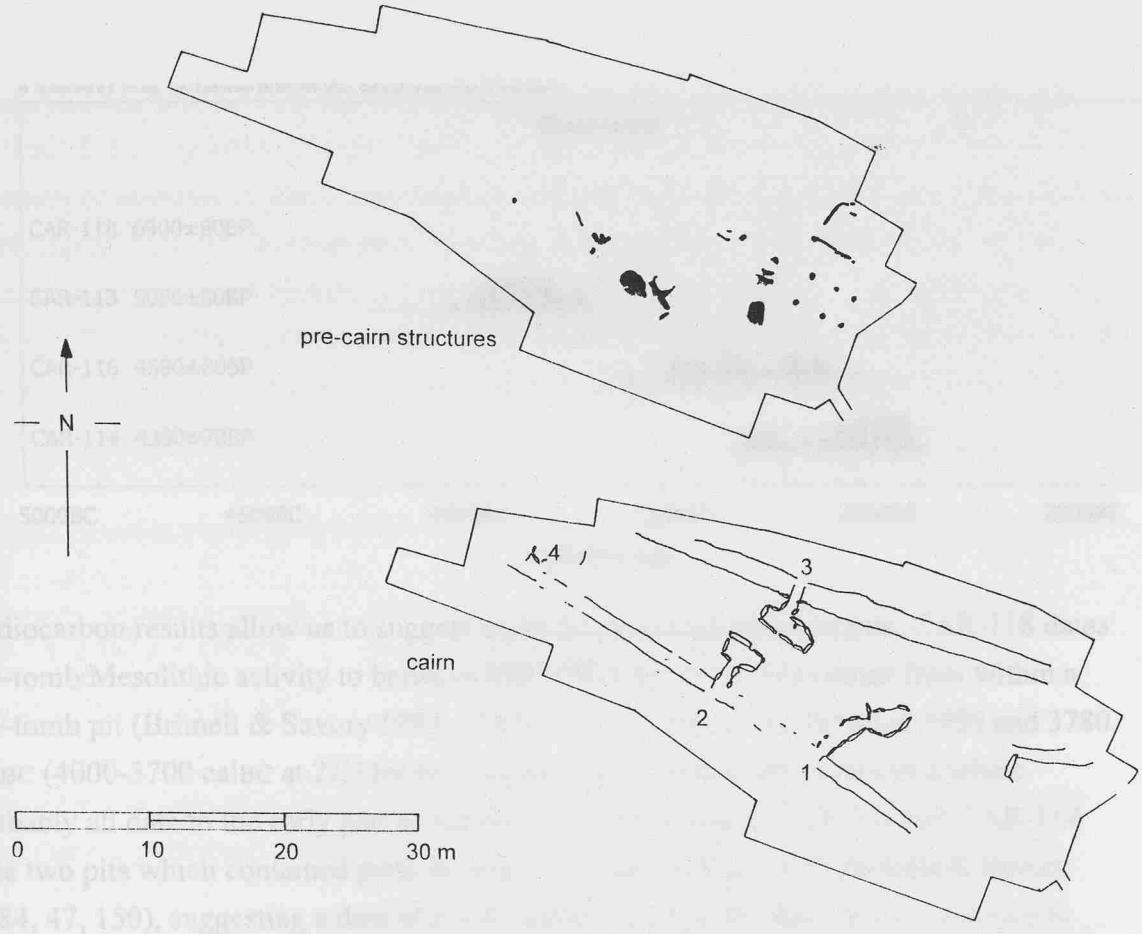


Figure 7.3: Gwernvale chambered cairn (after Britnell & Savory 1984)

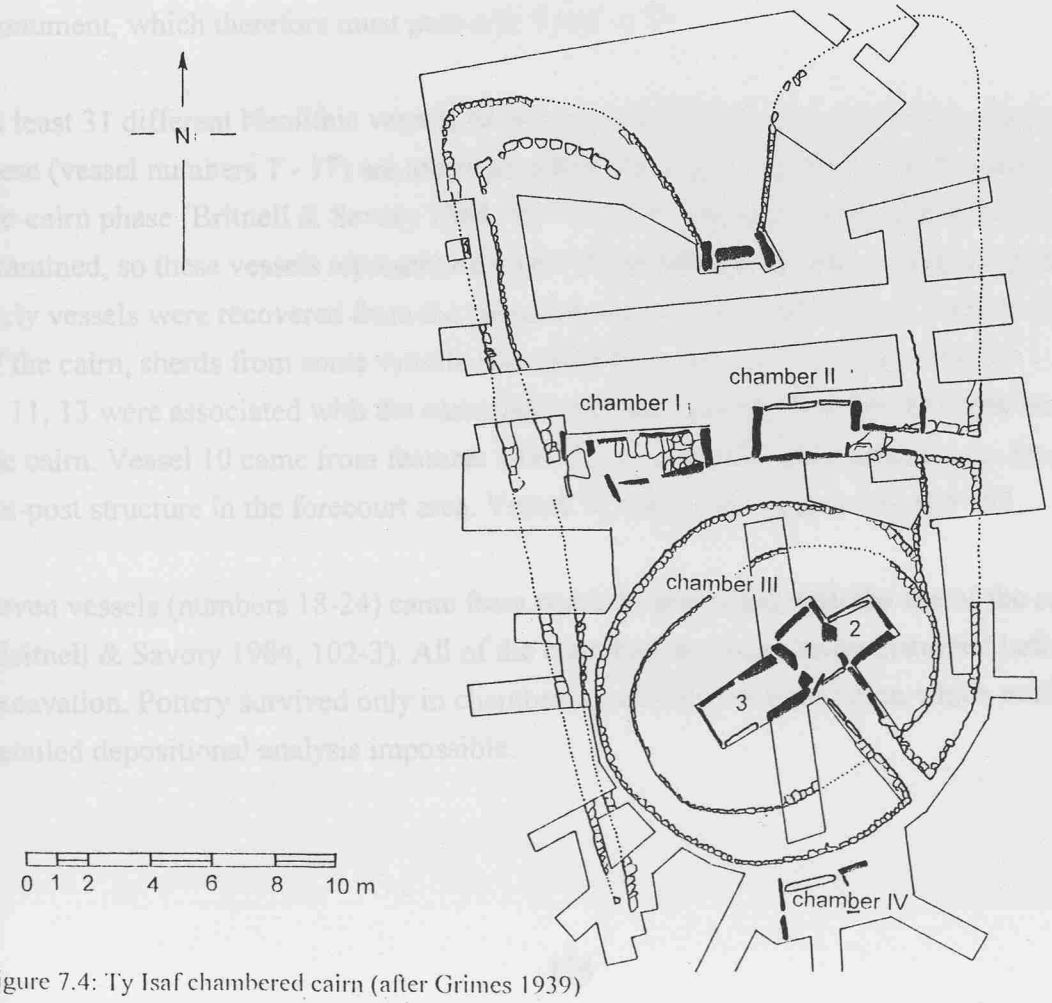
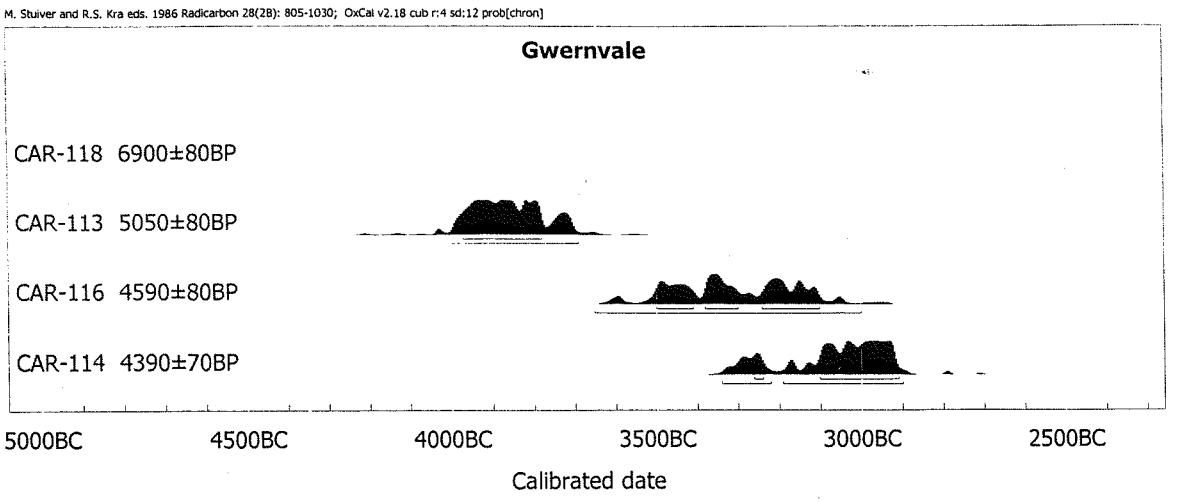


Figure 7.4: Ty Isaf chambered cairn (after Grimes 1939)



Radiocarbon results allow us to suggest dates for three successive events. CAR-118 dates pre-tomb Mesolithic activity to between 6980-6820 bp. CAR-113 comes from within a pre-tomb pit (Britnell & Savory 1984, 138-9) and suggests a date between 3980 and 3780 calBC (4000-3700 calBC at 2Σ) for this feature. The pre-tomb structures as a whole probably all date to the early part of the 4th millennium calBC. CAR-116 and CAR-114 date two pits which contained parts of vessel 26 outside chamber 2 (Britnell & Savory 1984, 47, 150), suggesting a date of *c* 3100 calBC (3350-3000 calBC at 2Σ). This pit is sealed by the material blocking chamber 2 at the time of the final closure of the monument, which therefore must post-date 3100 calBC.

At least 31 different Neolithic vessels have been identified at Gwernvale. Seventeen of these (vessel numbers 1 - 17) are ascribed, either certainly or probably, by Britnell to the pre-cairn phase (Britnell & Savory 1984, 97-101). The whole of the pre-cairn soil was not examined, so these vessels represent only part of the early assemblage. Parts of all the early vessels were recovered from the pre-cairn soil and equivalent layers outside the area of the cairn, sherds from some vessels also came from pre-cairn features. Vessels 1, 2, 3, 9, 11, 13 were associated with the construction of the structure beneath the north horn of the cairn. Vessel 10 came from features 149-51, 163 and 259, and probably also from the six-post structure in the forecourt area. Vessel 12 was from features 162 and 167.

Seven vessels (numbers 18-24) came from contexts associated with the use of the cairn (Britnell & Savory 1984, 102-3). All of the chambers had been badly disturbed before excavation. Pottery survived only in chamber 2, and there in a condition which made detailed depositional analysis impossible.

Seven vessels (numbers 25-31) were associated with the final closing of the monument (Britnell & Savory 1984, 103-5). Vessels 25, 26 and 27 appear to be associated with the blocking of chamber 2. The single sherd of vessel 27 and parts of vessel 26 were from a pit (F58, figure) beneath the chamber 2 blocking material. The ^{14}C date (CAR-114) 4390 ± 70 bp comes from this pit. Sherds of vessels 25 and 26 came from F47, associated with ^{14}C date (CAR-116) 4590 ± 80 bp. As suggested above, this places the blocking of chamber 2 at some date after *c* 3100 calBC. Vessels 29 and 30 appear to have been associated with the closing of chamber 3, although there is a possibility that they have been incorporated into these layers as residual material. Vessel 31 came from the partially excavated blocking material outside chamber 4.

pre-cairn contexts (phase 1)	chamber 2 (phase 2)	pre-blocking contexts (phase 3)
gv1 gv2 gv3 gv4 gv5 gv6 gv7 gv8 gv9 gv10 gv11 gv12 gv13 gv14 gv15 gv16 gv17	gv18 gv19 gv20 gv21 gv22 gv23 gv24	gv25 gv26 gv27 gv28 gv29 gv30 gv31

Raw Material Selection There were six different styles of raw material gathering in use (see Darvill *in* Britnell & Savory 1984, 110-1, for thin section data).

Vessel 17, in group 3, was tempered with fine and medium pieces of granular stone and grog. Vessels 1, 2, 3, 4, 5, 6, 27 and 31 belong in group 26. They were tempered using pieces of locally available stone, chopped up plant material and grog. The inclusions were fine, medium and coarse and were predominantly laminar in texture, with some granular pieces. Pottery in group 27, vessels 7, 8, 9, 23 and 25, was tempered using pieces of chopped plants. The pieces were coarse and medium in size and predominantly, but not exclusively, laminar in texture. Vessels 10, 11, 12, 13, 14, 15, 16, 19, 20, 22 and 29, all in group 28, were tempered using fine, medium and coarse pieces of chopped plant material which was laminar in texture. Group 1 vessels, numbers 24, 26, 28 and 30, were tempered with coarse, granular pieces of stone. Vessels 18 and 21, in group 15, were tempered with coarse, laminar pieces of stone from a source up to one week's travel away.

the phasing of raw material selection traditions at Gwernvale

	phase 1	phase 2	phase 3
group 3	gv17		
group 26	gv1 gv2 gv3 gv4 gv5 gv6		gv27 gv31
group 27	gv7 gv8 gv9	gv23	gv25
group 28	gv10 gv11 gv12 gv13 gv14 gv15 gv16	gv19 gv20 gv22	gv29
group 15		gv18 gv21	
group 1		gv24	gv26 gv28 gv30

Construction There was evidence for eight different methods of building pottery amongst the Gwernvale material (see figure 7.2).

Vessels 10, 12 and 13 belong in group 21. They had open concave rims on deep open bodies with rounded bases, no rim mouldings and no evidence for lugs. Vessel 9 may have belonged in this group, as it also had an open concave rim without moulding. Vessel 1 was part of the group 15 tradition. It had an open concave rim, above a neutral concave neck, on a deep open body with a rounded base. Vessel 1 had a rounded rim moulding but no evidence for lugs. Vessel 11, in group 5, had an upright concave rim on a deep neutral body with a rounded base and neither rim mouldings or lugs. Vessel 8, with its upright concave rim and lack of rim mouldings, may also have been part of group 5.

Vessel 25, in group 3, had an open concave rim on a shallow neutral body with a rounded base. Vessel 25 had a rounded rim moulding but no evidence for lugs. Vessel 20, in group 27, had an open straight-sided rim on a deep open body with a rounded base and neither rim mouldings or lugs. Vessel 18 may be part of group 42 or 45, as it had a closed straight-sided rim and no rim mouldings or lugs.

Vessel 28, in group 2, had an open concave rim above a deep open body with a rounded base. Vessel 28 had an angular rim moulding but no evidence for lugs. Vessel 26, in group 17, had an upright concave rim on a deep neutral body with a round base, but it had an angular rim moulding.

the phasing of construction traditions at Gwernvale

	phase 1	phase 2	phase 3
group 21	gv9 gv10 gv12 gv13		
group 15	gv1		
group 5	gv8 gv11		
group 3		gv25	
group 27		gv20	
group 42/45		gv18	
group 2			gv28
group 17			gv26

Decoration There were five different decoration traditions used at Gwernvale.

Group 12, comprised vessels 4 and 20, which were decorated by having the clay pushed aside while still plastic with wooden points. The surface of these vessels was divided. The vessels in group 11, numbers 1, 3, 5, 6, 8, 9, 12, 16, 17, 18, 22, 23 and 24, had no changes

to their surfaces. Those in group 14, numbers 2, 7, 10, 11, 13, 14, 15, 19, 21 and 25, were unified by being grass-wiped over the entire surface.

Vessel 28, in group 1, was decorated using combinations of plant fibres to push aside the clay while it was still wet. This decoration divided the surface of the vessel. Vessel 26, in group 9, was decorated using combined plant fibres and a bone point to push aside the clay while it was still plastic. This decoration also divided the surface of the vessel.

the phasing of decoration traditions at Gwernvale

	phase 1	phase 2	phase 3
group 12	gv4	gv20	
group 11	gv1 gv3 gv5 gv6 gv8 gv9 gv12 gv16 gv17	gv18 gv22 gv23 gv24	
group 14	gv2 gv7 gv10 gv11 gv13 gv14 gv15	gv19 gv21	gv25
group 1			gv28
group 9			gv26

Firing There was evidence for four different firing traditions.

Group 2 vessels, including 1, 6, 9, 12, 13, 15, 16, 17 and 22, were all fired for a moderate period of time, using dung as the main fuel. Group 1 vessels, numbers 2, 5, 7, 11, 14, 19, 23, 24 and 29, were also fired using dung as the main fuel, but for a short period of time. Vessels 4, 18, 21 and 27, in group 6, were fired using wood as the main fuel for a short period of time. Vessels in group 3, numbers 3, 8, 10, 26 and 30, were fired using dung for a long period of time.

the phasing of firing traditions at Gwernvale

	phase 1	phase 2	phase 3
group 2	gv1 gv6 gv9 gv12 gv13 gv15 gv16 gv17	gv22	
group 1	gv2 gv5 gv7 gv11 gv14	gv19 gv23 gv24	gv29
group 6	gv4	gv18 gv21	gv27
group 3	gv3 gv8 gv10		gv26 gv30

Use Seven different traditions of use were represented at Gwernvale.

Vessel 17, in group 22, was not modified after firing. There was no direct evidence for the use of this vessel, but it would have been non porous, with moderate resistance to physical and heat damage.

Group 5, including vessels 1, 2, 3, 4, 5, 6, 27 and 31, were not modified after firing and vessel 3 has secondary oxidisation of the base. These vessels would have been porous, with moderate heat resistance and good strength and could probably have been used for most styles of cooking. Vessels 10, 11, 12, 13, 14, 15, 16, 19, 20, 22 and 29, in group 4, were not modified after firing and vessel 22 had secondary oxidisation of the base. Where evidence survives, the vessels ranged in size from very small to medium sized. Group 4 vessels would have been porous with good resistance to heat damage and physical blows. They were probably used for the rapid, high temperature cooking of all foods. Group 2, vessels 7, 8, 9, 23 and 25, were not modified after firing, with vessels 8 and 23 both having secondary oxidisation of the base. The vessels would have been very porous, with good resistance to heat damage and physical blows.

Group 24 vessels, numbers 18 and 21, would have been non porous, with poor resistance to heat damage and good strength. Vessels 24, 26 and 30, in group 7, would have been non porous with poor resistance to heat damage and moderate strength. Vessel 28, in group 13, was non porous with moderate heat resistance and poor strength. Vessel 28 was small in size.

the phasing of use traditions at Gwernvale

	phase 1	phase 2	phase 3
group 22	gv17		
group 5	gv1 gv2 gv3 gv4 gv5 gv6		gv27 gv31
group 4	gv10 gv11 gv12 gv13 gv14 gv15 gv16	gv19 gv20 gv22	gv29
group 2	gv7 gv8 gv9	gv23	gv25
group 24		gv18 gv21	
group 7		gv24	gv26 gv30
group 13			gv28

7.8 *Mynydd Troed*

The site is a long cairn sited between two ridges at 350 m OD, north of Llangorse Lake and 12 km east of Brecon (NGR SO 160 281). Mynydd Troed was partially excavated as part of a palynological examination of prehistoric soils from south east Wales (Crampton & Webley 1966). The pottery was recovered from buried soil beneath 'extra-revetment' material on the east side of the cairn. Two vessels appear to be represented. Due to the very limited area excavated little contextual information is available.

Raw Material Selection Both vessels 1 and 2 were tempered using local stone but there were differences in the processing of the inclusions. In the case of Vessel 1, in the group 34 tradition, fine, medium and coarse pieces of granular stone were mixed with the clay. In

vessel 2, in the group 31 tradition, very fine pieces of crushed limestone were mixed with the clay.

Construction Vessel 1 belongs in the group 27 tradition, while there is not enough evidence to categorise vessel 2. Group 27 involved an open, straight-sided rim on a deep open body with a round base and neither rim mouldings or lugs.

Decoration Vessel 2 belongs in the group 30 tradition. It was decorated by using a wooden point to push aside clay which had begun to dry. This decoration divided the surface of the vessel. Vessel 1 belongs in the undecorated group 11 tradition.

Firing Vessel 1 belongs in group 1 and vessel 2 in group 2. Both were fired in a relatively high temperature firing, using dung as the main fuel, for a short period of time, in the case of vessel 1, and a moderate length of time, in the case of vessel 2.

Use Vessel 1 is part of the group 14 tradition. It would have been porous and moderately strong and heat-resistant, although there was no direct evidence for the use of this vessel in cooking. Vessel 2 does have strong evidence for use in cooking. It is part of the group 4 tradition, and was porous, heat-resistant and strong.

7.9 *Onllwyn*

There was a single sherd of pottery from this site (Webley 1956), which is a rock shelter near Vaynor, in the Brecon Beacons (NGR SO 999 091). The sherd was not associated with any other class of find.

Raw Material Selection The vessel is part of the group 2 tradition. The clay was mixed with coarse, granular grog fragments.

Construction There is no evidence to place the vessel in any construction group.

Decoration The single sherd present was not decorated, but this is not clear enough evidence to place the vessel in the group 11 tradition.

Firing The vessel belongs in the group 2 firing tradition. It was fired using dung as the main fuel for a moderate length of time.

Use There was no direct evidence for the use of this vessel. In terms of its physical properties it belongs in the group 9 tradition. It would have been non-porous, heat-resistant and moderately strong.

7.10 *Penywyrlod*

Penywyrlod (NGR SO 151 316) is a very large chambered long cairn, discovered during farm quarrying operations in 1972. It lies at around 240 m OD, around 400 m south west of Penyrwyrlodd Farm in the parish of Talgarth (Britnell & Savory 1984). The cairn is constructed of sandstone slabs and is trapezoidal in form, with an undisturbed main chamber and at least three lateral chambers. All of the pottery came from beneath the extra-revetment material outside the most northerly of these chambers, NEIII (Britnell & Savory 1984, 28). The sherds appear to be parts of two vessels.

Raw Material Selection Vessel 1 is part of the group 18 tradition. The clay was mixed with fine and medium pieces of laminar shell, from a source up to a week's travel away. Vessel 2 belongs in group 14. It was made by mixing coarse and medium granular pieces of locally available stone and grog with the clay.

Construction Vessel 1 belongs in the group 20 tradition. It had an open concave rim on a shallow neutral body with a round base and neither rim moulding nor lugs. There is no evidence as to which construction group Vessel 2 should be placed in.

Decoration Both vessels appear to have been undecorated and to belong in the group 11 tradition.

Firing Both vessels were fired using dung as the main fuel for a short period of time and thus belong in group 1.

Use Neither vessel has any direct evidence for how it was used. In terms of physical properties, Vessel 1 was non-porous, heat-resistant and strong, and belongs in group 21. Vessel 1 was medium sized. Vessel 2 was very porous and neither heat-resistant nor strong and was part of the group 28 tradition.

7.11 *Ty Isaf*

The site is a megalithic long cairn, excavated in the late 1930's (Grimes 1939). Ty Isaf lies at approximately 260 m OD, in the fork of the two branches of the Rhiangoll river (NGR SO 182 290). The site has a complex form (see figure 7.4), involving a false entrance, two

lateral chambers (I and II), a transepted chamber (III) in a round structure, referred to by Grimes as the 'rotunda', and a further simple box chamber (IV). It is far from clear in which order these elements were constructed. Grimes (1939, 136-7) lists three possible chronologies: Firstly, the rotunda and chamber III may have been primary, with the rest of the cairn added subsequently. Secondly, the wedge shaped cairn, and chambers I, II and IV, may be part of a primary monument which was partly destroyed by the insertion of the 'rotunda'. Or, thirdly - which is Grimes' favoured solution, all the chambers may be contemporary, as part of a single phase, complex monument. I do not regard this last suggestion as particularly convincing. Sufficient multi-phase long cairns have now been excavated to establish a general pattern of simple beginnings which were subsequently elaborated, for example at Trefignath (Lynch and Smith 1987) and Dyffryn Ardudwy (Powell 1973). Closer parallels for the rotunda structure can also be found at Nympsfield (Clifford 1938) and Notgrove (Clifford 1936).

All of the chambers at the site produced Neolithic pottery, except for the fragmentary chamber IV. Vessels 1, 2, 3, 4, 5 and 6 came from chamber II, Vessel 2 from the entrance passage. Vessel 7 came from chamber I, along with a body sherd with a lug which Grimes listed as Vessel 8, but which I consider to be part of the same vessel. Vessels 10, 11, 12 and 13 came from the lower layer in chamber III and Vessel 9 from the upper layer in this chamber (Grimes 1939, 126-30; 133-5).

Chamber III (lower)	Chamber III (upper)	Chamber I	Chamber II	Chamber II (entrance)
ti10 ti11 ti12 ti13	ti9	ti7	ti1 ti3 ti4 ti5 ti6	ti2

These contexts have been divided into two successive phases, equivalent to phase 1 at Gwernvale, as follows:

phase 1a	phase 1b
ti10 ti11 ti12 ti13	ti1 ti2 ti3 ti4 ti5 ti6 ti7 ti9

Raw Material Selection There were four different traditions present.

Group 17 vessels, numbers 5, 7 and 10, were tempered using fine and medium pieces of laminar and granular shell from up to a week's travel away. Group 25 vessels, including 2, 9, 11, 12 and 13, were tempered using fine and medium pieces of granular, locally available stone.

Vessel 3, in group 48, was tempered using fine, medium and coarse pieces of laminar and granular shell and stone. The shell inclusions would have come from up to a week's travel away. Vessels 1, 4 and 6, in group 16, were tempered using fine, medium and coarse pieces of laminar and granular shell from up to one week's travel away.

the phasing of raw material traditions at Ty Isaf

	phase 1a	phase 1b
group 17	ti10	ti7 ti5
group 25	ti11 ti12 ti13	ti9 ti2
group 48		ti3
group 16		ti1 ti4 ti6

Construction There were nine different construction techniques used at Ty Isaf (see figure 7.2).

Vessel 12, which was probably part of group 24, had a neutral concave rim with a rounded rim moulding. Vessels 6 and 13 had open concave rims and no rim mouldings or lugs and may have been part of group 20, which was represented at Penywyrlod, or group 21, represented at Gwernvale. Group 4 vessels, numbers 5, 10 and 11, had neutral straight-sided rims on shallow neutral bodies with rounded bases. Group 4 vessels had rounded rim mouldings.

Vessel 9, in group 34, had neutral straight-sided rim, on a shallow neutral body, with a rounded base and neither rim mouldings or lugs. Vessel 7, in group 38, had a straight-sided neutral rim on a deep neutral body with a rounded base. Vessel 7 had a rounded rim and a plain lug. Vessel 4, in group 23, had a neutral concave rim on a deep neutral body with a rounded base. The vessel had a plain lug. Vessel 1, in group 6, also had a plain lug. It had a neutral straight-sided rim on a deep neutral body with a rounded base. Vessel 3, in group 36, had a neutral straight-sided rim on a deep open body with a rounded base. Vessel 3 had a rounded rim moulding. Vessel 2, in group 5, had a neutral concave rim on a deep neutral body with a rounded base, with no evidence for rim mouldings or lugs.

the phasing of construction traditions at Ty Isaf

	phase 1a	phase 1b
group ?24	ti12	
group 20/21	ti13	ti6
group 4	ti10 ti11	ti5
group 34		ti9
group 38		ti7
group 23		ti4
group 6		ti1
group 36		ti3
group 5		ti2

Decoration There were two different traditions at Ty Isaf. In both cases the surfaces of the vessels were unified. In group 8, vessels 4, 5, 6 and 13 were burnished. In group 11, vessels 1, 2, 3, 7, 9, 10, 11 and 12 were left unchanged.

the phasing of decorative traditions at Ty Isaf

	phase 1a	phase 1b
group 8	ti13	ti4 ti5 ti6
group 11	ti10 ti11 ti12	ti9 ti7 ti1 ti3 ti2

Firing All of the Ty Isaf pottery apart from vessel 9 was part of the group 5 tradition, it was fired for a relatively long period of time using grasses as the main fuel. Vessel 9 was part of the group 1 tradition and was fired using dung as the main fuel for a short period of time.

the phasing of firing traditions at Ty Isaf

	phase 1a	phase 1b
group 5	ti10 ti11 ti12 ti13	ti7 ti1 ti3 ti4 ti5 ti6 ti2
group 1		ti9

Use There were seven different traditions at Ty Isaf.

Vessel 13, in group 7, was not modified after firing and was non porous with poor resistance to heat damage and moderate strength. Vessels 5 and 12, in group 14, were not modified after firing and vessel 12 had traces of reside internally. Group 14 vessels were small and medium in size and would have been porous, with moderate resistance to heat damage and physical blows. Group 8 comprised vessels 1, 6, 9 and 10, which were not modified after firing and would have been porous, with good resistance to heat damage and moderate strength. Group 22 vessels, numbers 2 and 11, were not modified after firing

and vessel 2 had both internal residue traces and secondary oxidisation. They would have been non porous with moderate resistance to heat damage and physical blows. They were probably used for the slow cooking of liquid foods.

Vessel 7, in group 27, was perforated after firing. It was small in size, and would have been porous with good resistance to heat damage and moderate strength. Vessel 4, in group 19, was not modified after firing, had secondary oxidisation of the base and traces of internal residue. It would have been porous with good resistance to heat and moderate strength. It was probably used for rapid, high temperature cooking. Vessel 3, in group 11, was not modified after firing. It would have been very porous, with moderate resistance to heat damage and poor strength.

the phasing of use traditions at Ty Isaf

	phase 1a	phase 1b
group 7	ti13	
group 14	ti12	ti5
group 8	ti10	ti9 ti1 ti6
group 22	ti11	ti2
group 27		ti7
group 19		ti4
group 11		ti3

7.12 *Usk*

Twenty five sherds of Neolithic pottery were recovered during the extensive excavations of the 1st century legionary fortress at Usk (Peterson 1992). The fortress covered an area of land to the south-west of the town (NGR SO 381 006). The pottery was largely residual in Roman contexts.

The sherds represent parts of at least eight vessels. Vessels 1, 2, 3, 4, 7 and 8 were earlier Neolithic carinated and plain bowls, Vessel 9 was part of a Peterborough Ware bowl, in the Mortlake sub-style, and Vessel 10 was probably Grooved Ware.

Raw Material Selection There were seven different styles of raw material collection in use at Usk.

Vessel 1 belongs in the group 49 tradition, in which the clay was mixed with fine granular pieces of shell and stone, from up to one day's travel away. Vessel 2 belongs in group 51, where the clay was mixed with fine and medium pieces of two kinds of locally available

stone. Vessel 3 was made by mixing fine and medium pieces of shell and stone. The inclusions were mostly laminar in texture and came from up to one day's travel away, putting vessel 3 in the group 40 tradition.

Vessel 4 was part of the group 50 tradition, mixed with fine pieces of granular and laminar shell and stone from one day's travel away. Vessels 7 and 8 both belong in group 48, mixed with fine, medium and coarse pieces of granular shell and stone. Vessel 9 was made using fine, medium and coarse pieces of granular, locally available stone, and belongs in group 34. Vessel 10 was part of the group 54 tradition, in which fine, granular pieces of shell and stone from up to one day's travel away were mixed with the clay.

Construction Only three vessels from the Usk were sufficiently well preserved to allow construction traditions to be discussed (see figure 7.2).

Vessel 1 has an open concave rim and no rim moulding or lugs and probably belongs in the group 20 tradition, which is also represented at Penywyrlod, or in group 21, represented at Gwernvale. Vessels 3 and 8 have open, straight-sided rims on shallow closed bodies with rounded bases. There was no rim moulding or lugs on either vessel. Vessels 3 and 8 are part of the group 25 tradition.

Decoration All but one of the vessels from Usk have no evidence for decoration, and hence were part of the plain, group 11 tradition. The single exception was vessel 9, part of the group 1 tradition. The decoration was carried out when the clay was still plastic, using whipped cord impressions to divide the surface of the vessel.

Firing Vessels 1, 2, 8, 9 and 10 were fired over a long period of time, in a relatively low temperature firing which used grasses as the main fuel, the group 5 tradition. Vessels 3 and 4 were fired using dung as the main fuel, for a moderate period of time, in the group 2 tradition. Vessel 7 was also fired using dung as the main fuel but for a long period of time, in the group 3 tradition.

Use There was evidence for four different styles of use at Usk.

Vessel 1 had secondary oxidisation of the base, indicating that it had probably been used for cooking. It would have been very porous, good at resisting heat damage and moderately strong; characteristics which it would have shared with vessel 10 as part of the group 17 tradition. Vessel 7 also had evidence for use in cooking. It would have had

similar physical properties to the group 17 vessels, except it would have been rather less heat-resistant. It would have shared these characteristics with vessels 2 and 4 as part of the group 25 tradition. Vessels 3 and 8 would have been very porous, moderately heat-resistant but physically weak, and belong in the group 11 tradition. No vessels in this group have any evidence of use for cooking. Vessel 9 has evidence for use in cooking and would have been porous, with poor resistance to heat damage and moderate strength, placing it in group 12.

7.13 *Summary*

In this section I will discuss the variation of traditions and their meanings across the whole of the study area. By necessity, this study will concentrate on those traditions represented in the two phased assemblages. All the phased traditions in the Usk valley and surrounding area therefore belong to the early or middle Neolithic.

Raw material selection

Two traditions are present in the earliest part of phase 1, groups 17 and 25. Vessels in group 17 were tempered using coarse and medium shell and those in group 25 used coarse and medium fragments of locally available stone. The shell inclusions would have required relatively complex processing, and came from a source at least one week's travelling time away. Groups 48 and 16 were only represented in the later part of phase 1. Both also involved shell inclusions in complex potting recipes. Group 3, represented in vessel 17 from Gwernvale, was the only other tradition dating exclusively to phase 1. Group 3 vessels were tempered with intensively processed, but locally available, stone and grog. During phase 1 there is some evidence for complexity and variety in raw material selection, although the trend is not as pronounced as in some other areas of Wales.

Groups 26, 27 and 28 also began during phase 1, but all three traditions appear to run on into phases 2 and 3. Vessels in these groups were distinguished by all containing varying quantities of chopped plant material as tempering. In the case of group 26 this was mixed with locally available stone and grog. Groups 27 and 28 were distinguished by different sizes and quantities of inclusions, which also distinguished them from two similar groups (32 and 46) which were represented at Dyffryn Ardudwy in north-west Wales. This use of plant material as inclusions may mark a shift towards a more pragmatic set of recipes, using locally available materials. However, it should be borne in mind that tempering with combustible plant material would have presented technical challenges of its own and would have produced extremely porous vessels. Despite their local origins I would see most of the plant based tempering traditions as examples of complex potting recipes.

Group 15 is only represented during phase 2. The vessels contained coarse, laminar pieces of chert, the nearest source for which was around one week's travelling time away. Group 15 therefore appears as a blend of difficult procurement and relatively uncomplicated processing techniques. It seems more likely that the chert was primarily imported for use in stone tools, or as complete artefacts. The waste from these processes was then incorporated into a simple pottery production technique.

Group 1 was represented during both phases 2 and 3. The use of coarse, granular local stone makes this the archetypal example of the later simple raw material techniques.

	first Neolithic before 3700 calBC		early Neolithic	middle Neolithic post 3100 calBC
	phase 1a	phase 1b	phase 2	phase 3
group 17	ti10	ti5 ti7		
group 25	ti11 ti12 ti13	ti2 ti9		
group 48		ti3		
group 16		ti1 ti4 ti6		
group 3	gv17			
group 26	gv1 gv2 gv3 gv4 gv5 gv6			gv27 gv31
group 27	gv7 gv8 gv9		gv23	gv25
group 28	gv10 gv11 gv12 gv13 gv14 gv15 gv16		gv19 gv20 gv22	gv29
group 15			gv18 gv21	
group 1			gv24	gv26 gv28 gv30

Construction

Three different construction styles were probably present in the earliest part of phase 1 (see figure 7.2). Group 4, group 21 and what is probably group 24. Six more styles date to the latter part of phase 1, groups 34, 38, 23, 6, 36 and 5. Group 15, represented at Gwernvale by vessel 1, also belongs in phase 1. The phase 1 traditions were dominated by the use of neutral rim forms, the only exceptions being groups 21 and 15, and by deep, neutral bodies, only group 4 and group 34 vessels were shallow and only groups 21, 36 and 15 had open body profiles. Rounded rim moulding was common in phase 1, on groups 24, 4, 36 and 15, with plain lugs present in groups 23 and 6.

Three traditions were represented in phase 2, groups 3, 27 and a closed rim form which was either group 42 or 45. There were only three phased vessels with surviving construction information, meaning that conclusions for this phase must necessarily be

tentative. The only obviously new trend was the introduction of the closed rim form mentioned above.

Two vessels in phase 3 were sufficiently well preserved to allow discussion of construction traditions. Both groups 2 and 17 contained deep, concave rimmed vessels, with an open rim and body profile in the case of group 2 and a neutral one in the case of group 17. The introduction of angular rim moulding, present in both groups, was probably the most significant change in phase 3.

	first Neolithic 4000-3700 calBC		early Neolithic	middle Neolithic post 3100 calBC
	phase 1a	phase 1b	phase 2	phase 3
group ?24	ti12			
group 20/21	ti13	ti6		
group 21	gv9 gv10 gv12 gv13			
group 4	ti10 ti11	ti5		
group 34		ti9		
group 38		ti7		
group 23		ti4		
group 6		ti1		
group 36		ti3		
group 5		ti2		
group 5	gv8 gv11			
group 15	gv1			
group 3			gv25	
group 27			gv20	
group 42/45			gv18	
group 2				gv28
group 17				gv26

Decoration

There were four different decorative styles in use during phase 1. Of these, only the burnished group 8 was solely present during the first phase. With the exception of group 12, the early decoration was used to unify the surfaces of vessels. It may be that the smoothed group 14 and the burnished group 8 are local versions of the same tradition, or that the smoothing is an attempt to reproduce the burnished effect without a proper understanding of the process involved. I have noted elsewhere that decorative style is transmitted very easily, and this kind of evidence for vessel copying may indicate that vessels were moving outside the area in which their decoration 'made sense', and acquiring new meanings in the process.

Two new decorative traditions were present in phase 3, groups 1 and 9. In both cases the surface of the vessel was divided using impressed decoration. Whipped cord impressions were used in the case of group 1, and whipped cord and bone point impressions in the case of group 9.

	first Neolithic 4000-3700 calBC		early Neolithic	middle Neolithic post 3100 calBC
	phase 1a	phase 1b	phase 2	phase 3
group 8	ti13	ti4 ti5 ti6		
group 11	ti10 ti11 ti12	ti1 ti2 ti3 ti7 ti9		
group 11	gv1 gv3 gv5 gv6 gv8 gv9 gv12 gv16 gv17		gv18 gv22 gv23 gv24	
group 12	gv4		gv20	
group 14	gv2 gv7 gv10 gv11 gv13 gv14 gv15		gv19 gv21	gv25
group 1				gv28
group 9				gv26

Firing

As elsewhere in Wales, there is little evidence for a set of phased transitions in the practices used to fire pottery. All of the groups present in phase 1, with the exception of group 5, continue into later periods. The slight difference about the Usk valley material is the fact that the grass based group 5 tradition, ubiquitous in all periods elsewhere, is the style which is less strongly represented. This does not entirely seem to be a product of the unphased nature of most of the Usk valley assemblages, apart from at Ty Isaf, group 5 firings were only present in three vessels from Cefn Cilsanws, one from Ffostyll and five from Usk.

	first Neolithic 4000-3700 calBC		early Neolithic	middle Neolithic post 3100 calBC
	phase 1a	phase 1b	phase 2	phase 3
group 5	ti10 ti11 ti12 ti13	ti1 ti2 ti3 ti4 ti5 ti6 ti7		
group 1		ti9		
group 1	gv2 gv5 gv7 gv11 gv14		gv19 gv23 gv24	gv29
group 2	gv1 gv6 gv9 gv12 gv13 gv15 gv16 gv17		gv22	
group 6	gv4		gv18 gv21	gv27
group 3	gv3 gv8 gv10			gv26 gv30

Use

Four different traditions of use were represented in vessels which could be placed in phase 1a, groups 7, 14, 8 and 22. Of these, group 14, 8 and 22 were all part of large traditions with plentiful evidence for use in cooking. Group 14 could have been used for cooking most foods on open fires. The vessel sizes range from very small to medium which may also indicate that group 14 vessels were used for serving food. Group 8 is a very common group, which would have been very flexible in its possible uses, cooking and storage of dry goods were both possibilities, although the vessels were probably too porous to allow the storage of liquids. Vessels in group 22 could have been used for cooking and the storage of dry goods and liquids. Group 7, by contrast was another of those traditions with evidence for cooking but with poor heat-resistance. As noted elsewhere, with regard to group 23, those groups with an emphasis on impermeability, at the expense of heat resistance and strength, may have been used for the storage of liquids, and for the slow cooking of some liquid substance.

Groups 27, 19 and 11 all date to phase 1b. Groups 27 and 19 have evidence for exposure to heat after firing. Group 27 vessels had identical physical properties to those in group 8, but had been perforated below the rim after firing. They were probably used for cooking over open fires and the storage of dry goods. Those in group 19 were probably used for cooking over open fires. Vessels in group 11 seem to have had a function not connected with either cooking or storage. They were small or very small in size.

The group 5, 4 and 2 traditions all began during phase 1, but ran on until phase 3. All three traditions had evidence of exposure to heat after firing, indicating use as cooking vessels. Group 5 pottery seems to have been used for cooking over open fires and probably the storage of dry goods. They ranged in size from small to very large. The group 4 vessels were part of a large tradition of small to medium sized vessels which would have been particularly well suited to use as cooking pots. In view of the size range of these vessels it also seems possible that they were used for the serving of food. Vessels in group 2 were so porous that they could probably only have been used for the cooking of relatively dry foods.

Two traditions began during phase 2, groups 24 and 7. Neither was particularly well suited for cooking. Vessels in both groups were probably primarily used for the storage of liquids, although there is evidence for some cooking in group 7. Group 7 may be another case in which cooking was a carefully controlled, perhaps ritualised, and occasional event.

Group 7 continued into phase 3, alongside the group 13 tradition, represented by vessel 28 from Gwernvale. This small vessel probably had a function unconnected with either cooking or storage.

	first Neolithic 4000-3700 calBC		early Neolithic	middle Neolithic post 3100 calBC
	phase 1a	phase 1b	phase 2	phase 3
group 7	ti13			
group 14	ti12	ti5		
group 8	ti10	ti1 ti6 ti9		
group 22	ti11	ti2		
group 22	gv17			
group 27		ti7		
group 19		ti4		
group 11		ti3		
group 5	gv1 gv2 gv3 gv4 gv5 gv6			gv27 gv31
group 4	gv10 gv11 gv12 gv13 gv14 gv15 gv16		gv19 gv20 gv22	gv29
group 2	gv7 gv8 gv9		gv23	gv25
group 24			gv18 gv21	
group 7			gv24	gv26 gv30
group 13				gv28

8 Glamorgan

8.1 *Introduction*

The pottery under examination in this chapter comes from a group of five sites grouped along the South Welsh coast, four on the Vale of Glamorgan and one from the Gower peninsula (see figure 8.1). The five sites are: Mount Pleasant, Nottage (Savory 1955); Ogmore-by-Sea (Hamilton & Aldhouse-Green 1998); Parc le Breos Cwm (Whittle & Wysocki 1998); Sant-y-Nyll (Savory 1962); and Tinkinswood (Ward 1916).

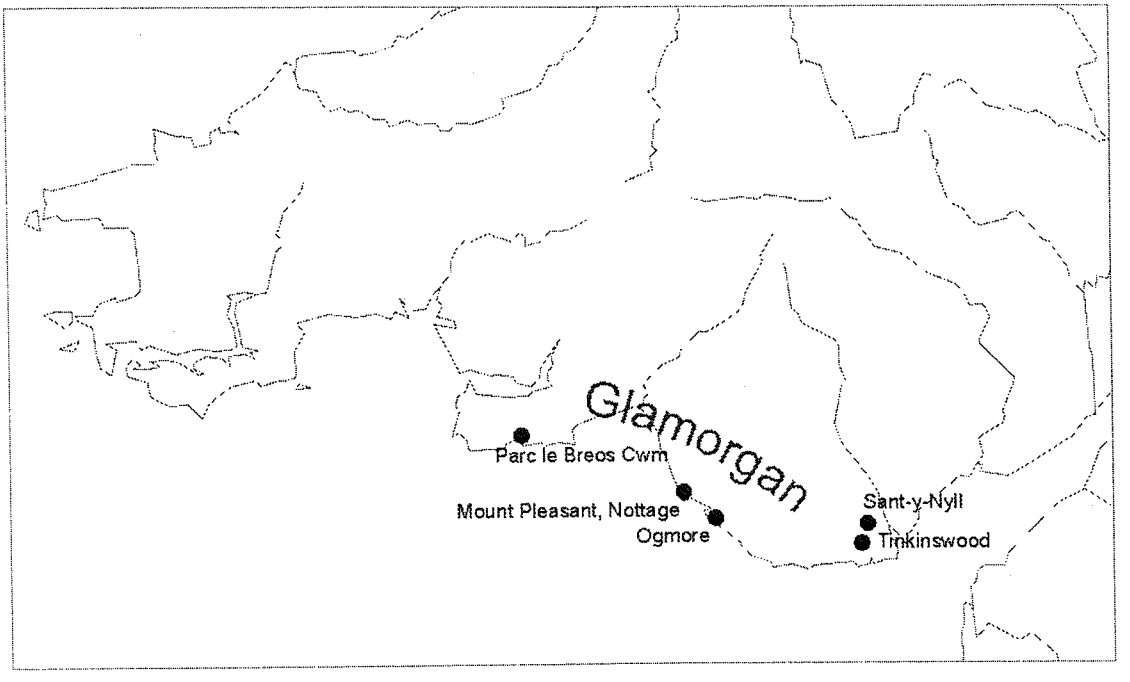


Figure 8.1: Neolithic pottery from Glamorgan

8.2 *Chronological Framework*

This study area is particularly poor in well stratified, phased assemblages. The only possible chronological indicators are provided by the radiocarbon dates from Ogmore-by-Sea and Parc le Breos Cwm (see sections 8.4 and 8.5 below). This gives a rough two phase division of material from the early and middle Neolithic.

site	early Neolithic (before 3780-3540 calBC) phase 1	middle Neolithic (around 3100-2800 calBC) phase 2
Parc le Breos Cwm	pb1	
Ogmore-by-Sea		og1 og2 og3 og4 og5 og6 og7 og8 og9 og10 og11 og12 og13 og14 og15 og16 og17 og18 og19 og20 og21 og22 og23 og24 og25 og26 og27 og28 og29 og30 og31 og32 og33 og34 og35 og36 og37 og38 og39 og40 og41 og42

While this phasing is too vague to allow pottery from the same sites to be placed in chronological order, it does at least allow some of the traditions present in Glamorgan to be dated.

8.3 *Mount Pleasant, Nottage*

The pottery from Nottage was recovered during the excavation of a badly damaged round mound (Savory 1955, 77-82) to the north of Merthyr Mawr warren (NGR SS 835 800, see figure 8.1). The mound was almost completely destroyed at the time of the excavation. At the centre Savory discovered a rectangular dry-stone and post structure, associated with Neolithic pottery, which he interpreted as a Neolithic house preserved beneath a Bronze Age barrow (figure 8.2). This structure contains no hearth, nor any evidence for prolonged occupation (Savory 1955, 78). It is also hard to distinguish a clear division between the Neolithic 'house' structure and the remnants of the round mound. I would suggest that, rather than being preserved beneath a Bronze Age barrow, this structure is an integral part of the round mound. The posts and dry-stone walling would have formed a central feature in the mound, either as part of the sequence of construction or as an accessible central space. A similar, and similarly enigmatic, structure was recorded from the Neolithic round mound at Pitnacree, Perthshire (Coles & Simpson 1965, 37-40). I would regard the two Bronze Age urned cremations as secondary insertions into an extant monument.

In addition to the two cremation Urns, there are parts of nine vessels from the central structure at Mount Pleasant, Vessels 1, 2, 3, 4, 5 and 6 are early Neolithic hemispherical bowls, Vessel 8 is a Peterborough ware bowl and Vessels 7 and 9 are either Peterborough Ware or Food Vessels. Vessels 1, 2, 5, 6 and 9 came from the floor of the central structure (figure 8.2 & Savory 1955, 83). Vessel 4 came from posthole 1 within the structure. Vessel 7 from within posthole C and Vessel 8 from a number of 'irregular hollows' to the north of

Figure 8.2: Structures beneath the round barrow at Mount Pleasant, Nottage (after Savory 1955)

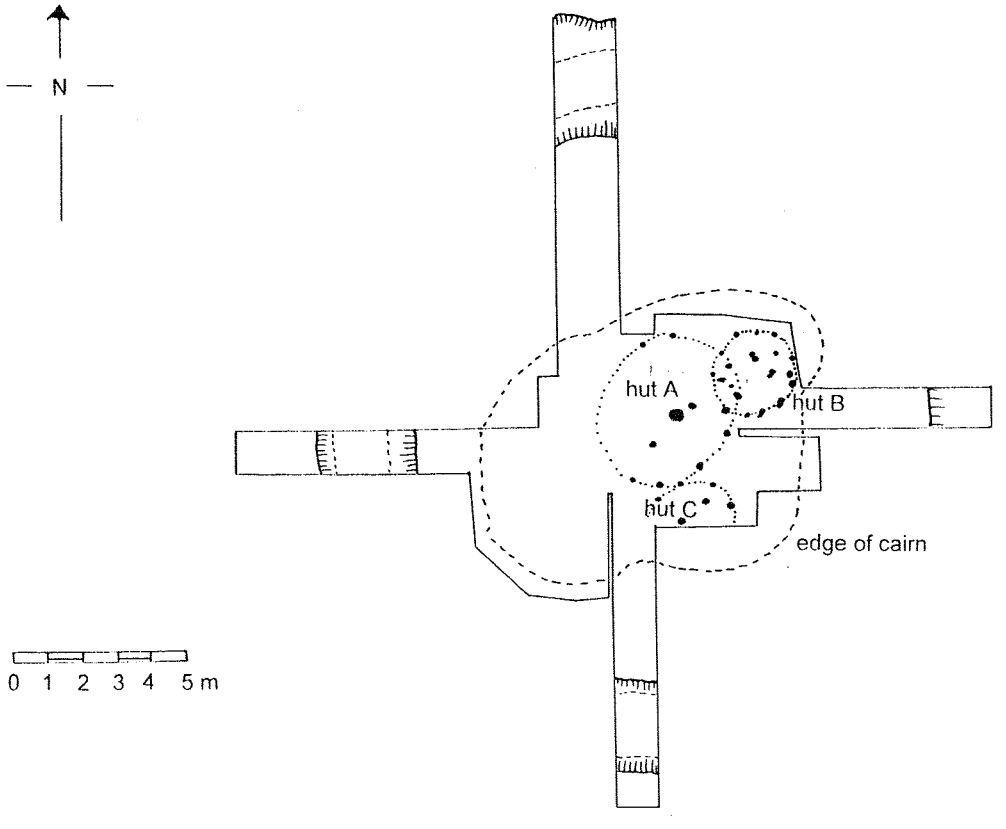


Figure 8.3: Structures beneath Sant-y-Nyll cairn (after Savory 1962)

the structure. There was no strong evidence for phasing within the construction of the mound.

Raw Material Selection Four different traditions were represented. Vessels 1, 2, 3, 4, 5 and 8 were all part of the group 30 tradition. These vessels were tempered using fine, medium and coarse laminar shell inclusions from up to one day's travel away. Vessel 6 was tempered with fine and medium laminar shell inclusions and belongs in the group 18 tradition. Vessel 7 used coarse laminar and granular grog fragments and was part of the group 42 tradition. Vessel 9 was tempered with medium and coarse granular grog fragments, placing it in the group 43 tradition.

Construction Four different construction styles were present. Vessel 2 belongs in the group 29 tradition. It was made with a straight-sided open rim on a deep, neutral body with a rounded base. The vessel had neither rim moulding nor lugs. Vessels 1 and 8 were part of the group 35 tradition, with upright, straight-sided rims on deep neutral bodies with rounded bases, also without rim moulding or lugs. Vessels 4, 5 and 6 probably also belong in this group but do not have enough surviving sherds to reconstruct body shape reliably. Vessel 7 belongs in group 43, with an open convex rim and no rim moulding or lugs. Vessel 3 had an open convex rim on a shallow open body with a rounded base and an angular rim moulding but no lugs, making it part of the group 13 tradition.

Decoration Vessels 1, 2, 8 and 9 were part of the group 7 tradition. They were decorated by using bone points to push aside the clay while it was still plastic. The surface of the vessels was divided by this decoration. Vessel 3 belongs in the group 24 tradition, in which bone points and fingernails were used to push aside the clay while it was still plastic. The surface of the vessel was divided by this decoration. Vessel 4, in group 27, was decorated using worked stone points to push the clay aside while it was still plastic. The surface of the vessel was divided by this decoration. Vessel 7, part of group 1, was decorated using cord to push aside the clay while it was still plastic. Once again the surface of the vessel was divided by this decoration. The surfaces of vessels 5 and 6 was unified, as neither of these vessels were decorated, placing them in the group 11 tradition.

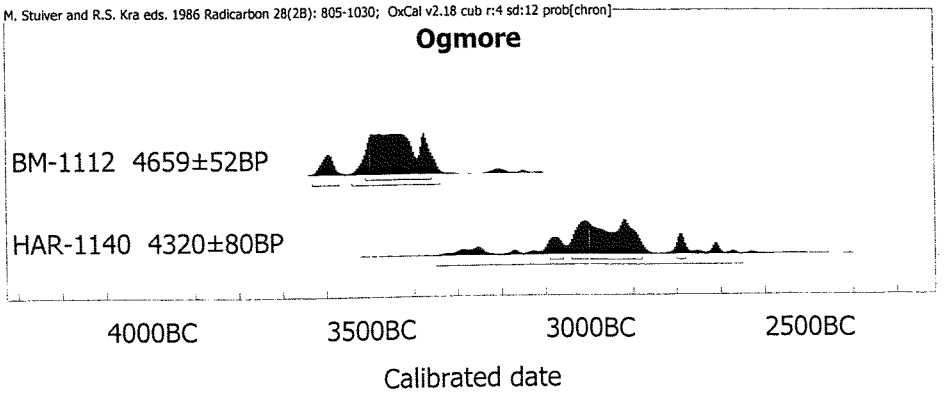
Firing Vessels 1, 2, 3, 4, 5, 6 and 8 all belong in the group 5 tradition. These vessels were fired over a long period of time in relatively low temperature firings which used grasses as the main fuel. Vessels 7 and 9 were fired using dung as the main fuel in long, higher temperature firings, part of the group 3 tradition.

Use Vessels 1, 2, 3, 4, 5 and 8 were all part of the group 6 tradition. In terms of physical characteristics they would have been very porous, with good resistance to heat but poor physical strength. Vessels 2, 4 and 8 all have considerable secondary oxidisation of the base, probably indicating that they were used for cooking. Vessel 6 belonged in the group 4 tradition. It would have been porous, highly heat-resistant and strong, but has no direct evidence for use in cooking. Vessels 7 and 9 were part of the group 9 tradition. They were non-porous, highly heat-resistant and moderately strong. Vessel 7 had secondary oxidisation of the base.

8.4 *Ogmore-by-Sea*

The large assemblage of later Neolithic pottery from Ogmore-by-Sea was recovered during two excavations of the same part of an eroding coastline (NGR SS 861 756). The first of these investigations was carried out by Derek Webley in 1968, which produced the majority of the pottery discussed here, associated flintwork, and the group of radiocarbon dates discussed below. A further excavation by Stephen Green in 1978 produced some further pottery and more worked stone. In an attempt to clarify aspects of the relationship of the two excavations and to recover any remaining material, new fieldwork was begun during the summer of 1998 (Hamilton & Aldhouse-Green 1998, 113). These excavations produced some new pottery from the Webley site and another assemblage from a different part of the foreshore. The pottery discussed below is that from the Webley and Green excavations, which was analysed in an NMW archive report by Alex Gibson in 1989. The whole collection of material will be published with the completion of the current excavations.

Webley identified two layers within the deposits, both of which contained hearths and spreads of charcoal. A date of 4659 ± 52 bp (BM-1112) came from the upper horizon and one of 4320 ± 80 bp (HAR-1140) from the lower.



The pottery assemblage is extremely homogenous and sherds from many vessels occurred in both the upper and lower deposits. The radiocarbon dates overlap, at two standard deviations only, around 3350 calBC, and the older date came from what was apparently the younger deposit. This led Hamilton and Aldhouse-Green (1998, 113) to reject Webley's division of the material into two phases. It seems likely that BM-1112 was derived from residual old charcoal and that all the material can therefore be provisionally ascribed a date in the range 3100 to 2800 calBC.

Raw Material Selection There was evidence of fourteen different raw material gathering traditions.

Vessels 2, 7, 11, 12, 13, 16, 18, 19, 20 and 25 were all part of the group 1 tradition. They were tempered using coarse, granular pieces of locally available stone. Vessels 15, 17, 35, 36, 41 and 42 all belonged in the group 13 tradition, and were tempered using medium and coarse granular pieces of locally available stone. Vessels 21, 32, 33 and 39 were part of the group 25 tradition, tempered using fine, medium and some coarse granular fragments of locally available stone. Vessels 14, 22, 23 and 27, in the group 33 tradition, were tempered using largely medium, with some fine and coarse, granular pieces of locally available stone. Vessels 31 and 34, in the group 34 tradition, were tempered with fine, medium and coarse granular pieces of locally available stone. Vessel 28, part of the group 35 tradition, was tempered with medium granular pieces of locally available stone; Vessel 30, in group 5, with fine and some medium pieces; and Vessel 26, in group 36, with predominately coarse, with some fine and medium, pieces.

Vessel 10, in group 37, contained medium and coarse fragments of granular calcined shell. In group 38, vessel 5 was tempered with fine pieces of laminar calcined shell. Vessels 3 and 4, making up group 39, were tempered with laminar shell and granular locally available stone. The fragments were mostly medium sized, with some fine and some coarse. In group 40, vessel 24 was tempered using laminar shell and granular stone, in medium sized and coarse fragments. Vessel 41, in group 9, contained shell, locally available stone and grog. The inclusions were medium and coarse and predominantly granular. Vessel 40, part of group 30, was tempered with fine, medium and coarse fragments of laminar shell.

Construction There was only detailed evidence for construction traditions from eleven of the vessels.

Vessel 15 belonged in the group 26 tradition. It had a closed concave rim on a shallow closed body with a rounded base, angular rim moulding and no lugs. Vessel 9 was part of the group 41 tradition. It had a closed straight-sided rim, above a neutral concave neck, on a shallow neutral body, with a rounded base, angular rim moulding and no lugs. Vessel 3 had an open convex rim without rim moulding or lugs and was part of the group 43 tradition. Vessel 11, in group 46, had a neutral convex rim above a neutral concave neck and neither rim moulding nor lugs. Four vessels, 25, 26, 27, and 31, belonged in either group 7 or 47. They had closed convex rims and neither rim moulding nor lugs. Vessel 23 was part of the group 48 tradition. It had a closed convex rim above a closed convex neck on a shallow closed body with a rounded base. The vessel had angular rim moulding but no lugs. Vessel 16 had an upright concave rim with an angular rim moulding, which would place it in either group 17 or group 49.

Decoration There were six different decoration traditions present at Ogmore.

The group 1 decoration tradition included vessels 2, 3, 4, 11, 12, 13 and 14 from Ogmore. All of these vessels were decorated by using cord impressions to divide the surface of the vessels. The cord impressions were made while the clay was still plastic. The group 23 tradition included vessels 9, 21 and 22, all of which were decorated using bird bone and fingernails to push aside the plastic clay. These impressions divided the surface of the vessel. Vessel 10, in group 18, was decorated using fingernails to push aside plastic clay. Vessel 23, part of the group 10 tradition, was decorated with cord and bird bone impressions, which divided the surface of the vessel. Group 4 vessels were decorated using bird bone impressions only. These impressions were made while the clay was plastic, and divided the surface of the vessels. Twenty two vessels belonged in group 4: vessels 15, 16, 17, 18, 19, 20, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 39, 41 and 42. Vessels 5 and 7 belonged in the group 3 tradition. The surfaces of these vessels had been unified by being decorated with cord impressions.

Firing Five different firing traditions were represented.

The group 1 tradition of a short, relatively high temperature firing, using dung as the main fuel, had been used to fire vessels 2, 5, 7, 9, 10, 12, 13, 14, 19, 20, 21, 22 and 25. The group 2 tradition, of slightly longer dung firings, had been used on vessels 15, 16, 17, 26, 28, 30, 31, 34, 35, 39, 41 and 42. Vessels 18, 24, 27, 32, 33 and 36 had been fired in long dung-fuelled firings, in the group 3 tradition. Long firings which used grasses as the main fuel made up the group 5 tradition, and had been used on vessels 3, 4 and 11. Vessels 23

and 40 had been fired at a very high temperature for a short length of time, using wood as the main fuel, in the group 6 tradition.

Use There was evidence for twelve different ways of using pottery from Ogmore.

Vessels 10 and 14 were part of the group 7 tradition, they would have been non-porous, poor at resisting heat and only moderately strong, neither vessel has any evidence for use in cooking. Group 12 comprises vessels 17, 18 and 32. These vessels also have no evidence for use in cooking and would have been porous, poor at resisting heat and only moderately strong. Vessels 3, 11, 19, 22 and 24 make up group 14, similar in physical properties to group 12, but with moderately more heat-resistance. Vessel 3 had residue adhering internally which could indicate use for cooking. Vessel 21, in group 5, was porous, moderately heat-resistant and physically strong.

Vessel 23, in group 25, was medium sized, very porous, moderately heat-resistant and moderately strong. It also had a possible cooking residue adhering to the interior surface. Group 23 vessels were non-porous, with poor heat-resistance and strength. Vessels 12, 15, 25 and 26 made up this group, with vessel 12 showing both secondary oxidisation of base sherds and an adhering residue, and vessel 15 being small in size. Group 22 vessels were also non-porous, but in this case with moderate heat-resistance and physical strength. Vessels 4, 7, 27, 33 and 39 were part of this group. Vessels 4 and 7 had internal residues and vessel 4 showed secondary oxidisation of the base. Vessel 28, in group 15, was non-porous, with moderate heat-resistance and good physical strength. Vessels 2, 13, 16, 20, 31, 34, 35, 36, 41 and 42 were all group 10 vessels and were porous, with poor heat resistance and strength. Despite this, vessels 2, 35, 36, 41 and 42 all contained residues, and vessels 35, 36, 41 and 42 showed secondary oxidisation.

Vessel 40 was the single Ogmore vessel in group 8. It was porous, with good heat-resistance and moderate strength. Vessel 5, in group 4, was porous, with good heat resistance and strength. Vessel 9, in group 9, was very small, non-porous, with good heat-resistance and moderate strength. There was residue adhering to the interior of this vessel. Vessel 30, part of group 21, was non-porous, with good heat-resistance and strength.

8.5 *Parc le Breos Cwm*

The site is a transepted long cairn, situated at around 50 m OD, above Oxwich Bay, on the south side of the Gower peninsula (NGR SS 537 898). The site was first excavated in the 19th century, but was re-excavated in 1960 and 1961 by R.J.C. Atkinson, prior to

restoration (Whittle & Wysocki 1998). Highly abraded sherds from a single early Neolithic bowl were recovered from a variety of contexts (Zienkiewicz *in* Whittle & Wysocki 1998, 168). At least some of these contexts pre-date the construction of the cairn, leading to the suggestion that the vessel was residual in the cairn contexts. Radiocarbon evidence (Whittle & Wysocki 1998, 148) suggests that the cairn must have been built prior to 3540 calBC, the earliest date from human bone in the chambers having a span of 3780 to 3540 calBC (3790 to 3520 calBC at 2Σ).

Raw material selection The vessel belongs in group 18 and was tempered using some medium, but mostly coarse, laminar fragments of calcined shell. These inclusions would have been available within one day's travel.

Construction The vessel had a concave upright rim and rounded rim moulding. There is no evidence for the shape of the lower part of the vessel, which, on the evidence of the rim form and moulding may have belonged in group 24.

Decoration The vessel belongs in group 11, the surface having been unified by being left undecorated.

Firing The vessel was fired for a moderate period of time, using dung as the main fuel, in the group 2 tradition.

Use The vessel has no direct evidence for how it was used but, on the basis of its physical characteristics, it belongs in the group 8 tradition. It was not modified after firing and would have been porous, with good resistance to heat damage and moderately strong. It could have been used for cooking over open fires and for the storage of dry goods.

8.6 *Sant-y-Nyll*

The Neolithic pottery from this site was recovered from beneath a substantial Early Bronze Age barrow, near St Brides-super-Ely to the west of Cardiff (NGR ST 102 783, see figure 8.1), excavated during 1940 and 1958 (Savory 1962). It was associated with a number of groups of postholes and a 'habitation layer' interpreted by Savory (1962, 10-23) as a group of late Neolithic houses. Of Savory's three huts (1962, 14-15 & figure 8.4) only Hut A had any evidence for a hearth or any substantial structure, while only Hut B was solely associated with Neolithic material. Savory (1962, 16) saw Hut B as stratigraphically earlier than Hut A, possibly by a considerable period of time. I would regard this as very probable, as Hut B presumably represents a temporary shelter of early Neolithic date. The

late Neolithic date proposed by Savory for the remaining two buildings seems more problematic, since both huts contained Early Bronze Age pottery and no unambiguously late Neolithic artefacts.

There are parts of four early Neolithic bowls from Sant-y-Nyll, all of the plain hemispherical style. Vessel 1 was discovered within the 'habitation layer', with one rim sherd from the base of post-hole 15 in Hut B. Vessel 2 came from the 1940 excavations and its precise position is now lost, Vessels 3 and 4 came from the base of the habitation layer, 'in the area of Hut B' (Savory 1962, 16-17).

Raw Material Selection All the pottery at Sant-y-Nyll used very similar raw materials. Vessel 1 was tempered with medium and coarse granular grog pieces and belongs in group 43. Vessels 3 and 4 were tempered with medium and coarse granular and laminar grog pieces and belong in group 44. Vessel 2 was tempered with fine and medium granular grog fragments and was part of group 45.

Construction Vessel 4 was built in the group 27 tradition, it had an open, straight-sided rim on a deep open body without rim moulding or lugs. Group 6 was represented by vessel 1, which had a neutral straight-sided rim on a deep neutral body with a rounded base. This vessel had no rim moulding but had vertical lugs. Vessel 2 had a closed, straight-sided rim without rim moulding or lugs and probably belonged in the group 42 or 45 tradition. Vessel 3 was part of group 44. It had a neutral, convex rim on a shallow neutral body with a rounded base and neither rim mouldings or lugs.

Decoration All four vessels were plain and fall into the group 11 tradition of vessels where the surface was unified by leaving it undecorated.

Firing Vessel 1 was fired using dung as the main fuel for a moderate period of time, and thus belongs in group 2. Vessels 2 and 4 were fired for a long period of time, using grasses as the main fuel, in the group 5 tradition. Vessel 3 was fired at a high temperature for a relatively short period of time, using wood as the main fuel, part of the group 6 tradition.

Use Vessels 3 and 4 belong in group 8. They would have been porous, with good heat-resistance and moderate strength. Both vessels show secondary oxidisation of the base. Vessels 1 and 2 are part of group 21, and would have been non-porous, with good heat-resistance and strength. Both vessels had traces of residues adhering internally.

8.7 *Tinkinswood*

The site is a terminally chambered long cairn situated at around 90 m OD, 400 m from the modern village of St Nicholas in the Vale of Glamorgan (NGR ST 093 733). It was excavated during the early years of this century and produced a small assemblage of early Neolithic bowls (Ward 1915; 1916). The chamber is an unusually large rectangular structure set within a rectangular mound and opening onto a horned forecourt. All of the Tinkinswood pottery was recovered from disturbed material within the chamber (Ward 1916, 243-4).

Raw Material Selection Vessel 1 was tempered using fine and medium granular pieces of locally available stone and forms part of the group 25 tradition. Vessels 2 and 3 belong in group 18. The clay for these vessels was mixed with fine and medium laminar shell fragments. Vessel 4 was tempered using fine, medium and coarse granular shell fragments, and is part of the group 47 tradition.

Construction Only Vessel 3 has sufficient evidence to discuss construction traditions. It had an open concave rim on a shallow open body with a round base and neither rim moulding or lugs. Vessel 3 is part of the group 9 tradition.

Decoration Vessels 1, 2 and 3 all belong in the undecorated group 11 tradition. The sherds of vessel 4 which survive are also undecorated but it is impossible to be confident in this case that the entire vessel was plain.

Firing All four vessels were fired using dung as the main fuel for a moderate length of time, putting them in the group 2 tradition.

Use None of the Tinkinswood vessels had any direct evidence for use, nor had any of them been modified after firing. Vessel 1, part of group 1, was very porous, with poor heat-resistance and moderate strength. Vessels 3 and 4 were part of group 8, porous with good heat-resistance and moderate strength. Vessel 2 was non-porous, with good heat-resistance and strength and belonged in the group 21 tradition.

8.8 *Summary*

The limited nature of the dating information from Glamorgan means that the summary discussion for this study area will be less detailed than in other cases.

Raw material selection The wide variety of techniques which appear to have been in use at Ogmore-by-Sea in the middle Neolithic is the most interesting aspect of this group of traditions. Of particular interest is the wide variety of ways of processing the locally available stone which was the inclusion in groups 1, 13, 25, 33, 34, 35 and 36. While some of this variety may be the result of over-zealous categorisation on my part, the majority of these groups seem to be sufficiently distinct to represent different Neolithic potting habits.

Traditions based around the use of shell inclusions were much less well represented. Although there were six different phase 2 traditions using shell, all but group 39 were represented by single vessels. Which suggests that, by the middle Neolithic, shell tempering had become a minor component of the pottery tradition.

the phasing of raw material traditions

	early Neolithic (before 3780-3540 calBC) phase 1	middle Neolithic (around 3350 calBC) phase 2
group 18	pb1	
group 13		og15 og17 og35 og36 og41 og42
group 25		og21 og32 og33 og39
group 1		og2 og7 og11 og12 og13 og16 og18 og19 og20 og25
group 34		og31 og34
group 35		og28
group 33		og14 og22 og23 og27
group 36		og26
group 37		og10
group 38		og5
group 39		og3 og4
group 40		og24
group 41		og9
group 30		og40

Construction Although there were comparatively few vessels at Ogmore with profiles which could be completely reconstructed, those that do survive indicate that a wide variety of vessel forms were being produced by the middle Neolithic. Closed and neutral rim and body forms predominate, together with angular rim mouldings, but flat and hollow bases were noticeable by their absence. Two of the vessels also have necks, vessel 11, in group 46, and vessel 23, in group 48.

the phasing of construction traditions

	early Neolithic (before 3780-3540 calBC) phase 1	middle Neolithic (around 3350 calBC) phase 2
group ?24	pb1	
group 17/49		og16
group 26		og15
group 41		og9
group 43		og3
group 46		og11
group 7/47		og25 og26 og27 og31
group 48		og23

Decoration The relatively early date for the plain group 11 tradition was confirmed at Parc le Breos Cwm. At Ogmore the decoration groups were dominated by the simpler kinds of impressed decoration. Group 1 and group 3 both use only cord impressions, dividing the surface of the vessel in the case of group 1 and unifying it in the case of group 3. The surfaces of group 4 vessels were divided using only bird bone impressions.

Only four Ogmore vessels fell outside these three groups. Vessel 23, in group 10, mixed the techniques of groups 1 and 4. Group 18 used finger impressions only, while vessels 21 and 22, in group 23, mixed finger and bird bone impressions

the phasing of decoration traditions

	early Neolithic (before 3780-3540 calBC) phase 1	middle Neolithic (around 3350 calBC) phase 2
group 11	pb1	
group 1		og2 og3 og4 og11 og12 og13 og14
group 3		og5 og7
group 4		og15 og16 og17 og18 og19 og20 og24 og25 og26 og27 og28 og30 og31 og32 og33 og34 og35 og36 og39 og41 og42
group 10		og23
group 18		og10
group 23		og21 og22

Firing All firing traditions were represented, except for group 4 - which only occurs in one vessel on Anglesey. The use of grasses was rare in the middle Neolithic assemblage at Ogmore, although it was common in the two unphased assemblages from Mount Pleasant and Sant y Nyll.

the phasing of firing traditions

	early Neolithic (before 3780-3540 calBC) phase 1	middle Neolithic (around 3350 calBC) phase 2
group 2	pb1	og15 og16 og17 og26 og28 og30 og31 og34 og35 og39 og41 og42
group 1		og2 og5 og7 og9 og10 og12 og13 og14 og19 og20 og21 og22 og25
group 3		og18 og24 og27 og32 og33 og36
group 5		og3 og4 og11
group 6		og23 og40

Use A wide variety of different traditions of use were represented in the datable material from Glamorgan. None of these vessels had been modified after firing. The only tradition which can be placed in phase 1 was group 8. Neither Parc le Breos Cwm 1 nor Ogmore 40 had direct evidence for use in cooking, although group 8 vessels from Sant-y-Nyll did. As was the case elsewhere in Wales, in seems likely that group 8 vessels were used for general cooking on open fires, and the storage of dry goods.

Of the later material, group 25 has some evidence of use for cooking. This is slightly anomalous as vessels in this group would have only been well suited for use for the storage of dry goods. The single group 4 vessel shows no evidence for use in cooking, although it would have been ideally suited to cooking on open fires, but it would also have worked well when used for the storage of dry goods. The vessel in group 5 was particularly strong and would have been suited for use as a storage pot. It would also have functioned perfectly adequately as a cooking vessel, but there is no direct evidence for this sort of use. The vessels in group 14 may have been used for the serving of food, Ogmore 3 contains traces of residue and the general range of sizes in the group was from very small to medium.

It does not seem likely that vessels in group 12 had a function connected with the preparation of food at all, although they could just have functioned as storage vessels for dry goods. Vessels in group 10 would have been very unsuitable for everyday cooking, but Ogmore 35, 36, 41 and 42 all had secondary oxidisation of the base and traces of internal residues. I would suggest that group 10 vessels were used for occasional slow cooking, possibly as a ritualised part of their main function, which was presumably non-utilitarian.

Group 21 vessels would have been particularly well adapted for the cooking of liquids over open fires, and pottery in this group from Sant-y-Nyll contains the remains of internal residues. Similarly, vessels in group 9 would have been used for the cooking of liquid foods over open fires. Ogmore 9 has traces of internal residue surviving, while Mount Pleasant 7 shows secondary oxidisation of the base. Group 15 vessels would have been good for liquid storage, although general cooking would also have been a possibility. No direct evidence for use survives from this small group. Vessels in group 22 show evidence for use in cooking. This cooking was probably slow cooking of liquid foods. Vessels in group 23 would have had a very limited utilitarian role. They were neither strong nor heat resistant, although they were very impermeable. It seems likely that the primary function of group 23 vessels was non-utilitarian. However, in common with group 23 vessels from elsewhere in Wales, those from the Vale of Glamorgan were used for occasional slow cooking of liquids, probably as part of their ritual use.

the phasing of use traditions

	early Neolithic (before 3780-3540 calBC) phase 1	middle Neolithic (around 3350 calBC) phase 2
group 8	pb1	og40
group 25		og23
group 4		og5
group 5		og21
group 14		og3 og11 og19 og22 og24
group 12		og17 og18 og32
group 10		og2 og13 og16 og20 og31 og34 og35 og36 og41 og42
group 21		og30
group 9		og9
group 15		og28
group 22		og4 og7 og27 og33 og39
group 23		og12 og15 og25 og26

9 West Wales

9.1 *Introduction*

The material in this study area comes from a group of seven sites around the Pembrokeshire and Carmarthenshire coasts (see figure 9.1). The sites in question are: Pentre Ifan (Grimes 1948); Carreg Samson (Lynch 1975); Clegyr Boia (Williams 1953); Stackpole Warren (Benson *et al* 1990); and three sites on Caldy Island - Daylight Rock Fissure, Nanna's Cave and Potter's Cave (Lacaille & Grimes 1961).

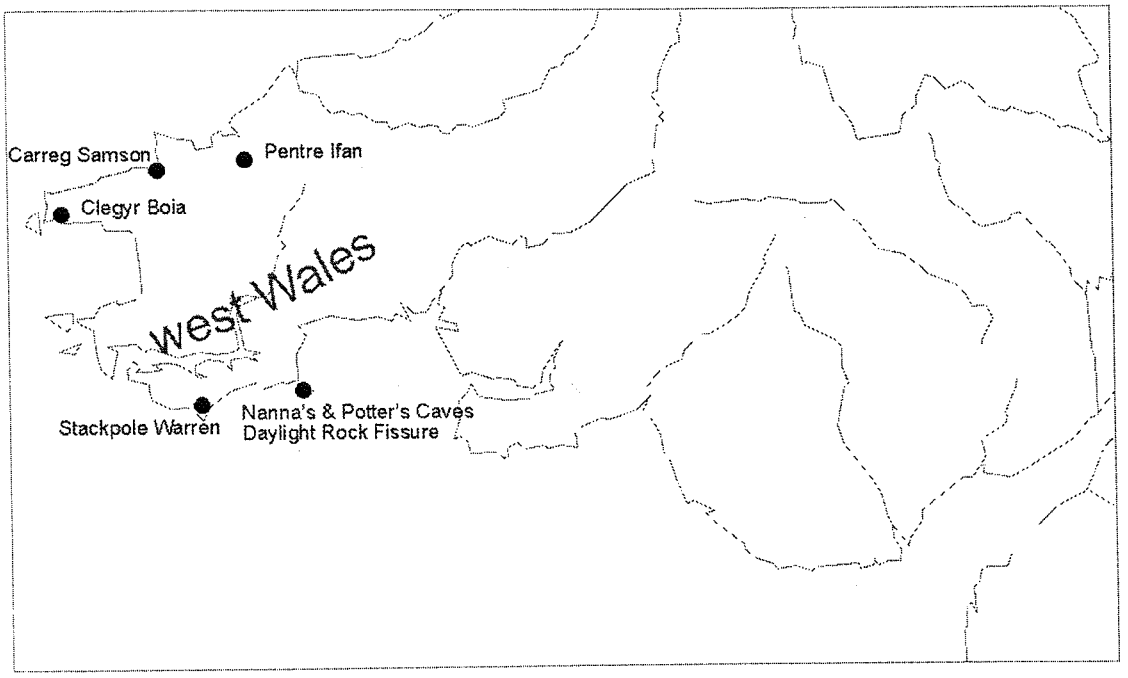


Figure 9.1: Neolithic pottery from west Wales

9.2 *Chronological Framework*

Unfortunately, none of the sites in the study area have either clearly stratified phasing or securely associated radiocarbon dates. The only material for which it is possible to suggest a chronological order is the pottery from Clegyr Boia (Williams 1953). Although the bulk of the contexts on this site were clearly contemporary (see section 9.6 below), some of the pottery from hut 2, which was stratified beneath the rampart, probably pre-dates other material from the site. This allows a rough, two-phase ordering of the pottery from Clegyr Boia as follows

hut 2 pottery	other contexts
cb3 cb4 cb5 cb6 cb7 cb8 cb9 cb10 cb11 cb12 cb13 cb16 cb17 cb18 cb19 cb20 cb22 cb23 cb24 cb27 cb30 cb32 cb33 cb34 cb35 cb36 cb37 cb39 cb40 cb43	cb1 cb2 cb14 cb15 cb21 cb25 cb26 cb28 cb29 cb31 cb38 cb41 cb42

All of this Clegyr Boia material appears to date to the first Neolithic.

9.4 *Pentre Ifan*

Pentre Ifan is a large megalithic chambered cairn which lies around 4 km east of Newport, at around 150 m OD on the northern edge of the Preseli hills (NGR SN 100 370). The site was excavated by W.F. Grimes (1948) and consists of a large chamber flanked by a megalithic facade, which was contained within a long cairn. At the time of Grimes' excavation the chamber had already been disturbed and only a small portion of the original chamber fills survived. Within this fill were four sherds from a single carinated bowl, vessel 1.

Raw Material Selection Vessel 1 belongs in the group 1 tradition. It was tempered using coarse, granular pieces of locally available stone.

Construction Vessel 1 was part of the group 21 tradition (see figure 9.2). It had an open, concave rim on a deep open body with a round base. It had no rim moulding or lugs.

Decoration The surface of vessel 1 was unchanged, placing it in the group 11 tradition.

Firing Vessel 1 was probably fired for a moderate period of time, using dung as the main fuel, making it part of the group 2 tradition.

Use Vessel 1 was part of the group 7 tradition, it would have been non-porous, poor at resisting heat and only moderately strong, the vessel has no evidence for use in cooking and was small in size. .

9.5 *Carreg Samson*

The site is a megalithic chambered cairn situated on the northern coast of Pembrokeshire, 3.5 km north west of the village of Mathry, at around 40 m OD (NGR SM 848 335). Carreg Samson was excavated in 1968, prior to being taken into Ministry of Works guardianship (Lynch 1975). The chamber consists of seven upright stones, sitting in the backfilled upper layers of a large pit. There were possible traces of an entrance on the north-western side of the chamber. It was not possible to completely excavate the pit beneath the chamber but sherds of pottery, worked stone and bone were recovered from the chamber floor. The sherds of pottery were part of a single, hemispherical bowl, vessel 1.

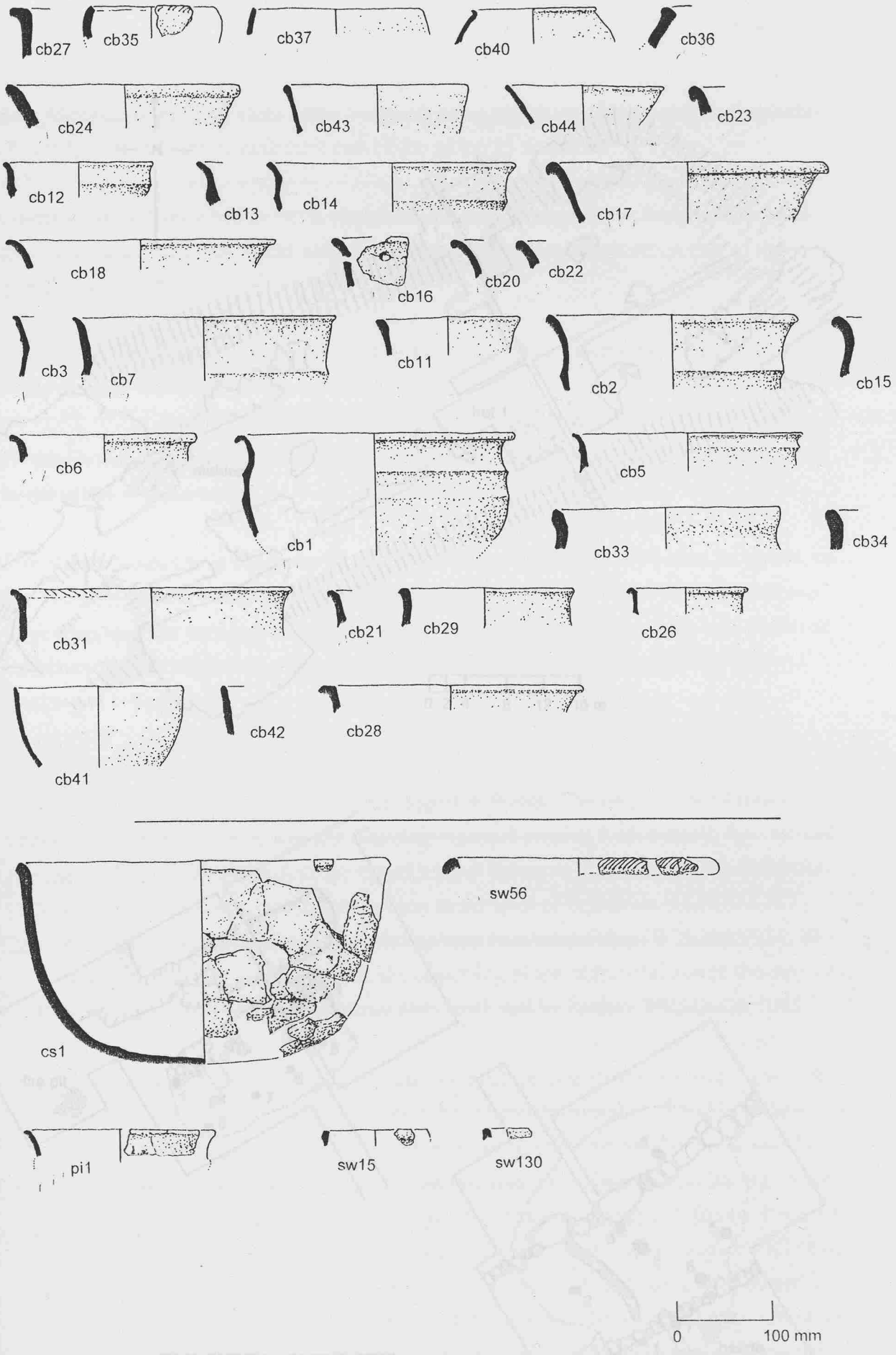
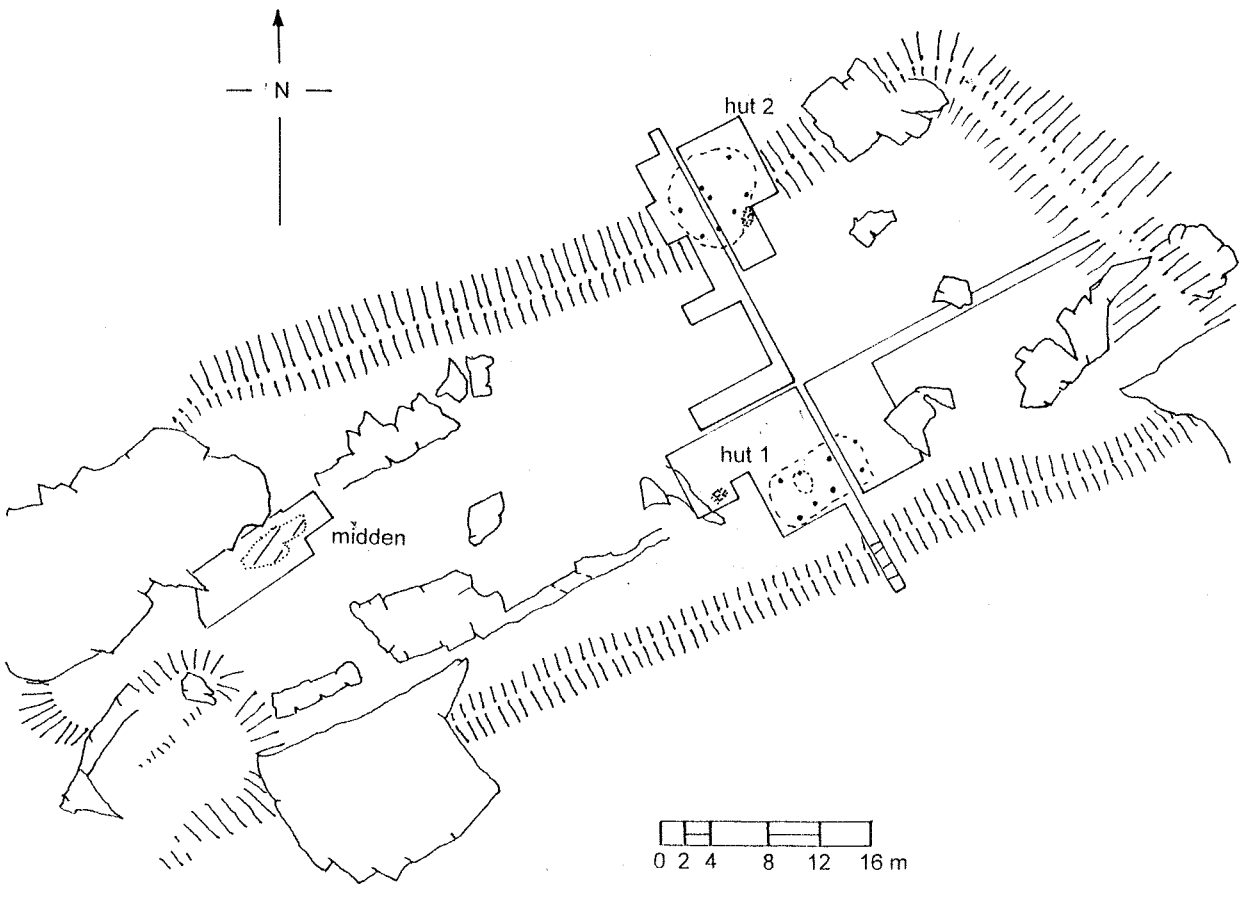


Figure 9.2: Pottery construction groups from west Wales (after Benson *et al* 1990; Grimes 1948; Lynch 1975; and Williams 1953)



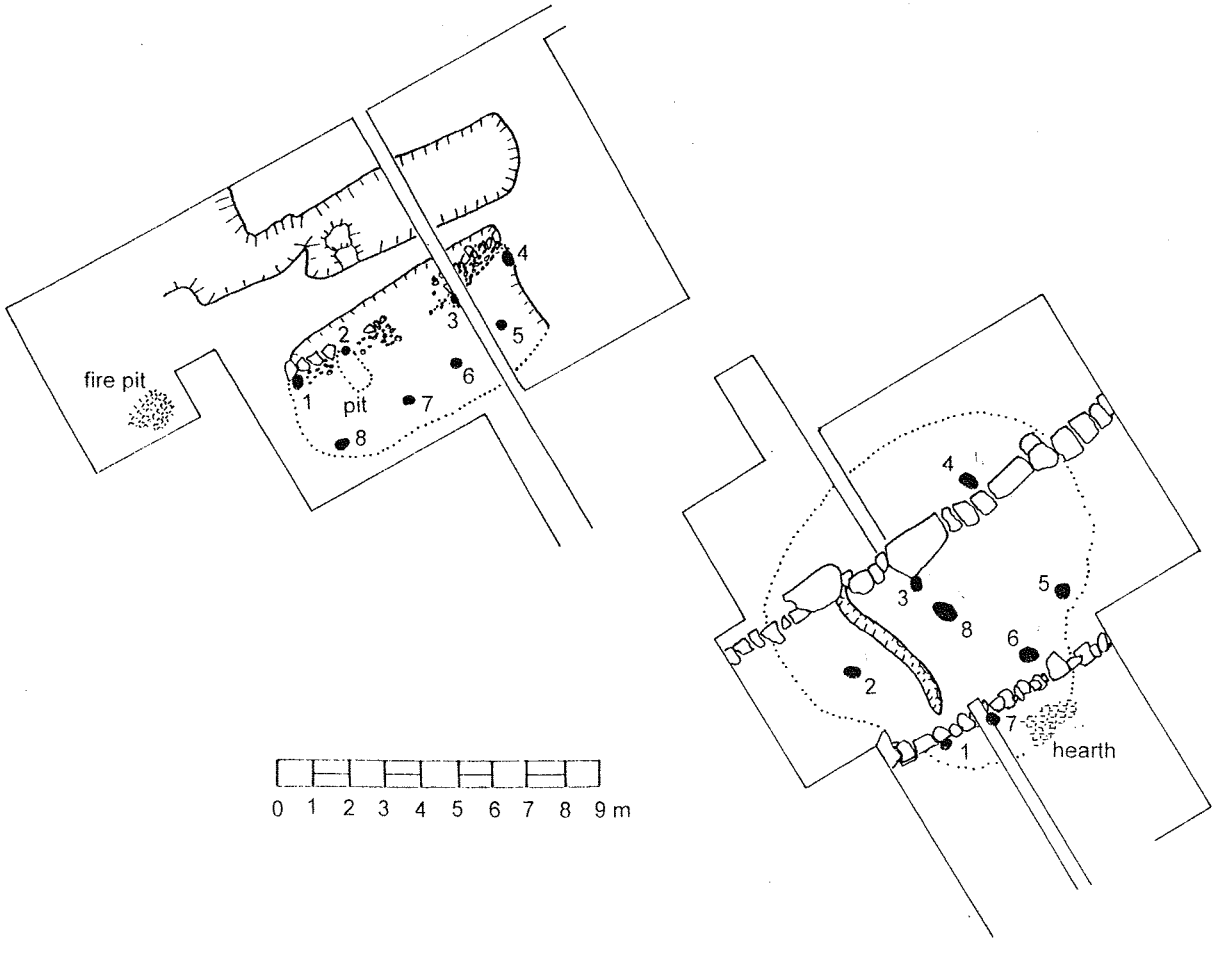


Figure 9.3: Clegyr Boia enclosure (after Williams 1953)

Raw Material Selection Vessel 1 was tempered using mostly medium, granular fragments of locally available stone, making it part of the group 35 tradition.

Construction Vessel 1 had an open, straight sided rim on a deep open body with a round base (see figure 9.2). The vessel had neither lugs nor rim mouldings and is part of the group 27 tradition.

Decoration The vessel belongs in the group 8 tradition. It was burnished using stones while the clay was drying.

Firing Vessel 1 was fired for a relatively long period of time, using dung as the main fuel, in the group 3 tradition.

Use Vessel 1 belongs in the group 22 use tradition. It was not modified after firing and, on the evidence of both internal residues and secondary oxidisation of the fabric, appears to have been used for cooking. This vessel would have been non porous, with only moderate resistance to thermal damage and physical blows. It was probably used for the slow cooking of liquid foods.

9.6 *Clegyr Boia*

The Clegyr Boia assemblage is one of the largest in Wales. The site itself is a hilltop enclosure of uncertain date, with the Neolithic material coming from beneath the vestigial ramparts. These ramparts enclose the top of a small intrusive projection of Pre-Cambrian rock which rises above the coastal plain 1 km to the west of St Davids (NGR SM 737 251), and lies at around 50 m OD. The site has been excavated twice (Williams 1953, 20-1): by the Rev. Sabine Baring-Gould at the beginning of the century (although the majority of finds from this excavation are unfortunately lost); and by Audrey Williams in 1943.

The Neolithic features on the hilltop include two post-defined structures (Hut 1 and Hut 2 on figure 9.3) and a midden. Hut 2 appears to have been destroyed by fire. All of these locations produced large quantities of Neolithic pottery, with joining sherds coming from all three contexts. Both structures appear to be associated with hearths and Baring-Gould reported a further two heaths and a third structure. It has been suggested (Barker 1992, 68-9, for example) that the enclosure is also of Neolithic date. The north enclosure wall seals Hut 2, but there was no build up of soil prior to its construction and there is no material culture from the site which would suggest any date later than the early Neolithic. Williams (1953, 43) suggested an Iron Age date for the enclosure, largely on the basis of typological

parallels with hillfort entrances. Two radiocarbon samples from the site were submitted to the British Museum in the late 1970's (Burleigh & Hewson 1979, 343). A bulked charcoal sample from the midden and hut 2, both of which are presumably Neolithic contexts, gave a date of 2370 ± 29 bp (BM-1109) and should be disregarded. A sample from burning outside the entrance gave a date of 1950 ± 116 bp (BM-1110), which is the sole indication of any Iron Age activity on the site.

On balance, it seems most likely that Clegyr Boia began its life as a collection of small, rectangular buildings. At least some of these buildings were in use simultaneously. Hut 2 was then destroyed and the hilltop site was enclosed by a dry stone wall during the early Neolithic. Hut 1 and the structure reported by Baring-Gould may have remained standing within the enclosed area. The Neolithic elements of the site have usually been classified as a settlement site (for example: Williams 1953; Lynch 1969, 170; Barker 1992, 68-9). It is true that huts 1 and 2 at Clegyr Boia, which are built of substantial timbers and contain hearths, are better candidates for dwellings than most other early Neolithic structures. Accepting that people may have dwelt within these buildings does automatically imply that the traditional vision of 'small social units based on an isolated farmstead' (Megaw & Simpson 1979, 86) and agrarian sedentism applies to Wales. The most compelling reason for regarding the Clegyr Boia structures and the succeeding enclosure as a ritualised marking of a distinctive part of the landscape is probably the sheer quantity of material culture which was deposited. This point has been argued in more detail and with reference to the whole of mainland Britain by Thomas (1996a).

All of the pottery from Clegyr Boia dates to the earlier Neolithic. In traditional terms it is an assemblage of early Neolithic bowl forms, some of which belong in the Dyffryn-Llandegai series of Irish Sea Ware and others of which are closer to the Hembury style pottery of south west England (Lynch 1969, 170). Sherds from vessels 1, 2, 14, 15, 25, 28, 29, 31 and 41 came from contexts associated with hut 1. Parts of vessels 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 22, 23, 24, 27, 30, 32, 33, 34, 35, 36, 37, 39, 40, 43 and 44 came from contexts associated with hut 2. The midden produced sherds from vessels 17, 21, 26, 38, 41 and 42.

Raw Material Selection There were ten different groups of raw material traditions represented at Clegyr Boia. Vessel 16, in group 61, used no inclusions at all. Vessel 15, in group 34, was tempered using fine, medium and coarse granular pieces of stone. Vessel 35, in group 57, used fine, medium and coarse granular and laminar pieces of stone. In the group 13 tradition, vessel 36 was tempered with medium and coarse fragments of granular

stone. Vessels 31, in group 25, contained fine and medium pieces of granular stone. Vessels 30 and 42, in group 58, were tempered with fine and medium pieces of some laminar but predominantly granular stone. Vessel 34, in group 59, was tempered with fine and medium pieces of mostly laminar stone.

Group 17, which included vessels 1, 3, 5, 6, 8, 10, 11, 14, 21, 23, 26, 27, 28 and 38, involved the use of fine and medium pieces of laminar and granular shell as tempering. Vessels 4, 12, 17, 18, 29, 32, 37, 40, 41 and 43 were tempered using fine, medium and coarse pieces of laminar and granular shell, placing them in the group 16 tradition. Group 20 vessels, including 9, 13 and 33, were tempered using mostly fine pieces of laminar and granular shell. Vessel 22, in group 60, was tempered with fine laminar shell fragments.

phasing of raw material traditions

	hut 2	hut 1	midden
group 61	cb16		
group 57	cb35		
group 59	cb34		
group 20	cb9 cb13 cb33		
group 60	cb22		
group 13	cb36		
group 58	cb30		cb42
group 17	cb3 cb5 cb6 cb10 cb14 cb8 cb11 cb23 cb27	cb1 cb14 cb28	cb21 cb26 cb38
group 16	cb4 cb12 cb17 cb18 cb32 cb37 cb40	cb29	cb41
group 25		cb31	
group 34		cb15	

Construction There were twelve different construction traditions represented in the assemblage (see figure 9.2).

Group 9, which includes vessels 12, 13, 14, 16, 17, 18, 20 and 22, was characterised by the use of an open concave rim on a shallow open body, with a rounded base and neither rim mouldings or lugs. Group 21 vessels, including 2, 3, 7, 11 and 15, used similar techniques to produce a deep open body. Vessel 26, in group 20, had an open concave rim on a shallow neutral body with a round base and neither lugs nor rim moulding. There was insufficient evidence to classify vessels 4, 19 and 32, except to say that they probably belonged to one of the preceding three groups.

Vessels 1 and 6 belonged in group 16. They had upright concave rims on shallow neutral bodies with round bases and had neither rim mouldings nor lugs. Vessel 29, in group 5

was similar, but had a deep neutral body. Vessels 5, 21, 31, 33 and 34 were not sufficiently well preserved to distinguish which of the preceding two groups they belonged to.

Group 14, which includes vessels 24, 43 and 44, was characterised by the use of open straight sided rims on a shallow open body with a round base. These vessels had neither rim moulding nor lugs. Vessels 41 and 42, in group 27, were distinguished from those in group 14 by having deep open bodies.

Vessels 35, 37, 40, and probably vessel 36, were part of the group 7 tradition. These vessels had closed convex rims on shallow closed bodies with round bases. They had neither rim mouldings nor lugs. Vessel 23, possibly part of group 24, had a rounded rim moulding on an upright concave rim. Vessel 28, in group 31, had a rounded rim moulding on a straight-sided open rim. Vessel 28 had a shallow open body and a round base. Group 22 vessels, 25 and 30, were similar in shape but had angular rim mouldings. Vessel 27, in group 40, had an angular rim moulding on an upright straight-sided rim. It had a shallow neutral body and a round base.

phasing of construction traditions

	hut 2	hut 1	midden
group 40	cb27		
group 7	cb37 cb35 cb40		
group ?7	cb36		
group 14	cb24 cb43 cb44		
group ?24	cb23		
group 9/21/20	cb4 cb19 cb32		
group 9	cb12 cb13 cb14 cb16 cb17 cb18 cb20 cb22	cb14	
group 21	cb3 cb7 cb11	cb2 cb15	
group 22	cb30	cb25	
group 16	cb6	cb1	
group 5/16	cb5 cb33 cb34	cb31	cb21
group 5		cb29	
group 20			cb26
group 27			cb41 cb42
group 31		cb28	

Decoration Five different decorative traditions were used at Clegyr Boia.

Vessels 1, 6, 17, 28, 32, 37, 42 and 43 were all part of the group 8 tradition, in which the surface of the vessel was unified by being burnished with a stone while the clay was drying. Group 6 vessels, including vessel 25, were decorated by removing drying clay with

a worked stone point to divide the surface of the vessel. The surface of vessel 31 was divided using a bone point to push aside drying clay, part of the group 20 tradition.

Vessel 35 was decorated using parts of the body to push aside the clay while it was still plastic. Vessel 35 was part of the group 18 tradition. The majority of the pottery from the site, certainly including vessels 2, 3, 4, 5, 7, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 24, 26, 27, 29, 30, 33, 34, 36, 38, 39, 40, 41 and 44, belonged in group 11, where the surface of the pottery was unified by being left unchanged.

phasing of decoration traditions

	hut 2	hut 1	midden
group 18	cb35		
group 11	cb3 cb4 cb5 cb7 cb11 cb12 cb13 cb14 cb16 cb18 cb19 cb20 cb22 cb23 cb24 cb27 cb30 cb33 cb34 cb36 cb39 cb40 cb44	cb2 cb14 cb15 cb29 cb41	cb21 cb26 cb38 cb41
group 8	cb6 cb17 cb32 cb37 cb43	cb1 cb28	cb42
group 6		cb25	
group 20		cb31	

Firing Three different firing traditions were represented in the Clegyr Boia pottery.

Vessels 1, 5, 6, 8, 10, 11, 13, 15, 16, 17, 18, 21, 23, 28, 29, 31, 32, 33, 34, 37, 38, 40, 42 and 43 were all fired for a long period of time, using grasses as the main fuel, in the group 5 tradition. Vessels 3, 12, 26 and 35 were fired for a moderate period of time, using dung as the main fuel, in the group 2 tradition. Group 1, in which vessels were fired for a short period of time, with dung as the main fuel, was represented by vessels 4, 9, 14, 27, 30, 36 and 41.

phasing of firing traditions

	hut 2	hut 1	midden
group 5	cb5 cb6 cb8 cb10 cb11 cb13 cb16 cb17 cb18 cb23 cb32 cb33 cb34 cb37 cb40 cb43	cb1 cb15 cb28 cb29 cb31	cb17 cb21 cb38 cb42
group 2	cb3 cb12 cb35		cb26
group 1	cb4 cb9 cb14 cb27 cb30 cb36	cb14 cb41	cb41

Use There appear to have been eight different styles of vessel use at Clegyr Boia.

The largest single group is the group 8 tradition. These vessels, numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 18, 21, 23, 25, 27, 32, 35, 37, 40 and 43, were not modified after firing. They range in size from very small to large and many of them show evidence of use for cooking, in the form of secondary oxidisation of the base. They would have been porous, with good resistance to thermal stress and been moderately strong and could have been used for relatively fast, high temperature cooking and the storage of dry goods. The vessels in group 14, numbers 15 and 30, were similar to those in group 8, although they were only moderately resistant to thermal damage. Despite, this vessel 15 shows evidence of use for cooking. Group 14 vessels were probably used in a similar manner to those in group 8. Vessels 11, 13, 22, 26, 28 and 29, in group 4, were also similar, although in this case they had good resistance to both thermal damage and physical blows. Group 4 vessels seem all to have been small or very small, and several seem to have been used for cooking. Once again, these vessels could have been used for rapid, high temperature cooking or the storage of dry goods. Vessel 16, in group 3, differs only from the group 4 vessels in that it was perforated after firing.

Vessel 31, in group 7, was not modified after firing. The vessel was small in size, non porous, with poor resistance to thermal damage and moderately strong. Despite this it appears to have been used for cooking, presumably the slow cooking of liquids. Vessels 34, 36 and 42, in group 22, were non porous, moderately strong and moderately resistant to heat damage. There is no evidence from Clegyr Boia as to how these vessels were used. The vessels in group 9, numbers 17, 38 and 41, were also not modified after firing and range in size from very small to large. These vessels were non porous, with good thermal resistance and moderate strength. They appear to have been used in cooking, probably the rapid, high temperature cooking of liquids. Vessel 33, in group 2, was very porous, with good resistance to heat damage and physical blows. There are indications that vessel 33 was used for cooking; presumably rapid, high temperature cooking of relatively dry foods.

phasing of use traditions

	hut 2	hut 1	midden
group 2	cb33		
group 3	cb16		
group 8	cb3 cb4 cb5 cb6 cb7 cb8 cb9 cb10 cb12 cb14 cb18 cb23 cb27 cb32 cb35 cb37 cb40 cb43	cb1 cb2 cb14 cb25	cb21
group 14	cb30	cb15	
group 4	cb11 cb13 cb22	cb28 cb29	cb26
group 9	cb17	cb41	cb17 cb38 cb41
group 22	cb34 cb36		cb42
group 7		cb31	

9.7 *Stackpole Warren*

The Neolithic pottery from Stackpole Warren comes from a number of different areas excavated during the archaeological investigation of blown sand layers from the Warren (Benson *et al* 1990). Stackpole Warren is an area of blown sand, at around 33 m OD, on the plateau between Broad Haven and Stackpole Head on the south coast of Pembrokeshire. The pottery came from excavations around the Devil's Quoit standing stone (NGR SR 981 951) and Bronze Age field systems 90 m to the west. All the vessels came from buried soil horizons sealed by the first deposits of blown sand (Benson *et al* 1990, 210-11).

Raw Material Selection There were two different traditions of raw material selection used at Stackpole Warren.

Vessels 15, 52, 56 and 130 are part of the group 29 tradition. They were tempered with fine, medium and coarse fragments of granular stone from at least one day's travel away (Benson *et al* 1990, 209-10). Vessels 90 and 94 belong in the group 1 tradition. They were tempered with coarse granular pieces of locally available stone.

Construction There were three different construction traditions represented on the site (see figure 9.2).

Vessels 130 and 94 appear to have had straight-sided open rims, without rim mouldings or lugs, and probably belonged in the group 14, 27 or 29 tradition. Vessel 15, in group 51, had an upright convex rim on a shallow closed body with a rounded base. It had neither rim mouldings nor lugs. Vessel 56, in group 32, had a straight-sided open rim on a shallow open body with a rounded base. Vessel 56 had a rounded rim moulding and no evidence for lugs.

Decoration Three different decoration traditions were present at Stackpole Warren.

Vessel 94 belonged in group 6, in which the surface of the vessel had been changed by using a worked stone point to remove drying clay. The decoration divided the surface of the vessels. Vessel 90, in group 18, had been decorated by dividing the surface of the vessel with pinched up cordons. Group 11, in which the surface of the vessel was unified by being left unchanged, was represented by vessels 15, 52 and 130.

Firing There were two different firing traditions in use.

Vessels 15, 52, 56 and 130 were fired for a long period of time with grasses as the main fuel, putting them in the group 5 tradition. Vessels 90 and 94 were fired for a relatively short period of time with dung as the main fuel, making them part of the group 1 tradition.

Use There appear to be two different traditions of use in this pottery.

Group 22 vessels, numbers 15, 52, 56 and 130, were not modified after firing, and were probably transported from over one day's travel away. There was no evidence for use for cooking, but in terms of physical characteristics the vessels would have been non porous, with moderate resistance to both physical blows and heat damage. Where sizes can be estimated the vessels range from very small to small. Vessel 90 and 94, in group 23, were also not modified after firing. Again there was no evidence for use in cooking and the physical properties of these vessels mean that they would have been non porous with poor heat resistance and physical strength.

9.8 Daylight Rock Fissure

Neolithic pottery is recorded from three separate locations on the island of Caldy (Lacaille & Grimes 1961, 36-8, 62). Two sherds from a single Mortlake style Peterborough ware bowl, vessel 1, were recovered from within a shallow pit in the floor of the Daylight Rock fissure (NGR SS 149 966). This pit was sealed by a deposit of modern windblown sand.

Raw material selection Vessel 1 belongs in group 15. It was tempered with large laminar pieces of stone from up to one day's travel away.

Construction Vessel 1 belongs in the group 39 tradition. It had an upright straight-sided rim on a deep open body with a rounded base. Vessel 1 had an angular rim moulding but no evidence for lugs.

Decoration The surface of vessel 1 was divided by using parts of the body and parts of animals to push aside the clay while it was still plastic. Vessel 1 belongs in group 23.

Firing Vessel 1 was fired for a relatively long period of time, using grasses as the main fuel, placing it in the group 5 tradition.

Use Vessel 1 is part of the group 22 tradition. It was not modified after firing and shows traces of residue internally. In terms of physical characteristics it would have been non

porous, with moderate resistance to heat damage and physical blows. Group 22 vessels were probably used for the slow cooking of liquid foods. Vessel 1 was large, although the group in general ranges from very small to large in size.

9.9 Nanna's Cave

Nanna's Cave (NGR SS 146 968) is the second Caldy site to produce Neolithic pottery. Lacaille and Grimes record a single vessel from this site, and illustrate it as a rather anomalous dish-shaped object. Examination of the Nanna's Cave material in the National Museum of Wales suggests that there were in fact three vessels from this site. Vessel 1 was a plain bowl with a slightly outurned rim, probably around 300 mm in diameter; vessel 2 was represented by a rim sherd only, but seems to have been another open bowl. Vessel 3 was the vessel illustrated by Lacaille and Grimes. I would suggest an alternative reconstruction of this vessel, rotating the rim sherd to give a closed bowl profile. The surviving portion of rim is too small to allow the rim angle to be accurately calculated, but the balance of probability favours the reconstruction as a bowl.

Raw material selection Vessel 2 was part of the group 17 tradition. It was tempered with medium and coarse pieces of granular and laminar shell. Vessel 3 belongs in the group 16 tradition. It was tempered using fine, medium and coarse pieces of laminar and granular shell. Vessel 1, in group 30, was tempered using fine, medium and coarse pieces of laminar shell.

Construction Vessels 1 and 2 both belong in group 9. They had concave open rims on shallow open bodies with rounded bases. Neither vessel had rim mouldings or lugs. Vessel 3, in group 33, had a straight-sided open rim, above a straight-sided inturned neck. The body of the vessel was shallow and neutral, with a rounded base, and the rim had an angular rim moulding.

Decoration All three vessels belonged in group 11, their surfaces were unified by being left unchanged.

Firing Vessels 1 and 3, in group 5, were fired using grasses as the main fuel for a relatively long period of time. Vessel 2, in group 2, was fired using dung as the main fuel, for a moderate period of time.

Use Vessel 1 belonged in the group 8 tradition. It was not modified after firing and had no evidence for use in cooking. Vessel 1 was large, although other group 8 vessels range in

size from very small to large. It would have been porous, with good resistance to heat damage and moderate or poor strength. It seems likely that group 8 vessels were used for the rapid, high temperature cooking of relatively dry foods. Vessel 2 belonged in group 19, it would have been porous, with good resistance to heat damage but poor physical strength. Vessel 2 was medium sized. Vessel 3 was part of the group 11 tradition. It was not modified after firing and would have been very small. There is no evidence of this vessel being used for cooking. It would have been very porous with moderate resistance to heat damage and poor strength.

9.10 Potter's Cave

Potter's Cave (NGR SS 145 971) is the third of the Caldy sites to produce Neolithic pottery. Four sherds from a single carinated bowl, vessel 1, were found within a buried soil beneath a windblown sand in the cave.

Raw material selection Vessel 1 is part of group 30, it was tempered using fine, medium and coarse pieces of laminar shell.

Construction Vessel 1 had a concave open rim on a shallow open body with a rounded base. It had a rounded rim moulding and no evidence of lugs and belongs in the group 1 tradition.

Decoration Vessel 1 belongs in the group 11 tradition. The surface was unified by being left undecorated.

Firing Vessel 1 was fired for a relatively long period of time, using grasses as the main fuel, putting it in the group 5 tradition.

Use Vessel 1 belongs in the group 22 tradition. It was not modified after firing and was very small. Vessel 1 would have been non porous, with moderate resistance to heat damage and physical blows.

9.11 Summary

The small amount of chronological information available for this study area limits the discussion of traditions in the region. I will discuss these traditions in the light of the two-phase chronology established in section 9.2 for the early Neolithic in the study area.

Raw material selection Accepting the rather tentative phasing suggestions made in section 9.2, there were six different raw material traditions in use in the earliest part of the Neolithic. These six traditions were quite varied. The simplest were group 61, which involved no tempering at all, and group 13, tempered with coarse and medium pieces of laminar stone. Group 20 and group 60 vessels contained intensively processed shell fragments and group 57 and group 59 vessels were tempered with intensively processed stone inclusions.

Groups 58, 17 and 16 all included some phase 1 vessels, but also ran on into phase 2. Group 58 vessels were tempered with granular and laminar pieces of fine and medium stone. Groups 16 and 17 were both large similar traditions which used shell as inclusions, medium and coarse pieces in the case of group 17, fine and medium in the case of group 16.

Vessels in groups 25 and 34, which entirely belonged in phase 2, were simpler, using granular fragments of local stone in various sizes.

Construction The obvious point about construction techniques is that most of the elements used to make up the various traditions seem to have been in place early. Closed and open bodies; concave, convex and straight-sided rims and angular and rounded rim moulding were all used in building the phase one pottery (see figure 9.2). The only chronological change appears to be the introduction of deep-bodied forms in phase two. Flat and hollow bases were notable by their absence from the phased pottery, unsurprisingly as the Clegyr Boia pottery was probably all early Neolithic. However, they were also absent from the unphased Pembrokeshire material, perhaps indicating that this material was all relatively early in the sequence for Wales.

Decoration There were three traditions which contain phase one vessels. The bulk of this material belongs in group 11 and 8, in which the surfaces of the vessels were unified, either by being left undecorated or by being burnished. These two groups also contained the bulk of the phase two material. Two further vessels, in two different groups, made up the rest of the assemblage.

Firing Given that firing traditions have been the least strongly phased of groups, it is not surprising that within the short time-span covered by the Clegyr Boia material, there should be no chronological succession of firing techniques. Short and moderate firings using dung and long firings using grass as the main fuel were all used from the beginning

of phase one and through phase two. The use of dung in longer firings is demonstrated by vessel 1 from Carreg Samson.

Use Group 2 and group 3 were the two traditions entirely confined to phase one. Vessels in group 2 would probably have been used for rapid, high temperature cooking of relatively dry foods. Those in group 3 would have had similar uses, but would have been better suited to cooking liquid foods.

Groups 4, 8, 14, 9 and 22 all began during phase one but continued into phase two. Vessels in groups 4, 8 and 14 were all probably used for cooking on open fires and for the storage of dry goods. Vessels in group 9 may have been for the cooking of liquid foods on open fires. Group 22 contains the earliest vessels which would not have been particularly well suited to high temperature cooking, but there was no direct evidence for how they were used.

Group 7 was the only tradition entirely confined to phase 2. These vessels appear to have been used for the slow cooking of liquid foods. In general, the assemblage was dominated by fine 'utilitarian' cookwares.

How many archaeologists does it take to change a light-bulb?
- we don't know, we haven't got enough information yet. - Anon.

10 Histories about Neolithic pottery in Wales

10.1 Introduction

In the analysis which follows I do not necessarily intend to imply that every similar vessel belonged, in an overt way, to a particular group. In certain cases, similar techniques will have been employed fortuitously and independently. In others I will simply have failed to recognise distinctions between practices, or conversely to have over-emphasised accidental or trivial distinctions. As this chapter is intended to be a review of the evidence for the most convincing traditions, I have only concerned myself in detail with those groups represented by five or more vessels.

The broad brush approach of this final chapter should not obscure the finer detail discussed in chapters 5 to 9, but the results of this chapter are intended to allow me to place Neolithic pottery use in Wales in its regional and chronological context. The fine detail of people's actions revealed in earlier chapters can now be related to the more general character of the Neolithic period in Wales

10.2 Chronological Framework

In this section, I will merge the individual chronologies for the five area studies with the more general chronology for the whole of Wales, established in chapter 4. The local chronologies generally provide a more detailed phasing, but do not cover the whole of the period under study.

First Neolithic, c *4000-3800 calBC* Radiocarbon evidence places the pre-cairn structures at Trefignath, and probably the first small cairn, in this phase. The pre-cairn structures at Gwernvale were also radiocarbon dated to this period. This suggests that pottery which belonged to phases 1 and 2 in north west Wales and phase 1 in the Usk valley should be placed in the first Neolithic. If the suggestion, see section 4.3 above, that Clegyr Boia also belongs in this phase is accepted, then the pottery from that site can also be placed in the first Neolithic.

Early Neolithic, c *3800-3400 calBC* The use of the chamber at Parc le Breos Cwm and the phase 2 pottery from Gwernvale were dated to this period. This suggests that phase 1 pottery from the Vale of Glamorgan and some phase 2 pottery from the Usk valley belongs

in the early Neolithic. It is also probable that phase 3 pottery from North west Wales and phase 1 pottery from the upper Severn valley were early Neolithic in date.

Middle Neolithic, c 3400-3000 calBC Radiocarbon dates suggest that phase 2 pottery from Four Crosses and pottery from phase 3, and possibly some from phase 2, at Gwernvale was middle Neolithic in date. The single date from Ogmore also places the pottery from that site at the end of the middle Neolithic. I would suggest that phase 4 pottery from North west Wales, phase 2 pottery from the upper Severn valley, some phase 2 and all phase 3 pottery from the Usk valley, and phase 2 pottery from the Vale of Glamorgan all belong in the middle Neolithic.

Late Neolithic, c 3000-2400 calBC The only pottery dated to this phase was that from sites in the upper Severn valley. This is due to the exclusion of the partially published Capel Eithin assemblage (White 1981), and the general absence of activity in the southern study areas in the late Neolithic (see section 4.3, above). The long, late Neolithic period appears to have been equivalent to phases 3, 4 and 5 of the pottery sequence in the upper Severn valley.

calBC Wales	*c* 4000-3800 first Neolithic	*c* 3800-3400 early Neolithic	*c* 3400-3000 middle Neolithic	*c* 3000-2400 late Neolithic
NW Wales	phase 1 phase 2	phase 3	phase 4	
Upper Severn		phase 1	phase 2	phase 3 phase 4 phase 5
Usk valley	phase 1	phase 2	phases 2 & 3	
Glamorgan		phase 1	phase 2	
West Wales	phase 1 phase 2			

10.3 Raw Material Selection

There were fifteen raw material groups which were well enough represented to be incorporated into this part of the study. Traditions to do with raw material collection were perhaps those most liable to be over-differentiated, particularly in those areas with good thin-section data. It may be that groups 26, 27, and 28 at Gwernvale, for example, are an over-splitting of what was essentially one technique.

Group 5 In this tradition local stone was used as an inclusion. It was granular in texture and processed to be largely fine, with some medium sized pieces. The vessels came from three sites: Bryn Celli Wen; Pant y Saer and Ogmore. It is probable that the single example from Ogmore is coincidental, and that this tradition was confined to North west Wales and dates to the first Neolithic.

Group 16 This large group had a predominantly western distribution, with only three vessels from Ty Isaf falling outside north west or West Wales. The datable vessels, from Ty Isaf and Clegyr Boia, place this tradition entirely within the first Neolithic. They were tempered using shell fragments which were laminar and granular in equal proportions. The shell included equal amounts of fine, medium and coarse pieces.

Group 17 This was another large group with a western distribution, which was very similar to group 16. Vessels came from Llugwy, Din Dryfol, Clegyr Boia, Nanna's Cave on Caldy, and Ty Isaf. This tradition also seemed to belong within the first Neolithic. The vessels were tempered using laminar and granular shell fragments. The shell had been crushed into medium-sized and fine pieces.

Group 26 This tradition was entirely confined to Gwernvale, and, except for two possibly residual vessels, to the first Neolithic. These vessels were largely tempered using laminar fragments of chopped plant material, probably grasses, but there was also a proportion of granular stone and grog. The inclusions were fine, medium-sized and coarse.

Group 27 This group was also entirely confined to Gwernvale, and to the first Neolithic and early Neolithic. The vessels were tempered with medium and coarse pieces of largely laminar chopped plant material.

Group 28 This was a third tradition which was entirely confined to Gwernvale, and which probably dated to the first and early Neolithic. The pottery contained fine and medium-sized chopped plant material, which was entirely laminar in texture.

Group 18 The vessels in this tradition came from a geographically wide spread of sites, but those which can be dated all belong to the first or early Neolithic phases, and all, except for a single vessel from Mount Pleasant[1], came from chambered cairns. The sites in question were: Llugwy; Pant y Saer; Parc le Breos Cwm; Tinkinswood; and Mount Pleasant. The pottery was tempered with shell fragments, laminar in texture, which were largely medium sized, but with some fine and coarse pieces.

[1]The exact nature of the Mount Pleasant cairn is unclear (see section 8.3 above) but it probably involved some sort of central space enclosed within a cairn.

Group 9 This tradition was entirely confined to Trefignath, dating to the latter part of the first Neolithic, and the early Neolithic. The vessels were tempered using grog and laminar shell fragments, all of which were coarse.

Group 10 Vessels made in this tradition used clay and inclusions from a distant source. It seems likely that the vessels were being produced elsewhere and transported to the sites in question. They were tempered with granular, medium and coarse stone and grog pieces. The vessels came from Trefignath, Ysgwennant and Four Crosses and cover the period from the first to the middle Neolithic. It may be more likely that group 10 should be split into two chronologically and geographically separate groups, one belonging to the earliest part of the first Neolithic in North west Wales, and the second dating to the middle Neolithic in the upper Severn valley.

Group 25 This group had a largely southern distribution, including vessels from Ogmore, Tinkinswood and Ty Isaf, and single vessels from Bryn yr Hen Bobl and Clegyr Boia. The presence of this tradition at Ty Isaf and Clegyr Boia would point to a date in the first Neolithic, with survival into the middle Neolithic indicated by the vessels from Ogmore. The pottery was tempered using fine and medium-sized fragments of granular local stone.

Group 13 Vessels in this tradition occurred at Bryn yr Hen Bobl and Ogmore, and in a single, probably unconnected, example from Clegyr Boia. The Ogmore vessels would date the tradition to the end of the middle Neolithic. The pottery was tempered using medium and coarse fragments of granular stone.

Group 34 This small tradition had an entirely southern distribution and came from Ogmore, Usk, Mynydd Troed and Clegyr Boia. All of these sites, except for Clegyr Boia, would fit well with the middle Neolithic date suggested by the pottery from Ogmore. The vessels were tempered with fine, medium and coarse fragments of locally available granular stone.

Group 30 Vessels in this group were tempered with fine, medium and coarse fragments of laminar shell. The group has a southern distribution and came from Ogmore, Mount Pleasant, and Nanna's and Potter's Caves on Caldy. The single vessel from Ogmore might suggest a middle Neolithic date for this tradition.

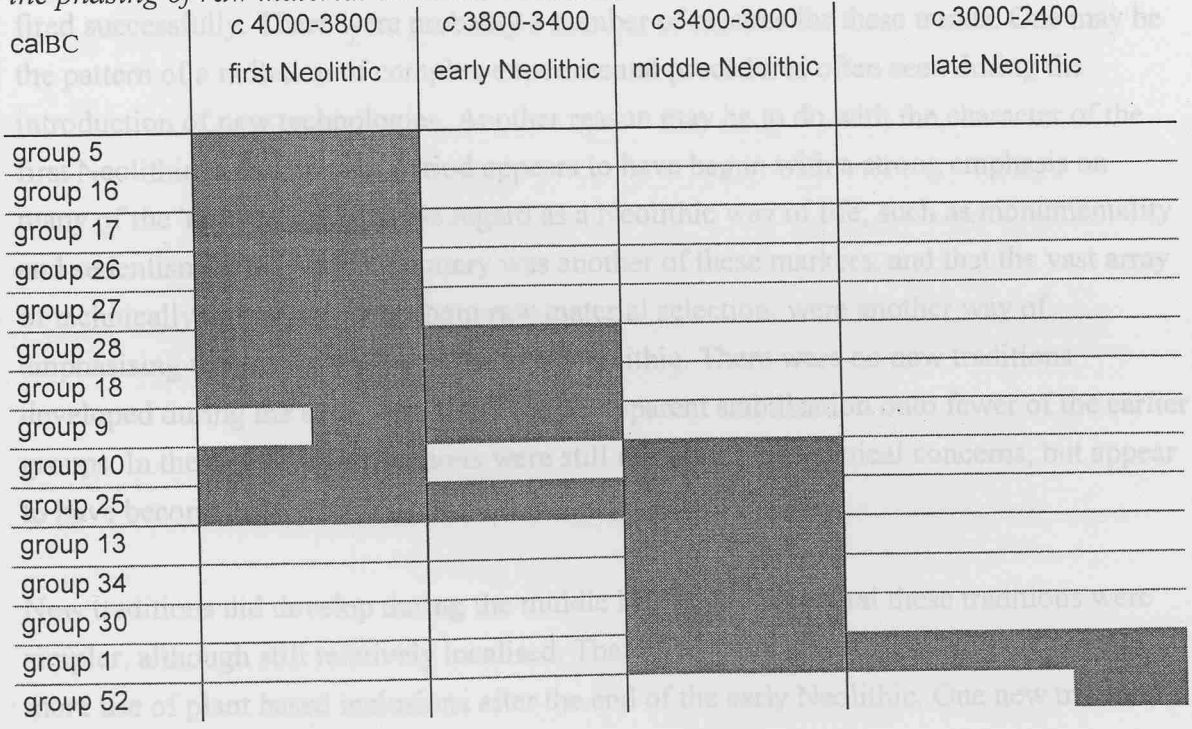
Group 1 This was the largest, and one of the simplest, raw material traditions used. It was present in vessels from Trefignath, Bryn Celli Wen, Castell Bryn Gwyn, Sarn-y-bryn-

caled, Four Crosses, Abergavenny, Cefn Cilsanws, Ffostyll, Gwernvale, Ogmore, Stackpole Warren and Pentre Ifan. The earliest date for this tradition appears to have been the later part of the middle Neolithic, and it was certainly present through the late Neolithic and into the Bronze Age. Vessels in this group contained coarse, granular fragments of locally available stone.

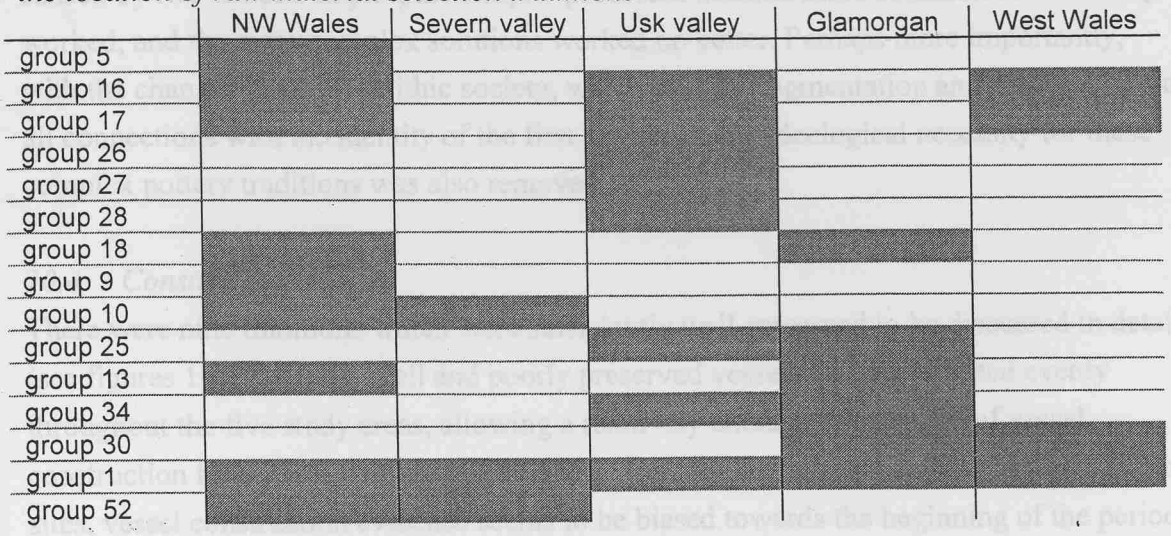
Group 52 This pottery was generally built using clay from a source up to one week's travel distant from the site. It was tempered using grog fragments which were granular and predominantly medium sized. Apart from a single vessel from Llugwy, all of the pottery was from Trelystan, and was dated to the end of the late Neolithic.

Summary The history of these traditions was complex, regionalised, and quickly changing, at least in the earlier part of the Neolithic. The chronology and locations of the groups is summarised in the tables below.

the phasing of raw material selection traditions



the location of raw material selection traditions



During the first Neolithic many different techniques were in use, many of which did not continue after this period. Many of these traditions were highly localised and most were much more complex than the minimum requirements for producing pottery which could be fired successfully. There were probably a number of reasons for these trends. One may be the pattern of a radiation of complex experimental procedures often seen during the introduction of new technologies. Another reason may be to do with the character of the first Neolithic in Wales. The period appears to have begun with a strong emphasis on many of the 'markers' of what we regard as a Neolithic way of life, such as monumentality and sedentism. It may be that pottery was another of these markers, and that the vast array of technically redundant rules about raw material selection, were another way of emphasising the special nature of the first Neolithic. There were no new traditions developed during the early Neolithic, and an apparent stabilisation onto fewer of the earlier groups. In the main, these traditions were still not driven by practical concerns, but appear to have become more stereotyped.

New traditions did develop during the middle Neolithic. In general these traditions were simpler, although still relatively localised. There was more use of stone and grog, and no more use of plant based inclusions after the end of the early Neolithic. One new tradition, group 1, which developed during this period, was different in character. It was geographically widespread and extremely simple, and was the beginning of a trend towards simple raw material selection in the latter part of the Neolithic. The late Neolithic was dominated by pottery tempered in the simplest traditions. These had wide geographical spreads and were often so simple as to be at the lower limits of what was necessary to allow the pottery to be fired. This technological simplification was probably

caused by two factors. In part, the simpler processes became more common because they worked, and the more complex solutions worked no better. Perhaps more importantly, with the changes in late Neolithic society, which saw its fragmentation and the final loss of all connections with the identity of the first Neolithic, the ideological necessity for these complex pottery traditions was also removed.

10.4 Construction

There were nine traditions which were sufficiently well preserved to be discussed in detail (see figures 10.1 & 10.2). Well and poorly preserved vessels were distributed evenly throughout the five study areas, allowing a relatively unbiased discussion of vessel construction techniques. However, due in part to the more ephemeral nature of many later sites, vessel construction evidence seems to be biased towards the beginning of the period.

Group 9 Vessels in this tradition were built with open concave rims on shallow open bodies and rounded bases. They had neither rim mouldings nor lugs. The tradition was present at Din Dryfol, Clegyr Boia, Nanna's Cave, the Breiddin and Tinkinswood. The Clegyr Boia material at least belonged in the first Neolithic.

Group 21 In this group, vessels were constructed with open concave rims on deep open bodies and rounded bases, with neither rim mouldings nor lugs. The pottery came from Gwernvale, Dyffryn Ardudwy, Clegyr Boia and Pentre Ifan and dated to the first Neolithic.

Groups 9 and 21 both dated to the first and early Neolithic phases and were deep and shallow variants on the same open, concave-rimmed form.

Group 20 This group also dated to the first Neolithic. It was present at Trefignath, Clegyr Boia and Penywyrlod. The vessels had concave open rims, shallow neutral bodies and rounded bases, without rim moulding or lugs.

Group 16 These vessels had concave upright rims on shallow neutral bodies with round bases. They had neither rim moulding nor lugs. The style had a largely western distribution, vessels came from Trefignath, Dyffryn Ardudwy, and Clegyr Boia, with the only exception being the single vessel from the Breiddin. This tradition can be dated to the first Neolithic at Clegyr Boia, to the later part of the first Neolithic at Dyffryn Ardudwy, and to the early Neolithic at Trefignath and the Breiddin.

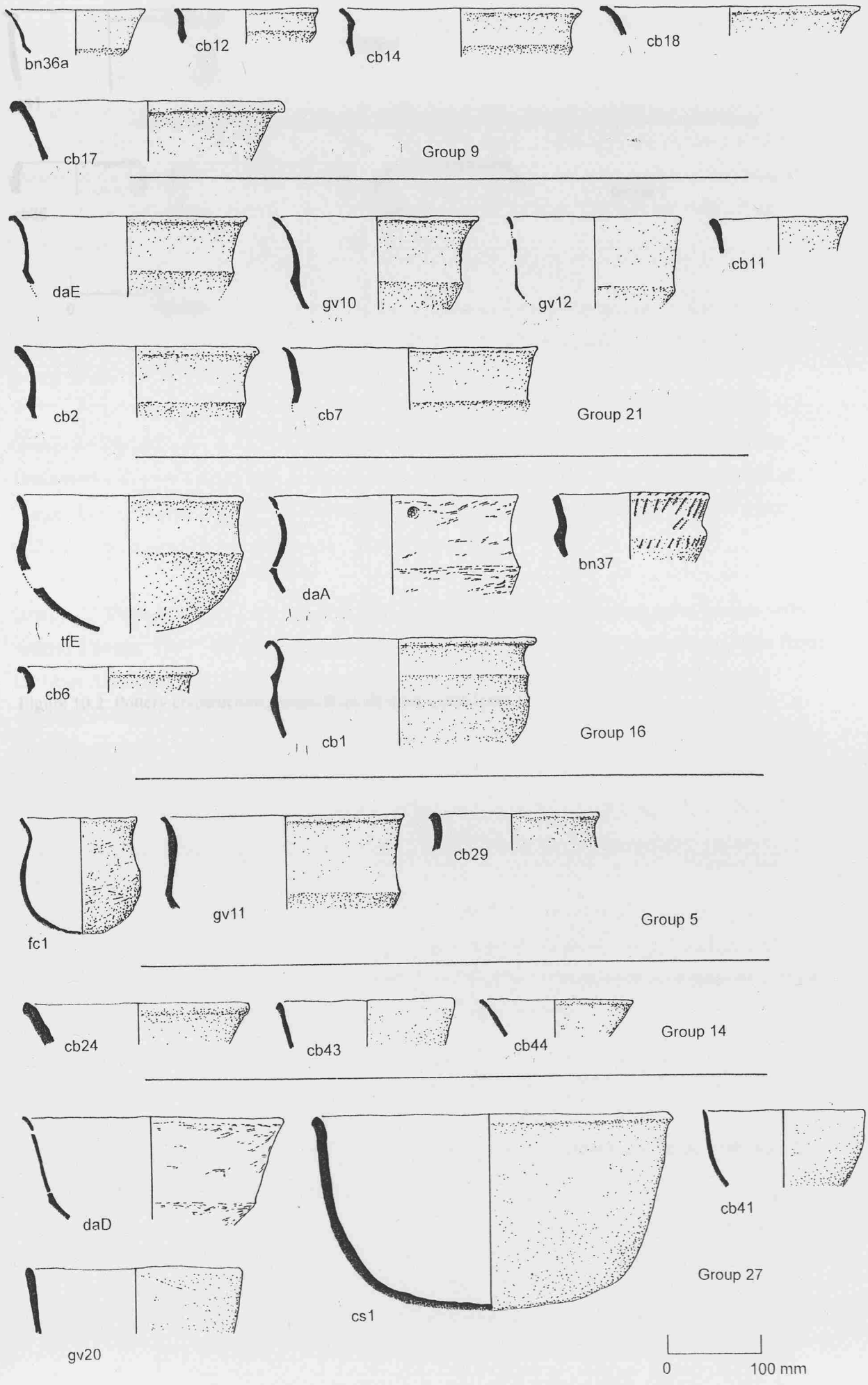


Figure 10.1: Pottery construction groups from all study areas (after Lynch 1969; Powell 1973; Scott 1933; Smith & Lynch 1987; Musson 1991; Warrilow *et al* 1986; Britnell & Savory 1984; Lynch 1975; and Williams 1953)

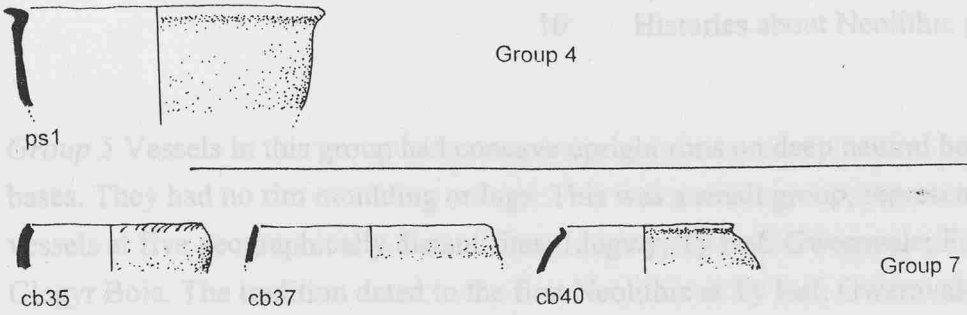


Figure 10.2: Pottery construction groups from all study areas (cont.)

Group 5 Vessels in this group had concave upright rims on deep neutral bodies with round bases. They had no rim moulding or lugs. This was a small group, represented by single vessels at five geographically distant sites: Llugwy; Ty Isaf; Gwernvale; Four Crosses; and Clegyr Boia. The tradition dated to the first Neolithic at Ty Isaf, Gwernvale and Clegyr Boia, but to the middle Neolithic at Four Crosses.

Like groups 9 and 21, groups 16 and 5 were shallow and deep variations on the same basic form. The chronological and spatial spread of group 5 makes it perhaps less likely that this group constituted a genuinely connected tradition during the Neolithic.

Group 14 The pottery in this group had an entirely western distribution and came from Trefignath, Bryn Celli Wen and Clegyr Boia. The tradition dated to the first Neolithic at Clegyr Boia and Trefignath. The vessels had open, straight-sided rims on shallow open bodies with rounded bases and no rim moulding or lugs.

Group 27 Vessels in this tradition had open straight-sided rims on deep open bodies with rounded bases. They had neither rim mouldings nor lugs. Except for a single example from Dyffryn Ardudwy, all the pottery was from sites in the southern study areas: Mynydd Troed; Gwernvale; Sant-y-Nyll; Clegyr Boia and Carreg Samson. The pottery from Dyffryn Ardudwy and Clegyr Boia dates to the first Neolithic, and that from Gwernvale to the early or middle Neolithic.

Groups 14 and 27 formed another set of similar traditions; deep and shallow versions of the straight-sided open rimmed form.

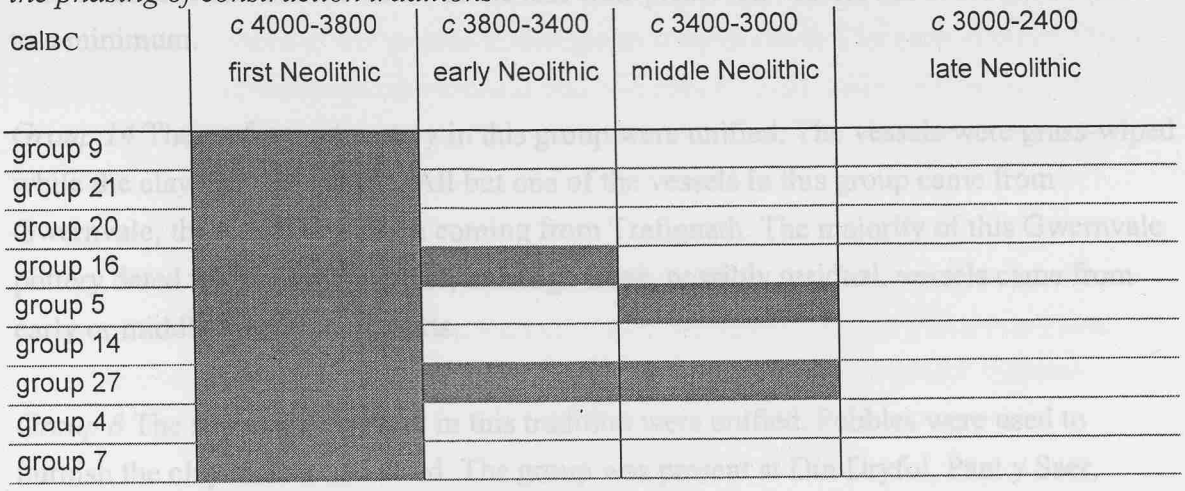
Group 4 These vessels had upright, straight-sided rims on shallow neutral bodies with round bases. They had rounded rim moulding but no lugs. The pottery was present at Pant y Saer and Ty Isaf, and dated to the first Neolithic at both sites.

Group 7 Pottery in this tradition came from two sites: a single vessel from Trefignath; and three from Clegyr Boia. The vessels were constructed with closed convex rims on shallow closed bodies with rounded bases. They had neither rim mouldings nor lugs. The pottery dated to the first Neolithic at both sites.

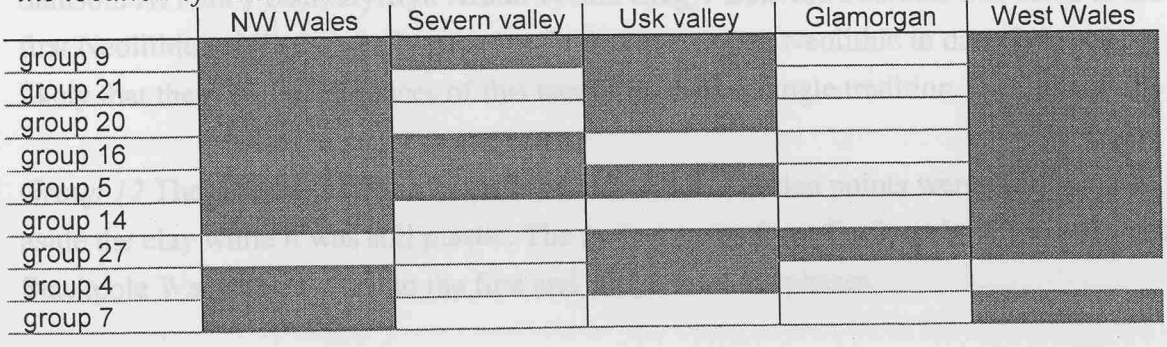
Summary Earlier Neolithic styles predominate in this analysis. There were two reasons for this. Firstly, the problem, mentioned above, of the extremely ephemeral nature of many later sites, leading to poorer sherd survival and lower numbers of reconstructable vessels.

Secondly, and more importantly, pottery styles in the later Neolithic became much more varied, and much less likely to be part of groups large enough to discuss in this kind of analysis. The phasing and location of the groups is summarised in the tables below.

the phasing of construction traditions



the location of construction traditions



All of the different construction traditions were present from the first Neolithic onwards. An extremely stereotyped range of vessel shapes appears to have been established early. Although nine groups are listed above, seven of these can be grouped further into shallow and deep versions of three basic forms: concave rimmed and open; concave rimmed and neutral; and straight-rimmed and open (see figures 10.1 and 10.2). This narrow range of styles did not fully break down until the end of the middle Neolithic. They were gradually replaced by a much more eclectic style of pottery construction, with the less structured combination of a wider range of shapes, and the use of rounded and angular rim mouldings. This change from a restricted range of shapes, to a much more open set of choices, was probably another symptom of the change from the strongly structured identities of the first Neolithic to the more fragmented society of the later periods.

10.5 Decoration

Sufficient vessels survived from eleven different groups to enable them to be discussed in detail. The traditions were probably slightly biased in favour of the undecorated group 11, as small areas of decoration might have escaped notice on even well-preserved vessels, but I am confident that the exclusion of the less well-preserved vessels has reduced the effect to a minimum.

Group 14 The surfaces of pottery in this group were unified. The vessels were grass-wiped while the clay was still plastic. All but one of the vessels in this group came from Gwernvale, the single exception coming from Trefignath. The majority of this Gwernvale pottery dated to the first Neolithic, although three, possibly residual, vessels came from early or middle Neolithic contexts.

Group 8 The surfaces of pottery in this tradition were unified. Pebbles were used to burnish the clay once it had dried. The group was present at Din Dryfol, Pant y Saer, Dyffryn Ardudwy, Ty Isaf, Sarn-y-bryn-caled, Ysgwennant, Clegyr Boia, and Carreg Samson. At Pant y Saer, Dyffryn Ardudwy and Clegyr Boia the tradition was dated to the first Neolithic, while the single vessel at Trelystan was late Neolithic in date. It is not likely that these two occurrences of this technique were a single tradition.

Group 12 The surfaces of these vessels were divided. Wooden points were used to push aside the clay while it was still plastic. The pottery came from Trefignath, Gwernvale and Stackpole Warren and dated to the first and early Neolithic phases.

Group 11 This was by far the largest decoration tradition. The surfaces of the pottery were unified by being left undecorated. Pottery in this group came from Dyffryn Ardudwy, Bryn Celli Wen, Bryn yr Hen Bobl, Castell Bryn Gwyn, Llugwy, Pant y Saer, Trefignath, The Breiddin, Cefn Cilsanws, Y Gaer, Mynydd Troed, Penywyrlod, Ty Isaf, Usk, Gwernvale, Tinkinswood, Mount Pleasant, Sant-y-Nyll, Parc le Breos Cwm, Clegyr Boia, Nanna's and Potter's Caves, Stackpole Warren and Pentre Ifan. It was noticeable that this tradition was strongly represented in all the study areas apart from the upper Severn valley. Dates in the first Neolithic were provided by material from Trefignath, Ty Isaf, Gwernvale and Clegyr Boia, while material from Trefignath, Dyffryn Ardudwy, the Breiddin and Gwernvale dated to the early Neolithic. There was a single middle Neolithic vessel from Trefignath.

Group 1 The surfaces of pottery in this tradition were divided. They were decorated by using whipped and twisted cord impressions to push aside clay while it was still plastic.

The vessels came from Bryn yr Hen Bobl, Trefignath, Dyffryn Ardudwy, Abergavenny, Gwernvale, Ogmore, Mount Pleasant, and Usk. The pottery from Dyffryn Ardudwy, Gwernvale, and Ogmore belonged in the middle Neolithic, that from Trefignath to the middle Neolithic and to the Bronze Age.

Group 4 The surfaces of the vessels in this group were divided. The ends of animal bones were used to push aside the clay while it was still plastic. This tradition was dominated by pottery from Ogmore, dating to the later part of the middle Neolithic, but there were also vessels from Cefn Cilsanws, Llugwy and Bryn yr Hen Bobl.

Group 23 The surfaces of this pottery were divided. The ends of animal bones and fingernails were used to push aside the clay while it was still plastic. The pottery came from Ogmore, Sarn-y-bryn-caled and Daylight Rock Fissure. The Ogmore material suggests that this tradition dated to the end of the middle Neolithic.

Group 10 The surfaces of vessels in this group were divided. The ends of animal bones and twisted and whipped cord had been used to push aside the clay while it was still plastic. Pottery from this tradition came from Bryn Celli Wen, Ogmore, Ysgwennant, Sarn-y-bryn-caled, and Four Crosses. Evidence from Ogmore would suggest a date at the end of the middle Neolithic, that from Sarn-y-bryn-caled and Four Crosses a date in the first two phases of the late Neolithic.

Group 6 The surfaces of the pottery in this group were divided. Worked stone points were used to remove clay which had started to dry. The vessels came from Stackpole Warren, Clegyr Boia, Llugwy, Sarn-y-bryn-caled and Trelystan. The vessel from Clegyr Boia belongs in the first Neolithic, however those from Sarn-y-bryn-caled and Trelystan dated to the later parts of the late Neolithic. It seems likely that the presence of this style at Clegyr Boia was coincidental, rather than a genuine example of continuity over this long time-span.

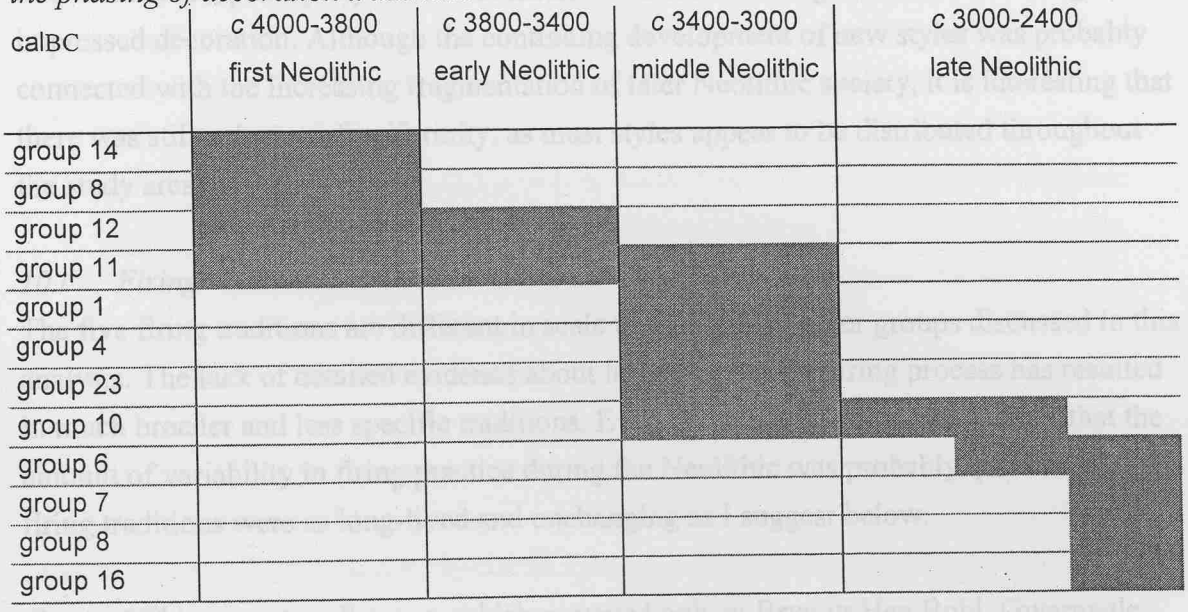
Group 7 The surfaces of vessels in this tradition were divided. Worked bone points were used to push aside the clay while it was still plastic. The pottery came from Castell Bryn Gwyn, Bryn yr Hen Bobl, Trelystan, Cefn Cilsanws, and Mount Pleasant. The Trelystan pottery dated to the last part of the late Neolithic.

Group 16 The surfaces of the vessels in this tradition were divided. Fingernails and twisted and whipped cord were used to push aside the clay while it was still plastic. The

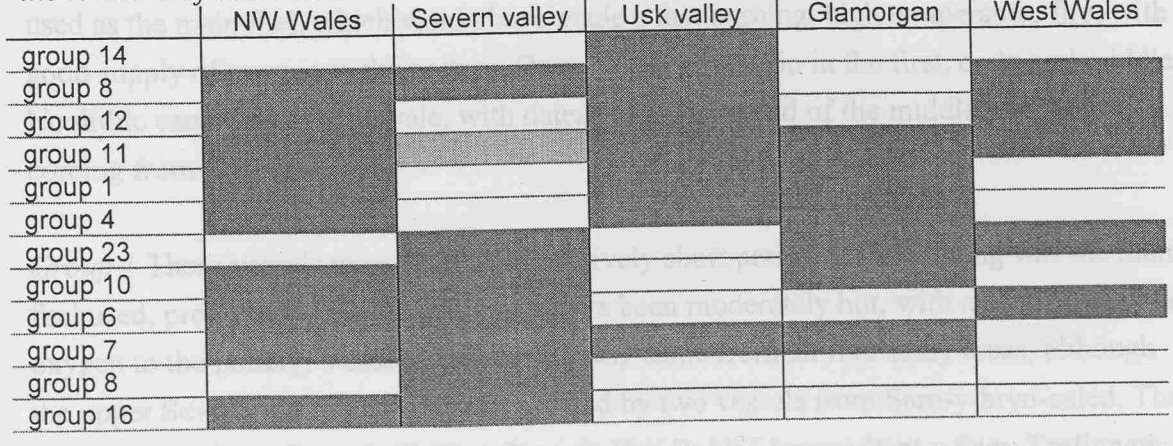
pottery was all from north Wales and came from Bryn yr Hen Bobl, Trefignath and Sarn-y-bryn-caled and dated to the last part of the late Neolithic and to the Early Bronze Age.

Summary Traditions of pottery decoration were very strongly phased, but were not localised. The major period of innovation in pottery decoration appears to have been the middle Neolithic. The principal problem with an analysis of decoration is the ease with which motifs and styles can be transmitted across space and time, without there necessarily being any continuity of meaning. I have noted specific examples of this process in the site by site analysis, and it occurred more generally in the revival of many middle Neolithic traditions in the Bronze Age. The tables below summarise the chronology and location of the traditions during the Neolithic.

the phasing of decoration traditions



the location of decoration traditions



Decoration on pottery during the first Neolithic was extremely restricted in scope. The vast majority of pottery was completely plain, and those decorative styles which were used acted to unify the surfaces of the vessels. This situation appears to have been similar to the restricted range of vessel shapes in use. This very plain set of styles continued into the early Neolithic, and entirely undecorated vessels were still common during the middle Neolithic.

However, it was during the middle Neolithic that a range of new decorative styles were introduced, using impressed decoration to divided the surfaces of the vessels. This might also be thought of as analogous to the development of more eclectic combinations of vessel shapes during the same period. During the late Neolithic, further new decorative traditions arose, principally the use of incised decoration, along with the continuing impressed decoration. Although the continuing development of new styles was probably connected with the increasing fragmentation of later Neolithic society, it is interesting that there was still a degree of uniformity, as most styles appear to be distributed throughout the study areas.

10.6 Firing

The five firing traditions are different in scale to most of the other groups discussed in this analysis. The lack of detailed evidence about large parts of the firing process has resulted in much broader and less specific traditions. Even given these limitations, I think that the amount of variability in firing practice during the Neolithic was probably quite small, and firing traditions were as long-lived and unchanging as I suggest below.

Group 6 This was a small group, which occurred only at Bryn yr Hen Bobl, Gwernvale, Sant-y-Nyll and Ogmore. The vessels were fired for a short period of time. Wood was used as the main fuel, which would have made a fast burning, high temperature fire, with a good supply of oxygen to the pottery. Dates for this tradition in the first, early and middle Neolithic came from Gwernvale, with dates towards the end of the middle Neolithic coming from Ogmore.

Group 1 These vessels were fired for a relatively short period of time. Dung was the main fuel used, producing a fire which would have been moderately hot, with a patchy supply of oxygen to the pottery. Vessels fired in this way came from all five study areas, although the upper Severn valley was only represented by two vessels from Sarn-y-bryn-caled. The pottery came from: Bryn Celli Wen; Bryn yr Hen Bobl; Llugwy; Pant y Saer; Trefignath;

Dyffryn Ardudwy; Sarn-y-bryn-caled; Mynydd Troed; Penywyrlod; Ty Isaf; Gwernvale; Ogmore; Clegyr Boia and Stackpole Warren. Dates for this tradition in the first Neolithic came from Pant y Saer, Trefignath, Dyffryn Ardudwy, Penywyrlod, Ty Isaf, Gwernvale and Clegyr Boia. In the early and middle Neolithic this tradition was present at Trefignath, Dyffryn Ardudwy and Gwernvale, and during the middle Neolithic at Ogmore. In the north there appears to have been a later revival of this tradition attested by the single vessel from the last part of the late Neolithic at Sarn-y-bryn-caled and two Bronze Age vessels from Trefignath.

Group 2 Vessels in this tradition were fired for a moderate period of time. Dung was once again the main fuel used, producing a moderately hot fire with a variable supply of oxygen to the pottery. Once again the upper Severn valley was only represented by two vessels, with a wide distribution of the tradition throughout the other five study areas. The pottery came from Bryn Celli Wen, Bryn yr Hen Bobl, Trefignath, Llugwy, Castell Bryn Gwyn, Dyffryn Ardudwy, Trelystan, Ysgwennant, Y Gaer, Mynydd Troed, Onllwyn, Usk, Gwernvale, Sant-y-Nyll, Ogmore, Parc le Breos Cwm, Tinkinswood, Clegyr Boia, Nanna's Cave, and Pentre Ifan. Dates for this group in the first Neolithic came from Gwernvale. Two vessels, one from Gwernvale and one from Parc le Breos Cwm, dated to the early Neolithic, and a large number of examples from Ogmore to the middle Neolithic. A seemingly separate use of this technique in the north dated to the last part of the late Neolithic at Trelystan, and to the Bronze Age at Trefignath and Dyffryn Ardudwy.

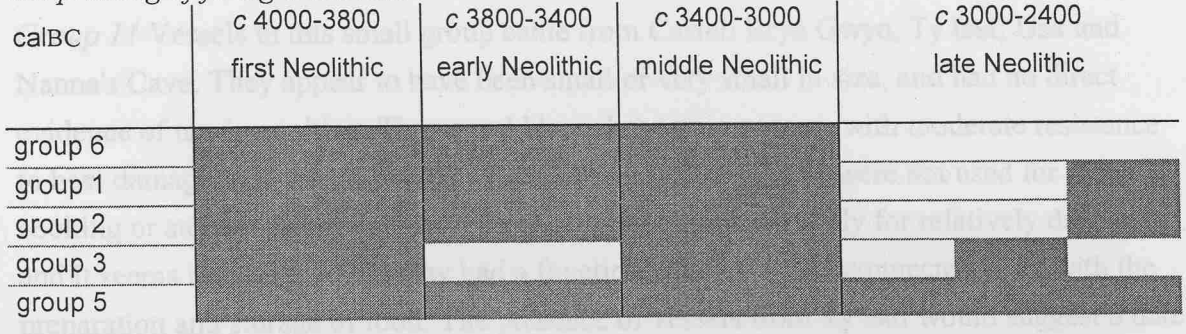
Group 3 The pottery in this group was fired for a long period of time. Dung was the main fuel used, which would have produced a moderately hot fire with a variable supply of oxygen to the vessels. The distribution of this tradition had a strong bias towards certain study areas, with only two examples from the upper Severn valley and one from West Wales. Pottery came from Bryn Celli Wen, Llugwy, Castell Bryn Gwyn, Dyffryn Ardudwy, Sarn-y-bryn-caled, Four Crosses, Abergavenny, Usk, Gwernvale, Ogmore, Mount Pleasant, and Carreg Samson. Three vessels from Gwernvale dated to the first Neolithic, but there were middle Neolithic dates from Ogmore, Gwernvale, Dyffryn Ardudwy and Four Crosses and one late Neolithic example from Sarn-y-bryn-caled.

Group 5 Vessels in this tradition were fired for a long period of time. Grasses were used as the main fuel, creating a relatively low temperature, slow burning, fire, in which very little oxygen reached the pottery. This was by far the most common firing technique, and occurred in all five study areas. Pottery from Bryn Celli Wen, Llugwy, Pant y Saer, Trefignath, Castell Bryn Gwyn, Din Dryfol, Dyffryn Ardudwy, the Breiddin, Trelystan,

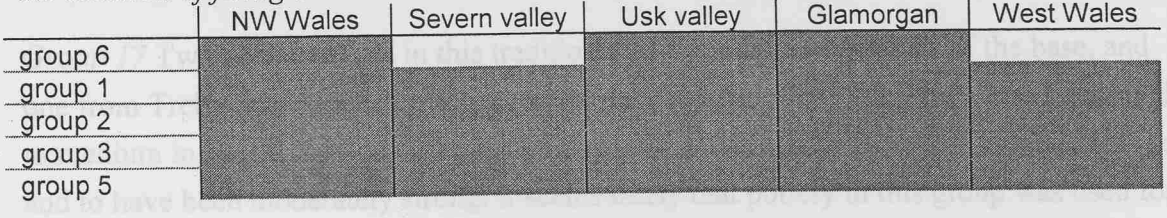
Sarn-y-bryn-caled, Ysgwennant, Four Crosses, Cefn Cilsanws, Ffostyll, Ty Isaf, Usk, Sant-y-Nyll, Ogmore, Mount Pleasant, Clegyr Boia, Daylight Rock Fissure, Nanna's and Potter's Caves and Stackpole Warren, was fired in this way. The tradition was also long lived. Pottery dating to the first Neolithic from Pant y Saer, Trefignath, Dyffryn Ardudwy, Ty Isaf and Clegyr Boia belonged in group 5. Early Neolithic examples came from Trefignath, the Breiddin, and Ysgwennant, with a single middle Neolithic vessel from Trefignath. Vessels from Four Crosses, Sarn-y-bryn-caled and Trelystan indicate that the technique was used through all three phases of the late Neolithic. The technique does not appear to have continued in use into the Bronze Age.

Summary As is demonstrated by the tables below, firing techniques appear to have been standardised over most of the Neolithic and throughout the study area.

the phasing of firing traditions



the location of firing traditions



All of the traditions appear to have been in use in the first Neolithic and all except group 6 continued in use into the late Neolithic. Group 6 would perhaps have been the most technically complex method of firing, involving a fast burning, relatively high temperature fuel. What I think that this uniformity suggests, is that the control of fire to do a number of quite complex tasks was so well understood before the beginning of the Neolithic that the firing of pottery was not really a new process at all. Rather it was the use of a set of established techniques on a new material. Firing therefore did not have either the experimental nature of some aspects of pottery use or the ideological charge of being part of the first Neolithic.

10.7 Use

Fifteen different traditions of pottery use were well enough represented to allow discussion at this scale. All, except group 6, included pottery which could be phased. The evidence for the use of pottery was necessarily biased towards cooking. Nevertheless, there were remarkable few groups which did not show some evidence for culinary use.

Group 6 This was a small tradition which, except for a single vessel from Bryn Celli Wen, came entirely from Mount Pleasant. The pottery ranged in size from small to large, and three of the vessels had evidence for probable use in cooking. They would have been very porous, with good resistance to heat damage, but would not have been strong. It is probable that they were used for cooking on open fires, but, despite the size of some vessels, not for storage.

Group 11 Vessels in this small group came from Castell Bryn Gwyn, Ty Isaf, Usk and Nanna's Cave. They appear to have been small or very small in size, and had no direct evidence of use in cooking. They would have been very porous, with moderate resistance to heat damage, and would not have been strong. These vessels were not used for either cooking or storage, they could have been serving vessels, but only for relatively dry foods, and it seems more likely that they had a function which was not connected at all with the preparation and storage of food. The presence of vessels from Ty Isaf would suggest a date in the first Neolithic for this style.

Group 17 Two of the vessels in this tradition had secondary oxidisation of the base, and one from Trelystan contained traces of an organic residue. They appear to have been small to medium in size and would have been very porous, with good resistance to heat damage and to have been moderately strong. It seems likely that pottery in this group was used for cooking over open fires and possibly for the storage of dry goods.

The group was represented by pottery from Pant y Saer, Trelystan, Y Gaer, and Usk. Dates for this tradition were problematic, with the vessel from Pant y Saer belonging in the first Neolithic and the two from Trelystan in the last part of the late Neolithic. There were presumably two similar, but unrelated, traditions of use at either end of the period, which have been subsumed within my group 17.

Group 8 This was the most common of all the traditions of use. The vessels ranged in size from very small to large. Twenty three had evidence of secondary oxidisation of the base,

and four appeared to have surviving traces of organic residues. They would have been porous, moderately strong, and would have had good resistance to heat damage. They would have been good general purpose cooking vessels, and could also have been used for the storage of dry goods.

It was present all over Wales, but was particularly common in the two western study areas. Vessels from Pant y Saer, Din Dryfol, Bryn yr Hen Bobl, Castell Bryn Gwyn, Llugwy, Dyffryn Ardudwy, Bryn Celli Wen, Trefignath, Trelystan, Sarn-y-bryn-caled, Ty Isaf, Ogmore, Parc le Breos Cwm, Tinkinswood, Sant-y-Nyll, Clegyr Boia, and Nanna's Cave were all used in this way. The group covered at least the first half of the Neolithic period, with a strong bias towards the first Neolithic. Dates for this tradition in the first Neolithic came from Pant y Saer, Dyffryn Ardudwy, Trefignath, Ty Isaf, and Clegyr Boia. Early Neolithic dates came from Trefignath, and Parc le Breos Cwm, and a single middle Neolithic vessel came from Ogmore. The vessels from Sarn-y-bryn-caled and Trelystan, which dated to the middle and end of the late Neolithic, perhaps suggest that, as with group 17, a similar, but unconnected, later group has been subsumed into group 8.

Group 2 This was a small tradition, which was largely confined to Gwernvale, with single examples from Llugwy, Trelystan, and Clegyr Boia. Three of these vessels had secondary oxidisation of the base, probably indicating that they had been used for cooking, and the single vessel whose volume could be reconstructed was medium sized. They would have been very porous, with good resistance to heat damage, and would have been physically strong. They were probably used for rapid cooking, on open fires, and for the storage of dry goods.

Dates for this style in the first Neolithic came from Clegyr Boia and Gwernvale, with the Gwernvale vessels continuing into the early and middle Neolithic. It seems likely that the single vessel from Trelystan, which dated to the last part of the late Neolithic, did not form part of a genuinely contiguous group with the other pottery in this tradition.

Group 21 This small group occurred only in north-west Wales, Glamorgan and a single example from the Usk valley. The vessels in the group show plentiful evidence for having been used in cooking. They would have been non-porous and strong, with good resistance to heat damage and were probably used for cooking all kinds of foods on open fires, they would have been particularly well suited to the heating of liquids.

Vessels came from Bryn Celli Wen, Trefignath, Ogmore, Sant-y-Nyll, Tinkinswood, and Penywyrlod. First Neolithic dates came from Trefignath, an early Neolithic date from Penywyrlod and a middle Neolithic one from Ogmore.

Group 9 Pottery in this tradition would have been non-porous, with good resistance to heat damage, and would have been moderately strong. Five vessels showed evidence of secondary oxidisation, and one had residue traces internally. Like vessels in group 21 they would have been particularly well suited for the heating of liquids.

Pottery in this group came from Bryn yr Hen Bobl, Trefignath, Din Dryfol, Llugwy, Pant y Saer, Trelystan, Onllwyn, Ogmore, Mount Pleasant, and Clegyr Boia. Vessels from Pant y Saer and Clegyr Boia dated to the first Neolithic, and that from Trefignath to the early Neolithic. A single middle Neolithic date came from Ogmore. The date from Trelystan in the last part of the late Neolithic was presumably coincidental and probably does not indicate a continuous tradition throughout the Neolithic.

Group 22 This medium sized group was largely southern in distribution, the sole northern example coming from Pant y Saer. The pottery would have been non-porous, with moderate resistance to heat damage, and would have been only moderately strong. Four vessels had secondary oxidisation of the base and six had surviving residue traces. They ranged in size from very small to very large, but with a concentration towards the smaller end of the size range. They were probably used for the slow cooking of liquid foods, although some of the larger examples may have been used for the storage of liquids.

The pottery came from Pant y Saer, Ty Isaf, Gwernvale, Ogmore, Daylight Rock Fissure, Potter's Cave, Clegyr Boia, Carreg Samson, and Stackpole Warren. Dates from Pant y Saer, Ty Isaf and Gwernvale place the style in the first Neolithic, while a large number of examples from Ogmore suggest that it survived until the middle Neolithic.

Group 7 Pottery in this medium-sized group would have been non-porous, with poor resistance to heat damage, and would have only been moderately strong. Two vessels had surviving residue traces, while one showed secondary oxidisation of the base. The pottery was predominantly very small or small in size, although there were two large examples. The vessels with evidence for use in cooking were presumably used for the slow cooking of liquids, and this only occasionally. It seems likely that the primary function of group 7 vessels was non-utilitarian.

The pottery came from Bryn Celli Wen, Trefignath, Dyffryn Ardudwy, Abergavenny, Ty Isaf, Gwernvale, Ogmore, Clegyr Boia, and Pentre Ifan. Apart from vessels A and C from Trefignath, which were probably part of a separate Bronze Age pottery tradition, this style appears to date to the first Neolithic (at Trefignath, Clegyr Boia and Ty Isaf), the early Neolithic (at Dyffryn Ardudwy and Gwernvale), and the middle Neolithic (at Ogmore and Gwernvale).

Group 4 Six vessels in this group had secondary oxidisation of the base, and two appeared to contain traces of organic residues. They ranged in size from very small to medium, and would have been porous and strong, with good resistance to heat damage. They would probably have been used for cooking on open fires, including the cooking of liquids, and for the storage of dry goods.

This was a large tradition, which was particularly well represented at Gwernvale, but which was also present at Bryn yr Hen Bobl, Trefignath, Llugwy, Bryn Celli Wen, Ysgwennant, Mynydd Troed, Ogmore, Mount Pleasant and Clegyr Boia. The group dated to the first Neolithic at Trefignath, Gwernvale and Clegyr Boia, to the early Neolithic at Ysgwennant and Gwernvale, and to the middle Neolithic at Gwernvale and Ogmore.

Group 5 The pottery would have been porous and strong, with moderate resistance to heat damage. Two of these vessels had evidence of secondary oxidisation of the base, and two had traces of internal residue. The vessels ranged in size from small to very large. They were probably used for general cooking and the storage of dry goods, although they would have to be heated rather more carefully than some other types of pottery.

The majority of vessels in this group came from Gwernvale, but the tradition was also present at Bryn Celli Wen, Dyffryn Ardudwy and Ogmore. Most of the dateable pottery belongs in the first Neolithic, but there was also a single early Neolithic vessel from Dyffryn Ardudwy, and three middle Neolithic examples from Gwernvale and Ogmore.

Group 14 The vessels in this tradition were porous, with moderate resistance to heat damage and were moderately strong. Three of them had traces of residue internally and one had some secondary oxidisation. They ranged in size from very small to medium. These vessels would probably have functioned as cooking vessels, but the limited evidence for exposure to heat, together with their limited size, might suggest that their primary function may have been to do with the presentation or serving of food. They seem unlikely to have been used as storage vessels.

Group 14 vessels were found in all the study areas. They came from Trefignath, Bryn yr Hen Bobl, Dyffryn Ardudwy, Trelystan, Four Crosses, Mynydd Troed, Ty Isaf, Ogmore and Clegyr Boia. The date range of the style is very long. Two vessels from Clegyr Boia and two from Ty Isaf dated to the first Neolithic, A single vessel from Trefignath dated to the early Neolithic, while middle Neolithic dates came from Trefignath, Four Crosses, Ogmore, and Dyffryn Ardudwy. A single example from the end of the late Neolithic at Trelystan was probably not part of this tradition, which should be regarded primarily as a middle Neolithic style, although it appears to begin in the first Neolithic.

Group 23 Vessels in this tradition would have been non-porous, with poor resistance to heat damage, and would not have been strong. They appear to have been built to be impermeable at the expense of all other qualities. Despite this, four vessels showed signs of secondary oxidisation of the base and three contained residue traces. It was only possible to reconstruct volumes from two vessels, both of which were small. Group 23 vessels may have been used for the occasional slow cooking of liquid foods, but it is likely that this was only part of their function. As with group 7, it seems probable that the primary function of pottery in group 23 was non-utilitarian.

The vessels came from Trefignath, Trelystan, Ysgwennant, Four Crosses, Ogmore, and Stackpole Warren. It is likely that the single first Neolithic date from Trefignath was coincidental. The tradition dated to the early Neolithic at Ysgwennant, the middle Neolithic at Four Crosses and Ogmore, and to the late Neolithic at Four Crosses and Trelystan. The bulk of these dates were from middle Neolithic sites, suggesting a largely middle Neolithic date for this style.

Group 10 This was a large group, dominated by vessels from Ogmore. The vessels would have been porous, with poor resistance to heat damage and not physically strong. Despite these disadvantages, six showed secondary oxidisation of the base and five had surviving residue traces. The vessels must have been heated very carefully on a slow fire in order to withstand the cooking process, and it is probable that their primary function was not 'domestic' cooking. They have been a group of vessels which were used infrequently in some form of ritualised food preparation.

Pottery in this tradition came from Bryn yr Hen Bobl, Castell Bryn Gwyn, Trefignath, Trelystan, Sarn-y-bryn-caled, Cefn Cilsanws, and Ogmore. No vessels in this group were found in west Wales, and only a single example from the Usk valley. The tradition appears

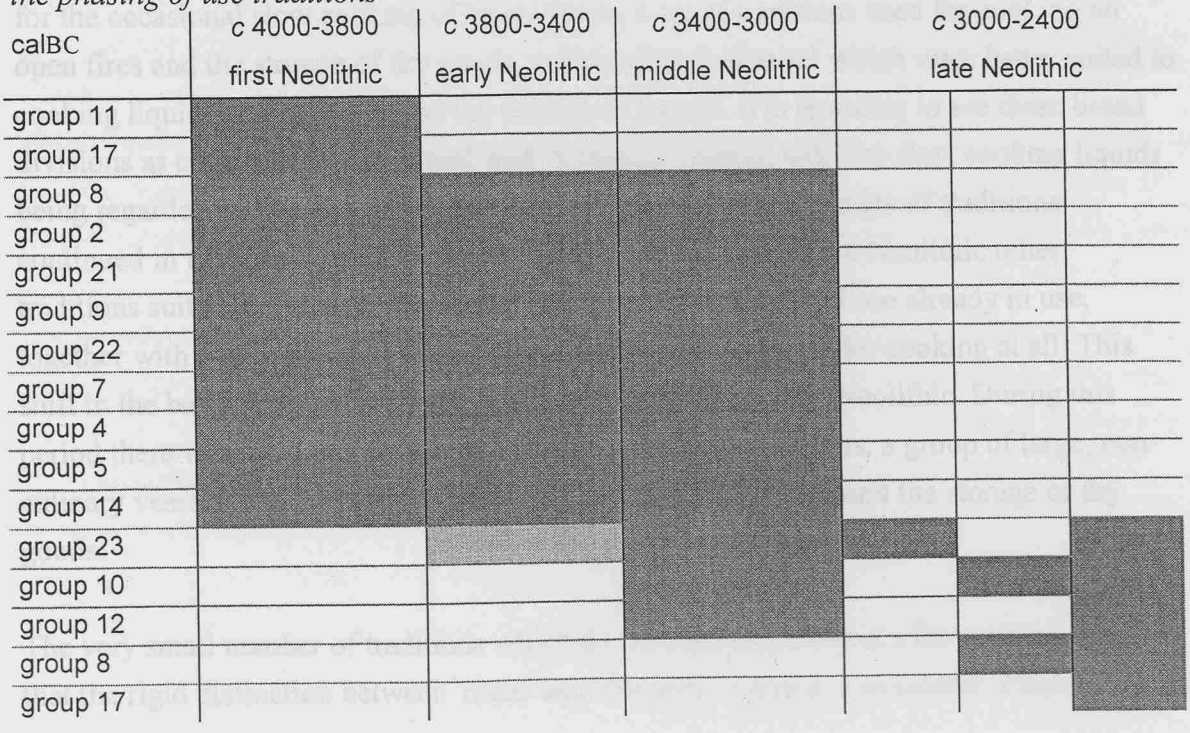
to have been substantially middle Neolithic in date. Pottery from Trefignath and Ogmore dated to the middle Neolithic, with that from Sarn-y-bryn-caled and Trelystan dating to the middle and end of the late Neolithic.

Group 12 The pottery would have been porous, with poor resistance to heat damage an only moderately strong. Two vessels could be reconstructed sufficiently well to allow their volumes to be estimated as medium and large and there was a single instance each of secondary oxidisation and of surviving residue traces. It seems likely that these vessels had a function other than one to do with the preparation and storage of food.

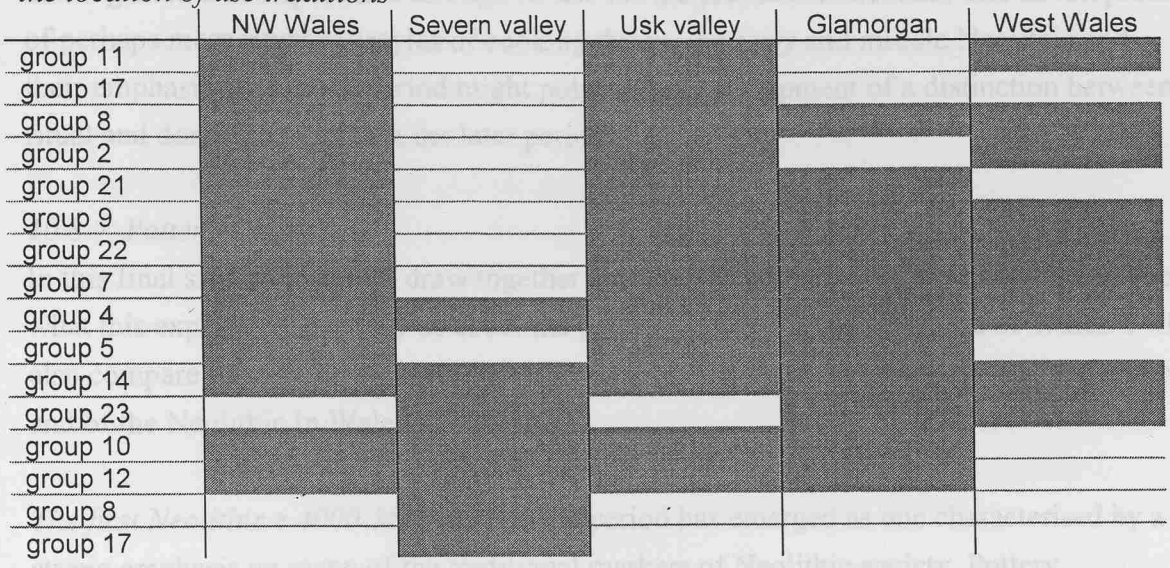
The vessels in this small tradition were predominantly late in date, with the single example from the first Neolithic at Trefignath likely to be coincidental. They were found in all of the study areas except for west Wales, and came from Trefignath, Dyffryn Ardudwy, Sarn-y-bryn-caled, Ogmore, and Usk. The style dated to the middle Neolithic at Trefignath, Dyffryn Ardudwy, Ogmore and to the end of the late Neolithic at Sarn-y-bryn-caled.

Summary The use of pottery was strongly phased, with a particularly large number of different styles of use in the earlier periods. Use traditions were also relatively widespread, pottery was clearly being designed to do similar sorts of tasks throughout the study area. The tables below summarise the chronology and location of the traditions.

the phasing of use traditions



the location of use traditions



There appear to have been two major changes in styles of use. The introduction in the first Neolithic of a set of practices, most of which lasted until the end of the middle Neolithic, and the gradual introduction during the middle and late Neolithic of other, different, traditions.

During the first Neolithic a range of use traditions can be identified. There were two styles of pottery which were small and not used for cooking at all, a set of vessels probably used for the occasional slow cooking of liquid foods, a set of traditions used for cooking on open fires and the storage of dry goods, and another similar set which were better suited to cooking liquids on open fires and the storage of liquids. It is tempting to see these broad divisions as corresponding to 'ritual' and 'domestic' vessels, with the slow cooking liquids being regarded as a specialised 'ritual' food. These four broad groups of traditions continued in to the early and middle Neolithic. During the middle Neolithic other traditions suited to the slow cooking of liquids arose alongside those already in use, together with a new group of large vessels which were not used for cooking at all. This shift in the balance towards 'ritual' vessels continued in the late Neolithic. During this period there were two groups used for the slow cooking of liquids, a group of large, non-culinary vessels, and two groups used for cooking on open fires and the storage of dry goods.

The very small number of traditions which do not have any evidence for cooking suggests that the rigid distinction between 'ritual' and 'domestic' vessels is untenable. I think it likely

that pottery was one of those 'markers' important to the creation of the first Neolithic, and that it gained that importance through its use for the preparation of food. The development of perhaps more ritualised styles of cooking during the early and middle Neolithic and their emphasis later in the period might point to the development of a distinction between ritual and domestic pottery in the later periods only.

10.8 Pottery and society

In this final section I want to draw together some of the themes from the chapter to suggest what this experiment has told us about the place of pottery in the Neolithic of Wales. I will also compare the accounts which I have developed with other histories of Neolithic society and of the Neolithic in Wales.

The first Neolithic c *4000-3800 calBC* This period has emerged as one characterised by a strong emphasis on many of the traditional markers of Neolithic society. Pottery production was strongly bound by rules and procedures. Where there was variability, such as the locally determined range of inclusion recipes, it was over-complex, and served to exaggerate the technical demands of the new technique. The period was the only part of the Neolithic where there was any evidence for permanent, or semi-permanent, settlement, alongside a considerable amount of building of very permanent monuments.

The early Neolithic c *3800-3400 calBC* This phase appears to have represented a stabilised version of the first Neolithic. Almost all aspects of pottery production and use saw at least some degree of standardisation. The understanding of the identity of the first Neolithic appears to have been preserved within a slightly modified, more mobile, society. The slight standardisation which had occurred may imply that this memory was achieved by the codifying of what had been intuitively understood in the earlier period into a series of formal rules.

The middle Neolithic c *3400-3000 calBC* This was perhaps the most interesting period of the Neolithic, as it marks the gradual change from a society still connected to the identity of the first Neolithic to the very different society of the later periods. In pottery production, interest shifted from the arcane sets of inclusion recipes, on to an increasingly open concern with eclectic vessel forms and vessel decoration. These new pottery traditions appeared in a world where early monuments still had a meaning, and indeed where some monument styles were still being built, but where society was becoming increasingly fragmented and mobile.

The late Neolithic c *3000-2400 calBC* By the late Neolithic, both society and pottery had ceased to have anything but a coincidental connection with the meaning of the first Neolithic. Pottery appeared to be being used much more for non-utilitarian tasks and was being made in a wide variety of locally occurring shapes. Raw material selection had been reduced to simple, widely understood principles, and while decorative styles were varied, they too appeared to be widely understood. Society was fragmented, mobile, and concentrated in the north of Wales. This open structure appears to have been both long lasting and highly successful, allowing the occupation of the upland areas of north Wales for the first time.

In discussing this account of social change in relation to other studies, several points stand out. Wales, or at least my presentation of the Neolithic in Wales, has a more defined chronology, and several marked differences from the Neolithic as traditionally understood in the rest of the British Isles. Despite this, there are still many points of contact with earlier accounts. Richard Bradley (1984, 13-15) was amongst the first to critically examine the presumed relationship between agriculture, monument building and the beginning of the Neolithic. This work, and that of Ian Kinnes (1988) on the date and character of the first Neolithic, underlies my presentation of the first Neolithic in Wales. I am less sure that the first Neolithic owes its character to a single social structure such as Bradley's ranked ancestors. It also seems clear that whatever the original nature of this society, at least in Wales, it began to change relatively quickly.

Hubert Savory's essay on the Neolithic of Wales (Savory 1980), which treats the period as a 2000 year unitary phenomenon, is an extreme example of the tendency noted by Kinnes (1988, 2) to retreat from inadequate radiocarbon evidence into chronological vagueness. He also defined the earlier Neolithic in Wales as:

> '..two provinces separated by the major north-south watershed –a large one oriented towards England and a smaller one in the west based on Atlantic and Irish Channel contacts.' (Savory 1980, 222)

I believe that this derivative formulation has helped to obscure the fragmented and open late Neolithic in Wales. Studies of Late Neolithic society in the British Isles have by and large been studies of artefact variability on monumental sites (for example, Bradley 1984, 51-2; Richards & Thomas 1984). These sites have been seen to cluster in 'core areas' (Bradley & Chapman 1986; Bradley 1984, 42). The fragmentation of late Neolithic society, which has been noted by Bradley and others, is defined in the emergence of these localised core areas. As there was no monumental late Neolithic in Wales, the similar changes in society have gone unnoticed. Despite this, it is still possible to see a number of

important social changes in the evidence we do have. Fragmentation is clearly demonstrated; as is disassociation from those traces of earlier Neolithic periods which were still visible in the landscape; the upland areas were colonised for the first time; and the apparent abandonment of the southern part of the study area. As South Wales is the nearest part of the study area to any of the monumental core areas it may be that the late Neolithic in Wales was part of a different, less archaeologically visible, type of late Neolithic society, oriented away from these core areas.

10.9 History and the Neolithic of Wales

Throughout my accounts of changing activities in Wales during the Neolithic the influence of the contingent history of each of these practices can been seen. On the large scale, it seems likely that the changing nature of society during the early and middle Neolithic was masked by that society's origins in the strongly structured first Neolithic. The character of these periods was constrained by all kinds of baggage, in the manner of making things and of significant places, which perhaps overemphasise the connections with the first Neolithic. I believe that our somewhat amorphous understanding of the earlier part of the Neolithic is a kind of stretched and distorted version of the first Neolithic, caused by this strong historical connection between the periods. On the smaller scale, innovations in the construction and use of pottery can be seen as arising within the framework of existing practices. Rules about vessel shape appear to have gradually lost their force through experimental modification, rather than being replaced by new and innovative systems.

Where there was unambiguous and radical change, my methodological bias will tend to lead me to see it in terms of historically specific events, rather than totalising socio-political forces. Two such examples stand out from this study, the first being the beginning of the first Neolithic, and the second the almost complete break with earlier tradition which occurs at the beginning of the late Neolithic. It seems clear, despite the strongly structured nature of the first Neolithic in much of Europe, that the first Neolithic in a specific area was a local product: 'a series of meaningful events, not the imposition of an abstract template' to quote Thomas' characterisation of a particular part of the north Welsh evidence (1996b, 140). The emergence of the transient, fragmented and open late Neolithic society was even more grounded in past practice. The kind of sites which typify this apparently radical change had been present, albeit in small numbers, since the beginning of the Neolithic. At the beginning of the late Neolithic, society changed in such a way that this formally marginal way of living became the dominant part of society, expanding into new areas and abandoning old heartlands.

A contingent history of the construction and use of Neolithic pottery in Wales has allowed me to add both chronological resolution and some social interpretation to what had previously been a depressingly marginal set of material. Many problems remain, and new information and concepts could easily overthrow much of what I have asserted. However, the history as I have presented it gives us a beginning, a series of connections, and a narrative to react against.

UNIVERSITY OF SOUTHAMPTON

The Construction and Use of Categories of Neolithic Pottery from Wales

Appendices and References

Volume 2 of 2

Richard Garvin Peterson

Doctor of Philosophy

Department of Archaeology

December 1999

Appendix A, radiocarbon evidence

A.1 Radiocarbon dates from Wales before 3500 bp

Lab No.	Site	Grid Ref	Context	Date bp	Σ
BM-1367	Paviland Cave[1]	SS 437 859	*bos* bone from goat's hole cave	27600	1300
BM-499	Coygan Cave[2]	SN 284 092	moustarian reindeer antler	38684	2700
BM-374	Paviland Cave[3]	SS 437 859	bits of the red lady	18460	340
BM-691	Rhuddlan[4]	SJ 025 779	shells assoc meso flint	8739	86
BM-822	Rhuddlan[5]	SJ 025 779	shells assoc meso flint	8528	73
Q-1385	Trwyn Du, Aberffraw[6]	SH 355 690	F13, hollow in occupation layer	8640	150
HAR-1194	Trwyn Du, Aberffraw	SH 355 690	F13, hollow in occupation layer	8590	90
HAR-1193	Trwyn Du, Aberffraw	SH 355 690	F16, below F13	7980	140
HAR-1135	Brenig 53[7]	SH 980 570	fire pit with meso flintwork	7300	100
HAR-1436	Brenig[8]	SH 980 570	mesolithic fire pit	5120	100
CAR-118	Gwernvale[9]	SO 211 192	pre-cairn pit no assocs.	6900	80
CAR-113	Gwernvale	SO 211 192	pre-cairn pit assoc. Neo pottery	5050	80
CAR-116	Gwernvale	SO 211 192	pit outside chamber 2, pre-closure, assoc. with late Neo pottery	4590	80
CAR-114	Gwernvale	SO 211 192	pit outside chamber 2, pre-closure, assoc. with late Neo pottery	4390	70
NPL-223	Llandegai[10]	SH 592 714	timber, building	5240	150
NPL-220	Llandegai	SH 592 714	fire trough within henge	4740	150
OxA-6487	Parc le Breos Cwm[11]	SS 537 898	adult male, SE chamber	4685	65
OxA-6496	Parc le Breos Cwm	SS 537 898	adult, SE chamber	4850	65
OxA-6641	Parc le Breos Cwm	SS 537 898	adult, SE chamber	4690	55
OxA-6488	Parc le Breos Cwm	SS 537 898	adult ?male, SW chamber	4780	60
OxA-6489	Parc le Breos Cwm	SS 537 898	adult ?female, SW chamber	4445	60
OxA-6493	Parc le Breos Cwm	SS 537 898	adult, NE chamber	4875	55
OxA-6494	Parc le Breos Cwm	SS 537 898	adult, NE chamber	4645	60
OxA-6490	Parc le Breos Cwm	SS 537 898	adult ?male, NW chamber	4660	60
OxA-6491	Parc le Breos Cwm	SS 537 898	adult, NW chamber	4805	55
OxA-6492	Parc le Breos Cwm	SS 537 898	adult ?male, passage	4805	55
OxA-6495	Parc le Breos Cwm	SS 537 898	subadult, passage	3705	55
OxA-6497	Parc le Breos Cwm	SS 537 898	adult female, passage	3750	55
OxA-6499	Parc le Breos Cwm[12]	SS 537 898	badger, passage	7665	65

[1]Burleigh & Matthews 1982, 155
[2]Burleigh, Hewson & Meeks 1976, 20
[3]Barker, Burleigh & Meeks 1969, 288
[4]Burleigh, Hewson & Meeks 1976, 27
[5]Burleigh, Hewson & Meeks 1976, 27
[6]Lynch 1991, 394
[7]Otlet & Walker 1979, 365-7
[8]Otlet & Walker 1979, 365-7
[9]Dresser 1985, 374
[10]Lynch 1976, 65
[11]Whittle & Wysocki 1998, 148
[12]possibly derived from Cat Hole Cave, certainly residual

OxA-6500	Parc le Breos Cwm	SS 537 898	large ungulate, passage	10625	80
CAR-392	Carreg Coetan[13]	SN 060 394	under kerb, pre-mound surface	4830	80
CAR-391	Carreg Coetan	SN 060 394	pre-mound surface	4560	80
CAR-394	Carreg Coetan	SN 060 394	chamber stone-hole	4700	80
CAR-393	Carreg Coetan	SN 060 394	body of mound	4470	80
BM-1112	Ogmore[14]	SS 863 756	charcoal from pottery layer	4659	52
HAR-1140	Ogmore	SS 863 756	charcoal from pottery layer	4320	80
CAR-525	Moel-y-Gerddi[15]	SH 617 317	charcoal from 1st phase pallisade slot, supposedly IA	4760	70
CAR-397	Moel-y-Gerddi	SH 617 317	hearth pit sealed by IA house	4590	80
CAR-527	Moel-y-Gerddi	SH 617 317	hearth pit sealed by IA house	4540	70
CAR-528	Moel-y-Gerddi	SH 617 317	2nd hearth sealed by IA house	4030	80
CAR-670	Four Crosses[16]	SJ 275 192	central grave, phase 1, site 5	4440	70
CAR-707	Four Crosses	SJ 275 192	burnt area, ?phase 1, site 5	4380	70
CAR-671	Four Crosses	SJ 275 192	phase 2 ditch silt, site 5 (?residual)	4260	70
CAR-669	Four Crosses	SJ 275 192	phase 3ditch silt, site 5	3510	70
CAR-619	Capel Eithin[17]	SH 490 727	F69, ?building, posthole H	6330	90
CAR-485	Capel Eithin	SH 490 727	F69, ?building, posthole G	5890	90
CAR-797	Capel Eithin	SH 490 727	F78, lowest fill of posthole	6510	90
CAR-480	Capel Eithin	SH 490 727	F78	5350	100
CAR-481	Capel Eithin	SH 490 727	F83, grooved ware pit	4740	80
CAR-446	Capel Eithin	SH 490 727	F17, grooved ware pit	3950	80
CAR-488	Capel Eithin	SH 490 727	hearth, near urns	4380	80
CAR-447	Capel Eithin	SH 490 727	pit, cut by grave 35	3580	70
CAR-453	Capel Eithin	SH 490 727	urn C6	3760	60
CAR-452	Capel Eithin	SH 490 727	urn C12	3760	70
CAR-451	Capel Eithin	SH 490 727	urn C11	3675	70
CAR-448	Capel Eithin	SH 490 727	urn C2	3610	70
CAR-450	Capel Eithin	SH 490 727	urn C1	3590	70
BM-2819	Sarn-y-bryn-caled 2[18]	SJ 218 048	phase 2 ditch silts	4200	40
BM-2820	Sarn-y-bryn-caled 2	SJ 218 048	phase 2 ditch silts	4400	45
HAR-4694	Ty Mawr[19]	SH 212 821	hearth 113, in yard, level uncertain	4170	80
HAR-4695	Ty Mawr	SH 212 821	hearth 99, beneath occupation	3890	80
BIRM-1237	Cefn Bryn[20]	SS 490 906	charcoal, pre-barrow posthole	4340	100
BIRM-1235	Cefn Bryn	SS 490 906	charcoal, pre-barrow pit	4230	95
BIRM-1238	Cefn Bryn	SS 490 906	nut shells, pre-barrow posthole	3990	100
BIRM-1236	Cefn Bryn	SS 490 906	charcoal, pre-barrow hearth	3960	100

[13]Dresser 1985, 381
[14]Burleigh & Hewson 1979, 343-4
[15]Dresser 1985, 373
[16]Warrilow et al 1986, 64-7
[17]Lynch 1991, 394-5
[18]Gibson 1994, 161
[19]Lynch 1991, 394
[20]Barker 1992, 69

CAR-282	Trelystan[21]	SJ 277 070	charcoal, burial 1, barrow II	4350	70
CAR-272	Trelystan	SJ 277 070	pit 13, structure B	4269	70
CAR- 273	Trelystan	SJ 277 070	pit 14, structure B	4140	70
CAR-275	Trelystan	SJ 277 070	pit 1 structure A	4050	70
CAR-274	Trelystan	SJ 277 070	hearth, strucutre B	3990	70
CAR-276	Trelystan	SJ 277 070	hearth, structure A	3960	70
CAR-279	Trelystan	SJ 277 070	burning sealing structures	3750	70
CAR 281	Trelystan	SJ 277 070	charcoal, burial 4, barrow I	3700	70
CAR-280	Trelystan	SJ 277 070	charcoal, burial 4, barrow I	3650	70
CAR-283	Trelystan	SJ 277 070	charcoal, burial 3, barrow II	3550	60
CAR-390	Trelystan	SJ 277 070	ols beneath barrow II, phase 2	3550	70
CAR-285	Trelystan	SJ 277 070	phase 1 surface of barrow I	3540	70
CAR-278	Trelystan	SJ 277 070	burning sealing structures	3500	60
CAR-277	Trelystan	SJ 277 070	pit 18 beneath barrow I	3450	70
CAR-201	Corn Du[22]	SO 007 213	Pre-cairn surface, mountain-top cist	3800	80
CAR-202	Corn Du	SO 007 213	sealed beneath basal slab of cist	3700	80
BM-2829	Sarn-y-bryn-caled 1[23]	SJ 219 049	context 198, outlying posthole	4740	35
BM-2808	Sarn-y-bryn-caled 1	SJ 219 049	pit 11, outer timber circle	3720	40
BM-2807	Sarn-y-bryn-caled 1	SJ 219 049	pit 12, outer timber circle	3660	60
BM-2805	Sarn-y-bryn-caled 1	SJ 219 049	post F, inner timber circle	3730	40
BM-2806	Sarn-y-bryn-caled 1	SJ 219 049	post E, inner timber circle	3670	40
BM-2809	Sarn-y-bryn-caled 1	SJ 219 049	primary crem, central pit (charcoal)	3900	40
BM-2809?	Sarn-y-bryn-caled 1	SJ 219 049	second crem, central pit (charcoal)	3660	40
CAR-165	Moel Goedog Circle I[24]	SH 610 324	pit f10, urn assoc.	3640	70
CAR-162	Moel Goedog Circle I	SH 610 324	pit f11	3610	70
CAR-163	Moel Goedog Circle I	SH 610 324	pit f1	3600	70
CAR-160	Moel Goedog Circle I	SH 610 324	pit f8, fv urn assoc.	3500	70
CAR-164	Moel Goedog Circle I	SH 610 324	pit f3	3470	70
CAR-166	Moel Goedog Circle I	SH 610 324	pit f7, urn assoc.	3470	70
CAR-161	Moel Goedog Circle I	SH 610 324	pit f5	3450	70
BM-2584	Parys Mountain[25]	SH 444 906	site 3, context 20, base of spoil heap in Cu mine	3550	50
BM-2586	Parys Mountain	SH 444 906	site 3A, top of spoil heap	3500	50
BM-2585	Parys Mountain	SH 444 906	context 13, charcoal	3490	50
HAR-501	Brenig 44[26]	SH 983 572	phase 1 of ring cairn	3630	100
HAR-1133	Brenig 44[27]	SH 983 572	pit A in ring cairn	3500	80
HAR-500	Brenig 44	SH 983 572	central crem, ring cairn	3490	70
HAR-502	Brenig 44	SH 983 572	phase 2 of ring cairn	3470	70
HAR-505	Brenig 44	SH 983 572	phase 2 of outer bank	3470	80

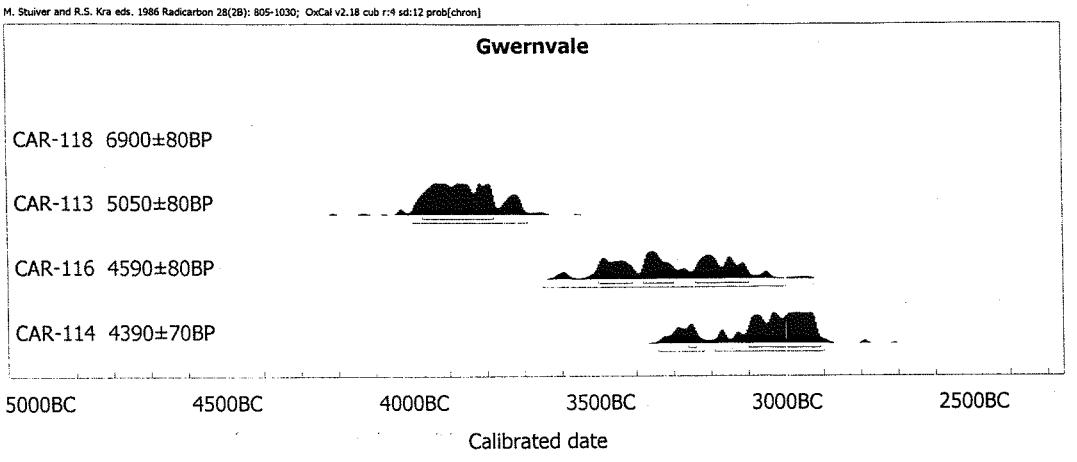
[21]Dresser 1985, 377-8
[22]Dresser 1985, 379
[23]Gibson 1994, 150-9
[24]Dresser 1985, 380
[25]Ambers, Matthews & Bowman 1991, 58
[26]Otlet 1977, 411-2
[27]Otlet & Walker 1979, 365-7

BM-1113	Nant Maden[28]	SN 971 105	phase 1 cairn surface	3518	51
BM-1114	Nant Maden	SN 971 105	pre-phase 3 cairn	3475	36
NPL-10	Penmaenmawr[29]	SH 725 747	ols beneath bank, NE quad of circle	3355	155
NPL-11	Penmaenmawr	SH 725 747	ols, SW quad of circle	3470	145
Q-530	Freshwater West[30]	SM 868 002	peat sealing meso flint floor	5960	120
HAR-3932	Trefignath[31]	SH 259 805	pre-phase 1 cairn	5050	70
NPL-132	Coygan Camp[32]	SN 284 092	shells from pit C 19	5000	95
HAR-674	Pen-y-wyrlod[33]	SO 151 316	human bone, chamber NEII	4970	80
OxA-3997	Sarn-y-bryn caled 5[34]	SJ 217 048	above primary cursus ditch silts	4960	70
CAR-994	Plas Gogerddan[35]	SN 626 835	pit, burnt cereals, nuts, apples	4700	70
HAR-1920	Dwigyr[36]	SH 418 916	'metalworking' pit 1	4130	70
HAR-744	Cefn Glas[37]	SN 932 024	Charcoal, hut floor, assoc. LN flint	4110	70
HAR-1134	Brenig 47[38]	SH 98? 57?	Beneath stone edging of round cairn	4090	70
BM-882	Breiddin[39]	SJ 292 144	charcoal, pit inside fort	3826	106
HAR-1027	Brenig 45[40]	SH 980 570	urn in trench outside barrow	3620	100
BM-2837	Coed-y-dinas 1[41]	SJ 223 053	early ring ditch fills	3630	45
HAR-605	Moel-y-Gaer[42]	SJ 212 691	'occupation layer' beneath IA bank	3590	80
BM-1111	Pond Cairn[43]	SS 915 812	assoc. with collared urn burial	3506	51
HAR-958	Pentre Farm[44]	SN 592 027	pit within EBA mound	3470	70
BIRM-85	Ysgwennant[45]	SJ 189 305	Charcoal, burial pit, beaker assoc	3428	82

[28]Burleigh & Hewson 1979, 344
[29]Callow, Baker & Pritchard 1963, 35
[30]Godwin & Willis 1964, 127
[31]Smith & Lynch 1987, 10
[32]Callow & Hassall 1968, 117
[33]Otlet 1977, 417
[34]Gibson 1994, 171
[35]Murphy 1986, 30-1
[36]Lynch 1991, 395
[37]Otlet 1977, 417
[38]Otlet & Walker 1979, 365-7
[39]Burleigh, Hewson & Meeks 1976, 34
[40]Otlet & Walker 1979, 365-7
[41]Gibson 1994, 165
[42]Otlet 1977, 414
[43]Burleigh & Hewson 1979, 343
[44]Otlet & Walker 1979, 364
[45]Shotton, Blundell & Williams 1969, 268

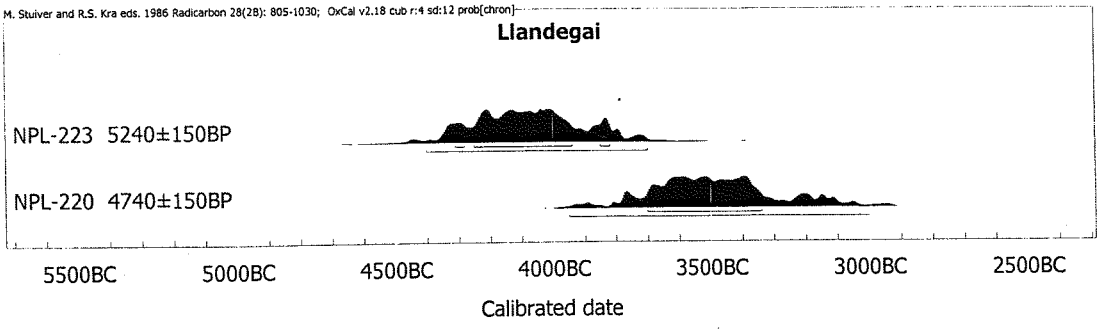
A.2 Calibrated date ranges for the occupation of sites with multiple dates in Wales

Gwernvale from before the Neolithic period to at least 3100 calBC



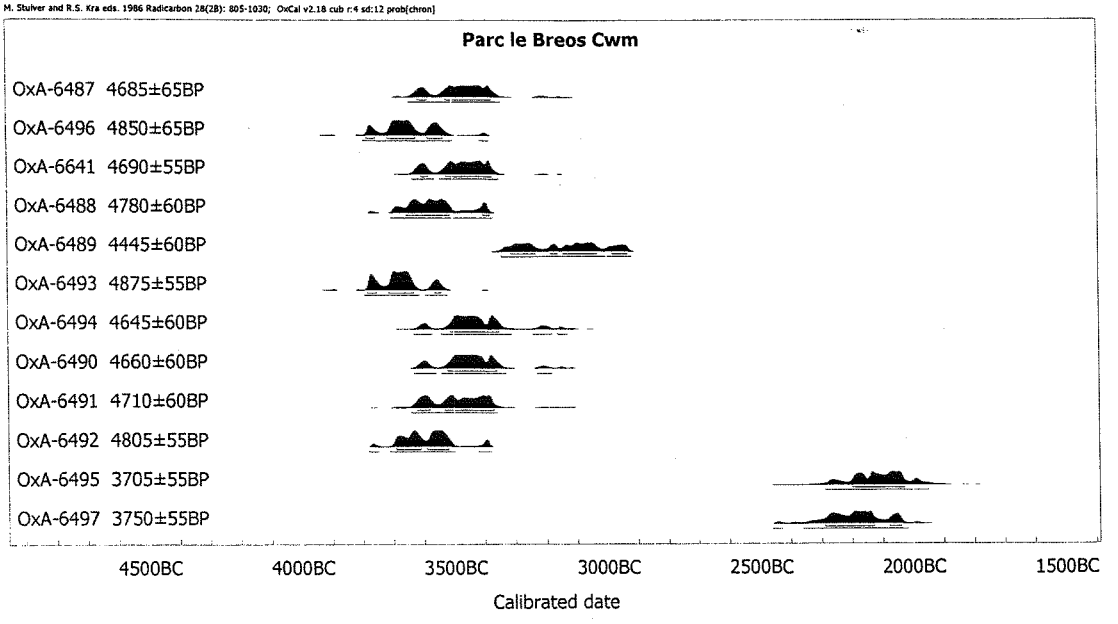
These dates allow us to suggest dates for three successive events: CAR-118 dates Mesolithic activity between 6980-6820 bp; CAR-113 dates activity at a pre-tomb pit (Britnell & Savory 1984, 138-9), to between 3980 and 3780 calBC (4000-3700 calBC at 2Σ); CAR-116 and CAR-114 date the same pre-closure pit outside chamber 2 (Britnell & Savory 1984, 47, 150), allowing it to be dated to 3100 calBC (3350-3000 calBC at 2Σ). These dates suggest that people were active at Gwernvale from the middle of the Mesolithic period until at least 3100 calBC.

Llandegai from *c* 3800 calBC to *c* 3500 calBC



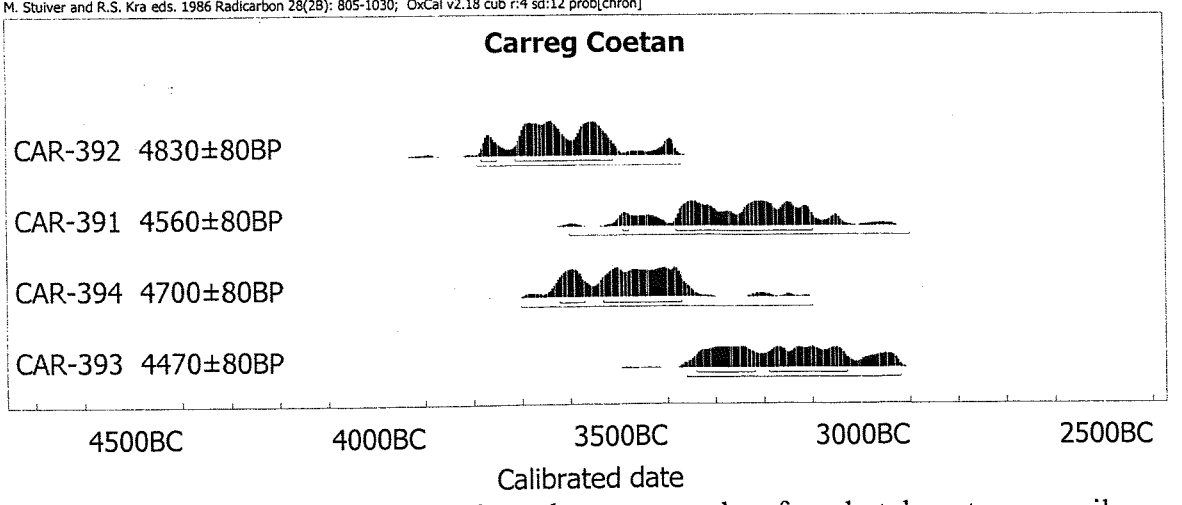
NPL-223 dates one of the timber buildings at Llandegai and indicates that this building was constructed before 3800 calBC (3700 calBC at 2Σ). NPL-220 dates activity within the henge, which cannot have taken place before 3700 calBC (3950 calBC at 2Σ). The shortest possible timescale for the human activity at Llandegai is the 100 year span from 3800-3700 calBC. The buildings probably do not date to significantly earlier than this period (Herne 1988, 25-6), but it is likely that the true date for the henge is considerably younger than this upper limit.

Parc le Breos Cwm from before 3540 until 2930 calBC (3520-2920 calBC at 2Σ)



All of the Parc le Breos Cwm dates are from discrete individuals. The pattern of dates implies that the main use of the monument began before 3540 calBC, and was probably over by 2930 calBC (3520 to 2920 calBC at 2Σ). An Early Bronze Age secondary use of the passage dates to around 2290 to 2230 calBC (2460 to 2050 calBC at 2Σ). The presence of Neolithic material from pre-cairn contexts at the site implies Neolithic activity began before the deposition of the individual dated by OxA-6493. This date has a range of 3780 to 3540 calBC (3790 to 3520 calBC at 2Σ).

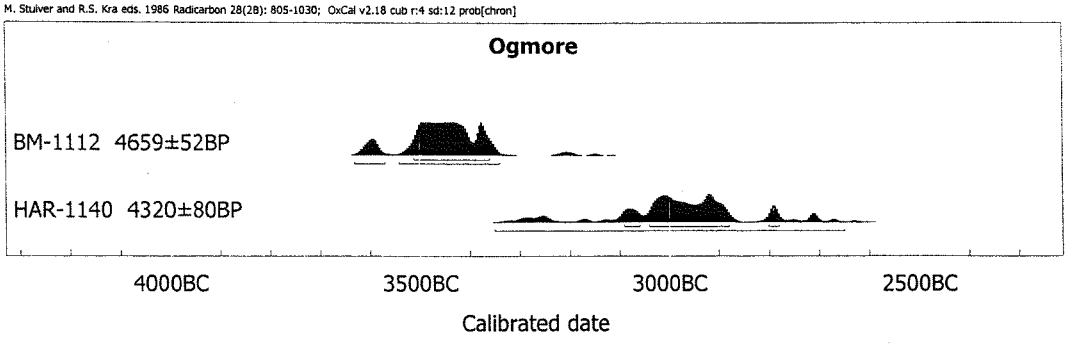
Carreg Coetan from before c 3500 calBC (3600 calBC at 2Σ) for an unknown period



CAR-392 and CAR-391 both come from the pre-mound surface, but do not necessarily date the same event. Some pre-mound activity must have taken place before *c* 3500 calBC. Taking these dates in conjunction with the date from the body of the mound, CAR-393, Carreg Coetan cannot have been constructed before around 3350 calBC nor after 3020 calBC (3370-2920 calBC at 2Σ). CAR-394 is a bulked sample from a chamber stonehole and has been ignored (Barker 1992, 21). There is no evidence for how long the chamber remained in use. The finding of beaker material from the chamber floor (Barker 1992, 20),

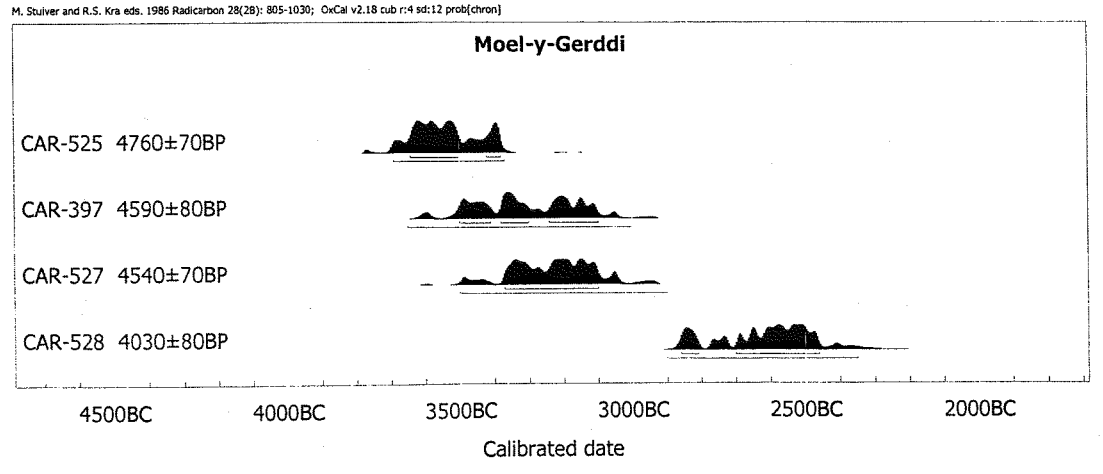
suggests a secondary Early Bronze Age reuse of the monument, similar to that at Parc le Breos Cwm.

Ogmore 3090-3060 or 3040-2880 or 2800-2780 calBC (3350-2650 calBC at 2Σ).



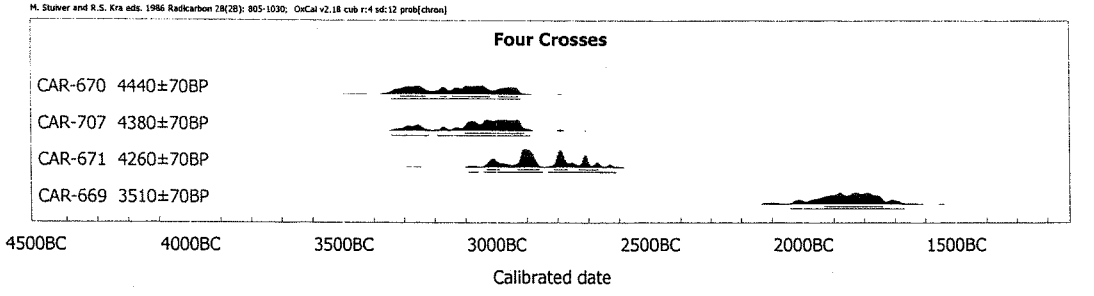
BM-1112 is a charcoal date from a hearth in the upper layer of deposits at Ogmore, HAR-1140 is from the lower layer. Re-excavation of these deposits has suggested that they represent a single event (Hamilton & Aldhouse-Green 1998, 113). I have assumed that BM-1112 dates residual material, and that the true date for this pottery lies in the range 3090 to 2780 calBC (3350-2650 calBC at 2Σ). Re-evaluation of the site is still in progress.

Moel-y-Gerddi after 3380 until 2460 calBC at the latest (probably *c* 3100-2800 calBC)



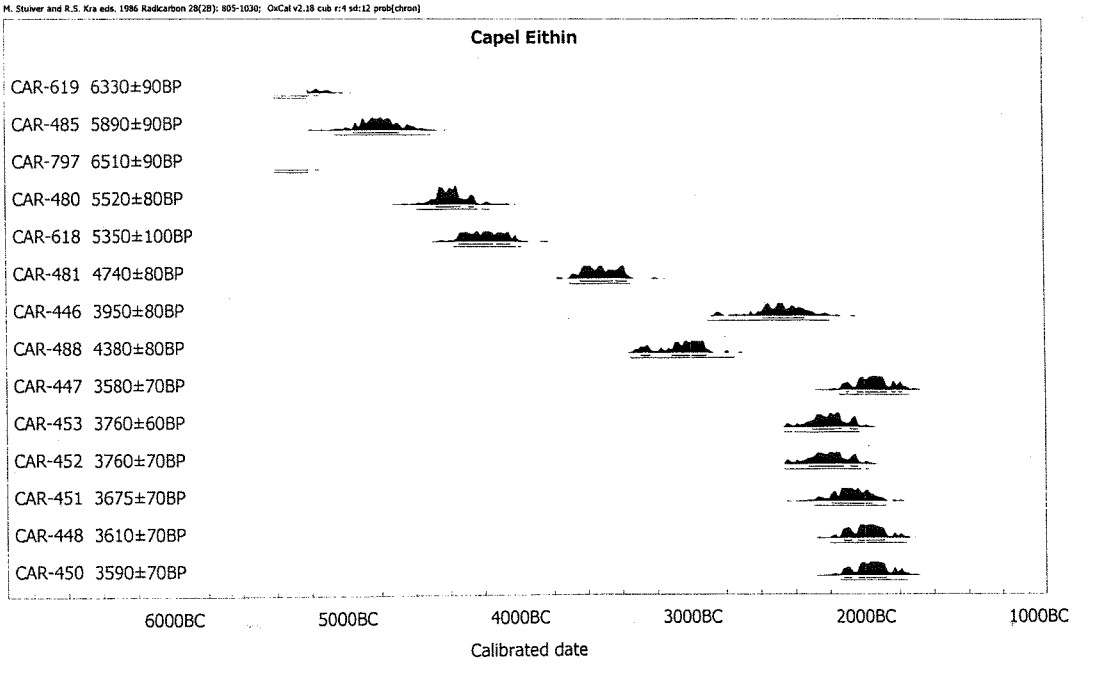
CAR-525 comes from a supposedly Iron Age context, and presumably represents residual old charcoal, which cannot be securely associated with human activity. CAR-397 and CAR-527 both date the same hearth to between 3380 and 3100 calBC (3500-3000 calBC at 2Σ). CAR-528 dates a second hearth to between 2860-2800 calBC *or* 2700-2460 calBC (2900-2350 calBC at 2Σ). The Neolithic occupation of Moel-y-Gerddi probably began after 3380 calBC and was over by 2460 calBC at the latest. Given the ephemeral nature of the remains, a much shorter occupation from *c* 3100 calBC to *c* 2800 calBC seems more likely.

Four Crosses from no earlier than 3310 until no later than 1740 calBC (3340-1670 calBC at 2Σ)



CAR-670 and 707 both date features associated with phase 1 at Four Crosses site 5. CAR-671 was residual in a phase 2 context on the same site. On this evidence, phase 1 did not begin before 3310 calBC and was over by 2910 calBC (3340-2890 calBC at 2Σ). CAR-669 dates phase 3 activity at the same site to between 1930 and 1740 calBC (2040-1670 calBC at 2Σ).

Capel Eithin from not before 3290 until around 2100 calBC (3350-2100 calBC at 2Σ)



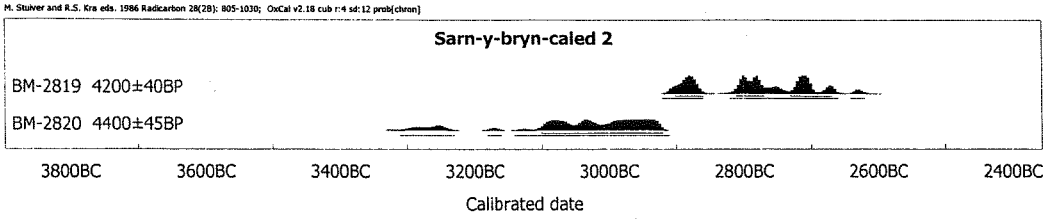
CAR-619 and CAR-485 both came from postholes within feature 69, a large trapeziodal trench with no material culture associations. CAR-797, CAR-480 and CAR-618 all date charcoal from another trench, feature 78. Feature 78 contained a sherd of Peterborough ware pottery. CAR-481 dates a pit, feature 83, which contained Grooved Ware (White 1981, 15-9; Lynch 1991, 394). All of these dates are impossibly early, and the dates for features 69 and 78 cover a vast span of time. It seems likely that all of these dates should be rejected as being unreliable.

CAR-488 was probably the earliest reliable date from the site, this provides a single date for a hearth which is not associated with any material culture (Lynch 1991, 342). This date would be between 3290 and 2910 calBC (3350-2750 calBC at 2Σ). The date from pit

feature 17, CAR-446, calibrates to between 2580 and 2340 calBC (2900-2200 calBC at 2Σ), which fits well with the Grooved Ware pottery from this pit.

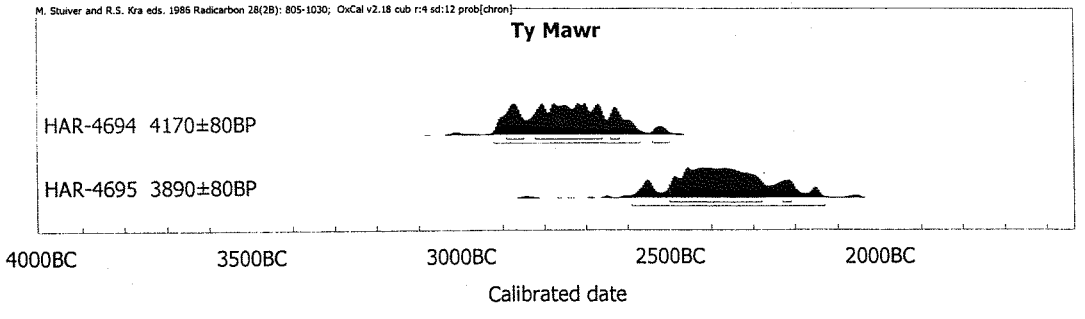
The remainer of the Capel Eithin dates form a coherent group, associated with Collared Urn and Food Vessel Urn cremations, clustering around 2100 calBC.

Sarn-y-bryn-caled 2 2900-2860, 2810-2770 or 2730-2670 calBC, 2920-2860, 2820-2660 or 2640-2620 calBC at 2Σ



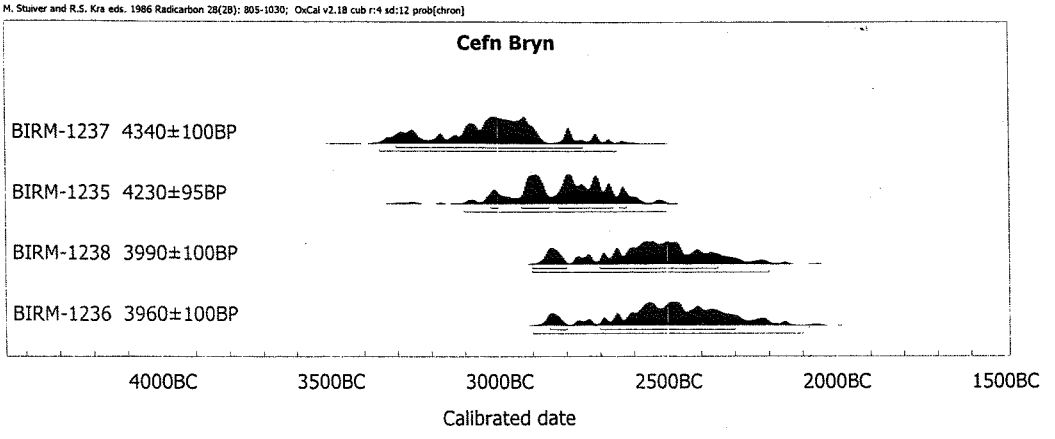
Both of these dates came from the fill of the Peterborough Ware associated re-cut in the ring ditch. They do not necessarily date a single event, but it seems likely, in view of the lack of any overlap between the dates, that BM-2820 included residual charcoal and that the true date for this phase lies within the range of dates 2900-2860, 2810-2770 or 2730-2670 calBC (2920-2860, 2820-2660 or 2640-2620 calBC at 2Σ).

Ty Mawr not before 2920 and not after 2210 calBC and at least between 2620 and 2500 calBC (in the range 2920-2130 calBC at 2Σ)



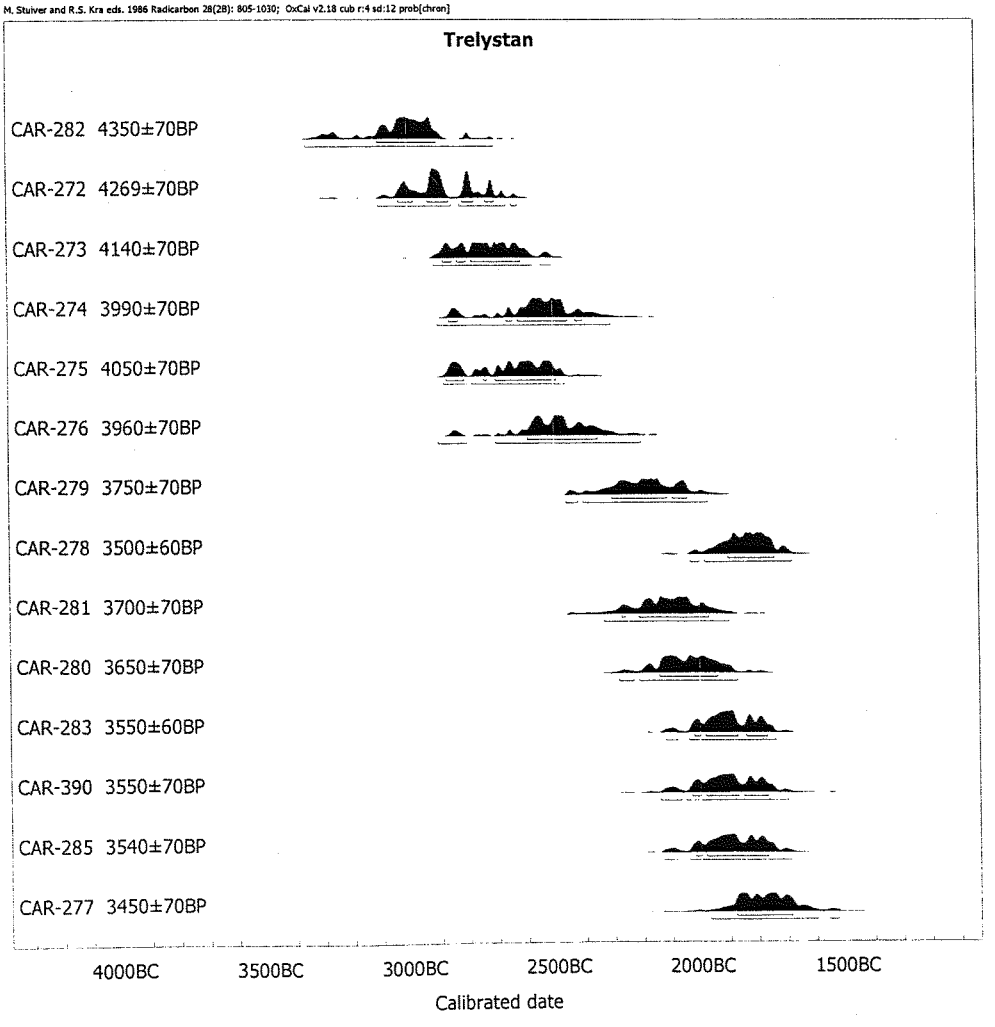
These two dates come from two hearths, judged to be below the main level of occupation (Smith 1987, 24) and associated with no material culture. The dates only overlap at 2Σ, probably indicating that the hearths are not contemporary, and that there was activity at Ty Mawr between 2920 and 2210 calBC (on the longest chronology) or between 2620 and 2500 calBC (on the shortest possible chronology). At 2Σ, both hearths fall at some point within the span 2920 to 2130 calBC.

Cefn Bryn between 2850 and 2750 calBC (2900-2640 calBC at 2Σ)



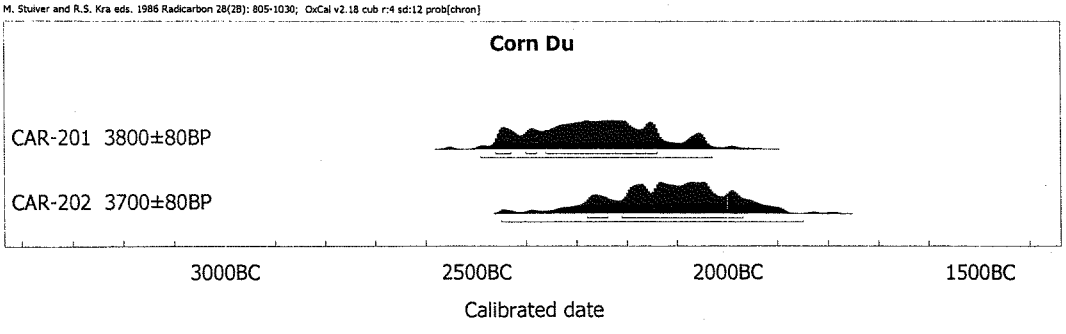
The four dates from beneath the barrow at Cefn Bryn all belong to the same ephemeral group of features. Assuming that the structures in question were not long lived, a date in the range 2850-2750 calBC seems likely (2900-2640 calBC at 2Σ).

Trelystan from not before 2880 calBC (2900 at 2Σ) until *c* 1700 calBC



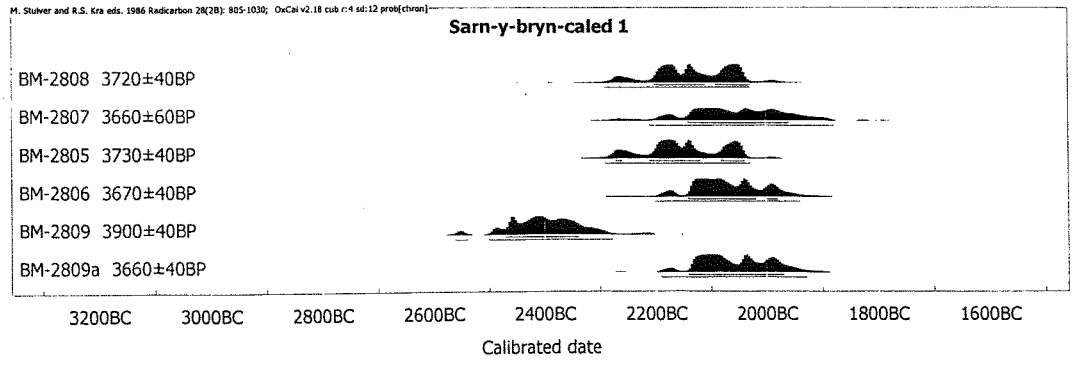
CAR-282 comes from charcoal from a timber coffin in the central burial beneath barrow II (see section 6.7, for details of the site) and dates to between 3100 and 2900 calBC (3350-2700 calBC at 2Σ). There is a strong probability that this date is too old, the coffin was a sizable piece of oak, the sample dated was not sapwood and the coffin may not have been made from a recently felled tree. CAR-272, CAR-273 and CAR-274 all date pits and hearths within structure B, beneath barrow I; this structure dates to between 2880 and 2700 calBC (2900-2600 calBC at 2Σ) and I would regard this as the earliest securely dated human activity. CAR-275 and CAR-276 date a pit and a hearth within structure A, also beneath barrow I; structure A was probably in use between 2600 and 2490 calBC (2700-2450 calBC at 2Σ). CAR-279 and CAR-278 only overlap at 2Σ and date a layer of burning which sealed these structures to 2050 to 1950 calBC, The subsequent dates relate to the two Early Bronze Age barrows. In summary, Trelystan appears to be first occupied after 2880 calBC and continues in use into the Early Bronze Age.

Corn Du 2280-2240 or 2200-2140 calBC (2450-2040 calBC at 2Σ)



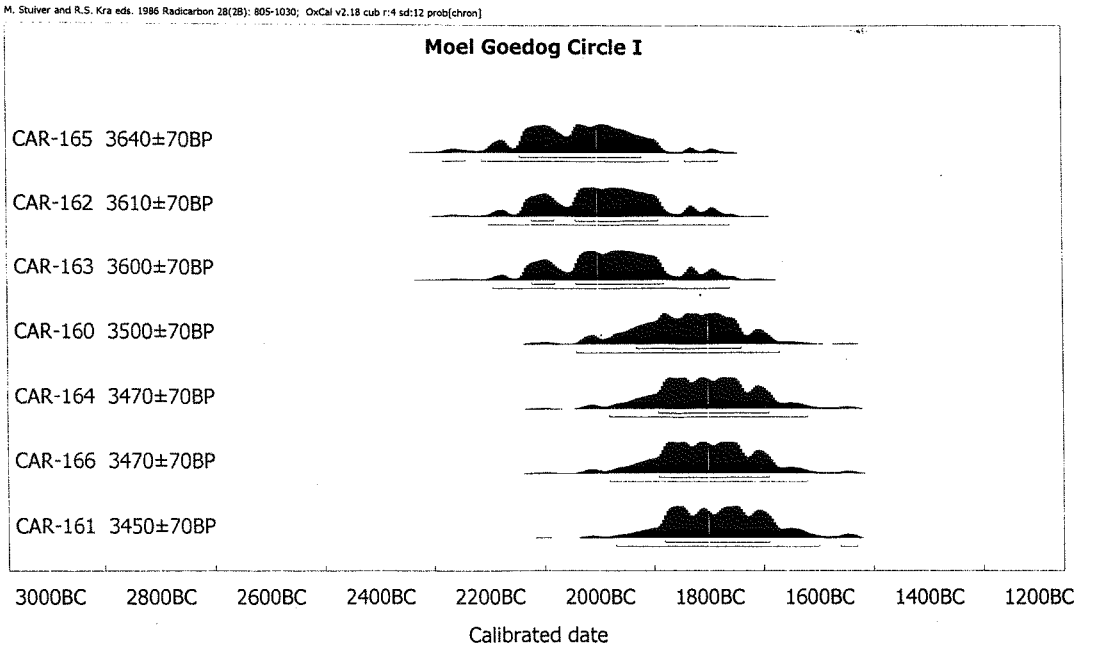
Neither is securely associated with human activity. They date the same pre-cairn surface to 2280-2240 calBC *or* 2200-2140 calBC (2450-2040 calBC at 2Σ).

Sarn-y-bryn-caled 1 not before 2150 and not after 2050 calBC (2200-2050 calBC at 2Σ)



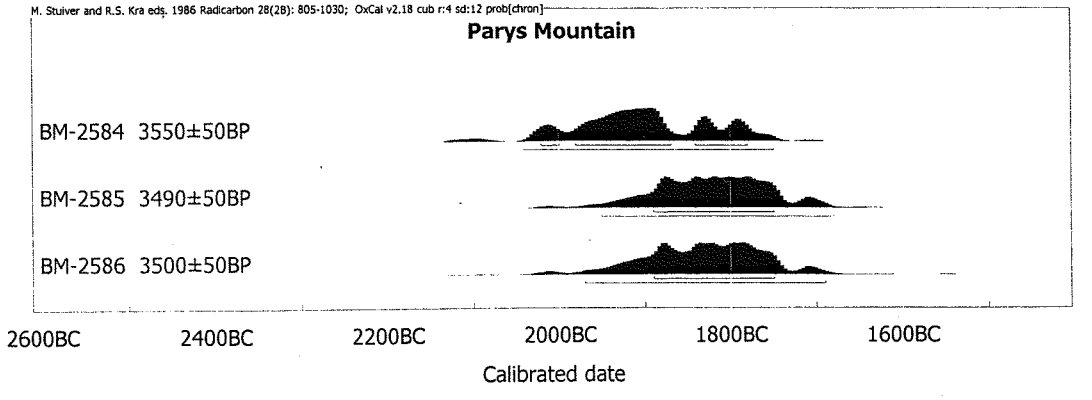
These dates from the Sarn-y-bryn-caled timber circle provide a good indication that all the main phases of this monument were contemporary. BM-2809 dates the first cremation in the central pit, which is stratigraphically later than structures dated by BM-2805 to 2808, and presumably contained old charcoal. Assuming that all the main elements *were* contemporary, the timber circle cannot have been begun before about 2150 calBC, and was completed before 2050 calBC (2200-2050 calBC at 2Σ).

Moel Goedog Circle I not before 2150 calBC (2270 calBC at 2Σ)



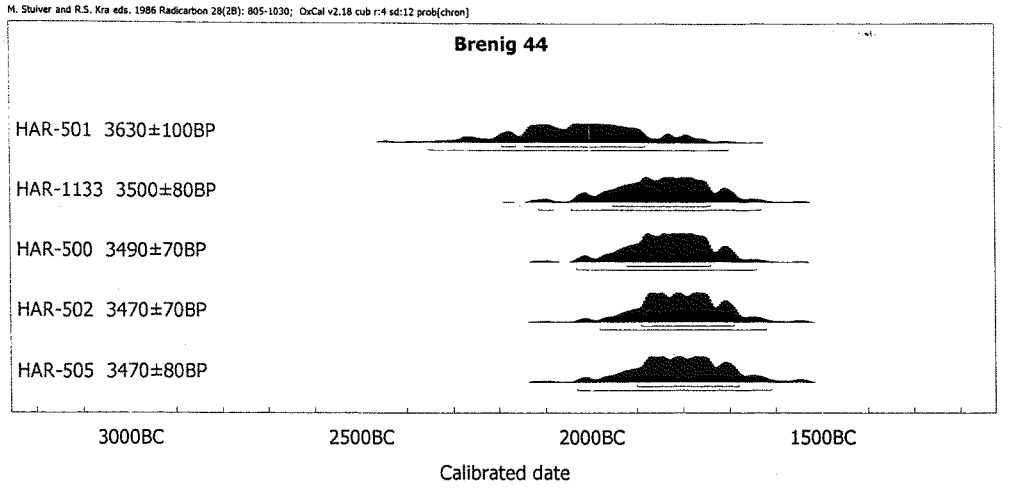
The Moel Goedog dates form a very close group. They date a group of pits associated with Early Bronze Age ceramics. The earliest of these pits was dug after 2150 calBC (2270 calBC at 2Σ) and use of the circle continued into the Bronze Age.

Parys Mountain not before 2010 calBC (2020 calBC at 2Σ)



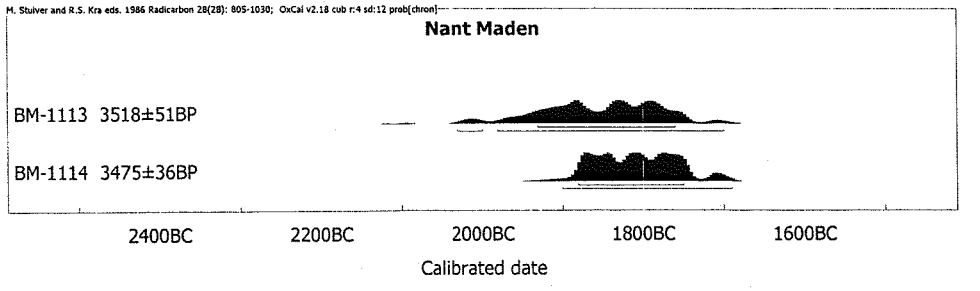
BM-2584 pre-dates the formation of one of the spoil-heaps in the Parys Mountain copper mine, giving an earliest possible date of around 2010 calBC for the start of mining (2020 calBC at 2Σ). BM-2586, from the top of a different spoil heap, indicates that mining was certainly underway before 1750 calBC (1690 calBC at 2Σ).

Brenig 44 not before 2200 calBC



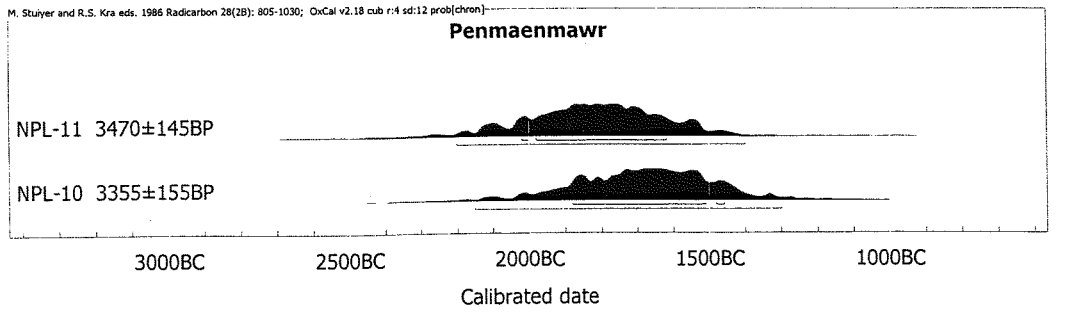
HAR-501, HAR-1133 and HAR-500 are all associated with phase 1 of the Brenig 44 ring cairn, although they do not date the same event. Phase 1 does not begin before 2200 calBC and probably dates to between 1930 and 1890 calBC (2020-1700 calBC at 2Σ). HAR-502 and HAR-505 both date to phase 2 of the monument, which on this evidence cannot have begun before 1900-1700 calBC (1980-1600 calBC at 2Σ).

Nant Maden not before 1930 calBC (2030 calBC at 2Σ)



BM-1113 pre-dates the phase 2 cairn at Nant Maden, with BM-1114 pre-dating the phase 3 cairn. Phase 2 begins during or after 1930-1750 calBC (2030-1700 calBC at 2Σ); phase 3 begins during or after 1880-1740 calBC (1900-1690 calBC at 2Σ).

Penmaenmawr not before 1880 calBC (2150 calBC at 2Σ)

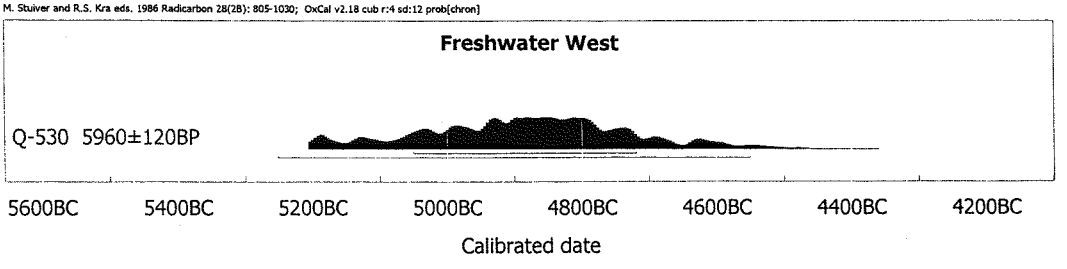


Both NPL-10 and NPL-11 pre-date the building of the stone circle. They indicate that the construction of the monument cannot have begun before 1880 calBC (2150 calBC at 2Σ).

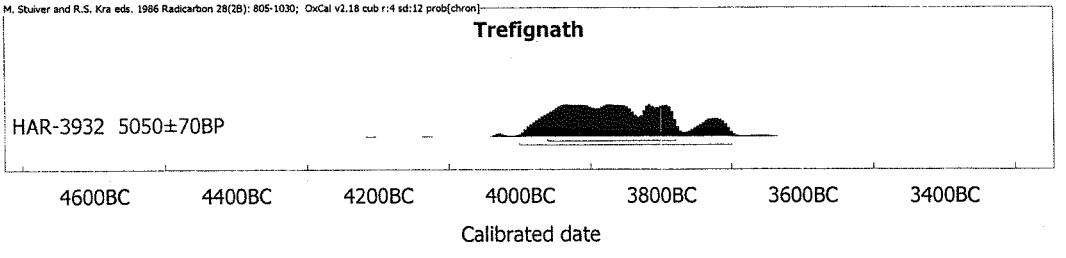
A.3 Calibrated single radiocarbon dates from sites in Wales

These single dates are less useful in establishing durations of use for particular sites, but they do give snapshots of dated human activity. All the dates I have presented below are securely associated with prehistoric events.

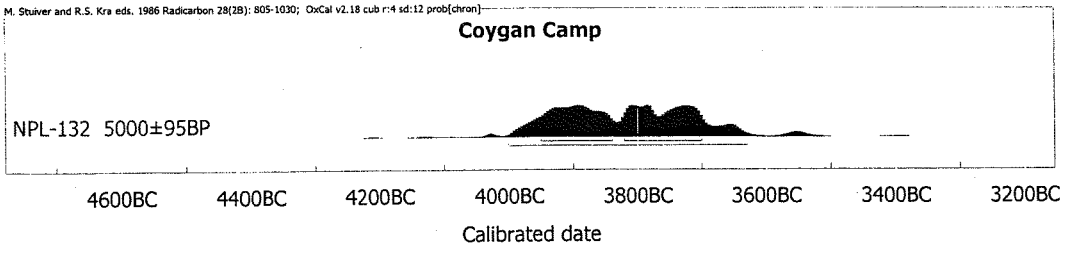
Freshwater West 5060-4520 calBC (5250-4540 calBC at 2Σ)



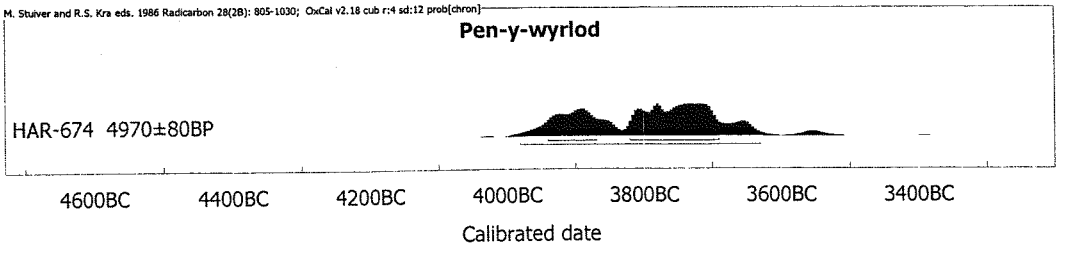
Trefignath 3960-3780 calBC (4000-3700 calBC at 2Σ)



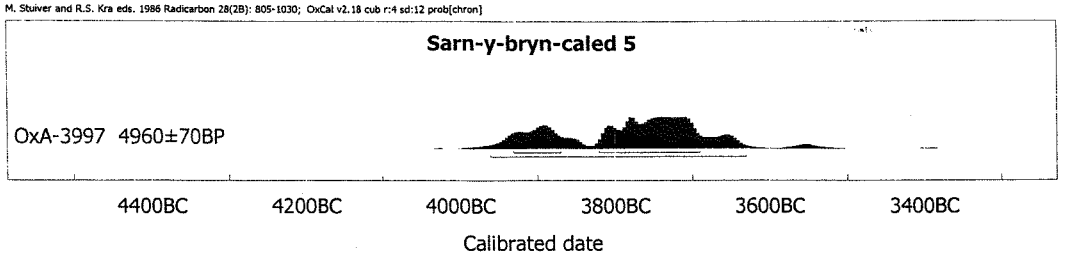
Coygan Camp 3950-3830 *or* 3820-3700 calBC (4000-3630 calBC at 2Σ)



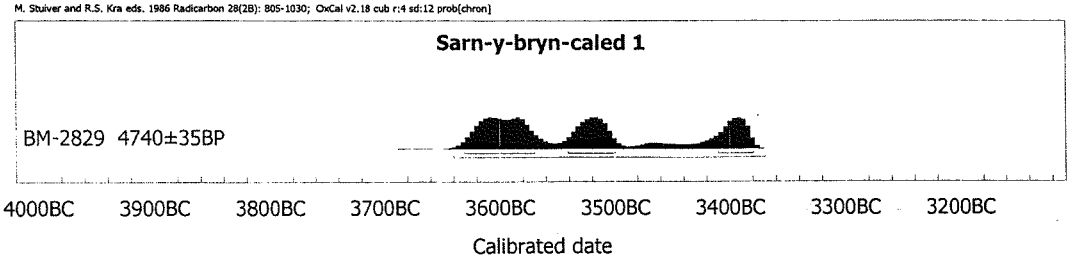
Pen-y-wyrlod 3950-3870 *or* 3820-3690 calBC (3980-3620 calBC at 2Σ)



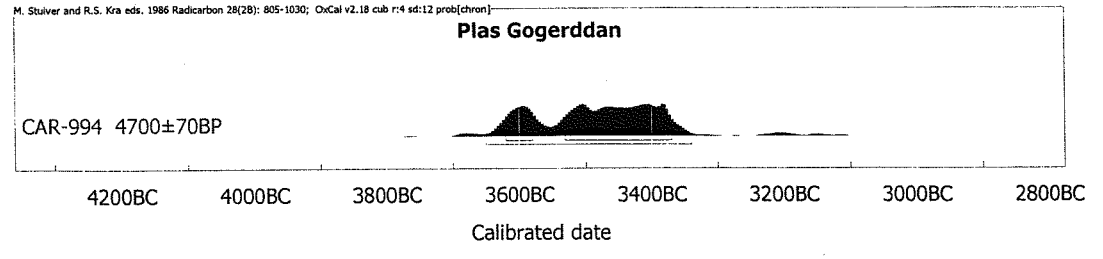
Sarn-y-bryn-caled 5 3930-3870 *or* 3820-3690 calBC (3960-3630 calBC at 2Σ)



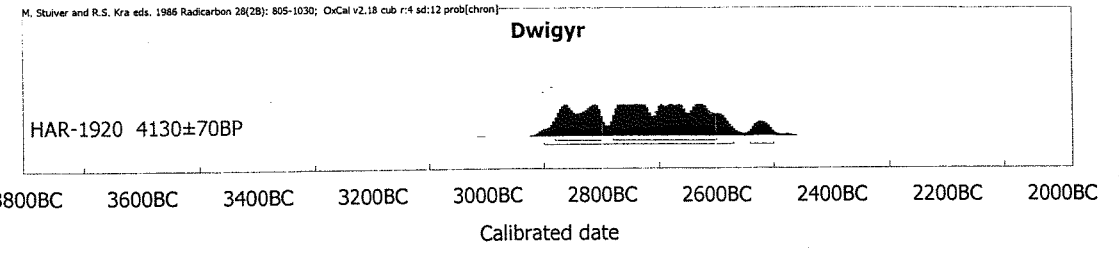
Sarn-y-bryn-caled 1 3630-3570, 3540-3500 *or* 3410-3380 calBC (3640-3370 calBC at 2Σ)



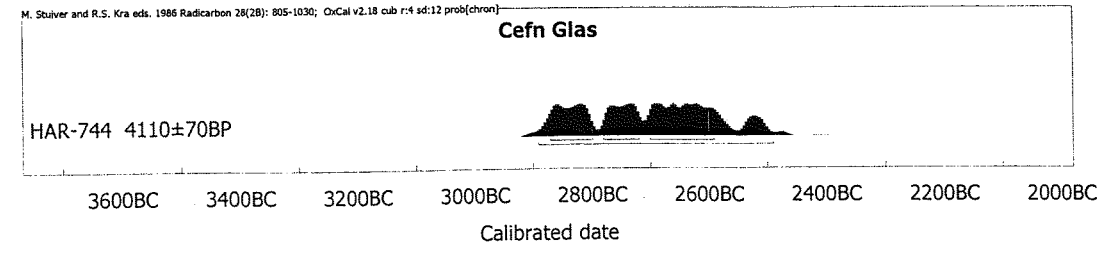
Plas Gogerddan 3620-3580 *or* 3520-3370 calBC (3650-3340 calBC at 2Σ)



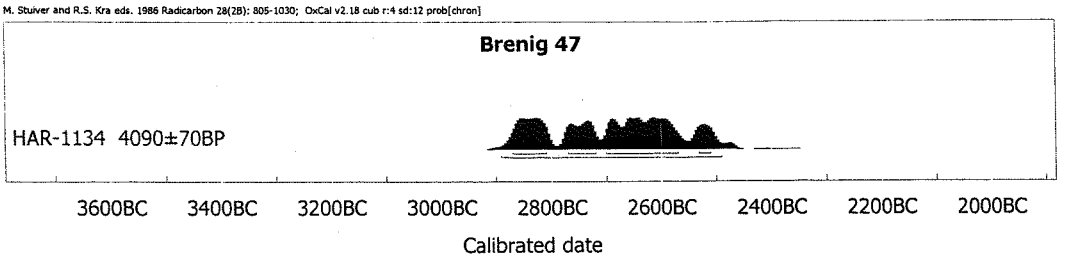
Dwigyr 2880-2800 or 2780-2600 calBC (2900-2570 calBC at 2Σ)



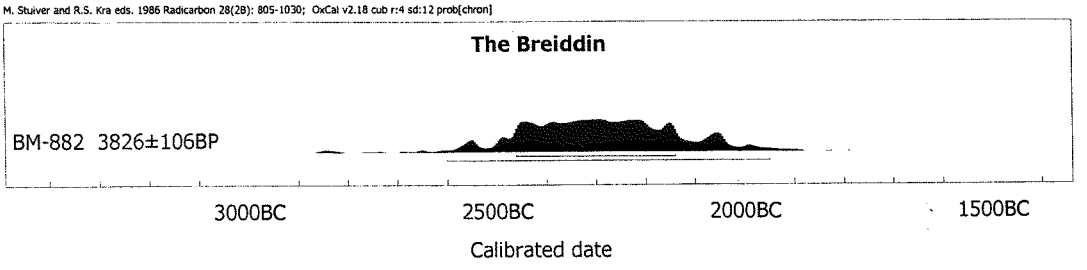
Cefn Glas 2870-2800 *or* 2780-2710 *or* 2700-2590 calBC (2890-2500 calBC at 2Σ)



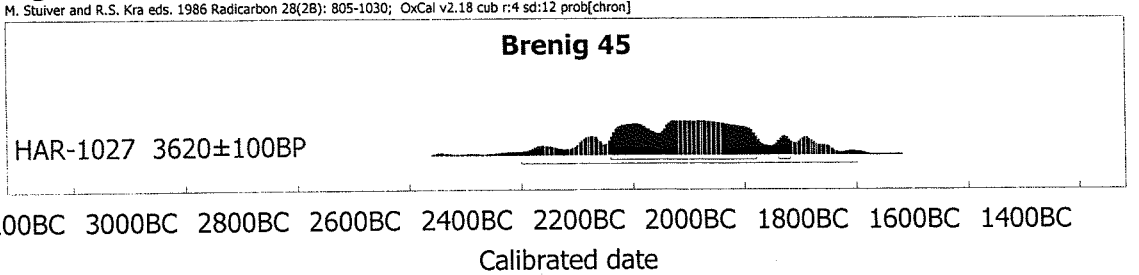
Brenig 47 2870-2810 *or* 2770-2720 *or* 2700-2570 *or* 2520-2500 calBC (2900-2490 calBC at 2Σ)



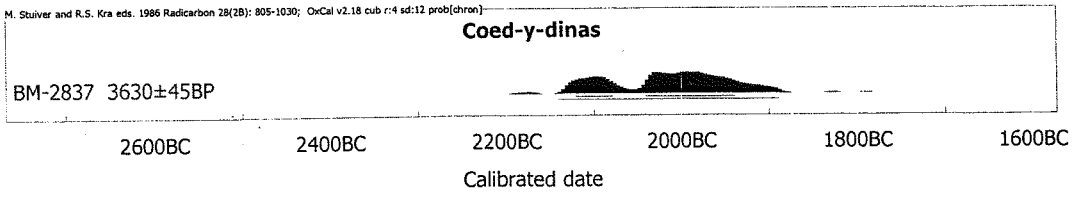
The Breiddin 2450-2140 calBC (2600-1950 calBC at 2Σ)



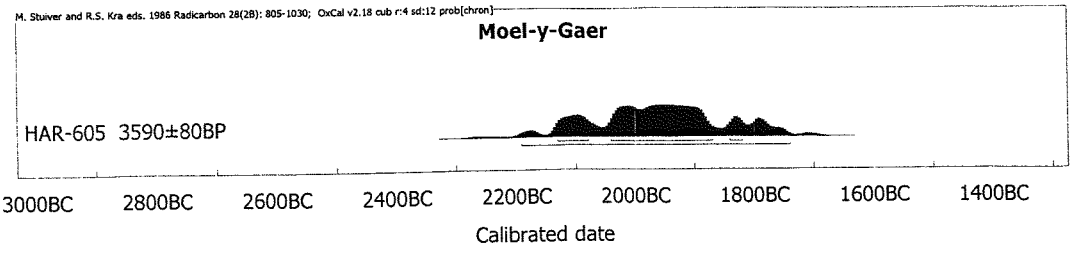
Brenig 45 2140-1880 *or* 1840-1820 calBC (2300-1700 calBC at 2Σ)



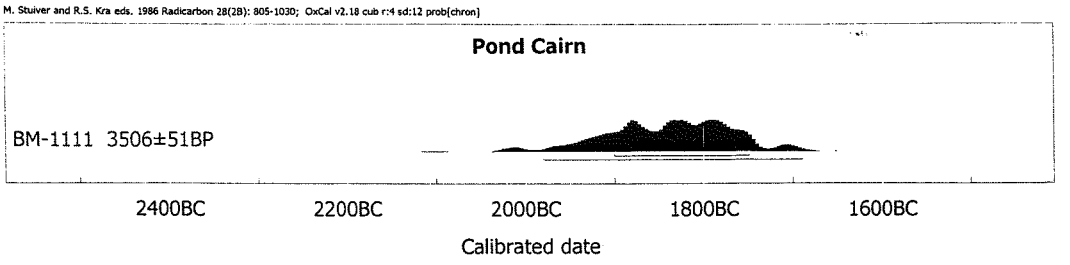
Coed-y-dinas 2120-2080 or 2040-1940 calBC (2140-1890 calBC at 2Σ)



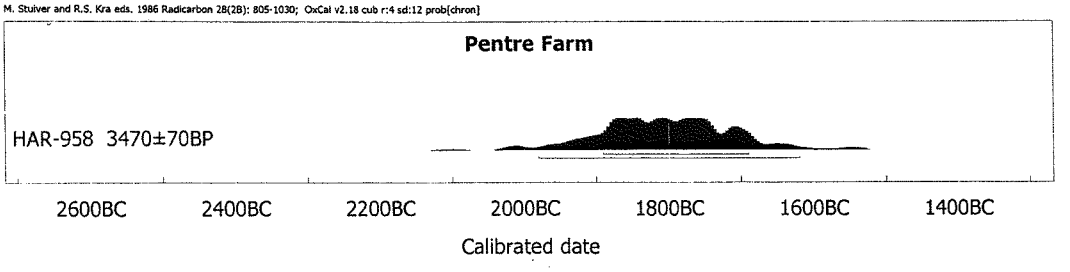
Moel-y-Gaer 2120-2080 *or* 2040-1870 *or* 1850-1830 calBC (2195-1730 calBC at 2Σ)



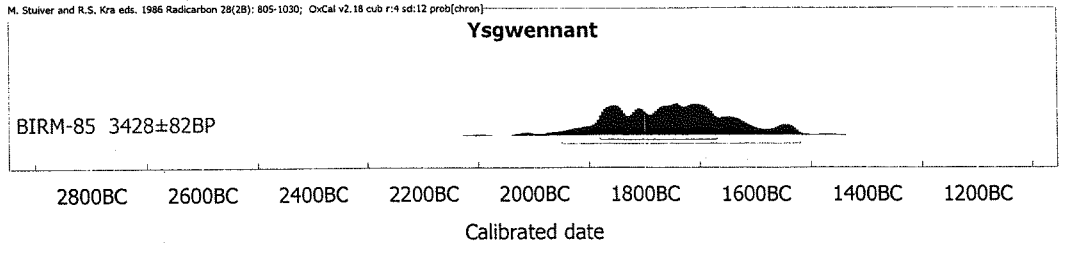
Pond Cairn 1900-1740 calBC (1980-1690 calBC at 2Σ)



Pentre Farm 1880-1700 calBC (1980-1620 calBC at 2Σ)



Ysgwennant 1880-1680 calBC (1950-1520 calBC at 2Σ)



Appendix B A summary of pottery traditions

B.1 Raw material selection

group	vessel	clay source	inclusion source	inclusions used	size[1]	texture[2]
5	Bryn Celli Wen 7		local	stone	7	1
5	Bryn Celli Wen 9		local	stone	7	1
5	Bryn Celli Wen 10		local	stone	7	1
5	Pant y Saer 7			stone	7	1
5	Ogmore 30		local	stone	7	1
11	Din Dryfol 2		1 day	shell	6	5
11	Bryn Celli Wen 2		1 day	shell	6	5
11	Bryn yr Hen Bobl 8		1 day	shell	6	4
22	Pant y Saer 3		1 day	shell, stone	4	3
23	Llugwy 3			shell, stone	7	2
23	Llugwy 8			shell, stone	7	2
10	Trefignath H	1 day	1 day	2 types of stone, grog	2	1
10	Trefignath J	1 day	1 day	stone, grog	2	1
10	Trefignath R	1 day	1 day	stone, grog	2	1
10	Trefignath S	1 day	1 day	stone, grog	2	1
10	Ysgwennant 2			stone grog	2	1
10	Four Crosses 1	not local	local	stone grog	2	1
18	Llugwy 1		1 day	shell	3	5
18	Pant y Saer 1		1 day	shell	2	5
18	Pant y Saer 2		1 day	shell	2	5
18	Pant y Saer 5		1 day	shell	3	5
18	Parc le Breos Cwm 1		1 day	shell	2	5
18	Tinkinswood 2		1 day	shell	3	5
18	Tinkinswood 3		1 day	shell	3	5
18	Mount Pleasant, Nottage 6		1 day	shell	3	5
2	Bryn Celli Wen 3		local	grog	1	1
2	Pant y Saer 6		local	grog	1	1
2	Onllwyn 1		local	grog	1	1
3	Bryn Celli Wen 5		local	stone, grog	7	1
3	Bryn Celli Wen 6		local	stone, grog	7	1
3	Gwernvale 17	local	local	stone grog	7	1
52	Llugwy 9		local	grog	6	1
52	Trelystan 1	1 week	local	grog	6	1

[1]Inclusion sizes have been arranged into nine groups:

Group	fine inclusions (%)	medium inclusions (%)	coarse inclusions (%)
1	0	0-30	70-100
2	0-20	20-50	40-60
3	40-50	40-50	0-20
4	0-20	60	20-40
5	30-40	30-40	30-40
6	0-20	80-100	0-10
7	60-80	10-40	0-20
8	100	0	0
9	0-20	0-20	80

[2]Inclusion textures have been similarly arranged into five groups:

Group	laminar inclusions (%)	granular inclusions (%)
1	0-10	90-100
2	20-40	60-80
3	50	50
4	70	30
5	90-100	0-10

group	vessel	clay source	inclusion source	inclusions used	size	texture
52	Trelystan 2	1 week	local	grog	6	1
52	Trelystan 3	1 week	local	grog	6	1
52	Trelystan 4	1 week	local	grog	6	1
52	Trelystan 5	1 week	local	grog	6	1
52	Trelystan 6	1 week	local	grog	6	1
52	Trelystan 7	1 week	local	grog	6	1
52	Trelystan 8	1 week	local	grog	6	1
52	Trelystan 15	1 week	local	grog	6	1
16	Bryn yr Hen Bobl 1		1 day	shell	5	3
16	Bryn yr Hen Bobl 3		1 day	shell	5	3
16	Bryn yr Hen Bobl 4		1 day	shell	5	3
16	Bryn yr Hen Bobl 5		1 day	shell	5	3
16	Bryn yr Hen Bobl 7		1 day	shell	5	3
16	Llugwy 7		1 day	shell	5	3
16	Castell Bryn Gwyn 1			shell	5	3
16	Bryn yr Hen Bobl 6		1 day	shell, grog	5	3
16	Clegyr Boia 4		1 day	shell	5	3
16	Clegyr Boia 12		1 day	shell	5	3
16	Clegyr Boia 17		1 day	shell	5	3
16	Clegyr Boia 18		1 day	shell	5	3
16	Clegyr Boia 29		1 day	shell	5	3
16	Clegyr Boia 32		1 day	shell	5	3
16	Clegyr Boia 37		1 day	shell	5	3
16	Clegyr Boia 40		1 day	shell	5	3
16	Clegyr Boia 41		1 day	shell	5	3
16	Clegyr Boia 43		1 day	shell	5	3
16	Nanna's Cave 3		local	shell	5	3
16	Ty Isaf 1		1 week	shell	5	3
16	Ty Isaf 4		1 week	shell	5	3
16	Ty Isaf 6		1 week	shell	5	3
17	Llugwy 2		1 day	shell	2	3
17	Din Dryfol 1		1 day	shell	3	3
17	Ty Isaf 7		1 week	shell	2	3
17	Ty Isaf 5		1 week	shell	3	3
17	Ty Isaf 10		1 week	shell	3	3
17	Clegyr Boia 8		1 day	shell	2	3
17	Clegyr Boia 11		1 day	shell	2	3
17	Clegyr Boia 21		1 day	shell	2	3
17	Clegyr Boia 27		1 day	shell	2	3
17	Nanna's Cave 2		local	shell	2	3
17	Clegyr Boia 5		1 day	shell	3	2
17	Clegyr Boia 3		1 day	shell	3	3
17	Clegyr Boia 6		1 day	shell	3	3
17	Clegyr Boia 10		1 day	shell	3	3
17	Clegyr Boia 14		1 day	shell	3	3
17	Clegyr Boia 23		1 day	shell	3	3
17	Clegyr Boia 26		1 day	shell	3	3
17	Clegyr Boia 38		1 day	shell	3	3
17	Clegyr Boia 28		1 day	shell	3	4
17	Clegyr Boia 1		1 day	shell	4	3
7	Trefignath D	1 day	1day	stone, grog	7	1
7	Trefignath M	1 day	1day	stone, grog	7	1
7	Trefignath 145	1 day	1day	stone, grog	7	1
7	Trefignath 265	1 day	1day	stone, grog	7	1
9	Trefignath E	local	1 day	shell, grog	1	5
9	Trefignath N	local	1 day	shell, grog	1	5
9	Trefignath F	1 day	1 day	shell, grog	1	5
9	Trefignath L	1 day	1 day	shell, grog	1	5
9	Trefignath T	1 day	1 day	shell, grog	1	5
9	Trefignath U	1 day	1 day	shell, grog	1	5
9	Trefignath 200	1 day	1 day	shell, grog	1	5
8	Trefignath K	local	1 day	stone, grog	8	1
8	Trefignath W	1 day	1 day	stone, grog	6	1
8	Trelystan 16	1 week	1 week	stone grog	6	1
8	Trelystan 17	1 week	1 week	stone grog	6	1
24	Trefignath Q	1 day	1 day	2 types of stone, grog	6	1

group	vessel	clay source	inclusion source	inclusions used	size	texture
13	Bryn yr Hen Bobl 9		local	stone	2	1
13	Bryn yr Hen Bobl 10		local	stone	2	1
13	Ogmore 15		local	stone	2	1
13	Ogmore 17		local	stone	2	1
13	Ogmore 35		local	stone	2	1
13	Ogmore 36		local	stone	2	1
13	Ogmore 41		local	stone	2	1
13	Ogmore 42		local	stone	2	1
13	Clegyr Boia 36			stone	2	1
25	Bryn yr Hen Bobl 12		local	stone	3	1
25	Clegyr Boia 31			stone	3	1
25	Ogmore 21		local	stone	3	1
25	Ogmore 32		local	stone	3	1
25	Ogmore 33		local	stone	3	1
25	Ogmore 39		local	stone	3	1
25	Tinkinswood 1			stone	3	1
25	Ty Isaf 2		local	stone	3	1
25	Ty Isaf 9		local	stone	3	1
25	Ty Isaf 11		local	stone	3	1
25	Ty Isaf 12		local	stone	3	1
25	Ty Isaf 13		local	stone	3	1
1	Trefignath A	local	local	stone, grog	1	1
1	Trefignath B	local	local	stone, grog	1	1
1	Trefignath C	local	local	stone, grog	1	1
1	Trefignath G	local	local	stone, grog	1	1
1	Trefignath 439	local	local	stone, grog	1	1
1	Bryn Celli Wen 11		local	stone, grog	1	1
1	Trefignath V	local	local	stone	1	1
1	Castell Bryn Gwyn 2			stone	1	1
1	Castell Bryn Gwyn 3			stone	1	1
1	Abergavenny 1		local	stone	1	1
1	Cefn Cilsanws 1		local	stone	1	1
1	Cefn Cilsanws 2		local	stone	1	1
1	Ffostyll 1		local	stone	1	1
1	Gwernvale 24	local	local	stone	1	1
1	Gwernvale 26	local	local	stone	1	1
1	Gwernvale 30	local	local	stone	1	1
1	Gwernvale 28	local	local	stone	1	1
1	Cefn Cilsanws 3		local	stone grog	1	1
1	Ogmore 2			stone	1	1
1	Ogmore 7		local	stone	1	1
1	Ogmore 11		local	stone	1	1
1	Ogmore 12		local	stone	1	1
1	Ogmore 13		local	stone	1	1
1	Ogmore 16		local	stone	1	1
1	Ogmore 18		local	stone	1	1
1	Ogmore 19		local	stone	1	1
1	Ogmore 20		local	stone	1	1
1	Ogmore 25		local	stone	1	1
1	Sarn-y-bryn-caled 1			stone grog	1	1
1	Sarn-y-bryn-caled 2			stone grog	1	1
1	Sarn-y-bryn-caled 3			stone grog	1	1
1	Sarn-y-bryn-caled 5			stone grog	1	1
1	Sarn-y-bryn-caled 6			stone grog	1	1
1	Sarn-y-bryn-caled 7			stone grog	1	1
1	Four Crosses 2	not local	local	stone	1	1
1	Stackpole Warren 90		local	stone	1	1
1	Stackpole Warren 94		local	stone	1	1
1	Pentre Ifan 1		local	stone	1	1
6	Bryn Celli Wen 14		local	2 types of stone, grog	2	1
4	Bryn Celli Wen 1		local	stone	1	5
15	Gwernvale 18	local	1 week	stone	1	5
15	Gwernvale 21	local	1 week	stone	1	5
15	Daylight Rock Fissure 1		1 day	stone	1	5
12	Bryn Celli Wen 13		1 day	2 types of stone	7	1

group	vessel	clay source	inclusion source	inclusions used	size	texture
14	Bryn yr Hen Bobl 13		local	stone, grog	2	1
14	Bryn yr Hen Bobl 14		local	stone, grog	2	1
14	Penywyrlod 2		local	stone grog	2	1
19	Llugwy 4		1 day	shell	1	3
20	Llugwy 5		1 day	shell	7	3
20	Clegyr Boia 9		1 day	shell	7	3
20	Clegyr Boia 13		1 day	shell	7	3
20	Clegyr Boia 33		1 day	shell	7	3
21	Llugwy 6		1 day	shell, grog	3	2
21	Sarn-y-bryn-caled 8			shell grog	3	2
26	Gwernvale 1	local	local	stone plant grog	5	4
26	Gwernvale 2	local	local	stone plant grog	5	4
26	Gwernvale 3	local	local	stone plant grog	5	4
26	Gwernvale 4	local	local	stone plant grog	5	4
26	Gwernvale 5	local	local	stone plant grog	5	4
26	Gwernvale 6	local	local	stone plant grog	5	4
26	Gwernvale 27	local	local	stone plant grog	5	4
26	Gwernvale 31	local	local	stone plant grog	5	4
27	Gwernvale 7	local	local	plant	2	4
27	Gwernvale 8	local	local	plant	2	4
27	Gwernvale 9	local	local	plant	2	4
27	Gwernvale 23	local	local	plant	2	4
27	Gwernvale 25	local	local	plant	2	4
28	Gwernvale 10	local	local	plant	3	5
28	Gwernvale 11	local	local	plant	3	5
28	Gwernvale 12	local	local	plant	3	5
28	Gwernvale 13	local	local	plant	3	5
28	Gwernvale 14	local	local	plant	3	5
28	Gwernvale 15	local	local	plant	3	5
28	Gwernvale 16	local	local	plant	3	5
28	Gwernvale 19	local	local	plant	3	5
28	Gwernvale 20	local	local	plant	3	5
28	Gwernvale 22	local	local	plant	3	5
28	Gwernvale 29	local	local	plant	3	5
34	Mynydd Troed 1		local	stone	5	1
34	Usk 9		local	stone	5	1
34	Ogmore 31		local	stone	5	1
34	Ogmore 34		local	stone	5	1
34	Clegyr Boia 15			stone	5	1
29	Stackpole Warren 15		1 day	stone	5	1
29	Stackpole Warren 52		1 day	stone	5	1
29	Stackpole Warren 56		1 day	stone	5	1
29	Stackpole Warren 130		1 day	stone	5	1
31	Mynydd Troed 2		1 week	stone	8	1
40	Usk 3		1 day	shell stone	3	4
48	Usk 7		1 day	shell stone	5	1
48	Usk 8		1 day	shell stone	5	1
48	Ty Isaf 3		1 week	shell stone	5	2
49	Usk 1		1 day	shell stone	7	1
50	Y Gaer, Gwernyfed 1		1 week	shell stone	7	3
50	Usk 4		1 day	shell stone	7	4
54	Usk 10		1 day	shell stone	8	1
18	Penywyrlod 1		1 week	shell	3	5
51	Usk 2		local	2 types of stone	3	1

group	vessel	clay source	inclusion source	inclusions used	size	texture
32	Dyffryn Ardudwy A		local	charcoal?	3	3
32	Dyffryn Ardudwy C		local	charcoal?	3	3
46	Dyffryn Ardudwy B		local	charcoal?	5	3
46	Dyffryn Ardudwy E		local	charcoal?	5	3
54	Dyffryn Ardudwy D		local	charcoal?	9	3
55	Dyffryn Ardudwy F		1 day	stone	6	1
55	Dyffryn Ardudwy G		1 day	stone	6	1
55	Dyffryn Ardudwy H		1 day	stone	6	1
35	Ogmore 28		local	stone	6	1
35	Carreg Samson 1		local	stone	6	1
56	Dyffryn Ardudwy J		1 day	shell 2 types of stone	6	2
33	Ogmore 14		local	stone	4	1
33	Ogmore 22		local	stone	4	1
33	Ogmore 23		local	stone	4	1
33	Ogmore 27		local	stone	4	1
36	Ogmore 26		local	stone	9	1
37	Ogmore 10		local	shell	2	1
38	Ogmore 5		local	shell	7	5
39	Ogmore 3		local	shell, stone	4	2
39	Ogmore 4		local	shell, stone	4	2
40	Ogmore 24		local	shell, stone	3	3
41	Ogmore 9		local	shell, stone, grog	2	2
42	Mount Pleasant, Nottage 7		local	grog	1	3
43	Mount Pleasant, Nottage 9		local	grog	2	1
43	Sant-y-Nyll 1		local	grog	2	1
43	Ysgwennant 1		local	grog	2	1
44	Sant-y-Nyll 3		local	grog	2	3
44	Sant-y-Nyll 4		local	grog	2	3
44	Trelystan 9	1 week	local	grog	2	3
45	Sant-y-Nyll 2		local	grog	3	1
47	Tinkinswood 4		1 day	shell	5	1
30	Ogmore 40		local	shell	5	5
30	Mount Pleasant, Nottage 1		1 day	shell	5	5
30	Mount Pleasant, Nottage 2		1 day	shell	5	5
30	Mount Pleasant, Nottage 3		1 day	shell	5	5
30	Mount Pleasant, Nottage 4		1 day	shell	5	5
30	Mount Pleasant, Nottage 5		1 day	shell	5	5
30	Mount Pleasant, Nottage 8		1 day	shell	5	5
30	Nanna's Cave 1		local	shell	5	5
30	Potter's Cave 1		local	shell	5	5
53	Breidden 36a	not local	not local	3 types of stone	1	5
53	Breidden 37	not local	not local	2 types of stone	1	5
	Four Crosses 1	1 week	local	stone		
	Four Crosses 2	1 week				
61	Clegyr Boia 16			none		
57	Clegyr Boia 35			stone	5	3
58	Clegyr Boia 30		1 day	stone	3	2

group	vessel	clay source	inclusion source	inclusions used	size	texture
58	Clegyr Boia 42			stone	3	2
59	Clegyr Boia 34			stone	3	4
60	Clegyr Boia 22		1 day	shell	8	5

B.2 Construction

group	vessel	clay	rim	body	base	neck	rim moulding	lugs
9	Din Dryfol 1	70	1	1	1	0	none	none
9	Clegyr Boia 17	60	1	1	1	0	none	none
9	Nanna's Cave 1	60	1	1	1	0	none	none
9	Nanna's Cave 2	60	1	1	1	0	none	none
9	Clegyr Boia 12	70	1	1	1	0	none	none
9	Clegyr Boia 14	70	1	1	1	0	none	none
9	Clegyr Boia 13	80	1	1	1	0	none	none
9	Clegyr Boia 18	80	1	1	1	0	none	none
9	Clegyr Boia 16	100	1	1	1	0	none	none
9	Clegyr Boia 20		1	1	1	0	none	none
9	Clegyr Boia 22		1	1	1	0	none	none
9	Breidden 36a		1	1	1	0	none	none
9	Tinkinswood 3	60	1	1	1	0	none	none
21	Gwernvale 10	70	1	2	1	0	none	none
21	Gwernvale 12	70	1	2	1	0	none	none
21	Gwernvale 13	70	1	2	1	0	none	none
21	Dyffryn Ardudwy E	60	1	2	1	0	none	none
21	Clegyr Boia 2		1	2	1	0	none	none
21	Clegyr Boia 3	60	1	2	1	0	none	none
21	Clegyr Boia 7		1	2	1	0	none	none
21	Clegyr Boia 15	70	1	2	1	0	none	none
21	Clegyr Boia 11	80	1	2	1	0	none	none
21	Pentre Ifan 1	60	1	2	1	0	none	none
20	Trefignath J	70	1	3	1	0	none	none
20	Trefignath L	90	1	3	1	0	none	none
20	Trefignath M	80	1	3	1	0	none	none
20	Clegyr Boia 26	90	1	3	1	0	none	none
20	Penywyrlod 1	70	1	3	1	0	none	none
19	Trefignath D	80	1	2	3	0	none	none
9/19/10/21	Bryn yr Hen Bobl 3	70	1				none	none
9/19/10/21	Llugwy 3	70	1				none	none
9/19/10/21	Trefignath W	80	1				none	none
9/19/10/21	Pant y Saer 5	80	1				none	none
9/19/10/21	Trefignath Q	60	1				none	none
9/19/10/21	Gwernvale 9	50	1				none	none
9/19/10/21	Ty Isaf 6	70	1				none	none
9/19/10/21	Ty Isaf 13	70	1				none	none
9/19/10/21	Usk 1	70	1				none	none
9/19/10/21	Ysgwennant 1	90	1				none	none
9/19/10/21	Clegyr Boia 4	60	1				none	none
9/19/10/21	Clegyr Boia 19		1				none	none
9/19/10/21	Clegyr Boia 32	70	1				none	none
1	Potter's Cave 1	80	1	1	1	0	rounded	none
2	Gwernvale 28	90	1	2	1	0	angular	none
3	Gwernvale 25	50	1	3	1	0	rounded	none
15	Gwernvale 1	80	1	2	1	2	rounded	none
16	Trefignath E	80	2	3	1	0	none	none
16	Dyffryn Ardudwy A	70	2	3	1	0	none	none
16	Dyffryn Ardudwy B	60	2	3	1	0	none	none
16	Dyffryn Ardudwy C	70	2	3	1	0	none	none
16	Breidden 37	40	2	3	1	0	none	none
16	Clegyr Boia 1	60	2	3	1	0	none	none
16	Clegyr Boia 6	70	2	3			none	none
5	Llugwy 4	60	2	4	1	0	none	none
5	Ty Isaf 2	70	2	4	1	0	none	none
5	Gwernvale 11	70	2	4	1	0	none	none
5	Four Crosses 1		2	4	1	0	none	none
5	Clegyr Boia 29	60	2	4	1	0	none	none

group	vessel	clay	rim	body	base	neck	rim moulding	lugs
5/16	Pant y Saer 3	80	2				none	none
5/16	Llugwy 7	60	2				none	none
5/16	Gwernvale 8	50	2				none	none
5/16	Clegyr Boia 33	80	2				none	none
5/16	Clegyr Boia 34	80	2				none	none
5/16	Clegyr Boia 21	70	2				none	none
5/16	Clegyr Boia 5	70	2				none	none
5/16	Clegyr Boia 31	70	2				none	none
23	Ty Isaf 4	60	2	4	1	0	none	plain
49	Four Crosses 2		2	2	1	0	angular	none
17	Gwernvale 26	50	2	4	1	0	angular	none
17/49	Ogmore 16	70	2				angular	
24	Sarn-y-bryn-caled 1	70	2	4	1	0	rounded	none
24	Sarn-y-bryn-caled 2	70	2	4				none
?24	Clegyr Boia 23	70	2				rounded	none
?24	Sarn-y-bryn-caled 5	70	2				rounded	none
?24	Ty Isaf 12	70	2				rounded	none
?24	Parc le Breos Cwm 1		2				rounded	none
25	Usk 3	60	3	5	1	0	none	none
25	Usk 8	70	3	5	1	0	none	none
18	Trefignath B	80	3	4			angular	none
26	Ogmore 15	60	3	5	1	0	angular	none
11	Bryn yr Hen Bobl 9	70	3	6	3	0	angular	none
11	Bryn yr Hen Bobl 10	70	3	6	3	0	angular	none
11/18/26	Bryn yr Hen Bobl 12	80	3				angular	none
11/18/26	Castell Bryn Gwyn 2	80	3				angular	none
8	Bryn yr Hen Bobl 1	70	3	5	1	0	rounded	plain
?8	Bryn Celli Wen 13	60	3				rounded	none
14	Trefignath U	80	4	1	1	0	none	none
14	Bryn Celli Wen 1	70	4	1	1	0	none	none
14	Clegyr Boia 24		4	1	1	0	none	none
14	Clegyr Boia 43	70	4	1	1	0	none	none
14	Clegyr Boia 44		4	1	1	0	none	none
27	Mynydd Troed 1	70	4	2	1	0	none	none
27	Gwernvale 20	70	4	2	1	0	none	none
27	Dyffryn Ardudwy D	90	4	2	1	0	none	none
27	Clegyr Boia 41	70	4	2	1	0	none	none
27	Clegyr Boia 42	70	4	2	1	0	none	none
27	Carreg Samson 1		4	2	1	0	none	none
27	Sant-y-Nyll 4	70	4	2			none	none
28	Trelystan 17	70	4	2	3	0	none	none
29	Mount Pleasant 2	60	4	4	1	0	none	none
30	Trelystan 5	60	4	4	3	0	none	none
14/27/28/	Trefignath N	80	4				none	none
29/30	Llugwy 1	60	4				none	none
"	Stackpole Warren 130		4				none	none
"	Stackpole Warren 94		4				none	none
22	Clegyr Boia 25		4	1	1	0	angular	none
22	Clegyr Boia 30	60	4	1	1	0	angular	none
10	Bryn yr Hen Bobl 6	70	4				angular	none

group	vessel	clay	rim	body	base	neck	rim moulding	lugs
31	Clegyr Boia 28	80	4	1	1	0	rounded	none
31	Y Gaer, Gwernyfed 1	60	4	1	1	0	rounded	none
32	Stackpole Warren 56		4	2	1	0	rounded	none
33	Nanna's Cave 3	60	4	3	1	6	rounded	none
34	Ty Isaf 9	70	5	3	1	0	none	none
34	Trelystan 6	60	5	3	1	0	none	none
35	Mount Pleasant 1	60	5	4	1	0	none	none
35	Mount Pleasant 8	60	5	4		0	none	none
34/35	Mount Pleasant 6	80	5				none	none
34/35	Mount Pleasant 4	60	5		1		none	none
34/35	Mount Pleasant 5	60	5		1		none	none
34/35	Sarn-y-bryn-caled 7	70	5				none	none
?6	Sant-y-Nyll 1	80	5	4	1	0	none	vertical
6	Ty Isaf 1	60	5	4	1	0	none	plain
?6	Pant y Saer 7	60	5				none	plain
39	Daylight Rock 1	90	5	2	1	0	angular	none
40	Clegyr Boia 27	80	5	3	1	0	angular	none
12	Trefignath A	70	5	2	3	0	angular	none
12	Trefignath C	70	5	2	3	0	angular	none
36	Ty Isaf 3	60	5	2	1	0	rounded	none
4	Pant y Saer 1	60	5	3	1	0	rounded	none
4	Ty Isaf 10	60	5	3	1	0	rounded	none
4	Ty Isaf 11	70	5	3	1	0	rounded	none
4	Ty Isaf 5	80	5	3	1	0	rounded	none
37	Abergavenny 1		5	4	1	0	rounded	none
36/4/37	Pant y Saer 2	60	5				rounded	none
36/4/37	Llugwy 2	60	5				rounded	none
38	Ty Isaf 7	60	5	4	1	0	rounded	plain
45	Dyffryn Ardudwy F	60	6	6	2	0	none	none
45	Dyffryn Ardudwy G	60	6	6	2	0	none	none
42	Trelystan 3	60	6	6	3	0	none	none
?42	Gwernvale 18	60	6				none	none
?42	Sant-y-Nyll 2	70	6				none	none
41	Ogmore 9	60	6	3	1	2	angular	none
50	Dyffryn Ardudwy J	60	6	6	3	0	rounded	none
43	Ogmore 3	60	7				none	none
43	Mount Pleasant 7	60	7				none	none
13	Mount Pleasant 3	60	7	1	1	0	angular	none
13	Trefignath G	70	7				angular	none
44	Sant-y-Nyll 3	70	8	3	1	0	none	none
51	Stackpole Warren 15		8	5	1	0	none	none
46	Cefn Cilsanws 1	70	8			2	none	none
46	Ogmore 11	90	8			2	none	none
7	Trefignath H	60	9	5	1	0	none	none

group	vessel	clay	rim	body	base	neck	rim moulding	lugs
7	Clegyr Boia 37	60	9	5	1	0	none	none
7	Clegyr Boia 35	70	9	5	1	0	none	none
7	Clegyr Boia 40	80	9	5	1	0	none	none
47	Trelystan 2	60	9	6	3	0	none	none
7/47	Clegyr Boia 36	70	9				none	none
7/47	Trelystan 15	60	9				none	none
7/47	Ogmore 26	60	9				none	none
7/47	Ogmore 27	60	9				none	none
7/47	Ogmore 31	60	9				none	
7/47	Ogmore 25	60	9				none	none
48	Ogmore 23	80	9	5	1	3	angular	none
	Ffostyll 1	60			1			
	Usk 9	60		3	1			none
	Gwernvale 2	80					rounded	none
	Gwernvale 3	80					rounded	none
	Gwernvale 27	80					rounded	none
	Gwernvale 7	50					rounded	none
	Gwernvale 30	50					rounded	none
	Tinkinswood 4	60					rounded	
	Tinkinswood 1	60					rounded	none
	Ogmore 22	80					rounded	
	Ogmore 17	70					angular	
	Mount Pleasant 9	70					angular	
	Ogmore 19	90					angular	
	Ogmore 28	90					angular	
	Clegyr Boia 9	70						curved
	Clegyr Boia 10	80						curved
	Clegyr Boia 8	70						plain
	Gwernvale 4	80					unknown	plain

B.3 Decoration

group	vessel	surface	state	tools	change	clay	unified
1	bb12	changed	plastic	plants	combined	pushed aside	divded
1	tfG	changed	plastic	plants	combined	pushed aside	divided
1	ab1	changed	plastic	plants	combined	pushed aside	divided
1	gv28	changed	plastic	plants	combined	pushed aside	divided
1	daH	changed	plastic	plants	combined	pushed aside	divided
1	og2	changed	plastic	plants	combined	pushed aside	divided
1	og3	changed	plastic	plants	combined	pushed aside	divided
1	og4	changed	plastic	plants	combined	pushed aside	divided
1	mp7	changed	plastic	plants	combined	pushed aside	divided
1	og12	changed	plastic	plants	combined	pushed aside	divided
1	og13	changed	plastic	plants	combined	pushed aside	divided
1	og14	changed	plastic	plants	combined	pushed aside	divided
1	bb5	changed	plastic	plants	combined	pushed aside	divided
1	tfB	changed	plastic	plants	combined	pushed aside	divided
1	uk9	changed	plastic	plants	combined	pushed aside	divided
1	og11	changed	plastic	plants	combined	pushed aside	divided
2	tfK	changed	plastic, drying	plants, stones	combined no change	pushed aside	divided
3	bb1	changed	plastic	plants	combined	pushed aside	unified
3	og5	changed	plastic	plants	combined	pushed aside	unified
3	og7	changed	plastic	plants	combined	pushed aside	unified
3	bn37	changed	plastic	plants	combined	pushed aside	unified
4	bb4	changed	plastic	animals	no change	pushed aside	divided
4	ll7	changed	plastic	animals	no change	pushed aside	divided
4	cc1	changed	plastic	animals	no change	pushed aside	divided
4	og15	changed	plastic	animals	no change	pushed aside	divided
4	og16	changed	plastic	animals	no change	pushed aside	divided
4	og24	changed	plastic	animals	no change	pushed aside	divided
4	og25	changed	plastic	animals	no change	pushed aside	divided
4	og33	changed	plastic	animals	no change	pushed aside	divided
4	og17	changed	plastic	animals	no change	pushed aside	divided
4	og18	changed	plastic	animals	no change	pushed aside	divided
4	og19	changed	plastic	animals	no change	pushed aside	divided
4	og20	changed	plastic	animals	no change	pushed aside	divided
4	og26	changed	plastic	animals	no change	pushed aside	divided
4	og27	changed	plastic	animals	no change	pushed aside	divided
4	og28	changed	plastic	animals	no change	pushed aside	divided
4	og30	changed	plastic	animals	no change	pushed aside	divided
4	og31	changed	plastic	animals	no change	pushed aside	divided
4	og32	changed	plastic	animals	no change	pushed aside	divided
4	og35	changed	plastic	animals	no change	pushed aside	divided
4	og36	changed	plastic	animals	no change	pushed aside	divided
4	og39	changed	plastic	animals	no change	pushed aside	divided
4	og41	changed	plastic	animals	no change	pushed aside	divided
4	og42	changed	plastic	animals	no change	pushed aside	divided
4	og34	changed	plastic	animals	no change	pushed aside	divided
6	cb25	changed	drying	stones	modified	removed	divided
6	sw94	changed	drying	stones	modified	removed	divided
6	ll6	changed	drying	stones	modified	removed	divided
6	sc8	changed	drying	stones	modified	removed	divided
6	ts5	changed	drying	stones	modified	removed	divided
6	ts9	changed	drying	stones	modified	removed	divided
6	sc3	changed	drying	stones	modified	removed	divided
7	cg3	changed	plastic	animals	modified	pushed aside	divided
7	cc2	changed	plastic	animals	modified	pushed aside	divided
7	bb13	changed	plastic	animals	modified	pushed aside	divided
7	mp1	changed	plastic	animals	modified	pushed aside	divided
7	mp2	changed	plastic	animals	modified	pushed aside	divided
7	mp8	changed	plastic	animals	modified	pushed aside	divided
7	mp9	changed	plastic	animals	modified	pushed aside	divided
7	ts7	changed	plastic	animals	modified	pushed aside	divided
8	dd1	changed	drying	stones	no change	pushed aside	unified
8	ps5	changed	drying	stones	no change	pushed aside	unified

group	vessel	surface	state	tools	change	clay	unified
8	ti4	changed	drying	stones	no change	pushed aside	unified
8	ti5	changed	drying	stones	no change	pushed aside	unified
8	ti6	changed	drying	stones	no change	pushed aside	unified
8	ti13	changed	drying	stones	no change	pushed aside	unified
8	daD	changed	drying	stones	no change	pushed aside	unified
8	sc7	changed	drying	stones	no change	pushed aside	unified
8	yt1	changed	drying	stones	no change	pushed aside	unified
8	cb1	changed	drying	stones	no change	pushed aside	unified
8	cb6	changed	drying	stones	no change	pushed aside	unified
8	cb17	changed	drying	stones	no change	pushed aside	unified
8	cb28	changed	drying	stones	no change	pushed aside	unified
8	cb32	changed	drying	stones	no change	pushed aside	unified
8	cb37	changed	drying	stones	no change	pushed aside	unified
8	cb42	changed	drying	stones	no change	pushed aside	unified
8	cb43	changed	drying	stones	no change	pushed aside	unified
8	cs1	changed	drying	stones	no change	pushed aside	unified
10	bc14	changed	plastic	animals plants	no change combined	pushed aside	divided
10	og23	changed	plastic	animals plants	no change combined	pushed aside	divided
10	yt2	changed	plastic	animals plants	no change combined	pushed aside	divided
10	sc2	changed	plastic	animals plants	no change combined	pushed aside	divided
10	fc2	changed	plastic	animals plants	no change combined	pushed aside	divided
12	tfQ	changed	plastic	plants	modified	pushed aside	divided
12	gv4	changed	plastic	plants	modified	pushed aside	divided
12	gv20	changed	plastic	plants	modified	pushed aside	divided
12	sw56	changed	plastic	plants	modified	pushed aside	divided
14	tfF	changed	plastic	plants	no change	pushed aside	unified
14	gv2	changed	plastic	plants	no change	pushed aside	unified
14	gv7	changed	plastic	plants	no change	pushed aside	unified
14	gv10	changed	plastic	plants	no change	pushed aside	unified
14	gv11	changed	plastic	plants	no change	pushed aside	unified
14	gv13	changed	plastic	plants	no change	pushed aside	unified
14	gv14	changed	plastic	plants	no change	pushed aside	unified
14	gv15	changed	plastic	plants	no change	pushed aside	unified
14	gv19	changed	plastic	plants	no change	pushed aside	unified
14	gv21	changed	plastic	plants	no change	pushed aside	unified
14	gv25	changed	plastic	plants	no change	pushed aside	unified
16	bb9	changed	plastic	body, plants	no change combined	pushed aside	divded
16	bb10	changed	plastic	body, plants	no change combined	pushed aside	divded
16	tfA	changed	plastic	body, plants	no change, combined	pushed aside	divided
16	tfC	changed	plastic	body, plants	no change, combined	pushed aside	divided
16	sc5	changed	plastic	body plants	no change combined	pushed aside	divided
18	cg2	changed	plastic	body	no change	pushed aside	divided
18	cb35	changed	plastic	body	no change	pushed aside	divided
18	og10	changed	plastic	body	no change	pushed aside	
18	sw90	changed	plastic	body	no change	pushed aside	divded
23	og9	changed	plastic	body animals	no change	pushed aside	divided
23	og21	changed	plastic	body animals	no change	pushed aside	divided
23	og22	changed	plastic	body animals	no change	pushed aside	divided
23	sc1	changed	plastic	body animals	no change	pushed aside	divided
23	dr1	changed	plastic	body animals	no change	pushed aside	divided
24	mp3	changed	plastic	body animals	no change modified	pushed aside	divided
27	mp4	changed	plastic	stones	modified	pushed aside	divided
30	mt2	changed	drying	plants	modified	pushed aside	divided
32	ts2	changed	plastic	stones	modified	removed	unified
33	ts1	changed	plastic	body	no change	pushed aside added	divided

group	vessel	surface	state	tools	change	clay	unified
33	ts16	changed	plastic	body	no change	pushed aside added	divided
34	ts3	changed	plastic	animals stones	modified	removed pushed aside	divided
36	ts6	changed	drying	stones	modified	removed	unified
36	ts17	changed	drying	stones	modified	removed	unified
37	ts8	changed	drying	stones	modified	removed added	divided
5	bb14	changed	drying	plants, stones	modified	removed, pushed aside	divided
9	gv26	changed	plastic	plants animals	combined modified	pushed aside	divided
13	daA	changed	drying	stones	no change	pushed aside	divided
13	daB	changed	drying	stones	no change	pushed aside	divided
15	daC	changed	plastic	plants	modified	pushed aside	unified
15	fc1	changed	plastic	plants	modified	pushed aside	unified
17	daF	changed	plastic	animals	modified	removed	divided
17	daG	changed	plastic	animals	modified	removed	divided
19	daJ	changed	plastic	body animals stones	no change modified	removed pushed aside	divided
20	cb31	changed	drying	animals	modified	pushed aside	divided
11	cb2	unchanged					unified
11	cb3	unchanged					unified
11	cb4	unchanged					unified
11	cb5	unchanged					unified
11	cb7	unchanged					unified
11	cb11	unchanged					unified
11	cb12	unchanged					unified
11	cb13	unchanged					unified
11	cb14	unchanged					unified
11	cb15	unchanged					unified
11	cb16	unchanged					unified
11	cb18	unchanged					unified
11	cb19	unchanged					unified
11	cb20	unchanged					unified
11	cb21	unchanged					unified
11	cb22	unchanged					unified
11	cb23	unchanged					unified
11	cb24	unchanged					unified
11	cb26	unchanged					unified
11	cb27	unchanged					unified
11	cb29	unchanged					unified
11	cb30	unchanged					unified
11	cb33	unchanged					unified
11	cb34	unchanged					unified
11	cb36	unchanged					unified
11	cb38	unchanged					unified
11	cb39	unchanged					unified
11	cb40	unchanged					unified
11	cb41	unchanged					unified
11	cb44	unchanged					unified
11	nc1	unchanged					unified
11	nc2	unchanged					unified
11	nc3	unchanged					unified
11	pc1	unchanged					unified
11	sw15	unchanged					unified
11	sw52	unchanged					uniied
11	sw130	unchanged					unified
11	pi1	unchanged					unified
11	bn36a	unchanged					unified
11	tw1	unchanged					unified
11	tw2	unchanged					unified

group	vessel	surface	state	tools	change	clay	unified
11	tw3	unchanged					unified
11	mp5	unchanged					unified
11	mp6	unchanged					unified
11	sn1	unchanged					unified
11	sn2	unchanged					unified
11	sn3	unchanged					unified
11	sn4	unchanged					unified
11	daE	unchanged					unified
11	cc3	unchanged					unified
11	gg1	unchanged					unified
11	mt1	unchanged					unified
11	pw1	unchanged					unified
11	pw2	unchanged					unified
11	ti1	unchanged					unified
11	ti2	unchanged					unified
11	ti3	unchanged					unified
11	ti7	unchanged					unified
11	ti9	unchanged					unified
11	ti10	unchanged					unified
11	ti11	unchanged					unified
11	ti12	unchanged					unified
11	uk1	unchanged					unified
11	uk2	unchanged					unified
11	uk3	unchanged					unified
11	uk4	unchanged					unified
11	uk7	unchanged					unified
11	uk8	unchanged					unified
11	uk10	unchanged					unified
11	gv1	unchanged					unified
11	gv3	unchanged					unified
11	gv5	unchanged					unified
11	gv6	unchanged					unified
11	gv8	unchanged					unified
11	gv9	unchanged					unified
11	gv12	unchanged					unified
11	gv16	unchanged					unified
11	gv17	unchanged					unified
11	gv18	unchanged					unified
11	gv22	unchanged					unified
11	gv23	unchanged					unified
11	gv24	unchanged					unified
11	bc1	unchanged					unified
11	bc3	unchanged					unified
11	bc5	unchanged					unified
11	bc6	unchanged					unified
11	bc7	unchanged					unified
11	bc10	unchanged					unified
11	bb3	unchanged					unified
11	bb6	unchanged					unified
11	bb7	unchanged					unified
11	bb8	unchanged					unified
11	cg1	unchanged					unified
11	ll1	unchanged					unified
11	ll3	unchanged					unified
11	ll4	unchanged					unified
11	ll5	unchanged					unified
11	ll8	unchanged					unified
11	ll9	unchanged					unified
11	ps1	unchanged					unified
11	ps2	unchanged					unified
11	ps3	unchanged					unified
11	ps4	unchanged					unified
11	ps6	unchanged					unified
11	ps7	unchanged					unified
11	ps8	unchanged					unified
11	tfD	unchanged					unified
11	tfE	unchanged					unified
11	tfH	unchanged					unified
11	tfJ	unchanged					unified
11	tfL	unchanged					unified
11	tfM	unchanged					unified
11	tfN	unchanged					unified

group	vessel	surface	state	tools	change	clay	unified
11	tfR	unchanged					unified
11	tf265	unchanged					unified
11	tf439	unchanged					unified
11	tfU	unchanged					unified
11	tfV	unchanged					unified
11	pb1	unchanged					unified

B.4 Firing

Group	Vessel	Main Fuel	Time
1	Bryn Celli Wen 5	dung	short
1	Bryn Celli Wen 6	dung	short
1	Bryn yr Hen Bobl 4	dung	short
1	Bryn yr Hen Bobl 9	dung	short
1	Bryn yr Hen Bobl 10	dung	short
1	Bryn yr Hen Bobl 13	dung	short
1	Llugwy 9	dung	short
1	Pant y Saer 1	dung	short
1	Pant y Saer 2	dung	short
1	Pant y Saer 6	dung	short
1	Trefignath A	dung	short
1	Trefignath C	dung	short
1	Trefignath N	dung	short
1	Trefignath Q	dung	short
1	Trefignath 265	dung	short
1	Trefignath 439	dung	short
1	Trefignath U	dung	short
1	Trefignath V	dung	short
1	Mynydd Troed 1	dung	short
1	Penywyrlod 1	dung	short
1	Penywyrlod 2	dung	short
1	Ty Isaf 9	dung	short
1	Gwernvale 2	dung	short
1	Gwernvale 5	dung	short
1	Gwernvale 7	dung	short
1	Gwernvale 11	dung	short
1	Gwernvale 14	dung	short
1	Gwernvale 19	dung	short
1	Gwernvale 23	dung	short
1	Gwernvale 24	dung	short
1	Gwernvale 29	dung	short
	Dyffryn Ardudwy B	dung	short
	Dyffryn Ardudwy C	dung	short
	Dyffryn Ardudwy D	dung	short
	Dyffryn Ardudwy E	dung	short
	Dyffryn Ardudwy F	dung	short
	Dyffryn Ardudwy G	dung	short
1	Ogmore 2	dung	short
1	Ogmore 5	dung	short
1	Ogmore 7	dung	short
1	Ogmore 9	dung	short
1	Ogmore 10	dung	short
1	Ogmore 12	dung	short
1	Ogmore 13	dung	short
1	Ogmore 14	dung	short
1	Ogmore 19	dung	short
1	Ogmore 20	dung	short
1	Ogmore 21	dung	short
1	Ogmore 22	dung	short
1	Ogmore 25	dung	short
1	Sarn-y-bryn-caled 1	dung	short
1	Sarn-y-bryn-caled 7	dung	short
1	Clegyr Boia 4	dung	short
1	Clegyr Boia 9	dung	short
1	Clegyr Boia 14	dung	short
1	Clegyr Boia 27	dung	short
1	Clegyr Boia 30	dung	short
1	Clegyr Boia 36	dung	short
1	Clegyr Boia 41	dung	short
1	Stackpole Warren 90	dung	short
1	Stackpole Warren 94	dung	short
2	Bryn Celli Wen 1	dung	moderate
2	Bryn yr Hen Bobl 12	dung	moderate
2	Bryn yr Hen Bobl 14	dung	moderate
2	Trefignath B	dung	moderate
2	Llugwy 3	dung	moderate
2	Castell Bryn Gwyn 3	dung	moderate
2	Y Gaer, Gwernyfed 1	dung	moderate

Group	Vessel	Main Fuel	Time
2	Mynydd Troed 2	dung	moderate
2	Onllwyn 1	dung	moderate
2	Usk 3	dung	moderate
2	Usk 4	dung	moderate
2	Gwernvale 1	dung	moderate
2	Gwernvale 6	dung	moderate
2	Gwernvale 9	dung	moderate
2	Gwernvale 12	dung	moderate
2	Gwernvale 13	dung	moderate
2	Gwernvale 15	dung	moderate
2	Gwernvale 16	dung	moderate
2	Gwernvale 17	dung	moderate
2	Gwernvale 22	dung	moderate
2	Dyffryn Ardudwy J	dung	moderate
2	Sant-y-Nyll 1	dung	moderate
2	Ogmore 15	dung	moderate
2	Ogmore 16	dung	moderate
2	Ogmore 17	dung	moderate
2	Ogmore 26	dung	moderate
2	Ogmore 28	dung	moderate
2	Ogmore 30	dung	moderate
2	Ogmore 31	dung	moderate
2	Ogmore 34	dung	moderate
2	Ogmore 35	dung	moderate
2	Ogmore 39	dung	moderate
2	Ogmore 41	dung	moderate
2	Ogmore 42	dung	moderate
2	Parc le Breos Cwm 1	dung	moderate
2	Tinkinswood 1	dung	moderate
2	Tinkinswood 2	dung	moderate
2	Tinkinswood 3	dung	moderate
2	Tinkinswood 4	dung	moderate
2	Trelystan 17	dung	moderate
2	Ysgwennant 2	dung	moderate
2	Clegyr Boia 3	dung	moderate
2	Clegyr Boia 12	dung	moderate
2	Clegyr Boia 26	dung	moderate
2	Clegyr Boia 35	dung	moderate
2	Nanna's Cave 2	dung	moderate
2	Pentre Ifan 1	dung	moderate
3	Bryn Celli Wen 2	dung	long
3	Bryn Celli Wen 7	dung	long
3	Bryn Celli Wen 9	dung	long
3	Bryn Celli Wen 10	dung	long
3	Bryn Celli Wen 11	dung	long
3	Llugwy 1	dung	long
3	Llugwy 2	dung	long
3	Llugwy 6	dung	long
3	Llugwy 8	dung	long
3	Castell Bryn Gwyn 2	dung	long
3	Abergavenny 1	dung	long
3	Usk 7	dung	long
3	Gwernvale 3	dung	long
3	Gwernvale 8	dung	long
3	Gwernvale 10	dung	long
3	Gwernvale 26	dung	long
3	Gwernvale 30	dung	long
	Dyffryn Ardudwy H	dung	long
3	Ogmore 18	dung	long
3	Ogmore 24	dung	long
3	Ogmore 27	dung	long
3	Ogmore 32	dung	long
3	Ogmore 33	dung	long
3	Ogmore 36	dung	long
3	Mount Pleasant 7	dung	long
3	Mount Pleasant 9	dung	long
3	Sarn-y-bryn-caled 2	dung	long
3	Four Crosses 1	dung	long
3	Carreg Samson 1	dung	long
4	Bryn Celli Wen 13	grass	short

Group	Vessel	Main Fuel	Time
5	Bryn Celli Wen 3	grass	long
5	Bryn Celli Wen 14	grass	long
5	Bryn yr Hen Bobl 1	grass	long
5	Bryn yr Hen Bobl 3	grass	long
5	Bryn yr Hen Bobl 5	grass	long
5	Bryn yr Hen Bobl 6	grass	long
5	Llugwy 4	grass	long
5	Llugwy 5	grass	long
5	Llugwy 7	grass	long
5	Pant y Saer 3	grass	long
5	Pant y Saer 5	grass	long
5	Pant y Saer 7	grass	long
5	Trefignath D	grass	long
5	Trefignath E	grass	long
5	Trefignath F	grass	long
5	Trefignath G	grass	long
5	Trefignath H	grass	long
5	Trefignath K	grass	long
5	Trefignath L	grass	long
5	Trefignath M	grass	long
5	Trefignath R	grass	long
5	Trefignath S	grass	long
5	Trefignath 145	grass	long
5	Trefignath 200	grass	long
5	Trefignath T	grass	long
5	Trefignath W	grass	long
5	Castell Bryn Gwyn 1	grass	long
5	Din Dryfol 1	grass	long
5	Din Dryfol 2	grass	long
5	Cefn Cilsanws 1	grass	long
5	Cefn Cilsanws 2	grass	long
5	Cefn Cilsanws 3	grass	long
5	Ffostyll 1	grass	long
5	Ty Isaf 1	grass	long
5	Ty Isaf 2	grass	long
5	Ty Isaf 3	grass	long
5	Ty Isaf 4	grass	long
5	Ty Isaf 5	grass	long
5	Ty Isaf 6	grass	long
5	Ty Isaf 7	grass	long
5	Ty Isaf 10	grass	long
5	Ty Isaf 11	grass	long
5	Ty Isaf 12	grass	long
5	Ty Isaf 13	grass	long
5	Usk 1	grass	long
5	Usk 2	grass	long
5	Usk 8	grass	long
5	Usk 9	grass	long
5	Usk 10	grass	long
5	Dyffryn Ardudwy A	grass	long
5	Sant-y-Nyll 2	grass	long
5	Sant-y-Nyll 4	grass	long
5	Ogmore 3	grass	long
5	Ogmore 4	grass	long
5	Ogmore 11	grass	long
5	Mount Pleasant 1	grass	long
5	Mount Pleasant 2	grass	long
5	Mount Pleasant 3	grass	long
5	Mount Pleasant 4	grass	long
5	Mount Pleasant 5	grass	long
5	Mount Pleasant 6	grass	long
5	Mount Pleasant 8	grass	long
5	Breidden 36a	grass	long
5	Breidden 37	grass	long
5	Trelystan 1	grass	long
5	Trelystan 2	grass	long
5	Trelystan 3	grass	long
5	Trelystan 5	grass	long
5	Trelystan 6	grass	long
5	Trelystan 7	grass	long
5	Trelystan 8	grass	long

Group	Vessel	Main Fuel	Time
5	Trelystan 9	grass	long
5	Trelystan 15	grass	long
5	Trelystan 16	grass	long
5	Sarn-y-bryn-caled 3	grass	long
5	Sarn-y-bryn-caled 5	grass	long
5	Sarn-y-bryn-caled 6	grass	long
5	Sarn-y-bryn-caled 8	grass	long
5	Ysgwennant 1	grass	long
5	Four Crosses 2	grass	long
5	Clegyr Boia 1	grass	long
5	Clegyr Boia 5	grass	long
5	Clegyr Boia 6	grass	long
5	Clegyr Boia 8	grass	long
5	Clegyr Boia 10	grass	long
5	Clegyr Boia 11	grass	long
5	Clegyr Boia 13	grass	long
5	Clegyr Boia 15	grass	long
5	Clegyr Boia 16	grass	long
5	Clegyr Boia 17	grass	long
5	Clegyr Boia 18	grass	long
5	Clegyr Boia 21	grass	long
5	Clegyr Boia 23	grass	long
5	Clegyr Boia 28	grass	long
5	Clegyr Boia 29	grass	long
5	Clegyr Boia 31	grass	long
5	Clegyr Boia 32	grass	long
5	Clegyr Boia 33	grass	long
5	Clegyr Boia 34	grass	long
5	Clegyr Boia 37	grass	long
5	Clegyr Boia 38	grass	long
5	Clegyr Boia 40	grass	long
5	Clegyr Boia 42	grass	long
5	Clegyr Boia 43	grass	long
5	Daylight Rock 1	grass	long
5	Nanna's Cave 1	grass	long
5	Nanna's Cave 3	grass	long
5	Potter's Cave 1	grass	long
5	Stackpole Warren 15	grass	long
5	Stackpole Warren 52	grass	long
5	Stackpole Warren 56	grass	long
5	Stackpole Warren 130	grass	long
6	Bryn yr Hen Bobl 7	wood	short
6	Bryn yr Hen Bobl 8	wood	short
	Gwernvale 4	wood	short
	Gwernvale 18	wood	short
	Gwernvale 21	wood	short
	Gwernvale 27	wood	short
6	Sant-y-Nyll 3	wood	short
6	Ogmore 23	wood	short
6	Ogmore 40	wood	short

B.5 Use

group	vessel	modified	transport	porosity	thermal	strength	size[1]	residue	oxide
1	bc1	no	local	v. porous	poor	moderate	XS	yes	
1	tfJ	no	1 day	v. porous	poor	moderate			
1	tw1	no		v. porous	poor	moderate			
2	ll8	no		v. porous	good	good			
2	gv7	no	local	v. porous	good	good			
2	gv8	no	local	v. porous	good	good			yes
2	gv9	no	local	v. porous	good	good			
2	gv23	no	local	v. porous	good	good			yes
2	gv25	no	local	v. porous	good	good	M		
2	ts7	no	local	v. porous	good	good			
2	cb33	no		v. porous	good	good			yes
6	bc13	no	1 day	v. porous	good	poor			
6	mp1	no		v. porous	good	poor	L		
6	mp2	no		v. porous	good	poor	L		yes
6	mp3	no		v. porous	good	poor	M		
6	mp4	no		v. porous	good	poor			yes
6	mp5	no		v. porous	good	poor			
6	mp8	no		v. porous	good	poor	S		yes
11	cg3	no		v. porous	moderate	poor			
11	ti3	no		v. porous	moderate	poor	S		
11	uk3	no		v. porous	moderate	poor			
11	uk8	no		v. porous	moderate	poor			
11	nc3	no	local	v. porous	moderate	poor	XS		
25	uk2	no		v. porous	moderate	moderate			
25	uk4	no		v. porous	moderate	moderate			yes
25	uk7	no		v. porous	moderate	moderate			
25	og23	no	local	v. porous	moderate	moderate	M	yes	
17	ps3	no		v. porous	good	moderate			
17	gg1	no		v. porous	good	moderate			
17	uk1	no		v. porous	good	moderate			yes
17	uk10	no		v. porous	good	moderate			
17	ts3	no		v. porous	good	moderate	M		
17	ts5	no		v. porous	good	moderate	S	yes	yes
18	ll3	no		v. porous	moderate	good			
18	bn36a	no	not local	v. porous	moderate	good	XS		
28	pw2	no		v. porous	poor	poor			
28	bn37	no	not local	v. porous	poor	poor	XS		
3	daD	perforated	local	porous	good	good	S		yes
3	cb16	perforated		porous	good	good	S		yes
4	bb8	no		porous	good	good			
4	tfL	no	1 day	porous	good	good		yes	
4	ll9	no		porous	good	good			yes
4	bc2	no	1 day	porous	good	good			
4	bc6	no	local	porous	good	good			
4	og5	no	local	porous	good	good			
4	mp6	no		porous	good	good			
4	yt1	no	local	porous	good	good			
4	cb28	no		porous	good	good	S		
4	cb11	no		porous	good	good	XS		yes
4	cb29	no		porous	good	good	XS		yes
4	cb13	no		porous	good	good			yes
4	cb26	no		porous	good	good			
4	cb22	no			good	good			

[1]Size Ranges:

Very Small (XS)	Small (S)	Medium (M)	Large (L)	Very Large (XL)
0 - 2.5 l	2.75 - 5.5 l	5.75 - 8.5 l	8.75 - 12.5 l	12.75 l -

group	vessel	modified	transport	porosity	thermal	strength	size	residue	oxide
4	mt2	no		porous	good	good		yes	yes
4	gv10	no	local	porous	good	good	S		
4	gv11	no	local	porous	good	good	M		
4	gv12	no	local	porous	good	good	XS		
4	gv13	no	local	porous	good	good	M		
4	gv14	no	local	porous	good	good			
4	gv15	no	local	porous	good	good			
4	gv16	no	local	porous	good	good			
4	gv19	no	local	porous	good	good			
4	gv20	no	local	porous	good	good	S		
4	gv22	no	local	porous	good	good			yes
4	gv29	no	local	porous	good	good			
27	daA	perforated	local	porous	good	moderate	M		
27	ti7	perforated		porous	good	moderate	S		
8	dd2	no		porous	good	moderate			
8	ps1	no		porous	good	moderate	L		yes
8	ps2	no		porous	good	moderate			yes
8	bb1	no		porous	good	moderate	M		
8	bb3	no		porous	good	moderate			
8	bb4	no		porous	good	moderate			
8	bb6	no		porous	good	moderate			
8	cg1	no		porous	good	moderate			
8	ll1	no		porous	good	moderate			
8	ll2	no		porous	good	moderate			
8	ll4	no		porous	good	moderate			yes
8	ll5	no		porous	good	moderate			yes
8	ll7	no		porous	good	moderate			yes
8	daB	no	local	porous	good	moderate	M	yes	yes
8	daC	no	local	porous	good	moderate	M		yes
8a	bc3	no	local	porous	good	moderate		yes	
8a	tfE	no	local	porous	good	moderate	M		yes
8b	tfT	no	1 day	porous	good	moderate			
8b	tfU	no	1 day	porous	good	moderate			yes
8b	tf200	no	1 day	porous	good	moderate			
8b	tfF	no	1 day	porous	good	moderate			
8	og40	no	local	porous	good	moderate			
8	pb1	no		porous	good	moderate			
8	tw3	no		porous	good	moderate			
8	tw4	no		porous	good	moderate			
8	sn3	no		porous	good	moderate	S		yes
8	sn4	no		porous	good	moderate			yes
8	ts4	no		porous	good	moderate			yes
8	ts6	no		porous	good	moderate	XS	yes	yes
8	ts8	no	local	porous	good	moderate		yes	yes
8	sc8	no		porous	good	moderate			
8	cb3	no		porous	good	moderate	L		
8	nc1	no	local	porous	good	moderate	L		
8	cb1	no		porous	good	moderate	M		yes
8	cb4	no		porous	good	moderate	M		
8	cb23	no		porous	good	moderate	M		yes
8	cb14	no		porous	good	moderate	S		
8	cb18	no		porous	good	moderate	S		
8	cb12	no		porous	good	moderate	XS		
8	cb35	no		porous	good	moderate	XS		
8	cb37	no		porous	good	moderate	XS		
8	cb40	no		porous	good	moderate	XS		yes
8	cb43	no		porous	good	moderate	XS		yes
8	cb5	no		porous	good	moderate			yes
8	cb6	no		porous	good	moderate			yes
8	cb8	no		porous	good	moderate			yes
8	cb9	no		porous	good	moderate			
8	cb10	no		porous	good	moderate			yes
8	cb21	no		porous	good	moderate			yes
8	cb27	no		porous	good	moderate			
8	cb32	no		porous	good	moderate			
8	ti1	no		porous	good	moderate	M		
8	ti6	no		porous	good	moderate			
8	ti9	no		porous	good	moderate	XS		
8	ti10	no		porous	good	moderate	XS		
8	cb7	no			good	moderate	M		

group	vessel	modified	transport	porosity	thermal	strength	size	residue	oxide
8	cb2	no			good	moderate	S		
8	cb25	no			good	moderate			
19	ps6	no	local	porous	good	poor		yes	yes
19	ts2	no		porous	good	poor			
19	nc2	no	local	porous	good	poor	M		
19	ti4	no		porous	good	poor	L	yes	yes
5	bc7	no	local	porous	moderate	good			
5	bc9	no	local	porous	moderate	good			
5	bc10	no	local	porous	moderate	good			
5	daE	no	local	porous	moderate	good	S	yes	yes
5	daJ	no		porous	moderate	good	XL	yes	
5	og21	no	local	porous	moderate	good			
5	gv1	no	local	porous	moderate	good	M		
5	gv2	no	local	porous	moderate	good			
5	gv3	no	local	porous	moderate	good			yes
5	gv4	no	local	porous	moderate	good			
5	gv5	no	local	porous	moderate	good			
5	gv6	no	local	porous	moderate	good			
5	gv27	no	local	porous	moderate	good			
5	gv31	no	local	porous	moderate	good			
16	tfW	perforated, not repair	1 day	porous	moderate	moderate			
14	tfK	no	local	porous	moderate	moderate			
14	tfN	no	local	porous	moderate	moderate			
14	bb12			porous	moderate	moderate			
14	daH	no	local	porous	moderate	moderate		yes	
14	og3	no	local	porous	moderate	moderate		yes	
14	og11	no	local	porous	moderate	moderate			
14	og19	no	local	porous	moderate	moderate			
14	og22	no	local	porous	moderate	moderate			
14	og24	no	local	porous	moderate	moderate			
14	ts17	no	local	porous	moderate	moderate	XS		
14	cb15	no		porous	moderate	moderate	M		yes
14	cb30	no		porous	moderate	moderate			
14	mt1	no		porous	moderate	moderate	XS		
14	ti5	no		porous	moderate	moderate	M		
14	ti12	no		porous	moderate	moderate	S	yes	
14	fc1	no	not local	porous	moderate	moderate	XS		
20	bc11	no	local	porous	moderate	poor			
12	tfS	no	1 day	porous	poor	moderate		yes	
12	tfB	no	local	porous	poor	moderate	M		
12	tfG	no	local	porous	poor	moderate			
12	daG	no		porous	poor	moderate	L	yes	
12	og17	no	local	porous	poor	moderate			
12	og18	no	local	porous	poor	moderate			
12	og32	no	local	porous	poor	moderate			
12	sc5	no		porous	poor	moderate			
12	sc7	no		porous	poor	moderate			
12	uk9	no		porous	poor	moderate			yes
30	sc1	perforated		porous	poor	poor	S		yes
10	bb9	no		porous	poor	poor	L		
10	bb10	no		porous	poor	poor	L		
10	bb13	no		porous	poor	poor			
10	bb14	no		porous	poor	poor			
10	cg2	no		porous	poor	poor			
10	tfV	no	local	porous	poor	poor			
10	og2	no		porous	poor	poor		yes	
10	og13	no	local	porous	poor	poor			
10	og16	no	local	porous	poor	poor			
10	og20	no	local	porous	poor	poor			
10	og31	no	local	porous	poor	poor			
10	og34	no	local	porous	poor	poor			
10	og35	no	local	porous	poor	poor		yes	yes
10	og36	no	local	porous	poor	poor		yes	yes

group	vessel	modified	transport	porosity	thermal	strength	size	residue	oxide
10	og41	no	local	porous	poor	poor		yes	yes
10	og42	no	local	porous	poor	poor		yes	yes
10	ts15	no	local	porous	poor	poor			
10	sc2	no		porous	poor	poor			
10	sc3	no		porous	poor	poor			
10	sc6	no		porous	poor	poor			yes
10	cc1	no	local	porous	poor	poor			yes
10	cc2	no	local	porous	poor	poor			
10	cc3	no	local	porous	poor	poor			
21	bc5	no	local	n. porous	good	good		yes	
21	bb5	no		n. porous	good	good			
21	tf145	no	1 day	n. porous	good	good			
21	tf265	no	1 day	n. porous	good	good		yes	yes
21	og30	no	local	n. porous	good	good			
21	sn1	no		n. porous	good	good	S	yes	
21	sn2	no		n. porous	good	good		yes	
21	tw2	no		n. porous	good	good			
21	pw1	no		n. porous	good	good	M		
9	bb7	no		n. porous	good	moderate			
9	tfD	no	1 day	n. porous	good	moderate			
9	tfM	no	1 day	n. porous	good	moderate			yes
9	dd1	no		n. porous	good	moderate			
9	ll6	no		n.porous	good	moderate			
9	ps5	no		n. porous	good	moderate			
9	og9	no	local	n. porous	good	moderate	XS	yes	
9	mp7	no		n. porous	good	moderate			yes
9	mp9			n. porous	good	moderate			
9	ts9	no		n. porous	good	moderate			yes
9	cb17	no		n. porous	good	moderate	L		yes
9	cb41	no		n. porous	good	moderate	XS		yes
9	cb38	no		n. porous	good	moderate			
9	on1	no	local	n. porous	good	moderate			
15	tfQ	no	1 day	n. porous	moderate	good			
15	og28	no	local	n. porous	moderate	good			
29	ts1	perforated		n. porous	moderate	moderate			
22	ps7	no		n. porous	moderate	moderate		yes	yes
22	og4	no	local	n. porous	moderate	moderate		yes	yes
22	og7	no	local	n. porous	moderate	moderate		yes	
22	og27	no	local	n. porous	moderate	moderate			
22	og39	no	local	n. porous	moderate	moderate			
22	og33	no	local	n. porous	moderate	moderate			
22	dr1	no	local	n. porous	moderate	moderate	L	yes	
22	cb42	no		n. porous	moderate	moderate	XS		
22	pc1	no	local	n. porous	moderate	moderate	XS		
22	cb34	no		n. porous	moderate	moderate			
22	cb36	no		n. porous	moderate	moderate			
22	cs1	no		n. porous	moderate	moderate	M	yes	yes
22	sw15	no	1 day	n. porous	moderate	moderate	XS		
22	sw52	no	1 day	n. porous	moderate	moderate			
22	sw56	no	1 day	n. porous	moderate	moderate	S		
22	sw130	no	1 day	n. porous	moderate	moderate			
22	ti2	no		n. porous	moderate	moderate	XL	yes	yes
22	ti11	no		n. porous	moderate	moderate	S		
22	gv17	no	local	n. porous	moderate	moderate			
13	gv28	no	local	n. porous	moderate	poor	S		
24	gv18	no	local	n. porous	poor	good			
24	gv21	no	local	n. porous	poor	good			
7	bc14	no	local	n. porous	poor	moderate		yes	
7	tfA	no	local	n. porous	poor	moderate	S		
7	tfC	no	local	n. porous	poor	moderate	S		
7	tfH	no	1 day	n. porous	poor	moderate			
7	daF	no		n. porous	poor	moderate	L	yes	
7	og10	no	local	n. porous	poor	moderate			
7	og14	no	local	n. porous	poor	moderate			

group	vessel	modified	transport	porosity	thermal	strength	size	residue	oxide
7	cb31	no		n. porous	poor	moderate	S		yes
7	pi1	no		n. porous	poor	moderate	S		
7	ab1	no	local	n. porous	poor	moderate	S		
7	ti13	no		n. porous	poor	moderate			
7	gv24	no	local	n. porous	poor	moderate	XS		
7	gv26	no	local	n. porous	poor	moderate	L		
7	gv30	no	local	n. porous	poor	moderate			
23	tf439	no	local	n. porous	poor	poor			yes
23	tfR	no	1 day	n. porous	poor	poor		yes	yes
23	og12	no	local	n. porous	poor	poor		yes	yes
23	og15	no	local	n. porous	poor	poor	S		
23	og25	no	local	n. porous	poor	poor			
23	og26	no	local	n. porous	poor	poor			
23	ts16	no	local	n. porous	poor	poor		yes	yes
23	yt2	no		n. porous	poor	poor			
23	sw90	no	local	n. porous	poor	poor			
23	sw94	no	local	n. porous	poor	poor			
23	fo1	no	local	n. porous	poor	poor			no
23	fc2	no	not local	n. porous	poor	poor	S		

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