STRATIFICATION THEORY

Dafydd Davies

APPLIED ARCHAEOLOGY

This guide to Stratification Theory was written as the first part of an Applied Archaeology Series which is intended to describe the entire archaeological process from archaeological recording through to archaeological interpretation and publication. This series is intended to describe and merge both archaeological theory and archaeological practice, and so explain how archaeological theories are applied in practice as part of an overall documentation system.

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To see a world in a grain of sand,
And a heaven in a wild flower,
Hold infinity in the palm of your hand,
And eternity in an hour.

(William Blake, AUGURIES OF INNOCENCE)
ARCHAEOLOGICAL STRATIGRAPHY

“Why did the Romans live so far underground?”
(A question asked by a visitor to an archaeological excavation)

To members of the general public a visit to an archaeological excavation can be an interesting, but frequently confusing and slightly disappointing experience. Visitors often arrive with preconceived images of archaeologists and archaeological excavations derived from Indiana Jones films or television programs, and these images leave the visitor with the impression that archaeologists are primarily concerned with the discovery of artefacts, and the more valuable or shiny the artefact the better. The question most frequently asked by visitors is “what have you found?”, the visitor expects to hear about golden objects, swords and buried treasure, and is therefore frequently puzzled when an archaeologist points at two lines of small holes in the ground and replies “a late Saxon building”.

Over recent years, news reports from excavations in towns such as York, Winchester or the City of London may have changed the public perception of archaeological excavation from large rural sites staffed by students in T-shirts and shorts, to small noisy urban sites staffed by grim faced archaeologists in safety helmets, desperately working against a developer’s deadline. Even though the image of an archaeological excavation has changed, the idea that archaeologists are mainly looking for artefacts has not, and it remains difficult to explain to visitors that archaeologists are primarily interested in excavating and recording the ARCHAEOLOGICAL STRATIGRAPHY. This may be because the recovery of objects is more obvious and understandable to visitors, whereas the concept of archaeological stratigraphy is more abstract, as it involves associating subtle changes in the soil with evidence of past activities, and the sequence in which those activities has occurred. Visitors frequently have difficulty visualising these activities, so for example it may not be immediately apparent to the inexperienced eye why two lines of small holes in the ground may in fact be evidence of the construction of “a late Saxon building”.

To explain this transformation from subtle changes in the soil, to evidence of past activities it is necessary to first take a step back and consider, not the present archaeological stratigraphy, but how that archaeological stratigraphy was originally formed.
Over time, a number of specific types of individual activities may have occurred within an area. These activities would have either introduced and deposited additional material within the area, or removed material from that area. If more material is deposited within the area than is removed from the area then the ground level will rise. This process will form archaeological stratigraphy, and is referred to as STRATIFICATION.

The longer and more intense the human occupation of an area, the more individual activities are likely to have occurred within that area. For example, a rural settlement may have been dispersed and may only have existed for a relatively short period of time, and the rural nature of this type of settlement may also have meant that the area reverted to farmland after the settlement had been abandoned, and the archaeological stratigraphy produced by the settlement may then have been truncated, either by natural erosion, or by later agricultural activity. An urban settlement would involve a greater density and continuity of human occupation, and this would produce almost continual activity within the area and the introduction of additional material. If this material was not removed once it had fulfilled its function, it would eventually create a great deal of archaeological stratigraphy. The terms RURAL and URBAN are therefore often used by archaeologists to describe, not the present location and surroundings of an excavation, but the amount of archaeological stratigraphy and the different techniques needed to excavate and record that archaeological stratigraphy.

Although different documentation systems have developed to deal with these different types of archaeological stratigraphy they are all based on the fundamental concept that:

ALL ARCHAEOLOGICAL STRATIGRAPHY CAN BE DIVIDED INTO SINGLE DEPOSITIONAL UNITS, AND EACH DEPOSITIONAL UNIT WILL REPRESENT THE STRATIGRAPHIC EVIDENCE OF AN INDIVIDUAL ACTIVITY.

The identification of these individual units is the most important part of all archaeological excavation, and is based on the observations of individual archaeologists guided by a set of theoretical principles which define the individual units and how they units relate to each other to form archaeological stratigraphy. All these principles describe the basic mechanics of stratification, and may be collectively referred to as STRATIFICATION THEORY. This theory can best be explained by first considering the ACTIVITY which created archaeological stratigraphy, and then by examining the EVIDENCE OF ACTIVITY.
1 ACTIVITY

All archaeological stratigraphy is the result of specific forms of ACTIVITY, inactivity or a state-of-stability will not create archaeological stratigraphy. To produce archaeological stratigraphy these activities must have affected or changed the GROUND SURFACE. While the archaeologist may be familiar with specific activities which took place in cellars, back gardens or on ground floors, activities which have not changed the ground surface, or which took place on the upper floors of the house will not be preserved. It is therefore evident how much is missing from the archaeological stratigraphy, and equally evident the importance of what remains.

All activities which affect the ground surface will involve the deposition or removal of MATERIAL. This material may consist of anything from building rubble, flood deposits, a human body or simply kitchen waste. Activity in these terms is any action which involves the TRANSPORTATION or movement of material either to a given location or from a given location. Every time that material is moved it is possible that it will be changed in some way, as new elements are added or old elements are lost, so the composition of material may not stay constant.

Once this material has been deposited in a specific location, it becomes archaeological stratigraphy. If more material was transported to a specific area than was transported away from that area, then there will have been an increase in the ground level and the total amount of archaeological stratigraphy. If more material was transported away from a specific area, then there will have been a decrease in the total amount of archaeological stratigraphy or no archaeological stratigraphy at all. It therefore follows that if the same amount of material is simply moved around within an area, then the overall amount of archaeological stratigraphy will not increase or decrease, it will just become changed.
Figure 1: An individual activity.
1.1 THE TYPE OF ACTIVITY

There are two forces which may cause activity:

1. HUMAN ACTIVITY. These activities may include building houses, walls or fences, digging pits or digging graves, or just ploughing fields.

2. NATURAL ACTIVITY. These activities will be the result of natural processes which may in certain circumstances be predicted and reconstructed, for example floods, landslides or just natural erosion, or the development of a ground surface caused by animals and decomposing vegetation.

There are two forms of natural activity, natural activity which took place in ‘archaeological time’, that is the time from the present day back as far as the first identifiable human activity on the site, and natural activity which took place in ‘geological time’, that is the time before any identifiable human activity within the area. Archaeologists are primarily interested in all activities which took place in ‘archaeological time’, regardless of whether they were the result of human activity or natural activity. The term ‘archaeological stratigraphy’ therefore includes all stratigraphic deposits as far back as the first identifiable human activity within the area of excavation, and does not include the earlier underlying ‘geological natural’, which usually consists of large scale deposits of alluvial sediment, glacial deposits or natural bedrock.

Unfortunately, this point may be difficult to identify during excavation as large scale natural activities (particularly floods) may have occurred during periods of human occupation and these deposits may have covered evidence of earlier human activity. In normal circumstances archaeological excavation therefore continues until the ‘natural’ has been uncovered over the entire area of the site, thus insuring that all human activity within the area has been excavated and recorded. Then the underlying ‘natural’ is carefully documented to prove that there was no remaining evidence of human occupation and to record what the area may have been like before any identifiable human activity had occurred. Then finally, a large hole is dug down into the ‘natural’ to ensure that it does not contain any evidence of human activity and that it does not cover any evidence of earlier human activity.

1.2 THE FORM OF ACTIVITY

All activities which have affected the ground surface, regardless of the forces which caused them, or the reasons why they took place, will be, either POSITIVE ACTIVITIES which have transported material to a given location, or NEGATIVE ACTIVITIES which have transported material away from a given location. All the surviving archaeological stratigraphy within a specific area is therefore the result of positive activities, although the existence of negative activities may be deduced.
1.2.1 POSITIVE ACTIVITY

Positive activity will produce more archaeological stratigraphy. This form of activity will transport material to a given location on site, where it would form an individual deposit and create a new area of ground surface. The scale of this activity may vary from very small-scale activity such as the gradual inclusion of organic material or the development of a soil horizon or a peat deposit, to large-scale activity such as the accumulation of alluvial sediment or building rubble. Although this material may have originated from a negative activity in a different location, the source of that material and the distance it has been transported cannot normally be determined with any certainty.

EXAMPLES OF POSITIVE ACTIVITY

### HUMAN ACTIVITY

**CONSTRUCTION**

The deliberate raising of the ground surface for construction.

Wall building.

**OCCUPATION**

Repairs and re-plastering.

Hearth fires.

**DESTRUCTION**

Destruction debris left where it fell.

Layers of destructive burning.

**CULTIVATION**

Development of ground surface due to agricultural activity. (Plough Soil)

### NATURAL ACTIVITY

**LONG TERM**

The abandonment and natural development of the ground surface over time.

**SHORT TERM**

Deposits caused by natural disasters such as flooding or slope collapse.

Volcanic eruption.

Figure 2: Positive Activity.
POSITIVE ACTIVITY

Figure 3: A positive activity.

Positive activities will produce two different types of evidence:

1 STRATIGRAPHIC EVIDENCE

The stratigraphic evidence of positive activity consists of descriptions of the shape, form and composition of individual deposits. Once material has been deposited it may start to change or decay, so the present stratigraphic evidence of an individual deposit may not resemble the original material, although the general nature of the original material may be deduced.

2 ASSEMBLAGE EVIDENCE

Stratigraphic evidence may also contain collections of objects which were deposited within and at the same time as the original material. These objects may be recovered from individual deposits, and will form the assemblage evidence from that deposit. This assemblage evidence can be divided into two forms:

1 ARTEFACTS, these take the form of objects manufactured by humans, for example pottery, bricks or coins.

2 ECOFACTS, these were once living organisms, parts of which may have been preserved, for example bones, shells, seeds or wood.

NOTE

Some objects will be both artefacts and ecofacts, for example a bone comb is both a bone, and a comb.

Once buried some objects may start to decay. This decay will proceed until the object reaches a balance with the surrounding environmental conditions. Some objects may decay completely, and their existence can only be deduced from other stratigraphic or assemblage evidence, for example it may be possible to deduce the existence of a wooden coffin from the position of surviving coffin nails.
1.2.2 NEGATIVE ACTIVITY

Negative activity will remove existing archaeological stratigraphy. This form of activity will transport material away from a given location on site, thus creating a new area of ground surface. The scale of this activity may vary from very small-scale activity, such as the gradual erosion caused by hill-wash, to large-scale activity such as sand or gravel quarrying. This material may then be deposited and result in a positive activity in a different location, although that location cannot normally be determined with any certainty.

**EXAMPLES OF NEGATIVE ACTIVITY**

**HUMAN ACTIVITY**

**CONSTRUCTION**

  - Levelling of the ground surface in preparation for construction.
  - The excavation of foundation trenches.

**OCCUPATION**

  - Ruts or signs of wear on floors.

**DESTRUCTION**

  - The excavation of pits for various reasons.
  - The deliberate removal of building materials for re-use.

**CULTIVATION**

  - Erosion caused by ploughing.

**NATURAL ACTIVITY**

**LONG TERM**

  - Small scale natural erosion of the ground surface over time. (Hill Wash)
  - Destruction caused by decay or neglect.

**SHORT TERM**

  - Erosion caused by flooding or slope collapse.

*Figure 4: Negative Activity.*
Negative activities will produce only one type of evidence:

1 STRATIGRAPHIC EVIDENCE

The stratigraphic evidence of negative activity consists of descriptions of the shape and form of the area left by the removal of existing archaeological stratigraphy. Frequently it is difficult to decide whether material has been removed or not, as the archaeologist is trying to spot something which is no longer there, for example the archaeological stratigraphy within an area may at one time have formed a flat and level surface, or the area may have been truncated by negative activity. No assemblage evidence will be recovered from negative activity.

NOTE

A state-of-stability may occur within a specific area when very small-scale positive activities, such as the gradual inclusion of organic material within a soil horizon or the deposition of dirt and occupation debris on a floor surface are eliminated by very small-scale negative activities, such as the gradual erosion caused by hill-wash or the regular cleaning of a floor surface. However, that material may then be deposited and result in a positive activity in a different location.
1.3  THE SEQUENCE OF ACTIVITY

All archaeological stratigraphy is the result of many individual activities occurring one after another in a unique sequence. Archaeological stratigraphy will therefore contain not only stratigraphic and assemblage evidence of individual activities, but also evidence of the order in which those activities first occurred. This order is referred to as the STRATIGRAPHIC SEQUENCE. To establish this stratigraphic sequence it is necessary to consider several basic concepts and principles which affect the change from activities to the evidence of those activities.

1.3.1  ABSOLUTE TIME AND RELATIVE TIME

All activities exist in ABSOLUTE TIME, that is time measured in minutes, hours, days and years. Activities will therefore have a historic calendar date which would indicate when they were completed, for example if a pit was dug on the morning of the 24th of October 1415 then that is the historic date of the activity in absolute time. Some individual activities may have continued for many years, for example a plough soil may have developed over 400 years, but the historic date of that activity would be the date of the last ploughing.

Although all activities occurred in absolute time, the stratigraphic evidence of those activities can only exist in RELATIVE TIME, that is the time relative to other activities. The stratigraphic evidence of individual activities may therefore occur, either ‘before’, or ‘after’ another individual activity, for example a human body can only be buried after a grave has been dug. Some individual activities may have occurred in different locations and no stratigraphic evidence may exist which would indicate their relationship in relative time. These activities may be considered as have occurred either ‘before’, or ‘after’ in relative time or they may be considered as being ‘contemporary’ in relative time, though they may not have been contemporary in absolute time.

It is normally impossible to establish from the stratigraphic and assemblage evidence the historic date of an individual activity in absolute time, although it may be possible to estimate the historic date by using relative time and assemblage evidence.
1.3.2 THE CONTEMPORARY GROUND SURFACE

As all activities have to affect the GROUND SURFACE to become part of the archaeological stratigraphy, the resulting stratigraphic evidence will have created a new ground surface in the area where the original activity took place. This area of new ground surface marks the identifiable end of an individual activity, and is also termed the INTERFACE of the stratigraphic evidence. The sum of all the individual ground surfaces or parts of ground surfaces visible at any one time is referred to as the CONTEMPORARY GROUND SURFACE for that moment in relative time. Any new activity would take place from the level of the contemporary ground surface, and would not only create a new ground surface in the area where it took place, but it would also create a new contemporary ground surface which is associated with the next moment in relative time. Not all of the contemporary ground surface may be affected at any one time, therefore the ground surface of an individual activity may be part of any number of contemporary ground surfaces.

The contemporary ground surface is important to the interpretation of the archaeological stratigraphy, as this is what people saw at the time, and what would have affected and influenced their decisions, for example if it is possible to establish what the contemporary ground surface looked like before a specific activity took place, and what the contemporary ground surface looked like after that activity had been completed, it may then be possible to deduce the motivation for the original activity.
Figure 6: The contemporary ground surface.
1.3.3 THE PRINCIPLES OF ARCHAEOLOGICAL STRATIFICATION

All archaeological excavation is based on a relatively simple concept which states that any new activity will take place from the level of the contemporary ground surface (the sum of the existing ground surfaces), so a chronologically later activity will always be found to have covered or removed part of the chronologically earlier ground surface, thus creating a new contemporary ground surface. Chronology in this sense refers to the relative time between various activities. This concept is more or less constant because of the unconsolidated nature of most archaeological deposits and the effect of gravity upon those deposits. This makes it impossible to pick up existing stratigraphic evidence to ‘slip’ chronologically later stratigraphic evidence underneath. Although this is not strictly true, exceptions to this basic concept will be dealt with later.

In terms of the stratigraphic evidence, this concept produces the following basic PRINCIPLES OF ARCHAEOLOGICAL STRATIFICATION:

1. ALL ARCHAEOLOGICAL STRATIGRAPHY CAN BE DIVIDED INTO INDIVIDUAL UNITS, EACH OF WHICH WILL REPRESENT THE STRATIGRAPHIC EVIDENCE OF AN INDIVIDUAL ACTIVITY.

2. IF A UNIT PHYSICALLY COVERS ALL OR PART OF A SECOND UNIT, THEN THE SECOND UNIT WAS DEPOSITED FIRST.

These principles are basically very simple, complications occur when the archaeologist considers,

1. What is a unit?
2. What is meant by covers?
2 EVIDENCE OF ACTIVITY

If all archaeological stratigraphy was the result of individual activities, then to understand those activities and the sequence in which those activities occurred it is necessary to examine the stratigraphic and assemblage evidence produced by those activities.

Figure 7: Evidence of an individual activity.
2.1 THE STRATIGRAPHIC EVIDENCE

The present stratigraphic evidence may not be the same as the original stratigraphic evidence produced by individual activities, as the original stratigraphic evidence may have been changed or altered either while it formed part of the contemporary ground surface, or during the time it remained within the burial environment.

The initial ground surface formed by individual activities may have been altered after deposition by natural consolidation and weathering, or as the result of erosion caused by later activity, such as the continual passage of human feet. As most unconsolidated or unprepared ground surface will have been disturbed or truncated to some extent this type of activity is normally assumed to have been part of the process which formed the original stratigraphic evidence, but if it can be identified as having had a specific or significant effect on the ground surface then it may be considered as a separate activity.

Once the stratigraphic evidence was completely buried, it may have been altered by other natural processes such as water leaching, root or worm action, or decay. Although these processes may vary greatly between different sites, they are normally constant within the limited area of most excavations, but exceptions may occur if the site experienced two or more different environmental conditions, such as the increased preservation of deeper archaeological stratigraphy below the water table. All of these potential alterations to the stratigraphic evidence should be considered and taken into account when trying to identify the stratigraphic evidence of individual activities.
2.1.1 STRATIGRAPHIC UNITS

In an attempt to decipher and understand the archaeological stratigraphy, it is necessary to divide that stratigraphy into separate units with precise limits or boundaries, each of which will represent the stratigraphic evidence of an individual activity, either positive or negative, man-made or natural. This division is based upon the assumption that the stratigraphic evidence produced by an individual activity will remain the same as long as the activity which produced that evidence remains the same. Each unit should therefore have an intrinsic continuity of form and composition, as any change of activity would produce a corresponding change in the stratigraphic evidence of that activity. These units are referred to as STRATIGRAPHIC UNITS or Contexts, and though the limits or boundaries of individual Stratigraphic Units may sometimes be indistinct or the result of personal interpretation, the sum of these units should constitute the total excavated area. All Stratigraphic Units may therefore be defined by the following Stratigraphic Unit Policy.

### STRATIGRAPHIC UNIT POLICY

1. THERE SHOULD BE NO PART OF THE ARCHAEOLOGICAL STRATIGRAPHY OF A SITE WHICH IS NOT PART OF A STRATIGRAPHIC UNIT.

2. THERE SHOULD BE NO PART OF THE ARCHAEOLOGICAL STRATIGRAPHY OF A SITE WHICH IS A PART OF TWO OR MORE STRATIGRAPHIC UNITS.

Figure 8: Stratigraphic Unit Policy.
As each Stratigraphic Unit represents an individual activity, these units can be divided into the following broad categories depending upon the FORM OF ACTIVITY which originally produced the stratigraphic evidence.

1. **POSITIVE ACTIVITY**
2. **NEGATIVE ACTIVITY**

**PHYSICAL DEFINITION**

The PHYSICAL DEFINITION indicates the type of material that the Stratigraphic Unit was composed of. Each of these definitions will require a different form of description to identify and record specific characteristics.

1. **POSITIVE ACTIVITY**
   1. DEPOSIT
   2. SKELETON
   3. MASONRY
   4. TIMBER

2. **NEGATIVE ACTIVITY**
   5. INTERFACE

**STRATIGRAPHIC DEFINITION**

The STRATIGRAPHIC DEFINITION indicates how the Stratigraphic Unit was deposited. These definitions will also indicate how a specific Stratigraphic Unit related to other surrounding Stratigraphic Units.

1. **POSITIVE ACTIVITY**
   1. Horizontal Deposition (LAYER)
   2. Vertical Construction (STRUCTURAL)
   3. Contained Deposition (FILL)

2. **NEGATIVE ACTIVITY**
   4. Probable Cut (CUT)
   5. Possible Cut (TRUNCATION)
The final definition of an individual Stratigraphic Unit will therefore be a combination of both the PHYSICAL DEFINITION and the STRATIGRAPHIC DEFINITION, for example:

**DEPOSIT (LAYER)**  
**DEPOSIT (FILL)**

Although there will be a close link between the physical definition and stratigraphic definition of any individual Stratigraphic Unit, the stratigraphic definition will indicate how the unit was deposited, and this may not be dependent upon the type of material from which the unit was formed. This will allow a large number of different combinations of physical and stratigraphic definitions, each of which will have specific characteristics and constraints, for example:

**DEPOSIT (LAYER)**  
**DEPOSIT (FILL)**  
**SKELETON (FILL)**  
**MASONRY (STRUCTURAL)**  
*Although in English (STRUCTURAL) MASONRY may be a more appropriate term to use.***  
**TIMBER (STRUCTURAL)**  
**INTERFACE (CUT)**  
**INTERFACE (TRUNCATION)**

These are the most common combinations of physical and stratigraphic definitions, and though other combinations may be encountered, they should be carefully considered before use, for example:

**DEPOSIT (STRUCTURAL)**  
*Turf walls, cob walls or shuttered cob walls.*  
**MASONRY (FILL)**  
*Some types of poured foundations.*

To understand the significance of both the physical and stratigraphic definitions of an individual Stratigraphic Unit it is necessary to consider what Stratigraphic Units physically represent in both absolute and relative time.
1 WHAT DO UNITS PHYSICALLY REPRESENT?

The physical representation of an individual Stratigraphic Unit is dependent upon the FORM OF ACTIVITY which produced the unit, and this is indicated by the PHYSICAL DEFINITION of the individual Stratigraphic Unit. This physical definition allows for a full description of the characteristics of the different forms of Stratigraphic Unit, and may also help to define the limits or boundaries of individual units.

1 POSITIVE ACTIVITY

These Stratigraphic Units have resulted from positive activity, and would have added to the total archaeological stratigraphy. They contain three types of basic information.

| POSITIVE ACTIVITY |

THE STRATIGRAPHIC EVIDENCE

1 THE PHYSICAL DESCRIPTION of the Stratigraphic Unit. (The Definition, Boundaries and Composition)

2 THE INTERFACE DESCRIPTION of the Stratigraphic Unit. (The Ground Surface)

THE ASSEMBLAGE EVIDENCE

3 THE STRATIGRAPHIC ASSEMBLAGE of the Stratigraphic Unit. (The Artefacts and Ecofacts contained within the Stratigraphic Unit)

Figure 9: Positive Activity.
1 THE PHYSICAL DESCRIPTION

The physical description of a Stratigraphic Unit will depend upon the PHYSICAL DEFINITION of that unit. This definition will affect the ability to identify individual Stratigraphic Units, and indicate the different characteristics needed to describe an individual unit. This involves a description of both the PHYSICAL BOUNDARIES of the Stratigraphic Unit including the size and shape of the boundaries at their maximum extent, and the COMPOSITION of the Stratigraphic Unit including a clear description of the material from which the unit was composed.

PHYSICAL DEFINITION

DEPOSIT
Deposits form a major part of all archaeological stratigraphy. They consist of positive accumulations or depositions of similar material on top of the level of the contemporary ground surface, and may have been the result of either human or natural activity such as plough soil, human cremations, road surfaces, floor surfaces, as well as natural flood accumulations or deposits of rubbish or rubble.

SKELETON
Individual human skeletons are part of both the stratigraphic and assemblage evidence, and therefore require special excavation and recording techniques to preserve as much information as possible. However, it may be difficult to distinguish between an individual disarticulated or disturbed human skeleton, and a charnel pit containing re-deposited human bones.

MASONRY
Masonry is probably the easiest form of stratigraphic evidence to identify, and is also the most obvious sign of human activity. Masonry usually consists of two component parts, a building material such as worked stone, brick or tile, and a bonding material used to hold the building material together.

TIMBER
Individual timbers are also easily identified, though they require specific environmental conditions in order to have survived. Each timber or element of worked wood is normally described individually, as it not only forms part of the stratigraphic evidence, but is also part of the assemblage evidence, and may be dated by dendrochronology.
2 THE INTERFACE DESCRIPTION

The interface resulting from a positive activity may be referred to as a POSITIVE INTERFACE. This interface is always considered to be the upper surface of a Stratigraphic Unit, and includes the vertical face of masonry or timber structures. Although a positive interface may represent the ground surface formed by the original activities, this interface may have been affected by post-depositional processes or by later negative activity. The clarity of a positive interface may also vary, and the precise position of an interface may therefore be difficult to establish. In these circumstances there is always the danger of either over digging or under digging an interface, and thus destroying the actual ground surface, as well as contaminating the assemblage evidence.

3 THE STRATIGRAPHIC ASSEMBLAGE

The artefacts and ecofacts recovered from an individual Stratigraphic Unit would have been deposited or re-deposited during the formation of the Stratigraphic Unit, and are grouped together as the STRATIGRAPHIC ASSEMBLAGE of that unit. Artefacts and ecofacts may also have been deposited on the interface of Stratigraphic Units while they were part of the contemporary ground surface. It is frequently very difficult to be precise about the position of such artefacts or ecofacts in relation to the interface, especially if the interface was indistinct, and in these cases the artefacts and ecofacts are normally considered as part of the Stratigraphic Assemblage of the covering Stratigraphic Unit.

2 NEGATIVE ACTIVITY

These Stratigraphic Units have resulted from negative activity, and would have removed part of the existing archaeological stratigraphy. Although all remaining archaeological stratigraphy is the result of positive activity, it may be possible to identify areas which have been removed, and therefore the existence of negative activity can be deduced. They contain only two types of basic information.

<table>
<thead>
<tr>
<th>NEGATIVE ACTIVITY</th>
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<tr>
<th>THE STRATIGRAPHIC EVIDENCE</th>
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1 **THE PHYSICAL DESCRIPTION** of the Stratigraphic Unit. (The Definition and Boundaries)

2 **THE INTERFACE DESCRIPTION** of the Stratigraphic Unit. (The Ground Surface)

Figure 10: Negative Activity.
1 THE PHYSICAL DESCRIPTION

The physical description of a Stratigraphic Unit which resulted from negative activity will depend upon the PHYSICAL DEFINITION of that unit, however negative activity has only one form of physical definition, an interface. The description of the PHYSICAL BOUNDARIES of this form of Stratigraphic Unit will indicate the dimensions of the area which was believed to have been removed, and includes the size and shape of the precise boundaries of that area at their maximum extent.

PHYSICAL DEFINITION

INTERFACE

This form of Stratigraphic Unit represents the ground surface which has resulted from a negative activity, that is the ground surface formed by the removal of part of one or more existing Stratigraphic Units. Sometimes this may be difficult to establish as a negative activity may have removed all or part of a previous interface without removing the entire Stratigraphic Unit, thus the existing interface of that Stratigraphic Unit may be the result of either positive activity or negative activity.

2 THE INTERFACE DESCRIPTION

The interface resulting from a negative activity may be referred to as a NEGATIVE INTERFACE. This interface may have been affected by post-depositional processes such as slumping or weathering, or by other later negative activities, and though the clarity of a negative interface will normally be sharp, if the surrounding stratigraphic evidence is similar, the precise position of the interface, or even the existence of a negative interface, may be difficult to establish. In these circumstances over digging or under digging a negative interface will mean that the actual shape and gradient of the ground surface will be disturbed or distorted, and this may affect later interpretation.

The physical definition of Stratigraphic Units is probably the first and the simplest consideration when trying to identify individual units. These physical definitions also provide the first indication of the physical limits or boundaries of individual Stratigraphic Units, as one of the most difficult decisions to be taken when dividing the stratigraphic evidence into units is where one unit ends and another unit begins. Using these simple definitions a complex site, containing various subtle variations of colour or composition can be broken into a series of individual component parts or building blocks from which the history of the site can be reconstructed.
2 WHAT DO UNITS REPRESENT IN ABSOLUTE TIME?

To fully understand what individual Stratigraphic Units represent it is also necessary to consider units within a chronological context. This involves establishing the absolute time periods represented by the original activity which created the stratigraphic evidence, and the changes which occur when an activity in absolute time becomes the stratigraphic evidence of an activity in relative time. This may explain the complexities involved in interpreting the stratigraphic evidence by indicating the significance of specific forms of evidence and descriptions to the interpretation procedure. It is therefore necessary to first consider a Stratigraphic Unit as an individual activity in absolute time.

1 AN INDIVIDUAL ACTIVITY

An individual activity will exist in absolute time, that is it will have occurred at a specific historic date. Although an assessment of the historic date when an individual activity took place is a vital part of the interpretation, there are certain other periods of absolute time which may also be represented by the individual activity and which should also be considered if the consequences of the original activity are to be fully interpreted. An individual activity may therefore represent a maximum of four different periods of absolute time:

1 An activity.
2 A direct part of the contemporary ground surfaces.
3 An indirect part of the contemporary ground surfaces.
4 A possible influence on contemporary ground surfaces.
Figure 11: An individual activity in absolute time.
1 AN ACTIVITY

An individual activity will have taken a certain period of absolute time to complete, this may have been anything from a matter of seconds to a matter of years or even centuries. The length of this period of absolute time may vary depending upon the type of activity, for example the individual human activities of construction or destruction will normally consist of relatively short periods of absolute time. Even if a large project took a number of years to complete, the slight inconsistency of the work or materials would mean that it should be possible to identify separate activities within the same construction process, thus dividing a long term project into a number of individual short term activities. The factors which affect occupational activities may have been more consistent, and so these individual activities may have occurred over a longer period of absolute time, for example the fill of a cess pit may represent several years of similar activity. Occupational activities may also represent the last activity in a sequence of similar activities, for example a hearth may have been used continually for a hundred years, but as the ash is continually cleared away the stratigraphic evidence of that hearth represents only the last fire, so a long period of similar activities may be represented by the last short term activity in that sequence. The same may occur with agricultural activity, for example the stratigraphic evidence of a plough soil will represent only the last ploughing activity, but may incorporate the continual mixing caused by several hundred years of similar activity. Although it is possible for a single natural activity to last for a relatively short period of absolute time, if the environmental conditions remain consistent, it is possible for a single activity to last for a considerably longer period of absolute time.

2 A DIRECT PART OF THE CONTEMPORARY GROUND SURFACES

Although a single activity may have taken a relatively short period of absolute time to occur, the result of that activity may have lasted considerably longer, and may therefore have directly influenced later activities. This represents the period of absolute time that all or part of the interface of that activity remained visible as part of a sequence of contemporary ground surfaces.

1 POSITIVE ACTIVITIES

The interface formed by positive activity may have remained evident as part of the contemporary ground surfaces for varying periods of absolute time, for example occupation surfaces may exist for long periods of absolute time as they may have been continuously cleaned, and any potential covering stratigraphic evidence would have been removed. Individual construction or destruction activities may have been part of the contemporary ground surface for only a short period of time as they may form only one part of a sequence of activities within a much larger project which could have lasted for years.

2 NEGATIVE ACTIVITIES

The interface formed by negative activity may have remained evident as part of the contemporary ground surface for a relatively short period of absolute time due to erosion or collapse. Silting or partial backfilling may also have covered the interface formed by the original negative activity, and this may also have occurred within a matter of days of the completion of the original activity.

This period of absolute time will end when the ground surface of the Stratigraphic Unit is either completely covered by later positive activity, and thus became part of the stratigraphic evidence, or is completely removed by later negative activity, a cut or truncation, and became part of another Stratigraphic Unit somewhere else. It is thus no longer possible for that activity to have had a direct influence on later activities.
3 AN INDIRECT PART OF THE CONTEMPORARY GROUND SURFACES

Even though the stratigraphic evidence of an activity may have been completely covered and no longer formed a direct part of the contemporary ground surface, the results of that activity may still be evident and recognisable as an indirect part of later contemporary ground surfaces, for example the interface formed by negative activity may have only remained as a direct part of the contemporary ground surface for a relatively short period of absolute time before it was completely covered, but this does not mean that the negative activity was completely backfilled, so though the interface of the negative activity may no longer have formed a direct part of the contemporary ground surface, it would still have been evident, and would have formed an indirect part of the contemporary ground surface. Therefore the amount of absolute time that an activity may still have been evident and an influence on later activities may have been considerably longer. This influence may be shown by the occurrence of similar activities or alignments within the same area.

4 A POSSIBLE INFLUENCE ON THE CONTEMPORARY GROUND SURFACES

The existence of an activity may even be lost completely from the stratigraphic evidence, but the activity may still have had an influence on later contemporary ground surfaces, for example a property boundary may have been completely removed and the area covered over so that no trace of it can be detected, and then the property boundary may be reinstated along exactly the same alignment. Although these factors may be difficult to assess, this period of absolute time may indicate a continuity of occupation or function.

THE HISTORIC DATE

With all these potential dates it is necessary to define the HISTORIC DATE of an individual activity in absolute time as the moment when the original activity ended.

EXAMPLE

To use a specific example, the individual activity of excavating a ditch may take a number of days to complete depending upon its size or the number of people involved, and would create a new contemporary ground surface in the shape of the sides of the ditch. This new contemporary ground surface would soon change as the base of the ditch would become silted up and the sides may slump in, thus becoming indistinguishable from the original ditch. At some later point the ditch would become partly backfilled, but although the contemporary ground surface formed by the original activity would be completely covered, the existence of the original activity may still influence later activity, possibly by guiding the direction of roads or paths around the ditch or by causing the ditch to be re-cut. Eventually the ditch may be completely backfilled and forgotten, as if the original activity had never occurred, though the existence of some form of division may be preserved in the form of a property boundary. Thus the existence of a single activity which only took a number of days to complete may influence other activities within the area for many centuries, although its original purpose or existence may have been forgotten.
EXAMPLE OF AN INDIVIDUAL ACTIVITY

End of Time as an Indirect part of C.G.S.

End of Time as a Direct part of C.G.S.
Figure 12: Example of an individual activity.
2 EVIDENCE OF AN INDIVIDUAL ACTIVITY

Even though an individual activity existed in absolute time, the stratigraphic evidence of that activity will exist only in relative time. Although this stratigraphic evidence would include the same absolute time periods as the original activity, only a few of these periods can be immediately identified, while the others have to be deduced from the stratigraphic sequence and assemblage evidence. The stratigraphic evidence of an individual Stratigraphic Unit would therefore represent the absolute time between the start of the activity which created the unit, and the start of the next activity, so an individual Stratigraphic Unit may be considered as representing two periods of absolute time:

1. The absolute time taken to form the Stratigraphic Unit.
2. The absolute time before the start of the formation of the next Stratigraphic Unit.
Figure 13: An individual Stratigraphic Unit in absolute time.
THE ABSOLUTE TIME TAKEN TO FORM THE STRATIGRAPHIC UNIT

This represents the absolute time taken to create the stratigraphic evidence of an individual Stratigraphic Unit. While a specific activity remained the same, the stratigraphic evidence produced by that activity should also remain the same, regardless of the amount of absolute time. When these circumstances change, the stratigraphic evidence should also change, and it should be possible to identify a different Stratigraphic Unit. The formation of an individual Stratigraphic Unit may therefore have occurred in a matter of seconds or over a period of many years, and though this period of absolute time would be difficult to establish with any certainty, it may be possible to consider all Stratigraphic Units as the result of:

1. A SHORT TERM ACTIVITY

This may represent an activity which occurred over a relatively short period of absolute time, for example most human construction or destruction may be considered as a short term activity.

2. A LONG TERM ACTIVITY

This may represent an activity which occurred over a relatively long period of absolute time, for example some forms of agricultural activity may have occurred over a number of years. The existence of such stratigraphic evidence would represent a continuity of activity.

An indication of whether an individual Stratigraphic Unit may be considered to be the result of either a short term or a long term activity may be derived from the PHYSICAL DESCRIPTION of that Stratigraphic Unit, as this may indicate the type of activity or process which formed the stratigraphic evidence. The distinction between a short term activity and a long term activity may also be one of interpretation, as a single long term activity or process may in fact be made up of a sequence of similar short term activities which cannot be individually identified, for example the backfilling of a cess pit. This interpretation is made during the identification of the individual Stratigraphic Units.
2 THE ABSOLUTE TIME BEFORE THE START OF THE FORMATION OF THE NEXT STRATIGRAPHIC UNIT

This represents the absolute time the entire interface of an individual Stratigraphic Unit remained visible, that is the absolute time before the start of the next activity within the stratigraphic sequence. If this next activity completely covered or removed all of the interface of the original Stratigraphic Unit, then the start of this activity would correspond to the end of the interface as a direct part of the contemporary ground surface, but if only part of the interface of the original Stratigraphic Unit was covered or removed then the remaining area of the interface may still form a direct part of any number of later contemporary ground surfaces. For example, if a wall was constructed and then a number of layers were deposited against the base of that wall, then the entire interface of the wall would no longer have been visible, but the wall would still form part of the contemporary ground surface. Therefore, an individual activity will remain a direct part of the contemporary ground surface as long as all or part of the interface of that activity remained visible, but the stratigraphic evidence of that activity will initially represent only the absolute time the entire interface remained visible. Although this period of absolute time would be difficult to establish with any certainty, it may be simpler to consider it as being the result of:

1 A CONTINUATION OF ACTIVITY

A continuation of activity would occur when the end of one activity corresponded with the start of the next activity within the stratigraphic sequence. This is normally very difficult to identify, though it may be deduced from the stratigraphic evidence if a group of individual activities is considered to form a single action, for example the burial of a human body would involve the excavation of the grave, placing the body in the grave, then backfilling the grave, and it may be possible to assume that each of these individual activities occurred as part of a single continuous action.

2 A SIGNIFICANT PERIOD OF INACTIVITY

A significant period of inactivity may represent either no activity, or activity which did not produce any direct stratigraphic or assemblage evidence. This would occur when the end of one activity did not correspond with the start of the next activity, and though this may also be difficult to establish, it may be deduced from the stratigraphic evidence, for example if a masonry or timber structure was repaired it may be possible to assume that there was a significant period of absolute time between the original construction and the need for repair, and this may correspond to a period of occupation which had not produced any direct stratigraphic or assemblage evidence.

An indication of whether an individual Stratigraphic Unit was followed by either a continuation of activity, or by a significant period of inactivity may be derived from the INTERFACE DESCRIPTION of that Stratigraphic Unit, as this may indicate the type of activity or process which occurred while the unit remained as part of the contemporary ground surface. An assessment of these absolute time periods is a fundamental part of identifying individual Stratigraphic Units, as the same stratigraphic evidence may be considered as either a single activity, involving slow but continual change, or as a sequence of separate activities, involving rapid change followed by periods of inactivity. Frequently this distinction will depend upon whether the individual activities can be identified, and if they can be identified whether they are considered to have been individually significant.
EXAMPLE

This may be explained by using the previous example of a ditch. A single activity such as the excavation of a ditch would involve a period of absolute time to complete. This period of absolute time would normally be considered as archaeologically insignificant, taking at most a matter of days to complete, but to illustrate this example it has been considered as having occurred over a longer period of absolute time. The end of the activity will indicate the historic date of the activity. In this example this date corresponded to the start of the next activity, the silting up of the ditch by natural activity.

This has continued for a considerable period of time before the dumping of domestic rubbish in the ditch changed the nature of the activity and therefore the evidence of that activity. The dumping of rubbish in the ditch may be seen as a large number of individual activities followed by periods of normal silting though in this example it has been considered as a single continuous activity which occurred over a long period of time.

The ditch was then deliberately backfilled with a stony deposit, this is considered as a long term activity but is followed by a significantly longer period of inactivity. This also marks the end of the original ditch as a direct part of the contemporary ground surface, although its existence may still be recognised, and this may still influence later decisions as an indirect part of the contemporary ground surface. In fact in this particular example the ditch did not influence decisions, as it was completely covered over by a gravel surface.

The sequence in relative time represents the stratigraphic sequence, that is what can be immediately established from the stratigraphic evidence. Although archaeological stratigraphy looks like a continuous sequence of activities, similar stratigraphic evidence may represent a complex progression of short term activity and long periods of inactivity.
EXAMPLE OF THE EVIDENCE OF AN INDIVIDUAL ACTIVITY

End of Time as an Indirect part of C.G.S.

End of Time as a Direct part of C.G.S.
Figure 14: Example of the evidence of an individual activity.
Figure 15: The evidence of activity in absolute time.
Although an individual activity may represent many different absolute time periods, the evidence of that activity will exist only in relative time and will therefore represent only two absolute time periods, the absolute time taken to form the individual Stratigraphic Unit, and the absolute time before the start of the formation of the next Stratigraphic Unit, and even this limited information may be difficult to establish from the stratigraphic and assemblage evidence. To fully understand the amount of absolute time that an individual Stratigraphic Unit remained as a direct or as an indirect part of the contemporary ground surface, or was a possible influence on the contemporary ground surface, it is necessary to establish the sequence of contemporary ground surfaces.
3 WHAT DO UNITS REPRESENT IN RELATIVE TIME?

The position of any individual Stratigraphic Unit within the stratigraphic sequence will depend upon the units STRATIGRAPHIC DEFINITION. This definition is established using basic principles derived from sedimentology and the actions of natural processes which describe the way Stratigraphic Units are deposited and how they relate to other surrounding Stratigraphic Units. These principles may be collectively referred to as the PRINCIPLES OF STRATIGRAPHIC DEPOSITION.

STRATIGRAPHIC DEFINITION

Horizontal Deposition (LAYER)

All layers are formed by the horizontal deposition of unconsolidated material. An individual layer may be deposited up to its natural angle of repose. This represents the maximum angle at which unconsolidated material may be deposited and still remain stable (not move), and will initially depend upon the material the layer is composed of, for example when sand is initially deposited it will have a lower angle of repose than gravel or rubble. Once deposited a layer may be immediately covered by another deposit, thus preserving its original position and condition, but if the layer is left exposed, then it may be subjected to other processes such as natural weathering or the passage of human feet. These processes will compact and consolidate the layer, as well as eroding the interface of the layer towards a horizontal position while maintaining its intrinsic continuity.

All deposits will tend towards a horizontal position, due to gravity transporting loose material down any existing slope. The ability of different deposits to resist this process will also depend upon the material they are composed of, and on how consolidated the deposits are. This process will cause the limits or boundaries of the deposit to either taper or fade out towards a natural edge (sometimes referred to as a feather edge), or to come to rest against an existing surface such as a vertical structure or the side of a natural depression.

The most important factor affecting the position of a layer within the stratigraphic sequence will therefore be the location of these limits or boundaries, as they will indicate the maximum extent of the layer. Any anomalies to the intrinsic continuity of the layer, either vertically or horizontally, should also be identified and accounted for, as they may be the result of later negative activity.
Figure 17: Example of a layer.
Vertical Construction (STRUCTURAL)

Structural elements are normally composed of a combination of selected or prepared materials, for example stone, brick or timber, which when bonded together are stable enough to support vertical construction above the level of the contemporary ground surface. The consolidated and ordered nature of such construction allows the materials to be stable beyond their natural angle of repose. This type of construction is normally identified by the type of facing on the vertical surface of the structural element, which could only have been possible if the face was exposed.

Vertical constructions will also be subject to the same processes of natural erosion and gravity as other deposits. The ability of any structural elements to resist these processes will be dependent upon their method of construction, and the strength of the bonding material. They may be maintained or repaired to preserve their stability, but may also be subject to collapse, either due to deliberate destruction or long term neglect.

Structural elements will have distinct stratigraphic properties as they have a vertical, as well as a horizontal interface. The faced vertical interfaces are normally the most important factors affecting structural elements, as these will indicate the point of construction within the stratigraphic sequence, as well as the amount of relative time that the structure remained up-standing.
Figure 18: Example of a structural element.
Contained Deposition (FILL)

Fills are horizontal deposits completely contained within the limits of an identified cut. Although both horizontal deposits and vertical constructions may be fills of a cut, and be recorded as such, only horizontal deposits may be separately defined as contained deposits. Horizontal deposits, by definition, will conform to the shape of the earlier contemporary ground surface, and will therefore completely backfill an open cut before being deposited outside the limits of the cut, thus forming a consecutive sequence of directly related deposits. Contained deposits may therefore be considered as a sub-division of horizontal deposits, with the same depositional properties and subject to the same processes as horizontal deposits composed of the same material, but with a different stratigraphic definition to indicate that they are contained within an identified cut.

As contained deposits exist only within the limits of a cut their stratigraphic properties are closely connected to those of the cut, and a number of these deposits may form a consecutive sequence of fills within the same cut. The most significant of these will be the first fill to be identified as this will indicate the point within the stratigraphic sequence at which the cut was excavated and the last fill to be removed, as this will indicate the shape of the original cut. These contained deposits should therefore not be confused with layers which may have been deposited within a contained area such as the up-standing walls of an individual room, or the sides of a natural depression.
Figure 19: Example of a fill.
Probable Cut (CUT)

All negative activity involves the removal of existing archaeological stratigraphy, and is therefore difficult to identify. As the existence of a cut may be uncertain, a distinction has to be made between a negative interface which was the result of an individual activity, and a negative interface which was the result of natural weathering and erosion, or even a natural depression in an undulating ground surface. The identification of significant negative activity will therefore include an indication of the level of confidence in the precise limits of that negative activity, based on two separate stratigraphic definitions of negative activity, a probable cut, and a possible cut.

A probable cut may be defined as having precise identifiable limits which contain at least one fill. These limits may be deduced by observing anomalies or inconsistencies in the expected deposition of the stratigraphic evidence, either by identifying that part of an existing deposit has been removed and has therefore been cut, or by identifying that an existing deposit is contained within artificial limits and is therefore a fill. By definition, the existence of a cut will indicate the presence of a fill, and the existence of a fill will indicate the presence of a cut.

Once completed, a probable cut will be subjected to the same processes of natural weathering and erosion as the surrounding deposits. The ability of a cut to resist these processes will depend upon the angle of the cut, and the material the surrounding stratigraphic evidence is composed of, as well as the amount of time the negative interface remained exposed before it was backfilled. These processes may cause collapses or slumping which could significantly change the limits or shape of the original cut. This would destroy the original negative interface by forming a new negative interface which may be indistinguishable from the old negative interface.

The position of a probable cut within the stratigraphic sequence will depend on the location of the limits of the cut, as these will indicate which stratigraphic deposits were affected by the cut, and thus the contemporary ground surface from which the cut was excavated.
Figure 20: Example of a cut.
Possible Cut (TRUNCATION)

A possible cut may be defined as the absence of expected stratigraphic evidence. A small cut may be easily recognised as an anomaly, but as the size of the cut increases it becomes more difficult to recognise an anomaly, and so identify a cut with precise limits. A possible cut is therefore the result of the same form of negative activity as a probable cut, but may be so large that it is very difficult to identify the precise limits of the area affected, and this makes a truncation the most difficult Stratigraphic Unit to identify correctly.

It is fair to assume that most unconsolidated or unprepared deposits will have been disturbed or truncated to some extent by natural weathering and erosion, especially in muddy conditions. It is therefore also necessary to consider whether a possible cut is significant enough to have been the result of an intentional negative activity such as the levelling or terracing of the contemporary ground surface.

Although this form of cut may not have obvious and reliable limits and will not contain a fill, its existence may be deduced almost by default as the only way to explain the observed stratigraphic evidence, for example a contemporary ground surface may appear to be unnaturally level, or the slope of a contemporary ground surface may appear to be greater than the expected angle of repose, and this may indicate that the existing deposits have been truncated. If the full stratigraphic evidence is to be properly understood all such activity has to be identified and recorded.
Figure 21: Example of a truncation.
The basic Principles of Stratigraphic Deposition are necessary if the archaeologist is to understand the stratigraphic evidence observed on site. There are alternative methods of stratigraphic definition, for example on some urban excavations the separate stratigraphic definition of fills are not used, as the area excavated may be too small to positively identify deposits as either fills or layers. In most circumstances this will not make a significant difference, however the use of fill as a separate stratigraphic definition encourages the identification of anomalies which may be the result of negative activity, and therefore consideration of the contemporary ground surface in relation to the stratigraphic sequence.
2.1.2 STRATIGRAPHIC RELATIONSHIPS

Once the stratigraphic evidence has been broken down into the basic components of individual Stratigraphic Units it is then necessary to establish how those components relate to each other. These physical relationships are identified by first establishing the interface of an individual Stratigraphic Unit at its maximum extent, and then by identifying how that interface physically relates to the surrounding Stratigraphic Units both vertically and horizontally.

1 PHYSICAL RELATIONSHIPS BETWEEN STRATIGRAPHIC UNITS

An individual Stratigraphic Unit may have many physical relationships, and these relationships may be of a number of different types.

1 COVERED BY \ COVERS

These are the most common form of physical relationships which occur between horizontal deposition and other deposits. One Stratigraphic Unit formed by positive activity will be physically on top of, or partially over another. This is sometimes difficult to determine when the exact limits or boundaries of the Stratigraphic Units are uncertain.

2 ABUTTED BY \ ABUTS

These are relationships which occur between vertical constructions and other deposits. The up-standing face of vertical constructions allows other Stratigraphic Units to be deposited against them without physically covering the structural element, for example a wall has to exist before a layer can be deposited against it.

3 FILLED BY \ FILLS

These relationships indicate that a Stratigraphic Unit is contained within the limits of a cut. Several different fills can be contained within the same cut forming their own stratigraphic sequence, and all of these fills are recorded as being fills of the same cut. Individual fills can also be contained within a cut, but not have a direct physical relationship with that cut, so this relationship indicates the presence of a Stratigraphic Unit, and not the direct physical relationships of that unit.

4 CUT BY \ CUTS

A ‘Cut By’ relationship indicates that part of an existing Stratigraphic Unit has been removed by a negative activity, either a cut or a truncation. The corresponding ‘Cuts’ relationship indicates which Stratigraphic Units had been affected by that negative activity.
5 \hspace{1cm} \textbf{EQUAL TO}

This type of relationship occurs when a single Stratigraphic Unit is given more than one Stratigraphic Unit number, for example if the limits or boundaries of a single Stratigraphic Unit are wrongly identified, and what was originally considered to have been two separate units were in fact one. This is normally a simple error, but the artefacts and ecofacts recovered from this Stratigraphic Unit may have been recorded under two different numbers, so it is not always possible or advisable to cancel one of the numbers. If two or more units are considered to be ‘Equal To’ each other they \textit{must} be in physical contact on site, and any relationship which affects one Stratigraphic Unit will automatically affect all other ‘Equal To’ Stratigraphic Units.

6 \hspace{1cm} \textbf{SAME AS?}

The ‘Same As?’ relationship is used when two or more individual Stratigraphic Units are so similar that the archaeologist considers that they once formed part of the same Stratigraphic Unit which has then been divided by later negative activity. As there is no direct physical relationship between any of these units an element of doubt will always remain, and this type of relationship should therefore be considered as a form of interpretation which should only be made during excavation when the Stratigraphic Units concerned can be physically compared with each other. The physical relationships which affect one Stratigraphic Unit need not have affected any other ‘Same As?’ Stratigraphic Units, but those relationships which do affect other units should be consistent, for example if Stratigraphic Units A and B are considered to have a ‘Same As?’ relationship, then Stratigraphic Unit C cannot ‘Cover’ unit A and be ‘Covered By’ unit B.

The integrated study of standing buildings and archaeological stratigraphy may also use an additional form of stratigraphic relationship, that of \textit{CHRONOLOGICALLY AFTER?} / \textit{CHRONOLOGICALLY BEFORE}? This is a similar type of interpretive relationships to ‘Same As?’ and is based upon the logical deductions of the archaeologist who considers that a specific Stratigraphic Unit must have occurred ‘Chronologically After?’ another Stratigraphic Unit, but cannot prove that by a direct physical relationship between the two units, for example an archaeologist may consider that the construction of a staircase leading up to a specific doorway would have occurred chronologically before that doorway was blocked, even though there was no direct physical relationship between the two units, because it would be illogical to construct a staircase which only leads up to a blocked doorway. Although this type of relationship may be useful on normal excavations for identifying specific interpretations in a similar way to the ‘Same As?’ relationship, it does introduce a large element of interpretation into the primary record, and should therefore only be used when it is absolutely necessary during the study of standing buildings.
RECIPROCAL RELATIONSHIPS

Although it may appear to be stating the obvious, but it should always be remembered that all physical relationships are reciprocal and work in both directions, for example if Stratigraphic Unit A ‘Covers’ Stratigraphic Unit B, then it is also true that Stratigraphic Unit B is ‘Covered By’ Stratigraphic Unit A. Also once a physical relationship has been established at one point on the boundary of a Stratigraphic Unit, then that relationship should remain constant in all other locations, for example if Stratigraphic Unit A definitely ‘Covers’ Stratigraphic Unit B at one point then Stratigraphic Unit A should cover Stratigraphic Unit B at all other locations.

RESTRICTED RELATIONSHIPS

The stratigraphic definition of a Stratigraphic Unit limits the possible physical relationships between units, for example two layers cannot ‘Abut’ one another because by definition the limits or boundaries of a layer should fade out if they do not ‘Abut’ a structural element, therefore either the relationship has been wrongly identified, or the stratigraphic definition was wrong and one of the two ‘layers’ is in fact the fill of a cut. Thus the restricted physical relationships between Stratigraphic Units will help to define both the correct physical relationships, and the correct stratigraphic definition of any Stratigraphic Unit.

The following RELATIONSHIP TABLES indicate which physical relationships are possible between the different types of Stratigraphic Units. These tables are based upon the previously described Principles of Stratigraphic Deposition and the resulting stratigraphic definitions of Stratigraphic Units, different principles or stratigraphic definitions will create different relationship tables.

These tables may require some explanation, as physical relationships which exist between two Stratigraphic Units will then also exist between two stratigraphic definitions of those units, each table therefore represents one stratigraphic definition. For example, the first table represents a layer, the vertical axis represents the various types of physical relationships, and the horizontal axis represents the stratigraphic definition of the other Stratigraphic Unit. A number indicates that a physical relationship is possible, and that number will indicate the reciprocal relationship. So if the LAYER TABLE is consulted along the line ‘Abuts’ it will be seen that a layer can only abut another Stratigraphic Unit with a structural stratigraphic definition, the number 10 in this case indicates the reciprocal relationship. If the STRUCTURAL TABLE is then consulted it will indicate that a vertical construction can be ‘Abutted By’ a layer, also marked as number 10.
**POSITIVE ACTIVITY**

The following physical relationships are possible, the numbers indicate the reciprocal relationship.

<table>
<thead>
<tr>
<th>(LAYER) Horizontal Deposition</th>
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<tbody>
<tr>
<td><strong>LAYER</strong></td>
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<tr>
<td>Covered By</td>
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<td>Abutted By</td>
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<td>Filled By</td>
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<td>Same As?</td>
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<td>Cuts</td>
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**Figure 22:** (LAYER) Horizontal Deposition.

<table>
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<tr>
<th>(STRUCTURAL) Vertical Construction</th>
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<tr>
<td><strong>LAYER</strong></td>
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<td>Covered By</td>
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**Figure 23:** (STRUCTURAL) Vertical Construction.
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<td>19</td>
<td>23</td>
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<tr>
<td>Abutted By</td>
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<td>Filled By</td>
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<tr>
<td>Cut By</td>
<td>-</td>
<td>-</td>
<td>24</td>
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<th>TRUNC.</th>
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<table>
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<th>TRUNC.</th>
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</tr>
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<td>Fills</td>
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<td>-</td>
<td>28</td>
</tr>
<tr>
<td>Cuts</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Figure 24:** (FILL) Contained Deposition.
NEGATIVE ACTIVITY

The following physical relationships are possible.

| Covered By | - | 20 | 27 | - | - |
| Abutted By | - | - | - | - | - |
| Filled By  | - | 22 | 28 | - | - |
| Cut By     | - | - | - | - | - |

Equal To   - - - 29 -
Same As?   - - - 29 -

Covers     - - - - -
Abuts      - - - - -
Fills      - - - - -
Cuts       3 15 24 - 30

**Figure 25:** (CUT) Probable Cut.

| Covered By | 9 | 20 | - | - | - |
| Abutted By | - | - | - | - | - |
| Filled By  | - | - | - | - | - |
| Cut By     | - | - | - | 30 | - |

Equal To   - - - - 31
Same As?   - - - - 31

Covers     - - - - -
Abuts      - - - - -
Fills      - - - - -
Cuts       4 16 25 - -

**Figure 26:** (TRUNCATION) Possible Cut.
IRREGULAR RELATIONSHIPS

Unfortunately, certain relationships cannot be identified directly by using the stratigraphic definitions of units, but the existence of these relationships may still be deduced from other evidence. These irregular relationships are exceptions, not because the system is inadequate, but because they break the basic Principles of Stratigraphic Deposition. Once these irregular relationships have been identified then they can be recorded, but their irregular nature means that they are frequently overlooked or recorded incorrectly, and this will affect the final stratigraphic sequence.

1  BURNING IN SITU

On occasions burning or intense heat will change the colour of the existing stratigraphic evidence, thus creating what may appear to be a different Stratigraphic Unit. The archaeologist therefore has to consider whether a burnt area has resulted from the re-deposition of burnt material, or from burning which has taken place in situ. If the latter is the case, then the burnt area cannot be excavated as a separate Stratigraphic Unit as the Stratigraphic Assemblage is the same. The burning should therefore be recorded as part of the underlying stratigraphic evidence.

Cracked or discoloured stones are also a sign that burning has taken place. The intensity of the burning will produce a different colour, and may change the colour of stones to red or blue depending on the intensity of the heat. If these stones are part of a structure and the burning has continued along the face of that structure, then the structure was subjected to burning, but if individual stones are burnt, then it can be presumed that they were burnt before becoming part of the structure.

2  LARGE INCLUSIONS

When large quantities of similar material are being deposited at the same time, a slight variation in the composition of the deposit may be identified as a separate Stratigraphic Unit, even though it has identical deposits both above and below it. This situation may be considered either as three different Stratigraphic Units separated by an indistinct interface, or as a single Stratigraphic Unit which contained a large inclusion of different material.

On occasions what may appear to have been a large inclusion may in fact have been the fill of a negative activity, for example a pit or post hole may suddenly become visible within a layer while it is being excavated. This occurs because the activity which created the layer continued unchanged immediately after the excavation and backfilling of the pit, thus forming the similar stratigraphic evidence both above and below the pit. In these cases the interface from which the pit or post hole was cut would have existed, but would have been very indistinct, and may therefore not have been identified.

Similar problems may be caused by deposits contained within large artefacts, for example a cremation deposit contained within a large pot or urn. It may be difficult to decide whether to consider the artefact as a separate Stratigraphic Unit or as a specific find contained within the surrounding Stratigraphic Unit. The exact sequence in which the Stratigraphic Units occurred may also be difficult to determine.
3  LAYERS WHICH ARE ALSO FILLS
Occasionally a layer may also partially backfill a cut. This may occur, either because the cut had not been completely backfilled when the layer was deposited, or because the original fill of the cut was composed of organic material which has since decomposed and allowed the covering layer to slump into the cut. Although the layer will then form the last fill of a cut, this fact is usually recorded as part of the description of the layer.

Circumstances may occur when this solution becomes impossible, and it may then be necessary to make an artificial distinction between the part of the deposit which is a fill, and the part which is a layer, and then record these two Stratigraphic Units as being equal. Although unsatisfactory, this does eliminate the problem of a cut existing without a corresponding fill, or the same layer being the fill of more than one cut. This artificial distinction may also help to identify the artefacts or ecofacts which were recovered from within individual cuts.

4  STRUCTURAL ELEMENTS WHICH ARE ALSO FILLS
Structural masonry or structural timbers may also be contained within an identifiable cut, for example a free-standing foundation may be constructed within a foundation trench. Although this form of vertical construction may stop at the level of the external contemporary ground surface, thus indicating that it was a fill contained within the limits of a cut, it may also continue to become an up-standing wall. As this represents a single construction it may be inappropriate to make an artificial distinction between the part of the unit contained within the cut and the part of the unit outside the limits of the cut. Structural masonry or structural timbers should therefore be identified and recorded as a single Stratigraphic Unit, which may also be wholly or partly contained within a cut. This type of physical relationship is indicated on the relationship tables, as both a structural element and a fill may be contained within a cut.

This type of foundation should not be confused with a trench built foundation in which the masonry material has been placed or poured into an existing cut. Unlike a structural element, this type of masonry unit would not be a faced vertical construction, and may therefore be considered to be a contained deposit.

5  FILLS OF DRAINS
The backfilling of drains occurs when the drain becomes blocked and goes out of use. Unfortunately, it is normally impossible to tell what the contemporary ground surface was at that moment in relative time. This is relatively unimportant in the stratigraphic sequence as the backfill is contained within the drain and will only have a physical relationship with that drain, but any assemblage evidence recovered from the backfill of a drain would have been deposited when the drain ceased to function, and not when the drain was constructed.

6  ANIMAL ACTIVITY
Animal burrows or holes left by decayed tree roots may be mistaken for post holes during excavation, and this mistake is only discovered when the presumed post hole suddenly turns sideways. Although this form of activity may be responsible for introducing later artefacts or ecofacts into earlier deposits it may either be ignored or recorded as an area of disturbance, for example the area of disturbance caused by the roots of a specific tree may be recorded as a tree bowl consisting of a cut and a fill indicating the presence of a tree. The cut of the tree bowl may also indicate whether the tree was allowed to root in situ, or had been deliberately removed, or fell over in a specific direction forming a ‘D’ shaped cut.
TIED IN STRUCTURAL ELEMENTS

A structural element may be tied into an earlier structural element, that is part of the earlier structural element has been removed and the later structural element has been built into the vertical cut to improve the stability. This type of relationship may be recorded by considering the later structural element as abutting the earlier structural element. Though not strictly true, this solution is an adequate compromise as this still indicates that one Stratigraphic Unit was chronologically later than the other, and that both were in existence at the same time.

An attempt to tie in a later wall to an earlier structure should not be confused with bonding, as bonded structural elements are constructed at the same time and are essentially the same Stratigraphic Unit, for example a building may be constructed with four individual walls, but as those walls are constructed at the same time and are bonded together they represent a single Stratigraphic Unit.

UNDERPINNING

Masonry structures may be underpinned, that is their foundations may have been replaced without altering the up-standing structure. This is possible because the stability of masonry structures allows them to be undercut without their collapse, if the action is limited to a small area at any one time. This contradicts the basic principle of stratification by allowing a chronologically later Stratigraphic Unit to be completed ‘Covered By’ a chronologically earlier Stratigraphic Unit, and may therefore be very difficult to recognise and record unless the underpinning construction pit or trench can be identified.

DRIVEN STAKES OR POSTS

It is impossible to tell from the stratigraphic evidence the contemporary ground surface for driven posts or stakes as they are pushed into earlier stratigraphy and later stratigraphy will abut against them, thus producing the same stratigraphic evidence. The level from which the post was driven may be inferred if the post was part of a structure or property boundary and a different stratigraphic sequence developed on either side of this physical division. If the post decays and is replaced by a post ghost then the only point which can be identified from the stratigraphic evidence is the moment of destruction when the post ceased to exist and the stratigraphic evidence was covered, and this may not correspond with the point when the post ceased to be part of a structure.

VOIDS

Voids may have been caused by a number of different processes such as structural collapse or water activity, but the most significant of these processes is the decomposition of timber. Most voids can either be ignored or considered as an integral part of other Stratigraphic Units, but if a void can be positively identified as being the result of decomposed timber then it should be recorded as if the timber was still present, but described as a void.
11 RE-EMERGING INTERFACE

A re-emerging interface may produce the same stratigraphic evidence as the original stratigraphic evidence, and is therefore very difficult to identify, but in certain circumstances this may be deduced. In these cases the consolidated interface resulting from a positive activity corresponds perfectly with the interface resulting from a later negative activity which has re-exposed and cleared the earlier interface, for example the vertical interface formed by the walls of a stone lined cess pit. The consolidated nature of the earlier interface would in effect limit and define the shape of any later negative activity. Any later stratigraphic evidence may also resemble the evidence which has been removed, it may therefore be difficult to identify such activity as an anomaly and therefore as a cut. For example, a stone lined cess pit may be filled up and emptied out many times, but only the last fill in this sequence would become archaeological stratigraphy. When this fill is removed the archaeologist is actually emptying a pit which corresponds to the shape of the stone lining.

The interface of a Stratigraphic Unit may therefore never re-emerge once it has been covered, as the area re-exposed is, in fact, not the consolidated interface of the original positive activity, but the interface of the later negative activity. For example, a mortar floor surface which is completely covered and then partially cleared will become re-exposed, but the re-exposed area of the floor is actually the interface of a negative activity.

12 TRUNCATIONS

Although not exactly an irregular relationship, a truncation cut should be used with great caution as the precise limits of the area affected may be open to several alternative interpretations. This may also cause confusion with the physical relationships between other Stratigraphic Units, for example if a backfilled pit is found under a suspected truncation cut then it is impossible to tell whether the pit was excavated before or after the truncation cut. The order in which these events occurred cannot therefore be identified, and may have to be deduced. Although this situation is highly unsatisfactory, it is frequently the only way to explain the observed stratigraphic evidence.

A particular form of truncation cut will occur if an area is cultivated. This would ‘turnover’ the underlying stratigraphic evidence, but leaves the disturbed material in roughly the same general location, thus forming a single deposit with a varied composition within which different material may be observed in different areas, for example if ploughing activity occurs in the area of a covered wall, then fragments of the wall will be broken off by the plough but will remain in the same general location, thus forming a ‘ghost’ of the underlying wall. The more frequently that this occurs, the more mixed the deposit should become until it reaches a uniform composition, and it may then become difficult to distinguish this deposit from a normal layer, though the underlying interface may be less distinct. If this form of activity can be identified then the mixed deposit may be considered as a specific form of activity which may have occurred only a few times, and the underlying stratigraphy evidence may be considered as having been truncated.
2 SEQUENTIAL RELATIONSHIPS BETWEEN STRATIGRAPHIC UNITS

Although a Stratigraphic Unit may have many physical relationships, only a few of these will be sequential relationships. These sequential relationships are more important than the physical relationships, as they indicate the chronological order in which individual Stratigraphic Units occurred, and not just the physical extent of individual units. The sequential relationships will therefore form the stratigraphic sequence by indicating if a specific Stratigraphic Units occurred either directly 'Before', or directly 'After' other Stratigraphic Units in relative time, or whether the specific Stratigraphic Units may be considered to be ‘Contemporary’ with other Stratigraphic Units.

1 BELOW (BEFORE)

The following physical relationships will contain the sequential relationships with chronologically later Stratigraphic Units.

Covered By / Abutted By / Filled By / Cut By

2 CONTEMPORARY

The following physical relationships will contain the sequential relationships with Stratigraphic Units which were considered to be contemporary.

Equal To / Same As?

3 ABOVE (AFTER)

The following physical relationships will contain the sequential relationships with chronologically earlier Stratigraphic Units.

Covers / Abuts / Fills / Cuts

All physical relationships will depend upon the precise position of the limits or boundaries of individual Stratigraphic Units. By defining individual Stratigraphic Units and then restricting the physical relationships between different stratigraphic definitions it may be possible to check that these limits or boundaries and the resulting physical relationships are logically correct. The correct physical relationships may then be used to identify the limited number of sequential relationships required to complete the stratigraphic sequence. Any errors or omissions in the precise position of these limits or boundaries should therefore be identified and corrected as soon as possible during excavation, as all further recording and interpretation will depend on the accuracy of these limits or boundaries.

NOTE

Confusion frequently surrounds the correct use of these terms. When describing (SU 10) it is possible to say that (SU 10) ‘Covers’ (SU 20) (physically) and that (SU 10) is ‘Above’ (SU 20) (both physically and within the stratigraphic sequence), and it is therefore also true to say that (SU 10) occurred ‘Above’ and ‘After’ (SU 20) in relative time.
2.1.3 THE IDENTIFICATION OF INDIVIDUAL STRATIGRAPHIC UNITS

The identification of individual Stratigraphic Units may therefore occur at several different stages during excavation. Usually the initial identification of Stratigraphic Units is based upon the composition and limits or boundaries of the individual units, but these may change as more information becomes available. These changes may affect not only the individual Stratigraphic Unit being identified, but also other surrounding Stratigraphic Units. To fully understand the significance of these changes it is therefore necessary to consider the various stages which occur during identification, and how these stages relate to each other.

<table>
<thead>
<tr>
<th>THE IDENTIFICATION OF INDIVIDUAL STRATIGRAPHIC UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 COMPOSITION</td>
</tr>
<tr>
<td>1 Identification of Form of Activity, either Positive Activity or Negative Activity.</td>
</tr>
<tr>
<td>(Normally Positive Activity as Negative Activity is inferred from the identification of fills or missing deposits.)</td>
</tr>
<tr>
<td>2 Identification of the Physical Definition.</td>
</tr>
<tr>
<td>(DEPOSIT, SKELETON, MASONRY, TIMBER, INTERFACE)</td>
</tr>
<tr>
<td>2 LIMITS OR BOUNDARIES</td>
</tr>
<tr>
<td>1 Identification of the precise limits or boundaries of the Stratigraphic Unit.</td>
</tr>
<tr>
<td>(All stratigraphic evidence must be contained within a Stratigraphic Unit.)</td>
</tr>
<tr>
<td>2 Identification of the Stratigraphic Definition.</td>
</tr>
<tr>
<td>(LAYER, STRUCTURAL, FILL, CUT, TRUNCATION)</td>
</tr>
<tr>
<td>(At this point Negative Activity may be identified)</td>
</tr>
<tr>
<td>3 RELATIONSHIPS</td>
</tr>
<tr>
<td>1 Identification of the Physical Relationships.</td>
</tr>
<tr>
<td>2 Identification of the Sequential Relationships from the Physical Relationships.</td>
</tr>
</tbody>
</table>

NOTE
These stages are in no specific order as they are frequently reconsidered retrospectively before a final decision is reached.

Figure 27: The identification of individual Stratigraphic Units.

The identification of individual Stratigraphic Units may therefore be considered as the most important and the most limiting interpretation of the stratigraphic evidence, and once made this interpretation has been made on site it should not be open to re-interpretation during post-excavation.
2.2 THE ASSEMBLAGE EVIDENCE

To become part of the assemblage evidence an artefact or ecofact must have survived within the burial environment. During burial, objects are open to biological, chemical and physical decay. The extent of the damage sustained will depend upon the chemical and physical structure of the object, and the nature of the burial environment.

Oxygen and moisture are necessary for most decay processes to take place, therefore environmental conditions which are low in oxygen or without moisture will cause minimal decay. Waterlogged conditions or fine damp clay can be expected to be low in oxygen content, and many organic materials which would have totally disappeared in damp soil or sediment will have survived in waterlogged environments. Metals objects will also have decayed less within low oxygen environments or dry conditions.

The acidity or alkalinity of the soil will also affect the extent to which objects decay. Acidity and alkalinity can either aid or hinder decay depending on their concentration and the chemical composition of the buried materials. Neutral environments, being neither acidic nor alkaline, usually contribute less to the decay of objects. Bedrock, vegetation and human activity may influence localised concentrations of acidity or alkalinity and these may vary widely over the area of a site.

Objects decay rapidly during their initial period of burial, until they have reached a balance with their environmental conditions, any later change in the environmental conditions may initiate further decay. The extent of this decay may vary from minimal decay to total decay, for example metal objects may eventually consist of nothing more than corrosion. The age of the object is not necessarily a factor in its preservation.
2.2.1 STRATIGRAPHIC ASSEMBLAGES

The assemblage evidence may be considered on several levels.

1 AS INDIVIDUAL ARTEFACTS OR ECOFACTS
Assemblage evidence may be examined as individual objects. This would include the identification of individual artefacts, and consideration of the manufacture and design of these objects in an attempt to understand their possible function. Ecofacts may also be examined individually as single objects within an environment.

2 AS AN INDIVIDUAL STRATIGRAPHIC ASSEMBLAGE
To understand the full importance of the assemblage evidence, it is necessary to identify which other objects may have been deposited at the same time, and the location from which those individual artefacts and ecofacts were recovered. All assemblage evidence is therefore divided into individual collections of artefacts and ecofacts, defined by the limits or boundaries of the Stratigraphic Unit from which they were recovered. These separate collections are the basic units of the assemblage evidence, and are referred to as the STRATIGRAPHIC ASSEMBLAGE of a specific Stratigraphic Unit. A Stratigraphic Assemblage would indicate the physical location from which objects were recovered, and may also allow an estimate of the historic date and possible nature of the original activity which created the Stratigraphic Unit.

3 AS A COLLECTION OF ARTEFACTS AND ECOFACTS RECOVERED FROM A SPECIFIC GEOGRAPHICAL LOCATION
All the artefacts and ecofacts recovered during excavation will have been found within a specific geographical location. If the location from which the object originated can also be identified and established, then it is possible to conclude that, at some point, these objects were transported from their original location to their present location. This will allow for the potential study of transport networks and the economic trade in individual objects. This would also include artefacts and ecofacts which were not identified as having been recovered from a specific Stratigraphic Unit but which were recovered during the excavation, for example artefacts or ecofacts recovered during machining will not belong to a specific Stratigraphic Assemblage, as they were recovered from many different Stratigraphic Units, and though these artefacts or ecofacts are normally grouped together and are recorded as being UNSTRATIFIED they were still recovered from geographical location of the excavation.
The division of assemblage evidence into Stratigraphic Assemblages may therefore be defined by the following Stratigraphic Assemblage Policy:

---

**STRATIGRAPHIC ASSEMBLAGE POLICY**

**EVERY INDIVIDUAL ARTEFACT OR ECOFACT SHOULD BE IDENTIFIED AS BEING**

1. EITHER RECOVERED FROM AN INDIVIDUAL STRATIGRAPHIC UNIT AND THEREFORE PART OF A SPECIFIC STRATIGRAPHIC ASSEMBLAGE

2. OR UNSTRATIFIED AND THEREFORE RECOVERED FROM THE GEOGRAPHICAL LOCATION OF THE EXCAVATION.

**Figure 28: Stratigraphic Assemblage Policy.**

The composition of Stratigraphic Assemblages is established using a number of basic principles which describe the way in which a Stratigraphic Assemblage is related to the deposition of individual Stratigraphic Units. These may be collectively referred to as the PRINCIPLES OF ASSEMBLAGE FORMATION.

1. If an artefact or ecofact is added to an existing Stratigraphic Assemblage, that assemblage will become a different Stratigraphic Assemblage.

2. If an artefact or ecofact is removed from an existing Stratigraphic Assemblage, that assemblage will remain the same, but will be diminished or incomplete.

3. If an individual artefact or ecofact is removed from a Stratigraphic Assemblage by negative activity, then it can never again form part of that assemblage, even if it is replaced in the same physical location, as it will then form part of a different Stratigraphic Assemblage.

4. If all or part of a Stratigraphic Assemblage is moved to a different physical location by negative activity, then it will become a different Stratigraphic Assemblage, even if no new artefacts or ecofacts have been added, as it will no longer be in the position in which it had originally been deposited.

To fully understand the significance of these principles and the composition of an assemblage, it is necessary to consider what the individual Stratigraphic Assemblages physically represent in both absolute and relative time.
1 WHAT DO ASSEMBLAGES PHYSICALLY REPRESENT?

Although a Stratigraphic Assemblage will be defined as the collection of artefacts and ecofacts which formed all or part of a Stratigraphic Unit, this is only a potential assemblage until those individual artefacts and ecofacts are observed and retrieved. The physical representation of a Stratigraphic Assemblage is therefore dependent upon the RECOVERY of individual artefacts and ecofacts from individual Stratigraphic Units.

1 AN ARTEFACT

Artefacts are objects which are the product of human manufacture, and may form all or part of a Stratigraphic Unit. These objects are normally categorised by the material from which they are made or the function they were meant to fulfil.

CERAMICS

Ceramics include all forms of objects manufactured from fired clay. This includes handmade pottery, thrown pottery or other forms of ceramics produced using moulds, for example decorated pottery or ceramic statues. This may also include the by-products of ceramic production such as wasters and kiln furniture.

WORKED BONE

Worked bone would include any bone objects which have been deliberately worked by humans, for example bone combs or bone needles as well as worked or shaped horn and ivory, but this does not include bone which has been cut by butchery marks.

METAL OBJECTS

Metal objects may have been worked or shaped into a wide variety of different forms, for example coins, personal jewellery, domestic objects, tools, or simply various types of nails. These objects may consist of a single metal or combinations of different metals including iron, bronze or lead as well as precious metals. This category also includes waste products from manufacture or smelting, for example solidified metal, pig iron or metal slag.

GLASS

Glass may include fragments of both glass objects and window glass, as well as melted glass and glass slag.
BUILDING MATERIAL
Building material will consist of any objects manufactured from fired clay or worked objects used in construction, for example brick, tile, worked stone or architectural fragments, as well as mortar or plaster. This may include building material which was recovered as part of a deposit or as a masonry Stratigraphic Unit.

WORKED FLINT
Worked flint includes individual objects such as arrowheads or hand axes as well as the waste flakes produced during the manufacture.

Under specific damp or waterlogged conditions additional artefacts may have survived. These would include,

WOODEN OBJECTS
Wooden objects include individual artefacts which have been deliberately worked by humans, for example small domestic objects such as wooden bowls or spoons.

TIMBER
Timber includes any large lengths of wood which have been deliberately worked or shaped by humans and used as building material, for example planks and posts. This would include timber which is not an identifiable structural element, but which was recovered as part of a deposit.

LEATHER
Leather objects or fragments may also have survived in waterlogged conditions. This may include such varied objects as shoes, belts, buckets or clothing.

TEXTILES
Fabric objects or fragments may also have been preserved. This would include objects made from animal hair, for example felt or woollen fragments, or objects made from plant fibre, such as linen. Fragments of paper or papyrus may also have survived, and these may be treated in the same way as textiles.
2 AN ECOFACT

Ecofacts are the remains of living plants or animals. In broad terms these may be considered as the product of the natural environment of a particular region or period.

ANIMAL REMAINS
Animal remains include animal bone, teeth, hooves or horn from domesticated or wild animals. This category would also include rodent, bird and fish remains.

HUMAN REMAINS
Human remains include bones, teeth or hair from individual human skeletons. This category would also include human remains which are not part of an identifiable skeleton, either articulated or disarticulated, but which were recovered as part of a deposit.

PLANT REMAINS
Plant or tree remains would include carbonised or waterlogged seeds, nuts, pollen or leaves.

INVERTEBRATE REMAINS
Invertebrate remains would include mollusc shells or insect eggs or cases, as well as parasite eggs.

Individual artefacts or ecofacts may occur in combinations of two or more categories, either because of the materials used, for example a bone comb is both an artefact and an ecofact, or because they have been re-used to fulfil a different function, for example ceramic amphorae may have been re-used as building material. Some objects may be very complex and may consist of several different materials, for example a medieval saddle may be made from wood with a leather seat stuffed with grass or horsehair and nailed with iron studs. These object may be studied as individual artefacts, as well as allowing a study of the individual materials from which they were constructed or the function to which they were put.
3 A STRATIGRAPHIC ASSEMBLAGE

The individual artefacts and ecofacts which form a Stratigraphic Assemblage are not those which have survived decay, but those which have been recovered. Any artefacts or ecofacts which are not recovered will not form part of the assemblage evidence, and their existence will remain unknown. The recovery of individual artefacts or ecofacts will be affected by RECOVERY BIAS which will influence the composition of the final Stratigraphic Assemblage. This bias may affect both the total number of artefacts and ecofacts recovered, and the types of artefacts and ecofacts recovered. A recovery bias may be introduced into an individual Stratigraphic Assemblage by the excavational and recovery techniques used.

EXCAVATIONAL TECHNIQUES

The excavational techniques used will affect the observation, and therefore the recovery of individual artefacts and ecofacts, for example individual artefacts will be more easily observed during the excavation of an area by trowel, than if the same area had been excavated by pickaxe and shovel, or by machine. The soil type or colour may make specific artefacts or ecofacts more obvious and therefore more likely to be recovered, for example Samian pottery is red and shiny and therefore more obvious than a darker type of pottery. This may introduce a recovery bias against objects which are dark or the same colour as the background soil. The size of individual artefacts or ecofacts may also affect observation and recovery, as small objects will be less obvious and therefore less likely to be recovered using certain excavational techniques. This may introduce a recovery bias against small objects or objects which fragment.

RECOVERY TECHNIQUES

It is inevitable that some form of selection will be made by archaeologists when observing and recovering individual artefacts and ecofacts. A realistic Recovery Policy must therefore be established at the start of any excavation to ensure that this selection is consistent and not arbitrary. This policy will indicate the recovery techniques to be used for different types of Stratigraphic Units, and the type and quantity of artefacts and ecofacts which are expected to be recovered. Unfortunately the application of the Recovery Policy by individual archaeologists may differ, and this may also introduce a recovery bias into the final Stratigraphic Assemblage.

The actual recovery techniques indicated by the Recovery Policy may also introduce a bias into the final Stratigraphic Assemblage. The most effective technique for recovering a total Stratigraphic Assemblage is to sample the entire deposit and use flotation and sieving methods to retrieve the individual artefacts and ecofacts. This type of sampling is not practical on large excavations. Normally only specific deposits are sampled, and artefacts and ecofacts are usually observed and then recovered by hand during excavation. The recovery techniques used will therefore not only affect the total number of artefacts and ecofacts recovered, but will also lead to bias in the type of artefacts or ecofacts recovered, for example rodent bones are so small that they are normally only recovered from samples, thus Stratigraphic Assemblages which were not sampled will normally not contain rodent bones.

Although some of the factors which affect recovery bias can be identified and recorded, they cannot be accurately quantified or taken fully into account when considering the individual artefacts and ecofacts as part of a Stratigraphic Assemblage. There is no means of checking that an individual Stratigraphic Assemblage has been recovered and recorded correctly or represents the original artefacts or ecofacts deposited with the Stratigraphic Unit.
2 WHAT DO ASSEMBLAGES REPRESENT IN ABSOLUTE TIME?

To fully understand what a Stratigraphic Assemblage represents it is essential to consider the difference between the individual activities which produced the assemblage, and the evidence of those activities, within a chronological context.

1 AN INDIVIDUAL ACTIVITY

Although each Stratigraphic Assemblage consists of the individual artefacts and ecofacts deposited as part of an individual activity, the individual elements within that assemblage are the consequence of a number of separate activities. It is therefore necessary to consider the absolute time period represented by each artefact and ecofact individually, as well as the absolute time period represented by the individual Stratigraphic Assemblage, as this may explain some of the difficulties involved in dating and interpreting the individual Stratigraphic Assemblages.
1 AN INDIVIDUAL ARTEFACT

All artefacts recovered during excavation are unique, and will have a different history of manufacture and use. It is therefore necessary to consider individual artefacts on a theoretical basis, first as a SINGLE ARTEFACT, and then, as one of a number of similar ‘mass produced’ artefacts which form a recognisable ARTEFACT TYPE.

A SINGLE ARTEFACT

A single artefact recovered from an archaeological excavation may represent a maximum of three different dates in absolute time:

1 The date of manufacture.
2 The date of breakage or loss.
3 The date of burial.

The absolute time between the date of manufacture and the date of breakage or loss will represent the life-span of the individual artefact, that is the amount of absolute time the artefact remained intact, and may have influenced, or been influenced by contemporary activity. The date of manufacture and the date of breakage or loss can also indicate exactly when the individual artefact may be considered to have been IN USE, that is the dates in absolute time within which the artefact was used to fulfil the function or purpose for which it was originally designed.
A SINGLE ARTEFACT

THE LIFE-SPAN OF A SINGLE ARTEFACT

ABSOLUTE TIME

Date of Manufacture

Date of Burial

Date of Breakage or Loss

Figure 29: The absolute time a single artefact remained in use.
1 DATE OF MANUFACTURE
This is the date in absolute time when an artefact was made. The accuracy of this date may depend upon the type of artefact, for example variations in form or material used in manufacture may be associated with specific historic periods or locations. The date of manufacture may also be written on the artefact, for example the date of manufacture may be written on coins or on inscriptions, though this may also be the date of an event commemorated by those objects, and not their date of manufacture.

2 DATE OF BREAKAGE OR LOSS
This is the date when a single artefact was broken or lost, and marks the end of the life-span of the artefact. This may have occurred immediately after manufacture, or an artefact may have continued in use for many hundreds of years after manufacture. Although this date will be different for each individual artefact, it may be possible to estimate the average life-span of specific artefact types.

THE LIFE-SPAN OF A SINGLE ARTEFACT
An estimate of the life-span of an artefact will depend upon:

1 The durability of the artefact. (The material and method of manufacture)
2 The function the artefact was designed to fulfil. (A good or bad design for the function)

These factors may be used to give an expected life-span for an artefact, for example a well made and designed cooking pot may have had an expected life-span of ten years in normal use, but this expected life-span will also be affected by the way in which the artefact was actually used or valued by the contemporary population.

1 AS A SPECIAL ARTEFACT
An artefact which was necessary for everyday life or which would be difficult to replace may have been considered as ‘special’. This may reflect the rarity of the artefact, or the cost of the artefact, or even the sentimental value attached to a specific artefact. Artefacts which were considered as ‘special’ may have been looked after and used differently from those which were considered ‘ordinary’. They may therefore have had a longer than expected life-span, for example a fragile clay lamp may have been a rarity and therefore been used with care, and thus had a longer than expected life-span.

2 AS AN ORDINARY ARTEFACT
An artefacts which was considered as ‘ordinary’ would have been used normally and would therefore have had an expected life-span, for example a poorly designed and made cooking pot would have had a shorter life-span than a well designed and well made cooking pot.

3 AS A COMMON ARTEFACT
An artefact which was considered as ‘common’ may have been regarded as unimportant or easily replaced and may therefore have had a shorter than expected life-span, but this may vary greatly as this type of artefact may also have been re-used to fulfil a different function, for example a Roman amphora may have been designed for the transportation of oil, but may then have been re-used for storage, or building material, or for the burial of human bodies. If an artefact was re-used it would change the expected life-span, and the date of breakage or loss would become to a certain extent unpredictable.
THE ABSOLUTE TIME A SINGLE ARTEFACT REMAINED IN USE

The date of manufacture and the date of breakage or loss should normally indicate when an individual artefact was ‘in use’. These dates are unpredictable as each individual artefact will have been affected by different activities. As a general rule, an artefact which was considered ‘special’ would be more distinctive, and the date of manufacture may be easier to establish, but the life-span, and therefore the date of breakage or loss may have varied greatly. The life-span of an ‘ordinary’ artefact may be more predictable, but the date of manufacture may be more difficult to establish, so the element of uncertainty may remain roughly the same. An artefact which was considered as ‘common’ may be totally unpredictable, especially if it had been re-used.

3 DATE OF BURIAL

This is the date when the artefact became part of the archaeological stratigraphy, and will be the same as, or chronologically later than the date of breakage or loss. The time between the date of breakage or loss and the date of burial will represent the absolute time that the artefact, or fragments of the artefact, remained on the contemporary ground surface before they become incorporated within a Stratigraphic Unit, and is therefore dependent, not upon the individual artefact, but upon the individual activities which formed the stratigraphic evidence. This distinction is based on the assumption that once an artefact had been broken or lost it was no longer considered as an artefact by the contemporary population and so could become part of the stratigraphic evidence.
AN ARTEFACT TYPE

Although no handmade artefacts will ever be identical, mass produced artefacts will have only minor differences, and will be sufficiently similar to be identified as the result of the same production process. These artefacts may therefore be considered as forming a distinct artefact type. An artefact type should be defined in such a way as to distinguish it from other artefact types, but still allow for minor variations between individual artefacts. This is normally done by identifying a number of key characteristics which define a specific artefact type. An individual artefact may then be compared to this definition, and the number of key characteristics which can be identified will indicate the level of similarity. As an artefact type consists of a number of nearly identical artefacts produced over a long period of absolute time it may represent four dates in absolute time:

1. The date of first manufacture.
2. The start of common use.
3. The date of last manufacture.
4. The end of common use.

These dates will indicate when the artefact type may be considered to have been IN COMMON USE, that is the dates in absolute time within which the artefact type could be expected to have been used regularly within a specific location.
Figure 30: The absolute time an artefact type remained in common use.
1 DATE OF THE FIRST MANUFACTURE
This is the date in absolute time when the first artefact of a new artefact type was made. This date may be known from historic documents or it may have been established by excavating the site of manufacture, though the accuracy of this date may be difficult to establish, and may always remain uncertain.

2 THE START OF COMMON USE
This is the theoretical date in absolute time when the first artefact of an artefact type was used within a specific location. This date will occur after the date of first manufacture, but if the artefact type was not manufactured locally then it would have had to have been moved to its present location, so additional time may have been spent in transportation and establishing a regular supply.

3 DATE OF THE LAST MANUFACTURE
This is the date in absolute time when the last artefact of an artefact type was made. This date would indicate either that production of that artefact type had stopped, or that the artefact type had changed sufficiently to be considered as a new artefact type.

4 THE END OF COMMON USE
This is the theoretical date in absolute time when the last artefact of an artefact type was broken or lost within a specific location, and indicates when that artefact type was considered to have gone out of common use. Although individual artefacts may have survived and been in use after this time, that use may be considered as being ‘unusual’, for example although complete Samian bowls exist today, none are in ‘common use’, therefore at a certain point in time after the supply of new Samian bowls had stopped the remaining Samian bowls would have ceased being everyday artefacts and become rare or unusual artefacts. The application of the concept of common use therefore allows an estimate of the date of last use to be made. This date may mark a distinct end to an artefact type, or it may be an arbitrary point on a gradual fading out of the use of the artefact type. Theoretically, the date of the last use may not be later than the date of last manufactured plus an average life-span of an artefact from the artefact type, but the date of last use may have occurred earlier within a specific location if there had been a break in supply.

THE ABSOLUTE TIME AN ARTEFACT TYPE REMAINED IN COMMON USE
The absolute time an artefact remained ‘in common use’ within a specific location will therefore be the time between the dates of first and last use. Unfortunately, these dates are difficult to establish, as they do not take into account other factors such as the regular supply of artefacts and the unpredictable life-span of individual artefacts. It may therefore be more appropriate to approach the problem from the opposite direction by initially estimating expected dates of first and last use within a specific location based on the dates of manufacture. These dates may then be open to constant review and revision, which will refine or ‘fine tune’ the dates by taking into account increasing amounts of local information. Establishing the dates of first and last use for a specific location would then become a process of continual trial and error, until a point is reached where there are consistent results. Although this process is initially dependent upon preconceived assumptions of what the archaeologist believes the results should be, it should eventually produce reasonably accurate dates if those dates are kept under constant review.
Once the dates of first and last use are established within a specific location, it may be possible to assume a theoretical pattern of regular use within that time period based upon four consecutive stages:

1  A GRADUAL INCREASE IN USE
During this stage a gradual increase in the number of artefacts ‘in use’ will occur as the artefact type becomes more popular or more readily available. This increase will continue until a level of regular use has been reached.

2  REGULAR USE
As artefacts are used, broken and then replaced a steady turnover of individual artefacts will occur. During this stage the number of artefacts actually ‘in use’ may be constant, or it may reach a peak while the artefact type was most popular or in greatest supply. The majority of individual artefacts would have been broken or lost during this period.

3  A GRADUAL DECREASE IN USE
At a certain point the manufacture or supply of replacement artefacts will stop, and the numbers of artefacts ‘in use’ will gradually decline as the remaining artefacts are broken or lost, until a point is reached when the last surviving artefacts are ‘unusual’, and can no longer be considered as being ‘in common use’. This may be a gradual decrease in the number of artefacts ‘in use’, or a sudden collapse, possibly due to breaks in manufacture or supply.

4  OCCASIONAL OR NO USE
This stage represents the period when the artefact type was no longer ‘in common use’. Even if individual artefacts had survived and were being used during this period, it would be impossible to distinguish these from earlier artefacts.

This theoretical pattern assumes a constant and consistent manufacture and supply of artefacts to a specific location and their regular use. Any sudden change in manufacture, supply or use would distort this theoretical pattern.

THE MEAN DATE
When an individual artefact is recovered it is impossible to tell whether it was the first or last artefact of that type to have been used within a specific location. The MEAN DATE of an artefact type may therefore be considered as a single theoretical date when an individual artefact would most likely have been ‘in use’, but as this is a single date it will not reflect the amount of absolute time an artefact type remained ‘in common use’.

For an artefact type with an unknown pattern of use within a specific location the MEAN DATE would be half way between the ‘start of common use’ and the ‘end of common use’, however if the pattern of use has been established then the MEAN DATE should represent the date of peak use as this would be the single theoretical date when an individual artefact would most likely have been ‘in use’.
2 AN INDIVIDUAL ECOFACT

Although all ecofacts are individual, their life cycle may be represented by three different dates in absolute time:

1 The date of birth.
2 The date of death.
3 The date of burial.

These dates will define the life-span of individual ecofacts, but unlike artefacts, different dates and absolute time periods can be established from this assemblage evidence.
Figure 31: The life-span of an individual ecofact in absolute time.
1 DATE OF BIRTH
This is the date in absolute time upon which the individual ecofact was born or germinated. The type and number of species may indicate the environmental conditions in a specific location at this time, for example the area may have been farmland or forest or salt water marsh.

2 DATE OF DEATH
This is the date when the individual ecofact died. Although this date is difficult to estimate, in certain circumstances it may be possible to establish the date accurately by using C14 or dendrochronology dating techniques. These are normally the only methods of directly dating individual ecofacts which are preserved within the archaeological stratigraphy.

THE LIFE-SPAN OF AN INDIVIDUAL ECOFACT
The life-span of an individual ecofact may therefore also reflect environmental conditions within a specific location, for example a longer than expected life-span may indicate less harsh environmental conditions and a higher rate of survival. This may also indicate that animals or vegetation were killed or cut down at a specific point within their life cycle, as part of a human economic strategy. A clearer picture of the environment conditions may be gained by considering as many contemporary ecofacts as possible.

3 DATE OF BURIAL
This is the date when the ecofact was buried. This date is normally difficult to determine using normal comparative methods, as ecofacts do not vary or change as much as artefacts over time, for example it may be possible to distinguish Roman pottery from medieval pottery, but it may not be possible to tell a Roman pig bone from a medieval pig bone.

Ecofacts may therefore be considered as forming two distinct types:

1 ECOFACTS WHICH WOULD BE BURIED SOON AFTER THE DATE OF DEATH
In these cases the date of death may be considered as corresponding to the date of burial, for example human bodies or carbonised seeds.

2 ECOFACTS WHICH WERE USED AS THE RAW MATERIALS FOR MANUFACTURE OF ARTEFACTS AFTER DEATH
In these cases the ecofacts should now be considered as artefacts. Although it may be possible to determine the date of death of these ecofacts from C14 or dendrochronology, the date of burial may have occurred sometime after the date of death, and may therefore be more difficult to establish.
3 AN INDIVIDUAL STRATIGRAPHIC ASSEMBLAGE

The composition of an individual Stratigraphic Assemblage is not instantaneous, and the individual artefacts and ecofacts which form a Stratigraphic Assemblage are normally gathered together over a long period of absolute time. An individual Stratigraphic Assemblage may therefore be considered as representing two consecutive periods of absolute time:

1. The deposition of artefacts and ecofacts on the contemporary ground surface.
2. The deposition of artefacts and ecofacts within a Stratigraphic Unit.
AN INDIVIDUAL STRATIGRAPHIC ASSEMBLAGE

ABSOLUTE TIME

FORMATION OF THE S.U.

Start of Deposition

End of Deposition

HISTORIC DATE

Figure 32: An individual Stratigraphic Assemblage in absolute time.
1 THE DEPOSITION OF ARTEFACTS AND ECOFACTS ON THE CONTEMPORARY GROUND SURFACE

If it is considered that artefacts are either broken or lost at a more or less even rate during long periods of occupation, then the majority of artefacts will have been deposited on a contemporary ground surface before they became incorporated within the material which will eventually form a Stratigraphic Unit. Other artefacts or ecofacts may have remained on the contemporary ground surface until they were covered by later stratigraphic evidence and thus became part of a Stratigraphic Unit. This time period would therefore represent the absolute time between the dates of breakage or loss of individual artefacts, and their collective date of burial.

2 THE DEPOSITION OF ARTEFACTS AND ECOFACTS WITHIN A STRATIGRAPHIC UNIT

Individual artefacts and ecofacts may also have been deposited in a specific location while a Stratigraphic Unit was being formed, and thus became included within that Stratigraphic Unit as part of the Stratigraphic Assemblage. This time period should therefore correspond to that of the original activity which created the Stratigraphic Unit from which the assemblage was recovered.

THE ABSOLUTE TIME TAKEN TO FORM THE STRATIGRAPHIC ASSEMBLAGE

The individual artefacts and ecofacts which form a Stratigraphic Assemblage will therefore have two common factors, the location in which they were deposited, and the absolute time period in which they were deposited. These artefacts and ecofacts may also be associated with either the activities which occurred on a contemporary ground surface such as domestic occupation, or with the activity which formed the Stratigraphic Unit, but there may also be no direct connection between the individual artefacts and ecofacts which make up the assemblage and the original activity which produced the Stratigraphic Unit.

THE HISTORIC DATE

The date which marks the end of the formation of an individual Stratigraphic Assemblage may be considered as the HISTORIC DATE of that Stratigraphic Assemblage. This date corresponds to the historic date of the activity which created the Stratigraphic Unit from which the assemblage was recovered.

The assemblage evidence from an individual Stratigraphic Assemblage may therefore have been composed of many individual activities, representing many different dates in absolute time, but only a limited number of these will have affected and been preserved within the archaeological stratigraphy. Although the differences between these dates may be small and not archaeologically significant, consideration of these possible variations or factors may explain the element of uncertainty which exists in any attempt at establishing the historic date for a specific activity.
2 EVIDENCE OF AN INDIVIDUAL ACTIVITY

In theory, an individual Stratigraphic Assemblage will contain the artefacts which were ‘in common use’ when the assemblage was deposited, and these may possibly have been associated with the original activity which formed either the Stratigraphic Assemblage, or the Stratigraphic Unit. In practice, many Stratigraphic Assemblages will also contain an element of CONTAMINATION, that is artefacts or ecofacts which were not ‘in common use’ during the time the assemblage was deposited, and therefore could not have been associated with the activity which formed either the Stratigraphic Assemblage, or the Stratigraphic Unit.

The most common form of contamination is caused by negative activity which will have removed existing stratigraphic evidence from its original position and re-deposited that material in the form of a new Stratigraphic Unit. This material may contain chronologically earlier artefacts or ecofacts, and these would then become incorporated into a new Stratigraphic Assemblage, for example a Saxon ditch may have been cut into stratigraphic evidence containing Roman artefacts or ecofacts. Some of these artefacts and ecofacts may then have become incorporated into the bank formed by the up-cast from the ditch, and eventually as the bank is eroded, also become incorporated into the fill of the ditch. These chronologically earlier artefacts or ecofacts would then have contaminated any Stratigraphic Assemblage formed from artefacts or ecofacts which were ‘in common use’ when the ditch was backfilled.

There is also some evidence that artefacts or ecofacts may not stay in the same location once they have been deposited. The movement of artefacts or ecofacts after deposition may have occurred under certain environmental conditions, and have been influenced by the type of soil, for example freeze thaw action and frost heaving may move artefacts or ecofacts to the surface, or the drying and cracking of the ground may allow small artefacts or ecofacts to fall down cracks. Artefacts or ecofacts may also have been ‘pressed’ into lower deposits by movement on damp or muddy surfaces. Natural activities may have moved artefacts or ecofacts, either due to tree roots or animal action, for example artefacts or ecofacts may be brought to the surface by rabbit or mole action, and worm action may also have moved artefacts. The amount of movement may depend on the size and shape of the artefact, for example if movement does occur small artefacts may move, or move further, than large artefacts, and this may particularly affect coins.

Contamination may also be introduced into an assemblage by the incorrect observation and recovery of individual artefacts or ecofacts. The limits or boundaries of each individual Stratigraphic Assemblage will be defined by the interface which marks the edge of the Stratigraphic Unit. Although excavating to this precise interface is expected, it is not always possible, and it should be recognised that there may be over digging or under digging. Under digging may leave chronologically later artefacts or ecofacts to be recovered from earlier Stratigraphic Assemblages, and this will affect artefacts or ecofacts which have been deposited on the interface when it was the contemporary ground surface. Over digging may introduce chronologically earlier artefacts or ecofact into the later Stratigraphic Assemblages. Of these two sins over digging will probably introduce the least contamination into a Stratigraphic Assemblage, though it may also remove stratigraphic evidence. Individual artefacts or ecofacts may also become contamination if they were placed in the wrong finds bag, or if the bag was wrongly labelled.
The individual artefacts and ecofacts which form a Stratigraphic Assemblage may therefore be considered to take three possible forms:

1  RESIDUAL ARTEFACTS OR ECOFACTS
Residual artefacts or ecofacts are chronologically earlier objects which have become incorporated into a chronologically later Stratigraphic Assemblage. These artefacts and ecofacts are the most common form of contamination as any negative activity may have introduced re-deposited material, including residual artefacts and ecofacts, into later Stratigraphic Assemblages. This may have happened more than once as there is no way of identifying how many times an individual artefact or ecofact has been deposited, and then been re-deposited.

2  CONTEMPORARY ARTEFACTS OR ECOFACTS
Contemporary artefacts or ecofacts were ‘in common use’ at the time the Stratigraphic Assemblage was deposited. As the identification of contamination can only be achieved by using relative dates of deposition, these artefacts and ecofacts are not considered as contamination, even though they may not have been associated with the activity which originally formed the Stratigraphic Unit, and may even have been re-deposited. A Stratigraphic Assemblage may also have been deposited over a long period of absolute time, and it may therefore be difficult to distinguish between residual artefacts which have contaminated an assemblage, and artefacts which were ‘in common use’ at the start of the deposition of a specific assemblage, but were not ‘in common use’ at the end of the deposition of the assemblage.

3  INTRUSIVE ARTEFACTS OR ECOFACTS
Intrusive artefacts or ecofacts are chronologically later objects which have become incorporated into a chronologically earlier Stratigraphic Assemblage. These artefacts and ecofacts are a less common form of contamination which is usually caused by post-depositional movement, or errors on the part of the archaeologist recovering the assemblage. Although this form of contamination may only be limited, it may influence the dating of the Stratigraphic Assemblage, and therefore the identification of contamination. Some Stratigraphic Assemblages may have been SEALED either by impenetrable Stratigraphic Units such as mortar floors or pavements, or by large natural deposits such as large flood deposits, or a deposit of volcanic ash. This would, in theory, prevent intrusive artefacts or ecofacts from being introduced into the earlier Stratigraphic Assemblage, which may then be considered to be free from this form of contamination, but unfortunately intrusive contamination may still have been introduced into an assemblage before it was ‘sealed’ or during excavation.

Unfortunately, the decision on whether an individual artefact or ecofact was considered to have been residual or intrusive contamination will depend upon the estimated formation dates of the Stratigraphic Assemblage, and these formation dates will depend upon whether an individual artefact or ecofact was considered to have been contemporary or contamination. For example, a Stratigraphic Assemblage may contain a large number of Roman artefacts and a single Saxon artefact, this assemblage may therefore be considered, either as a Roman deposit containing a single intrusive Saxon artefact, or as a Saxon deposit containing a large number of residual Roman artefacts, but the Stratigraphic Assemblage may also have been a medieval deposit composed entirely of residual artefacts. To clarify this situation each Stratigraphic Assemblage has to be considered and compared with other assemblages within the limits of the stratigraphic sequence.
3 WHAT DO ASSEMBLAGES REPRESENT IN RELATIVE TIME?

Although each Stratigraphic Assemblage will represent a specific period of absolute time, these periods will also occur consecutively within limits imposed by the stratigraphic sequence. To compare different individual Stratigraphic Assemblages within relative time it is therefore necessary to first consider all the available assemblage evidence and assess both the historic date and the formation dates of individual Stratigraphic Assemblages. Once this process has been completed it should be possible to identify contaminated Stratigraphic Assemblages or Stratigraphic Assemblages with insufficient assemblage evidence, and establish SECURELY DATED Stratigraphic Assemblages which can be used as key points within the stratigraphic sequence, based on the following revised principles.

1 TERMINUS POST QUEM
This states that if the Stratigraphic Assemblage recovered from a Stratigraphic Unit can be ‘securely dated’, then all later Stratigraphic Units within the stratigraphic sequence will have the same historic date or later than that unit.

2 TERMINUS ANTE QUEM
This states that if the Stratigraphic Assemblage recovered from a Stratigraphic Unit can be ‘securely dated’, then all earlier Stratigraphic Units within the stratigraphic sequence will have the same historic date or earlier than that unit.

The comparison of ‘securely dated’ Stratigraphic Assemblages within relative time will therefore limit the possible formation dates of other Stratigraphic Assemblages, as well as re-adjusting formation dates and allowing for the re-consideration of the level of contamination within individual Stratigraphic Assemblages. This may include individual Stratigraphic Assemblages which had initially been identified as uncontaminated, but which were in fact composed entirely of residual contamination. For example, if a specific Stratigraphic Assemblage can be ‘securely dated’ within a medieval historic period, then the next Stratigraphic Assemblage in the stratigraphic sequence must be the same historic date or later, even though that Stratigraphic Assemblage contains a large number of Roman artefacts and a single Saxon artefact.
The accuracy or relevance of any interpretation of the Stratigraphic Assemblage derived from the assemblage evidence will depend upon the connection between the individual artefacts or ecofacts which formed the Stratigraphic Assemblage, and the original activity which produced either the Stratigraphic Assemblage, or the Stratigraphic Unit. If a Stratigraphic Assemblage has been RE-DEPOSITED, then the individual artefacts and ecofacts which form that assemblage would have been moved from the position in which they had originally been deposited by later negative activity, and a connection between those individual artefacts or ecofacts and the activity which produced either the present Stratigraphic Assemblage or the present Stratigraphic Unit will not exist. Any interpretation of either the present Stratigraphic Assemblage, or the present Stratigraphic Unit based on this assemblage evidence would therefore be ‘misleading’. Before any interpretation of the assemblage evidence can be made it is therefore necessary to establish which Stratigraphic Assemblages have been re-deposited by considering both the stratigraphic evidence and assemblage evidence. High levels of residual contamination may indicate that a Stratigraphic Assemblage has been re-deposited, but as it is difficult to be precise about the level of contamination contained within an individual Stratigraphic Assemblage it may be simpler to classify the assemblage evidence recovered from each individual Stratigraphic Unit in two broad categories:

**PRIMARY ASSEMBLAGE** (A Deposition)

A Stratigraphic Assemblage which is believed to have remained in the position in which it had originally been deposited may be considered as a PRIMARY ASSEMBLAGE. The identification of a ‘primary assemblage’ will indicate that it is possible to use the assemblage evidence to interpret the original activity which created either the Stratigraphic Assemblage, or the Stratigraphic Unit, as well as allowing the artefacts and ecofacts to be considered and interpreted individually, and as part of a collection of artefacts or ecofacts recovered from a specific location. Although a Stratigraphic Assemblage may contain only contemporary artefacts, that ‘primary assemblage’ may still contain residual or intrusive ecofacts which cannot be identified as contamination, as their date of death cannot be established without using independent dating methods such as C14 or dendrochronology. For example, a specific Stratigraphic Assemblage may contain a large number of naturally deposited ecofacts and no artefacts. If this Stratigraphic Assemblage was then re-deposited and contemporary artefacts were introduced, then the assemblage may be identified as a ‘primary assemblage’ even though it contained re-deposited ecofacts as it would be impossible to identify the individual ecofacts as residual contamination. Artefacts may therefore indicate that the ecofacts which form a Stratigraphic Assemblage may have been re-deposited, but artefacts cannot indicate that the ecofacts have not been re-deposited.

**SECONDARY ASSEMBLAGE** (A Re-Deposition)

A Stratigraphic Assemblage which is believed to have been moved from the position in which it had originally been deposited by later negative activity may be considered as a SECONDARY ASSEMBLAGE. These Stratigraphic Assemblages will contain varying levels of contamination, and if individual intrusive or residual artefacts or ecofacts can be identified they may be set aside, and the remaining Stratigraphic Assemblage may be considered as a ‘primary assemblage’. Unfortunately, this is very difficult to achieve, and though the more obvious intrusive or residual artefacts may be identified, the remaining artefacts and ecofacts may still be contamination. Although a ‘secondary assemblage’ cannot be used to interpret the original activity which created either the Stratigraphic Assemblage or the Stratigraphic Unit, the artefacts and ecofacts may still be considered and interpreted individually, and as part of a collection of artefacts or ecofacts recovered from a specific location.
The number of ‘primary assemblages’ which occurred on a specific site will depend upon the intensity of activity, and therefore the level of occupation within the area excavated. Low levels of contamination can be expected on single period excavations, or rural excavations consisting of only limited occupation. On prehistoric sites the difficulty of establishing precise dates for artefact types may mean that insufficient information is available to establish the level of contamination. High levels of contamination can be expected on urban sites where there may be substantial quantities of residual artefacts, and the complicated stratigraphic sequence may lead to the accidental introduction of intrusive artefacts. The number of ‘secondary assemblages’ may be so high on some urban sites that only minimum information can be retrieved, and the use of any assemblage evidence for dating or the interpretations of the original activities may not be possible.
2.2.2 THE COMPOSITION OF INDIVIDUAL STRATIGRAPHIC ASSEMBLAGES

The composition of an individual Stratigraphic Assemblage is therefore of vital importance, and will depend upon both the recovery of the individual artefacts and ecofacts, and the correct identification of the limits or boundaries of the Stratigraphic Unit from which the artefacts and ecofacts were recovered. An individual artefact or ecofact will lose a lot of its intrinsic value if it was not identified and recorded as having been recovered from a specific Stratigraphic Unit, and therefore formed part of a specific Stratigraphic Assemblage. An individual artefact or ecofact may be positively misleading if the Stratigraphic Unit is wrongly identified or recorded as this may introduce contamination into a ‘primary assemblage’. It is therefore important to understand the processes which may distort the composition of an individual Stratigraphic Assemblage.
THE COMPOSITION OF INDIVIDUAL STRATIGRAPHIC ASSEMBLAGES

1 DEPOSITION
The deposition of an individual Stratigraphic Assemblages.
1 The Deposition of individual contemporary artefacts and ecofacts.
2 The Contamination of the Stratigraphic Assemblage by intrusive or residual artefacts or ecofacts.

2 SURVIVAL
The survival of individual artefacts or ecofacts.
1 The Material from which the individual artefacts or ecofacts were formed.
2 The Burial Environment, soil conditions, oxygen or moisture, acidity or alkalinity.

3 RECOVERY
The recovery of individual artefacts and ecofacts.
1 Excavational Techniques, different observational conditions may introduce a recovery bias.
2 Recovery Techniques, the personal application of the Recovery Policy may also introduce a recovery bias.

4 ANALYSIS
The analysis of individual Stratigraphic Assemblages.
1 Assessment of the level of contamination within a Stratigraphic Assemblage.
2 Assessment of the level of contamination of a Stratigraphic Assemblage within a Stratigraphic Sequence.

(PRIMARY ASSEMBLAGE, SECONDARY ASSEMBLAGE)

NOTE
These processes should be considered in this specific order. Any assemblage evidence which is lost cannot be regained retrospectively at a later stage.

Figure 33: The composition of individual Stratigraphic Assemblages.

The observation and recovery of individual artefacts and ecofacts as part of a specific Stratigraphic Assemblage may therefore be considered as the most important and the most limiting interpretation of the assemblage evidence, and once made this interpretation should not be open to re-interpretation, but unlike stratigraphic evidence, the assemblage evidence if conserved and stored correctly is not diminished or destroyed by analysis.
CONCLUSION

This provides the fundamental STRATIFICATION THEORY from which observations made on site can be understood, and upon which all recording and interpretations are based. This theory has defined not only the basic elements of archaeological recording and interpretation, the Stratigraphic Units and the Stratigraphic Assemblages, but also how these elements relate to each other in both absolute and relative time. Although this may appear over complicated, it is intended to cope with as many stratigraphic situations as possible, and a full knowledge of this theory is fundamental if any archaeological excavation is to be completed successfully.
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