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David S. Webster

**Archaeological Knowledge and its Representation
An inter-disciplinary Study of The Problems of
Knowledge Representation**

**Thesis Presented for the degree of M.Sc
Durham University : October 1992.**

Abstract

The thesis is a study of archaeology viewed from a perspective informed by (a) social constructionist theory and pragmatism; (b) techniques of Belief and Knowledge Representation developed by Artificial Intelligence research and (c) the conception of history and historical practice propounded by the philosopher, historian and archaeologist, R.G. Collingwood.

It is argued that Gibsonian affordances and von Uexkull's notion of the Umwelt, recently discussed by Rom Harré, provide the basis for a description and understanding of human action and agency. Further, belief and knowledge representation techniques embodied in Expert Systems and Intelligent Tutoring Systems provide a means of implementing models of human action which may bridge intentionality and process and thereby provide a unifying learning environment in which the relationships of language, social action and material transformation of the physical world can be explored in a unified way.

The central claim made by the thesis is that Collingwood's logic (dialectic) of Question & Answer developed in 1917 as a hermeneutic procedure, may be seen as a fore-runner of Newell and Simon's Heuristic Search, and thereby amenable to modern approaches to problem solving. Collingwood's own approach to History/ Archaeology is grounded on many shared ideas with pragmatism and a social constructionist conception of mind and is conducted within a problem solving framework. Collingwood is therefore seen as a three-way bridge between Social Psychology, Artificial Intelligence and Archaeology.

The thesis concludes that Social Psychology, Artificial Intelligence and Archaeology can be integrated through the use of Intelligent Tutoring Systems informed by a Collingwoodian perspective on Archaeology, Mind and History - construed as Mind's self-knowledge.

**ARCHAEOLOGICAL KNOWLEDGE AND ITS
REPRESENTATION**

**An Inter-disciplinary Study of the Problems of
Knowledge Representation**

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**Thesis submitted for M.Sc.
University of Durham
October 1992**

David S. Webster



= 2 JUL 1999

ACKNOWLEDGEMENTS

I would like to give my sincere thanks to Dr Rosemary Stevenson for the help, advice and supervision proffered throughout the writing of this thesis.

I would also like to thank all the academic and technical staff of the Department of Psychology, University of Durham who have given me all the encouragement and support I could wish for these past two years.

I am also deeply indebted to Dr Ken Richardson. As Dr Richardson's Research Assistant, my education in psychology was both broadened and deepened. Finally, I would also like to thank all my friends and family for being there.

Of all the works of man

**Of all the works of man I like the best
Those which have been used.
The copper pots with their dents and flattened edges
The knives and forks whose wooden handles
Have been worn away by many hands: such forms
Seemed to me the noblest. so too the flagstones round
old**

houses

**Trodden by many feet, ground down
And with tufts of grass growing between them: these
Are happy works**

**Absorbed into service of the many
Frequently altered, they improve their shape, grow
precious**

Because so appreciated.

**Even broken pieces of sculpture
With their hands lopped off, are dear to me. They too
Were alive for me. They were dropped, yet they were
also carried.**

They were knocked down, yet they never stood too high.

**Half ruined buildings once again take on
The look of buildings waiting to be finished
Generously planned: their fine proportions
Can already be guessed at, but they still
Need our understanding. At the same time
They have already served, indeed have already been
overcome. All this
Delights me.**

Bertolt Brecht

TABLE OF CONTENTS

PROLEGOMENA	1
CHAPTER ONE	
AN INTRODUCTION TO ARCHAEOLOGY.....	5
1.0 Introduction.....	5
1.1 Origins of Archaeological Thought	5
1.11 Stratigraphy	6
1.12 Early Practitioners of Archaeology	9
1.13 Archaeology 1900-1960.....	10
1.14 Ideology and Archaeology	14
1.15 Science and Archaeology.....	15
1.2 The New Archaeology.....	16
1.3 Processual & Post-Processual Archaeology	22
1.4 Archaeology: Its Future	31
1.5 Summary & Conclusions.....	32
CHAPTER TWO	
PERSPECTIVES ON THE PSYCHOLOGICAL ENVIRONMENT.....	33
2.0 Introduction.....	33
2.1 The Human Umwelt & Gibson's Affordances.....	33
2.2 Cognition & Affordances.....	38
2.3 Texts of Identity	40
2.4 Folk Psychology	44
2.5 The 'Problem of Induction'.....	48
2.6 Categorisation & Discourse	51
2.7 Summary	57

CHAPTER THREE

ASPECTS OF COGNITION & ARTIFICIAL INTELLIGENCE	59
3.0 Introduction.....	59
3.1 Mental Models	59
3.2 A Cognitive Account of Thought & Thinking.....	61
3.21 Thought.....	61
3.22 Deduction.....	62
3.3 Representation of Knowledge	69
3.31 Representation of Belief	72
3.4 Problem Solving: Artificial Intelligence	77
3.41 Intelligent Tutoring Systems.....	79
3.5 Archaeology's Current Use of AI.....	80
3.6 Summary	87

CHAPTER FOUR

THE MATTER OF MIND	88
4.0 Introduction.....	88
4.1 Edelman's Biological Theory of Consciousness.....	89
4.2 Dennett's Multiple Drafts.....	94
4.3 Bridgeman's 'Plans'.....	95
4.4 Brooks's Mobots.....	96
4.5 Collingwood's Dialectic of Mind.....	100
4.6 Summary	113

CHAPTER FIVE

THOUGHT & HISTORY Belief & Action	114
5.0 Introduction.....	114
5.1 Historical Knowledge as the Re-enactment of Past Thought.....	114
5.11 Summary & Conclusions.....	127
5.2 Human Beings or Distorting Models.....	129
5.3 Belief & Conduct.....	137

CHAPTER SIX

SOLVING THE PROBLEMS of ARCHAEOLOGY & LIFE	144
6.0 Introduction.....	144
6.1 The Psychological Environment.....	145
6.11 Intentionality, Discourse and Human Action.....	155
6.2 Representations	157
6.3 Is There a Future for Archaeology ?	164

EPILEGOMENA	167
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BIBLIOGRAPHY	168
---------------------------	-----

Figures

Fig 1 Harris Matrix.....	6
Fig 2 Palaeolithic & Neolithic Figurines.....	21
Fig 3 Semantic net for Samian Pottery.....	71
Fig 4 Forming the 'Frank-as-Jim's-father' environment.....	75
Fig 5 Diagrammatic Sketch of Collingwood's Theory of Mind	102

PROLEGOMENA

I was a very recent graduate of archaeology when I started this thesis (part-time). Before coming to university, I had spent the previous thirteen years working in Local Government. Over most of the period of my research and writing up I was employed as a research assistant for Dr K. Richardson of the Centre for Human Development and Learning based in the Open University's School of Education. The origins of this thesis lie in my long standing (pre-university) interest in philosophy and history. But the spur was given by the somewhat hobby-horsical attitude that I came to have about the philosophy and archaeology of Robin George Collingwood.

When I came to Durham to read archaeology, I was somewhat shocked to find that most if not all of my year group had never heard of Collingwood, or if they had, they only knew him as a 'Romanist' i.e. an archaeologist of the Roman period. Members of staff, when asked what they thought of Collingwood, gave the almost knee jerk response of 'he was an Idealist' in a tone of voice that meant 'do not trouble yourself with **him**'. If Collingwood was not quite a hobby-horse of mine when I arrived at Durham, he was soon to become one.

As well as studying archaeology, I took options in the History and Philosophy of Science and the Philosophy of the Social Sciences. In this way I fed my interest in Philosophy. I also, of course, continued reading Collingwood.

It became apparent to me that Collingwood had a much better standing in philosophical and historical circles generally than he had in archaeology, and that was irritating, because Collingwood's philosophical interests were shaped and refined through his historical and archaeological work. As he said himself 'It was necessary for the advancement of my philosophical work that I should be constantly engaged not only in philosophical studies but in historical studies as well...for this purpose Roman Britain was very suitable.' (Collingwood, 1987: 120) Here then, I thought, was a worthy role model. This thesis, however, is not intended to be a lionization of Collingwood, rather, it is a recognition of the spirit of his scholarship, if frankly, not a match for it.

When the time came to write my undergraduate dissertation, my interests were as much philosophically orientated as they were archaeological. The standard dissertation topic of geophysical, or worse, parish surveys certainly did not appeal

to me. I was looking for a topic that would engage both my main interests. Classification and its philosophical foundations came to mind and this eventually coalesced around the problem of sorting and classifying mass produced decorated Roman Pottery. This pottery, known as Samian, is an important dating tool on Roman sites, but its identification and provenancing was a specialist job. To be told you had just found a sherd of Samian which was of the type Dragendorf 37, was not very informative. It also served to create a sense of unrequited mystique. The answer to this, I decided, was Expert Systems.

The two poles of attraction became classification and expert systems. Both led me to language, as did the philosophy of social sciences. Language led me to thought and thinking as did Collingwood (and to Samian). Together, they propelled me towards Psychology in its various guises. But the hobby-horse had not gone away, Collingwood was not, as far as I understood the term, an Idealist, or at least, not **just** an Idealist. And even if he was, he was still important to archaeology.

Archaeology today seems to be facing a crisis of identity. On the theoretical side the 'philosophical turn' to Carl Hempel's ideas about hypothetico-deductive method and hypothesis testing, made in the 1960's, created a lot of disillusionment. All the thorny problems of interpretation were left as intractable as ever. The next philosophical turn - towards structuralism / post-structuralism / Hermeneutics / Literary Criticism / Psychoanalysis - made in the 1980's, only served to create a schism in Anglo-American Archaeology¹.

The aforementioned constitutes the general background to the thesis and hopefully goes some way to explaining the rather unusual convergence of topics and issues therein. The thesis aims to show that (a) Collingwood can be used as a three-way bridge between Social Psychology in its pragmatist guise² (i.e. social constructionism), Cognitive Psychology / Artificial Intelligence and archaeology ;

¹ Archaeology on the Continent is lagging somewhat behind in theoretical matters. This is probably to their gain.

² Pragmatism is the term coined by C.S. Peirce for his doctrine of meaning which held that ' we come down to what is tangible and conceivably practical, as the root of every real distinction of thought..there is no distinction of meaning so fine as to consist in anything but a possible difference of practice' The term was subsequently adopted by William James who extended the doctrine to include truth as well as meaning. For James, pragmatism showed that our beliefs and ideas are 'discerned by asking what difference they make to our lives; and they are true if living by them produces "satisfactory relations with other parts of our experience" ' (Collinson, 1990 pp. 114-9). Social Constructionists may be broadly taken to be on the Jamesian side of the matter, but there seems to be little consensus even about this.

and (b) in so doing, point the way forward (tentatively) for archaeology and take it out of the theoretical morass into which it seems to have fallen.

The first chapter of the thesis is straight-forwardly an introduction to archaeology. Its purpose is to inform the non-archaeological reader (since the thesis is a study of psychology) about the why's and wherefores of archaeology. The chapter ends by noting the re-emergence of human intentionality as a central problem for archaeological interpretation. The newly perceived problematical relation of intentionality to process is taken as the jumping off point for the rest of the thesis.

The second chapter reviews perspectives on the 'Psychological Environment' as I have chosen to call it. Basically, it reviews issues in social and ecological psychology together with issues in the philosophy of language pertinent to the social constructionist perspective.

I discuss the notion of Umwelt developed by von Uexkull in 1909, now being promoted by Rom Harré; closely related to this work is that of J.J. Gibson and his theory of Affordances. Social cognition is taken up in the light of Gibsonian Affordances by Reed and this section is followed by a return to Harré who develops a Wittgensteinian perspective on the social construction of self together with a critique of mainstream psychology's emphasis on process and structure leading to a discussion on the nature of human agency. This discussion on agency is followed by a section on Folk or Naive Psychology as Andy Clark terms it, and in its turn, folk Psychology is followed by Dilman's Wittgensteinian treatment of Induction. Finally, the chapter looks at Edward's discussion of the relationship of discourse to categorization.

The third chapter looks at issues in mainstream cognitive science including knowledge and belief representation, mental models, deduction, intelligent tutoring systems, and finally, it reviews work in archaeology which already attempts to utilize expert systems.

In reviewing the approaches to cognition and its instantiation in AI programmes, I have sought to map out the strengths and weaknesses of such approaches for understanding human intentionality and actions. I conclude in this chapter that much of the current work on archaeological uses of expert systems pays scant regard to the problematical nature of archaeological knowledge as embodying an account of human agency and activity based on contentious epistemological grounds and interpretative strategies.

The fourth chapter deals with the topic of human consciousness by reviewing Edelman's theory of the biological foundation of consciousness built on 'Darwinian automata'; Dennett's *Multiple Drafts*; Brooks work in robotics and Bridgeman's 'Plans'. The review of such work in this chapter and the previous two grounds the later discussion of cognition within a Collingwoodian framework which links the concept of mind and history. The second half of this fourth chapter details the origins and content of this framework.

The fifth and sixth chapters attempt to bring the various strands together. The fifth chapter introduces Collingwood's doctrine of re-enactment of past thought, his logic of question and answer allied to which is the theory of absolute and relative presuppositions. Following on from this discussion of Collingwood spanning the later part of the fourth chapter and the first part of the fifth, is a consideration of one recent attempt in Archaeology to model human action. This attempt by Mithen (1990) to model human action in the Mesolithic period has come under fire from other archaeologists. Criticism levelled at Mithen also brought Collingwood into the line of fire. In this chapter I defend Collingwood whilst broadly agreeing with the main criticisms of Mithen. I conclude the chapter with a discussion of the problems faced in coming to understand and describe human action.

In the sixth and last chapter I endeavour to set out a possible new direction for archaeology based on a Collingwoodian understanding of the nature and tasks of historical study which is informed by insights into human action gleaned from social (Gibsonian) psychology, but I also suggest that mainstream cognitive psychology has much to offer as well, particularly through the utilization of intelligent tutoring systems based on expert systems.

CHAPTER ONE

AN INTRODUCTION TO ARCHAEOLOGY

1.0 Introduction

In this first chapter I will offer by means of a historical sketch, a general account of archaeology. The main issues dealt with are (a) **Stratigraphy** - the spatial and temporal relations of archaeological remains within the ground. Excavation is a controlled process by which the remains of past human activity are recovered to form the primary data base for archaeological interpretation; (b) **Early interpretational frameworks** e.g. intentionality or technologies; (c) **The Role of Ideology in Interpretation** ; (d) **Scientific methods, Scientism & The New Archaeology**; (e) **Processual & Post-processual approaches** ; and (f) **Theoretical Impasse in Archaeology**.

1.1 Origins of Archaeological Thought

An interest in other people's art and artefacts probably started with the Romans, given their fondness for all things Greek. Coming forward in time to Renaissance Europe, we find *dilettante* - those who delighted in the arts; the hunters of treasure and collectors of Greek and Roman art.

There was however a more historically inclined group of antiquarians, who, from the sixteenth century onwards (in England at least) undertook topographical surveys of visible antiquities. What they lacked, though, was a chronological framework that would allow a proper ordering of the monuments to be made. It was therefore in the mid - late 19th century that what we recognise today as Archaeology properly emerged from Antiquarianism.

Archaeology today constitutes a nexus at which many other disciplines meet; Geology, Biology, Anthropology, Geography, Chemistry, Physics, Linguistics and Psychology. Geology and Biology, however, may be cited as foundational.

From Geology, Archaeology took the notion of stratigraphy, i.e. the delineation of spatial and temporal depositional sequences, and thereby gained its necessary chronological depth. The key to this development was the eventual ascendancy of uniformitarianism (the idea that geological processes are unchanging) in Geological

thinking. This change in thinking brought with it the recognition that when found together in the same geological strata, human remains and worked stone was indeed contemporary with remains of extinct animals. The idea that depositional sequence could be used as a chronological measure prompted the idea of excavation as a method for exploring the past. The metaphor of "digging into the past" whereby time is measured in feet and inches has exerted a strong influence on archaeological thought.

1.11 Stratigraphy

The rudiments of archaeological stratigraphy are illustrated below¹

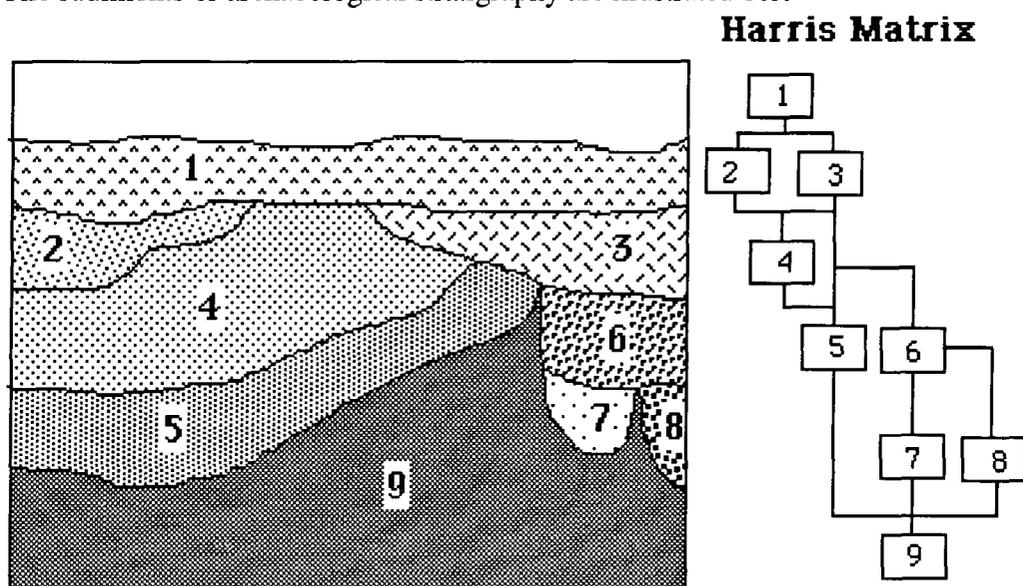


Fig 1 To the right of the illustration is a Harris Matrix that specifies the salient spatial and chronological relations between the strata.

To briefly explain Fig 1: the earliest layer is clearly (9) which is overlain by the other eight layers. Next come (7) & (8) which are directly overlain by (6),(3) and (1). Layer (3) overlies (4), (5) and (6); layer (2) overlies (4), and layer (1) overlies layers (2) - (9). A point to note is that layer (4) and (5) are cut by layer (3) that is, the original deposition of both layers has been truncated by the creation of layer (3) and therefore (3) is later. Of course, it is never that simple !

The reason why it is never that simple is because illustrated above in terms of different patterned patches are what are in actual fact, ephemeral perceptual

¹ The illustration is taken from **Techniques of Archaeological Excavation** (Barker, 1982: 201)

distinctions arising out of differential moisture content (in the main) which in turn reflects compositional variations in the soil and compaction. The boundary between one layer and another can often only be seen when freshly exposed by the trowel. Again, there is a thin line to be drawn between recognizing the form and fill of say, layer seven in the illustration, and what in the illustration (layer nine) is bounding it. It is not always easy to tell when one is excavating the fill of a *de facto* hole, and digging it fresh.

Edward C. Harris, who devised the Harris matrix has usefully set out the basic tenets of archaeological stratigraphy. These tenets are as follows:

The Law of Superposition : in a series of layers and interfacial features, as originally created, the upper units of stratification are younger and the lower are older, for each must have been deposited on, or created by the removal of, a preexisting mass of archaeological stratification.

The Law of Original Horizontality : any archaeological layer deposited in an unconsolidated form will tend towards an horizontal disposition. Strata which are found with tilted surfaces were so originally deposited, or lie in conformity with contours of a pre-existing basin of deposition.

The Law of Original Continuity: any archaeological deposit, as originally laid down, will be bounded by a basin of deposition, or will thin down to a feather-edge. Therefore, if any edge of the deposit is exposed in a vertical plane view, a part of its original extent must have been removed by excavation or erosion : its continuity must be sought, or its absence explained.

The Law of Stratigraphic Succession : any given unit of archaeological stratification takes its place in the stratigraphic sequence of a site from its position between the undermost of all units which lie above it and the uppermost of all those units which lie below it and with which it has physical contact, all other superpositional relationships being regarded as redundant.

(Harris, 1979: 112-3)

When it come to using the stratigraphic sequence for relative dating there are two relational terms used; there is the *terminus ante quem* -that is, a date **before** which the earlier features must have been deposited.(Barker, 1982: 198) When later

datable features seal or cut earlier features, the datable features give the *terminus ante quem* for the earlier ones.

The *terminus post quem* - gives the date **on or after** which the layer or feature was deposited. Supposing on stripping off layer (1) we find a mosaic floor which completely seals all the other layers. We know from the texts that this mosaic floor was laid in 325 AD Thus anything we find in (1) is dated to 325 AD or later. Anything we find in the sealed layers is 4th century or earlier. The floor gives a *terminus post quem* date for Layer (1) and a *terminus ante quem* for the rest. But just suppose that we did not have a date for the mosaic floor, but rather found a coin sitting directly on the floor. This coin carries the date of 300 AD. The coin would give a provisional *terminus post quem* of 300 AD. That is, the earliest date on or after which the floor could have been laid. This date would have to be provisional, because of residuality. That is, the coin could have been an heirloom. If on removing the mosaic floor we now find a coin dated to 325 AD, then that date would now become the new *terminus post quem*. Thus in a continuous sealed layer in which there are independently datable items, the item which has the latest date gives the *terminus post quem*. As for the dates of the sealed layers, the latest date would be 325 AD, but the dates between the layers could be one day or several millenia. Hence we can see that spatial relations determine temporal ones and the physical positions of features or objects in a three dimensional grid stand as a metaphor (model) for events in time, the dimension of depth broadly marks the passage of time.

Events are captured in space and the elements that mark the events constitute the spatial and thus the temporal **context** for each and every other element.

The concept of context is central to archaeological thinking, which is why there has been in times past an enthusiasm (demand) for "total" excavation. Now no longer financially feasible or theoretically justified. Total recording was an ideal which many have aspired to but that of course presupposes that the individual element or constituting phenomenon has individual identity. Granted, artifacts which are the products of human endeavour happen to be "sensible" objects. But if we take a wall for example, although a human artifact, walls need not, and often do not, leave unambiguous remains. An illustration of this situation would be the fragile daub fragments that survived as the only sign of a Wattle & Daub wall. Hypothesis : these settlements had Wattle & Daub walls.(unstated supposition : human settlements have walls of some kind, we are on the site of a settlement) Evidence : daub (often burnt or showing signs of firing) Corroborating evidence : The daub when planned out demonstrated expected linearity (or curvilinearity) in the manner of walls.

By planning out the position of the daub as excavated, the plan provides the context for the fragments of daub by demonstrating that the fragments of daub share in at least two features associated with Wattle & Daub Walls. i.e. daub itself and linear (or curvilinear) alignment. Q.E.D. As the plan of the site is built up by the addition of more detail, so each detail added strengthens the interlinked suppositions about the site; or not, as the case may be. Just as the spatial relations within the ground stand as a metaphor for the temporal events, so the plan stands (or so it is intended that it should be) as a metaphor for the spatial relations between artefacts or features that pertain in the ground. Since not all the elements that go to make up the spatial/temporal matrix in the ground are recognized and thus recorded, there is also a pre-selection or prejudgement as to what elements are of significance and must be recorded. Thus the plan of the site is the product of the interaction between the *de facto* spatial relations of artefacts /features in the ground and the constellation of presuppositions about what is to be recorded. The process is dictated by the extent to which the archaeologist will allow the ground to alter and redirect the basis of recording. The site plan and the archive as a totality, therefore, already embody a wealth of interpretative activity and presupposition.

From Biology, Archaeology took the theories of Evolution and classification current in the mid to late 19th century and thereby gained (a) a framework and mechanism to explain social change signified by changes in the Archaeological record and (b) guiding principles for the chronological sorting of artefacts.

The influence of Darwinian evolution on 19th century archaeological thinking resulted in the view that modern European society was the outcome of intensive cultural and biological evolution and the most advanced result of natural selection. Technologically less advanced people were thereby held to be culturally, intellectually and emotionally inferior to Europeans. The mis-appropriation and misconstrual of Darwinian natural selection by early archaeologists is notorious.

1.12 Early Practitioners of Archaeology

The archaeologist of the mid-late 19th century was almost exclusively a member of the moneyed class. Either an owner of land, a well-to-do country parson, or a man with a military commission. One way or another, the nineteenth century archaeologists had both the time and the money to pursue their interest in the past through the recovery and collection of material artefacts. What marked these people off from some of their predecessors e.g. grave robbers, was that they professed a scholarly interest in the people whose material culture i.e. physical remains, they

were recovering. They regarded such material remains as evidence of the past and not just loot to be traded for money. As scholars, many of them were associates of prominent men of Science e.g. Charles Darwin, Thomas Huxley, and Charles Lyle to name but three.

A good illustration of this point is Augustus Pitt-Rivers. Pitt-Rivers was at one time or another, and often concurrently, a member of the Royal Geographical Society ; the Ethnological and Anthropological Society of London ; the Society of Antiquaries ; the Archaeological Institute ; the Geological Institute ; the Royal Institution ; the Linnaean Society and the British Association for the Advancement of Science. Sir John Lubbock a prominent practitioner of Archaeology and a student of Darwin's was also Pitt-Rivers' son-in-law.

According to Pitt-Rivers, cultural artifacts are **emanations** (emphasis added) of the mind ; and as such, are similar to language.

Pitt-Rivers argued that² :

these words and these implements are but the outward signs or symbols of particular ideas in the mind; and the sequence, if any, which we observe to connect them together, is but the outward sign of the succession of ideas in the brain. **It is the Mind that we study by means of these symbols** (emphasis added)... Words, as I said before, are the outward signs of ideas of the mind, and this is also the case with tools or weapons. Words are ideas expressed by sounds, whilst tools are ideas expressed by hands; and unless it can be shown that there are distinct processes in the mind for language and for the arts they must be classed together.

(Thompson, 1977: 138-9)

Pitt-Rivers goes on to point out that just as words must become public property before entering a language, so too do implements ; natural selection and survival of the fittest (sic) are held by Pitt-Rivers to determine what material forms persist.

Pitt-Rivers's claim that in studying material culture we are studying the (past) mind is not a claim that many in Archaeology to-day would accept.

1.13 Archaeology 1900-1960

² Pitt-Rivers, A. (1875) 'On the Evolution of Culture' *Proc. Royal Institution* vol vii 496-520 1875

The changes in the aims and methods of archaeology since the days of Pitt-Rivers are conveniently mapped out for us by V. Gordon Childe. Childe was one of the great synthesizers in archaeology. Influenced by Marxism and Soviet archaeology, Childe focused on craft specialisation, that is, the social division of labour and the economic aspects of social development that come out of the social division of labour. For the purpose of this introductory chapter, however, I will review Childe's 1935 **Presidential Address to the Prehistoric Society** .

In his address, Childe stated that Archaeology could not supplement history nor become prehistory until it succeeded in arranging its material in temporal order. Arranging things by material composition was of little use. In order to make Archeology a science,³ it was necessary to establish a systematic and significant classification for its materials.

Thus Childe stated that :

The first step to making archaeology a science was to establish a systematic and significant classification for its materials...Geology not only taught archaeologists the necessity of a chronological classification, it also indicated how such can be scientifically established. The rule of stratigraphy has been taken over from geology...But archaeology went on to borrow from geology methods and concepts that can not appropriately be applied to human science...The concepts of natural science cannot be applied without modification to human sciences; natural history is far more abstract than human history, and prehistorians must advance from abstractions of the former to the concreteness of the latter.

(Childe, 1935: 2)

The thrust of what Childe is saying here is brought out by R.G.Collingwood when he points out that when an archaeologist finds a stratum of earth with pot sherds and in another stratum, different sherds plus coins, it may be concluded by some that archaeologists treat the pot sherds and coins the same way as a geologist uses fossils: that is, to show that the strata belong to different periods and they can date them by correlating them with strata found elsewhere which contain the same type of relics. But this would be a wrong conclusion. Natural science unlike Archaeology, argued Collingwood, does not include the category of purpose in its

³ As Jerry Fodor put it 'What you need in order to do science is a taxonomic apparatus that distinguishes between things insofar as they have different causal properties, and that groups things together insofar as they have the same causal properties' **Psychosemantics: the problem of meaning in cognitive science** (1987) p. 34 Cambridge MA: MIT Press

working categories. While the stratigraphic sequence and thereby the temporal sequence is important to the archaeologist, it is only so to the extent that the archaeologist can impute a use or purpose to the material ; for it is that purpose which makes it evidence at all. As Collingwood wryly remarks, if a palaeontologist told him that he never bothered to ask what trilobites were for, Collingwood would be glad for his (the palaeontologist's) immortal soul and the progress of his science.

'If archaeology and palaeontology worked according to the same principles, trilobites would be as valueless to that palaeontologist as are to the archaeologist those " iron implements of uncertain use " which cause him so much embarrassment.'

(Collingwood, 1987: 109)

The concreteness that Childe seeks then, is historical concreteness. Or as Marx put it, 'in history we ascend to the particular.'(Bruner, 1990: 350)⁴

With this end in mind Childe embarks on a discussion which, in essence, is about the ambiguities embedded in the central concepts and terms used in the study of Prehistory. e.g. <Race>, <Palaeolithic>, <Neolithic>, <Bronze Age> and <Iron Age>.⁵

To the concept of Race based on shared physical attributes, Childe counterpoised that of Culture; that social entity which is **united by a common social heritage - by community of language, institutions, artistic and industrial traditions**. Going further, Childe distinguished between Culture (as above) and a cultural-group signified by a particular material culture assemblage which makes up the archaeological remains.

When we come to the terms Palaeolithic, Neolithic, Bronze Age and Iron Age, as Childe points out, the old, evolutionary (i.e. chronologically linear) model is unsustainable. Basically, classification by **material** (stone/metal type) precedes that of **economic subsistence** resulting in a "Stone Age" within which the Palaeolithic is distinguished from the Mesolithic in terms of tool assemblages⁶ and art, but sharing a Hunter / Gatherer mode of subsistence. In the Neolithic there are

⁴ As opposed to ascending to the general as in logical abstraction

⁵ Concepts, as opposed to terms, will be signaled by <....>

⁶ Palaeolithic tools are singular whereas Mesolithic tools are often composite being constructed from a "tool kit" of different microliths.

also differences in tool assemblages but the mode of subsistence is that of agriculture and domestication of animals. With the advent of agriculture and metal working there ensues both economic and political development. Thus the distinction between the Bronze Age and the Iron Age goes beyond simply that of the dominant metals used. Chronological linearity suggested by the stone - bronze - iron progression is subverted by (a) stone tools being regularly used by societies who have and use alternative technologies, and (b) the inclusion of other criteria such as subsistence strategies and political culture within the concept <Iron Age>. In short the original terms have become mere shorthand for diverse technological and social formations; but which co-exist within the same chronological frame. e.g. the Central European 'Iron Age' tribes and the Graeco-Roman civilizations.

The move to studying the political aspects (trade and war), and the social aspects (settlement and demography) of past societies as well as their technology, (tools, manufacture, subsistence) has pushed archaeology into trying to utilize the physical sciences directly. As Childe put it :

The study of a culture from this angle imposes fresh obligations upon the archaeologist. He can no longer be content with merely describing and classifying the objects he uncovers; he must ascertain how they were made and whence the materials for their manufacture came. To do that the archaeologist must enlist the co-operation of the geologist, botanist, and zoologist, of practical farmers, artisans and engineers as well as ethnographers. And to see the culture functioning the environment to which it was an adaptation must be reconstructed.

(Childe, 1935: 10)

The distinctions that Childe made earlier between the concepts of natural science, which Childe says cannot be used without modification in the human sciences, foreshadow the tensions that would arise with the incorporation of natural science techniques and modes of explanation into Archaeology.

The contrast with Pitt-Rivers could not be more vivid, for Pitt-Rivers the material culture was evidence of the conceptual repertoire and psychological development of our early ancestors, for Childe it is evidence of the technical, social and political life of our ancestors. Which is not to say that material culture could not be evidence for both.

1.14 Ideology and Archaeology

The motivations for archaeological research in any period are derived from the wider economic, political and social concerns of that period. By the time of Pitt-Rivers (mid -late 19th century), the Enlightenment programme (18th century) which expressed a belief in universal rationality and anti-clericalism; as well as a naturalistic understanding of social processes and a firm belief in 'progress', was on the wane. Out of the Enlightenment came the idea of psychic unity i.e. all humans possess essentially the same kind and level of intelligence and share the same basic emotions (Trigger, 1990: 57). Thus until the mid 19th century scholars tended to assume that people in the past were in no important way different from themselves.

This view of humanity gave way to naked racism and a disillusionment with the notion of 'progress' in the wake of Western military and economic expansion and industrialisation. From the late 19th century onwards, human inventiveness was depreciated and change was held to be contrary to human nature. The stability and continuity of society was stressed, and to this end, archaeology helped to provide the 'evidence'.⁷ The development of the notion of culture took place in an atmosphere where difference was stressed and universality was denied. Childe, while repudiating all the racist ideas that abounded in the thirties about the purity of the nation, still promoted the idea that the significant developments, e.g. metal working, were 'one offs' and therefore the spread of such techniques was the result of the diffusion of the idea or due to actual migration and the supplanting of populations. German expansion to the east was justified (at least to the satisfaction of the Nazis, if no one else) on the grounds that Slovakia contained 'Germanic' cultural artifacts.

In general then, archaeological interpretations took the form of culture-historical narratives (origin stories) which were to a greater or lesser degree the basis of support for Nationalist myths and territorial claims.

The aftermath of the 1939-45 war was such that those peoples who had hitherto been subject to western imperialism and racism started to fight for their independence and in doing so, constructed their own myths, with the help (once

⁷ See Chapter 4 'The Imperial Synthesis' Trigger (1990)

more) of archaeology⁸. This development highlighted the ideological and political trappings that inhered to the culture-historical approach and the diffusionist model of cultural and technological dissemination.

1.15 Science and Archaeology

The other major post-war development in archaeology was the growth of scientific methods and the professionalisation of the discipline. The need of Archaeology to enlist the co-operation of other scientists (see above) was realised and expanded at this time. The wider adoption of functionalist approaches, e.g. environmental, economic, or demographic - based explanations of change, was made manifest by the growing incorporation of science into Archaeology. Functionalist approaches had however been a feature of archaeological theorizing since the mid 19th century. The contribution of physics to Archaeology in the form of Carbon 14 dating was revolutionary. The advent of 'absolute' dating methods such as Carbon 14, or Dendrochronology (tree ring dating) directly undermined the then dominant diffusionist model of social "progress" and Childe's own grand synthesis of European development. Carbon 14 dating effectively showed that megaliths (e.g. Stonehenge) in West Europe were chronologically prior to those in the east, this confounded the doctrine of east to west diffusion of peoples and technologies.

The effects on archaeology and its practice of the importation of scientific techniques was welcomed by most; this development may also be seen as a contributing factor to the growing dissatisfaction with the culture-historical approach, particularly in America. The incorporation of scientific methods caused the focus of archaeological interpretation and activity to shift away from excavation and field work towards that of laboratory-based studies. The shift to laboratory-based studies drew up-and-coming archaeologists into a new academic milieu whose ethos and methodological outlook was derived from natural science. A split in approaches and objectives for archaeology was in the offing.

In Britain such views as expressed by Jacquetta Hawkes (1968) were typical of the 'old guard' and still held sway amongst the general public.

We have mocked the explorers of a century and more ago because they dug for "loot"...

In the same spirit, we have criticized those great and dynamic men of pre-World War 1

⁸ The re-interpretation of Great Zimbabwe is a good example: see Lowenthal 1985 p.335

vintages for imposing their personalities too strongly on their work. Yet in doing so they caught the imagination of the public, made the periods and peoples they revealed appear real and important.

(Hawkes, 1968: 258)

Hawkes tried to fight a rear guard action against the over emphasis, in her view, on quantification and the mathematization of archaeology. This led, she argued, to people getting bogged down in minutiae and the growth of obfuscating jargon. Thus Hawkes bemoaned the fact that despite the great amount of archaeological work going on, it is left to the 'old guard' to 'distil history from the welter of disparate facts that fill the journals and excavation reports' (Hawkes, 1968: 258)

In targeting the perhaps necessary consequences of specialist reports for archaeological interpretations (from non archaeologically trained scientists), Hawkes attack misses the mark. The whole *raison d'être* of the New Archaeology movement, which may be seen as the explicit manifestation of natural science pursuing an Archaeological past, was precisely to abandon historical accounts and historicism in general in favour of hard science and its methodological strictures.

1.2 The New Archaeology

Lewis Binford was a central figure in the debate that developed in the 1960s on the merits of the New Archaeology program. Binford argued that traditional archaeology was dominated by a normative view of culture, meaning that a culture is composed / defined by a set of internalized ideas or norms carried by individuals and transmitted by diffusion and socialization; thus 'a cultural tradition is a patterned and integrated whole formed by a set of covarying ideas or norms which 'flow' across space and time.' (Gibbon, 1989: 69)

Binford rejected this normative view because of its mentalistic or idealistic accounts of the past. Such a normative view did not capture, for him, the full complexity required to explain variability, discontinuities, reversal of trends and other anomalies in the archaeological record. Nor could it explain, he argued, why the norms themselves varied. The normative view simply assumed that past and present cultures were alike, thereby denying the possibility of a fundamental difference. By idealistic, Binford meant that the Culture-historical approach regarded culture as the product of the workings of individual minds. Culture was produced by the action of cultural and natural events on individual minds.

Culture-history was vitiated, according to Binford, because it had to accommodate the psychological make up of people no longer with us.

Yet another problem with the 'idealistic' view was that similarities at the formal / physical level could not be taken at face value because people in the past may not have perceived the artefacts in question in the same way as ourselves. Their mental representations and conceptual structures could be quite different. To understand the true nature of past relics required the correct understanding of the differences between our mental structures and theirs.

Binford maintained that this put the traditional approach in a paradoxical position. The only source of information about the past was the material artefacts and structures which survived into the present,⁹ but seen as emanations of the mind, to use Pitt-Rivers's term, the meaning of such artefacts was necessarily opaque.

Since material culture was caused by the now opaque ideas in the minds of past peoples, Culture-historical archaeologists did not look for theories which would explain the dynamics operating between these ideas and the material world. Binford and others argued that traditional archaeology could not test its theories because the "seat of causation", meaning the conceptions and beliefs of past peoples, was not preserved. Furthermore, the material outcome of the causal forces, that is, ideas in peoples mind, could only be described and systematized but not investigated because no regular relationship between similar material artefacts and their meaning (for their makers) could be seen to exist. As Binford put it :

The paradox of adopting a strict empiricist's view of science while at the same time adopting an idealist theory of causation, where the "black box" - the minds of the ancients - was not available for investigation... Strict empiricism argued against inference and interpretation, yet the past was gone and could only be known through inference from the remnants surviving in the present !

(Binford, 1989: 52)

This rather improbable imputation of 'strict empiricism' as Binford terms it to the Culture-historians is baldly contradicted further on when he tells us that archaeologists of the remote past did offer inferences and interpretation! The

confusion displayed by the proponents of the New Archaeology about what 'empiricism' meant is widely recognized and retrospectively admitted. What is fair to say about the Culture-historians is that they took a relativistic view of cultures.

⁹ Ecofacts such as pollen, animal bones and plant seeds also survive but these are not emanations of the mind.

That is, they argued that each culture had to be understood on its own terms and not by comparison with an external standard such as a cultural evolutionary scale. (Trigger, 1989: 21)

Binford's answer to this 'problem' was simply to redefine culture. Binford redefined culture by shifting the seat of causation away from ideas and towards the material ecosystem. Culture was now to be seen as a complex, systemic, integrated, adaptive, extrasomatic (i.e. social) and material-based organization of behaviour. As systemic, culture was composed of sub-systems and functional contexts. (Gibbon, 1989: 70)

The functional contexts were held to be technological, social and ideological spheres. Material culture participated in all such contexts, therefore, each reflected the other and all mutually interacted. Ideas in the minds of people did play some role but had to be viewed as insufficient in explaining change or behaviour in general. Changes in the environment were now to be held as the primary causative forces which effected cultural change. Internal ideational causes of cultural change were thus replaced by external material (ecological) conditions.

The New Archaeology was launched on two fronts ; as can be seen from above, changes in culture were now to be explained by changes in environment. However, research was now to be conducted in a rigorous 'scientific' manner - by proposing hypotheses and testing them against the archaeological record.

At the methodological level, the New Archaeologists embraced Logical positivism / empiricism, specifically, that of Carl Hempel's hypothetico-deductive description of the scientific method.

Lewis Binford states that what was at issue in the New Archaeology, was the question of how one accurately gave meaning to archaeological observations. (Binford, 1989: 50)

In other words, how does one verify the truth or falsity of explanatory statements made by archaeologists in response to the extant archaeological record. Traditional archaeology did not even make the attempt at verification and it was this fact as much as any that provoked the scorn of the new breed of professional archaeologist.

In Britain, David L. Clarke became the leading exponent of the New Archaeology with the publication of **Analytical Archaeology** in 1968. Clarke's book was unlike anything else to be found in archaeological literature both in its scope and self-conscious rigour. Clarke introduced British archaeology to Systems Theory, Cybernetics, Statistical testing as part of computer modeling, Information Theory, Numerical Taxonomy and a glossary of terms and definitions which left many quite bemused. Not surprisingly, Clarke also deals in his book with the nature of scientific laws and the use of generalization and induction in archaeological explanations.

Clarke drew attention to the problematic nature of many of the generalizations made by archaeologists ; thus Clarke states that archaeological observations are rarely general propositions, rather they take the probabilistic form of 'some A's are B's' as opposed to 'all A's are B's'.

Thus, we might say that 'some Venus figurines are Gravettian', some Dimini pots have trichrome spirals', or ' some La Tene burials are Celtic '.

(Clarke, 1968:17)

What, one might ask, is a Venus Figurine ? Gravettian or otherwise. Likewise, what makes a pot, a 'Dimini' pot ? Clearly not trichrome spirals, or all Dimini pots would have them. Again, what counts as a 'Celtic' burial if only some La Tene burials are Celtic (others are Teutonic).

The problem lies in the terms on which such 'probabilistic' generalizations are constructed. A **type concept** e.g. <Celtic>, <Dimini> or <Gravettian> in Archaeology is marked by:

..a minimum statement of the **diagnostic attributes** of any given **type** ; that is, it would furnish the minimum amount of information about any type which would be sufficient to distinguish it from all other types. In archaeology, most types are not given **explicit definitions** ; they are represented in the form of **type descriptions** rather than of definitions.[Furthermore] If a type concept is to be shared between two or more individuals, it must first be communicated in the form of a type description. This is a verbal and / or pictorial representation of the type concept which depicts as many of its known characteristics as possible.

(Adams and Adams, 1991: 367)

Thus the intension of the concept <Gravettian> is those attributes which diagnostically define the type 'Gravettian', originally in this case, being found at the

site of La Gravette in France and being dated to the Upper Palaeolithic. Today however, Gravettian denotes, not the specific geographical location, but the attributes displayed by the **artifacts** e.g. stone tools and figurines similar to those found at La Gravette. But the geographical distribution of such artifacts which display close similarity to those found at La Gravette covers much of the mid / south west to mid /south east Europe. So, the generalization 'some Venus figurines are Gravettian' could simply mean 'some Venus figurines are found at La Gravette' or ' Venus figurines are found in many places in Europe'.

In the same vein, the term 'Celtic' signifies a socio-political grouping with wide chronological and geographical boundaries. 'La Tene' denotes La Tene artifact assemblages found in graves at the site of La Tene. Again we have a shift in denotation of original terms which owe their origin to the practice of categorizing on the basis of geography, but which now denote attributes of artifacts as well as, but not necessarily, their original geography.

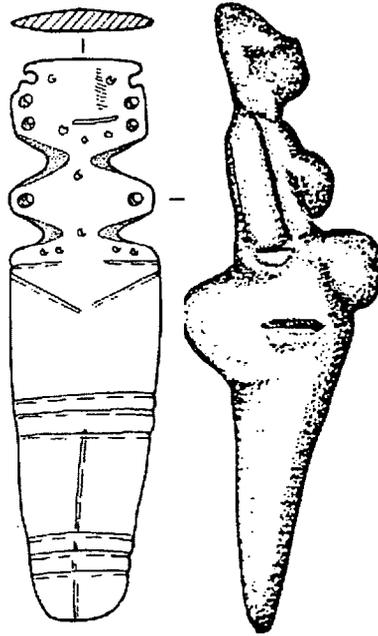


Fig 2 Left : A bone figurine from the Ruse Tell, Bulgaria (Neolithic) : Right, a Gravettian Venus Figurine¹⁰. The excavator of the Ruse Tell¹¹, however, did not see fit to indulge in fanciful descriptive terms for the material recovered.

It is, by and large, classification and typology that cuts across the goal of composing informative generalizations in the manner of natural scientific laws. Classifications and type terms take their saliency from the classificatory scheme in which they are embedded and the specific purpose the scheme was meant to serve e.g. dating. In short, such terms are too specific and context bound to partake in logical formulations; they need to be unpacked with the denotation of the terms made clear. As Clarke concluded :

The mistaken concept of an Archaeological 'fact' as a general proposition has led to the incorrect handling of data and helped to conceal the important relationships

¹⁰ The romanticism of 'exploring the past' has often resulted in the labelling of 'interesting' artifacts with exotic names. This was particularly so in the 19th century when naked speculation was often as not paraded as 'obvious fact'. Thus the figurines found at La Gravette were 'obviously' fertility goddesses. A paper in *Antiquity* 65(1991) by Jean-Pierre Duhard, a French gynaecologist turned Archaeologist argues that the Gravettian figurines display the same relationship between adiposity and pregnancy as found in modern females. In other words, the figurines display the realistic features of forms of adiposity found in females. The figurine above *Femme au goitre* found at the Grimaldi cave shows, he claims, signs of pregnancy and steatopygia.

¹¹ A 'Tell' is the term for a mound which has built up over the years by levelling existing buildings and rebuilding directly on top. It literally means people lived on top of their own rubbish heap.

underlying archaeological concepts in a fog of imprecise terminology. [But] Archaeological facts are observational data samples which start as propositions about perceived attributes - those A's are or have B's. These selective observations are then further extended as inferred attributes in probability propositions - some qualified A's are or have B's. thus the observations escalate from arbitrary perceptions to probability propositions ; at no stage is elemental reality the unit of discussion
(Clarke, 1968: 19)

It would be useful to know what is meant by the phrase 'elemental reality' but no further explanation was forthcoming.

As things turned out, the original programme of the New Archaeology did not last beyond the late seventies, mainly because it totally failed to demonstrate any non-trivial covering laws through its application of Hempelian hypothetico-deductive reasoning thereby failing to live up to the promises it made. The attempted use of hypothetico-deductive method was soon exposed as being based on an already discredited (in philosophy of science) account of what scientific method entails. What the New Archaeology left behind was a diverse set of commitments and methodological approaches which in general rely on techniques culled from the natural sciences. Archaeological orthodoxy, a weakened and heterodox form of the New Archaeology now goes under the name of **Processual Archaeology**.

1.3 Processual & Post-Processual Archaeology

Processual archaeology typically involves the use of specific natural sciences in the analysis of the artifactual and ecofactual remains. In this way, questions about the growth and development of societies are framed against what we can tell about past conditions with respect to agricultural practice, hunting strategies, disease, diet, technology, population growth, demographic movements etc. Over-arching theories (e.g. Marx, Weber) about the interaction and reciprocal relations between the technological, economic, and political spheres of life are imported from the social sciences to provide the schemata into which are fitted the 'results' of Archaeological research.

Since the 1980s, Colin Renfrew has promoted a variant of Processual Archaeology, namely, Cognitive Archaeology. In 1982, Renfrew gave his inaugural lecture at Cambridge entitled **Towards an Archaeology of Mind**, thus launching his own brand of Processual archaeology. With the apparent failure of the strong version of the New Archaeology by the late seventies, Renfrew

promoted Cognitive Archaeology, as a blend of what had gone before (e.g. culture-history) and what could be salvaged from the New Archaeology. Cognitive Archaeology as originally conceived, was also well able to absorb much of what was to come out of the other response to the perceived failure of New Archaeology. **i.e. Post-Processual Archaeology.** In particular, Cognitive Archaeology picked up on the Post-processual emphasis on symbolism and textuality (see below).

A major new text on archaeology, aimed at undergraduate students, has been produced by Renfrew and Paul Bahn (Renfrew & Bahn, 1991) and this contains the most comprehensive statement to date on Cognitive Archaeology. Cognitive Archaeology, we are told, studies past ways of thought from material remains. Furthermore, the skepticism of the early New Archaeologists in this regard can be answered by Cognitive Archaeology by the development of explicit procedures of assessment e.g. the constructing of cognitive maps¹² in order to analyse the concepts of early societies and the way people thought. Renfrew states that:

'We start from the assumption that things we find are, in part, the products of human thoughts and intentions...They belong, in short, to what the philosopher Karl Popper would term "world 3"'

(Renfrew and Bahn, 1991: 340)

Popper's World 3, i.e. objective knowledge, and related issues will be discussed in chapter five.

Post-Processual Archaeology became the rival to Processual Archaeology and this challenge to archaeological orthodoxy was not without rancour. The rancour was directed largely at Michael Shanks and Christopher Tilley.

Shanks & Tilley's two books, **Re-Constructing Archaeology (RCA)** and **Social Theory and Archaeology (STA)** both published in 1987, set out their criticisms and their answers to orthodox archaeology. They write:

The past (which others may call the museum, the archive, the library) recedes in an indefinite, perhaps infinite series of galleries. Archaeologists wander the winding and seemingly endless corridors, forever unlocking doors which appear new, armed with different analytical keys, picking over the skeletal remains of past societies, scrutinizing the shelves of death or gathering 'truths' from self-referencing site reports. The

¹² Something akin to Cognitive Psychology's mental models seems to be implied here.

archaeologist is devoted to the embalmed relics deafeningly silent yet sacred in their meaninglessness, devoted to the preserved past.

(Shanks and Tilley, 1987: 7)

In this opening passage to RCA Shanks and Tilley are being provocative, rhetorical and, in my view, generally right.

The relationship between past and present, they argue, is no longer seen as self-evident, and therefore a class of experts is needed to bridge the gulf. It is the job of these 'experts' to (a) observe the traces of the past objectively ; (b) to show how to bridge the distance between the traces in the present and their social origin in the past ; (c) to order what to do about the destruction and disappearance of the traces of the past ; and (d) to explain why these problems are worth posing and considering anyway.

Processual Archaeology can be seen, they argue, as embodying a consensus about how to observe the traces the past has left behind. We observe the traces of the past by survey and excavation ; by detailed 'scientific' examination; and thereby produce 'high quality' information about the past.

Processual archaeology, it is argued, is **Topographical thinking**. Quoting Adorno (1967):

Topographical thinking, which knows the place of every phenomenon and the essence of none, is secretly related to the paranoiac system of delusions which is cut off from experience of the object. With the aid of mechanically functioning categories, the world is divided in to black and white and thus made ready for the very domination against which concepts were once conceived.¹³

(Shanks and Tilley, 1987: 9)

The traces of the past are locked into and possessed by a 'perfect' past, held in spatial temporality. Time is reduced to a spatial distance within a system of spatial co-ordinates. In this way the past becomes contingent and our relationship to it is accidental and mysterious.(Shanks and Tilley, 1987: 9)

The challenge of Archaeology is to remove the mystery by setting the traces of the past in their place, in the distance. Archaeological inquiry becomes topographical

¹³ Adorno, T.W. (1967) *Cultural criticism and society* In T. Adorno **Prisms** Neville Spearman.

and domineering, the material traces are ordered, classified, then to be presented with identification papers and locked up.(Shanks and Tilley, 1987: 10)

Time is commodified in the manner of Capitalistic appropriation of labour time (the universal equivalent form of value) through the creation of surplus value. Thus your time, my time and God's own time is brought into equivalence and emptied of subjective content and value for the individual. This is the 'time' of physics which recognizes no past, present or future.

Empty commodified time applies to all events. All events are comparable according to such time which maintains that a pot and the spread of farming belong to the same calculus, a calculus which is indifferent to them both...The past disintegrates when the meaning of an object lies in its assignation to a point in time, such assignation occurs at the cost of the integrity of our experiences of the past. It amounts to a loss of memory, a betrayal of the past which is forgotten. As a sequence of 'nows' history exists separately from people. It loses its specificity, its coherence and it becomes a problem ; hence the paradox of Zeno's race.

(Shanks and Tilley, 1987: 10)

The foregoing gives an idea of Shank and Tilley's style and thrust. I will truncate their discussion of the ills of modern Archaeology, except to say that 'subjectivity' is seen as the main battle ground between themselves and the Processualists. Science, it is said, eschews subjectivity. Moreover, the once popular 'empathetic' approach of the old guard, to use Hawkes phrase, is little better, according to those of Post-processualist bent. The empathetic approach to the past, while recognizing the necessary subjectivity of all human action, falls the other way in accepting the fetishized account of the autonomous individual, prevalent in Capitalist societies. e.g Margaret Thatcher's claim that there is no such thing as society, only people.¹⁴

Shanks and Tilley's 1989 paper **Archaeology into the 90s** a distillation of RCA and STA went on to set out a "progressive" programme for the 1990's: In the 90s we need -

- The refinement and extension of a reflexive and mediatory conceptual apparatus.
- A continuing investigation of the relation of theory to practice.

¹⁴ Likewise, there is no such thing as a traffic jam, there are only cars which can't move !

- A rediscovery and refinement of the subjective, rooting archaeology in an examination of basic and ordinary experiences of the past: the development of a politics of subjective identity and its relation to the past.
- Experimentation with fresh ways of producing the past and relating it to the present, in the contexts of excavation strategies, museum displays, and writing texts.
- Detailed critical analysis of the nature of archaeological discourses and their relations to a capitalist present.
- The full realization of archaeology as a strategic intervention in the present through a focus on (i) archaeology itself as constituting a micropolitical field; (ii) an adequate theorization of the relation between material culture and social structures both within contemporary society and in the past; (iii) using the *difference* of the past to challenge established economic and social strategies, categorizations, epistemologies, rationalities, modes of living , and relating to others.

(Shanks and Tilley, 1989: 6-7)

Given the explicitly political nature of this programme and its ambitions for archaeology as a discipline, it is little wonder that it has generated both debate and hostility. This programme for archaeology is seen by many and acknowledged by its authors to be in part a reaction to the political shift to the right in the 80s and the attending financial squeeze on the discipline as a whole. Nevertheless, it mirrors doubts and anxieties felt by many, their specific critiques of aspects of archaeological theory and practice are accepted (if with qualification) by even their more distinguished institutional critics.

What marks off Post-processual Archaeology in general from what has gone before is its eclecticism. Every shade of 'Continental Philosophy' has been adopted at one time or another to produce a melange of theorizing. Lying behind this movement in Archaeology are those commentators (e.g. Lyotard) who claim the collapse of Modernity into the Postmodern condition.

Modernity, it is said, unites all by cutting across all boundaries of ethnicity, class, religion, gender, ideology and nationality, but it does so paradoxically. It is a unity of disunity whereby we live in a maelstrom of perpetual disintegration and renewal, struggle and contradiction, ambiguity and anguish, a world in which, as Marx said, 'all that is solid melts into air'. (Callinicos, 1989: 31)

Modernism reacts to this anarchy by looking back nostalgically to a time when we still had a sense of totality. Postmodernism celebrates the anarchy, there is no truth

to be found only different styles and interpretations in an endless and meaningless process. 'Multivocality' is now the slogan of the politically correct in archaeology.

The central thrust of post-processual theory has been the adoption of the metaphor of the text; material culture is a text to be interpreted. Philosophical authority comes from Paul Ricoeur, Roland Barthes, Jacques Derrida, Michel Foucault.

Ricoeur argues that language can be analysed not simply as a system of signs or types of sentence, but also as extended sequences of written discourse. This move, however, brings to the fore the problematic question of the 'work' which according to Ricoeur shows three distinctive features. First, a work is a structured totality the understanding of which cannot be reduced to the understanding of the composing sentences. Second, each work conforms to a certain codification which characterizes its composition. This determines its *genre*. Third, a work is produced in a unique configuration expressive of its individual character and this constitutes its style. Thus a work is a structured totality subsumed within a *genre* and expresses a particular style.

As a text, the work is more than simply speech written down. In being inscribed, speech is transformed through what Ricoeur calls **distanciation** i.e. the meaning of text goes beyond that intended by the author. The meaning of the text is removed from the control of the author and is given to the reader. Features of speech acts such as the locutionary, illocutionary and perlocutionary¹⁵ acts are exteriorized and realized in writing through the use of grammatical and other devices. What a text may say matters more than what the author meant to say. Exegesis takes place within the circumference of meaning which has broken free of the author's intention. This circumference of meaning is referred to as the Hermeneutical circle. Thus the free text becomes open to an unlimited number of readers and thereby an unlimited number of readings.

That material culture can be considered a text is based on the notion of meaningful action in which, like speech when inscribed, human actions are objectified and thereby undergo distanciation.

First, just as the event of saying is surpassed by the meaning of what is said, the event of doing is eclipsed by the significance of what is done.

¹⁵ Locutionary act = 'saying words' : Illocutionary acts = act done *in* uttering words e.g. making a promise : Perlocutionary act = by which we cause effects e.g. causing embarrassment by what we say

Second, Ricoeur¹⁶ maintains that the action-event has the features of a speech act because it has both a propositional content (the act of doing), which allows it to be re-identified as the same action, and an illocutionary force (actions can be threats, warnings, expressions of regret, etc.).

Taken together, the propositional content and the illocutionary force of the action constitute its 'sense-content'.

Thus Ricoeur argues : ' Like the speech act, the action event (if we may use this analogical expression) develops a similar dialectic between its temporal status as an appearing and disappearing event, and its logical status as having such-and-such identifiable meaning or sense-content.' The meaning or sense-content of an action can acquire an autonomy which is comparable to the autonomy of textual meaning. Action can become detached from the agent and develop consequences of its own. Ricoeur asserts that the meaning of an action is freed from the intentions of the acting subject and thus leaves a trace - or puts a mark- on the course of events which is human history

This autonomy has further consequences because just as written discourse is freed from the dialogical situation, so an action is freed from the situation performance. An action, like a text, is an 'open work' ; it can be interpreted and judged by an indefinite range of possible 'readers'.

The interpretation of action by contemporaries has no particular privilege. 'The judges are not the contemporaries,.. but history itself. . Thus action, like a text, transcends the social conditions of its production. Human action, like written work, is freed from the restrictions of ostensive reference. Action, like text, opens up a world.(Moore, 1990: 98)

I will take these points in turn and try and translate them into more concrete terms. The first point basically says the palaeolithic hand axe eclipses the making of the hand axe. The process of manufacture as action event is surpassed by its distanced product, the hand axe.

The second point seems to be saying that the propositional content of the action event can be re-identified as such. Thus the process (propositional content) of constructing a hand axe can be re-identified i.e. "this hand axe was made this way". and expresses a function or purpose (illocutionary force) of the hand axe.

¹⁶ Ricoeur, P (1981) **Hermeneutics and the Human Sciences** Cambridge University Press

Just as the meaning or sense-content of an action can acquire an autonomy which is comparable to the autonomy of textual meaning. Action can become detached from the agent and develop consequences of its own. In less idealist terms ; the hand axe can be thrown away in the palaeolithic and picked up in the nineties and used as a paper weight. i.e. given a new interpretation. In short the hand axe can be taken to be anything that ones imagination can contrive.

Moore writes:

An action is understood when it can be explained why the individual acted as they did, and this can only be explained when a reason or motive for the action can be adduced. Consequentially, an individual can make his or her action intelligible by explaining that it was done out of compassion or sorrow or revenge. However, Ricoeur makes it clear that there is nothing definite about such an explanation. It is always possible to argue about the meaning of an action, to argue for or against a particular interpretation.

(Moore, 1990: 99)

Moore goes on to argue that it is not the actuality of past actions that is inscribed in material culture, but their meaning. The intentions of individual producers do not coincide with what the material culture signifies and material culture is freed from ostensive reference and the shared situation of production.

The attempt by Moore (and others) to use Ricoeur's discussion of textuality and discourse as support for the claim that material culture can be considered a text has not been very successful. The central problem as I see it is that speech acts, objectified by being inscribed in writing, are posited as fragments of a fully constituted signifying system. The linguistic signifier and the inscription of the symbol poses problems of identification (what is the value of this sign ?) What signifies is the system, not the components. Material artifacts as symbols are sociological signifiers which signify by **stating the case...** that this is so. That this tie, is an 'old school tie' therefore I am an 'old school boy' ; part of an elite. As such they pose the problem of recognition. (With what / whom am I dealing ?)

Ian Hodder has perhaps striven hardest to implement this symbolically (textual) contextualized approach to the material record. In **Reading the Past** (RP) (1986) Hodder put forward a critique of archaeological theorizing , concluding that :

archaeology needs to go back to go forward...it has been found necessary to return to the pre-New Archaeology, to recover culture-history and recover a coherent philosophical approach

(Hodder, 1986: 100)

To date, this has not happened, on either count. Contextual Archaeology was proposed by Hodder as a way of capitalizing on gains made by the Processual approach.

The gains of Processual Archaeology, in Hodder's view, were the concern taken over the problems of inference, sampling and research design. Also, the development and application of formal methods of analysis. Hitherto, archaeologists have been concerned with two distinct forms of process, that is, historical and adaptive. Examples of historical processes are diffusion, migration, convergence and divergence. Examples of adaptive processes are population changes, resource utilization, social complexity and trade. (Hodder, 1986: 152)

What contextual archaeology would seek to do is to adequately locate these different processes in the historical contexts i.e. holistically, such that no particular process is accorded primacy in terms of explanatory force. It is the framework of meanings generated by mutually interacting processes that is the key to understanding the past.

Hodder goes on to identify two main types of meaning of concern to the archaeologist. The first type of meaning is that derived from the system of functional inter-relationships i.e. the functional meaning. The second type of meaning is that derived from the structured content of ideas and symbols. (Hodder, 1986: 121)

Functional meanings are uncontroversial (an "axe", can ostensibly be **used** as an axe) and are the mainstay of all archaeological interpretation. Symbolic meaning, Hodder argues, needs to be more than just the kind of inference that is often made such that swords in graves symbolize warrior status. Rather, what is required is an understanding of how such symbolic configuration played a part in structuring society. Not surprisingly, Hodder also wishes to recover the role (activity) of the individual in history and that wish re-introduces the problem of intentionality - beliefs and ideas.

The Post-Processualists reject New Archaeology and its latter day variant because on empirical grounds, they feel the need to embrace a 'normativist' conception of the cultural subject. Not, however, as Binford has claimed, because of paradigmatic posturing. Wylie (1989) has brought this point out clearly in her paper which

examines the current state of the debate between Lewis Binford et. al. and the Post-processualists such as Ian Hodder.

Thus she argues that in the first instance they find it *prima facie* implausible that human action could be adequately comprehended in strictly eco-materialistic terms given its distinctively intentional nature. This is because Binford's theory cuts against both common sense and an extensive tradition in social scientific theory which presumes human subjects to be agents. Also normativist critics go on to substantiate the intuitions which lead them to question Binford's commitment to an ecosystem paradigm. Hodder (1982b), she points out, provides extensive and detailed ethnographic documentation for the view that cognitive variables of the sort that Binford considers dependent can play a dramatic rôle in shaping human behaviour with regard to material things. And therefore, cognitive variables play a rôle in shaping the archaeological record. Moreover, Hodder shows that the interaction between cognitive variables can be quite arbitrary and context-specific. Thus it may be impossible to discover any projectible principles of connection holding among them that would allow their reliable reconstruction from archaeological data. This may even be the case when living contexts in which all the interacting variables are directly accessible are considered.

One of the notable conclusions that Wylie comes to in her examination of the claims of both New Archaeologists and the Post-Processualists is that the limits to archaeological enquiry cannot be stipulated *a priori* on the basis of programmatic argument and the assertion of paradigmatic commitments as inescapable or self evidently correct (Wylie, 1989: 107) Rather, it is an empirical question as to what we can say about the workings of past cultures.

The current debate thus suggests that actualistic research should be treated, not as a means of underwriting predetermined ambitions, but as a means of realistically defining and delimiting these ambitions. Indeed, it demonstrates that actualistic research can determine, in concrete terms, what specific aspects of the past we can profitably investigate, given the nature of the specific record and subject in question

(Wylie, 1989: 107)

1.4 Archaeology: Its Future

Some consideration of where archaeology is going in the future is appropriate here. W.A. McDonald, a veteran American classicist wrote a retrospective paper in 1991 for **Antiquity**, the premier British archaeological journal. McDonald expressed deep worries about the current situation. He identifies six areas of concern (a) a lack

of collegiality within the discipline arising from a lack of shared primary goals; (b) out-dated perceptions of archaeology prevalent in the general public; (c) an ambivalent attitude in the discipline to the world market in illicitly excavated antiquities ; (d) the lack of clarity or understanding demonstrated by many professional archaeologists about the nature of inter-disciplinary research ; (e) the disappointing results of inter-disciplinary work done so far with others in the social and behavioural sciences ; and (f) the relationship and attitude of archaeology to special interest or minority groups. McDonald's worries are, I would say, well founded, though his favoured remedy of a new international body that will represent fairly the interests of all constituencies and take the lead in speaking and acting for what should be a united world community of archaeology, is, to say the least, not on the horizon.

1.5 Summary & Conclusions

It is clear that archaeology has developed and changed - from treasure hunting to post structuralism - coming full circle in the manner of a spiral.

From Pitt-Rivers who focused on the intentionality expressed in material artefacts, archaeology has gone on to embrace notions of objectivity and deterministic accounts ; to replace intentionality with process. Archaeology, in moving from the psychology of material culture to the sociology of material culture has flipped from one 'one-sided' view to another. Human action is at the same time irreducibly social whilst being paradigmatically individual. To understand the content and trajectory of history it is necessary to see the individual as emblematic of the social context; the individual both exemplify the structure of the social and are the source of its transformation.

Now in the nineties, archaeology is confronted once more with the thorny problem of human intentionality. The time is ripe to attempt a unification of intentionality and process. The rest of this thesis will be concerned with the relation between intentionality and process and what interpreting the past through archaeological and historical approaches requires.

In the next chapter I will turn to what I have chosen to call, the Psychological Environment ¹⁷ (i.e. Social life and human action).

¹⁷ The term is taken from Kurt Lewin.

CHAPTER TWO
PERSPECTIVES
ON
THE PSYCHOLOGICAL ENVIRONMENT

2.0 Introduction

In the first chapter an understanding of human intentional action was seen to be a central problem for archaeological interpretation. In this chapter I will review perspectives in Social Psychology which deal with how individuals within a social matrix perceive, categorize, mentally represent, and make inferences about their world. This focus on the interactive relation that humans have with and in their physical and social environment thereby foregrounds issues that relate to human intention. The nature of human intentional action is taken up by several authors reviewed. The interactive relationship of humans and their environment is seen here as fundamental to an understanding of human psychological / social development.

2.1 The Human Umwelt & Gibson's Affordances

The Umwelt of a species is taken to be that part of the material world that is available as a living space to each member of the species by virtue of their specific modes of adaptation e.g. perceptual and manipulative capacities.(Harré, 1990: 301)

Rom Harré (1990), in his essay **Exploring the Human Umwelt** is concerned to develop a unified account of Philosophical Realism and Social Psychology informed by social constructionist perspectives. Social constructionist approaches promote the concept 'person' i.e. as a moral entity, rather than psychological 'subject'.

The only sustainable **realist** account for the physical sciences, in Harré's view, is to treat the human umwelt as developing historically as we advance in the uses of observational and manipulative techniques through and by scientific research. A cognate realist stance in respect of social and psychological studies would entail the following claims.

(1) There is a species-wide and history-long conversation, only partially available to individual human beings, as their social *Umwelten*. But these *Umwelten* are structured for each of us by local moral orders, that is, by tacitly accepted systems of rights, duties and obligations.

(2) In the ultimate stage of the development of the reflexive study of human life we pass beyond the investigation of those language games which are transparent to any one of us, to the open set of possibilities that are affordances of Conversation.

(3) The conversation is only so *far* amenable to the influence of individual speakers. (Harré, 1989: 351)

Social life is seen to be founded in the fact of conversation. To recognise the humanity of an other, is to regard that other as something with which a conversation may be had.

Wittgenstein wrote that 'My attitude towards him is an attitude towards a soul. I am not of the *opinion* that he has a soul' (Wittgenstein, 1988a: § II iv)

The quote from Wittgenstein has been interpreted by Peter Winch¹, Raimond Gaita (1991) and others as marking a new conception of subjectivity. Gaita quotes Peter Winch who claims that we should understand Wittgenstein to mean that an attitude towards a soul is a **condition** rather than a consequence of our ascription of mental predicates. Thus Gaita concludes that the almost irresistible and natural thought that we react to one another as persons - as to other minds - because we know, believe, or conjecture that others have psychological states more or less as we do, is turned on its head.

The point is not merely epistemological. We have two different conceptions of subjectivity and of what it is for an other to be someone with whom we can speak.

(Gaita, 1991: 111)

What is at issue here is our sense of the **reality** of another human being and the fact that we are affected by others in ways we cannot quite comprehend or avert. The point was made by Simone Weil when she wrote of the 'power of refusal' exercised by anyone in our vicinity, just by being there ; when we step aside for a passer-by on the road, it is not the same as changing direction on reading a road sign. Our attitude towards a soul would not extend to a road sign and thereby a road sign is not something with which we would have a conversation.

¹Winch, P. (1980) 'Eine Einstellung zur Seele', **Proceedings of the Aristotelian Society**.

In other words only obstacles set a rule or a limit for human action. These are the only realities with which it comes into contact. Matter imposes obstacles according to its own mechanisms. A man is capable of imposing obstacles by virtue of a power to refuse which he sometimes possesses and sometimes not.... **Whenever there is action thought reaches right through to a goal.** (emphasis added) If there were no obstacles the goal would be attained the moment it was conceived...Anything within the field of action which does not constitute an obstacle - as for instance, men deprived of the power to refuse - is transparent for thought in the way completely clear glass is for sight...When our will finds expression externally to us, through actions carried out by others, we do not spend our time or our power of attention on investigating whether they have consented to this. That applies to us all. Our attention, being completely absorbed in the success of our project, is not claimed by them as long as they are compliant.²

(Weil, 1987: Winch, 1989: 106)

The human umwelt can be regarded then as the ethical and instrumental field of action available to individuals as they partake mutually in social life.

A closely related perspective on the human environment is that of J.J. Gibson. Gibson's **Ecological psychology** is founded on the notion of Affordances ; affordances are what the environment provides or furnishes the animal, to its advantage or otherwise. Here 'environment' includes both the physical and social.

Valenti and Good (1991) offer four distinguishing features of Gibson's ecological approach to psychology, namely; (1) perception seen as an adaptive process guides both biological and socially functional behaviours ; (2) perceptual information is revealed in dynamic interactions with environmental surfaces, objects, places, and persons ; (3) structured sound and light specify opportunities (affordances) for action and interaction ; and (4) evolutionary design, personal history, intentions, and current context of the perceiver determine the perceiver's attunement to particular affordances of objects, places and persons. (Valenti and Good, 1991: 80)

The standard analysis of perception holds that meaning is imposed on sensory input by mental processes. Gibson rejected this view. For Gibson, perception is not

² Weil, S. 'Are we Struggling for Justice' **Philosophical Investigation** 53 (January 1987) trans. Marina Barabus

based on stimulation of receptors by physical energies, rather, it is the pick up of higher-order information contained in invariances transmitted or reflected by ambient light or sound. This information conveys properties such as object size, shape, movement and functional significance or meaning of the object for the perceiver. With affordances there is a deviation from the strict meaning of an objective property in that such properties are not specifiable independent of an individual in the way that the property of say 'mass' is. But neither are affordances subjective in the sense that they reside in someone's mind. Affordances are ecological facts; they are therefore, relational in character.

Living entities are open systems, which means that their continued existence and growth is based on an on-going reciprocal exchange with their surrounds. It is in this way that living entities are relational to their environment. Critically, affordances for animals are constrained by their bodily scale. To specify something about an animal is to imply something about its environment. The behaviour of animals implicates and delimits their niche, in this way, affordances express the unity of behavioural acts. 'the affordance and the related behaviour **together** specify goal-directed action.' (Heft, 1989: 6)

Heft goes on to argue that body-scaling *per se* is less fundamental than the recognition that affordances are specifiable as what the individual can do, relative to their potentialities for action. In other words the affordances proffered by the environment are to be identified in relation to the **body** as a means of expressing various goals or intentions. Or as Merleau-Ponty³ argued:

The body is the vehicle for being in the world, and having a body is, for a living creature, to be involved in a definite environment, to identify oneself with a certain project and be continually committed to them.

(Heft, 1989: 11)

Heft, after Merleau-Ponty, argues that intentional acts do not exist *in* the individual in the form of schema, rather, intentional acts are always situated. Thus, inherent in an act is a reflection of a situation or set of conditions. Also, an intention cannot be described in the absence of some foreseeable expression of it in the world. Hence intention does not refer to a mental representation, it is not a mentalistic notion. (Heft, 1989 : 11)

³ Merleau-Ponty, M. (1963) **The Phenomenology of Perception** trans C. Smith London : Routledge and Kegan Paul

In Harré's discussion of intention, intention is internal to the concept of action.(see below) Intentions refer to **possibilities** which are only realizable as situated behaviour. To summarize then :

An intentional act is situated with respect to two factors: the functional characteristics of the environment confronting the individual (i.e. its affordances), and the physical characteristics of the individual's body, (e.g., body-scaling). The affordances of the setting are, in a sense, the ecological resources for behaviour. The physical characteristics of the body establish what can be performed (i.e., what the individual can do) as a function of such things as length of reach and stride, breadth of grasp, strength, etc. In combination, the affordances of the environment and the characteristics of the body constrain the range of intentional acts that can be expressed.

(Heft, 1989: 12)

An object may be what it is, and what it affords us rests on what it is, but humans also do work on the material world. The material world affords us the opportunity to do work upon it and thereby expand the range of possible affordances open to us and thereby expand or alter our umwelt.

The consideration of human labour on the material world has led some researchers into studying the relation of culture to social ecological psychology. In moving in this direction they are paralleling moves by developmental psychology. As Valenti and Good point out, in contemporary Vygotskian approaches to understanding cognitive development e.g. Valsiner ⁴, there is an emphasis on the sociocultural nature of the child's environment and its impact on cognitive development. With regard to affordances, Valenti and Good argue that cultural practices by structuring the environment can hide some affordances while revealing others, and this allows the child to participate in the creation of still other affordances thereby providing a range of directions for the development of behavioural competence.

I will now move on to discuss social constructionist perspectives on cognition.

⁴ Valsiner, J. (1984) *Construction of the zone of Proximal Development in adult-child joint action : the socialization of Meals* In B. Rogoff & J. V. Wertsch (Eds.), **Children's learning in the "zone of proximal development"** San Francisco: Jossey Bass

2.2 Cognition & Affordances

The dominant paradigm in Psychology is regarded to be the characterization of cognition as rule-governed symbol manipulation. This view of cognition has been under attack, (if that's not too strong a term) by others who favour more social and ecologically based approaches. It is also challenged by Connectionism, i.e. non rule, non-symbol based distributed representations (see below).

Reed (1991) maintains that there is a gap in both mainstream cognitive and ecological psychology where cognition in natural contexts is concerned. In his paper, Reed concentrates on the work of Lave (1988)⁵ and Rogoff (1990)⁶ Reed states that :

Both these writers treat cognition as a kind of active thinking that emerges out of the kind of active perceiving emphasized by Gibson...In contrast to the representational theories which predominate in modern cognitive psychology, Rogoff and Lave see cognition as a set of activities of the person (e.g. remembering, planning), not things acquired by the mind.

(Reed, 1991: 138)

Both Lave and Rogoff, in contradistinction to the classic studies by Piaget, do not treat formalizable school tasks, logical problems etc, as paradigm examples of cognition. Lave and Rogoff take an anthropological approach to cognition, that is, they reject the artificial setting of laboratory controlled situations. According to Rogoff, we think for the purpose of acting effectively in the pursuit of goals which are socially and culturally specified as a means of handling problems. In the psychology laboratory, Lave argues, puzzles or problems are simply assumed to be objective and factual. 'Problem solvers have no choice but to try and solve problems, and if they choose not to do so, or do not find correct answers, they fail.' (Lave, 1988: 35)

In her own studies on situated mathematics, Lave reports that people reorganize the elements available to them rather than attempting to solve problems as given. Adults when faced with mathematical problems isomorphic to calculating tasks

⁵ Lave, J. (1988) **Cognition in Practice** New York: Cambridge University Press

⁶ Rogoff, B. (1990) **Apprenticeship in Thinking: Cognitive Development in Social Contexts** New York : Oxford University Press

embedded in everyday practices, make more mistakes in the formal representations of the task than in the more familiar form. People engage in what she calls **gap closing** procedures (similar to Rogoff's **bridging operations**). Thus people will hunt for information and procedures to solve the current aspect of the problem that is judged to be the most immediate, it makes no difference if such procedures will only yield approximate solutions. Lave has concluded that there is strong evidence to show that adults prefer to avoid formal problem solving (e.g. a shopper will judge the merits of buying the larger package for a small price increase rather than working out the price per unit weight) regardless of the fact that it means they must engage in more than one round of thinking through the problem. Lave found that one way of avoiding calculation was to discover or invent units that allow one to make direct comparisons without any calculation or problem solving. This approach to the problems would, in cognitive accounts, be termed Heuristics.

Rogoff conducted a study on spatial memory involving a group of U.S. school children and a group of Mayan children. Toy models of familiar objects were arranged in a miniature scenario and then replaced into a larger pool of objects. The children were then asked to reconstruct the scenario they had seen. Previous research suggested that the Mayan children had poorer memory for lists, but in this spatial task they did better than their American counter-parts. Rogoff interprets this reversal in performance as being rooted in the distinctly different educational environments experienced by the two groups of children. The American children were more used to rote learning which did not help them in this case. The Mayan children, however, remembered what the scenario looked like rather than recalling the constituent items.

In many if not all cultures, the learning of skills, particularly practical skills, is structured in the form of apprenticeship - pupil and teacher. Teaching is through example and discussion. Reed reports on the work of Forman and Cazden⁷ who claim to show that adolescent peers often have divergent assessments of problems to be solved jointly, this divergence is instrumental in the developing of skills, both of individual and group, as solutions emerge through discussion, disagreement, and consensus. Argumentation then forms the ground on which interactive problem solving takes place and is available to individuals to abstract from.

Reed concludes:

⁷ Forman, E.A., & Cazden, C. B. (1985). *Exploring Vygotskian perspectives in education : The cognitive value of peer interaction* In J.V. Wertsch (Ed.), **Culture, Communication, and Cognition: Vygotskian perspectives** New York: Cambridge University Press

cognitive skills emerge as a consequence of an individual's learning to share affordances, actions and intentions as a result of learning to coordinate and cooperate in working with others. I suggest that in child development there is a movement from what I have elsewhere called "The field of Promoted Action"⁸ (tasks promoted for and offered to the child by caretakers) to "The Field of Free Action" (self-selected tasks ;Reed in press). What affordances are encompassed within these different action fields varies from place to place, time to time, and task to task, but for the successful learning of any given task there is a consistent expansion of the field of free action.

(Reed, 1991: 143)

The movement from the field of promoted action to the field of free action, to use Reed's terminology, leads us on to the question of personhood, or what it is to be an agent. The gaining of personhood comes with the ability to give a certain kind of account in which every action is displayed as intended and is justified by reference to self-authorization, or so Rom Harré has argued.

2.3 Texts of Identity

Harré examines the grammars (logical features) of self-ascription and self-command. Wittgenstein claimed that there was an asymmetry between the grammar of psychological self-ascription and other ascription, of the first and third person uses. Thus epistemic claims such as that one 'knows' or 'thinks' or 'doubts' along with qualification of such epistemic claims e.g. 'sure' 'certain' and 'perhaps' are proper in commentary upon the ascription of psychological states to other people. But in the first-person case 'I know that...' does not mark an epistemic claim. For instance the claim 'I know that I feel sick' is simply an emphatic way of saying 'I feel sick', for how can **you** doubt what **you** feel. You may however be uncertain that what you say captures what you feel. Whereas, I can doubt what you **say** - you feel sick - but not what you feel. The distinction that Wittgenstein made was between first-person uses of psychological terms which must be criterionless, and ascriptions, second and third person uses based on inductive evidence. Harré writes:

⁸ Reed, E. S. (1989) *The Intention to use a Specific Affordance: A conceptual Framework for Psychology* Invited Lecture: Piaget Society Meeting

In my cries, you have criteria for ascription of feelings to me, but these criteria reflect the conditions for determination of meaning and not the truth and falsity of judgement of feeling. The judgements are inductive. There is no room for knowledge or certainty where there is no place for doubt. This insight, one must remember, is grammatical, not empirical.

(Harré, 1989: 25)

Harré then goes on to discuss the grammar of the first-person inflection. The grammar of 'I' in say, 'I will do X,Y & Z' signals not so much the referent who will do X,Y&Z but the **moral agent** who has made a set of commitments to the content of the utterances appropriate to that agent's moral universe. In communities which recognize the autonomous individual, the first-person inflection is used to perform a moral act. It is an affirmation of the individual's integrity. Moreover, in communities which do not recognize the autonomy of individuals, the grammatical first-person still exists, here the residual role seems always to be perceptual. That is how the world is from the point of view in space and time of that speaker, but still the moral aspect is maintained in the sincerity of the speaker 'Sincerity of he / she who sees or hears, rather than the integrity of he / she who promises, is the moral status at issue here.'(Harré, 1989: 26)

The problem of understanding human agency, Harré argues, has thus far been couched in terms of finding a special feature of the mental machinery which serves to account for the apparent distinction between human ways of acting and events produced by mechanistic determinants. But :

...if choosing for oneself, sticking to a decision, being onery and cussed, holding out against temptation and taking up a regime are things people can do, we had best look more closely at what these things are, that is, the conditions under which someone is properly said to have kept to a diet or to have made up his or her own mind.

(Harré, 1989: 29)

Drawing on John Greenwood, Harré proposes that the analysis of the grammar of action is advanced by two root concepts (a) intentions to act, and (b) reasons for acting. The point being that the logics, or grammars, of these two concepts are quite different. The relation of intentions to actions and the acts they may be used to accomplish is conceptual rather than empirical. For instance, the relation between the intention and the act is not disturbed by the statement 'the road to hell is paved with good intentions.'

By reiterating your intention, you give both the answer to what you would have done and to what you did do. Thus if you ask me **what** I propose to do, I will state my intentions, and thereby define my proposed act. My intention to act in a given matter is independent of how I may actually do so e.g. I may intend to score a penalty goal, but miss.

Reasons, in contradistinction to intentions, are often externally related to actions and the acts they accomplish. Thereby reasons often stand in an empirical relation to an action and not a conceptual relation. Two cases are cited here; 'having such a reason I do so and so' ; 'having done or being about to do, so and so, I give such and such a reason'. The first case mimics the structure of causality while the second has the form of a narrative. 'In these cases there is a gap between reason and action which could be filled by causal laws in the one case and narrative conventions in the other'(Harré, 1989: 30). You may ask me **why** I wish to do such a thing as score a penalty goal, and I give you my reason e.g. to win the football match.

The **why** of explanation construed as a causal determinant is identified by Harré as the source of confusion about causality. He therefore proposes to supplant the causal 'why' with the 'why' of authorization. Why score a penalty goal ? Because as team captain, it is **right** that I should, I am obliged to do so. Here we have the inexorability of moral necessity, and not the inevitability of causal necessity.

Harré concludes then that it is a conceptual point that the intention is ineliminable from any account of action e.g. from any account that is connected with a human form of life. Furthermore, the point made here requires that at least some aspects of folk psychology are fundamental(but see below)

The meaning of the notion of authorization cannot be accounted for solipsistically, that is, just with respect to attributes of notionally isolated individuals. I am authorized to undertake something when the judge, the committee, the king, the medical profession or all socially defined entities so decree...Instead of asking, What must something be to be called an agent ?, we should from now on ask. What sorts of things must people do to merit that characterization ?

(Harré, 1989: 31)

Harré's answer to this question was given at the end of the previous section, namely, to be counted as an agent, one must be able to give a certain kind of account in which every action is displayed as intended, and which is justified by reference to self-authorization. In short, they must be held by their social group to be a full member of the group who accepts and carries out the full scope of duties and obligations that come with such a recognition.

Being caused to do something and being authorized to do something are ideas which belong to different *satzsystems*, that is, sentence systems with different grammars (logical features). Problems arise when one is projected into the other. The question of how agency is possible is made intractable by using models of discourse based on patterns of causal explanation when endeavouring to account for the grammar of authorization explanations. What it is to be an agent is marked by our sense of identity and individuality which underlies self authorization.

In focusing on self-authorization Harré is lead to the nature of the human will. The will, taken in the sense of the power to act, fulfil plans, realize intentions fills the conceptual gap that is seen to exist between choosing and doing. This gap is taken by Harré to be the result of positing mechanisms for choosing and doing i.e. cognitive models and neurotransmissions.

Closely related to the idea of authorization is that of **dictation** or the command that one might have over another. Harré writes:

What if there are no *forces* of character, of temptation, of attraction and repulsion, of acts, but only reflexive versions of the language games of persuasion and command. The theoretician's contribution will be to look closely at what is meant by such phrases as 'the struggle against temptation', 'wrestling with conscience', 'wimpish', sticking to one's decisions' and so on ; that is, it will be to describe the grammars, their rules and conditions of use...But these metaphors are how we talk about our actions. So they contribute to the overall grammar of the concepts of actions and agency. They are the texts of Identity, for they create the illusion of the transcendental ego...The project of a psychology of action needs to include the disentangling of the pictures that have captured the minds of psychologists, which are a legacy of the failure to examine the discourses of self-command, self-exhortation (etc.) and so to be subject to their influence.

(Harré, 1989: 33)

The central thrust of Harré's argument can be seen as the articulation of an alternative mode of explanation. Where non-constructivist psychology explains via causality and therefore looks for mechanisms, both abstract and concrete, Harré recommends human actions be described in terms of customs and practices whereby people are ascribed the skills necessary for performing correctly rather than hidden states of mind.

2.4 Folk Psychology

Folk psychology, as it is termed, consists in attributing psychological states to people and is marked by the attribution of 'beliefs' 'desires' and 'ideas'. People are said to have beliefs, ideas, thoughts; people act with the intention to do this or that, they display, in other words, intentionality. Folk psychology also holds that people's beliefs cause them to do particular actions or act in particular ways. A central feature of folk psychology then, is the tendency to attribute to people's actions, causes, for which there is little or no clear warrant.

Some people according to Clark (1990) e.g. Stich (1983) or Churchland (1981), seem somewhat scandalized by this situation and advocate what has been termed 'eliminative materialism'. On this view, our common-sense talk about psychological phenomena constitutes a false theory about such phenomena and should be replaced by the categories (vocabulary) of neuroscience (at the very least).

Clark (1990), on the other hand, denies that our everyday talk is any kind of theory in the requisite sense i.e. scientific theory. If a reduction to the categories of neuroscience or further, to those of physics, cannot be made, then the question arises as to whether cognitive science can properly claim to be studying mind at all. Conversely, if such a reduction can be made, could or should cognitive science force the abandonment of our current way of speaking i.e., stop us couching matters in terms of belief and desires. One notable figure, Fodor has argued that if reducibility to physics is accepted as a constraint on the acceptability of sciences of using mental terms, *in extremis* this would see the end of disciplines such as economics, psychology (and archaeology) all the 'human sciences' since they would have no basis on which to make generalizations. (Schwartz, 1991: 203)

According to Clark, our folk psychology explains the movement of others by construing it as actions. We do this by subsuming it under the intentional umbrella of general psychological laws. For example, if we see a friend moving towards the

bar in a public house, our belief-desire description of their movement towards the bar is *explanatory*, it is argued, only if we tacitly accept a general psychological law. This example is given by Clark (1990):

(x) (p) (q) {[x desires that p] & (x believes that (q → p))] → (x will try, all else being equal, to bring it about that q)} Substituting for x, p, and q we get, (roughly): In all cases, if our colleague desires a Guinness and believes she can get one at the bar, then (all else being equal) she will go to the bar.

(Clark, 1990: 38)

Thus the theoretical content, if such it be, of our folk psychology, is embodied in a framework of just such psychological laws. (Which thereby constitute part of the framework of historical narrative as currently practiced)

Clark makes the point that there are two broad kinds of theoretical commitment which are not usually consciously articulated. These are (a) those commitments which, though once explicit, have now become ingrained in our talk and culture. Clark cites sexual taboos and practices; and (b) those commitments which we cannot help but make, given our biological nature and the physical environment. Here Clark cites the use of texture gradients as indicators of surface orientation. Clark lists the following complaints made about folk psychology by Paul Churchland and Steven Stich, among others.

' (1) Folk psychology affords only a local and somewhat species specific understanding. It flounders in the face of the young, the mad, and the alien.

(2) It is stagnant and infertile, exhibiting little change, improvement, or expansion over long periods of time.

(3) It shows no signs as yet of being neatly integrated with the body of science. It seems sadly disinterested in carving up nature at neurophysiologically respectable roots.'

(Clark, 1990: 39)

If our everyday vocabulary and the way we mobilize it to talk about the doings of others was really a theory in the requisite sense then the worries and objections raised by Churchland and Stich would have some validity. But as Clark suggests there is something very wrong with such a construal. Did our ancestors ever speculate and theorize about the best way of explaining human behaviour and come

up with the answer that the best explanation could be given in terms of beliefs etc.? This is to be doubted. As Clark states:

' There seem to be all sorts of assumptions here about the *role* of ordinary ascriptions of mental states in our lives. Are such ascriptions really just tools for explaining and predicting others' bodily movements ? And even if in some sense it *is* such a tool, is it really trying to fulfil its purpose by tracking states of the head ? Would it even be wise to try to explain behaviour in such a way ? If any of these pointed queries draws blood, the honour of the folk may be preserved. Instead of losing at protoscience, the folk may turn out to be winning at a different game.'

(Clark, 1990: 42)

Clark argues that what is called folk psychology would be better termed Naive psychology on similar grounds to those proposed by Hayes⁹ (1979) for naive physics.

Basically, we have the psychological understanding of each other that we have, because of the processes of evolution. Clark writes:

If human beings are effective folk-physicists on this level, it is presumably *not* a result of ordinary campfire speculation. Rather, it is because our cognitive capacities are naturally designed to embody, or else quickly yield, a rough and ready grasp of what ever physical principles are most important for the success of a mobile, tool using animal...Just as the mobile needs to know about support, so must the socially mobile know about the mental states (beliefs, desires, motivations) of their peers. for a sound psychological understanding of others must surely make an important contribution to the overall fitness of a social animal.

(Clark, 1987: 145)

Naive psychology then is seen by Clark to be the bedrock which enables us to achieve our most basic goal of understanding the actions of others. This bedrock of understanding learned or arrived at by the employment of exceptionally well-tested cognitive competencies may not be an infallible guide to the mental life of others, but its certainly adequate by evolutionary standards.

Clark therefore claims that a primary purpose (function) of folk-psychological talk is to make intelligible *to us* the behaviour of fellow agents. Also, it makes their

⁹Hayes, P. (1979) *The Naive Physics Manifesto*. In M.A. Boden (ed.). *The Philosophy of Artificial Intelligence* Oxford University Press

behaviour intelligible and predictable insofar as that behaviour bears or may bear on our own needs and interests.

What folk-psychological talk essentially does is to offer a narrative in which intentional states preserve what humanly matters and which is lost with objective descriptions. (Bruner, 1990: 350) Narratives are quintessentially about the actions of people in particular settings and their actions point to intentional states, that is, beliefs, desires, theories or values. The attribution of beliefs etc, to agents is an act of interpretation in the service of explaining their actions. In this way we afford them reasons for acting in the way they have done.

Bruner (ibid) raises the problem of what he calls 'hermeneutic composability' with regard to narrative construction. Quoting Charles Taylor¹⁰ the point is made that in establishing a reading of the whole text we appeal to readings of its partial expressions, but because we are trying to explicate meanings we can only do so by relating the meaning of partial expressions to the meaning of the whole text. In a narrative we interpret the parts in the light of a putative story or plot and re-work the plot as new elements are introduced in order to maintain coherence and intelligibility. By offering a narrative, folk or naive psychology furnishes an account of acts which matter to somebody in a non-random way, in a way to be negotiated, not dismissed and which has consequences for what is to happen next. As Bruner notes, narrative, unlike logic, is not stopped dead in its tracks by contradiction.

Returning briefly to Harré : Harré argues that there is only physiology and conversation. (Harré, 1989 : 27) That whatever the physiological processes going on in the brain or body, individuals are tied into the community of speakers by the acquisition of skills and competences. Nevertheless, since people do lead their lives choosing, feeling guilty, acting, believing etc, then shedding these concepts from our account of living would not reveal what human life is really about, but rather, it would make a way of being that was not recognizably human at all (ibid : 28) The problem, as Harré sees it, arises out of thinking of hidden state assignment (e.g folk psychology) as a technique of physics. ' Only affordances can be assigned to the underlying physical reality. Only powers, skills, abilities and capacities can be assigned to people as that which makes their conduct as joint producers of human conversation possible' (Harré, 1992 : 154) Thus all action which is capable

¹⁰ 'Interpretation and the Science of Man' in *Interpretative Social Science : A Reader* ed Paul Rabinow and William M. Sullivan (Berkeley, 1979)

of sustaining some psychological phenomenon such as remembering or deciding, is joint action since there could be no being which is both atomic and capable of the intentional use of symbols.

The notion of a bedrock (re Clark) on which our understanding of others is based, raises the more general question of induction. In other words, how can anyone know anything outside themselves or how can any amount of corroborated recollection give one a reason for believing in the reality of the past? The scepticism inherent in such questions is turned, according to Wittgenstein, by seeing induction and what judgements about the world may be induced, as a product of the form of life in which the individual partakes.

2.5 The 'Problem of Induction'

The 'problem of induction' which Kant considered to be a philosophical scandal is the source of philosophical scepticism. But with our use of inductive reasoning the conduct of ordinary life goes very well, despite an apparent lack of logical underpinning. The kind of scepticism which challenges our beliefs about the world, e.g. that the sun will rise tomorrow, was tackled head on by Wittgenstein. In **Philosophical Investigations (PI)**

Wittgenstein wrote:

The character of the belief in the uniformity of nature can perhaps be seen most clearly in the case in which we fear what we expect. Nothing could induce me to put my hand in the flame - although after all it is *only in the past* that I have burnt myself (§ 472). The belief that fire will burn me is of the same kind as the fear that it will burn me (§473).

Thus the presupposition of the uniformity of nature constitutes a very deep belief in our society (it is supported by our form of life) and underpins a great deal of what we are prepared to countenance and thereby influences the way we act. Such a belief in the uniformities of nature need not therefore have been shared by others in the past, or those who live differently to Westerners today. Though it is difficult to believe that the first humans to use fire would not soon learn to keep their fingers out of the way. However, as was pointed out in the first chapter, a thorough going uniformitarianism only took hold of Western thought in the last century. (see p.5)

Wittgenstein's point is this; such beliefs as fire will burn me or that a pencil will drop if I let go of it, are not reasoned (they are nevertheless reasonable) but rather,

are the **hinges** around which our reasonings revolve. It is the fact that we all have and share in such manifestly unassailable beliefs gained by experience that shows how we think and reason the way we in fact do. Dilman (1973) argues that the possibility of our carrying out empirical and scientific investigations by framing explanatory hypotheses and trying to verify (falsify) them, together with formulating scientific laws and empirical generalizations and justifying them, depends on there being a large number of beliefs which we all take for granted and are not prepared to question, and which do not need justification.

Thus the fact that we acquire such beliefs as a result of experience underlies the possibility of thinking and concept formation in general and inductive reasoning in particular.

(Dilman, 1973: 38)

What keeps these hinges in place is, in part, the attitude that we have been taught to take towards them. (Dilman, 1973 : 39) The teaching comes about through repeated experience of the world, as with all other animals, and through communication using language. When we learn our mother tongue we at the same time learn what is to be investigated and what is not. 'Just as in writing we learn a particular basic form of letters and then vary it later, so we learn first the stability of things as norms, which is then subject to alteration' (Wittgenstein, 1969: §473)

The belief in the uniformity of nature is taken up in detail by Dilman who states that this belief is the belief that everything that has happened or is happening and will happen in the future, is an instance of some general law to which there are no exceptions. The attitude that underlies such a view was expressed by Einstein when he remarks that the simplicity of our picture of the world but which at the same time embraces more facts than hitherto, reflects in our minds the harmony of the universe. The qualification is given by Simone Weil:

On the scale of our senses there is no appearance of determinism except in the laboratory. Ask a meteorologist or a peasant if they see much determinism in storms or rain : look at the sea, and see if the shapes of the waves appear to reveal a very rigorous necessity !

(Weil, 1968: 68)

The uniformity of nature is most impressive from the safe distance of the physicist's study: but as Steven Toulmin (1955) makes clear 'it is not nature that is Uniform,

but scientific procedure; and it is uniform only in this, that it is methodical and self-correcting' (Dilman, 1973 : 55)

What is being argued by Dilman here is not that there are no uniformities in nature, but that what we perceive as uniformity and thereby use to make predictions and explanations are relative to our language and systems of classification. The possibility of finding such uniformities in nature is rooted in the kind of regularity that exists in human affairs which include scientific techniques and theoretical speculation. How we reason and investigate the world cannot, without circularity, be explained in terms of features of the world as we picture it. 'I did not get my picture of the world by satisfying myself of its correctness ; nor do I have it because I am satisfied of its correctness, No.; it is the **inherited** (emphasis added) background against which I distinguish between true and false. (Wittgenstein, 1969: § 94)

Our picture of the world arrived at by induction, in a Wittgensteinian account, is not the result of assessments we have made about it, rather, it is the ground on which our judgements or assessments are made.

This inherited background which, according to Wittgenstein, grounds our distinguishing of true and false, (our agreement in judgements) would be regarded in cognitive psychology as **default** information but it would not be given quite the same omnipotent status as that given to it by Wittgenstein.

So far the account of induction has concentrated on judgements we can make about the world given the conceptual and linguistic resources made available to us by the social group of which we are a part. Parallel Distributed Processing (PDP) or Connectionism as it is sometimes called, offers some insight as to the cognitive underpinnings to such judgements.

PDP systems represent concepts by a specific pattern of activation strengths across a distributed network of simple processors. In such parallel systems, the activation of any unit or configuration of units can influence the activation of any others. Thus incomplete inputs e.g the image of a house, can generate the recall of other pertinent information (concepts) about houses. Some such system is thought to be the basis of the brain and underpins the rapid (real-time) cognition of the environment in which we constantly move. Such real-time cognition of the changing environment is always prone to error and needs continual updating. This then would be induction at its most general level, a level that we share with other

animals such as Russell's chicken. (see below) But the point must be made that the rapid revision required by real-time cognition which is therefore of necessity, error prone, is mis-cast by logical formalisms.

The reason why induction it is often viewed with suspicion by some e.g. Bertrand Russell, is attributed by Dilman to the view that takes deduction as the paradigm case of reasoning.

This craving for consistency offered by deduction has been encouraged, it is argued, by abstract thinking typified by mathematics and logic, and has had an adverse effect on many philosophers. One example given of this adverse effect is Bertrand Russell's story of the chicken who inductively reasoned that when the farmer appeared every morning, he (the chicken) got fed. Unfortunately for the chicken, one morning he got his neck wrung. Therefore, the chicken's reliance on induction was misplaced.

The problem with this story is that chickens don't infer anything at all. The chicken may exhibit the behaviour of one who expects feeding, but we cannot intelligibly attribute the kind of knowledge or judgement to a chicken that a human expresses when they say 'now I can go on' (Wittgenstein, 1988: § 151) That is, when a person can observe a rule, like a rule of inference.

Inductive inferences furnish us with premises for judgements about things in the world and the actions of others. Naive psychology constructs causal theories out of such judgements in the form of discursively produced narratives. Constitutive of such inferences are the concepts and categories by which we individuate and collectivize the material world. There is therefore an intimate link between discourse and categorization. It is in becoming a member of a speaking community that our powers of conceptualization are developed and it is in discourse that categories are generated. It is to this topic I will now turn.

2.6 Categorization & Discourse

From the above discussion of affordances, it may be argued that the world objectively constrains the way we would group things by limiting the kinds of activity in which we can participate with them. In other words, the categorization of things rests on a spectrum of activities including the use of language. What ever the properties of the object, it will only be those properties which are made salient by

activity e.g. discoursing, which gain our attention and lead us to see relations of similarity between objects and the properties of objects. Activity is to be taken here in its broadest sense. A Bird flies by flapping its wings, as does a Bat ; and therefore a Bird's wing is more **similar** to a Bat's wing than say, an aeroplane wing.

Or again, the symbolic role in initiation ceremonies that pigs play for the Orokaiva people of Papua New Guinea rests on a perceived (asserted) similarity between pigs and children. The most salient activity which posits this relation of similarity between pigs and children, is suckling. Orokaiva women suckle their pigs as well as their children. Moreover, the Orokaiva call pigs 'children' of their owners and talk of a pig's mother being the person who has brought it up. (Bloch, 1992 : 9) In the most general case then, how we categorize things, properties and people flows out of the specific matrix of interaction between things and people in the course of life's activities.

As stated above, the power of conceptualization develops with acquisition of language. The classical (Aristotelian) account of concepts held that concepts e.g. <wing> have an **intension**, that is the set of attributes that define the concept ; and an **extension**, that is the set of entities which are members of the concept or category. The classical view of concepts implies that concepts are arbitrary, that is, they depend on the particular set of attributes specified ; and that concepts are discrete all-or-none categories. (Stevenson, 1993 : forthcoming)

The classical view of concepts has been progressively undermined. Firstly there is Wittgenstein's notion of family resemblance. Wittgenstein used the concept of a <game> to illustrate the problems with the classical view. What, he asked, was common to all games that they be games ? He concluded that what we find when we actually look at games is a complicated network of similarities over-lapping and criss-crossing but no essential set of features in virtue of which they are all games. Wittgenstein's observations about the family resemblance aspect of concepts led to the **probabilistic** view of concepts i.e. they consist of characteristic features rather than defining features.

The probabilistic view of concepts suggests that concepts have internal structure. Eleanor Rosch developed the notion that some of the members of the category were more typical of the concept than others, e.g. a Robin is more typical of a <bird> than a Penguin. (at least where the average American was concerned.) This prototypicality of some members and not others counted against the view that concepts are arbitrary. In this case the concept is represented by the **prototype**. A

related but different account is given by the notion of **exemplars**, in this case the concept is represented not by a summary representation but by specific examples. (see Smith & Medin¹¹) Neither prototype nor exemplar based characterizations of concepts are held to be sufficient for understanding the nature of concepts. (Stevenson, 1993 : forthcoming)

Turning now to a 'discursive' view of categorization, Edwards (1991) remarks that the main thrust of recent developments in psychology has been along the lines of emphasizing the basis of linguistic categorization in the nature of bodily and perceptual experience including its metaphorical extensions. e.g. Lakoff.¹² In this kind of work, experientially rooted 'cognitive models' form the basis upon which categories are comprehended and used. Edwards appreciates the important insights that this work has provided but nevertheless feels that this emphasis creates a distortion of our understanding of human categorization by removing it from the context of social action. While recognizing the importance of perceptual experience in the semantics of categories, Edwards states :

I argue that the explanatory status of that experiential basis is subject to principles of discursive construction and deployment. By examining categorization as a social practice, the explanatory significance of individual cognition and perception is recognized but diminished, becoming part of a range of topics, devices and resources that participants can use in the performance of communicative acts.

(Edwards, 1991: 516)

Citing Lakoff's "demolition" of the classical view of categories (see above) Edwards states that in so far as Lakoff's work on the experiential basis of category formation deals with the semantic content of categories, this work is not obviously in conflict with discursive and rhetorical psychology, e.g. Billig¹³ In other words people draw upon knowledge of the organization of categories to produce intelligible conversation.

Edwards states that it is tempting to put the two approaches together since the discursive (rhetorical) approach says little about how words come to have

¹¹ Smith, E. E. & Medin, D. L. (1981) **Categories and Concepts** Harvard University Press

¹² Lakoff, G. (1987) **Women Fire and Dangerous Things** University of Chicago Press

¹³ Billig, M. (1989) **Arguing and Thinking : A Rhetorical approach to Social Psychology** Cambridge University Press

systematic semantic properties; the cognitive approach fails to 'explicate how actual categorizations, things that are said, function as actions fitted for their occasions' (Edwards, 1991: 517)

Edwards holds that the discursive approach requires categories to be flexible in that they refer indexically in indefinitely many specific ways governed by the context of situated use. In Potter and Wetherell's (1987)¹⁴ terms, categories are the 'building blocks of our many versions of the world.[and] have to be moulded in discourse for use in different accounts. (Edwards, 1991: 517)

According to Edwards, the cognitive approach treats discourse as simply a realization of, and thereby evidence of, underlying processes and structures of knowledge which in turn are derived from innate structures, e.g. perception and action. Furthermore discourse is assumed, it is claimed, by the cognitive approach to be driven by cognition, discourse is seen then as a process of assembling categorizations for making sense of experience.(Edwards,1991: 517) The emphasis is placed on the psychological origin and cross-cultural universal properties of linguistic categories along with their mental representations. Culture is therefore seen as a kind of socially shared cognitive organization.

In contradistinction to the cognitive view, the discursive approach treats talk and texts not as representations of pre-formed cognitions, even culturally provided ones, but as forms of social action. Categorization according to Edwards is *something we do*, (author's italics) in talk, in order to accomplish social actions such as persuasion, denial, refutation, accusation, etc.

.. From this perspective, we would expect language's 'resources' not to come ready-made from a process in which people are trying their best to understand the world (whether as individuals or together), but rather, or at least additionally, to be shaped for their function in talk, for the business of doing situated social actions.

(Edwards, 1991: 517)

Edwards argues that we should not start with the abstracted content of categories and then theorize about how they are used, rather we should start with situated

¹⁴ Potter, J. & Wetherell, M. (1987). **Discourse and Social Psychology: Beyond attitudes and behaviour**. London: Sage

usage in order to explicate what is being done. This recommended approach has a number of implications. These implications are reported below.

(1) We are always dealing empirically with indexicality, with a specific thing, event, property, or group of things being referenced, not the entire possible set.

(2) Categorization will always be encountered as part of an utterance, text, argument, description, account, etc.

(3) It is therefore encountered as part of the accomplishment of some social action : a reporting, blaming, defence, justification, excuse, etc.

(4) Situated categorizations therefore perform *moral* (author's italics) work on the world described, and indexically, on the current interaction and participants who are producing and receiving the description.(cf. Edwards & Potter, in Press)¹⁵

(5) It seems reasonable to assume that this is what linguistic categories are for, to do these kinds of things in talk.

(6) Category terms (their semantic content etc.) might fruitfully be examined, therefore, in terms of the kinds of discursive work they are functionally designed for, rather than how well they correspond to cognitively natural or perceptually derived organization of experience.(ibid 518)

Unfortunately Edwards does not make clear anywhere in this paper just what he means by saying that situated categories do moral work (see 4) but I think he has in mind the position taken by Rom Harré on the nature of agency. (see above)

Briefly, we gain the status of personhood i.e. self-authorizing speakers who can 'speak for themselves' by being judged a full member of the community who takes up and discharges the moral duties and obligations of the community. By talking over the heads of children, very old people and the disabled we are, to all intents and purposes, denying their status as persons, and in the act of that denial, we re-categorize them.

In point (6) Edwards makes the claim that it would be fruitful to examine categories from a functional perspective, perhaps so, but the way he puts it undermines his own position in that, if categories "even culturally provided ones" (see quote above) are built and re-formed in the very act of discoursing, then they cannot be "**functionally designed**" ahead of that discourse but only historically afforded.

¹⁵ Edwards, D. & Potter, J. (in Press) *Discursive Psychology* London: Sage

Edwards states that it is possible to distinguish two types of categorization (a) semantic and (b) propositional but I would add a third (c) the categorizations afforded us by perception and action. Semantic categories issue from the way that words label and meanings embody categorization whilst propositional categorization issues from the way we combine words in propositions such as 'Socrates is mortal': This distinction could be made in terms of simple and complex concepts. Complexity in concepts is defined by Keller and Lehman (1991) as 'specifically, if a particular concept definition requires more formal mechanisms in its representation than does some other concept, then the former is more complex than the latter' (Keller, et al., 1991: 272)

Perceptual and active categorization is described by Simone Weil¹⁶ who argues that our perception of the external world constitutes an essential relation which consists in a reaction or reflex. In her excellent metaphor, we engage in a 'dance of perception' and this dance is the source of our perceiving. Thus she writes:

If we examine the relations between reactions and stimuli, we see that the latter are limitless in number, while the former are limited. The salivary gland, for example, always secretes saliva, whatever the food is. It is as if it were able to discern the general character of food throughout an infinite variety of foods....So, by means of our reactions we generalize stimuli....It is in this way that the body classifies things in the world before there is any thought. (Example : the chick leaving the egg distinguishes between what is to be pecked and what not.) so, from the very fact we have a body, the world is ordered for it, it is arranged in order in relation to the bodies reactions.

(Weil, 1959 :Winch, 1989: 43)

Edwards makes the point that cognitive and rhetorical approaches to categorization tend to pass each other by as their relative strengths appear to be in different realms. Cognitive approaches explore the meanings of semantic categories, while rhetorical or discursive approaches concentrate on the rhetoric of social stereotyping.¹⁷

Edwards cites Lakoff's notion of Idealized Cognitive Models (ICM's) by which we make sense of the text in terms of typical kinds of things people are thought to do, but argues that it is not simply that talk realizes the structure of an underlying

¹⁶ Weil ,S (1959) **Leçons de philosophie**

¹⁷ e.g Billig (1989) However the distinction between the concerns of cognitive approaches and discursive ones is by no means as clear cut as Edwards would make out.

cognitive model e.g. an ICM. Talk is taken by Edwards to be the way that the ICM is referenced so that the speaker is able to say something. Normative assumptions about the topic in question form the backdrop or context for particular statements. Thus Edwards writes:

Indeed, the status of such Models as "idealized" allows them to operate normatively in just this way. But it is only by studying how such normative assumptions are orientated to in talk, in the adoption of Rhetorical positions, that we can make sense of how particular categorizations are constructed on occasions, so that idealized cognitive models do not slip into becoming models of cognition.

(Edwards, 1991: 525)

Edwards, however, still maintains that prototype theory can be seen as meeting discursive psychology half way, in that it portrays word meanings in a way that lends them to situated rhetorical practices.

2.7 Summary

In this chapter I have ranged over a number of topics, all of which stress, to greater or lesser degree, the dynamic environment in which the human psyche and society develops.

The thrust of the chapter is towards a focus on situated human action. Harré emphasises seeing people not as subjects but as moral agents whose actions are embedded in moral orders, local systems of obligation and duty with associated valuation criteria. Understanding this social matrix of duty etc, requires the analysis of the grammar of activity and discourses of self and command.

Social constructionist accounts of psychological development place the emphasis on conversation as the primary human reality. Gibsonian affordances offer an account of how we directly perceive information (not only) from the physical world but also from the social world. Together they make up the human Umwelt which is a dynamic and historically given reality directly constituted by the very nature of our species. Reed draws attention to the view of cognitive development which holds that the activities afforded by our Umwelt form the ground on which cognitive development takes place.

Clark defends our use of folk-psychology as being shaped by evolution and therefore necessarily adequate to our existential needs. Dilman's Wittgensteinian

treatment of the 'problem of induction' suggests that formal logic and the promotion of deduction as the paradigmatic form of reasoning cannot be sustained. Deduction is internal to language and formal logic is abstracted out of language. Induction, however, reflects the openness of life where continued existence and growth is based on an on-going reciprocal exchange with one's surrounds. Finally, Edwards explores the process of categorization in light of the fundamental role of discourse in our lives.

In the next chapter I will review aspects of cognition and Artificial Intelligence. I will also report on some of the Expert Systems work currently being undertaken in Archaeology.

CHAPTER THREE
ASPECTS OF COGNITION
&
ARTIFICIAL INTELLIGENCE

3.0 Introduction

In the second chapter I reviewed perspectives in psychology and philosophy which may be seen as focusing on human **praxis**. In this chapter I will discuss perspectives in psychology which are more formalistic in their approach to the conception of mind, knowledge and belief. These formalistic approaches underpin the work in Artificial Intelligence (AI). Also, I will review work in AI which seems to offer a new way of approaching (dealing with) archaeological problems and examples of current AI applications in Archaeology

3.1 Mental Models

The theory of mental models entails the view that in interacting with each other and the physical environment we form internal mental models of ourselves and the things which we encounter. There are four different things to be considered here (a) the target system ; (b) the conceptual model of that target system ; (c) the user's mental model ; and (d) the scientist's conceptualization of that mental model. Norman (1983) writes:

The system that the person is learning or using is, by definition, the *target system*. A *conceptual model* is invented to provide an appropriate representation of the target system, appropriate in the sense of being accurate, consistent, and complete. Conceptual models are invented by teachers, designers, scientist, and engineers.

(Norman, 1983: 7)

The target system is something in the world which we perceive and construct a mental model of. Such models are naturally evolving, that is, by interacting with the world, the model is formed and reformed. It is a central axiom of mental model theory that the model must be functional, that is operable ; it need not be a perfectly accurate representation of the world. The mental model will be constrained by the user's technical background, previous experiences with similar systems (situations)

and the structure of the human information processing system. (Norman, 1983: 8)

Norman makes a number of general observations about mental models such as that (a) they are incomplete; (b) there are limitations on peoples ability to 'run' their models; (c) Mental models are unstable, details are forgotten with time ; (d) Mental models are not clearly circumscribed and overlap; (e) Mental models are often self contradictory or 'unscientific': and (f) Models are parsimonious - people will often engage in excess physical activity rather than mentally plan out with a view to curtailing such excesses.

In modeling a Mental model the researcher must clearly distinguish his or her own conceptualization of the subject's mental model. That is, distinguish his or her meta-model from the subject's model and the subject's model from the target system. Norman cites three functional factors which apply to both the mental model and the researcher's meta-model. The three functional factors cited are (a) belief system ; (b) observability ; and (c) predictive power.

The belief system is constituted by a person's mental model (s) which reflect his or her beliefs about the physical system. These beliefs are acquired either through observation, instruction, or inference. The researcher's conceptual model of the person's mental model should contain a model of the the relevant parts of the person's belief system.

The functional factor of observability dictates that there should be a correspondence between the parameters and states of the mental model that are accessible to the person and the aspects and states of the physical system that the person can observe. With the researcher's conceptual model of the mental model, this means that there should be a correspondence between parameters and observable states and the observable aspects and states of the target.

Since the purpose of a mental model is to allow the person to understand and to anticipate the behaviour of a physical system e.g. the world before them, the model must have predictive power, either by applying rules of inference or by procedural derivation. Thus it should be possible for people to 'run' their models mentally. This in turn means that the conceptual mental model must also include a model of the relevant human information-processing and knowledge structures that make it possible for the person to use a mental model to predict and understand the physical system. (Norman, 1983: 12)

Conceptual or meta-models are devised as tools for teaching and understanding in general. Mental models are what people have in their heads and are used to guide action in the world.

3.2 A Cognitive Account of Thought & Thinking

There are different conceptions of what mind may or may not be. However, in cognitive psychology the emphasis tends to be on how we implement what we know, rather than what we know and how we acquired such knowledge. (Anderson, 1989: 313)

Anderson points out that the turn away from Behaviourism towards cognitive psychology brought with it a concern for computational rigour and with Newell and Simon's work on problem solving, a mapping from goals and knowledge to behaviour was accomplished. Behaviourists argued that there was no such thing as abstract knowledge, meaning that when we speak of someone having certain knowledge we mean that the person has certain behavioural potentials. Unfortunately, (in Anderson's view) this attitude led to a prohibition on discussing mental structures, thus Anderson remarks, a basically correct observation about there being no knowledge in the abstract was taken to an unfortunate extreme.

3.21 Thought

It would be uncontroversial to say that when we think, we derive conclusions from what we already know by making **inductive** and **deductive** inferences. Deductive inferences are **logical** in that they necessarily follow from the stated premises which contain explicit information. Inductive inferences are **non-logical** in that they do not logically follow from the premises. While this distinction can be and is made between these two forms of inference, both may be said to feature in human cognition since it is by induction that we generate new knowledge and furnish premises for deduction. The veracity of any conclusion derived by deduction stands or falls with the veracity of the inductively-derived premises.

Deductive inferences are said to exhibit logical form which guarantees the validity of the conclusion relative to the premises, if not the actual state of the world. Deduction makes explicit information that is implicit in the premises : thus

All A are B
All B are C
Therefore All A are C

An inductive inference may give rise to new knowledge if the conclusion is substantiated by means external to the principle premises: thus

Frank was seen in a red car
A red car was reported stolen
Therefore Frank stole a red car.

While the conclusion may seem plausible, it is not strictly warranted, rather, it implies background knowledge about Frank's attitude to personal property. In making an inductive inference we reason from a piece of information, which may be complex or multifaceted, to a conclusion which is independent of it. Furthermore, this independent conclusion may take the form of a prediction or a generalization made about either past, present, or future states of affairs. (see chapter two)

3.22 Deduction

The logical form of a deductive inference is a matter of grammar, i.e. the position and role of certain words within the premises and conclusion. Central here is the role of logical quantifiers e.g. 'All' and 'some', and connectives e.g. 'and', 'or' which give the logical form of the premises. Stevenson writes:

...in both forms of thinking, a conclusion which was not explicitly stated must be inferred. The two types of thinking differ in the nature of the inference. Deductions depend on the rules of logic. As long as the rules have been correctly followed, a deductive argument guarantees that the conclusion is correct. But with induction, no such guarantee is possible. Inductions are best guesses or hunches based on whatever information is available...The inferences that are made are conclusions about the state of the world. By contrast, deduction does not involve learning something new, since the conclusion that is arrived at by deduction is already contained in the premises and needs only to be made explicit.

(Stevenson, 1993: forthcoming)

According to Johnson-Laird & Byrne (1991) reasoning begins with a definite starting point, a set of observations or premises. Furthermore, there are three main varieties of reasoning, these are (a) calculation ; (b) deduction ; and (c) induction. Taken together with association and creation, these underlie all thought. Deductions are involved in formulating plans, evaluating actions etc, 'a world without deduction would be a world without science, technology, laws, social conventions, and culture.' (Johnson-Laird and Byrne, 1991: 3)

In cognitive science a distinction is made between the 'computational level' and the 'algorithmic level' of a theory. The computational level characterizes what is being computed, why it is computed and what constraints operate. The algorithmic level specifies how the computation is carried out. These two levels of theory mirror Chomsky's notion of Competence and Performance, respectively, with regards to language.

Deduction at the computational level is composed of the way people take a set of observations, memories, statements, beliefs etc, and produce a novel conclusion that follows from them (see above). Often, the starting point is a perceived state of affairs i.e. premises, and the conclusion issues in a course of action. A nineteenth century view of deduction known as Psychologism held that deductive logic is simply a generalization of those inferences that people have judged to be valid. Whereas the German logician Frege argued that it concerns objective relations between propositions.

It has been a matter of contention whether or not people are naturally rational i.e. have logical competence. Johnson-Laird & Byrne for example, argue that people are rational in principle but fallible in practice. But what is it, to be rational **in principle**? Johnson-Laird & Byrne argue that there is a central core of rationality, common to all societies. The Semantic principle of validity is cited as this core of rational inference. Thus in any language, if the premises are true they will yield a **true** conclusion. Johnson-Laird & Byrne go on to state that logical reasoning divorced from the practical contexts (which is made possible by formal rules) is, or appears to be, dependent on schooling and literacy. They conclude 'The common denominator of rationality is the search for counter-examples : anything else is logical icing on the cake' (Johnson-Laird and Byrne, 1991: 209)

This would seem to be broadly in agreement with Dilman's Wittgensteinian position. Dilman writes :

So if by a purely deductive procedure a contradiction were derived from the rules in accordance with which we reason, this need not show that there is anything wrong with the rules. As Wittgenstein put it : "The sign-post is in order - if, under the normal circumstances, it fulfils its purpose". The point is that you cannot talk of whether or not the sign-post is in order in separation from the circumstances in which it is used and what role it plays there

(Dilman, 1973: 206)

The interesting question, to my mind, is not whether all people past and present reason the same way, or even, if all 'humans' are capable of reasoning the same way, since, there is no *a priori* reason to think that they could not. Rather, the interesting question is what circumstances lead us to reason the way that we do now or have done in the past, or might do in the future.

At the algorithmic level, deduction has been characterized in three ways. (a) that deduction is the application of a set of formal rules; (b) that deduction involves the application of content-specific rules; and (c) deduction involves the semantic procedures that search for interpretations (or mental models) of the premises that are counter-examples to conclusions. (Johnson-Laird and Byrne, 1991: 23)

The formal rules of logic include such rules as *Modus ponens*

Modus ponens takes the form : If p then q

p

Therefore, q.

Where p and q are variables that denote any proposition.

Content specific rules are the basis of most Expert Systems in which meaning postulates (e.g. premises which express a consequence by virtue of what they mean) capture a body of knowledge. Within the Expert System, these meaning postulates are made to function as rules of inference.

It has been suggested that the mind uses content-specific rules to encode general knowledge, particularly where reasoning is seen to be based on memories of particular experiences. This is known as case-based reasoning. Johnson-Laird & Byrne point out that this view of reasoning fails to explain how people are able to make valid deductions that do not depend on their specific experiences. Johnson-Laird & Byrne favour the third option of semantic search or mental models, they write:

Neither formal rules nor content-specific rules appear to give complete explanations of the mechanism underlying deduction. On the one hand, the content of premises can exert a profound effect on the conclusions that people draw, and so a uniform procedure for extracting logical form and applying formal rules to it may not account for all aspects of performance. On the other hand, ordinary individuals are able to make valid deductions that depend solely on connectives and quantifiers, and so rules with specific content would have to rely on some (yet to be formulated) account of purely logical competence. One way out of this dilemma is provided by a third sort of algorithmic theory, which depends on semantic procedures.

(Johnson-Laird and Byrne, 1991: 35)

Jonathan St B. T. Evans asks, however, 'why should people not reason using mental models and schema and heuristics ?'(Evans, 1992: 240)

Evans goes on to question why Johnson-Laird & Byrne have not applied mental models to induction, only deduction. Evans accepts the claims that the strength of mental models lies in its ability to explain how people can deduce conclusions on relatively simple problems of an arbitrary nature where prior experience cannot be usefully applied. But, as Evans says, not much real world reasoning is like this.

Deduction, if it does anything, serves to develop the implicit knowledge that we have gained in order that we can apply it in a flexible way in many different situations. Evans writes:

One of the acknowledged mysteries of reasoning research is that of why human beings who are so manifestly intelligent in general should appear so biased and error-prone when confronted with explicit reasoning tasks in the laboratory. The answer may be that comparatively little real-world intelligence requires explicit reasoning ; that mostly involves the automatic induction and application of knowledge based schemas. If so, reasoning research in its present form would seem to diminish in importance. However, the bounded rationality argument is answered. If people do not use explicit reasoning processes in complex real-world situations, then the proposed criticisms of current theories of explicit reasoning evaporate.

(Evans, 1992: 240)

The notion of 'bounded rationality' mentioned by Evans in the quote above makes the point that human reasoning, construed as computational processing, is constrained to the actual time-scales exhibited by humans when reasoning. Some

computational processes are more complex than others and therefore require more computational resources in terms of memory and operations performed. Complexity is measured by treating it as a mathematical function relating the length of an input - n i.e. the amount of information which the process must take into account, to the amount of computational resources consumed. The point being that any process which requires exponentially increasing resources i.e. 2^n is regarded as computationally intractable. Oaksford and Chater (1992) write:

Spontaneous, real-world risky decisions, even of moderate complexity, are not made using Bayesian inference, because they *could not* be. Since the mind / brain is a limited information processor, the processes of risky decision-making cannot be based upon optimal, algorithmic procedures. This means that the only rationality to which we can aspire, as individual decision-makers, is one bounded by our limited computational resources.

(Oaksford and Chater, 1992: 226)

To return to mental models, according to Johnson-Laird & Byrne's theory of mental models, deduction depends on three stages of thought. Firstly, it is necessary to comprehend the premises, that is, extract the information given and express it in the form of an internal model of the state of affairs indicated by the premises. Secondly, a parsimonious description of the model is formulated. Thirdly, an attempt to falsify the favoured model is made by comparison with possible alternative models. I will not go into the detailed exposition that Johnson-Laird & Byrne give as to how well their 'mental models' can account for experimental findings of people's deductive performance. But I will make the following comments.

The first stage of constructing a model seems reasonable, and here Johnson-Laird & Byrne offer a view of propositions with a distinguished pedigree.

In the late 19th century, physical theories were likened to models or pictures of the world, and Heinrich Hertz gave this paradigmatic view :

Various models [*Bilder*] of the same objects are possible, and these models may differ in various respects. We should at once denote as inadmissible all models which implicitly contradict the laws of our thought. Hence we postulate that in the first place all our models shall be logically permissible...We shall denote as incorrect any permissible models, if their essential relations contradict the relations of external things. i.e. if they

do not satisfy our first fundamental requirement. Hence we postulate that in the second place our models shall be correct. But two permissible and correct models of the same external object may yet differ in respect of appropriateness. Of two models of the same object that is the more appropriate which includes in it more of the essential relations of the object - the one we may call the more distinct. Of two models of equal distinctness the more appropriate is the one which contains, in addition to the essential characteristics, the smaller number of superfluous or empty relations : - the simpler of the two. Empty relations cannot be altogether avoided : they enter into the model because they are simply models, - models produced by our mind and necessarily affected by the characteristics of its mode of modelling them.

(Janik and Toulmin, 1973: 140)

Thus logical consistency, correspondence with the empirical data and simplicity (elegance) of presentation are the three criteria, according to Hertz, by which a model (representation) is to be judged. When Hertz talks about the laws of our thought, and models being logically permissible, we can perhaps suppose that he means - conforms to a grammar that the physical world imposes on its constituents. Certainly, the notion of a physical grammar determining how the world must be put together was taken up by Wittgenstein to ground his 'picture theory of language' and the influence of Hertz and Boltzmann on Wittgenstein is now well established. (Janik and Toulmin, 1973)

Wittgenstein states in the **Tractatus** ' We make ourselves pictures of facts. (§ 2.1) The picture presents the facts in logical space, the existence and non - existence of atomic facts (§2.2) That the elements of the picture are combined with one another in a definite way, represents that the things are so combined with one another. This connection of the elements of the picture is called its structure, and the possibility of this structure is called the form of the representation of the picture' § 2.15)

Toulmin and Janik point out that Wittgenstein's use of *Bilder* and *Darstellungen* is the same as Hertz. With Hertz the sense of *Bilder* as model connotes the **constructive activity of building a model** rather than passively receiving a picture or image. Hence they write:

Just as we understand Hertz's account of theoretical mechanics best if we translate his word *Bild* as "model", so also with the **Tractatus**; for example, Wittgenstein's notion that a gramophone record, the musical idea, the written notes, and the sound waves, are

related to one another by virtue of a common *abbildenden internen Beziehung* (4.014) is best understood in terms of a common "model" rather than "picture"

(Janik and Toulmin, 1973: 183)

Just as with Hertz, 'representations' in the **Tractatus** take the form of **Darstellungen** i.e., they are logical constructs and not representations of sensory experience, not **Vorstellungen**. Immanuel Kant (1724-1804) argued that it is necessary to treat this raw sense given data as structured sensory representations or **Vorstellungen**. Thought and language are built into these representations from the start thus the limits and boundaries of reason are given by the limits and boundaries of representation and language. (Janik and Toulmin, 1973) Thus the term **Darstellungen** denotes 'models' in the sense of mathematical models, portraits (though not photographs), and architects' blueprints and **archaeological site plans**.

Written sentences (propositions) are then representations of situations composed of facts. Propositional sentences are not complete representations but consist only in what is essential to them i.e., objects (facts) designated by names plus the logical relations (quantifiers and connectives) that hold between. The elements of models are related to each other in determinate ways that mirror the determinate structure of that part of the world to which they stand as models. What in a proposition is shown by the model is its sense ; it is the **sense** of the proposition that is **shown** by the configuration of the model.

Of course, as Wittgenstein went on to argue, the sense of any proposition is determined by the relations that pertain to it within the whole language and how the language is woven into the life of the community whose language it is. The relation of propositions to facts could be shown and thereby be seen, but, there was no question of asserting or proving it to be so. The nature of models is such that they could not model anything that was not factual, that is, judgements of value are beyond their scope. Thus Janik and Toulmin write:

' Propositions were capable of modeling and, so, describing reality ; but they could not simultaneously describe *how* they described it, without becoming self-referential and consequentially meaningless. Wittgenstein's models *showed* the limits of what they were capable of *saying* : they modelled the way things were in the world, and accordingly made scientific knowledge of phenomena possible, but they could do nothing more'

(Janik and Toulmin, 1973: 190)

There is then, it can be argued, more than a passing resemblance between Johnson-Laird & Byrne's mental models and Wittgenstein's picture theory of language. Thus Johnson-Laird & Byrne's claim in **Deduction** that the theory of mental models can be fully instantiated on a computer (thereby countering the claim that mental models trade on the visual metaphor) is similar to a claim that has been made for the picture theory of language, thus 'the **Tractatus** gives a perfect description of a universe as it exists in the digital computer as the function of the computer is based essentially and exclusively on true protocol sentences and their logical interconnections.' (Zemanek, 1978: 117)

The account of mental models given by Johnson-Laird & Byrne seems most akin to *Darstellungen* since their models maintain the same information conveyed by the premises but are expressed more parsimoniously (Johnson-Laird and Byrne 1991: 194) i.e. they are produced by reflective thought. Norman however, states that 'people's mental models are apt to be deficient in a number of ways, perhaps including contradictory, erroneous, and unnecessary concepts.'(Norman 1983: 14) What seems to be needed is the conscious building of *Darstellungen* for the purposes of reliable deduction.

3.3 Representation of Knowledge

Representations in AI work fall into two distinct categories. (a) Programming languages like LISP or PROLOG which use ordinary language forms e.g. words to encode actual meanings but which manipulate and organize words and phrases either by the predicate calculus or semantic networks. I will discuss these two forms shortly. Or (b) by parallel distributed processing e.g. neural nets modelled on the synapses of the brain. Neural nets will not be discussed as our main focus on AI is on Expert Systems applications.

I will take PROLOG as my main example of a representational language suitable for Expert Systems work.

PROLOG is a computer programming language that is used for solving problems that involve **objects** and the **relationships** between objects. To that extent the 'picture theory of language' **and** mental models can be represented in PROLOG. A program written in PROLOG consists of (a) declaring some **facts** about objects and their relationships ; (b) defining some **rules** about objects and their relationships, and (c) asking **questions** about objects and their relationships.

A fact such as 'Jan likes apples' would be represented by the form: **likes**(Jan, apples) where **likes** is the predicate, Jan is the subject of the predicate and apples are the objects which Jan likes. Facts such as this one are the building blocks of the Knowledge Base and are represented by the Predicate (argument) form.

A rule is used when you want to say that a fact depends on a group of other facts, and takes the form of an If / Then clause. In PROLOG a rule consists of a **head** and a **body** which are connected by the ':-' symbol which denotes **if**. A rule is a general statement about objects and their relationships. e.g. likes (Jan, David) :- likes (David,Jan) the rule given would be an example of a content-specific rule mentioned earlier. Rules instantiated within an Expert System are also known as **production rules** since they produce an action when the **if** clause is matched. It is neither pertinent nor necessary to go into the mechanics of PROLOG any more than I have done except to say that together, facts and rules can be built into a system which can reason inferentially and then go on to up-date or alter its own knowledge base. It is this capacity that underpins Expert systems.

An alternative way of representing knowledge and the relations that pertain between facts (objects) is semantic networks. An alternate name would be **structured object representation**.

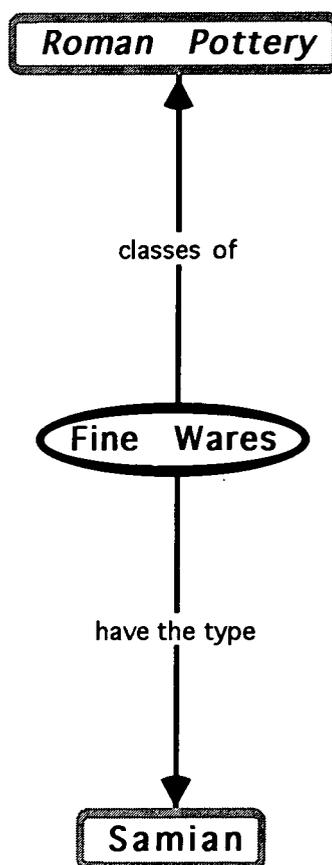


Fig 3 Part of a Semantic net for the Roman Pottery known as Samian

In the above net there are three concepts, **Roman Pottery**, **fine ware**, and **Samian**. Where <fine ware> marks a qualitative category in which <Samian> would be an exemplar of <Roman pottery> which falls under this qualitative category. In the net, the nodes (concepts) are joined by arcs which specify a relationship between the concepts. The semantic net is a graph which statically represents some knowledge of the world. Semantic nets can support inferences and can also be computationally realised by implementation in LISP, however as Bench-Capon (1990) writes:

If we allow many link types, and one of the attractions of semantic nets is the opportunity to do this, we will need to write many different procedures to follow them. The inference mechanism within semantic nets is thus more diverse and complicated than is the case with production rules, where a uniform inference mechanism can be employed, the diversity of inferences appropriate to different sorts of relations being catered for by the fact that permitted inferences are expressed in the rules.

(Bench-Capon, 1990: 84)

The aim of knowledge representation is to capture within the representation a perspicuous picture of some part of the world and the relationship between its elements. To do this the representation must be (a) metaphysically adequate, that is, there must be no contradiction between the facts that one wishes to represent and the subsequent representation ; (b) epistemically adequate, that is, it must be able to adequately express the facts to be represented. ; (c) it must exhibit heuristic adequacy, that is, support the reasoning processes required to solve the given problems.; (d) the representation must be computationally tractable. Furthermore, a knowledge representation should meet standards of expressiveness in that not only should it be able to say what one means, but it should do so without ambiguity. It should represent in a uniform manner, and use a notation that is convenient in a relevant way and be referentially transparent with regards to its statements. A representation is **referentially transparent** if equivalent expressions can always be substituted for one another whilst preserving the truth value of the statements in which they occur.(Bench-Capon, 1990: 18)

3.31 Representation of Belief

The computational representation of belief is very much like that of knowledge in terms of its formalism and manipulation. i.e. PROLOG or Semantic nets can be used for belief representation.

Knowledge representation is concerned with representing knowledge of the application environment and knowledge of the intended audience on a computer. It may be better termed 'information representation' or 'data representation' (Rapaport, 1986: 372) With belief representation, what is represented is objects of thought ; that may be objects, (material) properties, situations and propositions. Rapaport states that:

The distinction between knowledge, in particular, and beliefs or thought, in general, is an important one, for one can think about things that do not exist and one can believe propositions that are, in fact false...But one cannot *know* a false proposition. Yet, if an AI system is to simulate (or perhaps be) a mind or merely interact with humans, it must be provided with ways of representing nonexistents and falsehoods.

(Rapaport, 1986: 373)

An AI system which models beliefs is a representation and reasoning system whose data base contains information about the world and about the beliefs of cognitive agents. The data base is composed of 'beliefs' that the system has about the world and the beliefs of the agent about the world. When we reason about what other people are doing or have done, we hold beliefs about what they believe, which may be about what some third person believes. What we would have here are a set of **nested** beliefs.

When a particular belief is seen or thought to partake in causal relations regarding some action done by an agent, what is most important is both what the agent believes and how the agent believes it. Hence there is an interest in a third-person characterization of the agent's belief and a first-person characterization of belief. These two characterizations are termed *de re* and *de dicto* belief representations (respectively).

Thus an AI system that is capable of explaining or recommending behaviour must be able to distinguish between these two kinds of belief reports by having two distinct means of representing them. Moreover, with the possible exception of the system's own beliefs, the belief space of an agent *as represented by the system* will contain *not* the agent's (own) representations of the objects of his beliefs, but the *system's* representations of the agent's representation of them. And, in the case of nested beliefs, the objects of an agent's beliefs would be represented not as the agent represents them, but as another agent would represent (report) them.

(Rapaport, 1986: 375-6)

With regards to *de re* and *de dicto* reports, Rapaport states that the canonical forms are the following.

- (a) Any sentence of the form : **A** believes that **P** is the canonical representation of a *de dicto* report.
- (b) Any sentence of the form : **A** believes of **X** that **P** is the canonical form of a *de re* report, where **X** names or describes the objectum.

The notion of **Mental spaces** (or belief space in this case) is central to the modelling of an agent's beliefs. The theory of Mental spaces has been developed by G. Fauconnier. (1985)¹ John Dinsmore (1987) has built on Fauconnier's work,

¹Fauconnier, G. **Mental Spaces: Aspects of meaning construction in natural language** Cambridge, MA: Bradford/MIT Press

describing it as providing 'a theory of human knowledge representation and linguistic processing that provides a simple and uniform account of a wide variety of problems.'(Dinsmore, 1987: 1)

Mental spaces are domains used for consolidating certain kinds of information. Within such domains or spaces, objects may be represented as existing and relations may be represented as held between those objects. Spaces are evoked and accumulate information during the processing of discourses. Linguistic structures (space builders) e.g. 'Fred believes...' evokes the creation of a space in which is organized the information about what 'Fred believes'. Objects in one space can be connected to objects in another space such that a description of object **a** if connected to object **b** can be used to refer to **b**. Also there is a principle of space optimization which facilitates the inheritance of information by one space from another. A **Mentor** relationship is used to capture the strong dependence of hope spaces on belief spaces. Dinsmore's interest in Mental spaces lies in showing how mental spaces support efficient reasoning. Dinsmore writes:

The thesis of this paper is that mental spaces are functionally motivated in their support of a general reasoning technique that will be called *simulative reasoning*. Simulative reasoning requires a partitioning of knowledge into distinct spaces and additionally assumes that the contents of each space effectively simulate or model a possible reality, or part of a possible reality, and therefore represent a meaningful domain over which normal reasoning processes work...for instance, a *belief space* is frequently used to consolidate the set of propositions some person believes to be true. As Creary (1979) points out, once a separate knowledge base has been set up for a particular person and propositions explicitly known to be believed by that person are added to that knowledge base, the system can simulate the thinking of the agent by using its own reasoning facilities to derive further beliefs of the agent.

(Dinsmore, 1987 : 3)

The further beliefs of the agent are to be located in the presuppositions entailed by the constituent propositions espoused by the agent. Presuppositions are parts of the content of sentences that are taken as given or irrefutable in the utterances of sentences. e.g. ' The king of France is Bald ' presupposes a King of France. Dinsmore raises the problem of 'Projection' regarding presuppositions. The projection problem is that of predicting the presuppositions of complex sentences as a function of their structure and of the presuppositional constructions that they

embed. Dinsmore claims that the theory of mental spaces can give an account of the projection problem. The claim is that simple presuppositions associated with presuppositional constructions are uniformly satisfied locally in the relevant spaces; thus 'The restriction on legal contexts and distributive constraint entail a set of explicit predictions of the presuppositions of complex sentences not otherwise available.'(Dinsmore, 1987: 18) The restriction on legal contexts is that any context of a proposition is entailment-preserving. Distributive constraint constrains knowledge partitioning between spaces.

Ballim, Wilks & Barnden (1991) have constructed a system called ViewGen which represents the beliefs of agents as explicit, partitioned proposition sets known as environments. ViewGen creates these environments into which appropriate beliefs can be segregated so that parsing and reasoning can be done in that limited environment.

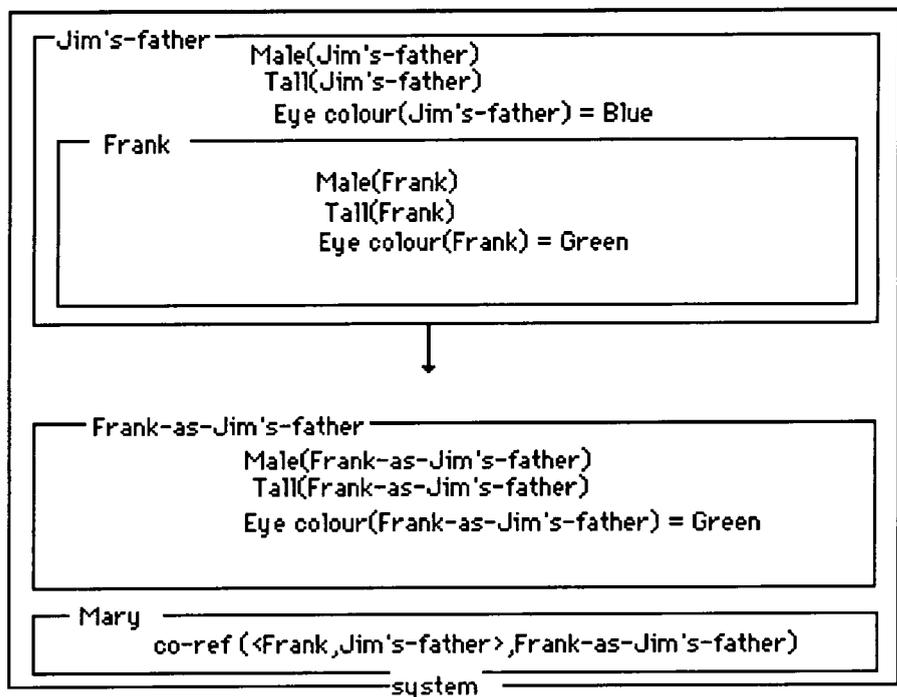


Fig 4 Forming the 'Frank-as-Jim's-father' environment

In the illustration above, ViewGen constructs an intensional object *O* called 'Frank-as-Jim's-father' inside Mary's view point which corresponds both to the system's Frank object and to the system's Jim's father object (topic environment). Mary's view (beliefs) of Frank is that he is (a) Jim's father ; (b) Male ; (c) Tall ; and (d) has Green eyes.

Ballim et al write:

It is natural in a system of partitioned environment notation to treat environments as intensional objects: to treat the Jim-object, pushed down into the Frank-object, as not just yielding by computation an environment that is Frank's-view of Jim, but also as a sort of intensional object we might call Jim-for-Frank

(Ballim, 1991: 147)

ViewGen ascribes beliefs to agents (Mary) on the evidence of a discourse (e.g. Mary was listening to what Frank was saying to the boy), context, and prior information. They state 'Ascriptional reasoning is profoundly dependent on communicative context, general information the system has about the world, and special information the system has about the agent at hand.'(Ballim et al., 1991: 134)

Ballim et al explicitly acknowledge the closeness of their work to that of Fauconnier and Johnson-Laird & Byrne's mental models; but perhaps the most interesting aspect of ViewGen is its handling of metaphor. They write:

The crucial idea here has been the application of a precise notion of computational belief ascription to metaphor, and transferring properties (expressed as belief propositions) by our standard algorithm in order to create a metaphorical point of view of an entity...Specifically, in a belief-ascription activity *one uses one's current belief state about the topic T as the vehicle of a metaphor, the target being the other agent's belief state*. In Brief: One uses one's own state of mind as a metaphor for other people's

(Ballim, et al., 1991: 165)

ViewGen uses the notion of default reasoning to ascribe beliefs to other agents unless there is evidence to prevent the ascription. Ballim et.al. claim a pragmatic approach to propositional attitudes, and an interest in common sense plausible reasoning schemas about propositional attitudes. They also argue that metaphors for the mind, which, are commonly used by people in ordinary discourse, must take a central role in representational approaches to propositional attitudes. e.g ViewGen exploits the mind-as-container metaphor.

3.4 Problem Solving : Artificial Intelligence

Life is a challenge, whether it is getting out of bed (on time) or writing a thesis, it all requires the organization of appropriate information, and this organizational task is the backdrop of one's existence. Of course there is a difference between getting out of bed as such, and writing a thesis, but it is a matter of degree rather than kind in as much as one is a prerequisite of the other.

The problems of life are many and so are the strategies employed to solve them, but a number of general principles can be set out. One such general strategy that has been recognized is simply to split the problem up in to discrete and manageable chunks. However, the time comes when one must tailor the approach to the task or problem and this fact underlies the emergence of what is termed expertise and its concomitant distinction of novice and expert.

Problem solving (strategies) have played a central role in the development of AI research. The practical / commercial outcome of this work being Expert Systems.

In AI work, problem solving is equated with **information processing**. In AI, a characterization of information processing is abstracted out of our existential problems for the purposes of analysis and operationalization on computers. The main feature of this characterization is the distinction between well-defined problems and ill-defined problems. A well-defined problem would be one that lent itself to sub-division and clear formularization, those that don't, are ill-defined e.g. writing a thesis. Ill defined problems demand creativity for their solution. For instance, no one yet has developed an algorithm for writing a Ph.D thesis, but grand master chess algorithms are available.

Formularization of a problem requires the breaking down of the final goal state which marks the complete solution, into a series of sub-goals which form a path from defining the problem to its solution. Each sub-goal marks a condition or set of conditions that must be met before any further progression can be made. The heart of this approach lies in production rules which are executed in sequence. The following production rule is taken from Stevenson (1993) and concerns the goal of shopping.

IF the goal is to go shopping	Goal
and there is a shopping list	Precondition
and I have my car keys	Precondition
and I am in the car	Precondition
Then Drive to the supermarket	Action

Each precondition can be the goal in yet more production rules. The number of rules necessary will vary with the problem.

Allen Newell and Herbert Simon (1990) who pioneered problem solving techniques in AI, formulated the **Heuristic Search Hypothesis** which states:

The solutions to problems are represented as symbol structures. A physical-symbol system exercises its intelligence in problem-solving by search - that is, by generating and progressively modifying symbol structures until it produces a solution structure. [they go on] Symbol systems are collections of patterns and processes, the latter being capable of producing, destroying, and modifying the former. The most important properties of patterns are that they can designate objects, processes, or other patterns, and that when they designate processes, they can be interpreted. Interpretation means carrying out the designated process. The two most significant classes of symbol systems with which we are acquainted are humans and computers

(Newell and Simon, 1990: 119,130)

How a problem is defined and represented affects the overall tractability of the problem for either a human or a computer. In other words, there is a meta-problem of perspicuous problem definition and description.

The role of analogical thinking in problem definition is important. In making an analogical connection between an old (solved) problem and a new (unsolved) problem, a model of the new problem is constructed out of the old. Stevenson (1993) identifies four processes of analogy, they are:

- (1) Interpretation and Representation of the target problem
- (2) The retrieval or selection of a plausibly useful source analogue
- (3) Mapping elements of the source analogue onto the target problem
- (4) The transfer of Inferences from the source to the target domain.

Number (1) is central to language comprehension and is therefore not specific to analogy. Numbers (2) and (3) are considered to be the key issues in analogical thinking. It is the new problem that is responsible for the triggering of the retrieval mechanism and mapping brings together the old and new problem in search of meaningful correspondences between them. The transfer of inferences is borne on the back of the mapping.

Concluding her discussion of problem solving and analogy as presented by the information processing view, Stevenson states that:

..it seems likely that the conscious, strategic search proposed by the information processors operates on retrieved knowledge. Simply retrieving and mapping a source analogue may not be sufficient to solve a problem. A conscious search through the problem space would be necessary to evaluate the outcome of inferred analogical knowledge, for example. It may also be needed to evaluate the outcome of an action triggered by a production rule.

(Stevenson, 1993: forthcoming)

3.41 Intelligent Tutoring Systems

With Intelligent Tutoring systems (ITS) problem-solving as a practical activity comes to the fore and, thereby, it presents the sharpest test of theories of reasoning and problem solving developed by AI. Also, ITS's make stringent demands of knowledge representation since they suppose a number of different expert skills.

There are two main representational concerns entailed by ITS ; (a) the representation of knowledge of the domain being taught ; and (b) the representation of the knowledge about tutorial and diagnostic strategies. Because of the problems raised by these two aspects of knowledge representation, Johnston (1991) reports that few systems as yet have well developed representations of both.

Knowledge acquisition techniques in ITS differ somewhat from those found in standard Expert Systems work, in that ITS developers interview people with varying degrees of expertise. The reason for this is to develop a progression of models and representations which span the gap between the novice and the expert. Also, it helps to identify what aspects of the domain are critical for instruction. Some researchers feel that it's important to use instructors, if there are any, because they have the ability to articulate their reasoning processes, often they are much better than 'Ivory Tower' experts. Johnston reports that a useful technique is

getting the domain experts to collaborate by setting each other problems to solve. Johnston writes:

This approach has the advantage of making evident what kinds of tasks are considered easy or difficult by the experts. For a given problem solution trace, they also asked the experts to suggest alternative actions which one might take. Although this does not result in a complete model of the problem space, it can produce a skeleton of such a space in a matter of a few hours.

(Johnston, 1991: 130)

Differential modelling is the way by which an account may be given of how a student acquires knowledge from a teacher, how the teacher recognizes what knowledge the student lacks and how a tutoring system can acquire knowledge from human experts. Differential modelling requires the building of an expert system that compares a problem solving trace performed by an expert system with one performed by a human. The differential modeller analyzes the differences in problem solving behaviour and attempts to account for the difference in terms of knowledge components that should be added or deleted from the expert system's knowledge base. When the human is a student, the system determines what knowledge the student lacks. If the human is an expert, the system determines what it lacks and the human has - which it can then add to its knowledge base. It should be stressed at this point that such systems are still in the early stages of development and their effectiveness has not yet been determined. Evaluation of such systems is becoming a topic of concern since it is simply not good enough for a tutoring system to demonstrate some advanced capability. An evaluation should measure such things as training effectiveness and user acceptance, also, it must evaluate whether the tutoring system accurately assesses student errors and performs the proper tutorial actions.

3.5 Archaeology's Current Use of AI

Work on expert systems geared to archaeological applications is growing ; thus we find Gardin (1989) , Gallay (1989) and Stutt and Shennan (1990) are attempting to use expert systems to investigate and control the inferential structure of archaeological reasoning and argumentation.

Klein (1991) offers a discussion on building a computationally-plausible knowledge system of the upper palaeolithic based on oppositional transformation

operators which relate the input and output states of behaviour rules by analogical transformations.

Oberlin, et al. (1991) have developed an AI system for identifying mythological scenes on Greek vases. In this system the narrative scene is decomposed in to Minimal Formal Units (MFI) e.g. 'human' with 'lion skin' together with 'club' equals the mythological figure of Herakles.

Biskowski (1990) is attempting to model in expert systems cultural change as a result of human cognitive processes; while Lagrange and Vitali (1990) have developed an expert system for provenancing archaeological ceramics using chemical, minerological and data analysis information.

Finally, Doran (1987) has drawn attention to AI and expert systems for archaeological purposes. Doran makes the following claims about AI techniques; they

- (a) provide potentially powerful means of experimenting with and therefore developing and testing sociocultural theory by way of computational modeling.
- (b) provide a conceptual repertoire within which to embed sociocultural theory.
- (c) clarify the role and potential of multivariate statistical analysis within archaeological data interpretation.
- (d) provide practical tools to aid data interpretation.

(Doran, 1987: 74)

Doran also goes on to recommend that no student of archaeology should be left unaware of the potentialities of expert systems and AI in general. While I can concur with Doran here, Doran's work with expert systems and the work cited above suggest that problems already exist with such projects. I do not mean here, strictly technical problems - programming, systems design etc - for they will always be encountered.

The overarching problem that I see is the unresolved question of the relationship of the archaeologists to the past embodied in the material traces. Thus unresolved problems in interpretation, say, with regard to mythical scenes on vases, are passed over in silence but they cannot be resolved merely by constructing an impoverished formalized description of that scene.

To take Oberlin's study as an example ; in the study of mythical scenes presented by Oberlin et al, each pictorial representation of mythical figures is decomposed into Minimal Formal Units each of which as an analytic unit, is manipulable by the system. It is out of mfu's that new scenes can be reconstructed and matched against a pre-defined construction (scenes). The example used earlier was that of the figure, Herakles, who is defined as having a club and lion skin. This is all well and good, and interesting, but what archaeological or historical end is this system meant to serve? We are told by the authors that:

Although the ways of representing a scene like the **Judgment of Paris** may differ on several points, an expert in mythology is generally able to identify it without any difficulty. For other scenes, the identification problem may be more troublesome, to the point that opinions may diverge among experts. Since these divergences are generally not concerned with the semantic interpretation of the scenes, they will not affect our work. For our purposes, the objective is to recognize what is happening in the scene and eventually to discover who the actors are

(Oberlin et al., 1991: 19)

The authors go on to say that while the concepts and references involved in mythology may be very subtle and difficult to model, the accuracy and regularity of identification will give a valuable control on inference process. This claim is empty. As Bruner (1991) pointed out: in establishing a reading of the whole text we appeal to readings of its partial expressions, but because we are trying to explicate meanings we can only do so by relating the meaning of partial expressions to the meaning of the whole text. In a narrative we interpret the parts in the light of a putative story or plot and by re-work the plot as new elements are introduced in order to maintain coherence and intelligibility. Herakles can be equated with a club and lion skin in a scene on a vase because the scene can be fitted into a narrative story, the content of which is pre-established elsewhere. The figures in the scene stand in specific relations and thereby index the scene to a given external narrative. But such a system as devised by Oberlin et. al. can only analyse the internal relations of a representation, and perhaps be made to yield meaning and reference relative to a particular version of a myth. But the system can say nothing about the veracity of its identifications beyond that which is allowed by the version of the myth it instantiates. The version of the myth is decided by other means. And of course, there are no actors to identify that are not already determined. Control of inference is total, and therefore tautologous.

In contrast to the above is the small scale study of Samian pottery carried out by Mullaney (1992) here at the Department of Psychology, University of Durham. The aim of the study was to show how an expert system could be used to provenance the Roman Pottery called **Terra Sigillata**, but more commonly, **Samian**.

Samian is not unlike the Greek vases discussed above in that it carries friezes composed of scenes from myths as well as other less structured compositions. Unlike the Greek painted vases, Samian is mass produced from moulds and is near ubiquitous on Roman sites. Its archaeological importance lies in this fact, as it can be used in some cases, to closely date sites. (closely, in archaeological terms e.g. 20 yrs)

To ascertain the broad chronological band within which the specimen may fall, its geographical origin is determined from the fabric description, colour, form (cup, type of bowl etc.) and compositional details of the friezes. Thus a knowledge base was constructed out of the above information groups. The compositional details of the friezes could have been decomposed in the manner adopted by Oberlin et.al. and for the same reasons, i.e. re-identifying indexical figure types.

The study of Samian undertaken by Mullaney was a teaching assignment aimed at demonstrating the basics of Expert systems construction, even so, the system built could assign correct dates to prototypical descriptions of the main types of Samian. The salient difference between Samian and Greek vases is that Samian is mass produced. The figure types may be identified as mythical characters but that is beside the point, once an adequate representation of a frieze from one vessel is constructed, that representation will match all the friezes on vessels made from the same mould. In other words, each vessel carries what in biological terms (from cladistics) are 'shared derived characteristics'. It is the shared derived characteristics which ground the archaeological importance of Samian and make an Expert system ideal for large scale searching and matching. In this case a well- defined problem was solved by a simple system directly geared to its resolution.

Archaeologists seem to think, or make the claim, that AI will solve their research problems regardless of the fact that they have conducted little or no work in establishing the scope and character of the representational systems they propose to use. Nor do they admit to the fact that understanding and modelling human action is still a highly problematic area. In Doran's case, he is trying to model a

Sociocultural system with a Programmed multiactor System. But the real complexity of such a system is abolished by drastic abstraction and curtailment of details. Doran states that the amount of detail incorporated (in one of his programs) seems unnecessarily great if attention is restricted (in another program) to broad questions of sociocultural system dynamics. It would seem then that one can have a dynamic sociocultural system without people actually doing things like manufacturing or going about their ordinary business. Needless to say, archaeological evidence is largely evidence of people manufacturing and going about their ordinary business. But then, as Doran points out, 'in social science and AI work, the concept of actor is defined **merely** (emphasis added) by the ability to act in a purposeful manner.'(Doran, 1987: 79)

In Biskowski's paper **Cultural Change, the Prehistoric Mind and Archaeological Simulations** the concept of mind or cognition leaves much to be desired. Biskowski and I share the view that cognitive processes are important to understanding past human activity. Also, expert systems and AI in general can be employed to model such processes and thereby provide a means by which explicit control over the exercise can be achieved. In short, the requirements of authentic modeling constrain vagueness of formulation and fudging in general.

However Biskowski says that 'since culture ultimately resides in the minds of individuals, reasonable explanations of cultural change must in some way address those features of human cognition which may inhibit or enhance the spread of culture.'(Biskowski, 1990: 32) What does Biskowski mean by saying that culture inhabits the individual mind? Since culture is never defined by Biskowski, one must suppose he means attitudes and beliefs etc.

Biskowski is quite clear about what is and what is not the object of the exercise. It is not to demonstrate that one model or another is better at modelling past cognitive processes regarding specific cultural change. Rather, it is to test traditional accounts against unambiguous models of decision-making and information exchange. It is hoped that by so doing, insight will be gained as to the amount of influence on cultural development that is exercised by cognition.

According to Biskowski, modeling the effects of cognition on cultural change involves (at least) (a) modelling the cognitive processes of important actors; (b) modelling how they reason; (c) modelling the mechanisms which may change how different actors reason about the world - including how the knowledge they possess

via acculturation and personal experience limits or enhances their receptivity to new ideas. ; and (d) modelling how the way that an actor reasons about the world affects that actor's life and the transmission of that actor's ideas to others and future generations.(Biskowski, 1990: 24)

I will not discuss the details of Biskowski's simulations, the main point I wished to illustrate here is that a less than clear and coherent exposition of mind, cognition and culture, apparent in this paper and the work it refers to, is obscured by the application of technology and what it seems, at first brush, to offer. While Biskowski appreciates that a simplistic and impoverished notion of cognition is to be found in many archaeological texts, the debates about cognition taking place within cognitive science and social psychology seem to have made no impact on him. Doran's paper is even more alarming, he uses the word cognition once, and the archaeological questions raised seem to be mere pretexts for modelling systems *per se*.

Biskowski makes the general point that archaeologists, in so far as they consider cognition or reasoning at all, make two general assumptions (a) that people obey the dictat's of economic rationalism, and (b) they will adopt successful subsistence strategies when they become apparent. Against this simplistic view of human action, archaeologists are able to detect gross changes in climate, resource availability, population size, subsistence techniques, settlement organization, apparent economic differentiation and exchange patterns. Thus although it is possible to produce plausible explanations of cultural change that do not include the role of cognition, such explanations will always be in doubt until such time as it can be shown that cognition is not a major factor that needs to be considered.

The work that has been done on the role of cognition, however, tends to show that it is, in fact, a key influence. e.g. Reynolds²

A rather different set of concerns are dealt with by Stutt and Shennan. These two enthusiasts for AI techniques have set their sights on the general process of argumentation in Archaeology. Furthermore, they perceive a link with Ian Hodder who has lately been arguing for a more open presentation of archaeological reports. Hodder writes:

² Reynolds, R.G. (1986) 'An Adaptive Computer Model of the Evolution of Plant Collecting and Early Agriculture in the Eastern Valley of Oaxaca'. In Flannery, K., (ed.), **Guila Naquitz : Archaic Foraging and Early Agriculture in Oaxaca, Mexico** 439-500 Academic Press

While a site report today still often has a main author, there are usually numerous other contributors and specialists...But there is rarely any debate or uncertainty in the text, and dialogue among the collective rarely surfaces on the page...Our decisions about what happened at a site change as we dig and analyse the finds. The supposed 'final' interpretation results from a series of contingent factors, and most excavators know that their 'final' account might well have been different if they could have excavated more or obtained more analytical results. But in the report, the dialogue and contingency are written out. After the excavation is finished and a 'final' interpretation is reached, we work backwards and reorganize our data so that they are coherent. We publish this constructed account as if it simply describes what was there.

(Hodder, 1989: 271)

Stutt and Shennan envisage a system based on hypertext, along with supporting AI techniques. They are not very forthcoming on this particular aspect of their work. They do however discuss in detail the problem of modelling argumentation.

It is not clear how much of a demand there is for this kind of open debate and report writing within the archaeological community at large since much of the kudos to be had, is derived from authoring excavation reports and launching bold new hypotheses therein. Nevertheless, Stutt and Shennan claim that their system, or something along its lines, will provide a means of storing and testing complex arguments that will stimulate archaeologists to produce new arguments.

This review of work that seeks to use AI for archaeological purposes is not meant to be exhaustive, but it suggests something about the current situation. As Marx wrote, history repeats itself, the first time as tragedy, the second time as farce. Since, as was shown in the first chapter, interpreting the past by means of the archaeological record has been shown to be deeply problematical, with little or no consensus about where to go next, the use of AI techniques will simply become a device for propping up yet more claims to scientific rigour and objectivity. Just as multivariate analysis by computer (statistics in general) was going to solve all the problems of classification and typology, so now AI will make good the promise, only more so. On the present showing, this is to be doubted.

3.6 Summary

In this chapter I have looked at aspects of cognition such as deduction from a formalist perspective. I have also reviewed work on artificial intelligence which may be used in modelling belief systems - collective and individual, physical artefacts and cultural dynamics. Also, I have drawn attention to intelligent tutoring systems based on expert systems.

The key issue or motif of the chapter is problem-solving, but I have concluded that much of the current work in archaeology that seeks to use AI techniques has not addressed the nature of archaeological interpretation and the relation between intentionality and process. Nor has there been any discussion of relevant topics such as the nature of mind, cognition, or the social aspect of cognition which would serve to constrain or guide the kind of archaeological task attempted using such techniques.

In the next chapter I will review Edelman's work on the biological basis of consciousness ; Dennett's Multiple Drafts theory of consciousness, Bridgeman's 'Plans' account of consciousness and Brooks's work in robotics as a prolegomena to a study of R.G. Collingwood's writings on mind and history.

CHAPTER FOUR

THE MATTER OF MIND

4.0 Introduction

In the second chapter, attention was drawn to Rom Harré's Wittgensteinian claim that there are only two domains that count, that of the physiological and that of the conversational or linguistic. According to Harré, there is no mind in the sense of an entity existing in the world. Rather, there are closely related terms (and the concepts they denote) in our vocabulary which pick out aspects of human actions. These actions are grounded in physiological phenomena and the terms used construe the actions in a way as to suggest that they interrelate and interact in the same way as physical entities and thereby can be understood in terms of the physical model of causality. For Harré, this confusion, as he sees it, is due to the lack of attention paid to the grammar of our 'mentalist' terms.

What Collingwood propounded throughout his writings was an analysis of the leading concepts and terms found in everyday language which are used to talk about people's mental life. Indeed, Collingwood denied that mind is either an epiphenomenon of organic and psychic function or an entity which has escaped or supervenes upon organic nature. Thus he wrote:

Even to say that the mind is one thing and the object another may mislead. The mind is specifically that which knows the object ; and to call it a "thing" already suggests conceiving it as an object one of whose qualities is that it knows other objects - as this table is an object one of whose qualities is that it holds my paper - or worse still, as a machine which turns out a kind of work called thinking... The mind seems to be not so much that which thinks as the thinking itself ; it is not an active thing so much as an activity.

(Collingwood, 1916: 100)

If, then, the mind is not so much that which thinks, but the thinking itself ; not so much an active thing, but rather, an activity. What then is this activity called thinking ?

One answer to this question is that thinking is the exercise of general cognitive processes such as induction and deduction. (see chapter three)

But this answer implies that such 'processes' can be divorced from the existential context in which they feature, and that is a claim that Collingwood would deny, or at least, qualify. The qualification that Collingwood would make is that although processes like induction and deduction may be profitably abstracted for the purposes of studying human cognition, it can never give the full picture. Vandenberg (1991) expresses the point when he writes:

Concepts, meanings, and social custom involve more than cognitive understanding ; they also involve *personal relationships* with others, and it is through shared meanings and beliefs that children remain close to trusted caregivers. The power of beliefs is derived from their existential implications. Beliefs can be defined as *fervent hopes*. They are efforts to establish some sense of stability, and they serve as a buttress against existential uncertainty

(Vandenberg, 1991: 1284)

Historical studies are about understanding people and require insight into both their cognitive and existential condition.

As will be shown later in the chapter, for Collingwood, there is an absolute continuity between thought and action. What is more, all thought exists for the sake of action. Put another way, a thought and its correlative action are the same phenomenon viewed from different perspectives. Thinking, on this account, draws attention to the fact that thinking (in the usual sense) arises out of some rather fundamental 'non-symbolic' process. How this comes about is one of the big questions.

4.1 Edelman's Biological Theory of Consciousness

With regards to the biological basis of thought and consciousness, we may look briefly at the work of Gerald M. Edelman (1989). Smoliar (1991) has reviewed Edelman's **The Remembered Present: A Biological Theory of Consciousness** and provides us with a summary and guide. Before starting, the point must be made that Edelman's theories are speculative to a greater or lesser degree.

Firstly, Edelman's studies on the nature of mind take as a founding assumption that cognition and consciousness rest on the orderings and processes in the physical world. Edelman differs from those working in physiology in that he regards it wrong to concentrate on the behaviour of individual cells, rather, it is populations

of cells that matter here. The analogy between the computer's transistor and the brain's neural cell is rejected. Nor does the genetic code provide a specific 'wiring diagram' it simply allows for the creation of a space of options within which a selection will take place. 'Consequentially, at the level of neurones, it is very unlikely that any two individuals will be identically wired, *even if they are clones of the same genetic code.*' (Smoliar, 1991: 287)

Furthermore:

As a result of evolution and through interaction between sensory and motor systems, many of these repertoires (of variant functioning neural circuits) are arranged in maps. Such maps are connected by parallel and reciprocal connections that provide the basis of the third tenet of the theory - the occurrence of reentrant signaling during behaviour, some groups in local maps are competitively selected over others.

(Smoliar, 1991: 298)

It is the maps referred to in the quote that provide the bridge between the **physiological** and the **psychological**. These maps are established through the strengths of connections between different groups of elements resulting from primary and secondary selection. e.g. primary morphogenesis and subsequent post-natal behaviours.

Edelman has sought to show how this bridge may be constructed from modelling neural (group) networks in 'Darwinian automata'. The details of this modelling will not be given here, however the automata are designed to show how selection can give rise to perceptual categorizations. A machine or primitive organism that can achieve this level of categorization need not necessarily be said to have a mind. For mind, we require consciousness and according to Edelman, a scientific theory of consciousness must be able to (a) propose explicit neural models that explain how consciousness can arise, (b) relate these models to the emergence of consciousness during evolution and development, (c) relate these models to concept formation, memory, and language, and (d) describe stringent tests for the models in terms of known neurobiological facts.

In moving from Darwinian automata to consciousness, the following issues need explicating; memory, ordering, concepts, "presyntax", primary consciousness and language.

With the theory of neuronal group selection (TNGS) memory in global mappings is not a store of fixed or coded attributes that can be called up and assembled in replicative fashion as with a computer. Rather, memory is the result of a continual recategorization, which given its nature, must be procedural and involved in continual motor activity and repeated rehearsal. The recategorization aspect emphasises the dynamic nature of the process. Moving on to the role of categorization and memory in learning, Edelman states that:

Perceptual categorization and memory are therefore considered to be necessary for learning but obviously are not sufficient for it. The sufficient condition is provided by the synaptic linkage of particular global mappings to the activity of hedonic centres and to the limbic system in a fashion that will satisfy homeostatic, appetitive and consummatory needs

(Smoliar, 1991: 305)

As Smoliar remarks, learning is a consequence of interactions between the dynamics of memory and those of the pleasure-pain responses of the limbic system; and Edelman summarizes 'values constrain behaviour, action modulates it, and memory alters it and is altered in its turn.'(ibid p.305)

Ordering is bound up with memory as its temporal dimension; I will not deal with this aspect apart from noting the comment from Smoliar that 'the brain deals with *patterns* (authors italics) of movement (in the form of gestures), rather than individual movements.

In artificial intelligence there is a tendency, claims Smoliar, to view concepts as building blocks of knowledge representation, constructed out of linguistic primitives.

Edelman rejects any assumption that language is a prerequisite for concepts. The very opposite in fact. Language is founded on concepts. Concepts here are a further extension to the brain's ability to form generalizations. 'The dynamics of *recategorization* extend this capability for generalization, since recategorization enables associations to be formed among those activation patterns.'(Smoliar, 1991: 306)

Since ordering extends perceptual categorization to motor activity¹, the power of generalization can accommodate not only what is perceived, but also what actions are taken and how actions interact with perception. Edelman's concepts are the categories that are formed when the brain 'bootstraps' its own categorization processes - selective attention in Collingwood's terms.

Presyntax is Edelman's term for structural relations between concepts (so construed) and it is this presyntax that underpins the ability to analogize, and make inferences. It is here that thought (proper) arises. Quoting Marvin Minsky²:

For generations, scientists and philosophers have tried to explain ordinary reasoning in terms of logical principles - with virtually no success. I suspect this enterprise failed because it was looking in the wrong direction : common sense works so well not because it is an approximation of logic; logic is only a small part of our great accumulation of different, useful ways to chain things together. Many thinkers have assumed that *logical necessity* lies at the heart of our reasoning. But for the purposes of psychology, we'd do better to set aside the dubious ideal of faultless deduction and try, instead, to understand how people actually deal with what is *usual* or *typical*. To do this, we often think in terms of causes, similarities, and dependencies. What do all of these forms of thinking share ? They all use different ways to make chains.

(Smoliar, 1991: 308)

Presyntax then would be Edelman's terms for the capacity to make the sort of chains that lie at the heart of Minsky's model of reasoning.

Thus far, memory, ordering and concepts have been bootstrapped out of the fundamental mechanism for perceptual categorization. Presyntax expresses the structural relations between the products of this bootstrapping. Primary consciousness expresses the relationship between the agent so construed and the environment, and may be viewed as a network of devices, each of which performs categorizations on a different set of input signals.

The network is seen as consisting of the following:

(1) At the lowest level, there is a device for perceptual categorization - C(W), which operates on signals from the World as perceived by the different sense organs.

¹To achieve perceptual categorization with respect to motor behaviour, categorization must depend on the succession of joint and muscle responses and of gestures which are themselves smoothly linked and successive. See Smoliar p. 305

² Minsky, M. **The Society of Minds** (Simon and Schuster, New York 1986)

(2) Similar to C(W), there is a device for *Introspective* categorization, C(I), which operates on interoceptive signals, such as those from the autonomic nervous system and endocrine system.

(3) Categorization may then be performed on signals which embody the activation states of both C(W) and C(I) as the agent experiences the world. Such categorizations may involve both comparison of the signals from two sources and comparison of present signals with past signals, which reveal categories of interaction. Edelman call this categorization device $C(W)*C(I)$.

(4) A final level of categorization is applied to the output of $C(W)*C(I)$. The device which performs recategorizations of the signals received from $C(W)*C(I)$ as time progresses is called $C\{C(W)*C(I)\}$

(5) In addition to performing recategorizations on $C(W)*C(I)$, $C\{C(W)*C(I)\}$ also maintains a reentrant exchange of signals with C(W). This is the basis of primary consciousness in Edelman's model. Through this reentrant connection, the agent's perception of the world (i.e.. the ability to perform perceptual categorizations on signals from the world) is affected not only by perceptual experience but also by relations between those experiences and introspections from which that agent may attach **values** to those experiences. Thus we now have the makings of an agent that should stand some chance of actually managing in its world. (Smoliar, 1991: 309)

I will pass over the question of mental images and move on to language and higher-order consciousness.

For language to arise out of biological systems, in Edelman's view, the preceding capabilities must be present. The capability for language is achieved through four premises, namely, (a) concepts which are necessary but not sufficient for semantics; (b) phonology and syntax are essentially more sophisticated ordering capabilities; (c) the development of phonological capabilities leads to the acquisition of sufficient ordering to form words and sentences. Syntax follows on; and (d) categorization and ordering may now be applied to these resulting abilities, leading to the ability to process the constructs of language at the levels of morphemes, words and sentences. The agent now has the ability to **use** language.

Finally, linguistic ability gives rise to our reasoning and the use of symbols for representation, which grounds the ability to plan and model. Edelman and

Collingwood both see consciousness arising directly out of physical existence through categorization which expresses values at each level. Collingwood through

an analysis of our everyday mental terms and concepts ; Edelman through neural modelling.

Leaving Edelman, I will now turn to Dennett & Kinsbourne's (1992) theory of Multiple Drafts of Consciousness.

4.2 Dennett's Multiple Drafts

In their target paper³ Dennett and Kinsbourne are primarily concerned with the subjective experience of time in the light of two competing models of consciousness.

One model being Cartesian materialism which posits a central locus in the brain (traditionally the pineal gland), the point in the brain where it all comes together. A material theatre in which the stream of consciousness is the show. This form of Cartesianism discards the mind - body dualism originally proposed by Descartes.

The other model, proposed by Dennett & Kinsbourne is that of Multiple drafts. This model is grounded on the view that perceptual operations (all thought and action) are accomplished by multitrack processes of interpretation and elaboration (Edelman's devices) that occur over a time scale in the millisecond range. During the processing, additions, emendations and overwriting of the content can occur and in various orders. Furthermore, feature detections or discriminations have to be made only once. Thus:

That is, once a localized, specialized "observation" has been made, the information content thus fixed does not have to be sent somewhere else to be *rediscriminated* by some "master" discriminator. In other words, it does not lead to a *re*-presentation of the already discriminated feature for the benefit of the audience in the Cartesian Theatre.

(Dennett and Kinsbourne, 1992: 185)

Hence drafts of experience can be revised at great speed, and none is more 'correct' than the others. Each draft reflects the situation at the time it is generated. The spatially and temporally distributed content fixations are precisely located in both space and time, the onset of content fixation does not mark the onset of awareness of their content. Dennett et al are basically arguing that the time scale

³ **Behavioral and Brain Sciences** (1992) 15, 183-247

both space and time, the onset of content fixation does not mark the onset of awareness of their content. Dennett et al are basically arguing that the time scale over which these drafts are composed sets the lower limit to what time scale can be humanly meaningful.

Dennett & Kinsbourne list the main points at which the the two models of consciousness conflict. These points are;

(1) Localized discriminations are **not** precursors of re-**presentations** of the discriminated content for consideration by a more central discriminator.

(2) The objective temporal properties of the discriminatory states may be determined, but they do **not** determine temporal properties of subjective experience.

(3) the "stream of consciousness" is **not** a single definitive narrative. It is a parallel stream of conflicting and continuously revised content, no one narrative thread of which can be singled out as canonical - as the true version of conscious experience.

(Dennett and Kinsbourne, 1992: 187)

Dennett & Kinsbourne therefore make the claim that the fundamental implication of the Multiple Drafts model is that it is always possible to "draw a line" in the stream of processing in the brain but there are no functional differences that could support the claim that any one stage of composition, reordering or emendations to the content is post-experiential memory-contaminated (meaning that consciousness does not fill in the 'picture' after the perceived event). The distinction lapses at close quarters.

4.3 Bridgeman's 'Plans'

Bridgeman (1992) puts forward the thesis that consciousness equates with the operation of a plan-executing mechanism which enables behaviour to be driven by plans rather than immediate environmental contingencies. This mechanism 'unpacks' a single internally held idea into a series of actions. But there is also the proposal that language uses this mechanism for communication, unpacking an idea into a series of articulatory acts.

Bridgeman draws a distinction between 'action plans' and 'linguistic action plans' in that 'An action plan becomes conscious only in the process of its execution. What is unique about the linguistic action plan is that whereas the processes that generate speech remain unconscious, the linguistic sequence can be fed back into

the neurological system that normally monitors external events connected with executing a plan.' (Bridgeman, 1992)

According to Bridgeman there must be, 'neurological devices to (1) make plans, (2) store them, (3) execute them, and (4) monitor them In order to control behaviour, the currently active plan must have access to memory and attention. It must link these functions with perception in order to guide action according to a combination of the internally held plan and the external realities of the perceptual world.'(Bridgeman, 1992)

Language comprehension uses the plan-monitoring mechanism to pack a series of linguistic events into an idea. Recursive processing results from monitoring one's own speech. Neurophysiologically, the planning mechanism is identified with higher-order motor control. Bridgeman writes:

The appearance of language as a communicative act generated by the planning mechanism brought with it some immediate and very powerful advantages. Not the least of these is that one also hears one's own speech, so that the plan-monitoring mechanism has immediate access to the plan-executing mechanism's products. In the process of development the loop can become internal, as pointed out by Vygotskii (1962) in his analysis of the importance of internal speech in human thinking. The whole planning process is made recursive, and the enormous power of human thought becomes available with a relatively minor change in a mechanism that all primates share. Again, this process allows quick evolution of a seemingly complex addition to the human brain.

(Bridgeman, 1992)

4.4 Brooks's Robots

I will now report on work in Artificial Intelligence (AI) research directed at robotics, which in its own way, echoes Edelman.

Brooks (1991) argues that AI has foundered on the issue of representation. Brooks takes the position that rather than decomposing an intelligent system into independent information processes which interface via representations, the intelligent system should be decomposed into independent physical, but parallel activity producers which all interface directly with the world through perception and action as opposed to each other, or at least, not very much with each other. There is

Brook's work with robots (mobots) has lead him to suggest that representations (in a strong sense) are unnecessary for much, if not all intelligent action.

The idea is to first build a very simple autonomous system, and *test it in the real world*...It senses objects in its immediate vicinity and moves away from them, halting if it senses something in its path. It is still necessary to build this system by decomposing it into parts, but there need be no clear distinction between a "perception subsystem", a "central system" and an "action" system. In fact, there may well be two independent channels connecting sensing to action (one for initiating motion, and one for emergency halt), so there is no single place where "perception" delivers a representation of the world in the traditional sense.

(Brooks, 1991: 147)

Brooks has constructed his robots in such a way that each task-achieving behaviour operates independently of the others 'out of the local chaos of their interactions there emerges, in the eye of the beholder, a coherent pattern of behaviour.'(ibid 149)

Each activity-producing system is termed a **layer**, each individual layer delivers a description of the world so that with multiple layers the 'world' gets blurred as there is no identifiable place where the 'output' of perception can be found. Brooks makes the following claims : (a) simple activities can instil the 'Creature' (robot) with reactions to dangerous or important changes in its environment. This is without representations and the need to reason about them.(b) It is by having multiple parallel activities without a central representation, that total collapse of the system is avoided when confronted with a change in the environment. Brooks places great emphasis on 'debugging' each layer by exposure to a real and relevant environment before incorporation into a Creature.

(c) Each layer has its own implicit purpose or goal. The key to a successful Creature is in its ability to use the world as its model ^{via} constant and active perception and response. The preconditions for each goal is continuously matched against the real world. (d)The purpose of the Creature are implicit in its higher-level purposes, goals or layers. There need be no explicit representation of goals that some central or distributed process selects from to decide what is most appropriate for the Creature to do next.

The work and claims made by Brooks have been the subject of a critique by David Kirch (1991), and it is Kirch's critique of Brooks that I will now consider.

Kirch starts by making the point that human activities fall along a continuum ; at one end there are **situationally determined** activities such as walking, avoiding collisions, tying shoelaces. At the other end there are **cerebral** activities such as chess, mathematical problem solving and discursive activities. Kirch focuses on the claim made by Brooks that the majority of intelligent activity is **concept free**. Kirch does not see representation as the main issue raised by mobotic research, rather, it is the place of conceptualization in intelligent activity.

As Kirch goes on to point out, the concept of representation remains a sore spot in foundational studies of mind 'no one is quite sure what the analysis of "state X represents the information that p is H" should be.' (Kirch, 1991: 162)

Kirch maintains that Brooks's Creatures are riddled with wires that carry messages which covary with equivalence classes of earlier signals, (for instance, an edge covaries with an equivalence class of pixel configurations) and which often covary with properties in the environment. Kirch's point is that if covariation is sufficient for representation, then Brooks too, accepts the need for representations.

A symbolic representation, however, is defined by Kirch as one which can be combined and manipulated. Hence we get the notion of **syntax** added to representation. Kirch writes:

To get systematic generation of representations it is necessary to have a notation that is sufficiently modular that individual elements of the notation can be combined to make molecular expressions. In the this way, ever more complex structure can be constructed and used by a finite system. Semantic discipline is maintained on these symbol structures by enforcing Frege's requirement that however complex the symbol, its meaning is a function of the meaning of its parts and their syntactic arrangement.

(Kirch, 1991: 163)

If an agent has symbolic representation as defined above then it may be assumed that they have concepts. To have a concept, says Kirch, is to have a capacity for finding invariance across a range of contexts and reifying that invariance so that it can combine with other appropriate invariances. As Kirch argues, it is because we have concepts that we can make judgements of identity, and reidentify across time. Kirch is basically arguing that both connectionist and symbolic representations are needed. Symbolic connectionism, as it is now termed ' combines standard symbolic representation with connectionist parallel constraint satisfaction procedures. Rule based processes (that is, production rules) construct symbolic propositional

representations while parallel processes produce an interpretation of the input' (Stevenson, 1993: forthcoming)

The question that arises for Kirch out of Brooks claims is, at what point in a theory of action must we advert to concepts? Also, which activities presuppose intelligent manipulation of concepts, and which do not? In short, what is the role of thought in action?

In the view of received wisdom (Kirch's term) about action, action is distinguished from mere movement in that an action is something that the agent is aware of and can be brought under a description which constitutes its identity e.g. waving good-bye. What marks the difference between raising one's arm and waving it about and 'waving good-bye' is the intention of the person to do such a thing within a particular social context. 'For an agent to have an intention...it is not necessary that he or she be aware of the action's description or that he or she consciously think before acting...Yet, any reasonable account of their practice must refer to their concepts, ideas, presuppositions, beliefs etc.'(Kirch, 1991: 165) The received view then bequeaths the legacy of unconscious beliefs, desires and rational explanations to AI research. It is this which is the source of Brooks' reaction against representation, in Kirch's view that is.

Kirch discusses the strong points of Brooks's position as an alternative theory of action, particular reference can be made to the notion of egocentric space as opposed to public space. Egocentric space is the world viewed from the perspective of the agent and the description yielded will be different from that given by an outside observer of the same world but with the agent in it. We can reference this point back to Collingwood's contention that action cannot be simply described by an observer, but must have reference to the way action is described by the agent. The heart of Brooks approach lies at the issue of control and decisions:

It is standard in decision theory to treat perception as a bounded resource that must be guided in order to be used to the fullest. The problem which decision-theoretic accounts encounter, however, is that to know what question it is best to ask next, or which test it is best to perform next, the agent must know all the sources of information available now and in the future, their consequences, utilities etc. To achieve optimality is clearly impossible in practice, for it requires knowing where you are most likely to get the information you want before you know exactly which decisions you must make.

(Kirch, 1991: 170)

The central problem that Kirch sees with Brooks's work is that the world of human beings regularly falls short of total situation determinedness. 'Most of our life is spent managing locally constrained choice. It is at this management level that we can best appreciate the virtue of concepts and representations' (ibid 174)

Kirch's defence of representations and concepts is (a) at the perceptual level, concepts unify perceptions into equivalent classes. (b) at the 'conceptual' level concepts license inferences about entities which are the subject of predication. The sharing of predicates by related entities allows the inheritance of truths about one entity to another entity and thus ground presuppositions held by the agent. (c) at the linguistic level a concept is the meaning of a term that denotes it.

One of the most important uses of concepts, argues Kirch, is to organize memory since concepts facilitate recall

In action management, an effective creature will benefit from its performance in the past. It will remember dangers, failures, helpful tricks, useful sub-goals. It may recall unexpected consequences of its previous performances. These memory accesses need not be conscious... But this information is *primed* in the sense that retrieving that related information in the near future takes less time than had the topic never been discussed.

(Kirch, 1991: 175)

From work cited above, we are beginning to see the connection between mind and body. I will now go on to examine, a somewhat older account of mind and body, but no less relevant for this thesis.

4.5 Collingwood's Dialectic of Mind.

Perhaps the fullest treatment of Collingwood's account of mind, and here the point is that what Collingwood meant by 'mind' is by no means obvious or straight forward, is given by Lewis O. Mink in **Mind History and Dialectic**.

For the purposes of this chapter I will summarise the account of Collingwood's dialectic of mind given by Mink. According to Mink there are three themes that constantly recur throughout Collingwood's work, and these three themes serve as landmarks by which to measure the continuity of Collingwood's thought. The themes are (a) the idea of philosophy as self-reflecting; (b) the idea of a dialectical series; and (c) the idea of the continuity of thought and action. (Mink, 1969: 79) With regards to (c) the opening sentence of **Speculum mentis** states 'All

thought exists for the sake of action' and it is the relationship between thought and action that this chapter principally seeks to address.

In summarising Mink's account of Collingwood, I have appropriated Mink's diagram in which he tried to set out in visual form the complicated dimensions and relations of Collingwood's theory of mind. As Mink himself remarks, visual models are not very suitable for representing dialectical relations 'but how could one represent in spatial properties that relation of concepts which " fuses difference of degree and difference of kind, relation of distinction and relation of opposition ?" ' (Mink, 1969: 82) The description of Collingwood's theory of mind given here owes a great deal to Mink, since, as he points out, it appears nowhere in particular in Collingwood's corpus but is spread throughout his entire works.

As can be seen from the diagram (see below), Collingwood distinguishes four levels of consciousness. The first level is our consciousness of our bodily processes, the undifferentiated sensuous emotional flux which is not an effect or concomitant of processes in the sensory-motor, or general metabolic functions, it *is* those functions or processes. Mind, for Collingwood, is a whole-body phenomenon. Pure feelings are momentary, and therefore transient, as well as being unlocalized and undifferentiated; felt, but not observed. We are conscious of such processes because enough of a trace of them survives in the higher form of consciousness. In being aware of them, in terms of **practical consciousness** they evoke the vague senses e.g. irritation or well-being. The awareness of such feelings marks a rudimentary sense of self and environment and this distinction brings forth the second level in practical consciousness, that of appetite.



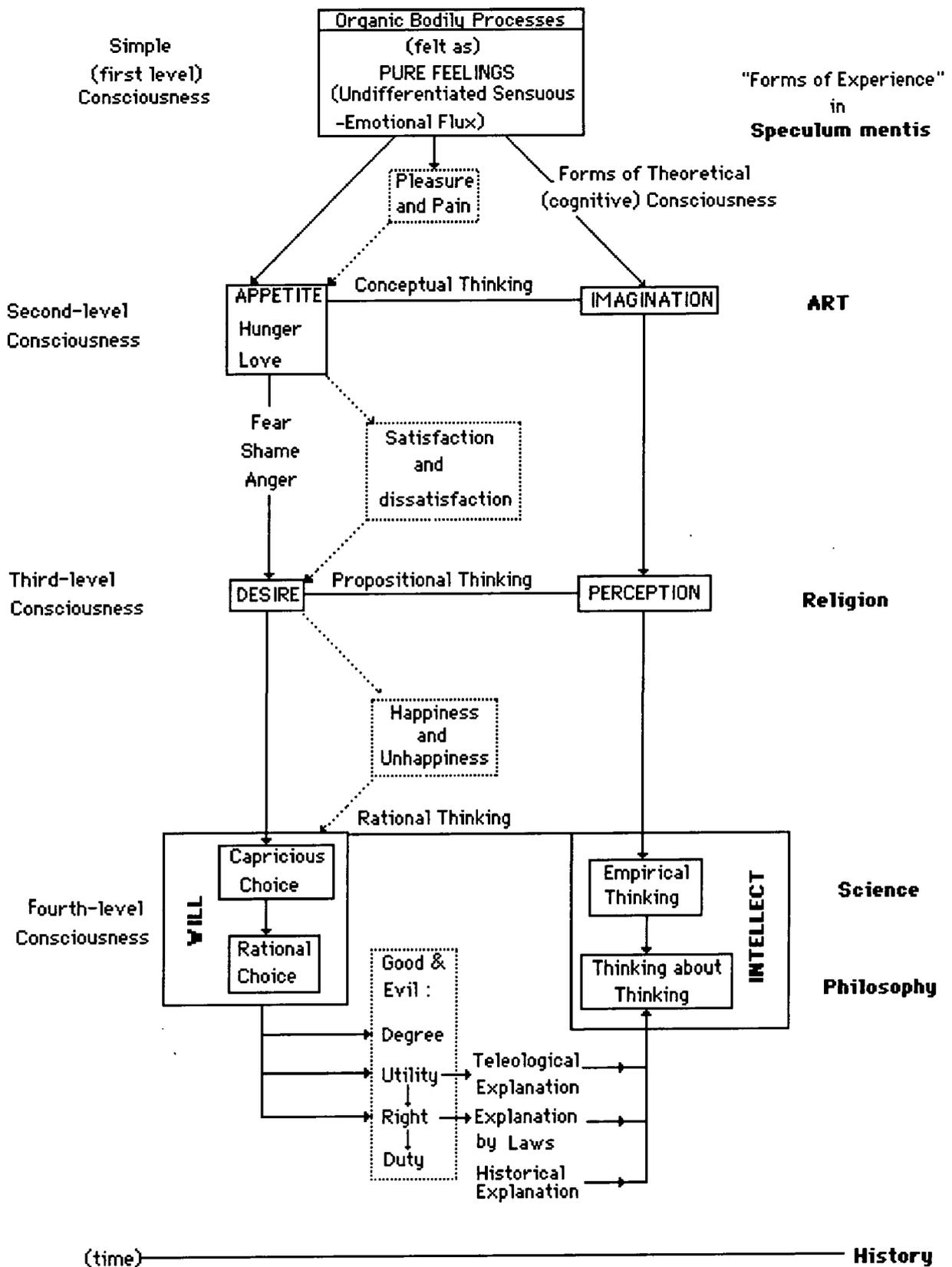


Fig 5. Diagrammatic Sketch of Collingwood's Theory of Mind (after Mink 1969)

Appetite is the awareness that I want something, don't have it, but can't say what it is. Well-being or unease are thus specified as satisfaction or dissatisfaction as the *consciousness* of well-being or unease. When one identifies an object or state which seems to be the object of appetite, practical consciousness has moved to the third level, that of desire. At the level of appetite 'I want something' at the level of desire 'I know I want something' and can specify something specific that will possibly satisfy the desire. At the level of desire we get a level of questioning, that is explicit thought - 'Which do I really desire' this or that ?

In moving to the fourth level of practical consciousness i.e. Will, the rudimentary choice that is already there in desire as the awareness of having a choice or option is not yet consciousness of oneself **making** a choice.' No moment of thought is conceivable which is not also a volition, and no moment of will is possible which is not also an act of knowledge' (Collingwood, 1916: 31)

When one thing is chosen in preference to an other, then does Desire become **action**. Also, it is at the level of Will that Value becomes explicit and by this alone, can criticism and the mollification of desire become possible. Here we get the important point that Collingwood gives us that at the level of Will or explicit choice, the **objects** of choice are not **things** but **actions**. Collingwood writes⁴:

If I will to think, there are not two elements in this act but one. When I will to walk, I do not separately experience an internal resolve on the one hand and a movement of my legs on the other ; the act of will *is* the voluntary moving of the legs...what we turn into a separate organ and "the will" is only the fact of free activity, the voluntary doing of this thing or that.

(Collingwood, 1916: 31,33)

As Mink points out ; Buridan's ass cannot decide between equal piles of hay because it cannot move to the level of Will. It must remain at the third level. We on the other hand can choose, if sometimes with the aid of psychological tools e.g. tossing a coin.

⁴ Likewise, Wittgenstein writes: When I raise my arm 'voluntarily' I do not use any instrument to bring the movement about. My wish is not such an instrument either...'Willing, if it is not to be a sort of wishing, must be the action itself. It cannot be allowed to stop short of the action' If it is the action, then it is so in the ordinary sense of the word ; so it is speaking, writing, walking, lifting a thing, imagining something. But it is also trying, attempting, making an effort, - to speak, to write, to lift a thing, to imagine something etc., (Philosophical Investigations § 614-5)

Following Lewin ⁵ who argued that in humans, 'the conflict between motives occurs at the stage of decision making rather than in the execution of an action' (Kozulin 1990: 145) Vygotsky undertook studies on decision making (designed to counter the model of competing reflexes for decision making) which suggest that a psychological tool as a sign-mediator acts to form a functional barrier between the sensory and motor parts of behaviour. 'The paradox of the will...is that the wilful act is implemented by an automatic action which itself is beyond the will' (Vygotsky 1983: 280)

The mediators help to separate the decision part, which is conscious and wilful from the implementation part, which is automatic and determinate. Thus:

Using an artificial mediator the child wilfully created a new situation in which his choice became linked to a deliberately selected stimulus : " Free will, as the experiments show, is exercised not by the freedom from motives, but by the child's comprehension of a situation and by the realization of the necessity of a choice determined by the motive ; as the philosophical maxim has it, freedom is in the comprehension of necessity"

(Kozulin, 1990: 146)

Returning to Collingwood : the central point of Collingwood's view is that each level of practical consciousness is dialectically related to the preceding one which may develop out of it whilst at the same time carrying over aspects of the foregoing levels. Consciousness here displays what Collingwood termed a 'Scale of Forms' In general terms, the scale of forms marks an overlap.

Thus the overlap is essentially not, as we took it to be in our first rough survey of the ground, an overlap of extension between classes, but an overlap of the intension between concepts, each in its degree a specification of the generic essence, but each embodying it more adequately than the one below.

(Collingwood, 1970: 91)

I will cut short the discussion of the dialectical development that leads to Will through appetite and desire via Pleasure / Pain : Satisfaction / Dissatisfaction : Happiness /Unhappiness and move to the relation of Will to Good/ Evil.

Collingwood maintains (in Mink's account) that the activity of choice does not presuppose but is identical with the judgement of value ; in choosing 'that' one comes to think it good. The act of choice and the judgement of value are the same

⁵ Lewin, K. (1926) **Vorsatz, Wille, und Bedürfnis** Berlin: Springer

thing. 'Good' is not properly a predicate of things or states, but of **actions**, since only actions are the proper objects of choice, capricious or rational. An action may be called good only with respect to the larger whole for whose sake it is done. Mink makes the point that the question can be raised here as to what is 'Good' of this 'Larger Whole'. The question might be seen as a fatal objection to defining good relationally. But, Mink maintains that this objection to Collingwood's, so far provisional account, precipitates a dialectic of the idea of good in which the dialectical relationship between appetite, desire, will (also satisfaction, happiness) and good is recapitulated. In this recapitulation we get a second-level satisfaction, a third-level **consciousness** of satisfaction and now a fourth-level **theory** of satisfaction.

Such a theory is possible and even inevitable once the fourth-level is reached, but it is nevertheless unstable. Its principle is the principle of utility: the attempt to define "good" as the instrumental value of means to ends. It is unstable because the "ends" are found to recede and turn out themselves to be only instrumental rather than consummatory; and as ends recede, the derivative value of means evanesces...In his (Collingwood's) view, the natural logic of thought, once the principle of utility has proved unstable, is to move from the relation of incomplete and complete acts to the relation between a particular act and the schema or abstract idea which it exemplifies. By this move the principle of utility is transformed into the principle of right; goodness then is seen as belonging derivatively to particular acts in virtue of their conformity to general commands or rules. But "the good itself escapes once more," because neither the act nor the rule is good *per se*. The act is good only derivatively as conforming to the rule; the rule on the other hand is abstract and cannot be willed in itself: it is as impossible to will a law without willing instances of it as it is to will an end without willing the means

(Mink, 1969: 89)

In this quote we have the central issues which underlie the questions of human behaviour and agency. As Mink goes on to make clear, Collingwood's thesis maintains that the moral characteristics of action cannot be separated from the way the agent thinks of the action and the extent to which the action is what it is as part of intentional activity. Thus Mink writes:

The third form of goodness therefore includes the other two forms; it combines the means-ends analysis of a situation with the act-rule analysis of a situation but transforms both from the stand-point of a consciousness for which the logical disparateness of means from ends and act from rule has disappeared... within such an action, one might say, it is

possible to distinguish rule from act, or means from end, *only in retrospect* ...The third form of goodness is itself a historical enactment.

(Mink, 1969: 90)

As Utilitarianism is the theory of rational (economic) choice and the Principle of Right is the theory of political/judicial activity, both have their uses but they are not moral principles as such, although both have been included in ethical theory. Collingwood's third form of goodness, his ethics, affirms that an intentional action is always at the same time a choice that one makes for oneself. Agents do not act merely because of what they are, but also to become what they are not. Such self-creative choosing is not a **fact** to which the agent can become aware, rather, it is a situation which comes into being and is constituted when consciously affirmed. Mink states that here Collingwood comes closest to the view of human nature expressed by modern existentialism but is more dialectically radical in that consciousness is not cut off from the causal nexus of nature.

Collingwood's fourth-level consciousness emerges from the natural world but is still attached through bodily processes. Consciousness at the lower levels reflects the world; at higher levels, consciousness transforms and expands it. The human world at the lower levels contains only behaviour and as such is describable by an observer. At the fourth-level there is also action. Here action is constituted and recognized by rational consciousness. Here an action cannot be described simply as it appears to observers but requires essential reference to the way it is conceived by the agent. This point has begun to be appreciated by those working in robotics.

Thus far I have discussed only the left-hand part of the diagram, that is, practical consciousness. I will now turn to the levels of **Cognitive Consciousness**. Cognition and the levels of consciousness with which it is associated in Collingwood's scheme of things, also stand in a dialectical order of development. Again there are four levels, the first-level is not in any way in consciousness' view, so to speak. At this level, cognition would be constituted by the biochemical and motor activity of the body, the activity of the neurophysiological system, in other words.

In the development of practical consciousness from feeling to rational choice, thought, understood as activity, develops via the making of distinctions within what at the next level down was an undifferentiated field (level 1-2) or the unifying of elements which at the lower level are discrete (level 2-3). Thought is held by Collingwood to be present in all conscious activity which is aware (even dimly) of a

contrast between what is immediately present and what is not. Thought, then, appears at the level of appetite in which consciousness is altered through an orientation towards an unrealized future. Thought is an unrealized future unimagined or conceived but felt 'as a feeling-tone suffusing the present'. Thought as knowledge only appears at the level of desire. With desire there is both explicit recollection and imagination with satisfaction being regarded as a future state the want of which impels action; desire marks the appearance of human rationality. Thought at the level of will is able to criticize desire; desire knows what it wants but not what it does not want.

The *comparison* between what is desired and what is not is an activity of the fourth-level; moreover, it is a kind of thinking which may actually modify desire. The comparison between what is desired and what is not further makes it possible to recognize a distinction between what is apparently desired and what is desired; desire, because it is a form of thought, can be mistaken. Finally, only at the level of rational choice does thought become fully explicit in its ordinary sense of inferential reasoning.

(Mink, 1969: 93)

To recapitulate : beyond appetite, at the level of desire we get an affirmation, namely, what I want is **A**. Then we get a negative element via reflection - I want **A**, but not **B**. This leads on to the conviction (i.e. capricious choice) that I **really** want **A** rather than **B** which is equivalent to **A is good** a judgement which, by reflecting upon it, can be backed up with reasons. Rational choice is the re-affirmation of **A is good** along with the reasons for it being so. 'For Collingwood, knowledge, as Socrates says in the **Meno** is "opinion fastened by a chain": at the level of desire opinion becomes conviction as a result of critical comparison, at the level of will as a result of inferential reasoning.' (Mink, 1969: 94)

Mink points out that a criticism of Collingwood's construal of knowledge can be made **if** one assumes that Collingwood is saying that the feeling of assurance is the infallible mark of knowledge. He is not. Collingwood does not set out criteria by which knowledge is distinguished from error, rather, he wishes to show that knowing as an **activity** results from reflection on opinion. Also it is a way of making the point that the development from feeling to reason carries with it the 'emotional charge' which although controlled by the forms thought, is still present even when making inferences.

It may be seen from the diagram that Collingwood marks the second-level of cognitive consciousness 'conceptual thinking'; here his terminology is at variance with normal usage. In Collingwood's terms conceptual thinking may be equated with **selective attention** through which discriminations are made within the undifferentiated here-and-now of the first-level sensuous-emotional flux. Conceptual thinking here is what in **The Principles of Art** Collingwood called imagination. Imagination, as in everyday language, carries a double reference, namely, (a) the activity of practical consciousness, and (b) the products of that activity. The products of imagination are objects of contemplation to theoretical consciousness.

But this is theoretical consciousness in its most embryonic form and its objects are not categorically different from feeling but are *parts* of the mass of feelings, which become discriminable parts only as they are demarcated and selected by acts of attention... In general, the "concepts" of "conceptual thinking" are not the concepts which we would naturally adduce in illustration: *our* fourth-level minds naturally fasten in reflection on third-level concepts. Second-level concepts are not even, as we normally suppose concepts to be, general; an example of a second-level concept is not the concept of redness, but *this* particular red, separated by attention from an attendant flux of feeling...Collingwood is giving a generic account of higher level functions; he is defining the concept of "concept"(and simultaneously exhibiting its connections with the definitions of other concepts, such as "thinking", "consciousness", "knowledge" and "abstraction") exactly as prescribed in the **Essay on Philosophical Method**

(Mink, 1969: 95)

Propositional thinking occurs in the delineation of desires and exhibits the form of question and answer. The primary questions of propositional thinking are practical; which do I want **A** or **B**; but the answers to these kinds of questions are statements which may be true or false. Truth and falsehood like Good and Evil emerge at the level of propositional thinking and were absent at the level of conceptual thinking. Furthermore, even though propositional thinking emerges at the third-level giving rise to truth and falsity, propositions about truth, just as with knowledge (declarative) belong to the fourth-level.

Rational thinking results from the reflection on propositional thinking and it too takes the form of question and answer. Rational thinking distinguishes between the "that" and the "why" it is therefore the thinking which gives rise to a consciousness

which thinks one thing i.e. a proposition because it thinks another which stands to the first as a reason or ground.

Although there is no higher level of consciousness, there is however a sub dialectic of **kinds** of reasons (teleological, law, historical) which can figure in explanations and justification of actions.

Mink makes the point that in this scheme of Collingwood's there is no separation, as in traditional rationalism, between reason and emotion. Thus a fundamental fact of ethics is the possibility of consciousness of self, but this self is not something which is simply **there** and can be disclosed, rather, it comes into being in the process of moving from barely conscious activity to that of fully conscious action.

I will have to truncate the discussion somewhat and pass over much of the discussion of Imagination as given in **The Principles of Art** ; it is out of this discussion that Mink was able to fix the third level of cognition as Perception.

Whereas imagination sorts, arranges and stores and transforms, a bridge to intellection is required, for imagination cannot deal with relations. As desire asks "which do I want, and answers **X and not Y**" ; third-level cognitive consciousness asks " Is that **A, an X or a Y**". I will now move on to Empirical Thought and Thought about Thought.

Empirical thinking i.e. scientific enquiry is held by Collingwood to be a more elaborate and coherent version of common-sense experience. Empirical thinking consists in the detection and construction of relations and networks of relations among the complex objects of third-level consciousness. Here relations may be held to subsist **in** perception but **for** empirical thinking. Thinking about thinking has as its objects, the relations among acts of thinking. Just as capricious choice is not accompanied by the explicit awareness of choosing, likewise empirical thinking is not accompanied by the explicit awareness of reasoning. And like rational choice, only thought about thought can affirm a proposition since it has reasons and is aware of those reasons.

It is thus only at this higher level of intellect that *principles* of inference can be formulated and reflected upon...This level of thought, Collingwood insists, is both normative and descriptive: both at once and inseparably so. It is "criteriological" or concerned with standards of inference which thought imposes on itself...but these

standards are attained only by reflecting on the *experience* of the activity of thinking. It follows that principles of inference are subject to change if and as the experience of thinking changes; and in fact Collingwood enacted this consequence in the practice of his own professional work. He not only held that the "principles of history" result from reflecting on the experience of historical thinking, but in **The Idea of History** he wrote a history of the idea of history, i.e. of the changes of those principles over time.

(Mink, 1969: 105)

Collingwood's general theory of levels of consciousness has, claims Mink, a powerful methodological imperative, namely, 'look for the connections among apparently unrelated mental functions as occurrences at different levels of consciousness of the same fundamental activity.' (ibid 106)

Another way of putting it is to see it as a programme for analyzing many general concepts into species of the concept at different levels of consciousness.

This scale of forms of concepts is illustrated by Mink thus: we can suppose the form of the concept of a <triangle> as held by a pigeon trained to react to equilateral triangles but who will also react to a scalene triangle. This would be second-level.

The concept of <triangle> at the third-level is exemplified by that of the descriptions of the shapes used by the psychologist doing the training. At the fourth-level, the <triangle> will be exemplified by the Euclidian and non Euclidian theorems. A fourth-level definition of <triangle> is intelligible only to someone who has attained the fourth-level through the lower-levels, but it can be understood apart from explicit reference to those levels. But according to Collingwood, a fourth-level definition of <Knowledge> cannot be understood other than as a development of the scale of forms of the concept. Here we have a distinction between in the first case of the triangle, a scientific concept ; and in the second case, a philosophical concept. 'One might well say that a *complete* theory of mind would include a dialectical account of every self-instancing concept as well as among the "levels" of each' (Mink, 1969: 107)

It would not be possible then to **define** such a self-instancing concept apart from giving an exposition of the generic features (products and relations) of the concept . Mink takes **abstraction** as one such (important) concept , as an illustration of the dialectical elucidation of thought. Abstraction in this sense is a primary act of

consciousness and on Collingwood's account, has three main characteristics; selectivity, indeterminacy and self-determination.

Abstraction as a process, requires the selective attention of consciousness towards an object in such a way as to highlight some features of the object while ignoring others. Such attended features can be named and be themselves made the objects of other and repeated acts of consciousness with no repetition of the primary presentation of the object. The first-order objects of any act of consciousness are **activities** of a lower level. These activities are transient, one cannot retrieve or repeat the total perceptual consciousness of a moment. But by attending to certain features we bring forth second-order objects which can be retrieved later and compared. At this level they are still indeterminate in all respects apart from those by which they have been constituted. Lastly, in abstracting such features, consciousness performs a **free** act thereby determining the contrastive aspects of features phenomenologically given.

By **naming** (to be taken in an extended sense, in that Collingwood considered a gesture an act of naming) we express our becoming conscious of our own activities; and to that extent our language determines the limits of abstraction i.e. 'we can attend only to those distinguishable features of experience for which we have names' (Mink, 1969: 108) The qualification here would be that it does so only to the extent that we permit it to do so. The culprit in Collingwood's view is our laziness not the irresistible power of language.

In his view common language is a habit of consciousness and by no means a bad one insofar it is the medium of social life. But habits are compulsory only when we are not conscious of them, and they can on suitable occasions be superseded to the extent that we are conscious of them. Even at the lowest level at which abstraction occurs, "attention "is in no sense a response to stimulus. It takes no orders from sensation. Consciousness, master in its own house, dominates feeling.

(Mink, 1969: 108)

A full exposition of Collingwood's dialectic of mind (as compiled by Mink) would be too long, but the foregoing should provide enough of the most important details to grasp the essence of it.

Collingwood's account of mind does not constitute a 'discovery' of levels of consciousness ; the dialectic of mind is a way of schematizing certain general

conceptions in order that they may be applicable to details of experience and forestall errors. Here Collingwood is calling for a genealogy of ideas which reminds us that rational consciousness (mind) is neither (a) an epiphenomenon of 'non-rational' organic and psychic function, or (b) an entity which has 'escaped' or supervenes upon the organic nature we share with all other sentient beings. The dialectic of each concept expresses its own cautions and reminders. For instance, the dialectic of abstraction reminds us that, although it issues in the construction of formal systems and models, the process by which these constructions are achieved includes steps which are arbitrary e.g. acts of selective division of experience which could have been otherwise and have lead to a different development of thought.

For Collingwood, every stage of enquiry yields results which are **about** experience and nothing else. But here experience includes both knower and known and is both theoretical and practical; which is to say that through the process of inquiry the self creates itself while at the same time coming to know the world in ever more complex ways, this process is both correlative and interdependent.

In this, Collingwood can be seen as an empiricist. However most empirical theories of knowledge start with what Collingwood would regard as second or third level consciousness and separate cognitive and practical consciousness. By holding that sensory 'data' is already 'facta', that is, already a product of consciousness and is therefore abstracted from forms of experience but not separable from experience, Collingwood is much closer to pragmatism than traditional empiricism. While being a radical empiricist, Collingwood is also a radical idealist in that he sees the originative powers of thought as being coeval with the most basic forms of experience. Collingwood was, and has subsequently been described as an 'Idealist' and this description of him was one he strenuously denied. The dialectic of mind may be seen then as Collingwood's attempt to transcend the realist - idealist divide.

At the bottom of the diagrammatic sketch there is drawn a horizontal line pointing to History. This was meant by Mink to mark the point where philosophy as the highest stage of mind becomes coextensive with history in Collingwood's scheme. It is the theory of Absolute and Relative Presuppositions which underlay the claim that metaphysics is the asking and answering of historical questions about the presuppositions that people have made or do make in the course of 'scientific thought'. The theory of Absolute and Relative presuppositions together with the preliminary study of the 'logic' of question and answer constitute the final stage in the dialectic of mind.

4.6 Summary :

In this chapter I have reviewed work which attempts to understand consciousness as (a) an emergent property of perceptual categorization (re Edelman) ; (b) the continuous re-writing (re-constitution) of a perceptual narrative (re Dennett); (c) the operation of a central plan-executing mechanism (re Bridgeman). I have also reviewed work in robotics which has given rise to a debate on the question of mental representation and concepts, re Brooks and Kirch. Finally I have looked at Collingwood's writings on mind as elucidated by Mink.

In the sixth chapter, I will use the work of Edelman, Dennett, Bridgeman, and Brooks on the physical basis of human perception and categorization along with the the perspectives on the psychological environment outlined in the second chapter; together they will guide our discussion of the social aspects of human perception and categorization.

The reason why I have focussed on Collingwood's writings on mind in this chapter is because it grounds his view of history. History is mind's self knowledge. In taking this view of history, Collingwood provides a linkage between diverse issues in philosophy and psychology and historical study.

In the next and penultimate chapter I will go on to discuss Collingwood's logic of question and answer, his doctrine of re-enactment of past thought (with Mink's emendations) and his notion of the double genesis of consciousness i.e. individual experience and the historically given situation of the agent. The logic (dialectic) of question and answer leads us to belief representation as implemented by ViewGen. The doctrine of re-enactment sets out a coherent account of historical study: the work on ViewGen, Mental spaces etc, offers a direct implementation of Collingwood's requirement for re-enactment, and thereby undermines past objections to it.

CHAPTER FIVE

THOUGHT & HISTORY

Belief & Action

5.0 Introduction:

In this chapter I will discuss Collingwood's logic of question and answer; his doctrine of re-enactment of past thought (with Mink's emendations) and his notion of the double genesis of consciousness i.e., individual experience and the historically given situation of the agent. The logic (dialectic) of question and answer leads us to belief representation as implemented by ViewGen. The doctrine of re-enactment as set out is taken here as a coherent account of historical study: the work on ViewGen, Mental spaces, etc, offers a direct implementation of Collingwood's requirement for re-enactment, and thereby undermines past objections to it.

Next I discuss work in archaeology that attempts to model human action, together with criticisms levelled at this model and, tangentially, at Collingwood. Against this criticism from Julian Thomas, Collingwood is defended.

Finally I discuss the nature of beliefs and the role they play (if any) in causal reasoning. Particular attention is given to religious or ritualistic practices and beliefs.

5.1 Historical Knowledge as the Re-enactment of Past Thought.

According to Collingwood, our knowledge of the past is not knowledge of the past as of an actual object, and therefore, not true knowledge; it is only the reconstruction of an ideal object in the interest of knowing the present.

The purpose of history is to enable us to know (and therefore to act relatively to) the present and that is the truth, for Collingwood, contained in the pragmatic view of history. But the knowledge of the past must not be misconceived as knowledge of one object, the past, which when achieved serves as means to the knowledge of another object, the present. That, for Collingwood, is the error of the pragmatic view. The past and the present are not two objects: the past is an element in the present, and in studying the past we are actually coming to know the present, not coming to know the something else which will lead us to know or to maintain the present. The principle, expressed by the ideality of the past, explains both why we

cannot and why we need not know the past as it actually happened. We cannot, because there is nothing to know ; nothing exists to be studied ; there are no past facts except so far as we reconstruct them in historical thought. The purpose of history is to grasp the present, ' and therefore any past fact which has left no visible trace on the present is not, need not be, and cannot be a real problem to historical thought.'(van der Dussen, 1981: 142)¹

What Collingwood is basically claiming is that (a) 'historical truth' as an account of happenings untainted by human perception and categorization, is incoherent. As Paul Roth put it ' there exists a world not of our making, but any subdivision of it into specific events is our doing, not nature's.' (Roth, 1991: 185) And (b) Historical knowledge is knowledge of the present from a developmental perspective.

History, as the knowledge of the past as an ideal aspect of the present, is the knowledge of past thought (action) and therefore history is mind's self knowledge. Collingwood states that events in history have two distinct but inseparable aspects, an internal aspect, the thought of the historical agent ; and an external aspect, the action of the historical agent. Historical events are constituted in the co-extensive relation between thought and action. The past, however, only achieves **actuality** as thought, that is, the interpreting thought of the historian. The past can only be said to exist in so far as it is re-enacted in the thought of the historian. Present day Post-processualist archaeologists hold that the past only exists in the archaeological texts. Collingwood writes:

Does this, then, prove that history is an illusion and to pursue it is folly ? No; because the past has no actual existence, it is an ideal element in the present, and can therefore be studied in the same general way and to the same extent to which any abstraction may be studied. The present is the past transformed. In knowing the present we are knowing that into which the past has changed. The past has become the present, and therefore if we ask where the past is to be found in living and concrete actuality, the answer is, in the present. But whereas the past exists actually as the present, it exists ideally as the past - as what it was before it turned into the present.

(van der Dussen, 1981: 142)

¹ Unpublished manuscript

Munz (1985) tells us that the ability to study the past (*res gestae*) depends on the historian having available to his or her mind a set of general laws, generalizations and concrete universals. (By concrete universals we will take Munz to mean that the historian must have to hand examples of historically instantiated universal categories. e.g. the Greek city state as the concrete universal of the abstract universal -The State.) The matter does not end there, the historian must be able to mobilize such items in such a way as to give both an intelligible account and thereby a relevant account in light of present concerns.

It is here that Collingwood's *logic* of 'Question & Answer' comes to the fore. But this logic, as Mink shows, is basically Hermeneutics. That is, it is not a logical system of interrogative and indicative sentences, but stages in the process of inquiry or of active thought in general. With Socrates, Bacon, Descartes, and Kant as his authorities, Collingwood states that he found it necessary to restate the classical expressions of a principle in logic which held that :

... a body of knowledge consists not of 'propositions', 'statements', 'judgements', or what ever names logicians use in order to designate assertive acts of thought (or what in those acts is asserted : for 'knowledge' means both the activity of knowing and what is known), but these together with the questions they are meant to answer; and that a logic in which the answers are attended to and the questions neglected is a false logic.

(Collingwood, 1987: 30)

Collingwood, as Mink shows, erred in his own characterization of the nature of question and answer. Collingwood first developed the notion of Question and Answer in an unpublished book **Truth & Contradiction** in 1917.² The reason for this, Mink suggests, was Collingwood's concern to refute the then dominant doctrine of logical positivism, in its own terms. Rather than a logic, it is a dialectic of question and answer. As with the generic character of dialectical processes, the relation between question and answer or question and presupposition occurs in a process which is **prospectively open but retrospectively determinate**. As Collingwood wrote in **Speculum mentis**:

A crude empiricism imagines...that to know and to assert are identical. But it is only when the knower looks back over his shoulder at the road he has travelled, that he

² The publisher did not think it was the right moment to publish a book on logic. Collingwood destroyed the manuscript after writing **An Autobiography**

identifies knowledge with assertion. Knowledge as past fact, as something dead and done with...and those who treat it as an affair of encyclopedias and text books may be forgiven for thinking that it is an assertion and nothing else. But those who look upon it as an affair of discovery and exploration have never fallen in to that error. People who are acquainted with knowledge at first hand have always known that assertions are only answers to questions.

(Collingwood, 1924: 77)

Mink summarizes the special features of the question / answer complex, which are reported below.

(1) Given a certain question, the answer to it must be discovered, not just inferred. The question determines what will **count** as an answer, but which of the alternative answers **would** count as the "right" one must be settled by other criteria.

(2) Given a certain answer or proposition, the question which it answers can be inferentially reconstructed from the proposition together with other evidence about the process of inquiry in which it occurs. Taken as having a specific meaning, the proposition is an answer to a **unique** question ; but the interpretation of meaning and the reconstruction of the question are themselves parts of a single process and cannot be determined independently of each other.

(3) Thus the possibility of answers, seen from the stand-point of the question, is multivalent ; but the reconstruction of the question, seen from the standpoint of a given answer, is univalent. Analogous features hold for the relation between question and presupposition.

(4) Given that a certain presupposition is made, any of a number of questions may arise, none of which would arise in the absence of the presupposition. At the same time, none must, or automatically will arise.

(5) Given that a certain question arises, there is an indefinite number of presuppositions which are jointly necessary to the question's arising, but there is one presupposition which uniquely, taken together with the others, is sufficient. This is its "logical efficacy". (Mink, 1969: 133)

Taken *prima facie* (4) and (5) are contradictory. with (4) no presupposition entails the asking of any question, and with (5) the asking of a question is entailed by a unique presupposition. The contradiction is resolved by taking the subject at issue as the dialectic of a question and answer **process** and not a question and answer **complex**. The difference is not unlike the difference between inference and implication. With inference we have a process i.e. something done by someone, but

with implication there is a relation i.e. something exists whether or not it is recognized. Mink writes:

Now one cannot describe a situation in which someone validly draws an inference unless one supposes that there is an implication which is correctly traced out in the process of drawing the inference. But on the other hand there are obviously many cases in which, although a certain implication plainly exists, it is drawn incorrectly or not at all : we see other people - and they see us - failing to "get the point". It is of course logically impossible to see oneself failing to get the point, because one would have to get it order to do so.

(Mink, 1969: 133)

However we often recognize that we did fail to get the point, but after we have done so; when we have drawn the inference from the implication that was always there. **Before** getting the point, there is nothing that can make us do so. The logical efficacy of a presupposition then is not the 'cause' of a question arising 'but the property that accrues to presuppositions in **retrospective reconstruction**. In the same way that the reconstruction of the steps by which a solution was reached has the lucidity which did not characterize the confusions and false starts of the problem-solving process itself.' (Mink, 1969: 134)

The logic of question & answer is a tool of interpretive inquiry, it does not of itself yield answers but guides the search for intelligible and relevant answers given the evidential base. For instance, we may argue that the hunter-gatherer is not confronted by the 'eternal problem of obtaining food' a vacuous formulation, but rather the concrete problem of 'digging up this root' or 'spearing this / that fish'. The Mesolithic leister (a two pronged spear) is an answer to the problem of fishing, the answer to the question. 'how do I get a fish for lunch?' Collingwood has in the past been dismissed for claiming that one needs to be able to get to the thoughts of people in the past. This task has been held to be *per impossibile* . But all that Collingwood really wishes to do is state explicitly the thoughts, including presuppositions, in the form of questions to which the material culture, and the processes that go into their formation, constitute intelligible answers.

The dialectic of question and answer applies to relations between question and answer which are context-dependent and thereby calls attention to the the fact we understand and use such context-dependency. This understanding cannot be exhausted by any formal analysis.

The logic of question & answer stands as a prolegomena to Collingwood's theory of Absolute & Relative Presuppositions.

When ever anybody states a thought in words, there are a great many more thoughts in his mind than are expressed in his statement. Among these there are some which stand in a peculiar relation to the thought he has stated : they are not merely its context, they are its presuppositions ³

(Collingwood, 1979: 21)

The progression from question and answer can be best demonstrated by quoting the propositions that Collingwood formally set down in his chapter 'On Presupposing' in **Essay on Metaphysics**.

Prop 1: Every statement that anybody ever makes is made in answer to a question

Prop 2: Every question involves a presupposition

Prop 3 :The logical efficacy of a supposition does not depend on the truth of what is supposed, or even on its being thought true, but only on its being supposed.

Prop 4 :A presupposition is either relative or absolute.

Def: By a relative presupposition I mean one which stands relatively to one question as its presupposition and relative to another as its answer.

An absolute presupposition is one which stands to all questions to which it is related, as a presupposition, never as an answer.

Prop 5 : Absolute presuppositions are not propositions.

As far as Absolute presuppositions are concerned, Mink argues that they are best seen as forming historically situated systems of *a priori* concepts (just as the later Wittgenstein argued that it was not the 'mind' but common language which incorporates a conceptual system which is acquired through learning the language). Thus language determines apriori what is **conceivable**. So Collingwood's absolute presuppositions provide the general structure of experience as a set of unquestionable beliefs about the world.

In a similar vein M. Meyer, professor of philosophy and rhetoric at the University of Brussels, has lately come to focus on the question-answer pair, as he puts it. Meyer holds that the question is the starting point of language and speech.⁴

³ I will take up this point later in the chapter, but from a different perspective.

⁴ Meyer quotes the very same philosophical authorities for his theory of 'Problematology' as does Collingwood for his logic of question & answer

Whenever we speak or write on any issue, we have as a purpose a need to solve a problem that takes the form of a direct or implied question. In our daily lives we are repeatedly confronted with a challenge of responding to such problems as the need to accomplish a task, perform an act, or surmount a difficulty. Since discourse, in Meyer's opinion, raises, evokes, suggests or indicates a question, we may perceive language as a way of responding to problems, of discussing, of naming issues, if need be, and in any event, of posing solutions where communication is the method of resolution.

(Golden and Jamison, 1990: 330)

Like Collingwood before him, Meyer criticizes analytical philosophy for not recognizing propositions as answers to questions. The parallels do not stop there, Meyer goes on to make the distinction between 'problematological' answers which are partial and tentative ; and apocritical answers which claim a resolution of the problem and therefore do not express a question. Thus problematological answers are nothing other than relative presuppositions and apocritical answers are absolute presuppositions.

Meyer's account of the question-answer pair is an advance on Collingwood's because he more clearly brings out the nature of apocritical answers or absolute presuppositions. Thus apocritical answer are 'answers in general', 'truths logically ordered' or 'solutions in the questioning system'. But perhaps the most important aspect that Meyer identifies is the situating of the question-answer pair in practical discourse. Apocritical answers, Meyer tells us, cover over the enquiry and suppress the problematological by not mentioning the problems that they solve.(Golden and Jamison, 1990: 343)

To return to Mink's account of Collingwood; the relationship of the theory of absolute presuppositions to the dialectic of mind lies in what Mink refers to as the double genesis of fourth-level acts of consciousness. The double genesis arises from (a) the individual's acts of consciousness; and (b) the historically prior rational activities which feed into the life of reason and will. Thus the origins of fourth-level acts of consciousness are from below i.e. acts of consciousness of the individual, and from behind comes the 'energy and formal definiteness but also the strains and limitations of a particular question and answer process reflecting a particular conceptual system or constellation of absolute presuppositions.' (Mink, 1969: 154)

This principle of double genesis can account for certain major differences among the interpretations of intellectual history in general. The history of philosophy can be read as a series of systems or of intellectual problems and their solutions completely unrelated to human experiences e.g. wars, or as a series of rationalizations of underlying processes of social change. The former, is the horizontal dimension, the later, the vertical dimension. The principle of double genesis suggest that both may be right in what they assert but they are wrong in what they deny.

Finally it must be made clear as to the importance of absolute presupposition to historical study, Mink writes:

In this respect, theory of absolute presuppositions is a kind of transcendental deduction of the leading principle of the *Geistwissenschaften* : that there are discernible patterns of imagination, belief and action in historical epochs, and that the analogies among artistic style, philosophical theories, religious beliefs and social and political institutions...while they are neither adventitious nor **causally** explicable, are intelligible as exhibiting the complex structure of constellations of absolute presuppositions implicit at those times in men's interpretation of the world and of themselves. The vertical and horizontal relations of absolute presuppositions constitute respectively the armature of historical reality and the dynamic of historical change. The logic of thought, dialectically interpreted, is the secret of history itself.

(Mink, 1969: 156)

Collingwood's approach to the past, as we have seen, was to maintain that the past does not exist independently of people thinking historically. Thinking historically means reconstructing the questions to which one's evidence, material or textual, may stand as answers.

Karl Popper has drawn attention to the fact that there seems to be a close resemblance between Collingwood's claim that it is necessary to re-enact past thought and his own (problem) situation-analysis. Popper is concerned to show they are different despite the resemblance and that he gives the right account and Collingwood the wrong account. Popper has been concerned to explain how one might arrive at objective knowledge and avoid the problem of relativism due to the predilections of the researcher. (see quote below) There are, claims Popper, three worlds ; the first world is that of physical matter - the material world. The second is the subjective - mental world ; the third is the objective world of the contents of thought. The objectivity of thought-content draws authority from Gottlob Frege who argued that mathematical and logical objects were distinct from the physical

symbols or the subjective ideas attending the symbols. Frege's objects which inhabit the third realm he called *Gedanken* and which closely correspond to what in English are referred to as propositions. (Skagestad, 1975: 44)

Thought-contents do not reside in anybody's mind and can be shared in intersubjective communication. Knowledge is to be found in the third world.

'Problem-situations are now something acknowledged as really existing, not something merely representing the researchers point of view.' (Skagestad, 1975: 44)

As Skagestad points out, the implication for the history of thought is this - theories arise out of problems as rational responses to them and the problems arise out of the state of the discussion.⁵ Thus to show why a particular theory arose involves showing how it relates to a specific problem and to the state of discussion that gave rise to the problem.

History, then, is *sui generis* in the sense that its subject matter differs from that of the natural sciences; history is concerned with rational beings, having thoughts, posing and solving problems, drawing inferences, and so forth. These thoughts, problems, etc. are members of the third world, and it is their third-world relations that the historian is interested in establishing, by the rational reconstruction of problem-situations or states of discussion: "My thesis [Popper's DW] is that the main aim of all historical understanding is the hypothetical reconstruction of historical *problem-situations*."

(Skagestad, 1975: 44-5)

Popper claims he differs with Collingwood in that what Collingwood thinks is essential is not the analysis of the situation itself but the historian's mental process of re-enactment. But as Skagestad shows:

To take Popper's example: Galileo's problem may be formulated: 'What causes the tides?', and the historian's problem may be formulated: 'What was Galileo's problem?' But, in the latter formulation, the phrase 'Galileo's problem' is simply shorthand for 'What causes the tides?', and posing the question 'What was Galileo's problem?' involves, *a fortiori*, posing the question 'What causes the tides?' The rational reconstruction of

⁵ Again, with Popper, as with Meyer we get a reference to discourse, this time couched in terms of a 'state of discussion'

Galileo's problem, i.e. the search for the presuppositions on which Galileo's answer was a rational one, necessarily involves a serious attempt at solving Galileo's problem. This is essentially Collingwood's position ; evidently, it can be stated without any reference to the reproduction of psychological processes.

(Skagestad, 1975: 55)

Saari (1984) has set out what is involved in the activity of re-enactment as follows:

- (1) Reconstructing the epistemic and motivational premises from which the agent's deed followed as a practical inference. He (Collingwood) shows that a deed was the appropriate thing to do in that historical situation relative to the premises of his or her action.
- (2) Re-arguing the agent's arguments, i.e. the historian goes through exactly the same process of argument through which the agent arrived at his or her decision to perform the deed in the historical situation in question.
- (3) Interpreting critically the evidence and filling in the gaps in the evidence inferentially in such a way that the historian is able to construct a coherent and convincing picture of what happened. (Saari, 1984: 109)

It is the contention of this thesis that the work on computational belief ascription (Ballim et al.), mental spaces and simulative reasoning (Fauconnier, Dinsmore) and related work, substantially consists in the computational realisation of the re-enactment approach. ViewGen, would seem to do just what Collingwood recommends. Indeed, as quoted in chapter three, Ballim et al say that one uses one's own state of mind as a metaphor for other people's. When interpreting an utterance (in this case, a distanced material trace) the system must ascribe a speech act (action event) to that agent. This ascription is a matter of ascribing specific intentions, beliefs, desires, expectations etc. (Ballim, Wilks, and Barnden, 1991: 134) Or again, in Norman's terms, re-enactment results in the construction of a conceptual model of a mental model. (see chapter three) The crucial point is how re-enactment is applied to what is being construed as evidence (but see below). Such approaches are then, potentially available for the purposes of historians and archaeologists.

Collingwood argued that historical construction must not be merely plausible but must be a necessary account and involve nothing that is not necessitated by the evidence. Thus when the historian 'knows what happened' he already knows why it happened. In line with the logic of question and answer, the view that there is

continuity of thought and action expressed in the slogan 'an action is the unity of the outside and inside of an event', Collingwood denies that our knowledge of what was done could possibly be **complete** apart from our knowledge of why it was done.

Take the example of Hadrian's Wall : What was Hadrian doing when he had a wall built across Britain ? An abstract and partial description of what he was doing would be 'building a wall'. But the question calls for a more **complete** description. To the extent that a description is incomplete, it will seem to call for an explanation which will be unforthcoming; to the extent that the phenomenon is described correctly, the **description leaves no questions unanswered which arise from the description itself**. Furthermore, (this point is central to the thesis) the dialectic of question and answer may be seen as an account of what Newell and Simon (1990) termed 'Heuristic Search' (see chapter three p.78). Newell and Simon argue that problem solving by search generates and progressively modifies symbol structures (in this case questions) until it produces a solution structure. The solution structure is attained when, as stated above, the description leaves no questions unanswered which arise from the description itself. Hence the correct description of an action can show the unity of its inside and outside, (unity in the sense that convex/ concave have) thus to know one, is to know the other. Mink writes:

It is not Collingwood's view that we first establish a description of someone's behaviour and then use this description to confirm or disconfirm various hypotheses about what "thoughts" inside his head were the "mental causes" of that behaviour. It is not his view that some actions have mental causes and other do not ; thoughts do not cause actions but are expressed as aspects of activity and in no other way. It is for this reason that the correct or complete description of an action already says everything about the thoughtfulness of that action that can be said. The "thought of an agent" is describable because it is observable ; "re-enactment" is not a privileged way of gaining access to otherwise unobservable mental processes, but rather a necessary part of the observation and description of actions.

(Mink, 1969: 190)

History as re-enactment by question and answer exploits the asymmetry of the dialectical process. It is like the retracing of the logic of a random conversation. Seeing in retrospect what relevant associations are to be found in moving from

subject to subject 'the logic of question and answer does not tell us how to conduct the conversation but how to reconstruct it.' (Mink, 1969: 192)

In reconstructing a past conversation the question arises as to how we can know whether or not we are in fact sharing the same mode of reasoning as the original participants in the discourse. In addressing a similar doubt, Ballim et.al. write:

No finite set of dialogue observations could ever establish conclusively that another believer was using *modus ponens*. That being so, concentration on such issues that are not susceptible to proof seems, to us, only to delay the central issue, which is how to infer heuristically the actual beliefs of others.

(Ballim, Wilks, and Barnden, 1991: 134)

The job of the historian or archaeologist is not to reduplicate the past i.e. build a faithful representation of it, but to ask questions and answer them. Representations e.g. those built by ViewGen, are exploratory guides to the construction of a description of a situation, not ends in themselves. Thus there can be no limit to the number and kind of questions to be asked nor to the amount and kind of relevant evidence. Inquiry is itself an historical process.

In order to demonstrate Collingwood's own treatment of the archaeological evidence I will now turn to his account of why Hadrian's wall was built, and in what way.

A major focus of Collingwood's archaeological work was provided by the Roman Wall which runs from Wallsend-on-Tyne in the east to Bowness-on-Solway in the west i.e. Hadrian's Wall.

The purpose of the Roman wall up and until 1921, had been thought of as akin to defensive town walls. Collingwood changed that view with a reconsideration that exemplified his notion of what historical understanding requires. Firstly, Collingwood argued that the construction of the wall made it quite unsuitable as a platform from which to fight off an invading force. Especially given what was known about Roman methods of fighting i.e. hand-to-hand in accordance with pre-set routines on command. On analogy with the German *limes*,⁶ Collingwood argued that the wall was primarily a marker of Roman jurisdiction and a lookout

⁶ *Limes* is the term for the cleared land flanking a Roman military road, some of which marked the *de facto* frontier between Roman held territory and that of the indigenous population. Fixed frontier positions came later.

point. The forts along its length housed troops who would intercept enemy forces on the ground to the North of the Wall with the wall protecting their rear and flanks. In consequence of taking this view based on a thinking-through of Roman military tactics and fighting methods as well as the existence of models to which this view could be assimilated e.g. the German *limes*, Collingwood went on to postulate the existence of signal-stations to the west of the Bowness end of the wall e.g. along the coast of the Solway. Thus the possibility of a flanking movement by crossing the Solway firth by boat was covered. Three forts were already known on this coast. A four day expedition by Collingwood and two assistants located a probable 10 sites of towers and 3 fortlets. Subsequent field work uncovered evenly spaced Roman structures running for twenty-six miles of the coast.

Collingwood's presumption of a frontier system on the Cumberland coast was an example of conditional inference. His conception of the wall's purpose, led him to locate his model of the wall in a form that was consistent with the topographical context of a coast line. When faced with man-made objects, it is necessary he asserted to 'ask what it was for, and whether the purpose embodied in it was successfully or unsuccessfully embodied.' (Couse, 1990: 66) These are historical questions and not to be answered by guesses but by the historical evidence. What needed to be thought through was what the authors of the physical evidence, artefacts or texts, had in mind when they gave rise to such material. It is necessary to infer from the circumstantial evidence provided by both forms of evidence, the physical remains and testimony where it exists.

As far as Collingwood and the notion of psychological environment is concerned, Collingwood writes:

In realizing its own rationality, mind also realizes the presence in itself of elements that are not rational...They are the blind forces and activities in us which are part of human life as it consciously experiences itself, but are not parts of the historical process: sensation as distinct from thought, feelings as distinct from conceptions, appetite as distinct from will. Their importance to us consists in the fact that they form the proximate environment in which our reason lives, as our physiological organism is the proximate environment in which they live.

(Collingwood, 1936: 33)

Collingwood excludes the 'blind forces' of emotion (feelings) and natural appetites from the subject matter of history, although he fully recognizes their

intimate role in human activities; what is important is the way such 'blind forces' in human life participate in the development of social customs and are sanctioned by convention and morality. (Collingwood, 1936: 16)

5.11 Summary & Conclusions

History in Collingwood's view only exists in the re-enactment of past thought. In this, he is not too far away from current post-processualist thinking. For the post-processualist it is writing - 'rewriting' the past that brings it into existence. The objection to this view is that, potentially, anything goes. That there is a loss of objectivity.

Collingwood's reply to this objection would be that history, as a practice, is concerned with asking and answering questions about the past which have arisen out of the consideration of material traces of the past which are existent in the present. The purpose of history is not to construct representations of a 'past', but to understand the trajectory of human thought as witnessed by the material evidence. The purpose of history is to understand human thought (as actions) which has led to its present content and which is encapsulated in present thought.

The doctrine of Re-enactment stipulates the necessary transcendental presuppositions required for historical thought. (Saari, 1984: 109) In re-thinking, historians place (incapsulate) past thought in the context of their own thoughts which transcend the re-thought thoughts. There is no question of complete identification of the historian's mind with the mind which is being studied. It is this gap between the historian's mind and the mind being studied that makes it possible for the historian to criticise the thoughts being studied. Thought, it must be remembered, consist in a dialectical scale of forms. Thus in rethinking Caesar's ambition, the historian cannot deal with ambitiousness in terms of its being a psychological characteristic. As Mink points out 'ambitiousness belongs to the second level of **appetite** (vague hunger for something) ; ambition belongs to the third level of **desire** (hunger for a specific object); ambitious decision belongs to the fourth level of **will**. In re-enacting the latter, the historian can and must re-enact ambitiousness and ambition as far as they survive in it.' (Mink 1968, 14)

The logic (dialectic) of question and answer is the hermeneutical re-construction of a context (a form of life) for past thought expressed in material traces existing in the present. The thought expressed has no prior or independent existence apart from the

action which is its expression. Thus past thought is only accessible through being observable, the only questions that can arise about past forms of life are those which arise in the attempt to construct an intelligible context for the material traces.

It is therefore argued here that the work by Ballim and others offers a controlled approach to constructing a 'conversation' in which the material traces are answers to questions. The questions are generated by exploring the implications of thought-contents expressed in sets of propositions about the material traces. The intention is to exploit the precision and completeness in the use of available information offered by such computational methods. As Ballim, remarked, ViewGen takes its own belief states (expressed as propositions about the world and things in it) as a metaphor (model) of the agent's belief states. The simulative reasoning enacted by ViewGen or Dinsmore's mental spaces allows for the controlled and exhaustive elucidations of new feasible propositions. Feasible propositions about Palaeolithic life, i.e. propositions that could have been entertained in language by people then and expressed in actions would not include propositions about colour televisions and watching TV but would include propositions about animals, other humans, plants etc and determinate actions between them. Modes of reasoning adopted in the distant past, would certainly be inductive, if minimally deductive (see below). But how far it is possible to go with this is dictated by our ability to recognize the evidential status of material in the present and therefore what questions we can ask of it. The name of the game is making the material traces from the past intelligible, it is not to be able to say that this or that happened this way, only that it could have happened this way - and that we have, at this time, a warrant for so saying.

It is therefore one thing to say we are different from those in the past, it is another to say that they are forever unintelligible to us. If complete unintelligibility is proposed then on the same basis, we would also be unintelligible to each other. The central issue is not that we are the same or different, but understanding how we are the same, but different at **all** times. To make past life-ways intelligible we need to recognize or map the **contours** of the relevant psychological environment. The analytical key to understanding human action in a particular psychological environment is the unit of 'problem situation' in which people are confronted with a temporally fixed set of obstacles and affordances. But though we must fix a situation, that is, reify it out of the flux of events in order to study it, it is always necessary to dissolve it back at some point into the flux lest the picture it offers us leads us into dogmatism.

5.2 Human Beings or Distorting Models

In order to focus the issue of how human action should be modelled, I will examine a debate in Archaeology about how we should represent humans and understand their actions. The context of the debate was a jibe by Thomas (1988) accusing others (eg Jochim, 1976; Reynolds, 1986) of describing the Mesolithic period as if it was a 'Cybernetic Wasteland'. Thomas was basically objecting to people in the Mesolithic period being characterized as Bayesian decision-makers⁷. More recently there is the publication of Mithen's **The Thoughtful Foragers** (1990) and further subsequent comment by Thomas (1991).

Mithen's approach to the Mesolithic is an evolutionary ecological one in which he has sought to model decision-making by Mesolithic hunters by assuming that they were (a) rational decision-makers ; (b) processing information and taking decisions to attain various goals; (c) hampered by imperfect information ; and (d) subject to an inherently unpredictable environment.

In **The Thoughtful Foragers** Mithen developed an algorithm which sought to embody the progress of a hunt. In constructing this algorithm, Mithen has drawn upon studies of both non-human and human foraging studies and psychology. The simulated hunt is decomposed into sub-goals in similar fashion to Newell and Simon's Heuristic search, Mithen comments 'the character of a problem and the different courses of action available are dependent upon the other problems and past solutions' (Mithen, 1990: 24)

Mithen discusses how human decision making takes place within social contexts, but the relationship between people is restricted to that of mutual sources of information and the assessment of other's actions for one's own goals. Mithen utilises the discussion by Carston⁸ of human cognition and arrives at the following conclusions:

⁷ By this it is meant that they (we) calculate the probabilities of outcomes (i.e. the basis of decisions) based on Bayes's Theorem which states 'that the probability of the hypothesis conditional on the data (or the posterior probability of the hypothesis) is equal to the probability of the data conditional on the hypothesis (or the likelihood of the hypothesis) times the probability (the so-called prior probability) of the hypothesis, all divided by the probability of the data' (Howson and Urbach 1989:26)

⁸ Carston, R. (1988) 'Language and Cognition' In **Linguistics : The Cambridge Survey**, Vol iii. **Language: Psychological and Biological Aspects**, F.J. Newmyer (ed.), pp 38-68 Cambridge: Cambridge University Press

Knowledge of the world must also refer to what the world will be like at some time in the future, a belief as to the state of oneself and one's environment. Moreover since decision making is concerned with choosing between alternative courses of action we are concerned with knowledge about several, perhaps many, different possible worlds each resulting from one of the possible choices. It is on the basis of these beliefs about future possible states of the world that choice is made. In this respect we have characterised the mind as a means for making multiple simulation models of the future.

(Mithen, 1990: 27)

Mithen (1991), in further defence of his position, turns to the work of Oatley and Johnson-Laird (1987) who suggest that emotions have important cognitive function. Emotions are 'part of a solution to problems of organizing knowledge and action in a world that is imperfectly known and in which we have limited resources' (Oatley, 1992:3) The same point may be made with more colour by saying emotions function when rational solutions are unavailable by prompting commitment to plans or changes of plan e.g when agreeing to marry.

Thomas originally argued that our understanding of the Mesolithic - Neolithic transition (i.e. from hunter-gathering to Agriculture) might best be achieved by 'injecting a little history and human intentionality into the cybernetic wasteland of the Mesolithic.' (Thomas, 1988: 64)

In response to Thomas, Mithen states his methodological perspective in contradistinction to what he takes Thomas's objection to be ; Mithen writes:

At the heart of such ecological approaches is the notion of the individual as a Bayesian decision-maker: a rational, though imperfect, processor of information. The question prompted by Thomas's paper is whether this emphasis on the mind as an information processor loses something that is quintessentially human - the rich emotional life that people experience

(Mithen, 1991: 10)

We may point out here that the notion that humans are Bayesian decision-makers has been called into question; most recently, by Oaksford and Chater (1992) on the basis of computational intractability. It may be useful here to reiterate what Evans had to say on the question of human reasoning, namely, that one of the mysteries of reasoning research is that while human beings are manifestly intelligent in general they seem biased and error-prone when confronted with explicit reasoning tasks in

the laboratory. The answer, according to Evans may be that comparatively little real-world intelligence requires such explicit reasoning; that most reasoning involves the automatic induction and application of knowledge based schemas. However, the bounded rationality argument is answered. If people do not use explicit reasoning processes in complex real-world situations, then the proposed criticisms of current theories of explicit reasoning evaporate.

In defending his approach to decision-making, Mithen, I would say, misrepresents Oatley and Johnson-Laird. In **Best Laid Schemes: the psychology of Emotions** (1992) Oatley does indeed make much of the functional role of emotions that he and Johnson-Laird have claimed for them. But Oatley's discussion of Emotions is much more sensitive to wider social and ethical consideration. Oatley writes

The fact is, as Kierkegaard supposed, that we live in two worlds simultaneously : a world of social and biological mechanisms that compel us though they are perhaps technically predictable and a world of possibilities limited only by our individual imagination and our preparedness to cooperate with one another...To a limited extent, then, as selves in relation to others, we come into a position to steer a little bit. It is not that the world comes under control, but that our actions and those of others with whom we construct mutual plans become, within limits, predictable and comprehensible, so that we may rely on ourselves and others.

(Oatley, 1992: 413)

I will now turn to Thomas's further criticisms of Mithen, and tangentially, Collingwood.

The nub of Thomas's criticism is the idea that there is a stable and hence decontextualized human subject. (Thomas, 1991: 17)

This supposed craving for the stable subject that can be modelled, mathematically in Mithen's case, is taken by Thomas to be the denial of history and the subordination of context. Quoting Michel Foucault, Thomas argues that there is nothing in man - not even his body - that is stable enough to serve as the basis for self-recognition or the understanding of others. 'Desires, emotions, forms of reason and techniques of self-interpretation are all contingent and historically situated. Only when we abandon any fixed points in the human condition do we begin to think historically.' (Thomas, 1991: 17) Thomas goes on :

Human beings make themselves through their actions and interpretations, but they do so in the context of a certain 'technology of the self' which exists independently of the individual, in practices, tastes, opinions, theories, and language which are the domain of society. In consequence, the constitution of human identity is enmeshed in political strategies, whether overt or covert.

(Thomas, 1991: 18)

Thomas (1990) makes reference to Paul Ricoeur's distinguishing of three tropes of historical writing, they are (a) History-as-same; (b) History-as-other ; and (c) History-as-analogue. The bulk of archaeological writing falls under the category of History-as-same. i.e. people in the past are no different to ourselves. Collingwood, notes Ricoeur, offers the most sophisticated version of history-as-same ; and Thomas notes that Hodder takes Collingwood to be implying that certain universal structuring principles allow unique events to be appreciated by all people at all times. This is true of Collingwood, 'we are still the same naked animal', but only up to a point.

All these ways of working with tools are specialized ways of working without them. Man digs with a plough or a hoe or stick because he has first dug with his bare hands. He hunts with weapons because he once hunted unarmed. He judges the sowing time by the stars because he once judged it by guess-work. And however far he goes on the road of mechanization, he must still have a strong enough faith in his immediate activity to assure him that he can handle the tools he has invented and make them do what he wants...Behind all his array of scientific tools, man is still the same naked animal.⁹

(van der Dussen, 1981: 191)

Technology has then, expanded our umwelt. It is also argued above, that for Collingwood, the principle of the double genesis of consciousness, that is, the vertical and horizontal relations of absolute presuppositions constitute the armature of historical reality and the dynamic of history. Again quoting Foucault , Thomas dismisses the possibility of any universal structuring principle. Foucault¹⁰ stated that 'there is nothing absolutely primary because, when all is said and done, underneath it all everything is already interpretation.'(Thomas, 1990: 19)

⁹ Unpublished Manuscript

¹⁰ Foucault, M. 1976 *Nietzsche, Freud, Marx. In: Nietzsche* Paris: Cahiers de Rojaumont

History-as-other is typified by Foucault whose historicising of seeming universals of the human condition is achieved by the act of contrasting past and present. Genealogy - a contrastive history - Thomas argues, can provide a paradigm for effective archaeological research. Thomas states that:

Such an archaeology, then would oppose itself to the forcing of the past into the present categories and classification. At each stage it attempts to maintain the strangeness of the past, its alien quality... So just as Derrida can demonstrate the absence of any fixity of meaning by moving constantly from one signifier to the next, we might search endlessly for a written past which finally breaks its ties with the present. At some point we must come to a stop and write a story.

(Thomas, 1990: 20)

At this point history-as-analogue emerges as a narrative which we write but acknowledge as not the real past. The question now must be answered as to whether Thomas (and Foucault) have the right of it.

Firstly, the phrase 'human identity' is somewhat incoherent. Individuals, we may say, have identities. Universals, on the other hand, marked by terms such as 'human', we say, have natures. Again, human identities are not enmeshed in political strategies, rather, political strategies are constituted by, are expressed through human actions. Social practices, tastes, opinions, theories, and language may be beyond the control of the individual, given, in one sense. But all individuals partake in such and thereby contribute to them and shape them also.

Subjectivity according to John Barrett, a notable Post-processualist is 'the means of knowing the world and one's place in it' (Barrett, 1991: 2) Subjectivity in one sense, as given, is historically situated, but that does not mean it is unintelligible, 'his mind is not an object in-itself ; it is an attitude towards the real world, and to know his mind is to know and share that attitude.' (Collingwood, 1916: 156) But there is a different notion of subjectivity that has already been mentioned, one that does not see the ascription of mental predicates as marking subjectivity, but rather, as the fundamental mark of species recognition on which all social, and thereby individual life is constructed.

For Collingwood, as for Wittgenstein and Weil, mind is never a mere spectacle to be watched from the outside, but always something that can be penetrated and seen from the inside, something one can share an attitude with, and this thereby marks the fundamental recognition of humanity. This 'attitude towards a soul' the

recognition of the humanity of others, not merely spans time, but is the universal foundation of self-hood. If one denied all others, one would deny oneself.

Thomas argues that desires, emotions, forms of reason and techniques of self-interpretation are all contingent and historically situated. But what is it for desire and emotion to be historically situated? Individuals are historically situated, and objects of desire are likewise historically situated e.g. someone in the Mesolithic could not desire to own a computer. Emotions and desire may be culturally controlled, i.e. what emotions can be expressed, or should not be expressed; what may or what may not be desired. Emotion and its forms of expression (e.g. smiling) however, are grounded in our physiology, and physiology (our body) largely defines our emotional capabilities. Collingwood brings this point out in the passage below:

Seeing and hearing are alternative specifications of their common genus sensation...so that an act of seeing is one act of sensation, and an act of hearing is another...we are performing two acts of sensation at once...There is a relation between sensation and emotion which is more intimate than this. When an infant is terrified at the sight of a scarlet curtain blazing in the sunlight, there are not two distinct experiences in its mind, one a sensation of red and the other an emotion of fear; there is only one experience, a terrifying red. We can certainly analyse that experience into two elements, one sensuous and the other emotional; but this is not to divide it into two experiences, acting independent of the other, like seeing red and hearing the note of a bell

(Collingwood, 1958: 161)

As Oatley maintains *pace* Harré, 'emotions are in part socially constructed, but they are constructed around a biological basis - a basis of mental states¹¹ concerned with the cognitive management of priorities in our everyday plans and actions. The occasions for these states depend strongly on the culture in which we live.' (Oatley, 1992:119) Furthermore, in some cultures, there may be codes of conduct (e.g. keeping a stiff upper lip) which seek to control the expression of emotions and rules about what to do in certain social situations which actively suppress demonstrativeness, but not the emotions themselves. Oatley cites the Chewong of Malasia, in this context. Finally, as quoted above, Collingwood specifically discounts emotions as being proper objects of historical knowledge, but sees them as constituents of mind. The importance of emotions consist in the fact that they

¹¹ For Collingwood, emotion is an integral part of consciousness and is carried through, even into making an inference.

form the proximate environment in which our reason lives, as our physiological organism is the proximate environment in which they live.

In order to further turn Foucault's spade, and thereby Thomas's, I must deal with the claim that underneath everything, there is only interpretation. Fortunately, Richard Shusterman (1992) has done this, or at least shown how this might be done. But also to be noted is the point that Weil made about our bodies categorizing the world before any thought. (see p. 57)

Shusterman denies the hermeneutical universalist claim that there are no facts only interpretations by pointing out that although all understanding is selective, not all selective understanding is interpretive. Thus when understanding's selection is neither conscious nor deliberate but pre-reflective and immediate, we have no reason to regard that selection or the resultant understanding as interpretation. We can, claims Shusterman, understand something without thinking about it at all. Quoting Wittgenstein 'To interpret is to think, to do something ; seeing is a state... when we interpret we form a hypothesis which may prove false' (Wittgenstein, 1988a: § II xi 212) Seeing 'the pain' in another, is not to make a hypothesis about that pain, rather, we hypothesis about its cause. Shusterman writes:

To interpret a text would be to produce (at least mentally) an articulation ; a proper reaction, a shudder or a tingle, may be enough to indicate that one has understood. Some of the things we experience and understand are never captured by language, not only because their particular feel defies adequate linguistic expression but because we are not even aware of them as "things" to describe. They are the felt background we presuppose when we start to articulate or to interpret.

(Shusterman, 1992: 134)

Mulhall's (1990) discussion of Wittgenstein's notion of 'seeing an aspect' and Heidegger's 'readiness-to-hand' add further weight to the claim that some understanding involves no interpretation. With regards to our utilization of objects, Mulhall argues that we sight **through** an object when encountering them in particular activities. The particular way we engage an object orients us towards a particular goal upon which we are focused directly and the things in our environment - given the kinds of things that they are - are treated as means towards that goal. In Gibsonian terms we directly perceive the affordances they offer us.

Thus, the intentional acts that a person can perform within a social context, just like any other goal-directed action, are situated with respect to particular objects, these

objects are invested with functional meaning in relation to these actions. Treating material objects in their own right involves a completely different orientation and suspends the unhesitating way they can be absorbed into our activities as means. Mulhall writes:

Similarly, an apt way of characterizing a relation of continuous aspect perception towards *language* would be to say that , in it, words are ready-to-hand for the speaker or author or audience. We do not have to remember that "tree" means tree, texts and speeches directly convey information and express emotion rather than confronting us with symbols requiring interpretation: is short, words are available to us as particular means of achieving our purposes and goals - just as a hammer is unhesitatingly utilized when our goal is hammering nails.

(Mulhall, 1990: 140)

When it comes to other people, we may or may not treat them in just the same instrumentalist way. To treat people in an instrumentalist way e.g. as Mithen does, is to reduce human action to utility, either for themselves or others.

As I have shown, Collingwood, as much as any post-processualist, denies the objectivity of *the* past, but what he does claim is that there is continuity between past and present ; continuity given in the development of mind i.e. self knowledge. It is the task of historians (broadly taken) to trace that development as and where they can on the basis of whatever can be couched as evidence.

The claim that Collingwood, like many in archaeology, deals in history-as-same (albeit a sophisticated version) is unsustainable. Rather, Collingwood commends History-as-analogue based on **at least**, what Krausz (1991) terms Praxial constructionism. Krausz writes:

the praxial constructionist makes no claims about whether there is a past actually beyond that constructed by the historian. He or she affirms only that if there were such a past it could do no methodological or praxial work...as regards the conduct of historical inquiry, an historian is constrained by what survives, the materials and procedures of historical research.¹²

(Krausz, 1991: 218, 227)

¹² A case could probably be made for seeing Collingwood as a global constructionist - as one who holds that we can have no knowledge of a reality independent of the framework of knowing.

The point about the double genesis of consciousness lies in the distinction to be made in the apprehension of the social life made by an individual in their immediate consciousness of it, and their apprehension of 'continual becoming' within their life as already historically situated. The same situation can appear as perfectly stable (the same) and fleetingly transient (all ways different) to the same person at one and the same moment. The whole point of historical re-enactment is to try and stabilize transience by explicitly recognizing what features of human existence can be taken as stable and what must be held as transient. What is stable is that we are the same naked animal i.e. physical and cognitive potential, what is transient is the matrix of the *umwelt*, but there is an unbroken link in the transformed forms of the human *umwelt*.

5.3 Belief & Conduct:

In the above discussion, there is a tacit assumption that human conduct is rationalistic and amenable to corrective judgements; but beliefs are not all rationalistic.

According to Vandenberg beliefs can be defined as fervent hopes maintained in the face of existential stress. In Collingwood's scheme, at the level of desire, opinion becomes conviction (a firmly held belief) as a result of critical comparison. Or at the level of will, as a result of reasoning. (Knowledge is opinion fastened by a chain). Furthermore beliefs are the thoughts that stand behind what is expressed in a statement or proposition, as their presuppositions. Absolute presuppositions are, in Mink's account of Collingwood, historically situated systems of *a priori* concepts. With Norman, mental models are constituted by beliefs about the world. For Wittgenstein beliefs are inculcated with the training in one's first language. In learning to use words and phrases etc, in many specific situations, we learn their meanings and thereby come to form beliefs about the world. Thus beliefs are hinges around which our reasoning about the world revolves. The belief that nature is uniform may be seen as a deep absolute presupposition about the world. Rapaport points out that beliefs are sometimes about non-existents and one can believe propositions that are false.

All the above take belief, generally, to be the result of empirical thought. There is, however, another form of belief which certainly does not rest on reason. Namely, religious belief.

With empirical belief a person's decisions as to what to believe are grounded in information derived from perception etc, and a change in information may bring

about a change in belief. These are the kind of beliefs modelled by ViewGen. But a Christian's belief in God does not depend on the historical truth of the bible and cannot be refuted by any argument that shows the non-existence of God. Barrett (1991) after reviewing Wittgenstein's writings on religious belief concluded that religious belief is always a belief in something. But what that something is, is shown by what we do rather than by what we say, in *praxis* rather than dogma, theory and theological speculation. Wittgenstein, in his **Remarks on Frazer's Golden Bough** asks 'Was Augustine mistaken then when he called on God on every page of of the **Confessions**' and 'A religious symbol does not rest on any *opinion*. And error belongs only with opinion.' (Wittgenstein, 1989a: 3e)

When, as Wittgenstein says, someone kisses the picture of a loved one, this act is not based on the belief that such an act will have any definite effect on the person in the picture, rather, we act this way, and feel satisfied. And Collingwood remarked that 'I have heard a philosopher confess a desire to dance upon a book whose doctrines he disapproved of' (van der Dussen, 1981: 188)

Both Wittgenstein and Collingwood make the same criticism of Frazer, namely, that he tries to explain ritual practice in scientific terms. According to Collingwood, both Frazer and Taylor treat magic as functional whereas Freud and Jung treat magic as psychological. Both methodologies are described by Collingwood as naturalistic. By naturalistic, he means that they treat the subject matter as external to a thinker, something that is not themselves but something else. 'A "primitive" mind as the essential characteristic of the "savage" is constructed as an outward phenomenon, completely separate from the "civilized" mind that is studying it. It is classified, according to naturalistic methods, as mythopoeic insanity (Müller), folly, (Frazer), or Neurosis (Freud).'

(van der Dussen, 1981: 184)¹³ None of these writers, according to Wittgenstein, takes account of the fact that magic and ritual play a special role in the lives of those who practice them, the striking fact being that it is only on certain occasions that people act in this way. Wittgenstein writes:

That a man's shadow which looks like a man, or that his mirror image, or that rain, thunderstorms, the phases of the moon, the changes of seasons, the likeness and differences of animals to one another and to human beings, the phenomenon of death, of birth and of sexual life, in short everything a man perceives year in, year out, connected

¹³ Unpublished Manuscript

together in a variety of ways - that all this should play a part in his thinking (his philosophy) and his practices, is obvious, or in other words this is what we really know and find interesting.

(Wittgenstein, 1989a: 6e)

Maurice Bloch (1992) has recently argued for the 'quasi-universality' of minimal religious structures. According to Bloch, this universality rests on the fact that the vast majority of societies represent human life as occurring within a permanent framework which transcends the natural transformative process of birth, growth, reproduction, ageing and death. It is the near-universality of this construct, Bloch argues, which accounts for the occurrence and re-occurrence of the same structural pattern in ritual and other religious representations. 'I am seeking' he says, 'to establish a connection between a religious construction and universal human constraints.' (Bloch, 1992: 4)

On a different aspect of religious and magical belief, Pascal Boyer (1992) looking at how anthropologists have understood magic and ritual, remarks that anthropologists when confronted with a "strange" account of why something did or did not happen, often take this to mean that the informant has a very different notion of causality. Questions of what constitutes rationality often then arise.

Boyer takes a different approach to the question of causality by looking at the cognitive processes involved in representing causal connections. Boyer cites the experiment by Michotte¹⁴ which seemed to show that some abstract principles of causation are mentally represented.

Boyer writes:

My argument here is that such abstract principles are so vague and unconstraining that they contribute very little to the cognitive salience of causal judgement.

There are two main problems with the anthropological use of "principles of causality" as a solution to the problems of strangeness. One problem is that the abstract principles of causality that can be inferred from people's causal claims are in fact much less constraining than this description would require. Another problem is that the idea of a noncausal description of events makes little sense because the predicates used to represent events are often implicitly causal.

(Boyer, 1992: 192)

¹⁴ Michotte, A (1963) *The Perception of Causality* New York: Basic Books

Thus according to Boyer, causal judgements (outside western scientific practice) are not judged valid or natural on the basis of a strongly constraining notion of causation consisting of necessary / sufficient conditions for causal connectedness.

The focus of Boyer's attack in this paper is the notion of cultural schemata and covering laws and the roles they are thought to play in causal judgements.

Cultural knowledge, according to Boyer, is often described as consisting in schemata, that is, abstract rules specifying relationships between concepts. e.g.

IF (ancestors angry)
THEN (poor crops)

Thus Clark (1990), mentioned in the second chapter, talks about general psychological laws couched in terms of beliefs and desires which constitute our folk or naive psychology. The implication being that the main cognitive processes involved in making causal judgements consist in providing instances for the variable ranges i.e. producing propositions from such schemata as above. The assumption being that people brought up in a certain culture are led to entertain a mentally represented schema of the form above and consequentially identify certain events or states of affairs as being instances of the conceptual slots in the schema.

Boyer argues that the identification of the appropriate variable is not straight forward and is always uncertain. In the schema above, how does one tell if in fact the ancestors are angry ? The application of a causal schema to any singular event or state of affairs presupposes the identification of those singular objects (situations) as belonging to certain types. For instance, Boyer cites the use of magical stones by the Aguaruna people of the Peruvian Amazon. These stones (there are three types) which are held to be magical in some way do not necessarily belong to any particular type of mineral. They may be any kind of stone at all. Thus 'finding out whether a stone belongs to any of the three categories (i.e.has magical powers) is a matter of reasoned guesses and corrigible inference.' (Boyer, 1992: 201) The identification or expectation, of causal powers, Boyer states, is generally founded on taxonomic identification and conversely, taxonomies of kinds, events, and properties are partly founded on causal criteria. Boyer writes:

This applies to causal judgements in general; The "schematic" description of causal thinking should therefore include some description of the identification procedures

subjects use to sort out situations and objects. In the case of magical claims, the identification procedure takes place in a context of uncertainty.

(Boyer, 1992: 202)

At the heart of the notion of cultural schemata is the idea that people deductively generalize from the schemata to singular events, but, claims Boyer, deductive reasoning does not exhaust the actual use of cultural knowledge. This is particularly true, it is argued, in the domain of magic. Here, schemata do not provide a stable knowledge structure or base and must be ramified by conjecture and ad hoc hypotheses which are limited to certain specific contexts.

After a discussion of the Fang people and their notion of *evur* (something which give superhuman power and is located in the stomach), Boyer notes that conversations about *evur* fall into two distinct registers. One consisting of vague generalizations put forward during causal conversations or contained in proverbs and other oral genre. The other type of discourse concerning *evur*, consists of definite and reliable statements about *evur*. These are termed by Boyer "specialist discourses". Some possessors of *evur*, e.g. witch doctors, use their *evur* to combat evil and antisocial influences on people. But as Boyer notes, their assertions are never about general properties of the "witchcraft organ" they are always focused on singular situations and problems. Thus witch doctors seldom make certain causal inferences on the basis of transmitted abstract models. Rather, they build a certain prototypical model by generalizing from singular cases and singular assertions about cases. (Boyer, 1992: 205)

Boyer writes:

The assumptions concerning *evur* that are used in causal judgements are not schemata...they do not constitute a stable knowledge structure made of general assertions...Rather, they are created by generalizing from singular instances, taken either from discourse or from experience and with the particular purpose of explaining a given singular situation Such generalizations do not become part of a "cultural model" of *evur*; they are transient structures that survive only so far as they make some particular explanations possible.

(Boyer, 1992: 205)

The problem of anthropological descriptions of magic and ritual, Boyer argues, is that they only consider deductive processes and not inductive reasoning which Boyer (also Wittgenstein) sees as the main process of belief fixation. Cultural schemata in part equate to folk or naive psychology but the implication to be taken

from Boyer's study is that folk or naive psychology as described by Clark in the second chapter is itself an ordering or rationalization which only captures features of our discourse about the world but not how we in fact go on in the world. Our beliefs are shown in the multifarious things we do (re Wittgenstein), and are thereby only individuated by the multifarious actions we undertake. Our beliefs are only imperfectly expressed by what we say about what we do. The falsity of our beliefs lies, not in expressing what is not the case, but in undertaking an inappropriate set of actions. This is central for any understanding of ritual practice as witnessed in the archaeological record. As argued above, past thought is identifiable because it is observable. It is in the remains of practices that non-empirical beliefs are to be found, and not in propositions generated by social schema or more generally, world views. (This point will be taken up again in the next chapter.)

The key point about deduction in our culture is the emphasis on validation and internal coherence. It is this which gives rise to the methodological and self-correcting nature of our science. Falsity of belief presupposes standards of appropriate behaviour given by a form of life. The belief in God can only be seen as a false belief on the presumption that truth is empirically verifiable.

Thus Wittgenstein writes¹⁵:

Queer as it sounds : The historical accounts in the Gospels might, historically speaking, be demonstrably false and yet belief would lose nothing by this: *not*, however because it concerns 'universal truths of reason' ! Rather, because historical proof (the historical proof-game) is irrelevant to belief. This message (the Gospels) is seized on by men believingly (i.e. lovingly). *That* is the certainty characterizing this particular acceptance-as-true, not something *else*.

(Hannay, 1991: 139)

According to Collingwood, our civilization has suppressed magic by the deliberate cultivation of a thick skinned or insensitive attitude towards emotion. This suppression was achieved by the adoption of utilitarianism; our civilization prides itself on being rational and business-like, every act, custom and institution must show its utility. The outcome of worshipping utility, is a self-inflicted violence on our emotions, in order that they might be suppressed. The horror and fascination of

¹⁵ Wittgenstein, L. (1989) **Culture and Value** trans. Peter Winch, ed. G.H. von Wright Oxford: Blackwell

magic (for us) lies in our perception of it being the systematic and organized expression of emotion. Collingwood writes:

What we call primitive man does not lack science. He understands enough of mechanics, of chemistry, of biology, to plough and fish and throw spears, to light fires and bake pots, and to sow seed and breed animals...The savage is not outside us ; he is inside us. Conceiving ourselves as rational and civilized people, which is what we want to be, we are aware within ourselves of savage and irrational elements, part of our selves which we would willingly disown...In order to understand magic among primitives it is therefore first necessary to look for and understand certain emotions among ourselves.¹⁶

(van der Dussen, 1981: 190)

To understand the action and beliefs of others we must temper the desire to be rationalistic and look to our own case, our own emotions, as also a guide; rather than our cultural emphasis on formal reasoning. The steadfastness of belief arises out of a form of life which gives the bedrock of our beliefs, the hinges, as Wittgenstein says, of our reasoning. Such belief is not solely intellectual or rational and based on evidence. It is also psychological - suffused with emotional content, ethical and based on a model of how we either wish to lead our life or think we ought to lead our life together with others.

In the next chapter I will endeavour to tease out an approach to constructing the psychological environment from an archaeological perspective. I will also discuss the notion of representation and its application to archaeological problems. I conclude the chapter with a brief discussion on the future of archaeology and joint work with psychology.

¹⁶ Unpublished Manuscript

CHAPTER SIX

SOLVING THE PROBLEMS

OF

ARCHAEOLOGY & LIFE

When these painful contradictions are removed...our minds, no longer vexed, will cease to ask illegitimate questions.¹

Heinrich Hertz *The Principles of Mechanics*

For the life of mind consists of raising and solving problems, problems in art, religion, science, commerce, politics, and so forth. The solution of the problems does not leave behind it a sediment of ascertained fact, which grows and solidifies as the mind's work goes on. Such a sediment is nothing but the externality of a half-solved problem : when the problem is fully solved the sediment of information disappears and the mind is left at liberty to go on

R. G. Collingwood *Speculum mentis*

6.0 Introduction

Lewis Binford complained that archaeology was dominated by a normative view of culture, meaning that a culture is composed / defined by a set of internalized ideas or norms carried by individuals and transmitted by diffusion and socialization; thus a cultural tradition is a patterned and integrated whole formed by a set of covarying ideas or norms which 'flow' across space and time. He also argued that Culture-history was vitiated, because it had to accommodate the psychological make up of people no longer with us ; material culture was said to be caused by the now opaque ideas in the minds of past peoples, therefore Binford and others argued that traditional archaeology could not test their theories because the "seat of causation" (meaning the conceptions and beliefs of past peoples) was not preserved.

Post-processualists however now argue that it is *prima facie* implausible that human action could be adequately comprehended in strictly eco-materialistic terms given its distinctively intentional nature. Binford's theory cuts against both common

¹ Quoted in Monk, R. (1991) *Ludwig Wittgenstein : The Duty of Genius* p.446
Vintage

sense and an extensive tradition in social scientific theory which presumes human subjects to be agents. Intentionality, concepts, beliefs, emotion, and subjectivity are now seen as necessary factors when dealing with human action, past or present. In this chapter I will endeavour to map out an old but now updated approach to the archaeological interpretation of human action.

6.1 The Psychological Environment

The human environment or *umwelt*, is not simply other people or things in the world, it is these together with the affordances for behaviour that they offer. It is species specific. The human point of view both reflects and defines what it is to be human. The human point of view is defined by the nature of the human ecological reality. (Loveland, 1991: 102) Our attitude towards a soul arises out of the recognition of other creatures as sharing the same complex set of transactions with the environment as we do. In so far as we recognise human behaviour in the material traces derived from the remote or near past, we posit the common ground on which we may seek to build an understanding of them.

The dialectical relation between the individual and the group, is captured by Collingwood's double genesis of consciousness, functioning as the armature of history. A more recent formulation of this idea would be Giddens's theory of structuration, thus 'Social structures are both constituted **by** human agency, and yet at the same time the very **medium** of human agency.' (Still and Good, 1992: 109)

We are able to act in the world in ways constrained by our ability to directly perceive affordances offered by things, peoples and situations. Ongoing activity, that is, the cultural setting is the immediate context of any individuated act. Thus act and context mutually constrain and support each other and neither can be described in isolation from the other. Still & Good (1992) state that :

If we accept the view derived from Vygotsky that culture is located in the everyday practices...it presumably constrains the flow of social activity itself, it is not just present in the affordances abstracted from the flow. Culture is thus " an ethos embodied in practices, skills, habits, and styles, not a world view abstracted from the reality it encompasses"...Hence it is by no means a distorting screen between us and the real world...

(Still and Good, 1992: 115)

Culture or tradition does not mean some Popperian third world composed of abstract intellectual systems independent of their implementation in people's minds. Rather, tradition takes the form of **tradition-as-concrete-objects** to use Boyer's (1987) terminology e.g stories, and artefacts. Boyer writes:

Consequentially, it is impossible to use the term 'tradition' in any empirically significant way without making precise psychological claims about individual processes of memorization... The re-arrangements and adaptations undergone by traditional stories are a consequence of their pertinence. Peoples must 'process' them in order to remember them, as a material that cannot be connected to previous knowledge is very likely to be abandoned. The stories that are not distorted or re-arranged are simply forgotten, and the same holds for most traditional phenomena. In other words the 'choice' in traditional societies is not between *verbatim* reproduction and distortion, but between constant re-arrangement and oblivion.

(Boyer, 1987: 62)

Boyer goes on to argue that 'conceptions', ideas, beliefs or 'world views' and other intellectual constructions, cannot be repeated. But it is utterances and gestures, and I would add, material transformations (physical actions), that are reiterated or repeated. It is what is actually treated as relevant, repeated and authoritative which lies at the surface of social communication i.e. memorized gesture, utterances and forms of action.

The claim that culture is composed of a set of covarying ideas or norms (re Binford) is rebuffed by the central role of Gibsonian affordances in mediating human actions and Boyer's emphasis on cognitive processing in the act of repeating or reiterating what is relevant to the people concerned. But of course, as Collingwood would have it 'the mind *is* what it *does* ; it is not a thing that thinks, but consciousness ; not a thing that wills, but an activity.' (Collingwood, 1916: 34) Thus in so far as we can arrive at a description that leaves no question unanswered that arises from the description itself, we have correctly described what has been done and what has been thought. What is done and what is thought stand as the unity of inside and outside - concave and convex.

This view of culture also points the way to resolving (exploring at least) the question as to why variation, discontinuities, reversal of trends and other anomalies are found in the archaeological record.

If we take the example of flint knapping: knapping is a craft, therefore, there is a distinction between means and ends. In reaching the end, the finished flint, the means has disappeared. The means here are the raw material to be transformed, tools used and the controlled, ordered actions which bring about the transformation of the flint. Tools, when not used, are potential means. The final form of the flint is determined by the degree of control over the process exercised by the knapper in the face of contingent flaking. The skill therefore lies in the ability of the knapper to adapt the sequence of types of blows to the flint. Too rigid a routine or un-reflexive knapping in general would lead to widely variant results. There would be no proper form. Fashioning a flint requires the skill to be able to judge when one form of blow - strength, position, angle, etc - is appropriate or not. This ability to judge is just like the ability to use words in the appropriate context in the appropriate way. With regards to learning one's mother tongue. Rush Rhees states that:

There is not any *single* thing which is learning to speak - as though that were an operation too, or something over and above what we do with these various expressions. But knowing the use of such expressions - being able to use them on the occasions when they arise in connexion with other people - that is speaking.

(Rhees, 1970: 82)

Likewise, there is no single way of learning to knap a particular shape of flint (type) in a particular way over and above what to do with various actions. Nor is there any single way - sequence of blows - that will guarantee the desired result. It is knowing how to use such actions when the occasion requires them. Even in today's world where there are detailed plans available which specify the sequence of construction operations e.g. in building a house, the house will inevitably differ from the plan in many subtle and idiosyncratic ways.

To understand why something came about that way, it is necessary to re-construct how it came about that way. And that means reconstructing the actions that went in to it, and not simply constructing a formal description of its final form. Reconstruction starts with the final form and works backwards, but the final form mirrors imperfectly some global intention or plan. To understand why the final form is how it is, it is necessary to fill in a gap where a chain of intentional acts once was located.

At the level of the material artefact, it is the obstacles and affordances of the material which constrain the generation of new affordances by human action. The

'language' of knapping or house building is learned in the same way as language proper, that is, within a tradition. The imposition of form and the boundaries of what is the 'proper' form for any given artefact will be constrained and directed by the affordances of the materials and the historically situated constitution of the tradition i.e. ways of doing. A tradition is nothing more than the way of doing. Artefacts such as palaeolithic stone tools, in so far as they are made by repeated and controlled types of actions, will never match exactly the intended shape so far as that may have been cognized, simply because there is a limit to the control that can be exercised over the knapping process. Each blow will always have unintended (accidental) consequences. Ricoeur is right in this respect. But standard forms are a consequence of the level of control of the constituting actions and thereby the outcomes. The possibility of distinct cultural forms likewise reflects the competence, control, and suite of techniques employed within the tradition. It is not the shapes that are cognized and learnt but the actions and the ways of executing them, together with judgements about what is proper. New forms are born out of the losing and adopting of old and new procedures respectively together with changes in judgement about what is appropriate.

Reed (1991) concluded his paper with the view derived from Lave (1988) and Rogoff (1990) that cognitive skills emerge as a consequence of an individual's learning to share affordances, actions and intentions as a result of learning to coordinate and cooperate in working with others. This prompts the question of language development and tool use.

If 'standardized' form results from the controlled execution of sequenced actions reflecting a tradition, and this is what is learnt together with the criteria of relevance (form and function) for the group, then standardization stands as circumstantial evidence of communicative behaviour. Or rather, such items were a topic of conversation. Cognition as 'ways of doing' arises along with the practice of language, as an integral part of language development, since language is a 'way of doing' with sound and body movement.

There has been a long running debate in archaeology about the reality of certain 'stone tools' to give them the benefit of the doubt. Are they the result of intentional human action, or have they been produced otherwise e.g. by the action of water or fortuitous splitting. Such a 'tool' may not have been manufactured, but it may still afford functional uses. It is only when the existence of such 'artefacts' is cited as

evidence of intentionality, that the recognition of intentional action is problematical. Collingwood writes:

Actions cannot strictly be classified at all. What is a lie ? Intentional deceit ? Then it covers such cases as ambiguous answers, refusals to answer, evasions...we cannot easily say when such concealment of the truth is intentional...A classification of actions, in short, can only exist so long as we refrain from asking the precise meaning of the terms employed.

(Collingwood, 1916: 206-7)

Collingwood here is arguing that the problem of recognizing intentionality is in part grammatical. i.e. what criteria do we bring forth to judge what is or is not to be taken as intentional. Already in 1916, Collingwood prefigures Wittgenstein and Derrida.

In developing the notion of psychological environment in the light of archaeological concerns it is necessary to recognize that the potential scale of operation is rather large. Thus, to take Collingwood's discussion of Hadrian's wall and its purpose. It is not principally Hadrian's immediate intentions as such that are the object of study. That is, his immediately given ecological resources of behaviour. Rather, what is of interest is the military situation which Hadrian and his governor had to contend with together with, the wider strategic goal maintaining political dominance. Both political dominance at home vis-a-vis would-be contenders for the position of Emperor; and and physical dominance over the malcontents within the conquered peoples.

The intention of the architect to build the wall, leads to a completely different problem space to that of Hadrian though the final goal state is shared. Archaeology and its mobilisation of science can inform the reconstruction of the architect's problem space, and with a high degree of certainty but not Hadrian's problem space. To adequately define Hadrian's problem vis-a-vis the Wall, (here Hadrian's intention stands for the intention of the Roman state) it is necessary to decide what the primary functions of the wall could be before the structure of the wall can be cited as evidence for that function.

At the other end of the scale, how do we formulate the likely problem space of some anonymous member of our ancestral species *H. erectus*.

It would seem a good place to start with the umwelten of our token proto-human. The physical environment is accessible to us through studies of pollen, and bone assemblages etc. Thus we could find something to say about the climate and food resources available to her. Also, bone studies on *H. erectus* indicate the size and general deportment she would have had. Comparative studies on Chimpanzees, their Umwelten and how they function in it, is also a source of ideas for a plausible reconstruction. So far as the intentionality of our token *H. erectus* is concerned, the ecological resources for behaviour, as Heft terms it, are specifiable in the general case. Since we may take intentional acts to be always situated and since intentions cannot be described in the absence of some foreseeable expression, in so far as we have observable traces of action, the direct intention to act in this way or that, is accessible case by case. Decideability, as we have seen, is not guaranteed. Since we have really no idea about the command of 'language' exercised by *H. erectus* we cannot meaningfully ascribe to them forward planning of their actions as we would understand such things. Nevertheless, language as we understand it did come about and this must be seen as a major transformation of the human psychological environment.

From Edwards'(1991) discussion of discourse and categorization we get the view that the meaning of category terms and the objects, persons, etc, to which they refer cannot be fully explicated in isolation from the forms of discourse and the activities mediated by such discourse. Since discourse is always temporally situated and inhabits the matrix of practical activity of people, the meaning of categorical terms under which objects are classified and sorted must *a fortiori* be that of those who are talking and acting. The problem that faces the archaeologist, particularly the prehistorian, is the gap between our activity and mediating discourses, and those of the past, with respect to the extant material.

The only people who are now talking (to any great extent) about archaeologically derived artefacts are present day archaeologists (obviously enough). This would seem to present a major obstacle to those archaeologists who would seek the meaning that artefacts had for the makers of such artefacts. But on this account, the meaning for the makers is situated in the affordances that the material offered them. It is the set of affordances which determines the place material artefacts held within any given discourse and therefore how they were indexed by terms (words) used. It is the flow of afforded human action, including discourse, that fixes the meaning of material culture. Meaning resides in activity, in the flux, not the form; though form constrains to a lesser or greater degree, that activity.

Category terms used by people in the past must have been as plastic as ours are since objects would have (one may suppose) featured in a multitude of different discourses. As Edwards remarks

It would not be possible to establish the existence of named objects, bodily actions and significances in the physical world, or in behaviour, **prior** (emphasis added) to the construction of such naming practices, since it is essentially through and for those practices that categories are brought into existence. This does not deny that named objects have to be distinguishable, whether they are motor cars or focal areas of the colour spectrum

(Edwards, 1991: 527)

The last sentence of the quote makes it clear that although things in the world are always distinguishable, their categorical status does not lie primarily in their physicality but in the role they play in the actions and concerns of humans as mediated by discursive practices.

It is, as has been argued, (a) the actions in which the artefacts were utilized that is central, their form is only important in so far as it affected their various functions ; and allied to this point is (b) the implication that human modes of action serve as a uniform base on which to understand specific configurations of acts.

In order to make both points more fully, I will cite the case of Dyirbal classification discussed by Lakoff (1987).

Dyirbal is an Australian aboriginal language and has been described by Dixon. (1982)²

Dixon reports that when a Dyirbal speaker uses a noun in a sentence, the noun must be preceded by a variant of one of four words, namely, **Bayi, Balan, Balam, and Bala**. These words serve to classify all objects in the Dyirbal universe. To speak proper Dyirbal then requires the correct word before the noun. Thus **Bayi** classifies; men, kangaroos, possums, most snakes, most fishes, some birds, most insects, the moon, storms, rainbows, boomerangs, some spears.

Balan classifies; women, bandicoots, dogs, platypus, echidna, some snakes, some fishes, most birds, fireflies, scorpions, crickets, the hairy mary grub, anything connected with water or fire, sun and stars, shields, some spears, some trees.

² Dixon, R.M.W. (1982) **Where have all the Adjectives Gone?** Berlin : Walter de Gruyter

Balam classifies ; all edible fruit and the plants that bear them, tubers, ferns, honey, cigarettes (?!), wine, cake.

Lastly, **Bala** classifies ; parts of the body, meat, bees, wind, yamsticks, some spears, most trees, grass, mud, stones, noises and language.

Clearly the Dyribal categorization is quite unlike our categorization, at least on the surface. Dixon concluded that there was a system operating. In general **Bayi**, grouped (human) males ; animals : **Balan** grouped (human) females; water ; fire; fighting. : **Balam** grouped non-flesh food. and **Bala** grouped everything not in the other classes.

Dixon also found that items which were associated in activities tended to share the same prefix e.g fishing spears are in the same class as fish i.e. **Bayi** like wise fighting spears are **Balan** i.e. to do with fighting. Yet another modifying principle is the myth-belief connection. Thus birds are held to hold the dead spirits of females and are therefore **Balan**. Except willy-wagtails who are mythical men thus **Bayi**. Lastly there is the 'important property' criterion which may serve to move things from one class to another. The most important property seems to be harmfulness, thus the stone fish is **Balan** along with fighting and other dangerous things. We may note that our Dyribal speaking Australians should be told that cigarettes are harmful and thus **Balan** and not **Balam**.

Lakoff cites the Dyribal classification as conforming to a general schema which he claims is universal and has the following characteristics. I report Lakoff directly.

(1) **Centrality**: What we have called basic members of categories are central. Willy-wagtails and the moon are less central members of **Bayi** than men.

(2) **Chaining**: Complex categories are structured by chaining ; central members are linked to other members, which are linked to other members, and so on. For example, women are linked to the sun, which is linked to sunburn, which is linked to the hairy mary grub. It is by virtue of such a chain that the hairy mary grub is in the same category as women.

(3) **Experiential Domains** : There are basic domains of experience, which may be culture specific. These can characterize links in category chains.

(4) **Idealized Models** : There are idealized models of the world - myths and beliefs among them - that can characterize links in category chains.

(5) **Specific Knowledge** : Specific knowledge (for example, knowledge of mythology) overrides general knowledge.

(6) **The Other** : Conceptual systems can have an 'everything else' category. It, of course, does not have a central member or chaining etc.

(7) **No Common Properties** : Categories on the whole need not be defined by common properties. There is no reason to believe that the Dyribal find anything in common among women, fire, and dangerous things etc. Nor do they assume, so far as is known, that there is anything feminine about fiery or dangerous things. On the other hand, common properties seem to play a role in characterizing the basic schemas within a category. (edible plant, human male, human female)

Motivation : The general principles given make sense of the Dyribal classification, but they do not predict exactly what the categories will be.

Jumping ahead to Lakoff's general conclusions on the classificatory systems of humans, he concludes that classifier systems reflect the experiential, imaginative, and ecological aspects of mind. Quoting Denny (1976)³ Lakoff makes the point that 'the semantic function of noun classifiers is to place objects within a set of classes different from, and additional to those given by the nouns. These classes are concerned with objects as they enter into human interactions.'(Lakoff, 1987: 112)

Denny holds that cross-culturally, classifiers fall into three basic semantic types, all of which have to do with human interaction. The three types are **physical interaction** e.g. handling ; **functional interaction** e.g. using an object as a vehicle ; and **social interaction** e.g. ethical attitudes. Denny claims that the range of physical classifiers correlates with the kind of significant physical activities performed by a given culture.(Lakoff, 1987: 112)

In short, our conceptual system is intimately bound up with physical and cultural experience but nevertheless there are reasons to think there are uniformities within the diverse forms of categorization structure, likewise, in religious activity, as Bloch seeks to show. (see previous chapter)

When we turn to consider modes of cognition, there is evidence to suggest that there is a degree of uniformity across cultures. The culture-historical approach to psychology developed by the Russian psychologists Vygotsky and Luria took as its basic premise that social experiences are expected to stimulate different types of mental processes, not just supply different knowledge.(Kozulin, 1990: 128)

Summarizing and defending Vygotsky and Luria, Kozulin (1990) argues that the cultural-historical theory Vygotsky and Luria propounded stresses the difference between various cognitive processes leading to the solution of a test problem. While

³ Denny, J. P., (1976) *What are noun Classifier's Good for* In **Papers from the Twelfth Regional Meeting, Chicago Linguistics Society.** Chicago Linguistics society

it is clear that both "primitive" and modern (educated) people are capable of solving certain syllogistic problems, they will use different means. The "primitive" may arrive at the correct answer by substituting his or her personal experiences for the terms of the syllogism, the educated individual relied on thinking in verbal, idealized meanings of the words. Thus in both cases the structure of the syllogism remained the same but the mechanism (approach) to the solution was different. Kozulin writes:

The cultural-historical point of view emphasized that such a transition changes the entire system of reasoning, with personal experiences, once at the forefront, later becoming subordinate moments in the predominantly verbal type of thinking...One of the central issues of cultural-historical theory was the denaturalization of psychological functions under the influence of psychological tools. Instead of an immediate interaction with problems posed by the environment, the human mind becomes involved in the indirect relationships mediated by more and more sophisticated systems of symbolic tools.

(Kozulin, 1990: 134)

We come here to the question of meaning construction Shore (1991) argues that a theory of meaning construction needs to be consistent with general trends in hominid evolution. Such trends, are identified by Shore as being the progressive dependence on symbolic mediated adaptations ; a need for reliable mechanisms of social coordination and communication in the face of changing environments ; the recognition of growing social interdependence **together** with growing cognitive capacity for autonomous mental representations and the transformation of idiosyncratic temperaments into full-blown personalities. ; the extension of memory beyond the individual's social repositories e.g traditions or institutions ; and the creation of stable intersubjective significances which support traditions and institutions.

Furthermore an adequate understanding of meaning construction should account for differences and relations between subjective meaning and intersubjective meaning. Shore takes up the point made by Taylor who argued that 'What the ontology of main-stream social science lacks is a notion of meaning as not simply for an individual subject [but] of a subject which can be a "we" as well as an "I".'⁴ (Shore, 1991: 11)

⁴ Taylor, C (1979) Interpretation and the Science of Man. In **Interpretive Social Science : A Reader** Paul Rabinow and William M. Sullivan, eds. pp 25-71. Berkley: University of California Press

Shore argues that we do not have to choose between structuralist and praxis-orientation accounts of meaning construction. Thus formalist accounts of knowledge structures employ constructs like schemata, mental models, and prototype. Whereas praxis-oriented perspectives treat meaning construction as a creative and on-going process that accompanies practical activities and problem solving and involves analysis of "discourses" *in experience* rather than structures of experience. Commenting on the attacks on objectified knowledge structures that have come from post-structuralists who argue that they are reifications, Shore argues that such reifications are likely to be an essential (and an "essentialist") moment in all cultural cognition. Shore writes:

Yet cultural processes include reification as a necessary moment in both individual understanding and social coordination of experience. It is important to distinguish the sort of subversive reification against which the new ethnographic sensibilities are directed from the other reifications that are intrinsic to cultural cognition....Since reification occurs only as part of a larger dialectic by which these structures are re-created in experience, neither reification nor praxis alone can constitute the essence of cultural analysis. A general theory of culturally mediated meaning construction should make clear the relations between the objectifying and the creative dimensions of meaning making.

(Shore, 1991:11)

6.11 Intentionality, Discourse and Human Action

On the basis of Wittgensteinian arguments, Harré argues that much of our talk is not quite what it seems. thus when I say 'I know I feel sick' I am not making the same kind of epistemic claims as when I say 'I know you are sick'. In fact, in the first case I am not making any epistemic claim at all since I cannot doubt what I feel, although I can be deceitful in what I say about what I feel. Here the claim 'I know you are sick' displays what Collingwood, after Socrates, would call opinion on a chain. The chain being a chain of inferences either based on deduction from what has been said, or induced from behaviour ; or both.

As with feelings, so it is with actions; I cannot doubt my intention to do **X**, but I can doubt my ability to carry it through since this depends on the relation I have to states of affairs in the world. For instance, if I say 'I intend to go to the moon' and do so intend rather than just saying so; now in the Nineties I can at least envisage what I would need to do in order to carry through my stated intention. But in the Fifties, my honest intention could find no possible expression. The intention 'to go to the moon' would perforce be an empty one, and no one would take my statement

seriously, unless the context of my utterance was such that no one would take me literally; if say, the utterance were part of a poetic recital.

It can be seen, then, that circumstance is central to the attribution and indication of intentions. If one were concerned to attribute intentionality, as Julian Thomas was to people in the Mesolithic, then he would have to demonstrate that the intention attributed had some means of actual expression. Only intentions that have given rise to observable expressions are the subject of attribution, those that have not, still remain confined in unarticulated (silent) speech acts and are therefore at best, only possible intentions. Intentions we may say are only actual when giving rise to observable phenomena.

To be an agent, is to form and carry through intentions, that is, to act in some definite way and thereby display one's intentionality. Intentions belong to the act, whereas reasons belong to the discourse which inhabits the interstices of our actions and indexes those acts. Intention marks the synchronic situated act and reasons mark the diachronic frame which links acts in time, thereby bringing them into relation with each other. With discourse, we set forth the future possibilities to act and explain the past actualities of action.

What our words and sentences connote to others is determined by our visible behaviour, the expectations that others have of us i.e. social mores, and the shared grammatical form of our language, embodying the multifarious ways in which words are used in communicative situations. The role material culture plays in our activities is determined by the way in which it derivatively issues from our actions on the physical world. As Collingwood maintained, the proper object of choice which is the implementation of an intention, is an act. The acts afforded by the physical world together with our intentionality which is grounded in those affordances, issue in material cultures which then go on to play their roles in further acts.

A complete description of human action in the sense that Collingwood envisaged as being the aim of historical re-enactment would have to bring into intimate relation the intentionality expressed in the observable material culture grounded in the ecologically given affordances, and the discourse in which it could have been enmeshed and indexed. The coherence of an alien material cultural assemblage, however it was put together, will be reflected in the possibility of constructing a meaningful discourse around it which stands as its description. Though the position (function) of each item of material culture within that discourse need not be fixed,

each new configuration will produce different foci of stress and strain in the body of the discourse so constructed. The material culture should mould the discourse through the process of question and answer to arrive at a description with the minimum of stress and strain ; but perhaps not too quickly, since it is the stresses and strains which are most illuminating. The relationship between the material and the discourse / description is not rigid but flexible as in Collingwood's felicitous example of the foot and a shoe:

This is as much to say that the two sets of data which have to be fitted together are not rigid data, like the pieces of a jigsaw puzzle, but flexible data like a foot and a shoe...And the consequence is that the difference between a good historical theory and a bad one is not the difference between assembling a machine rightly and assembling it wrongly so that in one case it will work and in the other case it will not.

(Collingwood, 1938 : 26)

In line with Shore's contention, a general theory of culturally mediated meaning construction should make clear the relations between the objectifying and the creative dimensions of meaning making. In weaving of a discourse / description around the material culture by question and answer, such relations between objectifying and creative dimensions of meaning should become apparent. However it is perhaps useful now to approach the question from the opposite formalistic end of the matter and take up the question of representation and material culture.

6.2 Representations

The idea of a 'mind set', 'mental template' or 'cognitive map' to give it its latest formulation by Colin Renfrew, is an idea which is rejuvenated from time to time. It underlies the claim of historical situationalness, cultural differences and types. But what can be meant by it ?

The question of representation has cropped up at various point in the thesis; from Edelman we get the notion of reentrant connection, where the agent's perception of the world (i.e.. the ability to perform perceptual categorizations on signals from the world) is affected not only by perceptual experience but also relations between those experiences and introspections from which that agent may attach **values** to those experiences.

From Norman there is the idea of mental models that are incomplete, unstable, overlapping, self-contradictory and parsimonious. There are also limitations on peoples ability to 'run' their models. From Collingwood we get selective attention and abstraction but in addition, the methodological imperative of looking for the connections among apparently unrelated mental functions as occurrences at different levels of consciousness of the same fundamental activity.

Underlying all these accounts of representation is the notion of construction (unconscious and conscious) and the imposition of ordered objectivity. i.e. reification. Kant and Hertz draw attention to the distinction made in the German language between senses of 'representation' e.g. *Vorstellungen* and *Darstellungen*. I propose to use these terms to mark distinctions within the concept of representation.

Darstellungen (upper case) will denote objective, public, verbally communicable representations ; *darstellungen* (lower case) will denote objective, non-communicable representations. The difference between these forms of representation is not absolute, rather, there is a difference in degree of abstracted 'arbitrary' structure. What is arbitrary is features of the environment abstracted, not the resultant structure of the representation.

In the light of the discussion of affordances in the second chapter *vorstellungen* will be held to be generated by the perceived affordances under the constraints imposed by ecological obstacles. It is the obstacles in our path which command (select) our attention and thus shape the *darstellungen* with which we operate in the world. As Weil stated, it is only those things within the field of action which do not constitute an obstacle that are transparent for thought in the way completely clear glass is for sight.

The dialectical interplay of affordance and obstacle confronted when moving through the environment or acting on the world generates *vorstellungen* mediated by our sensory organs. Thus the mental model that I have of my immediate surroundings, the model which constrains my interaction with the world is *vorstellungen* based on environmentally structured sensory inputs constituted as perceptual categories (re. Edelman and Brooks), being mediated and generated by intentional behaviour driven by appetite and desire.

Such *vorstellungen* are stabilised or constructed by fourth level consciousness (re. Collingwood) by further abstraction to form conscious *darstellungen* which are objective for the individual. The constructive move from *vorstellungen* to *darstellungen* roughly equates to the cognitively generated analogue of the *umwelt*; while the constructive move from *darstellungen* to *Darstellungen* is the move from language (understood as the cognitively generated analogue or model of the *umwelt*) to speech and thus on to writing and art. Thus *Darstellungen* are the developmentally generated and therefore shared basis for communication which unites all within a given language community.

If I describe in words and sentences, or paint a picture of my surroundings I will have fixed my mental model, so construed, as *Darstellungen* which are public and available to others. In other words, I will have abstracted and fixed a selective, objective, and in some sense, veridical representation of the world. When we construct scientific models or works of art, we are further abstracting, to create objectified *Darstellungen* out of the cognitively achieved *darstellungen* but at the same time purposefully manipulating the form of the *Darstellungen* in the light of particular ends. There is a difference between *Darstellungen* constructed by consciousness and which is individual though socially founded in language, and those of science, which is purely social, that difference is **purpose**. (intention)

All constructed representations reflect purpose. Consciousness has experiential purposes e.g walking; while science has experimental purposes. Experiential purposes reflect experiential problems for the individual.

It is not, *pace* Bridgeman, that immediate environmental contingencies drive behaviour, rather they define the possibilities within which we must choose. Sitting here in front of a computer screen, I cannot make myself a cup of coffee. To do that I must move in certain ways - get out of the chair, walk a certain distance in the appropriate direction etc, - my intention is 'make a cup of coffee' but I cannot determine how I shall actually do this ahead of actually moving. With each move, (standing up etc,) a new situation confronts me. I cannot actually know what will happen next, but I keep moving. Retrospectively, it is possible to re-construct the central elements of my intentions, my plan - make a cup of coffee, but as has already been stated in chapter five, the reconstruction of the steps by which a solution was reached has the lucidity which did not characterize the confusions and false starts of the problem-solving process itself. I move through the problem space with expectations of what is before me, these expectations may be realised, or not, if

not I need the reflexes and skill of judgement to negotiate any obstacle which may confront me.

As Oatley argued in an earlier quote as selves in relation to others (and the world) we come into a position to steer a little bit. It is not the world that comes under control (planning is about the exercise of control over a situation) but that our actions and those of others with whom we construct mutual plans (share intentions) become, within limits, predictable and comprehensible, so that we can rely on ourselves and others.

The steering that Oatley refers to is what Collingwood meant by his development of practical consciousness. In chapter four I wrote that at the level of desire we get an affirmation, namely, what I want is **A**. Then we get a negative element via reflection - I want **A**, but not **B**. This leads on to the conviction (i.e. capricious choice) that I **really** want **A** rather than **B** which is equivalent to **A is good** a judgement which, by reflecting upon, can be backed up with reasons. Rational choice is the re-affirmation of **A is good** along with the reasons for it being so. Collingwood's account sets out the internal structure of intentional acts and the role played by the assignment of values.

Bridgeman's appropriation of the concept of plan does violence to the objective nature of plans given by their intersubjective foundations; speech, as Vygotsky argued, is developmentally internalized but the ability to plan at the individual level is founded on the fact of joint planning. This point may more accurately stated by substituting for planning the generation of mutually held expectations. In talking and writing we are able to make explicit our expectations of how things should go. We are able to review the possibilities of obstacles before us. Our immediate existence as an unbroken flow of acts cannot be 'planned' in this way. It has to be lived. How this actuality squares with our explicit preformed intentions is another matter. Emotions, according to Oatley, play the role of reflexive re-orientation in the face of obstacles to our intentions. Either at the level of immediacy or life plans.

What is important is the planning not the plan. At the neurophysiological level, as Dennett shows, no particular draft, or *vorstellungen* in my terms, can be taken as authentic over and above any other. With the coming into consciousness i.e. as *darstellungen* there emerges the **possibility** of action ; it is only with reflection on the actuality of acting in this or that manner that an act can be couched in terms of a wider structure or plan. The recognition (existence) of a plan rests in the

judgement of the possibility of acting. But planning is a process which runs throughout.

With language we objectify the world, with discourse we continually reorder or reclassify the world and thereby set it before each other as knowledge. Science therefore, is the outcome of a reflexive attitude to this general process. Heidegger writes⁵:

Modern science's way of representing pursues and entraps nature as a calculable coherence of forces. Modern physics is not experimental physics because it applies apparatus to the questionings of nature. The reverse is true. Because physics, indeed already as pure theory, sets nature up to exhibit itself as a coherence of forces calculable in advance, it orders its experiments precisely for the purpose of asking whether and how nature reports itself when set up this way.

(Ihde, 1983: 239)

The move from *darstellungen* to *Darstellungen* is just this imposition of order. Speech, gesture and other physical acts objectify (make public) still further our *darstellungen* but as representations, *Darstellungen* are necessarily more arbitrary versions of *darstellungen* since they embody a change in purpose.

What then is the relationship between conscious *darstellungen* and observable *Darstellungen*? This is the central problem of archaeology.

Shore promotes the theories of Werner and Kaplan⁶ on symbol formation. Werner and Kaplan argue that perceptual objects (*darstellungen*) as well as symbolic vehicles (*Darstellungen*) are established in terms of organismic schematizing and the possibility that an inner similarity between the vehicle and the referent may occur without this similarity being apparent to an (alien) observer. The observer, it is argued, regards solely the external, geometric-technical properties of the word-form and the object. This is historically true of Archaeology and certainly true of many archaeologists.

⁵ Heidegger, M. (1977) 'The question concerning Technology' **Basic Writings** trans David Krell p 296 Harper and Row

⁶ Werner, H & Kaplan, B. (1963) **Symbol Formation** New York: Wiley and Sons

According to Shore, in this schematizing activity (*vorstellungen-darstellungen* to *Darstellungen*) by which symbols and the associated referents are neither fully arbitrary nor fully determined. 'the key process is the creative *construction* of idiosyncratic analogies, primitive sensory metaphors' (Shore, 1991:15)

Symbols are constructed by the mind by reproducing the subject's physical experiences of the world in mental representations of conventional sign-forms. Meaning construction rests then, it is argued, on the cognitive process of schematizing activity. Shore argues after Armstrong that 'Human history is marked by the exploitation of the potentialities of spatial and temporal analogies.' (Armstrong 1981: 24) Shore writes:

Analogic construction is probably essential to the formation of the "sensory concepts". Complex sensory experiences are brought into an intimate relation with public symbols (linguistic and otherwise), overcoming the initial contingency of their artificial relationship. This sort of schematizing process makes possible the unification in consciousness of cultural symbols and their referents. A culturally constructed world is thus experienced as a "natural fact" which is to say a meaningful world.

(Shore, 1991: 16)

Burbridge (1990) notes two important features about analogies, that they (a) express similarities between different things ; which are (b) similarities of relation. We use analogies to identify relationships for which we have no names (Burbridge, 1990 : 5) The practice of discussing a newly recognized aspect in one domain via the more fully developed vocabulary of another domain underlies the construction of cultural schemata (*Darstellungen*) which link up and weave together diverse experiences. As Wittgenstein argued, ' what I perceive in the dawning of an aspect is not a property of the object, but an internal relation between it and other objects.'(Wittgenstein, 1988a : 212a) We therefore become aware that a new kind of description might be made of the object as a whole.

Sharing the same obstacles and affordances is then the necessary ground for shared understanding. In order to understand and thereby model the actions of people in the past, particularly the remote past, it is necessary to bring into focus the obstacles and affordances both physical and social that they would have encountered. But that cannot be done without reference to their means for overcoming obstacles and utilising affordances. i.e. specifying their *umwelt*.

In so far as members of our species in the remote past (to give the extreme case) share with us the same potential set of affordances dictated by the physical nature of

our bodies, we share a common potential for action and thought. We share, in other words, the possibility of arriving at the same *darstellungen* as them mediated by the same *vorstellungen* arising out of our shared physical nature confronted by any given environment. What separates us from them is the development and growth of tool use, both symbolic and non-symbolic with which our *umwelt* has been made richer and more diverse.

What differs is not us, our concepts or conceptions, but the situation in which we operate and the material, social and linguistic resources through which we operate. The key to understanding the past is to focus on the situation pertaining under differing descriptions. The descriptions that we may come to are partially governed by what exists in the present that may partake in our conversations in the role of evidence; that is, the evidential hinges around that which our description / conversation may turn. It is the state or conduct of our discussion that brings in to play different sources and types of evidence.

Conducting a conversation about the past and reaching a warranted set of conclusions is the problem space of the archaeologist. **Inclusive of that problem space, is also the problem space people who are the subject of our conversation.**

Thus problem solving has a double aspect (hence the doctrine of re-enactment) for the archaeologists, because from their perspective (a) there were no problem situations in the past other than the ones in which the recovered material to hand, counted as part of the answer; and (b) there is the material itself which must be made intelligible. i.e. the existence of the material poses a problem for the archaeologist.

The material presents an obstacle in that (a) it is fragmentary ; (b) out of its usual social context ; (c) has also been re-configured through its depositional history and in the act of recovery. But at the same time, the material still offers up the perception of human affordances to the archaeologist, in much the same way as it did to its original makers and users. e.g. I would use a 'hand axe' in the very same way as would its Palaeolithic maker. Faced with these facts, the archaeologist has no option but to make the attempt at re-creating the matrix of social action in which the material can be seen to offer affordances of action perceptible to the modern viewer. But in doing this, the archaeologist hitherto moved from a *Darstellungen* (the archaeologically excavated record fixed by practice of excavation and the attendant theories and presuppositions of the archaeologist - itself constituted or

composed of other Darstellungen - the physical material as such) to darstellungsvorstellungen (original <-> re-enacted) which is the goal sought. It is rather like fixing the plot of a story (i.e. excavating a site or sites) and then explicating the elements of the plot to give coherence, but in doing that it is also necessary to recursively rejig the plot in respect of the detailed interactions between the elements. Hence it is not possible to start with excavation, rather, excavation must become an integral part of the re-enactment process and be guided by it.

It is what Bruner (1991) calls the problem of 'hermeneutic composability' (mentioned in chapter two) with regard to narrative construction. In establishing a reading of the whole text we appeal to readings of its partial expressions, but because we are trying to explicate meanings we can only do so by relating the meaning of partial expressions (artefacts, etc) to the meaning of the whole text (the site or site complex).

In a narrative we interpret the parts in the light of a putative story or plot and re-work the plot as new elements are introduced in order to maintain coherence and intelligibility.

This requirement would not mean a change in what is done i.e. techniques of excavation and survey but of seeing how the very process of excavation and survey can be brought into the process of re-enactment. That is, excavation and survey must become part of the 'conversation' and not its starting point.

6.3 Is There a Future for Archaeology ?

By insisting along with Collingwood, on the ideality of the past, the current and historically given *raison d'être* for archaeology is undermined. But as we have seen, for Collingwood, the only serious purpose of historical study is to understand the present into which the past has been transformed.

History, as Collingwood continually repeats, is mind's self-knowledge. 'If he [the historian] is able to understand, by re-thinking them, the thoughts of a great many different kinds of people, it follows that he must be a great many kinds of man. He must, in fact, be a microcosm of all the history he can know. Thus his own self-knowledge is at the same time his knowledge of the world of human affairs.'(Collingwood, 1987: 115)

Norton (1992) argues that the conceptual foundations for the value pluralism (i.e. the fact that the same object can have different values for different person) that

history provides lies in normative individualism. This normative individualism is described by Lomasky (1984):

To be committed to a long-term design, to order one's activities in light of it, to judge one's success or failure as a person by reference to its fate: these are inconceivable apart from a frankly partial attachment to one's most cherished ends...Practical reason is *essentially differentiated* among project pursuers, not merely contingently differentiated by various causal constraints that each person faces from his own spatio-temporal location. That end **E₁** can be achieved by **B** may provide **B** overwhelmingly good reason to act; that **C** could be equally effective in advancing **E₁** may merit vanishingly little weight in **C**'s deliberations as concerning what to do

(Lomasky, 1984: 44)

As Norton remarks, 'from this account of human beings as individuated pursuers of projects it follows that an understanding of anyone's present conduct requires reference to the ends to which it is directed.'(Norton,1992:9)

Collingwood argues that the study of history as the re-enactment of past thought, affords insight in to how to act in situations which fall outside the familiar categories. Even when confronted by a situation in which there is a rule to follow, there is always a mismatch between the ideal which gave rise to the rule and the concrete situation being confronted. The task of history is to train the eye to see the situation before you in its fully concrete form. This requires the mastery of problem formulation or summarization.

History as re-enactment is to be seen as a discourse centred on, and directed by the recovered material culture. The purpose of this discourse is to lay bare the full panoply of afforded actions (material and social) hinted at and supported by the material in the light of ecologically expressible intentions of agents relative to a set of ecologically afforded purposes. The point of such an exercise, however, should be not merely to 'explain the past' but rather, to create an environment in which the relationships of language, social action and material transformation of the physical world can be explored in a unified way.

The operational focus of such an approach could be located in Expert Systems / AI geared to problem solving exercises related to archaeological interpretation. With ITS, Cognitive Psychology and Archaeology can interpenetrate to their mutual benefit. Archaeology generates multilayered problem spaces to model and

explore, whilst ITS provides a rigorous environment for both the practitioner and student archaeologist to develop a fuller understanding of their field of study.

In an earlier chapter I felt obliged to criticise current work which seeks to use Expert systems for archaeological purposes. The general criticism I would make and which lies behind the specific ones made is that archaeology in the main has lost its way and its sense of purpose by its denial of what is properly human in human action i.e. the relation between thought and action. The active engagement of the past through Expert systems / ITS within a Collingwoodian perspective of re-enactment would, I contend, cut across (a) the processualist reduction and trivialization of human experience ; (b) the post-processualist tendency to disengage from and alienate the past experience of human kind ; and finally (c) offer archaeology an opportunity to put itself and its worthy and legitimate concerns at the heart of a multi-disciplined educational approach which re-connects the ethical and practical life of today through a consideration of life-worlds no longer in existence.

EPILEGOMENA

The supposed problematic relationship between intention and process which underlies differences in archaeological approaches to the past can be seen as something of an illusion. Human intentions are in principle, perceptible, as Heft maintained, they are not in the head but in the situation in which individuals find themselves as they move within it. In so far as it is possible to describe that state of affairs, it is possible to perceive intentions. Gibsonian Affordances offer the link between the conscious subject and the objective ecological state of affairs. Affordances bridge Binford's eco-materialistic archaeology and Hodder's subjectivist archaeology.

Collingwood shows us how to organize and join both aspects; AI offers a rigorous computational method of so doing.

I have argued that Expert Systems and ITS should be used to form the basis of a multi-disciplined educational environment in which we can seek to explore the relationships between language, social action and material transformations of the physical world. The larger aim is ethical, not didactic. The aim is to 'train the eye' to see the situation (whatever situation) in all its concrete particularity by working through the obstacles and affordances it offers. It trains one to know how, why and when to act.

But perhaps we ought also to bear in mind the following :

It is perhaps not possible to carry out this process (of construction of external worlds) in the full consciousness of what one is doing : the **illusion** (my emphasis DW) of abstract objectivity is essential to it: it must be done in good faith, in the belief that one is now at last discovering the ultimate truth, coming into contact with a pre-existent and absolute reality.

The truth is not some perfect system of philosophy: it is simply the way in which all systems, however perfect, collapse into nothingness on the discovery that they are only systems, only external worlds over against the knowing mind and not that mind itself

(Collingwood, 1924: 315-6)

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