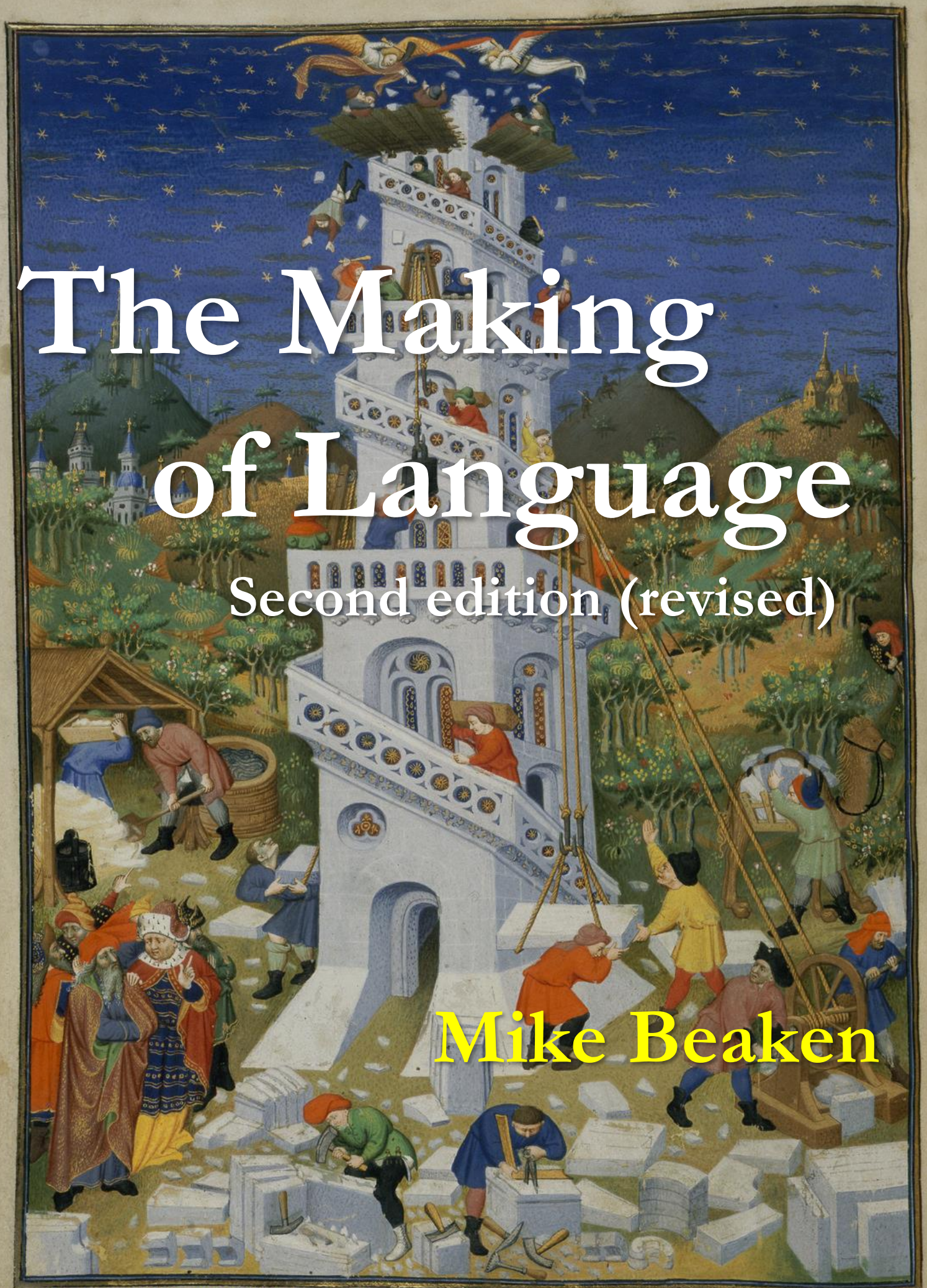
The Making of Language

Second edition (revised)

Mike Beaken



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To Kate, Jack and Joe

Contents

Introduction

Since the first edition of this book in 1996 there have been some far-reaching changes in attitudes to the topic of language origins. One of the reasons I gave for writing this book in the first place was the intrinsic interest of the topic. While the record of fossils and of tools and artefacts is absolutely silent on the issue of language, the topic gives rise to so many questions that it calls in all areas of linguistics, as well as archaeology, anthropology, psychology and even musicology.

Some of the changes in attitudes are welcome. Fifteen years ago the theory of Universal Grammar was fairly widely accepted among linguists, though less so among archaeologists and hardly at all among anthropologists. Nowadays the notion of innate properties of mind has come to seem less and less an explanation for the mysteries of language, and more and more a cover for ignorance.

There are other changes in ideas about language origins, many of which encouragingly confirm the views in the first edition, such as

- the idea that language has had a long and gradual development rather than a sudden appearance on the scene,
- the idea that gesture was an early form of communication, before speech was physically possible,
- the idea that there is not really that big a gap between animal and human communication,
- the idea that language is related to the activity of human beings[1],
- the idea that language changes in line with social developments,
- the idea that music is relevant to the origins of language and of human society,
- the idea that Neanderthals had a form of language just as effective as that of their contemporary humans,
- the idea that the major difference between Neanderthals and Cro-Magnon humans was cultural, not physical or cognitive,
- the idea that the Upper Palaeolithic period in Europe did not represent a 'human revolution'.

1 See for example Edwardes 2010.

Some questions remain unanswered: one is whether Neanderthals were replaced or absorbed by the human beings coming into Europe in the Late Stone Age[2].

In the research for the second edition of this book I have had the pleasure of reading a great many recent publications, but have also been lucky enough to rediscover some inspiring writers of the past two centuries. Writers such as Briffault[3], who challenged the view that humans have always lived in families led by the father; Evelyn Reed, who argued for the significance of kinship and totemism in the lives of the first humans, and for the crucial role of women in early societies[4]; George Thomson, whose meticulous studies of the ancient world included ideas about language, music, dancing and the origins of poetry.

What these writers have in common is a strongly materialist view of the world. They recognise that it is our relations with the external world around us that shape our lives, our ideas and our language – rather than what goes on inside our heads, or the way our individual genes are arranged. Because this view of things represents a challenge to the dominant modes of thinking in our universities and intellectual circles, these writers are often dismissed or ignored. This has happened to other materialists, such as Lewis Henry Morgan and Frederick Engels, whose ideas on the evolution of human societies are often dismissed on the basis of 'more recent evidence', though those who dismiss them rarely take the trouble to investigate what such recent evidence might be. There have even been attempts to dismiss the wonderful Stephen J Gould as slightly old-fashioned and out of touch[5].

So the aim of this book is to continue this tradition of materialist approaches to human life and language. In looking for the origins of human language we are looking also for the origins of human society. Any attempt to separate the two means failing to understand either. The past 50 years in linguistics has been dominated by what is an essentially idealist view of human beings, that is, a view that what happens inside our heads is the most important determinant of our behaviour. A peculiar distortion of this idealism is neo-Darwinism. This is a peculiar mish-mash of materialism and idealism that sees our behaviour as determined by what happens in our minds – but sees the working of our minds as determined by our genes. The discovery, by now a commonplace, that we share at least 99 per cent of our genetic material with chimpanzees and other great apes – and incidentally, 95% of our genetic material with mice -- provides a baffling stumbling block to any advance in thinking along these lines. The more investigators examine physical differences between us and the other apes, the smaller these

2 But see Beaken 2017.
3 Briffault 2004.
4 Reed 1975.
5 See Kenneally 2007, p.55.

differences turn out to be. So how to explain what is and what is not human? The only way out of this dilemma is to look outside of our corporeal bodies, at the way humans interact with each other, working together and building communities. Human languages, after all, can only exist in communities. The numerous sad cases of children growing up without human contact and therefore without language show this clearly.

Luckily, the notion of 'Universal Grammar', a name given to the idea that all humans have 'hard-wired' within them a unique capacity for language, is starting to look distinctly frayed at the edges. Better still, a number of researchers currently active in the field of language, are starting to produce findings that accord with the materialist views of the inspiring writers I have mentioned above – writers like Tomasello, those in the integrationist school of linguistics, functional linguists in the school of Michael Halliday, and many others whose work I have tried to draw on in producing this revised edition. To them all, much thanks.

Mike Beaken, Sheffield, March 2018

1 The story so far

Neglect and rediscovery

Over the last thirty or so years, and after a long period of neglect, the origin of human language has become a popular topic of study. It was not always so. This chapter traces briefly the way the topic has been studied at different periods and in different parts of the world.

Interest in the topic was intense in the first half of the nineteenth century, stimulated by discoveries such as the relation of Sanskrit to Greek and other Indo-European languages, and the sound laws that linked modern European languages to their ancestors. For quite a long time it was thought possible that the question of the ultimate origin of all languages could be solved. This supposition was not too unreasonable in the context of the belief at that time that the world was less than 6,000 years old[6].

The first identifiable Neanderthal fossil was unearthed in 1856; Darwin's *Origins of Species* was published in 1859; Lewis Henry Morgan's *Ancient Society* in 1877. You might suppose that the great interest in human origins that these developments stimulated would further promote the study of language origins. Strangely, however, just the opposite started to happen. Linguistics in the 1870s and 1880s turned away more and more from the general questions involved in the subject.

One reason was the multiplication of more or less cranky theories on the subject from amateur linguists and philosophers, which gave the whole question 'a bad repute among sober-minded philologists', as Whitney declared[7]. A further reason was the recognition – due largely to discoveries made by geologists – that the world was a great deal older than everyone had supposed and that human history and prehistory stretched back not thousands of years but millions[8]. The prospect of reconstructing humanity's original language therefore receded into the unattainable distance.

6 Archbishop James Ussher dated the creation to Sunday, October 23, 4004 BCE.

7 Whitney 1873-4, quoted by Jespersen 1922, p. 412. The problem was addressed by the Paris Société de Linguistique whose constitution forbade any discussion of the subject.

8 Gould 1977b honours Charles Lyell, 'hero of the geologic revolution', who blew established ideas of the world's dates apart.

The focus of linguistic study now shifted away from its previous consideration of languages in their national or cultural settings and towards a concentration on language form. This shift of focus, led by the so-called 'NeoGrammarians'[9], arose partly from the tasks that came to preoccupy linguists, namely the understanding of the abstract system of language, its laws and regularities.

A central preoccupation of European linguistics in the 1880s was the history of the Indo-European language family. Attempts were made to reconstruct its parent language, or 'proto-Indo-European', by tracing connections between words and grammatical forms in existing European languages and those of related ancient languages such as Sanskrit, Old Persian, Hittite. Word-histories and laws of sound-change were developed in order to establish connections between the languages.

In focusing in this way on grammatical forms and sound changes, linguists established a trend of attending to the form of languages to the exclusion of those who spoke them. This trend crystallised in Saussure's declaration at the beginning of the last century[10] that the primary job of linguists was to study not the history of language but its structure (or *langue*). This should be studied, he said, in its own terms and for its own sake, to the exclusion of the way that speakers use language in their lives, which he classified as *parole*. Saussure also recommended that linguists separate the study of language changes over time (*diachronic,* or historical linguistics) from the study of language at a particular point in time (*synchronic* linguistics).

The exclusion of the complexities and vagaries of *parole* may originally have had a practical justification. Language interpenetrates with every aspect of human activity. There are many thousands of languages in the world (far more in Saussure's time than there are today) and many more if we take into account historical predecessors of today's languages, and records of dead languages. The task of relating all these languages to the lives of their speakers may well have appeared too vast an undertaking to Saussure, who suggested a more restricted aim for linguists. However, this separation of language from life, which may have started as a temporary measure, seems to have become a defining principle of linguistics in the present day. Chomsky for example insists that the proper study of language is the abstract rules of syntax – regardless of the fact that language taken out of its context is meaningless. Voloshinov's observation about formal linguistics in the 1920s rings true still today – that it "studies a living language as if it were a dead language, and native language as if it were an alien tongue"[11].

9 The leading NeoGrammarians were Brugmann, Delbrueck, Osthoff and Paul. See Jespersen 1922, pp. 93ff.

10 Saussure's *Course in General Linguistics* was published in 1916 after his death - see Saussure 1974.

11 Voloshinov 1973, p,77 fn 1.

The separation of linguistics from history has led to historical linguistics being treated as a quite separate discipline of language study, with its own theories and principles, while the area of language study that deals with socially organised human beings is referred to as sociolinguistics, as if it were a subsidiary, secondary branch of linguistic proper. Given this self-imposed fragmentation of the disciplines concerned with language, it is hardly surprising that for most of the previous century the topic of language origins was regarded as of marginal interest to western linguists.

Soviet tradition

For a brief period in the 1920s, when intellectual and artistic work flourished in the post-revolutionary Soviet Union, the work of a group of psychologists and linguists around Vygotsky provided a new starting-point for language studies in the tradition of historical materialism. The group developed ideas about the nature of primate cognition compared to humans; about the development of human thought and its relation to language; about inner speech and its role in thought; about the development of speech and thought in children. Another group of writers around Bakhtin and Voloshinov developed ideas about the relation of language to social existence and to ideology. However, in the climate of Stalinist bureaucratic repression in the 1930s, both these groups found it harder and harder to carry out their work. Vygotsky died in 1934 and for generations his work was officially out of favour[12]. Voloshinov's work similarly fell out of favour with the Party bureaucracy, and he mysteriously disappeared in the early 1930s. The work of both these groups is now recognised as being of great value[13].

In the same period, the work of Nikolai Marr and his Japhetic Theory was winning official approval with the Stalinist bureaucracy. He founded the Japhetic Institute, which was later named the Marr Institute of Language and Thought. Strangely, he also died in 1934, but his considerable influence lived on, in the work of Meshchaninov and other 'Marrists'.

The Japhetic Theory, which seems to have represented the orthodox Soviet view of language for many decades, was a strange mixture of dogma, detailed empirical description of languages within the Soviet Union, and pure speculative fantasy. Marr proposed that the original form of communication was gestural, and that speech was introduced into human life by magicians or shamans, in the form of four spoken elements, which form the basis of all spoken languages[14]. He further held that language evolved in a series of stages, changing more or less in step with the evolution of society.

12 See Williams 1977, p.34, and Newman & Holzman 1993.

13 See Kozulin 1990; Brandist 2002; Brandist and Chown, 2010.

14 The four were *ber, ros, sal, yon,* supposedly surviving in the names *Iberian, Etruscan, Salmatian, Ionic*.

Thus there were thought to be different forms of language characteristic of primitive communism, of early agricultural societies, of slave societies, feudalism and capitalist society. The concepts of base (the economic foundation of a society) and of superstructure (the intellectual forms associate with the base) were used in a mechanical way, without a great deal of evidence or explanation. Alpatov calls the Japhetic Theory "a definitive break with real science, and a tragedy both for Marr and for Soviet science"[15]

In 1950, Stalin – or a linguist writing in his name[16] – denounced the Marrists, and that was really the end of Marrism. In fact there was probably some value in the work of Marr's followers, such as Meshchaninov, and as will be shown later, linguists in the Soviet Union continued to undertake much useful work in language history and the study of varieties of language[17].

The Search for Proto-languages

The early 19th century linguists combined interests in language, culture and anthropology, as did for example Morgan in his studies of the American First Nations' life and language. Humboldt's interest was not only in the languages he studied, but also in the way those languages expressed the 'world view' of speakers[18]. One of the aims of these early linguists was to find out about our Indo-European ancestors, and language was originally seen as one route to this understanding. Only later did the study of language forms become an interest in its own right. It was then that attention focused on the possibility of reconstructing the early forms of the common ancestor of all Indo-European languages, or *Proto-Indo-European.*

The comparative technique used in these reconstructions involves matching what appear to be similar words in different languages. After a sufficient number of matches are established it is supposed to be possible, in conjunction with knowledge of laws of sound change, to determine the degree of relationship between any two languages. If they are judged to be in the same language family, it then becomes possible to reconstruct an original 'proto' form of the matched words in their parent language. A simple example would be the numbers. Here are two, three, seven, and ten in English, Latin, Greek and Sanskrit.

15 Alpatov 1991 - and see the web page *hum.uit.no/lajanda/UNC%20H/slav167**marr**.ppt*.

16 It is thought to be A.S. Chikobava - see Bruche-Schulz, 1993.

17 See Wright 1991.

18 See Underhill 2009.

English	Latin	Greek	Sanskrit
two	duo	duo	dva
three	tres	tresi	trayas
seven	septem	hepta	sapta
ten	decem	deka	dasa

The *threes* are alike in all the languages, but such isolated resemblances often throw linguist researches off the track. We need to find more regular patterns. Notice, then, that "t" in English *two* and *ten* often appears as "d" in the other languages, and that the Greek form with "h" appears as "s" in English, Latin, and Sanskrit. It is by finding patterns like these that linguists can propose grouping languages together as members of a language family. The next step would be to suggest a parent form for each of the numbers. These would look something like *dwo or *duwo for two (the asterisk indicates a suggested proto-form); * trei for three; *septm for seven and *dekm or *dekmt for ten[19].

The reconstruction of proto-languages in this way has a considerable history in Europe. The work of the Marrists with the Caucasian languages gave it impetus in the Soviet Union, and despite the setback of Stalin's denunciation, the work of linguistic reconstruction has been furthered by Illich-Svitych and the so-called 'Nostraticists from Russia, whose work has found parallels in the west with the work of Greenberg, Ruhlen and others[20].

Many interesting and important results have come from this work, as the history of language families has emerged from these reconstructions. It often turns out that a suggested relationship between languages can be confirmed by archaeological discoveries, or genetic studies based on present-day populations[21]. However many efforts at reconstruction have been subject to the temptation of delving too enthusiastically into the past. The more cautious proponents of the comparative method have criticised what they see as a tendency to declare proto-families on the basis of too little evidence. Greenberg for example was apparently successful in proposing a large group of language families in Africa – but his proposal that all Amerindian languages could be grouped into three large families – Eskimo-Aleut, Na-Deane and Amerind – has proved controversial[22].

In particular, there are arguments about how far back reconstructions can hope to go, in the absence of written forms for any language beyond about 6,000 years ago. The

19 See Sihler 1995: 402-424.
20 Wright 1991.
21 Cavalli-Sforza 1991.
22 Greenberg & Ruhlen 1992.

cut-off point is usually put at about 10,000 years ago, but modern humans seem to have existed for some 200,000 years on present evidence. Though Ruhlen claims that the world's original language can be reconstructed[23] there is little chance that such a claim can ever be accepted beyond any doubt. Nor is it certain that there was only one original language[24].

Chomsky and Universal Grammar

For all the fragmentation of contemporary linguistics, there is no doubt that the dominant figure today is still, in the first decade of the twenty-first century, Noam Chomsky. Chomsky claims that his work is inspired by the principle that the study of language – specifically of syntax – enables us to understand the human mind. Underlying all human languages, he claims, is a common set of abstract principles of syntax, a *Universal Grammar* (UG). Further, it is claimed that children acquire UG by virtue of an innate *Language Acquisition Device*, a kind of mental organ, that enables them to learn the language of their parents rapidly and efficiently within just a few years.

Chomsky's impact on linguistics since the 1950s has been to stimulate research in the study of language in many different areas, encouraging a shift from the study of differences between one language and another to the study of properties that all languages share. His work gave an enormous boost to studies of children's language development.

However, his insistence that the defining property of language is syntax, as observed in human languages, was partly responsible for holding back studies of ape language, which were just starting to develop in the 1950s.[25]

Syntax, for Chomsky, is not the inconsistent, hit and miss syntax observed in everyday speech (what he terms *performance*), but an abstract idealised *competence.* Such abstractness does not present Chomsky with a problem. Indeed, he sees as the essential feature of human language the innate ability to manipulate highly abstract 'deep structures', transforming them into the various sentence types of what he calls 'surface structure'. The move towards greater and greater abstraction seems to take the process begun by Saussure to its logical conclusion. In Saussure the history of language was cut away. In Chomsky's early work any connection with human society is removed. In his later work, with the theory of Government and Binding, and then the impenetrably named X-bar theory, and the Minimalist Program, all is reduced still further to syntactic structures and parameters, in what he calls a core grammar, shorn of its *periphery*:

23 BBC Horizon 1992.

24 What Wolpoff 1989 has called the 'Eden hypothesis'.

25 Kenneally 2007, p.44.

'borrowings, historical residues, inventions and so on, which we can hardly expect to incorporate within a principled theory of UG'[26]. Thus the principles of UG are extremely abstract structural principles that have no connection with the material lives of human beings.

Exactly how humans came to possess such a mental organ Chomsky failed to consider, at least until recently[27]. The question started to be addressed by other linguists, such as Bickerton and Pinker in the 1980s and 1990s. Such is Chomsky's influence, though, that most of these linguists took for granted that there was indeed some kind of 'hard-wired' mental organ in the human brain that explained why human languages are structured as they are.

The view of language as a property of mind continues to cut language off from history, despite the efforts of the more 'evolutionary' linguists to come up with explanations of its origins. If all humans possess the same hard-wired mental organ, then all human languages must have been more or less as they are now, even at the time when the first of our ancestors started to speak the first human language. Thus the question of how the human mind, and the mental organ or organs it contains came into existence is not answerable, except by some inexplicable saltation or evolutionary leap[28].

The end of UG?

There were many positive features of Chomsky's ideas. His work continued a long tradition of searching for language universals, in the work of Schlegel, Sapir, Jakobson and Greenberg. The underlying motivation was undoubtedly egalitarian, counteracting the idea that any language might be superior or inferior to any other. This egalitarian aspect of Chomsky's thinking is found in his powerful writing about politics. Sadly his writings on syntax seem to have become less and less accessible as his theory has developed.

Now the consensus around the theory of Universal Grammar appears to be breaking up. UG does not provide any satisfying answers, indeed has become more and more obscure. Bit by bit the ideas at its foundation are being challenged. Objections to UG focus on three aspects of the theory: variation and complexity in language; the concept of recursion, and the notion of children's Language Acquisition Device.

26 Chomsky, 1981, p.8.

27 Probably starting with Hauser Chomsky and Fitch, 2002. See also see Chomsky, Hauser & Fitch, 2009.

28 Bickerton states this plainly in 2007. Pinker & Bloom's suggestion is a series of equally inexplicable leaps.

Variety in languages

A basic argument of UG has always been that all languages are fundamentally the same – and therefore equally complex, with equally abstract underlying deep structures. Recent work has challenged this. A conference of linguists reported in Samson et al[29] has shown that many languages are far simpler than UG would predict. The work of Daniel Everett on the language Pirahã asserts unequivocally that there is at least one language that fails to conform to the characteristics proposed by UG as universally present[30]. There could well turn out to be many other languages, if the anthropological linguists who study the 5,000 or more languages of the world were to address the question. A recent article by Evans & Levinson argues that the extent of variation in the grammatical systems found in the languages of the world is so great that it is not possible to encompass it all within the narrowly-defined categories of UG[31].

Sources of variation within individual languages are largely ignored by UG. Yet as soon as we look at language as it is spoken in everyday life, we are immediately struck by the amount of variation there is in language use. As a speaker moves from one social environment to another – work, family, social media, shopping – so does our language alter in quite drastic ways, ways that affect such basic aspects of grammar as word order, sentence formation, word-meanings, pronunciation and so on. Grammar changes from one generation to the next; it changes with fashion; it changes when we mix with another group of speakers. This aspect of language is one of its central and defining features, and not to be relegated to the 'periphery'[32].

Key argument – recursion

Another key argument for Universal Grammar is the phenomenon of *recursion*, a characteristic of human languages whereby clauses can be 'embedded' within other clauses. Examples might be

They told us that it would rain.
Mary said that she had already met John

The clauses *it will rain* and *I have met John* are embedded within the 'reporting' clauses. This property is what makes it possible to produce infinitely long sentences in any language. As soon as you think you have made the longest sentence possible, it can be lengthened by adding 'I think' at the beginning, or 'apparently' at the end. While doubt is cast increasingly on other aspects of UG, its proponents cling harder and harder to this

29 Sampson, Gill & Trudgill 2007.
30 Everett 2005.
31 Evans and Levinson 2010.
32 Voloshinov makes this point strongly - arguing that linguistics should shift its attention from 'sentence' to 'utterance'.

one property of UG – a stand that is starting to look increasingly like that last one of Colonel Custer[33].

Recursion is presented as a hard-wired property of our brains that enables us to cope not only with human syntax, but also with other types of mental activity. It is quite true that the feature of recursion is present in many other areas of human activity, such as puzzles, mathematics, story-telling, dance, knot-tying, dress-making, kinship. UG proponents would argue that language came first, and that it is the biological properties of the language faculty that make it possible for humans to handle the recursion in these behaviours.

Mathematics and recursion

It is true that mathematics which clearly demonstrates the property of recursion (a famous example being the Fibonacci sequence). To argue that this is somehow a particularly 'human' activity is absurd. While visiting Martians (Chomsky is fond of referring to what visiting Martians might make of human behaviour) might well agree that recursion in language is special in human communication, unlike in any other form of animal communication, they would certainly not agree that the ability to manipulate numbers in mathematics is 'uniquely human'. If those Martians had managed to construct a spaceship to get to planet Earth, they must have been able to manipulate the recursive properties of mathematics just as well as we can. Stephen Jay Gould makes the point about mathematics – that the acquisition by humans of their knowledge of mathematical laws is a product of many centuries of technical and scientific activity – and therefore nothing to do with innate structures of the brain. The same might be said about the tying of knots. A complex knot demonstrates the property of recursion, not because of hard-wired structures of the human brain, but because tied in any other way it would come undone.

Long-distance WH-movement

A widely discussed example of recursion is known as 'long-distance WH-movement', as exemplified by a sentence such as:

Who did Mary say that John kissed?[34]

where the question *'Who did John kiss'* is embedded in the clause *'Mary said'*

or:

What do you think they said she did?

33 A debate as to whether recursion is or is not a 'defining' characteristic of human language has gone on between Chomsky Hauser and Fitch on the one hand and Pinker and Jackendoff on the other – see Hauser *et al* 2002, Pinker and Jackendoff 2005, Fitch *et al* 2005.

34 this sentence invented by Chomsky in 1977.

The puzzle that such sentences represent is how do language users know how to connect the wh- question word with the correct element, in a clause that is distant from them – i.e. not in the same clause[35]? The answer in UG, once again, is that there is an innate capacity in the brain that enables speakers to manipulate the highly abstract 'deep' structures that underlie such sentences.

Templates

However, critics of UG point out that there are other ways to explain this ability of speakers. Firstly, there are really only a few verbs that can embed clauses in this way, and these are generally reporting verbs, or verbs with meanings related to the expression of opinion, such as *think, hope, know, tell*. Verhagen[36] argues that, rather than carry out highly abstract linguistic computations which can only be explained by a hard-wired brain mechanism, speakers learn to handle just a few specific language patterns associated with these verbs. You can see that these verbs are often part of independent phrases that can be inserted into conversation as speakers feel the need. *You know, I think, I hope (*sometimes heard in the non-clause form *hopefully*), and so on.

So, you might hear the question above in that rather formal expression, but in everyday conversation, the question may take the form

Who did John kiss, did Mary say?
What did she do, according to them, d'you think?

In other words, speakers have learnt to handle some of these very tightly structured, specific forms of producing complex sentences, by condensing looser, less complex ways of expressing the same content. Such simple grammatical patterns are sufficient, as Verhagen puts it "for linguistic behaviour as we actually still encounter it in the wild".

Tomasello suggests a parallel with the way children learn language, by acquiring chunks of language – formulaic patterns such as *do you know*, *I think*, *why not* – rather than learning to cope with highly abstract deep structures.

My own son at the age of three and a half had an expression 'why not' for any sentence with a negative, such as

Parent: *We can't go to the playground today*
Child: *Why not we can't go to the playground*?

Such formulaic patterns are learnt first as whole chunks, and only later differentiated into their separate functional components.

35 This phenomenon is described by the general term *subjacency* – see glossary.
36 Verhagen 2006.

How children learn language

Another argument of UG is that Language Acquisition Device is the only way to explain the way children learn their first language – a process which seems to be accomplished rapidly and completely, between the ages of 18 months and 3-4 years.

However, contrary to the claims of UG, children do not learn language structures all at once and completely. There are many stages for them to go through to achieve adult language. It is true that these stages pass amazingly quickly in adult terms, especially if we compare children's first language learning with the slow and painful process that adults endure in learning a second language[37]. Bear in mind though that there are no previous language habits that children might have to overcome, as adults learning a second language do. As children learn their first language they are at the same time learning how to live in the adult world around them. Their motivation is as high as it could ever be. Learning their first language is absolutely vital to children's survival in the world, to their acceptance by their peers, and to their achievement of humanity.

Where learning the sounds of speech is concerned, it has long been acknowledged that the way children acquire the sounds of their target language is the product, not of an inexplicable hard-wired bioprogram, but of a perfectly understandable approach to dividing up the acoustic material of adult speech into a manageable set of contrasts. So in infant speech the first 'word' is nearly always composed of a vowel such as 'a' – where the mouth is at its most open position – and a consonant such as 'm' or 'b', where the mouth is completely closed – giving a word such as 'mama', 'baba', or 'papa'. The contrast between vowel and consonant is determined by the constraints of human anatomy, in terms of both speaking and hearing. The next step is to divide the first vowel into two, so the first two vowels are based on the maximal contrast between an open vowel ('a') and a close vowel ('ee' or 'oo'). Here again it is anatomy, reinforced by the physics of sound, that explain why this contrast is acquired by infants early on. Similarly the first consonants represent a basic contrast between stop consonant, where the mouth is completely closed, stopping air from the lungs, and a nasal consonant, where the mouth is closed and air escapes through the nose. After this, consonants and vowels are acquired by the process of 'splitting' these maximal contrasts into more refined contrasts, such as the differentiation between the stop consonants *b, d, g*, the differentiation between voiced and voiceless consonants such as *d* and *t*, and, somewhat later, between stops like *t* and fricatives such as *s*[38]. None of this needs a biologically-

37 McMurray 2007 argues that language learning for a child is a simple process - that starts off slowly, then gets faster and faster.

38 This outline of child phonology was worked out by Jakobson in 1948 (see 1968 translation). Though modified by subsequent research, the basic details of Jakobson's scheme have not been fundamentally challenged.

based program to explain it. It can be explained on the basis of anatomy, the physical nature of sound, and the characteristics of human hearing.

Fifty years after the idea of UG was first proposed, not a single piece of incontrovertible physical evidence has been put forward to substantiate the claim. The argument seems to be 'there is no alternative explanation' for such a remarkable thing as the way children learn language, and for the apparent similarities between the languages of the world – which it is claimed are unique to language and to no other human behaviour.

Now it is a fact that there are many other aspects of human behaviour that are similar across the world, and that do not require reference to biology to explain. Water carriers, for example, are remarkably similar across the world's cultures, but this is easily explained by the physical properties required to carry water. Musical scales are also similar. As we shall see in a later chapter the pentatonic (five-note) scale has been shown to be present in the music of all known cultures. Nobody has yet claimed that this is a result of biological properties of our brains. It is certainly possible that it is the simple mathematics of musical intervals that explains this universal phenomenon.

A number of recent publications show linguists arguing along these lines. Evans & Levinson argue that language universals are a myth[39]. Christiansen and Chater have recently suggested that innate universal grammar is also a myth[40]. Anna Kinsella criticizes the Minimalist Program as inadequate to explain the development of language in an evolutionary context[41].

It took Darwin many years to appreciate that the theory he was working on was incompatible with current religious views. A similar reluctance to challenge accepted linguistic orthodoxy may have held back linguists investigating the origins of language. Luckily, this reluctance seems to be dissipating.

Darwin and language origins

There is no doubt that Darwin's ideas are extremely influential in linguistics today, probably more so than in the early part of the last century.

As Evelyn Reed says, of what she calls the three great thinkers of the nineteenth century – Morgan, Marx and Darwin – Darwin's ideas have survived because they are of use to modern-day capitalism[42] – such concepts as 'survival of the fittest', 'adapting to

39 Evans and Levinson 2010
40 Christiansen and Chater 2008
41 Kinsella 2009
42 Evelyn Reed 1975

changing circumstances', 'natural selection', 'law of the jungle' – have been used liberally to justify the less pleasant aspects of today's economic activity.

Over the last forty or so years, Darwinian ideas have been called upon to justify a wide variety of opinions about language origins. For example, Bickerton suggests that natural selection is involved in the leap from *protolanguage* – an early, relatively simple form of language – to modern language[43]. Pinker insists that natural selection applied at a number of stages in our evolution as a species, so that the environment somehow selected out those human beings who could not produce certain grammatical structures – not just once, but in a series of stages[44]. Exactly what grammatical features in our language are more primitive and which are more advanced is never explained – but presumably more complex structures are thought to have been selected after the simpler ones.

Accounts of what might have 'selected' language lack any convincing explanation. It is hard to see how the ability to manipulate a grammatical structure would improve any one individual's performance in tool-making, food-gathering, reproducing, caring for offspring. The idea that language-skilled individuals are better equipped to survive, or that they will produce more offspring than other individuals[45] is very much a man's viewpoint and, in the light of most accounts of hunter-gatherer society, based on a distorted view of the relationship between the sexes in such societies. It is also focused on the development of the language faculty in one individual, but this is not how new languages emerge. Accounts of the creation of pidgin languages, or of new deaf-signing languages – in Nicaragua and in Israel, for example – reveal that the new language forms require a sizeable group of humans in order, as it were, to launch them, for example 10 individuals in the first generation of Bedouin Al-Sayyid sign language users described by Sandler *et al*[46].

Pinker and Bloom's influential article of 1990 also starts from the assumption that the 'language organ' exists, and they go even further in the fantasy, equating the language organ with physical phenomena such as the eye. They argue:

> Language shows signs of complex design for the communication of propositional structures, and the only explanation for the origin of organs with complex design is the process of natural selection.[47]

43 Bickerton 1990, p.90.
44 Pinker & Bloom, 1990, p.711.
45 See for example Bickerton 1990.
46 Sandler *et al* 2005.
47 Pinker and Bloom 1990, p. 726.

Notice the leap in this quotation from 'language' to 'organ'. There is no evidence that language is an organ. Language is not like the human eye, which evolved from the eyes of antecedent species. An anatomical organ has to have an origin, but there is no direct antecedent for human language in animal behaviour[48].

More importantly, our eyes work perfectly well when nobody else is around, but language is essentially social behaviour. As long as we are considering individual hominids, it is hard to see how a developed syntax can be an advantage, until the speaker takes part in a developed social life. An ape or a hominid with a human language faculty will simply find no use for its linguistic skills. Indeed, it is only by not using its newly developed language skills that such an individual would be able to remain part of the social group that is crucial to individual survival.

Some would argue that the language faculty may have emerged as a genetic property of a group. This is not possible. A genetic modification can only emerge in one individual, and this is where the whole argument about Darwinian selection falls down – because it is clear that language developed not as an individual skill, enabled by an emergent genetic trait, but as a communal achievement, made possible by cultural developments within human groups.

Problem of biological reductionism

The search for biological explanations of language in humans at the level of our genes, our DNA, our instincts, is best characterised as reductionism – that is, an attempt to reduce human behaviour to the lowest possible biological, or even biochemical level. Reductionism is expressed well in a quotation from Robin Dunbar, where he talks about the 'common currency' of sociobiology, that

> allows us to integrate within a single unified framework all aspects of biology and behaviour. [W]e can now translate the costs and benefits of different activities or characters into a common currency, so as to be able to make direct comparisons of their relative evolutionary values.[49]

However, it does not help to reduce all phenomena to one common currency or one level of analysis. First is the problem of which is the appropriate level. Is it the level of sub-atomic physics? Chemistry? Biochemistry? Clearly different levels are appropriate for different phenomena. You cannot explain the workings of the stock market in terms of chemistry. Laws appropriate at one level of analysis do not necessarily explain laws at a different level. We cannot explain Darwinian evolutionary processes in terms of sub-atomic physics, any more than we can explain sub-atomic physics in terms of Darwinian

48 As Chomsky has always argued.

49 Dunbar 1988, p.161.

laws. Thus we should not expect to be able to understand human behaviour in terms suited to that of insects, fish, or birds. While it is true laws of animal behaviour are compatible with those of biochemistry, it is also the case that they have their own specific laws. The same applies to human behaviour. It is subject to its own laws, which are compatible with lower-order laws, but distinct from them, and not reducible to them.

Animal communication

This form of reductionism has distorted many studies of animal communication. Specialists in the study of particular species are sometimes so struck by the ingenuity and complexity of the system of communication they are studying that they are tempted to draw parallels with human behaviour.

This is the origin of the idea that bees and humans have in common an underlying instinct for language. It was long believed that bees can communicate with each other, passing on in a kind of dance quite specific information about where nectar-bearing flowers are growing, in what direction from the hive, and how far away. These claims were made as if they had been scientifically proved beyond all doubt. However in a series of studies in the 1990s, a bee-keeper, Adrian Wenner, examined claims for bee language and showed that while an individual bee's dance certainly does stimulate extra activity from fellow bees, it causes them to fly off not just in the direction of the flowers (the dish of sugared water in Wenner's experiment), but in every possible direction. The predominant factor determining where bees flew from the hive was in fact the prevailing wind, not the dance of the bee[50].

Many animal cries can be seen as instinctive reactions to external stimuli. This aspect of behaviour is present in human beings, but in non-linguistic behaviour such as crying, laughing, shouting with pain or pleasure – vocalisations that are not under our control unless we train ourselves. These vocalisations really have no connection with language. We can all laugh, cry or ouch at the same time as talking. A baby's cry of discomfort does not develop into sounds of speech – it simply continues as crying, until at a certain stage it is suppressed, to reappear only in times of great distress, perhaps in the adult form of swearing.

The clear line that has been drawn so far in this discussion between instinctive and learned behaviour has been thrown into question by many recent studies of animal research which have shown how in many of the larger species of mammals – monkeys, primates, elephants, aquatic mammals such as dolphins and whales – a considerable number of skills are passed on from adult to young members of the species. Dolphins

50 Wenner *et al* 1990.

and orcas have developed what appears to be a highly sophisticated system of communication that enables them to hunt their prey in a coordinated way[51]. The fact that these species, along with dogs, sea lions, elephants, even budgerigars, can also be trained by humans to carry out tricks and follow spoken commands, suggests that many species have an ability to learn new forms of behaviour for reasons that we are still far from understanding. We cannot know what animals are thinking, and animal consciousness is a topic riven with disagreements and contradictions[52]. While no animal has developed anything like human syntax, or the thinking that human language makes possible, recent studies are opening up the possibility of finding alternative ways of communication among the more advanced mammals. Whatever skills come to light, however, will almost certainly be based on learning and 'culture' rather than instinct. It seems that the bigger, and more long-lived the mammal, the bigger the part played in their behaviour by learning and the smaller the part played by instinct.

As studies of animals progress, we are starting to see a radical shift in viewpoint. There was once assumed to be a huge and unbridgeable gap between humans and all other species. The more we discover, the smaller that gap seems to get. It is still true, however, that there is a crucial difference between animal communication and our language. Human language is purposeful. It gets things done, by forging relationships between individuals and by coordinating action. We work together as humans, not separately, like weaver birds, or lions hunting.

Languages and 'descent with variation'

So is there anything in Darwin's theories that can apply to language itself, rather than to individual speakers of languages? Darwin himself considered the emergence of language in his *Descent of Man* (1874). He viewed language and thinking as developing in step, in a process of coevolution, whereby the advance of our language skills was reflected in the advance of thinking. He left open the question of which of these two is prior – but the question is answerable.

Where Darwin's idea of 'descent with variation' might usefully be applied is in looking at individual languages in their historical and social settings. This is the approach taken by Christiansen & Chater[53], who start from the position that languages can be viewed in metaphorical terms as complex organisms, which evolve under selectional pressures. The selectional pressures they consider are the capacities of individual human beings:

> languages themselves are shaped by severe selectional pressure from each generation of language users and learners. This suggests that apparently arbitrary

51 There is a good review in Kenneally 2007, chapters 5 and 7.

52 See for example Hurford 2007, and the review by Harris 2007.

53 Christiansen and Chater 2008, p. 495.

> aspects of linguistic structure may result from general learning and processing biases deriving from the structure of thought processes, perceptuo-motor factors, cognitive limitations, and pragmatics.

They conclude

> language has been shaped to fit the human brain, rather than vice versa.[54]

This is a useful shift in perspective: looking at the languages themselves rather than searching for an elusive language organ. However, once again the focus here is on individual human beings, in isolation as it were from their surrounding context. They overlook the fact that a language is the property of a community, not of an individual, and certainly not just of an individual brain.

The idea of 'descent with variation' certainly fits the facts about language development. Every generation either subtly or blatantly alters the language of their parents, and variation is a crucial feature of all languages. Given this variation, Darwin's concept of selection of traits that are best adapted to the environment applies well to the study of language. The way it works is not quite the same as with naturally living organisms, which adapt to a physical environment. Instead, it is a social and cultural environment that shapes language, and it seems that both children and adults do the selecting. Each generation of speakers is born into a changing social environment, and changes in circumstances bring with them new forms of language, new registers associated with economic and social activities, at the level of vocabulary, idiom and metaphor. The new generation grows up hearing a language that consists of older forms of language, alongside newly created forms associated with activities that adults have recently developed. Some new forms may conflict with older ones, but from this variety of forms the new generation selects those that match its communicative requirements and drops others.

A good example is the way the second person pronouns *thou* and *thee* came into widespread use during the period of the English Revolution 1640-1660, especially among the various religious groups loyal to the Parliamentary cause. They not only expressed a feeling of equality between fellow citizens, but also echoed the language of the Bible. These forms then dropped out of use rather rapidly when the monarchy was restored – and with it class distinctions in society as a whole[55].

In order for children to learn their new language quickly and completely it is necessary for them to make sense of this variety. As Chomsky has argued, they produce for

54 A very similar conclusion is reached by Deacon 1997.

55 Brown and Gilman 1960. A similar point is made by George Orwell in *Homage to Catalonia*. He noticed waiters dropping formal *usted* (= 'you' or 'your honour') in favour of the simple egalitarian *tu* during the Spanish Revolution.

themselves, within a fairly short time a version of the adult language around them that is coherent and consistent – until, as adults, they enter the complex world of adult activity, with its many different registers and subtle rules of communication and interaction, when they in turn contribute to the increasing elaboration of the language. Elizabeth Traugott points out that many innovations in grammar come from adults – not from children[56]. The implication is that children then have to make sense of the changes and do the 'tidying up' of the mess of adult speech.

The story is a cyclical one. From the adult's complex and sophisticated set of socially determined registers, adapted to the economic and social activities of adult existence, children create the basic forms of the next generation's language. The simplified, coherent and learnable language code of the child provides the basis for the many forms of communication needed to cope with the complexities of adult life.

Darwinian concepts can be applied to the development of languages. However what Darwin did not discuss was the human context in which language developed. The culture within which humans live is a socially created, rather than a natural environment. It is one that changes constantly, sometimes as rapidly as the natural environment. To understand this human context, we have to turn to two other great nineteenth century writers, Marx and Engels. This will be the focus of the next chapter, but first it is necessary to examine two areas of scientific investigation that have become increasingly important in relation to language origins – genetics, and the human brain.

Genetics

We are a curious species, and look constantly for explanations of the world around us. At one time baffling phenomena could be explained by reference to God's Great Plan. Darwin put the final nail in that coffin, but as religion loses more and more of its grip on people's thinking, so its ability to explain things is replaced by pseudo-scientific explanations, many of them based on a partial understanding of genetics.

This has led to some very strange pronouncements, and the search for such elusive phenomena as the gay gene, the criminal gene, lately the 'gangsta gene' and even the 'middle-class gene'[57].

Now genetics has led to some interesting and worthwhile findings – such as Cavalli-Forza's work, showing links between genetics of populations as they move, and the histories of languages. Recent advances in genetics have shown that humans have continued to evolve over the last 10,000 years, with adaptations such as lactose

56 Traugott 2003, p.626.

57 A notion put forward by the egregious Chris Woodhead - see *Guardian* Monday 11 May 2009.

tolerance among cattle-breeding populations, and the sickle cell mutation that arose as a response to malaria[58]. One quite startling finding emerged recently from the work of Svante Pääbo and his colleagues. They demonstrated that there is, though, absolutely no evidence of any difference in brain size, brain function, sexuality or criminality related to genetics of human populations in any part of the world.

In the 1990s, there was much excitement at the prospect of discovering a 'grammar gene' – FOXP2. A deficiency in this gene was said to be responsible for a set of language problems suffered by a family on West London[59]. However, it has been found that this gene controls many more aspects of behaviour and movement than just a cerebral skill, and may be as much involved in facial and mouth movements as in cognitive processing of language. It also controls growth of other genes and affects heart, lungs and other tissues[60]. In fact the excitement about FOXP2 was rather short-lived. It is not altogether surprising that a deficiency in this gene affects language – but so would a hard blow to the head. It is far from accurate to call it a grammar gene.

Christiansen & Chater argue that there simply has not been time in human development for a language gene to become established part of our biological make-up:

> language constitutes a "moving target" both over time and across different human populations, and hence cannot provide a stable environment to which language genes could have adapted. We conclude that a biologically determined UG is not evolutionarily viable.[61]

Brains and Language

It is on the face of it a reasonable assumption that the human brain is crucial for our human capacity to learn and produce languages. The idea that the way the brain functions feeds directly into the forms and patterns of our languages can be traced back at least as far as Schleicher, and as we have seen is prevalent among linguistics today.

In the nineteenth century Broca and Wernicke discovered that damage to certain areas of the brain disrupted individuals' language in predictable ways, strengthening the assumption that there were specific areas of the brain that were responsible for specific language functions. This chimed with the current fashion of phrenology – the idea that the brain was partitioned into areas carrying out different functions. It is an idea that reappears to day in the 'modular' theories of mind[62].

58 Cochran & Harpending 2009.
59 The family were referred to as the KE family - Hurst et al 1990.
60 The issue is described in Kenneally 2007, p. 197.
61 Christiansen and Chater 2008, p.6.
62 Barrett and Kurzban 2006.

It is well established that some parts of the brain are specialised. We have a visual cortex and an auditory cortex, and other parts of the brain are linked to the nerve systems controlling movements of the parts of the body. So the idea that language might be controlled in the same way is attractive. However, research into brain functions challenges this simple view. The search for language centres in the brain has now been abandoned by brain specialists. It was assumed that the neocortex – the most recent part of the brain in evolutionary terms – was responsible for language activity, and that language was further localised in the left hemisphere. However, the more the brain is studied for correlations with linguistic activity, the more areas are proposed. Even a cursory reading of the literature on language areas of the brain reveals a quite bewildering number of areas said to be relevant to language[63].

Our brain, like our other organs, is essentially similar in structure to that of monkeys and primates. Darwin commented:

> On the available evidence the brains of apes and humans are so similar that one is left at a loss to explain the remarkable, and apparently discontinuous, nature of the mental capacities of humans in comparison with those of our primate cousins.[64]

We possess, in other words, a typical primate brain, with the same proportions as, but something like three times the size of those of the nearest primates. There is no evidence of any alteration in the brain's structure or functioning in the course of evolution, apart from the growth of the neocortex.

We still do not know exactly why primate and human brains got so big in the course of evolution. The growth of the human brain may in part be a function of the growth in the complexity of the human organism – the number of things the human body has learnt to do, especially the hand the arm, mouth and facial muscles[65]. This growth in both the complexity of our musculature and in the number of functions controlled by muscles and nerves, has resulted in the growth of the coordinating centre for all these activities – the cortex. It is tempting to think of that increase in size as producing increased intelligence, but a lot of the increase is connected to physical attributes such as balance, manual dexterity, oral dexterity, facial expressiveness. The way the human brain increased is explained by Deacon: in apes the brain stops growing at a certain point of development. In humans the brain continues to grow much longer[66].

63 At least 15 areas were listed in the first edition of this book, and more have been proposed since, for example by Lieberman 2006.

64 Cited by Donald 1991, p.21.

65 Guillery et al 2017.

66 Deacon 1997.

Despite research by hundreds of investigators over the last fifty years or so, no evidence has yet been found that the brain can produce language structures, any more than it can produce thoughts or ideas or dreams, without previous experience of the body it is housed in. An important principle of neurophysiology is that the nervous system does not generate function; it is a system of connections.

If there is any in-built specialization in the brain, it may be the result of a link between the fine muscular movements required for manual skills and those required for the production of vocal sounds in the mouth and the throat. Greenfield argues that a common neural substrate – roughly Broca's area – is shared by speech and the capacity to combine objects manually, including tool use[67]. Among adults this area has differentiated into two parts, one controlling speech and the other motor activity.

The lack of any identifiable specific language areas does not make the achievement of language any less remarkable, just the reverse. In the first ten or so years of our lives we learn techniques of controlling our memory, in just the same way as we learn to control movements of eyes, arms, fingers, legs, mouth and tongue. We also learn how to interact and communicate with others of our species in a way far more complex than our near relations in the primates.

Current views of the brain compel us to choose between two contrasting views. On the one hand, it is seen as a highly specialised organ, with modules for syntax, for word-meanings, for problem-solving and so on [68]. On the other hand, it is seen as an increasingly flexible and decreasingly specialised set of neurons that is able to adapt to a variety of situations and tasks. The history of human beings suggests the latter strongly. We have shown ourselves able to adapt to life in deserts, in Ice Age Europe, on the African savannah, in the polar regions and in rain forests, showing greater adaptability in our behaviour than almost any other species. The flexibility of the human brain is part of this ability. Wallace argues that the history of the brain is the conversion of an inflexible subcortical system, strongly hereditary, dominated by built-in instincts, into a productive, labile system under considerable cortical control – a process of reduced specificity and increasing plasticity[69].

The picture of the brain's operations is becoming clearer. It is a huge network of millions of cells, connected to each other by synapses, resting on dendritic spines. Brain imagery of people's brains while they are speaking using shows that language activity is not confined to one part of the brain, but extends all over it, dipping into and activating

67 Greenfield 1991, p.537.

68 See Carruthers 2006 arguing for modularity; Buller 2008 on fallacies of evolutionary psychology, especially modularity.

69 Wallace 1993, p.44.

many different regions. Interestingly, men's and women's brain activities are often found to be different with women using the right hemisphere more than men[70]. These differences extend to gay men and gay women, whose brain activity in some cases resembles that of the straight members of the opposite sex[71].

The supposition that language is essentially governed by the left hemisphere is increasingly questioned, as it is demonstrated that some of the more musical and expressive aspects of language such as intonation are associated with the right hemisphere.

Deacon has shown that our brain is essentially a store or memory device for our behaviour – in other words, actions come first, brain structure follows. This is surely a more logical way to look at events than the converse. Otherwise you are left with the rather mystical notion of this object inside your head that you cannot access and cannot understand but that somehow predetermines all that you do.

Roughly speaking, any form of behaviour leaves an imprint on our brain, and repetitions of that behaviour strengthen the imprint. This may even be at the expense of earlier imprints or traces. It is possible that our brain has come to be shaped, over millions of generations by the communicative behaviour that we call language, or it may simply be that certain areas of the brain are better shaped, or better positioned, to store language experiences than others. So, the more we talk and listen as children, the stronger the imprints left on those areas of the brain. Some of these areas may originally have been associated with quite different functions from language. Thus the experience of using language actually creates language areas, experience determining structure, and not the converse.

This view is compatible with other observations about the brain. It is frequently observed that damage to the classical language centres such as Broca's or Wernicke's can be overcome by patients shifting language activity to other parts of the brain, even from one hemisphere to the other.

Szathmary has coined a lovely expression 'the language amoeba'[72]. The concept expresses the finding that language experiences colonise parts of the brain, parts that originally had other functions, or indeed no particular function at all. They become colonised by the imprints created by language activity.

70 Amen et al 2017.

71 Wegesin 1998.

72 Szathmary 2001. F Kortlandt 2003 uses the expression 'linguistic parasite' for the same idea.

A good example of this colonisation is that of swearing and cursing. Although we learn to swear relatively late in life – and usually not from our parents – it has been shown that swearing is deep-rooted in the brain, and associated, it would appear, with the primitive part of the brain, the amygdala. It is primitive in the sense that it is found even in animals much lower down the evolutionary tree, such as lizards. The amygdala is a region that is associated with basic feelings, such as fear, anger, reactions to pain. In infants the stimulation of these feelings produces crying; in adults it often produces swearing. Even when much language control is lost by stroke patients, the ability to swear often still persists. What seems to happen is that this register of language colonises even this most primitive and deep-seated part of the brain, perhaps reducing or replacing our ability to cry when in pain or in fear[73].

There are similar findings in other areas of brain study. Adult animals with hearing loss become more dependent on their sense of touch, and have been observed to 're-route' the sense of touch into the hearing parts of the brain[74].

Children's brains and language

The claim that we have an innate capacity for language depends on the so-called 'critical period' for language learning, roughly between 18 months and 10 years, and the fact that all children, whatever language their parents speak, follow roughly the same stages of development. However the fact that infants do not speak until they are approaching their second birthday does not mean that their brains are inactive till then. Children start learning from birth or even before that, in the womb. They have to accomplish a wide range of motor skills before adults recognise the meaning of their gestures, or acknowledge their vocalisations as 'first words'[75].

The brain at birth is extremely flexible and impressionable. Just prior to birth, neural material and connections are vastly over-produced, such that up to 80 per cent will die in the post-natal period. Very early learning then has a marked and permanent effect not only indirectly in terms of the associations formed, but indirectly in terms of the potential for later associations, created or ruled out by selective cell death.

Newborn infants are helpless, as the various separate systems of the body are not yet co-ordinated. Much of this co-ordination is achieved within the first few weeks and connections are established in the brain that will last for life. Babies are born with some innate abilities. These so-called *schemata* are sets of sensory-motor associations governing vision, touch, smell, movement and so on. As far as activity is concerned, apart

73 Stephens et al 2009.

74 Allman et al 2009, in studies of ferrets, and also of cats.

75 See McMurray 2007; Minai et al 2017.

from an instinctive ability to suck, babies have to learn almost every other action from the start. They learn about the world by interacting with it. This interaction is our original condition. Babies' first perception of the world is an awareness of their own activity – kicking their legs, waving their arms, moving their head, focusing their gaze. Later activities lead them to awareness of objects, touching, grasping or putting them in their mouth.

It may be as much as three months before the various bodily activities and neural systems start to be associated in such a way that infants can be said to be in control of their own body movements. The original schemata come to be integrated with an ever-growing network of associations, forming what Vygotsky called complexes – cognitive organisations of movement and sensation, linked along neural pathways. Attention starts to come under control and infants relate more and more to the adults and other humans around them.

Now primitive signs start to appear as part of infants' behaviour. These signs are originally gestures, such as pointing, reaching out to be lifted up, turning the head – but may also be vocalisations. The signs come to be linked with complexes of sensation and movement. At first the association of the sign with a complex may be accidental, a reflection of individual experience. An early example was noted by Stern in 1924. His child used the sound [ffff] for the blowing out of a candle, and later extended the sound, by analogy, to lights of all sorts.

Because their social link with adults is of such vital importance to infants' survival, their words quickly become the most important aspect of the various complexes they are establishing. Thus words become as it were the physical extension of neural complexes, forming a link between internal complexes and the outside world. Just as a neural pathway is strengthened each time it is stimulated, so words are strengthened each time they are used to connect children's cognitive systems to those of other humans around them. Words develop a number of related functions: as the basis of children's communication, as the material of their social life, and as the organising principle of their system of neural connections – in other words, of their thinking. They also start to be used as a way of regulating behaviour, as in the case of a child who says 'up', to nobody in particular, in fact to herself, as she climbs up on to a chair, or as a request to an adult to pick her up. The development of complexes in these ways depends of course on the response of adults to children's signs – interpreting, or reinforcing them by action, sometimes weakening them by failing to recognise a child's intentions.

This description of the development of children's first words[76] is compatible with a general model of children's learning in a social environment and needs no concepts of innate linguistic capacity to explain it.

Brain plasticity

Another suggestion made in the last century about children's language was that their ability to learn language started to tail off before they reached their teens, as the brain lost its 'plasticity' or flexibility to absorb new skills[77].

Once again this notion turns out to be only partially true, as many studies confirm that learning can continue into the teens and later, and that plasticity does not tail off as quickly as assumed[78].

What seems to be a major stumbling block to learning new language after people's teen years is more a result of emotional attachment to their first language than a fundamental cognitive blockage or brain rigidity. Sufficiently motivated individuals can learn second or third languages, alongside other cognitive skills, and in some cases have even been shown to lose their first language, where this is associated with unpleasant early experiences.

Finally

We have seen two different approaches to language studies above:

- mentalism, the theory that ideas and structures located in the individual mind result in the creation of a language.
- mechanical materialism, the theory that language is the product of our individual genetic structure and of instinctive, even subconscious neural activity, somehow, though mysteriously, connected to meaningful activity.

Voloshinov commented on these two traditions which – while they can apply perfectly well to Chomsky and to Pinker – have been around for many years. Language, he says,

> cannot possibly be explained in terms of either of these superhuman or subhuman, animalian roots. Its real place in existence is in the special social material of signs created by [humans]. Its specificity consists precisely in its being located between organised individuals, in its being the medium of their communication.

In other words, to focus on the individual's mind, or the individual's genes, is to miss the point about language. It is a social creation, originating not in the individual speaker, but

76 based on Uemlianin 1994

77 Lenneberg 1967

78 Dilks et al 2007 show even the visual cortex can be repaired

in the interaction between speaker and audience. When we look for the origins of language, we are simultaneously looking for the origins of the social life of human beings. This is the approach to be followed in subsequent chapters.

2 Language and Labour

Traditions of linguistic thought

We have seen in the previous chapter that linguists hoping to capture the essence of human language, set out to isolate it from the experience of language users. Some have attempted to explain it as a result of mental activity, others in terms of human biology, focusing all the time on the individual organism. Their attempts to explain the origin of language have relied on abstract, intellectual factors, such as intelligence, cognition, perception, and so on.

However, there is a long tradition of attempts to explain language as the product of humans' collective activity, a tradition that dates from the work of Marx and Engels, that appears in Vygotsky and Voloshinov in the 1920s, in the work of George Thomson in the 1940s, that has influenced the functional grammar of Halliday, and is acknowledged in the school of integrationist linguistics[79]. It appears in all sorts of areas of language investigation, such as the work with robots being carried out by Luc Steels[80].

This chapter presents the view that humans created language and consciousness, just as they created pots and pans, bows and arrows, in the course of co-operative activity. In so doing, they created the means to transform the world around them, and to transform themselves.

What is meant by labour?

Labour refers not simply to techniques of obtaining food (foraging, agriculture, industry etc.), but also the social relations, the organization of society, that make possible production and reproduction. Put simply, labour is the social production of the means of life, and the highest development of social behaviour. The study of labour necessarily involves the study of history too. The Kalahari forager, the Arctic herder of reindeer, the Greek slave, the mediaeval serf, the 21st century computer programmer, all these forms of labour live in specific social circumstances. The details of their lives are the result of

79 Toolan 1999.

80 'the meaning of a language utterance in general is a series of physical or mental actions that the speaker wants the hearer to perform, rather than a declarative statement to be stored whose only relevance are its truth conditions' Steels 2000.

a number of factors – the development of technology, the way that society is organized, the way that families come together and raise children, which people have political power at the time. Labour is both a result and a cause of these factors, a product of past history and a contributor to the forces that will shape future history.

Among apes, as we shall see, are some of the pre-conditions of human existence. Apes are a gregarious species, with a well-developed ability to solve problems on an individual basis. Engels shows how the emergence of human society from apes depended on factors that can be regarded as necessary pre-conditions for co-operative labour. Firstly, the development of upright gait freed the human hand, making possible the development of manual skills, the basis of labour and technology. The consequent freeing of the mouth made possible at a later stage the development of speech. The gregarious nature of the ape, combined with a life that gradually extended the range of food eaten and activities undertaken to obtain food, led to a gradual increase in cases of mutual support, co-operation and joint activity. Habits of sharing food led to co-operation in obtaining food, and to situations where more and more challenging problems could be tackled. Finally '[humans] in the making arrived at the point where they had something to say to each other.'[81]

Relevance to language origins

We have of course no record of the thinking or the language, spoken or gestured, of the first humans[82]. All that we can find are bones and artefacts, records of their activity. Those who regard language as primarily a way of expressing thoughts, or of communicating ideas, can only make guesses about the significance of these records. Their significance is for some 'The Hardest Problem in Science'[83]. However, an approach that sees language as emerging from activity has a better chance of interpreting them. If labour and language were intimately associated from the very start of humanity, then the records of the activity of human beings are also, even if indirectly, records of their developing social life, and indirectly of their communication and their language.

Origins of communication in labour

Conditions leading apes to communicate can be created in ingenious experiments, but are simply not there in the life of apes in the wild, who therefore communicate very little. What is lacking to them is shared attention on external objects. Tomasello[84] makes a distinction between two-way communication (he calls this *dyadic*) and three-way (or

81 Engels 1954; p. 232.

82 This term is used for early forms of the genus *Homo*, using the term *hominid* to distinguish pre-*Homo* species from apes and from humans.

83 The title of Christiansen and Kirby's introduction, 2003.

84 Tomasello 1999.

triadic). In two-way communication, two individuals attend to each other, register the significance of what their bodies and perhaps their vocalizations are saying about their intentions. Apes are capable of this two-way communication. In three-way communication, on the other hand, one individual directs the attention of the other to an object or person – a third party.

So what was the factor that created such joint attention in the early hominids after they split from the apes? It must have been what our ancestors had in abundance once they left the easy life of the rain forest – problems. If the individual's object of attention (say, inaccessible food) is part of a problem that requires co-operative action in its solution, then the various parties must communicate with each other – or the problem will remain unsolved. Co-operative action does not spring out of nowhere – a point that observation of chimpanzees proves abundantly.

The sign, a solution to a problem

Every linguist has their own definition of language. In this book language is defined as *the exchange of symbolic meanings in the context of activity*[85]. Meanings arise from interaction between human beings in their collective attempts to solve problems. This context consists of the physical environment, the technical problem, relations between speakers and other contributory factors, all combining to produce an utterance shaped to carry out a specific function.

The circumstances leading to the earliest exchanges of meanings between our ancestors must have had these elements:

- A problem confronts a number of individuals.
- The solution of the problem requires two factors: (a) joint attention on some phenomenon – object, animal or person, and (b) co-operative activity in relation to this phenomenon (moving it, catching it, hitting it and so on).
- Some material form – it may be an action, a sound, an accidental association with an object – is used as a way of referring to the object of attention, and comes to be associated with the action required to solve the problem. Thus a sign[86] is created by the individuals concerned, with a meaning related to their joint experience in solving this problem.
- The sign and its meaning enters the memory of individuals. It is now possible for any one of them to use the sign as a way of referring to or representing some aspect of the problem and the action that solved it. The sign is a collective, social achievement.

85 This definition is shared with Halliday 1978.

86 We use this term as a more general form of 'word', a term that normally implies speaking.

- This may seem like a lot of words to express a situation that is to us an everyday experience – getting help from another person, but in terms of the route from ape to human it has great significance.

Our emphasis on the *problem* as the pre-condition for communication explains how the creation of signs is possible. The learning of signs we have described is not the slow tortuous learning of a person undergoing instruction, such as a second language learner. Nor is it the mechanical stimulus-response-reinforcement model of learning of behaviourist psychology. It is the instant learning that we notice ourselves when a problem has long been worrying us; then suddenly the solution becomes clear, in a flash, as it were (the aha! phenomenon). The next time this problem arises, the solution comes back to us almost instantly, without having to go through any trial and error learning. This kind of learning was noticed by Köhler in his studies of apes[87] and is also seen among infants learning their first words. The problem sets up the solution. And the solution to the problem is a sign, with a shared meaning.

The creation of this elementary sign has a number of consequences:

- as a social memory of the experience for the group, who may use it to refer back to the accomplished action.
- as an internal record for each of the individuals involved in the original action, as an individual memory
- as an organizer of action for the collective group, who may use the sign socially, to repeat the action in future.
- as a guide to action for individuals, when repeating the initial activity.

These functions – social memory, individual memory, social organizing function and individual organizing function – are all aspects of what we term 'consciousness'. Even this list still does not exhaust the functions of the sign, or all the aspects of consciousness. We have only considered the social aspects of consciousness, not touching for the moment the question of the conceptual, or cognitive implications of the sign.

What should be clear from this example is that language is inextricably connected with collective activity.

Labour, language and consciousness

We need to consider in a little more detail the connection between labour and thinking. Not all forms of thinking require language, as we see in chimpanzees' and other animals' ability to solve a variety of physical and social problems. Some types of human thinking

87 Discussed in detail in Chapter Three.

are independent of language – for example we can mentally rehearse physical movements before undertaking them, or conjure up the taste of food, without words. Conversely, language may exist separately from consciousness, as in young children and certain pathological conditions[88].

What distinguishes humans from apes is not in the first instance ingenuity in problem-solving, or intelligence, but the ability to think in signs, or better, in meanings[89]. Consciousness as we have described it, though it has a biological foundation in the workings of the brain, is a social achievement, the result of creating and exchanging meanings in the context of activity. Its content, its meanings, are available to us as individuals. As we learn to speak we enter the world of social consciousness, a world created by others long before us, to which our own consciousness can now contribute. As Voloshinov puts it:

> Individual consciousness is not the architect of the ideological superstructure, but only a tenant lodging in the social edifice of ideological signs.[90]

Consciousness is the creation of a community. It is the sum of its actions, each action giving rise to an associated meaning that exists in the collective consciousness of all its speakers. This means that each speaker has access, through the system of signs and their meanings, to all the experience, knowledge and wisdom of the other speakers of the language.

The sequence we have described here starts in collective activity, and ends in forms of thinking and consciousness[91]. Equally important, however is to appreciate that signs, the product of labour, are also part of the labour process. From the earliest stages, language has organised socially based work, serving as a form of interaction between the members of the group, a means to communicate practical ideas and to put them into effect. In effect, language is the original information technology.

Once a system of signs, a simple language, becomes established among a group of individuals, then it becomes possible to manipulate the signs, both in public, social utterances and in internal thinking, to start to create a system of relations between phenomena – structures of syntax at first and, at a later stage, structures of logic.
Over time, the system of signs that originated in activity develops to the point where it starts to generate its own internal laws and regularities. Language shakes itself free from activity, but in so doing, takes on the appearance of a phenomenon that is autonomous, and more powerful than the humans who created it.

88 Some are discussed by Lieberman 1991; p. 119 ff.
89 This was first demonstrated by Pavlov – see Woolfson 1982, p.67.
90 Voloshinov 1973, p.13.
91 Leontiev 1978.

Language and Technology

Biological evolution often involves a species in a whole complex of adaptations. In the early stages of human evolution we witness advances in both anatomy and behaviour. Prehistoric humans not only developed physically from ape to human, but also developed technically and socially. In more recent prehistory, anatomical development becomes of less and less significance, and advance is primarily technical and social.

As Leroi-Gourhan puts it: first the organism adapts physically to its environment. After a certain stage of development, adaptation is in external forms – behaviour and social organization. The final step is in the creation of external objects – tools, language, social institutions:

> The whole of our evolution has been oriented toward placing outside ourselves what in the rest of the animal world is achieved inside by species adaptation. The most striking fact is certainly the `freeing' of tools, but the fundamental fact is really the freeing of the word and our unique ability to transfer our memory to a social organization outside ourselves.[92]

Significance of tools

The clearest and most durable evidence for the beginning of human labour is the record of stone tools. We have to be careful how we interpret this record, however. Looking at the individual shaped piece of stone it is easy to focus on the individual tool-maker and their tool. But a tool is a collective, not an individual product. Even at the lowest level of social co-operation, among chimpanzees, mothers teach their children to make and use tools. Without this minimal level of social life tool-use dies out[93]. Tools and technology are often taken as the yard-stick of hominid development, but it was social organization that made possible the development of tools beyond the simple techniques of apes.

In fact, other types of technology may have played a more central part in early human development. Contrary to earlier views of our ancestors as hunters from the beginning, it is now believed that the early tools of *Homo* were not weapons, and probably not even for hunting, but for food-gathering[94]. Tanner and Lee both emphasize the importance of carrying technology[95] at an early stage. When individuals live together in a troop moving around and foraging for food together, carrying is relatively unimportant, since food is eaten where it is found. As infants with larger brains are born at earlier stages of maturity, in a condition of greater dependence, the need for food to be gathered and brought back to a fixed location grows more pressing. This need is met

92 Leroi-Gourhan 1993; p. 235.

93 It would for example be particularly difficult to argue for a tool-making instinct, in the light of the fact that the Acheulean biface or 'hand-axe' appears twice in the record - see below, p. xx.

94 Tanner 1981; Zihlman 1978.

95 Tanner 1981, p.268; Lee, 1979, p. 493.

by the development of methods of carrying, a new technology that increases the capacity to feed children and nursing mothers, and leads to the establishment of a division of labour within the group. The material of carriers is not durable, and leaves little or no record, but we can deduce that the technology must have existed from evidence of the practice of carrying food back to an agreed assembly point[96]. We cannot argue that tools and technical advances in themselves lead directly to language[97], but that the collective activity associated with technical developments is the necessary precondition for communication.

Division of Labour

Kendon (1991) argues:

> until two or more individuals need to share a common goal, communication about concepts is not needed. For this to arise, a change in social organization is required in which there is both a consistent differentiation and a complementarity between the activities of different individuals within the group – in other words division of labour.[98]

'Division of labour', at its simplest, means the ability of an individual to share in collective tasks, at first by performing the same action as others, but eventually performing an action complementary to that of others, as in lifting one end of a log while someone lifts the other end, or collecting fuel while another tends a fire. In other words, to (a) perceive the actions of another individual, possibly imitating them and (b) to understand the viewpoint, and anticipate the needs of that individual.

Ilyenkov makes the point:

> Where there is no division of labour, not in elementary form even, there is no society – there is only a herd bound by biological rather than social ties.[99]

This emphasis on the division of labour makes possible a deeper understanding of the necessary pre-conditions for communication. The implication is that while life as an undifferentiated member of a herd may encourage closeness between its members, it does not permit the development of individual activity, thinking, initiatives. These features that are often supposed to form an innate part of the human character, rely on labour for their development, indeed for their social creation.

96 Lee 1979, appendix; Tanner & Zihlman 1976.

97 There are convincing suggestions that brain functions appropriate for tool-making are also used in many linguistic operations - Gibson 1991; Greenfield 1991. One of these is the brain function enabling recursion.

98 Kendon 91; p.212. a point also made by E Burke Leacock 1981; 229 and by Ilyenkov 1982.

99 Ilyenkov 1982; p. 90.

Ilyenkov suggests that the division of labour opens the way for individuals to become unique creative personalities because every other individual interacting with them is also unique and creative, rather than a being performing stereotyped, standardized actions, driven by instinct.[100]

To see when, and how, this differentiation took place, we need to look for evidence in the archaeological record of co-operative behaviour, of males and females caring jointly for of children, the passing on of skills, the care of the sick, the sharing of meat. As we shall see in future chapters, anatomical features such as sexual dimorphism (the difference between males and females) are also important clues to the development of social co-operation and the division of labour. Language depends absolutely on forms of social behaviour that favour co-operation and minimize conflict.

Forms of ideality

If the first forms of communicative behaviour were tied closely to activity, how is it that communication and consciousness are now free of this connection? Burke Leacock expresses the problem this way:

> The very impressiveness of mankind's mental achievements, however, has obscured the fundamental significance of labour. Furthermore, the separation of planning for labour from the labour itself, a development of complex society, contributed to the rise of an idealistic world outlook, one that explains people's actions as `arising out of their thoughts instead of their needs.[101]

The key to understanding this separation lies in the concept of ideality.

The ideality of money

The concept of ideality was introduced first by Hegel, developed by Marx and more recently by Ilyenkov, to explain the relation between forms of social life, thinking and language. This rather difficult concept relates to phenomena in our lives that are apparently abstractions, but still take on very concrete forms and have very concrete effects. Phenomena such as laws, kinship relations, even names, are all abstractions of a kind. All are forms of ideality, but perhaps the most characteristic form of ideality is money.

Money, as Marx explains[102], originated in a simple exchange of commodities, or barter. What started out at this stage as a simple negotiated transaction developed later into money, an external, concrete phenomenon; but the essence of money is not its physical

100 Ilyenkov 1982, p.90.
101 Quoted by Woolfson 1982, p.77.
102 in *Capital* Marx 1970; p. 47 ff.

form – gold, paper, or plastic – but the fact that its value is socially agreed. Money is social in origin; ideal in form; material in effect.

In barter an individual exchanges, for example, a goat for a roll of cloth. At this stage, the exchange is apparently a purely private transaction between two individuals, and the goods exchanged are for use, not for further exchange. There is however an underlying value to the commodities – put simply, the value depends on the amount of labour that went into producing them. Over time, in the course of thousands of similar acts of exchange, the value of these commodities comes to be socially fixed, in an expression of the cost of the labour involved in producing them.

Eventually, one commodity comes to be accepted as a general unit of value. Marx's example is a roll of cloth, though in different societies this unit of exchange may take different forms – cowry shells in Africa, bundles of yams in the Trobriand Islands[103]. In post-war Germany when the currency collapsed it took the form of packets of cigarettes or pairs of nylons.

Finally, one commodity emerges above all others as the established unit of exchange – gold. This may not be because of any intrinsic quality of gold. In fact, gold was the ideal unit of value precisely because it had few other uses – it was a relatively worthless metal, with few practical applications, but was scarce enough for the purpose, looked pretty and was long-lasting. As Marx says of money: 'a social relation, a definite relation between individuals, here appears as a metal ... as a purely external thing'[104]. Once gold was established as a currency, it then took on a life of its own. What was in origin the creation of human beings, came in a mysterious-seeming process to rule humans' lives. Money is now the organizing principle of our economic and political life. The very real economic laws of this system now have a life of their own, beyond the control of any individual or group of individuals, as the Wall Street Crash of the 1930s, and the recent credit crunch of 2008 demonstrated. The products of human labour, as Marx puts it, are in this way alienated from human beings.

Comments on ideality

Marx showed that gold became money because of social processes. In its use as money, its value derives specifically from human labour. More generally than that, however, its value is the expression of a relationship between people – at its simplest between those who make and those who use products. Therefore money can be said to be concrete (pieces of metal) and abstract (the expression of a relationship) at the same time. Perhaps the term 'abstract' is a little confusing here, and a term like 'relational' may be

103 Malinowski 1966; Vol. 2; p. 91.

104 Marx 1973; p. 239.

more revealing, as in Marx's comment on money: 'We carry our social relations in our pocket'[105]. For a number of reasons – because money was never invented, but gradually evolved; because money takes a very real, concrete form; because money can now stand alone as a symbol of wealth, and a great many other complicating factors, the origins of money in its connection with labour are now obscured. Like other forms of ideality, the rule of money is beyond the power of any one individual to later, even though it depends on our consciousness and individual brains for its continued existence.

Language as a form of ideality

Ilyenkov sees the ideality of money as a characteristic case of ideality in general[106], and extends the concept to human language. Like other forms of ideality language originated in exchanges between individuals. The signs of language have real values and, in fact you could say, real power. Where do these values and this power come from? Again, from the activities of human beings in society. Our language is an entirely social product. Words, like the value of the dollar, have no material existence outside social consciousness and social activity. Their form is ideal, but their effects are entirely concrete as organizers of human life.

Saussure saw that language was a totally social phenomenon. He also perceived its independence from control by its speakers. The historical process by which this state of affairs came about can only be explained by reference to ideality. Just as kinship, myths, customs, taste in food, all appear to us from childhood as facts of life, so too do words, their meanings, their pronunciation, their ways of combining in sentences. It is noticeable how children pass through stages in their social development where they take different attitudes to language. At one stage they are extremely literal, insisting on the truth of words. A word at this stage is experienced as an integral part of the phenomenon it describes. Later, children perceive that there is a difference between object and word, and start to enjoy puns, riddles, focusing on the form of language for its own sake.

Ideality accounts for the power of language in our lives, and underlies practices such as taboo, magic and so on. This process Marx refers to as fetishism or ideological inversion[107]. Before money, language was probably more powerful than we now appreciate, playing the role of currency of exchange, and the regulator of social life. To the member of a foraging group, a verbal promise to help in case of bad times, consolidated by a social form of alliance, is as good as, if not better than, money in the bank.

105 Marx 1973; p.240.
106 Ilyenkov 1982; pp. 90-91.
107 See Jones 1991; p. 92.

Concepts, knowledge, language

Implied in the advance of technique is the historical accumulation of knowledge. Without language, knowledge cannot be passed on, cannot develop beyond a very crude stage. In this sense, language is an aspect of technology. But what is the precise relationship between language and accumulating human knowledge? Knowledge is often said to be handled in the form of concepts. But this formulation is not as straightforward as it seems. Bickerton lists a number of 'concepts': *ghost; soul; angel; neutrino; phlogiston; gravity; atom* His argument is that for every one of us today 'there are some you do and some you don't believe in'. All these terms originated as educated guesses as to what the world might contain; they are, or were theories of the world[108].

As we can see, some of these concepts are sustainable by scientific proof; others are figments of the imagination. But if it is up to the individual to decide which to believe in, we can never be sure that we see the world as it really is. Bickerton implies that our innately determined internal representations get in the way.

Nevertheless, despite the unevenness of human history, we can see over time, a tendency for humans beings, with human cultures and languages, to achieve greater control over the world around them. There must be some factor in the human condition that can help us to distinguish genuine information from misleading representations of the world. Once again, this factor turns out to be human activity.

Notions and Concepts

What might be useful here is the distinction made by Ilyenkov (1982) who divides meanings into *notions*, the simple material of social consciousness, and *concepts*, a higher order of knowledge[109]. When we express our own or others' experience of the world in speech, we transform individual experience or observation into notions. A notion is a superficial correspondence to the observed general features of a phenomenon[110]. In their simplest form notions may be no more than names or labels, but they may also be more general inclusive categories, classified on some immediate impressionistic basis, as when we classify people on the colour of their skin, or divide living creatures into *farmyard animals*, *pets* and so on. Though these are general categories, they are not yet concepts; merely their prerequisites.

108 Bickerton 1990; p. 37.

109 Vygotsky proposes an additional, lower level of thinking in sets or 'complexes', which is necessary to explain aspects of thinking among children and certain facets of human languages.

110 Ilyenkov calls this 'verbally expressed contemplation' 1982; p. 43.

The process from notion to concept represents an advance from simple observation to a higher stage of understanding of the world[111]. Concepts represent an analysis of experience that goes beneath the surface, and matches the highest possible understanding of world experience at a historical point in time. We can express it most clearly in the formulation: every concept is the solution to a problem. The highest level of analysis that a concept can attain is that of the scientific concept, which is universally true[112], but there are many other practical concepts with which we operate in daily life. For Ilyenkov a concept

> is not therefore a monopoly of scientific thought. Every [human] has a concept, rather than a general notion expressed in a term, about such things as table or chair, knife or matches. Everybody understands quite well both the role of these things in our lives and the specific features owing to which they play a given role.[113]

Concepts are not simply abstractions, though that often does characterize them, but rather a reduction to essentials. 'Scientific abstractions reflect nature not only more deeply and correctly than living contemplation or notion but also more fully (thus more concretely).'[114] It is in practice that we test out notions, those educated guesses that Bickerton talks about. Historically this is how humans have arrived at the concepts that have enabled us to transform the world. In the last few hundred years this process has become institutionalized in what we know as science.

Of course, experience teaches a lot, and can be handed on, but simple experience cannot deepen our knowledge to the same extent as active attempts to change or to transform the world – whether solving our own individual problems, or participating in large-scale social enterprises. Human existence depends on this ability to see beyond appearances, to see in a dry stick the potential for fire or the material for constructing a shelter; to see in shriveled seeds a source of a future harvest; to see in a lump of mud the potential for a pot.

The concept of 'seed'

The difference between notion and concept can be illustrated in the meaning of *seed*, as it might be understood by people at different social-historical stages.

In a foraging society seeds will be perceived essentially as food. People may have words which we recognize as standing for *seed* – the seed you eat (nuts, berries), the seed you crush (grain), the seed you cook (beans), the seed you discard (pips, stones). However

111 Ilyenkov 1982; p. 44.

112 Alongside scientific concepts such as *oxygen, gravity, atom*, are the universal logical relations that Kant proposed in *Critique of Pure Reason – cause, result, possibility*, etc.

113 Ilyenkov 1982; p. 98.

114 Ilyenkov uses Lenin's expression 'concrete abstractions' 1982; p. 47.

until the historical advent of agriculture, the labels for various types of seed are no more than notions. Foraging people are confined to a mere contemplation of seeds in their various forms (and after contemplating, eating). They may have a practical classification of seeds on the basis of which are edible, poisonous, medicinal and so on. The concept of *seed* as a source of further food, is unlikely to be grasped, until the practice of sowing seeds arises.

A subsequent socio-economic practice, horticulture, depends on the understanding that certain grains, or tubers, can be sown, to produce future crops – but what horticulturists recognize as *seed* is still limited to those seeds that are of value to farming. Other seeds – of wild flowers, nuts, pips – may not be recognized as such. Still some general concept of *seed*, as part of a plant, and part of a cycle of life, has been formed. Doubtless, too, as today, different names would be given to seeds used in different ways – as we still talk about nuts, pips, stones.

With the scientific study of botany comes a fuller, richer concept of *seed* – as an essential part of the cycle of life of all plants, and hence of all living things. The concept derives not only from theoretical study, but also from practical experimentation, the breeding of new strains, and so on, linked to agricultural practice, organized in a new, capitalist way.

The scientific concept of *seed* is today fully developed. The reality to which the concept relates is accessible to all, though we may apprehend it in different ways in different situations. Children can understand *seed* in different ways – as a detail of a plant, or a piece of fruit – pips, nuts, grains, beans (still as a notion), or as an element of the cycle of life and death, a deeper, more concrete understanding. In our daily lives, the concept is not always used in the most scientific way. We use it as a metaphor (ideas 'germinate', people are described as having 'gone to seed'). In certain activities we apply only part of the knowledge that lies behind the concept. In cooking fruit and vegetables, the seed is something to be cooked or thrown away – the element of life-giving is not relevant. In gardening, we are more aware of the cycle of life. We extend the term to, for example, 'seed potatoes'.

Historical concepts – the best available

Historically concepts are the best available explanations – the ones that work at the time. Thus Egyptian astrologers were able to predict quite accurately the positions of stars, though their skill was based on a quite mistaken view that the stars and planets went around the world.

The development of a concept is not a steady progression from simple label or name to scientific concept. One of the features of language in its living, social context is a

constant dynamic struggle over the use and development of terms. Our language today is full of terms which are the focus of both ideological and practical struggle[115]. *Race* is a good example of an ill-defined notion, which is treated by some scientists as a concept, though it is without scientific basis. The notion entered European languages for a very specific economic reason – the slave trade – and it will only be removed from the languages of the world by the activity of those opposed to its ideological value and its practical social effects.

It has been observed that at certain stages of human development, in the languages of foragers and simple horticulturists, concepts – concrete abstractions – are relatively few. This is not a case of inability to handle concepts in thinking, and not necessarily an indication of a low level of technical skill or of practical understanding. It may rather be the result of absence of any need to use the concept – because planning, analysis, experimentation, are not yet institutionalized as social practices. The relative scarcity of these functions in the daily life of foragers may simply be a reflection of a low level of development of social and political organization, matching low levels of production.

In day to day interaction, human beings move from notion to concept and back again. However the sum of human knowledge is constantly accumulating, and more and more concepts are therefore becoming available to us. So what we see in language evolution is a historical expansion of the cognitive content of human languages, and since no language exists or has ever existed in isolation, this is on a world-wide scale. As Vygotsky points out, this means an increase in the proportion of conceptual knowledge in our language, and as a result an increasingly widely shared skill in abstract reasoning[116]. The requirement of our modern languages to handle abstractions arises both from conceptual content, and from the increasing range of social tasks required of these concepts. We shall examine the possible effect of these tasks on the form of language in Chapters Eight and Nine.

Language as a power

We have seen that language and other forms of social consciousness are the creation of individuals organized in collective activity over countless years of history, gradually advancing in ability to understand and transform the world. At first sight this appears as an unlimited benefit to children learning their parents' language.

However, looked at in another way, the language of our parents and ancestors could be seen as the dead weight of history and other people's experience, getting in the way of our ability to see the world as it really is. Forms of social consciousness (from forms of

115 Voloshinov 1973; p.23.

116 Kozulin 1990, p.17 ff.

political organization, morality, down to grammatical rules, words) structure from the outset our experience[117]. If as Saussure observes, our language is given to us, and nothing we do can change it, then our view of the world is totally determined for us from the time we start learning language. Painting the situation in the bleakest possible light, you might describe language as a prison, from which there is no chance of escaping[118]. This is known as linguistic determinism. We return to the question we encountered in Bickerton's discussion of concepts: whether we can ever really know the world we live in, and therefore whether we can ever change it in the direction we want.

Words as controllers: linguistic determinism

Linguistic determinism takes many forms. It dates back to nineteenth century linguists such as Steinthal, can be found in the ideas of Sapir and Whorf, in the so-called post-structuralists, and also, somewhat surprisingly in the work of Halliday, an otherwise enlightened linguist, and one of the few to make coherent connections between life and language[119]. It is worth looking briefly at Halliday's views.

Though Halliday perceives the connection between social life and language, he seems to view this connection backwards. Instead of recognizing that language forms reflect social life, he suggests the converse – that language creates or 'construes' reality, so refracting and distorting our view of the world.

The problem lies in 'the cryptotypic patterns of the grammar which typically remain beyond the limits of our conscious attention'. Language is something of a conspiracy –

> there is a syndrome of grammatical features which conspire ... to construe reality is a certain way; and it is a way that is no longer good for our health as a species.[120]

One example of this conspiracy is what Halliday calls 'growthism'. It is because our language values growth – large things in preference to small – that rain forests are being destroyed and whales slaughtered. Because our language classifies air, coal, iron, oil as uncountable (implying 'unbounded'), we are in danger of abusing the raw materials that the planet supplies. Similarly, because agents in human grammar tend to be animate beings (humans or animals), inanimate Nature cannot feature in our thinking. The language makes it hard for us to take seriously the notion of forests, rivers, oceans as active participants in events. The implication is that the wasting of our planet is not the fault of any group of human beings, or of the particular economic system that dominates

117 Ilyenkov 1982, p.41.
118 as does Foucault, for example. See Dreyfus & Rabinow 1982.
119 Halliday 1978.
120 Halliday 1990, p.84.

the world, but the result of grammar, or perhaps the people who allow grammar to influence their view of the world[121].

The implication is a pessimistic one: our language is out of our control; it is making people behave irrationally; it prevents us from seeing what is going on around us. It follows we cannot do anything to stop it.

This bleak picture should be countered by two considerations. Firstly, the alienation of language, unpleasant though it sounds, is not an unmitigated disaster. The divorce of language from activity has undoubtedly given us an ability to draw back and reflect on the world. Alienation is also objectification. Our image of the world had to acquire an apparent life of its own, in order for us to be able to contemplate it, similar to the process that goes on for us individually when we write down ideas, when we tell them to a friend, when we draw a picture, a diagram. Thereby we make objective our inner experience.

Secondly, other systems of human symbolic activity are alienated, in the sense of having become independent of their source – music; drawing; mythology; religion; commodities, even technology. These products of the human brain created by human hand seem to have a life of their own. However, few people would argue that the development of these phenomena has hampered human progress, except perhaps for those who entertain the fantasy that computers will one day take over the world.

Two-sided nature of words

Concepts are two-sided – on the one hand they dominate our thinking; on the other, they enable us to transform our world, and thus to transform ourselves. Language can be seen as potentially both imprisoning and liberating[122]. We certainly do not spend all our lives repeating the experiences of our parents. New experiences can be expressed in our language, even though we may have to negotiate their meanings with our fellow humans, and may at first fail to express them adequately.

Today the problem of knowledge is acute. We are surrounded with information, the product of past activity, of which we can never possibly comprehend more than a small part. Nevertheless the possibility for each generation of understanding and therefore transforming the world is greater than ever before. This does not mean that the world is better now than our grandparents' – but simply that we have greater opportunities to make it so.

121 Halliday does not always view the relation between language and reality in this one-sided fashion. Elsewhere in the same paper he recognizes the two-way interaction between the two: 'language is at the same time a part of reality, a shaper of reality, and a metaphor for reality' p. 7.

122 Halliday himself acknowledges this point (1990, p.65).

Language as tool

Vygotsky had a special interest in the way language functioned in the mental and social life of individuals as a 'psychological tool', to help individuals cope with practical tasks. The essence of a psychological tool is that a system of commands for others has the potential of becoming a command for oneself.

From the very early words of the infant, helping herself climb with an utterance like 'Up!', humans accompany their own activity with language. Vygotsky's studies of inner speech have shown how the external social forms of language that children learn become internalized, in the form of inner speech[123], as a vehicle of thinking for the individual, and Luria shows how inner speech develops as a regulator of children's self-activity[124].

Memorizing

Speech and gesture have a much shorter life than written records, and the ability to memorise is much more important in pre-literate than in literate societies. Luria & Vygotsky describe the 'auxiliary memory tools' of people living in pre-literate societies. These make possible memorization of long messages, or of vital technical information, enabling people to start to overcome their memory – to use it and to dominate it, rather than let it dominate them. A good example is the use of *kvinus* (knotted strings) for the bearers of messages in Peru[125].

Knot-tying

The relation between language and technique has been much debated in connection with the record of stone tools. Some archaeologists argue that skill can be divorced from language, that, for example, the ability to make a stone tool can be passed on from generation to generation simply by imitation. Clearly, though, there must come a point where technique can advance no further without language. The problem is to ascertain where is this point. Many technical operations are possible without language, but it is also true that such operations are much easier to remember with language than without. For example, it is much harder to teach someone how to tie a knot by instruction without demonstration, than by demonstrating it without instruction. On the other hand, to get someone to remember the skill, instruction is much more effective than demonstration. This is why the most effective technique is to combine practical demonstration with memorable words. I can still recall how to tie a reef knot, thanks to the formula 'left over right, right over left'. I am not so clear about the running bowline,

123 Vygotsky 1992.
124 Luria & Yudovich 1959.
125 Luria & Vygotsky 1992; pp 56-9.

though I can remember the instruction about 'chasing the rabbit round the tree' to this day.

Language as a means to self-control

A particularly clear illustration of how the use of signs can free an individual from instinctive behaviour and enhance self-control, comes from an experiment involving chimpanzees. Here is the complete description of Sarah Boyson's study with two chimpanzees, Sheba and Bob:

> the animals are given a choice between two amounts of candy and the rule is simple: if you pick an amount it goes to your partner and you get whatever's left over. So if you are aware of the rule, then in order to get the most you should pick the smallest amount – then you get the remainder. But they can't do it. Try as they might, presented with two piles of candy, they always pick the largest. But once the animals were taught the use of numerals [i.e. taking away the candy and putting numbers in their place, but still giving candy at the end] – they are completely released from their automatic, contextually imposed choice of picking the largest, and use of numerals allows them to use this cultural, symbolic rule. When they went back to candy, the same result as before.[126]

In this experiment the chimpanzees overcome instinctive behaviour by the use of a sign – putting a distance between the problem and themselves, thereby making it possible to consider the problem objectively.

It can only have been through use of some form of language that we were first able to overcome our fear of getting burnt, to grab a burning stick and carry home fire[127]. Sign-mediated behaviour makes possible self-control, as well as a more objective assessment of the situation and what is required.

Decision-making

Vygotsky included in his list of psychological tools, the use of language for decision-making: such practices as casting lots, dice, bones, interpreting dreams and so on[128]. Lee shows that for the !Kung, hunter-gatherers of the Kalahari, divination and prophesy had fairly practical functions as psychological tools helping people to come to decisions. !Kung hunters count "oracle discs", which they use to help decide where to hunt, as part of their hunting equipment along with bow and poisoned arrows[129].

126 BBC Horizon *Chimp Talk* 1993, p.22.
127 Bickerton 1990, p.141.
128 Kozulin 1990, p.144.
129 Lee 1979, p.149.

Social activity and register

In this section we finally discuss the question of linguistic form – usually the central question in works of linguistics. It will be clear from the above sections that theories of formal grammar can not explain the origins of their central subject matter – grammar. Functionalist approaches, that seek to explain the form of grammar on the basis of the way it is used[130], offer better possibilities. As Vygotsky says:

> The internal organization of language is not accidental; it embodies the functions that language has evolved to serve in the life of social [humans].[131]

A functionalist approach to language can provide a framework for the development of language form as follows: human society is organized on the basis of work, and historically can be shown to have passed through different work-based socio-economic stages – roughly speaking, foraging, agriculture, urban civilization, feudalism, capitalism – in which social life is characterized not simply by the production of the necessities of life, but by different forms of interaction such as kinship, child-raising, political decision-making, social gatherings and so on. These interactive contexts vary according to the socio-economic basis, and from the very beginning, language plays a key organizing role.

Characteristic forms of interaction, defined by all their circumstances[132], are associated with characteristic forms of communication, conducted according to social and linguistic rules, governing what can and cannot be said, who can speak and how they should speak.

Each variety of communication constitutes a *register* of language. Each register, shaped by its particular contextual factors, is characterized by its own particular linguistic (semantic, syntactic or phonological) forms, which we have to learn as we learn to take part in the social situation.

Register is obvious in the case of technical vocabulary and jargon, such as the specialized vocabularies of law, science, medicine, the weird language of magic mentioned by Malinowski[133], and so on. Some registers may have been part of human interaction from the very earliest stages of social life. What Englefield calls simple imperative communication (commands and requests for action), may well have been the very earliest type of communication[134]. It is certainly found in every linguistic community, and among the earliest utterances of children. This register has a very specific grammar in English, and probably in most languages (a specific form of the verb in Latin for

130 as Halliday 1978, Givon 1979, Voloshinov 1972.

131 Halliday 1978; p.42-4.

132 Halliday refers to the 'context of communication' – 1978, p.32-5.

133 Malinowski 1966 vol. 2; pp. 223-5.

134 They are present in non-linguistic form among chimpanzees.

example). While 'imperative' is a formal label for a verb form, we find in practice that many imperatives are not verbs at all. Utterances like 'Up!', 'Out!', 'Back!' 'Higher!', 'Left hand down!' and so on are outside the classic formal description of the structure of a sentence (neither verb phrase, nor noun phrase). Imperative communication can be carried out with ready-to-hand materials – gestures, pointing, pantomime action. This would certainly have been true of the very early stages of language[135].

A complete contrast with imperative communication is the register of scientific writing. The context of such writing is a universal and unspecified 'ideal' readership. Since nothing can be taken for granted about such a readership, content must be detailed, with the maximum specification of premises, procedures and conclusions. The form of the writing is highly structured. Sentences are formal, with heavy modification of the initial, subject, noun phrase. There is hardly any need to give examples here, and I hope there are not too many to be found in this book. We discuss this register in more detail in the final chapter.

Another example of register is to be found in Labov's analysis of natural narrative in American speech. Within this register he isolates different functional components – orientation, complicating action, resolution, evaluation, coda and so on. For each function in the narrative, there are specific and characteristic linguistic forms. Thus, for complicating action and resolution (the 'true narrative'), simple sentences with basic verb forms predominate. The verbs are often in the historic present, and inversions such as *Down she went* are found here. It is in these parts of the narrative too that speakers use expressive devices such as gesture, facial expression or phonological devices, e.g. *It came flying through the air and landed on the mat kerplonk*. The evaluative part of the narrative, where the speaker reflects on the action to explain, compare, make some kind of judgement on the events narrated, typically consists of a much more complex type of sentence, with frequent use of modal verbs and complex tenses[136].

Inner Speech

To emphasize the universal applicability of functional approaches to language, a final example of the way that function determines form is examined here. Inner speech was extensively studied by Vygotsky, who regarded it as a development of the egocentric speech observed in young children[137]. Inner speech is not usually thought of as a register, but it is composed of the same material as external speech (signs), and like other registers, has its own characteristic form. If utterances are considered as being composed of two elements, the *argument* (or topic) and *predicate* (the comment you

135 Englefield 1977; p. 34.
136 Labov, 1972, p. 380.
137 Vygotsky 1962.

are making on this topic), then the utterances of inner speech are composed predominantly of *predicates* without *arguments*. In inner speech you are talking to yourself. Since the argument of your thoughts is known, your thinking is almost entirely in predicates, comments on the topics that move through your consciousness. This form of language is not usually accessible; it is externalized in children's egocentric speech, and can be glimpsed in the speech of adults in times of unusual stress. In Joyce's *Ulysses* there is an excellent imaginary reconstruction of what inner speech might sound like, in the interior monologue of Leopold Bloom.

Registers and Linguistic Change

Now we need to consider, if new forms of social life give rise to new registers, with new forms of language, how do such changes affect the established language? Will a new register, especially an influential one, affecting a large part of the community, influence the established language? We should expect it to do so – and over time, we should expect changes in the established language to spread back into other registers. The relationship of register to language is clearly that of part to whole, with a constant interplay between them.

The standard view of grammar is of a phenomenon that can be codified, written up in completed form in an authoritative Grammar. Such a grammar would be an artificial construct, because as soon as it was written, new forms of grammar would have arisen in connection with new activities. Language cannot be reduced to a logical consistent form. Its essence, if we have to characterize it, is constant dynamic variation, an inevitable consequence of its task to adapt flexibly to ever-changing situations.

But this is still a one-sided view, as we see when we consider children's learning of their community's language. Children clearly do not learn a separate form of language for each situation they find themselves in. As pointed out in the previous chapter[138], they regularize the forms they learn, quickly construct rules and within a few years have internalized a complete grammar, this being the most efficient way to cope with the learning task. The result is what appears to be a new integrated grammar for each generation, slightly different from that of the previous generation, and reflecting changes in the activities and social life of their community since their parents learnt their language. The way that this process produces language changes over time we shall examine in a later chapter.

Thus language at any point in time is in a state of dynamic tension as the result of the interaction of these two tendencies – the innovative tendency that creates new forms of language in association with new social activities and functions, and the counteracting

138 And as Chomsky has always argued.

tendency to consolidate and regularize these disparate forms in a single, unified, learnable language code.

Conclusion

To summarise the argument in this chapter: language should not be seen as the primary force in human history. That role should be ascribed to human labour, expressed in the social relations surrounding different forms of collective activity. In the course of this activity human beings created their own language. Nevertheless, the central role of language in human activity, as an organizer of labour, and as an embodiment of notions, concepts, and forms of ideality has to be acknowledged. Without the creation of language, human labour and social consciousness could not have developed.

The freeing of language from the activity in which it originated and from its links with the immediate context, enabled human beings to reflect on their activity, but also gave rise to the alienation of language; an illusion that language was in some way a power governing human existence. Alienated forms of language enabled human beings further to transform their environment, to overcome instinctive forms of behaviour and to transform their own natures. The expanding range of human activities has given rise to new forms of ideality and new human abilities of abstract relational thinking. Social activity – whether it is the activity of groups of people or the internal, mental activity of individuals – requires language to perform varying functions, giving rise to linguistic forms appropriate to these functions. The creative, generative force that enables language to adapt to new communicative and cognitive functions is forever counteracted by conservative, consolidating forces.

3 Apes, hominids and common ancestors

The past twenty years have seen a tremendous explosion in the amount of information available on communication between other species – monkeys, primates, large mammals such as elephants, birds and aquatic mammals. Partly this is due to advances in methods of approaching and recording animals. There is also a much more open-minded attitude to the possibility that animals can develop and transmit methods of communication. We have certainly recovered from the blow to studies of ape language that Terrace administered in the 1970s[139].

This chapter focuses on what the study of apes, particularly chimpanzees, can teach us about the emergence of language. Recently other apes – gorillas and orang-utans, for example – have been shown to have undoubted abilities to communicate[140]. Orangutans in particular have been found to communicate and to behave more cooperatively than chimps, even than bonobos[141]. Nevertheless, it is studies of chimpanzees that are probably the most revealing about the starting point of the journey to humanity and to language, for three reasons:

- First, they are our closest living relatives, sharing 99% of our genetic material[142]. The split of chimpanzees and humans from their supposed common ancestor is reckoned to have taken place less than 6 million years BP[143], and despite the possibility of some changes in behaviour since the split, such as the adoption of knuckle-walking by chimps, we can assume that chimpanzees continue to live a life similar in most respects to our joint ancestors, in or at the edge of tropical forest [144] (it's also possible that the 'split' was not a single event. Remains of what appear to be hybrid forms of ape-hominids have been dated to before 6 million BP.)
- Second, chimpanzees have shown remarkable abilities, in experimental situations, to use symbols to communicate with humans and occasionally with

139 Terrace 1979a and 1979b – and see the description of this affair in Kenneally 2007, p. 44 ff.
140 Patterson 1981, Miles 1990.
141 Pelé *et al* 2009; Grehan and Schwartz 2009.
142 Gould, S J, introduction to Goodall 1988 ;p. 3.
143 Paterson *et al* 2006.
144 Foley & Lee, 903-4.

other chimpanzees. Studies of chimps in the 1970s, influenced by the emphasis of linguistics at that time on the centrality of syntax, started by asking the question, "Can chimpanzees produce sentences in the same way as humans?" The answer was generally a fairly clear "No!" Terrrace's negative conclusions at the end of a long study with the chimpanzee Nim[145] led to some disillusionment with the possibilities of research into chimpanzees' linguistic abilities. The study of ape language took a while to recover from this setback. More recent studies have addressed the subject asking the rather more open-ended question, "What kind of communicative abilities have chimpanzees got?", and producing more interesting and positive results. The way chimps communicate is clearly not the same as humans, but communicate they certainly can.

- Third, while chimpanzees' material existence and social life are considerably simpler than humans, there are still good grounds for supposing that their way of life is closer to that of our ancestors than present-day gorillas or orang-utans. Gorillas live on the ground, leading what seems to be a monotonous life of `mild and amiable serenity', with plentiful food supply and no predators to fear except humans[146], while orang-utans lead a relatively solitary life in the trees, coming together in monogamous pairs for breeding[147]. Chimpanzees, on the other hand, lead a complex and active life which is intensely social. They are inventive, they make and use tools, and occasionally take part in organised social activities such as hunting. If it is possible to establish some relationships between their way of life, their way of `thinking' and their use of symbols[148], then these relationships may throw light on the connections between human activity and human language.

Chimpanzees' life in the wild

Jane Goodall (1988) was one of the first to provide a detailed picture of the life of chimpanzees in the wild. The chimps spend about half their time foraging for food on the ground and in the trees, and the rest of the time in social interaction – grooming, playing, squabbling and making up. Social structure is quite flexible and free, with constantly changing associations of individuals – some all-male groups, some solitary males, some females and youngsters, some mixed[149]. In the dry season groups are large, and in the rainy season more often small units of two to six. [150]. Male dominance is not a permanent feature of social life. A chimp who has meat does not usually give it up to

145 Terrace 1979a, 1979b.
146 Campbell 1998; p.156.
147 Campbell 1988; pp. 155-6.
148 Nancy Tanner uses the term "culture" for these aspects of behaviour.
149 Goodall 1988; p. 21.
150 Goodall 1988; p. 61.

a dominant male, but shares it with those who beg for it[151]. Males do not fight over females, patiently waiting their turn to have sex[152]. Females who are ready for sex – "in oestrus" is the usual term – may move to another neighbouring group to find male partners[153]. Females take the initiative in sexual encounters, and will mate with a number of males. Baby chimpanzees are quite dependent, and young chimpanzees spend most of their early years with their mothers. They reach maturity between their tenth and fourteenth years, by which time they have learnt a wide range of social and practical skills. Although violence and even warfare have been reported between neighbouring groups of chimpanzees, chimpanzee social life appears well-balanced and harmonious when food is abundant and life is undisturbed. Occasional aggressive incidents between individuals generally end in reconciliation[154]. Chimpanzees can use tools to obtain food, and mothers will pass on the skills of tool use – such as the use of a twig to obtain termites – to their infants[155].

Chimp intelligence

Kohler's[156] experiments in the 1920s set out to explore the problem-solving abilities of a group of captive chimpanzees. He set them a variety of tasks, some of which they solved with ingenuity and resourcefulness, while others were quite beyond their capacity to solve. Bühler[157] commented that the problems the chimpanzees successfully solved seemed to require two related cognitive abilities:

a) going a roundabout way to achieve a goal
b) using a tool to get to goal

These two problem-solving techniques he related directly to chimpanzees' life in the trees. (a) reflects the chimpanzee's ability to work out a route through the branches of trees to get to food. (b) reflects the ability to for example pull a branch bearing fruit towards you until the fruit is within reach.

By contrast, problems involving the removal of an obstacle were extremely difficult for the chimpanzees, reflecting the fact that in the forest they would not normally have to remove an obstacle, being able to go round or over it. Luria & Vygotsky[158] note in this behaviour what they call "transfer of structures", whereby cognitive abilities learnt in one situation are applied to problems in another.

151 Goodall 1988; p.171.
152 Goodall 1988; p.84.
153 Goodall 1988; p.119; 188-9.
154 Goodall 1988; p.117.
155 Goodall 1988.
156 Kohler 1925.
157 Buehler 1934.
158 Luria & Vygotsky 1992;p. 21.

c) To these two manifestations of chimpanzee intelligence we can add a third. This is the social skill to manipulate others. Byrne and Whiten[159] have devoted an entire book to the study of this "Machiavellian" intelligence. A good example is provided by Savage-Rumbaugh and McDonald[160], in an incident where a young chimpanzee, Austin, stops a bigger chimp, Sherman from bullying him

> by going outside and making unusual noises which sound as though someone is scraping or pounding on the metal. After making such noises Austin runs back indoors and looks outside as though there is something out there to fear. Sherman then becomes fearful, runs over and hugs Austin, and stops the bullying.

This type of behaviour relates to chimps' social life. Chimps are very dependent on each other, and as they grow up into the life of their group they need to be able to form friendships and alliances, to learn to cope with competition and occasional hostility. It is important for them to be able to understand and anticipate the reactions of others to their own behaviour; to have, as Premack[161] puts it, a simple 'theory of mind'.

Egocentrism of chimps

In order to understand chimpanzees' use of symbols we need to look briefly at another aspect of their thinking. Savage-Rumbaugh has described chimpanzees as `egocentric', in the sense that Piaget[162] applied to a stage of children's cognitive development. Like young children, chimpanzees can work and play side by side with others of their species, without showing much sign of co-operation with them, working `in parallel', but not together [163] They may show each other objects, but find it very hard to share them[164]. This is not selfishness, in the way that we apprehend the term. They have no sense of `self', and therefore no sense of the `other'. As a result, it is difficult to train a chimp to regard another chimp as an audience, and turn-taking in conversations does not come naturally[165]. Like children, chimps behave as if others in the situation know what is in their mind, and therefore do not need to be informed[166]. Immediate visual sensations dominate chimpanzees' perception. Observers give a number of anecdotes in which chimpanzees seem to show grief at the visible suffering or death of another chimpanzee, but as soon as the sight of the suffering chimp is gone, the pain is apparently gone too[167].

It is only fair to say that in experimental conditions Savage-Rumbaugh's chimps have been taught to take turns in conversation, to share food, and to help each other in tasks

159 Byrne & Whiten 1988.
160 Savage-Rumbaugh and MacDonald 1988; p. 228.
161 Premack 1988.
162 Piaget 1959.
163 Kohler 1925; p. 174-6; Kendon 1991.
164 Savage-Rumbaugh 1986.
165 Terrace. Introduction to Savage-Rumbaugh 1986; xviii.
166 Savage-Rumbaugh 1986; p. 337.
167 Goodall 1988; de Waal1989; Kohler 1925.

where the objective is shared[168]. We should remember that these social skills do not come naturally to human children, who have to learn them from their mothers. It is possible that human children without socialisation may not rise above the level of chimpanzees in the wild (as cases of `wolf children' apparently demonstrate[169].

Studies of chimpanzee communication

It was discovered some time ago that common chimpanzees, (Pan troglodytes), could not be taught to speak more than an insignificant number of words[170]. Experimenters who devised other ways of communicating with them, by American Sign Language[171], plastic symbols[172] or an electronic keyboard showing lexigrams[173] demonstrated that chimpanzees were nevertheless capable of a wide range of linguistic skills. Savage-Rumbaugh summed up what has been found:

> They can learn words spontaneously and efficiently, and they can use them referentially for things not present; they can learn words from one another; they can learn to use words to co-ordinate their joint activities and to tell one another things they otherwise would not know; they can learn rules for ordering their words; they make comments; they can come to announce their intended actions; they are spontaneous and often inventive in their signs. In sum, they are communicative and they know what they are about.[174]

Additionally, it is clear that there is a critical period for young chimpanzees during which they can learn symbols fairly rapidly and easily, but beyond which learning is much more difficult[175]. The early experiments with chimpanzees were not only trying out new techniques, but in some cases started with chimpanzees who were fairly old (Sarah was five years old when her programme with David Premack started[176]).

These studies suggest that chimps are capable of far greater communicative abilities than was first thought, and that future studies may reveal other unexpected abilities. Particularly interesting results have been obtained by Sue Savage-Rumbaugh from bonobo or `pygmy' chimpanzees (Pan paniscus). The bonobo Kanzi, learnt to use lexigram symbols without instruction, and to comprehend spoken English. Another bonobo, Alia could 'speak' 26 intelligible English words at the age of 13 months[177].

168 Savage-Rumbaugh 1986; pp. 378-9.
169 Jakobson 1968; p. 15.
170 Hayes & Hayes 1951.
171 Gardner & Gardner 1969.
172 Premack & Premack 1972.
173 Savage-Rumbaugh 1986.
174 Savage-Rumbaugh 1986, p. 379.
175 Savage-Rumbaugh *et al* 1993; Gardner & Gardner 1992.
176 Linden 1976; p. 173.
177 Savage-Rumbaugh *et al*. 1993; p. 47.

Limits to symbol use

However there is a limit to chimps' cognitive skills. Though they can use names of food to obtain food, they do poorly at tasks which require simple naming of the same foods[178]. They have not reached the stage which human children reach between 1½ and two years, of pointing to and requesting names for objects around them. It seems that the activity of `naming' is not important to chimps.

Various observers have recorded chimpanzees' spontaneous use of symbols, outside the experimental situation, where they were interacting with other chimps or with humans. One `speech act' predominated in these situations, and that was "make a request of another" – mainly for food or for action[179]. In this respect it appears that chimpanzees can carry out what Tomasello calls dyadic communication.

Other speech acts were occasionally observed, like "announce what you're about to do" (Sherman uses the symbol *funny face* before pulling his lower lip down over his chin[180] – and comment on visible objects (e.g. Sherman's reaction to a sparkler indoors is to sign *straw give scare, outdoors* and then hurry to the door to be let out[181]). Though these uses of symbols are novel combinations, and go beyond simple requests, they are still tied to the here and now, and are relatively infrequent. It takes a lot of training and practice to get chimps to talk about objects and events outside the immediate context. Planning, remembering, thinking about things not present – all of which are summed up in the term "displacement" do not seem to be within the chimpanzee's repertoire of skills at this stage.

This linguistic profile puts the trained chimpanzee at about the same level of linguistic skills as a human child of between one and two years. Savage-Rumbaugh comments

> it appears that the chimpanzee is inclined to remain at the level of communication with which it was naturally endowed – namely, an ability to indicate in a general fashion that he desires another to perform an action upon him or for him, when there exists a sole unambiguous referent (as in the case when one chimpanzee has meat and the other has none).[182]

The ideational and the interpersonal

It appears that the chimpanzee's life has two separate aspects, which are combined in the human. Halliday[183] suggests that human language combines two functions, the

178 Savage-Rumbaugh *et al* 1993; p. 15.
179 Savage-Rumbaugh 1986; pp. 271-5.
180 Savage-Rumbaugh 1986; pp. 334-5.
181 Savage-Rumbaugh 1986; p. 284.
182 Savage-Rumbaugh 1986; p.28.
183 Halliday 1978.

ideational, dealing with information, judgements, evaluations etc., and *interpersonal,* encompassing greeting, persuading, commanding.

The chimpanzee's ideational abilities are its considerable problem-solving powers, based on visual and manual skills. Kohler's experiments showed that it can think about problems of a certain type, reflect on them and solve them, without language. If two or more chimpanzees are working on the same problem, they may both try to solve it, each building on what the other has done, but the final solution is not the result of co-operation, but of an accidental coincidence of aims.

Interpersonal relationships also present problems to be solved, and the many recorded cases of Machiavellian intelligence show that chimpanzees solve interpersonal problems in a variety of creative ways.

Human experimenters have presented chimpanzees problems which require them to demonstrate abilities in both these spheres. Menzel's[184] test involved hiding food in a field. One of a group of chimpanzees was shown the location of the food, and then released into the field with others who had not seen the hidden food. The informed chimpanzee was able to lead the others to the food with a high rate of success. These chimpanzees had not been taught symbol use, and the human observer could not tell how information was being communicated.

Savage-Rumbaugh's (1986) experiment required a chimpanzee, who had been taught to use symbols on a lexigram, to ask another for a tool (e.g. key, wrench, or straw) in order to get access to food for the two of them. After a training period, the two chimpanzees performed this operation with a high level of success in use of symbols[185].

Clearly, Savage-Rumbaugh's experiment has pushed the two chimpanzees beyond the limit of what they could communicate without symbols. When the experimenters, as a control, turned off the lexigram board the chimpanzees were using to communicate, they could not continue with the task, grew irritated and perplexed. They could not communicate, and behaved as though they knew it[186].

Chimpanzee Gestures in the wild

Observers of chimpanzees in the wild have recorded a wide range of apparently meaningful gestures used to other chimpanzees. Examples include:

184 Menzel 1988.

185 Savage-Rumbaugh 1986; 202-203.

186 Savage-Rumbaugh 1986; p. 202.

- infant raises its arm in the air as a signal to mother that it wants to be groomed[187];
- arm stretched out to "beg"[188];
- pointing[189];
- reassuring touches on the groin[190];
- arms raised as sign of disclaiming responsibility[191];
- arm stretched out in "invitation"[192];
- shaking head in refusal[193];
- gestural communication between two bonobos to negotiate copulation position[194];
- male chimpanzee waving his arm as a threat[195].

These and many other examples appear to represent exchanges of meaning, apparently carried out under the control of the chimpanzee. The following observations can be made about chimp gestures:

- They appear to develop from purposeful actions – e.g. the infant who raises its arm to ask for grooming is adopting the usual position for grooming; the aggressive male threatening gesture of waving away uses the same action as hitting; the action of invitation repeats the movements of pulling someone towards the signer. These actions become meaningful gestures as soon as the audience understands them to be so.
- In this sense, the meanings are iconic and can be easily retrieved from the context in which they are made, both by human observers and apparently by fellow chimps. Burling comments that "iconicity may be one area of communication in which non-human primates, or at least chimpanzees, have inched part-way along the same path that humans have traveled"[196].
- They are in the main appeals or demands for action by another individual, and are thus carrying out an interpersonal rather than an ideational function.
- However, though they are not conveying representational information, these gestures are distinct from the expression of emotion.

187 Kendon 1991; p. 211.
188 Goodall 1988; p.127.
189 Goodall 1988; p.128; Callaghan 1993.
190 Goodall 1988; p. 175.
191 Goodall 1988; p.105.
192 de Waal 1989; p.36.
193 de Waal 1989; p.34.
194 Savage-Rumbaugh et al 1977; p.114.
195 Boehm 1992; pp.332-3.
196 Burling 1993; p.33. Deacon 1997 suggests that the use of signs goes through three stages– iconic, indexical and symbolic, where the last of these is characteristic of human thinking.

Here it is worth referring briefly to the often quoted study of vervet monkeys by Cheney & Seyfarth[197]. The authors distinguished three types of vervet call, corresponding to predator on the ground ("snake"); predator in the air ("eagle"); predator approaching along the ground ("leopard"). Some commentators have viewed these calls as emotional responses to stimuli. Others have argued that the three calls have distinct referential meanings. This is to mistake the nature of primate communication at this primitive level. They are calls to action – in the vervet's case, not just one flight route, but three, depending on the predator. (They correspond to Englefield's[198] description of the most primitive stage of communication – 'call for joint action'). Whether the monkey makes the call or not depends on what is in the environment, not what is in the monkey's mind at the time. They can modify their calls to meet changes in the environment[199], but cannot apparently be induced to repeat the calls in the absence of a predator or predator-type stimulus[200].

How important are gestures in chimpanzee society?

Whether our ancestors depended from the start on the ability to gesture is still open to question. Many aspects of pre-hominid existence could have been carried out without a learned communicative system, if we are to extrapolate from chimpanzee behaviour. Co-operative hunting of a fairly simple type has been observed by Goodall, during which a group of males appeared to join in a clear purpose, different individuals acting together, guarding trees to cut off the quarry's escape route while one chimp chased the quarry, a young colobus monkey, through the trees. No gestures or sounds accompanied this procedure until the monkey was caught.[201]. The use of a stick to catch termites was copied by a young chimpanzee, without any sign passing between him and the adult chimp[202]. Learning here was a case of simple observation. Boesch observed a mother chimpanzee teaching youngsters to use a stone to crack open palm nuts, again, without gesture or sound[203]. Other types of co-operative action have been recorded, not all of them involving gestures.

It can be supposed that activities such as hunting, passing on the technique of tool use and tool making and many other aspects of work, could have been carried out by early australopithecines without an elaborate communicative system. These are further examples of Kohler's `parallel action', where simple observation of another chimpanzee's activity is sufficient, and true communication is unnecessary.

197 Cheney & Seyfarth 1990.
198 Englefield 1977.
199 Leakey & Lewin 1992; p. 242).
200 Wallman 1993; 44-45.
201 Goodall 1988: p.199; also Teleki 1973; p.33.
202 Goodall 1988: p.168.
203 Boesch 1991.

Why can't chimps speak?

Given the undoubted intelligence of chimpanzees and their highly sociable nature, and given that they are our closest cousins, the question of why it has not proved possible to teach them human speech is an intriguing one.

It is certainly not because of poor hearing. Studies of chimpanzees' hearing show great sensitivity to the entire range of sounds that are required for human speech, with a maximum sensitivity at 2 kHz. As Wallace[204] suggests, life in a forest habitat would give an advantage to creatures with auditory sensitivity to sounds such as the snap of a breaking twig, the creak of a dead branch, the rustle of leaves. Human senses – of touch, hearing, smell, – are in fact very close to those of the monkeys. Evolution has hardly altered our senses in these respects[205].

The vocal apparatus of chimpanzees

The usual answer to the question is that the vocal apparatus of the chimpanzee is not capable of speech. The only problem is, people cannot quite agree which aspects of chimpanzees' vocal apparatus are deficient. It is clear that there are significant differences between humans and chimpanzees in the anatomy of nose and throat.

Studies by Lieberman[206] and his colleagues show that the chimp's vocal tract is quite distinct from the human: the larynx is high in the throat, and as a result the pharynx is relatively short. Chimpanzees' jaws are longer than humans', and the roof of the mouth and the tongue are long and flat in comparison with the human arched palate and rounded tongue. The shape of the chimpanzee airway is a gently downward sloping tube, while the human airway bends sharply. The human tongue can be positioned to divide the airway (the oropharynx) into different shaped sections each producing a clearly distinct vowel – what Lieberman (1991) calls the quantal vowels /i/, /u/ and /a/[207].The chimpanzee airway and tongue may not be able to do this.

Duchin[208] disagrees with Lieberman and Laitman about the importance of the length of the oropharynx. She claims that the main restriction on the chimpanzees' production of consonants is that the muscles of its tongue will not allow it to reach the various parts of the mouth that the human tongue touches in the production of consonant sounds. The chimpanzee is said to be unable to raise its soft palate to shut off the nasal cavity,

204 Wallace 1993; p.44.
205 Campbell 1988, p. 153.
206 Lieberman 1991.
207 Lieberman 1991; pp 51-2.
208 Duchin 1990.

so that if it could speak all its vowels would be heavily nasalised and therefore rather indistinct[209].

Finally, examination of the chimpanzees' larynx, the source of sound for human speech, shows that it differs from the human larynx in a number of respects. It is relatively large, in comparison to the rest of the vocal tract; it is positioned higher in the neck, and it contains air-sacs, which may have the function of amplifying sound. It is adapted to vocalisation on both inward and outward airflow, unlike the human larynx which responds best to outward airflow. (Chimpanzee "pant-hoots" are uttered on alternating expiration and inspiration[210]). Kelemen comments, "in spite of its high mental qualities, this animal is unable to imitate human speech, as its own voice is made up of entirely different phonetic elements"[211]. Wind[212], on the other hand, plays down these differences and emphasises the great variety of sounds that the chimpanzee can produce.

Whereas humans can control the movement of larynx, tongue, pharynx, soft palate and lips, such variation as is heard in chimpanzee calls is produced mainly by variation at the larynx, and in the shape of the oral cavity and the lips. Chimpanzees, to put it another way, can produce a variety of vowel sounds, a variety of voicing types, and a variety of pitch patterns, but they do not seem able to manipulate their tongues as we do, and so can produce only a fraction of the consonant sounds that humans can make.

They are governed by emotions

It is often suggested that chimpanzee vocalisations are governed by emotion – instinctive reaction to external or internal stimuli, and that chimpanzees will vocalise even when it is not to their advantage to do so[213]. Certainly chimp calls do not appear to have directly communicative intent, in that they are broadcast whether others are present or not. If chimpanzee calls are relatively involuntary, and under the control of the limbic system, then explanation of the origin of human language has to account for the liberation of non-human primate vocal communication from limbic control[214].

Of course all this scholarly comment will look like wasted effort if the bonobo chimpanzee is found to have a similar anatomy to the common chimpanzee and yet still shows itself capable of producing human-like spoken words.

209 Lieberman 1991.
210 Kelemen 1948; Boehm 1992; p. 328.
211 Kelemen 1948; p.255.
212 Wind 1983; p.17.
213 Lieberman 1991: p.52.
214 Steklis and Raleigh1973; p.77.

The common chimp and the bonobo share a common ancestor with humans and are reckoned to have split as species some 6 million years ago[215]. We cannot really be sure what our common ancestor's vocal abilities were like on the basis of a study of today's chimpanzees today. It is quite possible for example that the chimpanzee larynx has specialised since then, adapting for intensity of sound. Chimp calls, especially their characteristic pant-hoot, can carry through the forest over distances in excess of a mile, and may result in continued exchanges between individual chimps or groups[216].

They use noise in a different way from us

Compared to humans, chimpanzees are capable of a great deal of noise. They produce a wide variety of sounds – pant-hoots, pant-grunts, pant-barks, screams, pant-screams, grunts, `wraas', `whaas', cough-threats, whimpers, laughing, lip-smacking[217]. It does appear that noise has a social significance for chimpanzees, but perhaps more interpersonal than ideational. Long-distance calls play an important part, probably in defining a group's territory. Intensity of noise is an important aspect of "displays", by which chimpanzees defend themselves against outside threat. Noisy displays are also used by male chimpanzees to establish their social ranking within a group. An example is provided by Mike, a young male chimpanzee at Gombe, who discovered that banging a tin can made a loud noise. He used this to his advantage, putting on a terrifying display of rushing through the middle of a group of chimps banging the can and sending others running in fear. After this he was for some time recognised by the others as a dominant male. [218]

In social groups, however, sound is much less important than touch and gesture. Kortlandt's description of a scene in the Congolese forest illustrates this well:

> About 200 yards away was a hamlet where human children were playing; while watching my chimps I could always hear the hullabaloo of the children. The chimp youngsters played almost exactly the same games as the human ones – running around, doing gymnastics, mock-fighting, playing tag and king-of-the-castle, dangling on low branches etc. – but without a single sound. Social intercourse in the chimpanzee group was achieved chiefly by silent facial expressions, arm and hand gestures, and bodily postures. From time to time, however, some of the adults (particularly the males the childless females and he ovulating females) would burst out in a deafening pandemonium of hoots, screams and yells, i.e. the accompaniment of their brief intimidation displays and sexual riotings.[219]

215 Savage-Rumbaugh *et al* 1993; p. 34.
216 Boehm 1992; p. 337.
217 Boehm 1992.
218 Goodall 1988.
219 Kortlandt 1986; p. 73.

Gaining self-control

If chimpanzee studies give a pointer to the importance of iconic gestures in the emergence of language, they also indicate that the path to "the liberation of primate vocal communication from limbic control" is perhaps not so hard to understand as was previously thought.

An anecdote from Goodall (1988) starts by repeating the common assumption that chimpanzees have little control over themselves:

> Chimpanzee vocalisations are closely tied to emotion. The production of a sound in the absence of the appropriate emotional state seems to be an almost impossible task for a chimpanzee. … A chimpanzee can learn to *suppress* calls in situations when the production of sounds might, by drawing attention to the signaler, place him in an unpleasant or dangerous position, but even this is not easy. On one occasion when Figan (a male chimpanzee) was an adolescent, he waited in camp until the senior males had left and we were able to give him some bananas (he had none before) his excited calls quickly brought the big males racing back and Figan lost his fruit. A few days later he waited behind again, and once more received his bananas. He made no loud sounds, but the calls could be heard deep in his throat, causing him almost to gag.[220]

Goodall's interpretation is that chimpanzees have a hard time controlling vocalisations. But look at the story again, remember that Figan was an adolescent at the time, and you can see a young chimpanzee learning between the first and second incident – "a few days later" – to control himself. In a later incident reported by Goodall[221], Figan glanced briefly at a hidden banana that had not been noticed by other chimps in the group, and calmly walked away from it. Later he returned to get the food when the larger chimpanzees had left. In this third incident he seems to have mastered volitional control of vocalisation pretty well!

Other reports of chimpanzee "deception" indicate that they can successfully suppress vocalisation in a situation that might otherwise call forth an uncontrolled response. Two examples given by de Waal show chimpanzees controlling vocalisations associated with fear and with sexual pleasure:

- Two adult male chimpanzees, who have been vying with each other for some time, finally face each other in physical confrontation. Neither shows any sign of fear, but later, out of sight, they both discharge their fear by screaming[222].

220 Goodall 1988, p.125.
221 Goodall 1988, pp. 141-2.
222 de Waal 1989; p. 133.

- A female chimpanzee screams aloud during sex with a dominant adult male, but screams silently during sex with a less impressive male out of sight of the large and possessive adult[223].

There are sufficient of these anecdotes to indicate that chimpanzees can control their vocalisation, if their physical or social situation requires it. Controlling vocal communication from limbic control seems perfectly possible under conditions of social life, where the importance of maintaining the individual's place in the social system imposes a measure of self-control that may not be observed in experimental conditions. Again the ape's behaviour should be seen as the product of social life, rather than the converse – social life as the outcome of individual instincts and emotions.

As far as the voluntary production of vocalisation is concerned, researchers may again be too eager to write off chimpanzees' abilities[224]. While it may be true that attempts in laboratories or researchers' houses to train common chimpanzees to modify their vocalisations have not been very successful[225], they do seem to be able to achieve more control when in a group. Kortlandt[226] reports a group of wild chimpanzees putting on a display of hooting and drumming to frighten away and eventually demolish a (stuffed) leopard. If this had been an emotional reaction, based on the limbic system of each chimpanzee, surely each individual – no match for a leopard – would have run away, screaming in fear. In a group, however, it is apparent that chimps can organise a collective response to drive away the predator. This is not to suggest that the collective response would be entirely under voluntary control in a situation of relaxed calm. It may be fairer to say that the group, faced with a choice between flight and fight, replaced its flight response with its fight response. In so doing each individual in the group gained some control over their own behaviour.

Interestingly, Jolly reports that lemurs, a much less brainy species of primate, bravely mob a four-legged predator such as a leopard, but scream `instinctively' with fear when a hawk goes overhead. Why the difference in behaviour? Could it be that experience has taught the lemurs that mobbing a leopard works, but that there is nothing they can do to stop a hawk carrying them off?[227]

It is not hard to imagine just how quickly complete control of vocalisation would be achieved by a species living in a dangerous environment, needing to keep silent while moving around in the presence of predators, stalking small game and so on. If our

223 de Waal 1989; p.49.
224 Steklis 1988.
225 Lieberman 1991: p.53.
226 Kortlandt 1986; p.74.
227 Jolly 1988.

upright ape ancestors were scavengers[228], the ability to produce loud noises at will to scare away rival predators would quickly prove an advantage.

Music and dance

Social interaction and co-operation may prove to be one of the mechanisms by which our species gained control over its vocal organs. We should perhaps consider such behaviour as music and dance as possible factors helping our ancestors to gain control over vocalisation and articulation. The collective use of sounds, such as group calls may well have played a part in solidifying the group. Jane Goodall observed chimpanzees dancing. The adult rain dance is by now well known. She also noticed youngsters clapping in rhythm with each other while spinning around in pirouette-like movements and performing somersaults[229]. Young gorillas were observed by Diana Fossey to make rhythms of their own by hand-clapping and chin slapping, which causes the teeth to make a clacking sound. They then began to move to the sounds they were making by whirling and turning[230]. This topic is developed in Chapter 6.

Co-operation among chimps

Scientists can study chimpanzee behaviour and come to two almost opposite conclusions: one, that they are aggressive, competitive, anti-social creatures who just about manage to live together without killing each other; the other, that they are co-operative, sociable creatures, who may get aggressive when provoked, but are otherwise fairly amiable.

There is evidence for both views. In the end, chimpanzees are not that different from us. It is the circumstances of life that play the key role in their behaviour. Given a secure, predictable environment they can live a rational, sociable life where individual skills can sometimes be combined for the benefit of all, as in the discovery of a tree full of fruit, or a joint hunting expedition. Circumstances that are unpredictable, where life is precarious and under constant threat, may lead to the breakdown of social life and a tendency for individuals to compete with each other. For example, the aggression shown by animals in zoos is now recognised to be a product of an environment that is, from the animal's point of view, a totally irrational environment, that in extreme forms can send animals mad. A striking example was the case of the male chimpanzee in Berlin Zoo who spent his days throwing stones at visitors – and was observed by his keepers spending evenings without visitors collecting little piles of stones ready to throw on the

228 Campbell 1988 describes their mode of existence as analogous to that of hunting dogs.

229 Goodall 1988.

230 http://scienceray.com/biology/zoology/dance-monkey-dance

following day. The story is a nice illustration, not only of chimpanzee's ability to plan ahead, but also of the desperation caused by captivity in zoos[231].

The Next Stage?

Chimpanzees' ability to use symbols has been amply demonstrated by experiments. They have been seen to be able to control their facial expressions, their bodies and their vocalisations. If chimps are to be taken as the model of our ancestors, what would it take to set them out on the road to humanity and to speech? Ultimately chimpanzees do not fail to talk because of any physical or mental deficit, but because life in the forest provides them with no incentive to do so. The material circumstances of apes in the wild are an easily obtained supply of food and a close but relatively uncomplicated social life. Their life presents no situation where one chimpanzee is dependent on another for information or for help in solving problems. When an individual does solve a problem, their solution may be copied by others, but it does not appear to be shared, to become part of collective consciousness. Chimpanzees' actions are not co-operative, they are parallel, and chimpanzee egocentrism is the cognitive equivalent of their parallel social life.

Until situations arise where there is a shared objective and shared consequences, chimpanzees will have no need to talk to each. Experiments by Savage-Rumbaugh and Menzel indicate that when a situation is devised by humans where the outcome depends on the knowledge that one of them possesses, chimpanzees can in fact cooperate and communicate effectively. Chimpanzee society has in it the embryo of co-operation and language. Exactly how these two behaviours may have emerged and how ape gestures and vocalisations may eventually have led to speech will be explored in the following chapters.

231 https://www.scientificamerican.com/article/chimpanzee-plans-throws-stones-zoo/

4 Gesture and origins of meaning

Looking at animal behaviour, there appear to be two possible routes by which we could have arrived at today's spoken modern languages, one from the calls of primates, leading to speech; the other is from animal's actions. Both these forms of behaviour have some part to play in the subsequent development of human speech, but neither can be regarded as direct antecedents of language, because both are based on instinctive individual responses to stimuli, whereas we regard human language as from its very origins a creation of social rather than individual behaviour. It was a new, specifically human behaviour – labour – that created language.

Interaction between individual animals, whether it is the physical grooming of chimpanzees or the collective vocal activity of baboons will remain at the level of grooming,[232] unless there is meaningful content – something to talk about. Once a message has to be communicated, its content will find out a form, using the available material, whether this is gesture, speech, pantomime or depiction.

In the sections which follow, we examine the case for gesture as the medium of our ancestors' first communication systems. The idea that gesture preceded speech has a long history – tracing as far back as Plato.[233] The idea was proposed as far back as the 17th-century by Étienne Condillac in France, and taken up in the 1970s by Gordon Hewes. It has started to gain acceptance more recently, particularly among those who see the story of language reaching back to our kinship with apes. Michael Corballis has recently restated the case strongly[234]. As the case for a sudden, dramatic Big Bang of spoken language weakens, it is logical to look for a possible route connecting ape-like communication to modern language. Gesture theory provides that link.

The gesture theory of language origins

Communication starts when two or more individuals co-ordinate their separate activities to produce a single social act, solving a socially relevant problem. The earliest version of communication takes the form of an iconic version of the joint activity – a

232 Aiello & Dunbar's phrase (1993) is 'vocal grooming'.

233 including such writers as Voltaire, Condillac, Wundt, Marr, Paget. See Hewes 1976 for a survey.

234 Corballis 1999.

truncated action, and therefore a gestural sign. The individual's initially unintentional meaning becomes intentional when the other individual responds to it. Englefield describes this process as one whereby the executive act (i.e. the act of doing something – lifting, pushing, carrying, hammering etc.) becomes a communicative act.[235] For this to happen, the response to the gesture is as important as the gesture itself. The creation of meanings is a dialogue from the very start, and communication is shaped by its function of exchange of meanings.

From initially iconic forms, with a direct connection between the representation and the action – a variety of forms develop. The establishment of the sign in social life depends from the start on agreement between two or more individuals – a convention. What may have originated as fairly elaborate pantomime gets shortened, iconicity is lost, and conventional or arbitrary signs predominate[236].

The context of gestural sign use is initially quite restricted, limited to a few essential social activities. Over time more and more activities are organised with gesture, and as part of this process general all-purpose forms, something like grammatical forms, start to develop. All the time, sound continues to be used by early hominids, with the function of maintaining social cohesion.

Supporting Evidence

Some of the arguments in favour of gesture theory derive from studies of apes. Chimpanzees display an embryonic forms of co-operation; they also display embryonic forms of gesture, gestural actions that appear to be under their control; but their vocalisations do not seem to be under control, and would appear to be linked to instinct.

Other evidence supporting the gesture theory comes from a variety of sources – existing gesture languages; children's language development, use of gesture in speech pathology ; use of gesture by primates, and the nature of gesture as a medium.

Existing gesture languages

Gestural signing has in the past been thought of as a somewhat inferior version of language. The history of deaf education shows a prejudice against gesture over almost a century, with great cruelty shown against deaf signers by hearing teachers who believed that speech was the only suitable medium for deaf children to aspire to[237].
After a period of neglect, it is increasingly being recognised that gestural languages have both a long history and a widespread use around the world, and that such languages are

235 Englefield 1977; p. 13.
236 as in the gesturing of monks in silent orders - Englefield 1977; p.48.
237 Kyle & Woll 1985.

as worthy of study as spoken languages. There are numerous examples of modern day gestural communication.

The American Plains Indians developed a system of gestural language that served as a lingua franca between North American tribes over thousands of years[238]. Kendon[239] has shown that gesture language is widespread among native Australians, and instances are reported in many places in South America, among the South African Khoisan people[240], and so on. Luria & Vygotsky[241] suggest that every foraging society at one time used both gestural and spoken languages.

In general, gesture can be used in any situation where speech is not possible or permissible. In contemporary Western society we see this practice in the restricted gestural systems used by bookmakers on racecourses, soldiers on army manoeuvres, scuba-divers, in recording studios and by workers in noisy factories. It is clear that deaf signing is not exceptional, and gesture languages do not represent a separate linguistic code, simply a different linguistic medium.

Children's language development

Children do not start to speak their first words till the age of about nine months, and their first sentences at about eighteen months. Before nine months parents understand their children's needs and intentions from their actions, rather than words. Because of babies' dependency on adults, and the resulting close bond that develops, parents can read meanings from babies' eye movements, body movements, facial expressions. Studies of children's development at these early stages show that their interaction with the world progresses from touch, to action, to gesture, then gesture and sound, finally to speech[242]. This progression depends crucially on parents attending to what children are trying to do, and interpreting their behaviour.

Perhaps the most typical babies' gesture is the pointing action which almost invariably precedes and often accompanies their first words. This is a development of early reactions to objects that interest them. First babies reach out to try and grasp an object. If parents understand and respond to this reaching action, babies discover that reaching alone is sufficient to achieve their desires, and the action consolidates into pointing. At a subsequent stage they accompany the pointing gesture with a vocalisation. This may at first be an indeterminate sound, becoming a more structured syllable, for English babies something sounding like [da], and interpreted by adults as 'that?'. Adults are

238 Skelly 1979.
239 Kendon 1989.
240 Alan Barnard, (personal communication).
241 Luria & Vygotsky 1992.
242 Clark 1978.

almost guaranteed to respond to this behaviour by speaking the name of the object pointed to. Thus the original accidental, almost instinctive reaction of grasping for an object, becomes a meaningful gesture and a social tool, as a result of this pre-linguistic dialogue between baby and parent.[243]

Language pathology

With patients suffering impaired speech functions as a result of brain damage or illness, it has been found that a simplified gesture language can be used in place of speech. This suggests that gesture may be in some sense more basic than speech. It is probably the more direct, less arbitrary connection between gesture signs and the actions, objects or shapes that makes the system easier for such patients to handle[244].

Here we have to tread very carefully, because the inference can easily follow, gesture is more primitive than speech. This is implied by Donald in his scheme of the development of consciousness, the second 'mimetic' stage of which is characterised by gestural communication. To explain this development, Donald proposes a module of the mind, the 'Mimetic Controller'[245], but this is to put forward a biological explanation for a process which has a perfectly rational explanation, once the significance of labour, as collective activity, is grasped.

The Characteristics of gestural language

Gesture has intrinsic characteristics which make it much more likely to have been the first medium of communication than speech. Rather than base our discussion on today's sophisticated deaf signing, we shall attempt to describe natural gestural communication, as exemplified in the gesturing of two people who do not know each other's language, but who share interests in common, and over time develop a gestural communication system. The American Indian lingua franca based on gestural signs may have been of this type, easily understood and learnt, composed of iconic gestures of natural actions[246], supplemented with facial expression, posture, pointing to or touching objects.

Gestures are in origin a natural medium, derived from human actions and perceptions of the world, and therefore iconic, whereas spoken languages have only a small proportion of natural signs – mainly onomatopoeia, imitations of natural sounds but the

243 This sequence is encapsulated in the title of A Lock's collection of articles, *Action-gesture-symbol* 1978.

244 Skelly 1979; Jones and Cregan 1986.

245 Donald 1991.

246 Skelly 1979.

proportion of iconic material is never more than about 10%[247]. Iconic gesture meanings are by nature universal in comparison with the restricted usage of spoken words. For instance, every language has a different word for the concept *sleep*, but the gesture of laying the head on the hands to one side while closing the eyes would be understood immediately anywhere in the world.

Gestures are based on physical properties of the world – shapes, movements, but most of all on actions. Natural gesture seems to excel at the expression of concrete, visual meaning. The meanings of natural gestures depend on the immediate context in which they are used. Since interpretation depends on context, meaning is relatively easily recovered, and the signer can use contextual features to elucidate meaning, for example pointing to objects, people, places in the vicinity. However the ability of signers to talk about matters beyond the here and now is limited. Gesture meanings may be complex or simple, according to the situation. There may be many elements of meaning in just one gesture. One sign corresponds to *sleep/sleeps/sleeping*, or even *I am sleeping/ I was asleep*, and so on. The sign for *drink*, a cupping of the hands together, can also mean *a cup; a drink; water; thirsty* and so on.

Since each gestural sign has a wide range of meanings, the load on memory is light, though ambiguity and misunderstanding may be frequent. It may be that as few as three to four hundred would provide a communicative system adequate for social interaction and simple co-operative tasks. (Skelly's manual gesture code for aphasics is based on 256 signs). The upper limit on memory for manual signs is probably in the order of 1,500 to 2,000[248]. Gesture is possible at a distance, and can also reach a large number of people at once, provided they are attentive. It is possible in noisy conditions, and conditions requiring silence.

All these features are in certain circumstances advantages for communication. As anybody who has travelled to a country without knowing its language will attest, a surprising amount of information can be communicated without any common spoken language. Interestingly, there are still today some things that can be better expressed through gesture than speech – describing the dimensions of an object, shapes, movements, indicating direction, specifying objects and persons in the immediate context ('deixis') and so on.

247 1990. (p. 145) Interestingly, though learners of deaf sign language are struck initially by the iconic nature of some signs, it is estimated that languages of the deaf such as ASL, BSL have no greater a proportion of iconic material than spoken languages - Skelly p.5.

248 Hewes 1976: p. 71.

Technical progress

The implication of gesture theory is that there must have been a certain level of technical development in order for co-operation between two or more individuals to have become necessary. Chimpanzees do not waste their time lifting things and dragging them about. They eat what is available on the tree, then move on. It is only when human society has developed to a point where it is necessary to drag part of a carcass back to a home base, or to move branches from one place or another – to provide fuel for a fire, or to make a shelter – that co-operative activity and the communication necessary for it would have becomes an established part of human behaviour.

Learning time

Englefield makes the point that a functioning vocal language requires a large number of spoken words, to be learnt quickly and thoroughly by all the members of the group: whereas a gestural sign system can function with a small number of iconic signs, each sign carrying a large functional load.

As we know, while early hominids had a longer learning time than chimpanzees, it was still a lot less than modern human children have. Children today have as much as six to seven years to learn the basics of their language, and have only just mastered them by the age of nine or ten. *Homo erectus* on the other hand was probably mature at about 14 years, and their period of rapid brain growth or brain plasticity may have finished by six or seven. This short growing period must have placed a limit on learning. Therefore a system of natural gestural signs, easy to learn, to create and to remember would appear to be more suitable than speech.

The Form of Early Gestural Language

The first gestural communication would probably have been rich in signs for actions connected with elementary activity, such as lifting, carrying, chopping, indicating direction, imitating animal movements. Gestures for social interaction would also have been important – gestures indicating mating, sharing food, attending to the young. Judgements of value would stem from the vial distinction between good (to eat) and bad, good (behaviour) and bad, and so on. Note that the modern chimpanzee Washoe was able to express judgements on aspects of her environment. 'Bad' was expressed by a sign indicating toilet. She could also swear in sign language[249].

Communication may have been slow, and in a situation of any complexity would have resembled pantomime more than present-day deaf signing. However, over time commonplace, habitual ideas would come to be expressed quickly and simply, stylised

249 Linden 1967, p.7.

into more conventional signs, providing more rapid communication for a familiar audience.[250] As we shall see later, this move from iconic to conventional representation is a common developmental feature all human languages.

It is often suggested that the earliest stages of language would be dominated by action words, hence 'verbs'. However, while the emphasis would probably have been on action, to talk of verbs is mistaken. Utterances would be holophrastic (as in children's first words), with mass, undifferentiated units, and probably without a clearly developed syntax. Even the semantic functions of Agent, Action, Patient of action, and so on, may not have been distinguished.

'Semantic Phonology' and the origins of syntax in gesture.

Armstrong, Stokoe & Wilson have proposed that the origins of syntax can be found in gesture. They see in a gestural sign a sentence in embryo, in the elements Agent, Action and frequently a Goal or Patient. So the American Sign Language (ASL) sign for 'catch', involves one hand (in the role of agent) moving across the body (an action) to grasp the forefinger of the other hand (the patient). Gestures of this type, they suggest, form the basis for a syntax that develops as signers over time analyse the gesture, gradually decomposing it into the separate semantic roles or meanings contained in the original unitary sign.

> [gestural] signs have a potential that vocal signs lack for being decomposed into meaningful agent/action sub units.[251]

Armstrong et al's ideas provide a welcome new perspective on language origins studies. They are concerned with seeing how language might have originated. Instead of starting from today's language and working back, with all the idealist baggage of modern linguistic theory, they start at the beginning and work forward. Instead of describing signing in terms of speech, they view speech in terms of gesture, with interesting results. Rather than divide language into two irreconcilable forms, spoken and gestured, they enable us to see it as one unitary but varying form, and spoken words as 'complexes of temporally ordered muscular gestures rather than as semiperfect representations of abstract formal categories' [252]

Their suggestion that within the gesture are all the elements of the utterance – the agent, the action, the patient – implies that syntax develops in the process not just of building, but also by way of analysis and decomposition of signs. The various elements

250 Englefield 1977; pp. 56-82.
251 Armstrong et al 1994; p. 356.
252 Armstrong et al 1994; p. 352.

of the utterance slowly emerge from the sign, as it becomes necessary to differentiate agent and action, action and its patient, and so on.

Life and syntax

However there is something missing in Armstrong et al's argument. They imply that the semantic relations agent-action-patient are simply present in the world, waiting for us to discover them. This is misleading, and it seems that in one sense Armstrong is in fact arguing backwards from modern languages, seeing modern semantic relations in gestures, just because they know that eventually this is how gesture developed for us. The point is that this is not the only way sentence structures could have emerged. In a later chapter we illustrate a peculiar form of grammar developed between the bonobo Kanzi and his carers. It does not look like human grammar at all. It is dominated by words of action, sometimes two actions in one sentence, such as *chase tickle*, or *tickle bite*.

The semantic relations that Armstrong sees inside gestures, waiting to come out, are particularly human relations, the creation of human beings interacting with the world. These are the relationships that are crucial to human beings acting on and interacting with the world, the relationships underlying the process of labour, which features so prominently in human languages; and not because this is the nature of gesture – or even the nature of the world. To attribute these relationships to the intrinsic nature of human gestures, is to suggest that linguistic form determines the way we analyse the world, rather than the converse, that our interactions with the world lead us to an analysis of experience that shapes our language.

Bruner puts it this way:

> The initial structure of language and, indeed, the universal structure of its syntax are extensions of the structure of action. Syntax is not arbitrary; its cases mirror the requirements of signaling about action and representing action.[253]

We can go further than Bruner, and suggest that in human society syntax mirrors not only routine day to day activity, but more broadly, the structure, or the generalised activity and social relations of the whole society. This point will be illustrated in Chapters 8 and 9.

The development of early gestures

We would expect the first gestural signs of prehistory to be relatively undifferentiated with respect to agent, action or patient. The same sign would refer to *drink; water; thirsty; someone drinking* and so on. But what happened when the original undifferentiated gesture started to decompose. Did it tend to become thing-noun, or

253 Bruner 1981; p. 50.

action-verb? We know that eventually both these forms must have emerged, in order for syntax to form. But which came first?

It is often argued that language developed through deixis, pointing, specifying objects and people around, which leads eventually to naming them[254]. It is also claimed that early language must have been dominated by actions, at the expense of attention to objects. The two views are in contradiction with each other and it is worth considering the issue, which came first, emphasis on objects (hence naming, hence nouns), or emphasis on action (hence verbs)?

If the logical content of an utterances is analysed in terms of the components *argument* and *predicate*, the earliest utterances would surely be ones where the predicate predominates. The fact that communication had not escaped from its context means that the argument would always be present in the situation. The argument in this situation is given to both speaker/signer and addressee, so is not specified. Predicates would predominate – as they do, we noticed above, in inner speech. The implication is that emphasis on action would historically precede emphasis on agents or patients, which would be implicit in the situation where communication took place.

Both Englefield and George Thomson argue that the register that predominates at this early stage must be simple imperative communication, and the content must be dominated by physical and social activities – *run, lift, go-come, sleep, eat, drink* and so on. In Kanzi's life these activities may have no purpose, but in the context of human labour, activities have a purpose, and therefore an implicit goal. This stage of elementary message formation is a prerequisite for the later stage of naming, when gestural signs develop into two forms, one for the action and the other either the agent or the patient of the action.

In fact it is not hard to see that naming is a fairly advanced function of language, presupposing a level of attention on objects and other phenomena that would require a certain level of social development. We notice among children that while naming is an important development in language learning it is not the first. Uemlianin argues that children become aware of their own activity, before they become aware of objects around them[255]. Their first act of meaning is the action of pointing rather than reference

254 as Rolfe 1989; p. 30, and Hewes 1976, quoting Plato's idea that deictic gesture is the path to propositionality p. 482.

255 Donald also sees the first evidence of mimesis in children's pointing behaviour preceding first words, c. 14 months, following a period when children have learnt to direct their gaze and focus attention where their mother or parent is focusing 1991; p. 171.

to objects. It is in the response of adults to this action[256] that learning of names proceeds.

In conclusion, there is no difficulty in understanding how individual gestures could be created from actions, once collective action required communication. The material of gesture is ideal for the creation of a simple communicative system, and still today better for some communicative tasks than speech.

Disadvantages of gesture?

A number of supposed disadvantages of gesture relative to speech have been proposed, and we should examine some of these.

Differential access to information?

No less a thinker than Vygotsky urged the importance of reading and writing in the education of deaf children, on the basis that otherwise they would be cut off from vital sources of information and from contact with the wider culture of their society. Is it fair to suggest that by comparison with speech gesture restricts the availability of information?

It is certainly true that modern day gesture cannot by itself carry out all the tasks of communication that its users require in a literate society (Important point!). Deaf signers have to rely also on forms such as finger spelling that derive from the spoken tradition. Kendon makes the point that gestural languages of aboriginal Australians are dependent in their form on characteristics of associated spoken languages.[257] But these are not inherent deficiencies in gesture. Rather they are a reflection of the dominance of spoken language today. If gesture is today not adequate for all communicative needs, then it also true that speech is not adequate – we rely more and more on written forms of language. So the question is really, can speech do so many more things than gesture?

There really are not that many things. Suggested activities that depend on speech include a) attracting attention, including calling from a distance; b) co-ordinating activity; c) the intimidator use of noise. We shall examine the significance of such activities later, and see whether they are sufficient in themselves to explain the origins of speech. What they do not prove though is that gesture is in any way deficient or inferior to speech as a communicative medium.

256 in what Lyons 1988; p. 151, calls 'the first language game'.

257 Kendon 1989.

Abstract ideas; gesture for concrete?

Some have proposed that gesture is more suitable for concrete notions, and speech more suitable for abstract notions. When we think of natural gesture, and its use as a *lingua franca*, the notion seems attractive. But we must remember that abstract notions are not the result of the medium of speech; they are the result of a certain level of social and technical development, such that thinking can be separated from the immediate activity and immediate sensory impressions. The proof of this is the fact that modern deaf-signing can cope perfectly well with abstract and general concepts.

Iconicity v. Arbitrariness

Pulley blank proposes a variation of this idea – that speech is arbitrary whereas gesture is iconic, and that gestural signing is therefore restricted by its inability to invent new terms[258] (really the same point as above, so cut it short).

This characterisation – gesture is iconic, speech arbitrary – again ignores the evidence of gestural signing today. Deaf signing is not generally iconic; its forms are in many respects as much a matter of convention (as arbitrary) as are spoken words. Conversely, while many insist on the arbitrariness of sound – meaning relations (following Saussure), there are in reality a great many connections between sound and meaning, in sound-symbolism, which we shall examine later.

In other words, while it is correct to argue that language forms show an evolution from more iconic to more arbitrary, it would be a mistake to identify 'iconic' with gestural sign and 'arbitrary' with spoken word.

Nor has a gestural signing community any less capacity to form new words than a speaking community. Thanks in part to the quality of radiance in signs deaf signers can produce exactly as many meanings as are needed for their communicative purpose – whether they are dealing with a Shakespeare play or the day's financial report. For example, the variation expressed in the series *slow, slow-is, quite slow, very slow, extremely slow, dead slow*, can all be expressed by varying the speed with which a gestural sign is executed.

Gestural-sign systems can easily make the transition from iconic to arbitrary form, and one of the strengths of Gesture theory is that it provides a convincing explanation of how language might originate in iconic form, and then make the transition to the arbitrary form of today's languages. The general picture of the development of gestural form is that a gestural sign originates as iconic representation, with a direct and natural connection with the aspect of the world that it represents. Over time, with increasing

258 Pulleyblank 1983; p. 402.

complexity of communicative needs, the form of gestural signs moves away from this natural connection towards conventional arbitrary form. Communicative needs demand that the meaning of a sign be restricted in some way if it is not to be ambiguous. In Englefield's illustration, footprints can be read for many different kinds of information – about the maker's direction, weight, speed, the time they passed, and so on. A footprint made for the purpose of passing on a message is read in quite a different way. In this case only a small part of the range of meanings can be intended, and this has to be the result of previous agreement or convention. The latter sign meaning is derived from the natural meaning, but can only correspond to a part of it[259]

Historically it was necessary for messages to become independent of context, separate from reliance on a direct connection with the world around. The associated development from iconic to arbitrary signs was a prerequisite for the later establishment of the almost totally arbitrary system of spoken language.

Speed of processing information

In his discussion of supposed differences between modern humans and their ancestors Lieberman emphasises the speed of processing of information that is characteristic of speech – suggesting that in speech, we process between fifteen and twenty-five phonetic segments per second[260]., whereas non-speech sounds cannot be handled at a rate no better than seven to nine items per second[261]. The implication is that speakers handle 'information' more efficiently than non-speakers (such as gestural signers)[262].

But anyone who watches deaf-signing interpretation of television programmes or public performances will immediately be aware that the signer processes information at just the same speed as speakers. What they are processing of course is not the distinct phonetic segments, but information contained in word meanings, or propositions. Klima & Bellugi conclude:

> though signs are produced at half the rate of words, the rate of producing propositions does not differ in the two modes.[263]

In other words, we seem to be processing not individual speech sounds or phonemes, but meanings – and in these terms information processing is no different from that in any other realm of human activity. We have to insist that gestural signing is a fully-

259 Englefield 1977; p.20.

260 Lieberman 1991; p. 37.

261 Lieberman 1991, quoting Miller 1956; p. 37-8.

262 Notice that not all spoken languages are as fast as each other. It is widely observed that a pidgin language, spoken as a second language is much slower than the same language spoken as a native language - when it is said to be a creole.

263 Klima & Bellugi 1979; p. 194.

formed human language, as highly structured, as expressive and as rapid in transmission as any spoken language, and equally capable of carrying out the communicative tasks of human society.

Overload of information

The suggestion comes, surprisingly from Armstrong et al, that gestural signing may suffer from an overload of information: 'as social organisation and exploitation of the environment evolved, vision and the upper body became overburdened and began to share more of the task of communication with the much less iconic and deictic vocal medium, always an important part of the primate heritage.'[264]

However, as we know, and as Armstrong et al would be the first to point out, being confined to gesture does not prove a barrier to communication for deaf signers, who don't complain of being 'overburdened' with visual information.

Natural Selection of speech?

In some discussions of a possible transition from gesture to speech, we find suggestions that because of all the presumed advantages of speech, there must have been in operation some Darwinian selective mechanisms, selecting speakers, and operating against gestural signers. This is implied in some outdated accounts of the demise of the Neanderthals – they failed, or disappeared, because their speech was slow, cumbersome, just not arbitrary enough, somehow. Lieberman suggests that the ability to produce distinct unnasalised quantal sounds (i.e. sounds within the modern human phonological repertoire) was the biological factor that enabled humans to survive but condemned Neanderthals to extinction.[265]

Once again, in this account, language is made the factor that determines our history. But as we have argued throughout, it was not language that made us human, but us humans that made language. As we shall see later, Neanderthals had a technology as advanced in its day as any made by anatomically modern humans. For thousands of years anatomically modern humans and Neanderthals lived side by side, and while some features of Neanderthal anatomy are not seen today, there is no certainty that they did in fact become extinct.

This story of how things might have happened does not in any case fit the Darwinian theory of selection of the fittest to survive in a given environment. For natural selection to operate in this area of human activity, we should need to establish that the ability to produce CV syllables gave a primary material 'advantage' to individual hominids. This is

264 Armstrong et al 1994; p. 364.

265 Lieberman 1991; 76-7. What Chris Knight calls the 'speech defect' theory of evolution.

clearly not tenable. The ability to articulate the names of hares, antelopes, and leopards does not give better chances of survival in the savannah, nor does it make for better food gathering techniques, or enhance the survival chances of infants. It is not even easy to demonstrate that articulacy gives an advantage in survival to groups of hominids, let alone to the individual members of the group. There is no way to demonstrate this without considering the social life of the group – and, once again, we see that deaf signers can cope perfectly well in constructing a social life.

In fact gesturing, because it can be immediate, visible, easy to learn and easy to remember, may well have given an advantage to hominids in the early stages of our development that speech could never have conferred.(have you really demonstrated this?) So those who seek biological explanations for the survival of our species, based on linguistic abilities, need first to explain how gesture, from being an advantage to our species at one point, later became a positive disadvantage!

Suggestions are often made that compared to gesture, speech makes possible finer analysis of concepts, makes possible syntax, grammatical morphology, thus greater differentiation and greater complexity. It is also argued that forms of communication based on gesture would be more conservative than those based on speech, and hold back innovation – and that this might provide an explanation for the long period of apparent stasis in the Acheulean[266]. It may be true that certain forms of gestural communication – what we have called 'natural gesture' are syntactically very simple, lacking for example in morphological endings characteristic of speech, but, as Kendon (91) observes,

> systemic, code-like properties in gestural communication expand in proportion to the range of communicative demands it is employed to meet. p. 59.

– i.e. linguistic properties of code are properties which result from communicative function. This point is particularly important, because if there was an increase in syntactic complexity at a certain point in our history, it was not due to a change from gesture to speech, but rather to an increase in the range of communicative demands made on language, and this can only have been due to an increase in the range of activities in social life.

Thus we have to find a different explanation for the shift from gesture to speech. Many forms of speech – for example, imperative communication, are very simple today. More importantly, we have to caution against pinning too much significance on language, on ideas as the movers of the world. Wonderful as words are, they cannot change the world in themselves. Language can neither promote progress nor hold it back, except as part of more general social developments.

266 e.g. Corballis 2002.

Gesture today

The final point to make in support of gesture theory is that gesture has not withered away as speech has advanced. Gesture today is still a very important part of our communication – whether in manual gesturing or as McNeill has suggested in a translation of original gestural movements to the level of intonation and other forms of prosodic behaviour accompanying speech, such as loudness, voice quality and so on.[267]

267 McNeill 1985 identifies linguistic gesticulation of three types - a) iconic gesturing, related to meaning of utterance, e.g. expressing shape, movement; b) metaphoric gesturing relating to more abstract conception of the content of message, e.g. gestures for 'broadening out', 'contained within', with a cup-like shape and so on c) gesturing with the 'beat' of the spoken utterance, for emphasis, or marking stress, information structure.

5 The making of human beings

This chapter presents a brief outline of what we know about the long slow transition from ape to human. The evolution of our ancestors can be pictured as a series of steps. Long periods where nothing much appeared to happen are punctuated by sudden dramatic changes. These changes seem to have been associated with periods of extreme hardship caused by climate change, when human populations seem to have become so small that there was a danger of extinction. It was probably during such periods that the most dramatic changes in anatomy and behaviour pushed our ancestors further along the road towards modern humanity. We shall be looking specifically at those changes in anatomy and behaviour that might be considered relevant to language.

We need to start by saying that even in the last twenty five years the dates for everything in the pre-human story have been pushed further and further back in time.

For example, a fossil has been unearthed – *Orrorin Tugenensis* – said to be the oldest walking upright specimen, dated to 7 million years before the present (BP), considerably older than 'Lucy', the *Australopithecus afarensis* fossil that was previously claimed to be our oldest ancestor[268]. There is also *Toumai,* around this time, either an ancestor of humans, or a result of interbreeding between upright and tree-dwelling apes – and similarly claimed to be the oldest upright walking ape yet discovered[269]. The split between apes and human ancestors has generally been dated at about 6 million BP, and to have a fairly precise correlation with a dramatic climatic shift, but this theory may need to be revised. Fossils have been found of upright apes that can be dated to slightly after 6 million years. *Ardipithecus Ramidus kadabba* found in Ethiopia is between 5.2 million to 5.8 million years old[270], and has been linked to a similar fossil *Ardipithecus ramidus,* dated at 4.4 million years ago. It is suggested that these are possible ancestors of the later *Australopithecus* finds.

Other finds that push the evolutionary timescale back include Ziegert's evidence that humans lived in settled communities far earlier than the generally accepted time scale

268 Johanson et al 1990.

269 Sahelanthropus tchadensis, see Brunet *et al* 2004.

270 White *et al* 2009.

of 10,000 BP[271]. Goren-Inbar *et al* have produced evidence that fire-making had been learned at least by 790 thousand years ago, and that it was this skill that made possible the first migration out of Africa by Homo erectus – pushing back the accepted view that fire-making came fairly late[272]. In respect of tools, blades, once thought to be characteristic of the Late Stone Age, no more than 40 thousand years BP, have been found at sites dated to 300 and 380 thousand BP outside Africa, and to 500 thousand BP in Kenya[273]. So all the dates that we use in discussing human evolution need to be prefixed with 'approximately'.

Three fairly clear stages have emerged from the archaeological evidence.

- Upright apes, or *Australopithecines,* from 5-7 million years BP to 1.5 million BP
- *Homo habilis* and *Homo erectus* 2.5 million to 300,000 BP
- Archaic *Homo sapiens* 300,000 BP on, developing into modern humans from about 200,000 BP[274].

While these appear to be distinct stages, it is important to bear in mind the gradual changes going on between the apparent leaps from one stage to another, though there is no doubting the transition between upright apes and Homo Erectus.

Evidence for these stages is chiefly from bones, tools and other surviving artefacts. Sometimes a hole in the ground or burn marks on a stick can lead to striking conclusions. The normal criterion for dividing the fossil record – in other words, anatomical evolution – is increases in brain size. There were two phases of rapid increase, one between the early Australopithecines and *Homo habilis/Homo erectus*, and one between *Homo erectus* and archaic *Homo sapiens*, when brains of modern size appear. The other criterion, a behavioural or cultural one, is the record of stone tools, on which basis stages of hominid history are divided according to the tool industries known as *Oldowan, Acheulean, Mousterian*, the implication being that advances in tool technology are associated with other social and cultural advances.

Anatomical advances and cultural, behavioural advances do not necessarily proceed in step. Stone tools first appear in a human context at the time of *Homo erectus*, around 2.5 million years BP, and over time there is a gradual though uneven increase in both brain size and in the variety and efficiency of human tools[275].

271 Ziegert 2007.
272 Goren-Inbar 2004.
273 Morgan and Renne 2008.
274 Though a remarkable discovery of a 'modern' human fossil in Morocco dated to 300,000 years ago suggests an even earlier date. Gibbons 2017.
275 measured by length of cutting edge of stone per kilogram: Leroi-Gourhan 1993; p. 135.

However, as far as language is concerned, the process of human evolution consists of much more than brain size and tool technology. In Wind's words, 'virtually the whole process of hominisation has to be taken into account.' Wind identifies almost a hundred inter-connected features of the human condition that he considers important to the development of language. Some of the crucial anatomical developments that took place at various points in the transition from ape to human were:

- Two-legged walking and, eventually, running. Whatever reasons are proposed for bipedality – new feeding techniques, carrying tools or weapons; carrying food; carrying babies; keeping cool[276]; better distant vision – bipedality was a crucial step for the development of tools, and of language.
- Bipedality created the human foot, different from the ape's. Our upright stance freed the hands and mouth from the function of carrying, which it has in monkeys and other animals.
- If bipedality was a means of cooling the body, it is no doubt linked to hairlessness and sweating, which enabled us to work and travel in the heat. Humans have more sweat glands than any other species[277]. Lack of body hair also made the arms more important for carrying babies, once they could no longer cling on to our hair. Amaral suggests that the lack of body hair, combined with the weight of heavier babies, may in fact have been the prime reason for walking upright, as babies could no longer cling to body hair, and so females had to carry babies in their arms, for at least some of the time[278].
- The hands no longer being used primarily for clinging to branches or for walking. were able to develop finer muscular control. The opposable thumb was important in developing first the power grip and then the precision grip, so improving the manual skills required for manipulating and processing materials, for tool-making, for gesturing and so on.
- The increased ability of the hands to obtain and to process food (e.g. using tools) meant reduced reliance on teeth, jaws and tongue to obtain food directly. The change of diet from apes' vegetarianism to human omnivory, the result of a diversity of gathering and hunting techniques, may explain some of the changes in the tongue and other parts of the mouth – shortening of the jaw and of the roof of the mouth, resulting in changes in teeth and in the shape of the mouth, nose and tongue, all significant aspects of the capacity for speech. The many functions carried out by hands and arms made it more likely that we would eventually prefer our mouths for communication.
- The growth of the brain is linked to the increased number of neural connections governing movements of hands and vocal organs. The increased size of the brain

276 A 60% reduction in heat absorbed when hominid changed from four-legged to two-legged, according to Wheeler 1990; 1992.

277 between two and five million sweat glands: Campbell 1988; p. 324.

278 Amaral 2007.

and hence the skull may have influenced the development of vocal tract, pushing the larynx downward in the throat, and bending the airway (pharynx). Brain asymmetry is linked to two-handed control. Whereas tree-dwelling apes tend to manipulate objects with one hand, while the other holds on to the tree, ground-based hominids developed the ability to hold an object in one hand while working on it with the other. This would lead to the development of a preferred hand, and to the dominance of one brain hemisphere.

- It has been argued that the lowering of the larynx and lengthening of the throat were important for the development of speech, though perhaps not as essential as at first thought[279]. These anatomical changes may have been linked to upright stance and the growth of the brain, but could also have been adaptations to the requirements of long-distance running – the ability to breathe rapidly through the mouth.
- Sexual dimorphism – the difference in size and shape between male and female – reduced over time, implying increased co-operation in social groups, and therefore sharing of tasks and division of labour.
- Female anatomy, a clever compromise between the requirements of bipedality and the requirement of carrying large-brained babies, is also relevant to language. Because of our upright stance, the birth canal is relatively narrow, so babies have to be born at a relatively earlier stage of development, and need increased maternal protection. Earlier birth is linked to the size of the brain and to the need for a longer period of infant learning, and thus of brain plasticity. Our relatively long period of childhood dependency maximises mother-child contact, enhancing communication and learning.

Thus most of our anatomy can be shown to be relevant to the evolution of speech. Our bodies, and our very existence are in every way biological, but by the time we have considered all the above factors we can see that biology alone is not enough. As we piece together human anatomical evolution, we are simultaneously piecing together the story of how human society developed – how food was obtained; how children were raised and integrated into adult society; how sexual alliances were formed; how skills were passed on; the form of social organisation and the form that communication took at each stage. Thus we are examining not just the development of individual bodies and minds, but also of human groups engaged in collective, cooperative activity.

The Upright apes

The first clearly identifiable upright apes are classified as *Australopithecines*, though fossils are being unearthed of earlier species. They are thought to have evolved from a species of tree-living ape not dissimilar from the modern-day chimpanzee or bonobo.

279 e.g. Lieberman 1991.

These apes, while gregarious and not specially aggressive, do not seem to have left evidence of co-operation. Their behaviour can be described as 'egocentric', meaning that while two individuals may be observed to do the same things simultaneously, it is more a case of acting in parallel than in co-operation. So at some point, our ape ancestors must have made the transition to the co-operative behaviour that set them on the path to humanity and to language. This has to be borne in mind in examining the record of their existence.

The split between the common ancestor of apes and humans took place between six and ten million years BP, during a period of global cooling, when areas of forest were replaced by grassland. One group of primates adapted to this change by spending more time on the ground, foraging at the edges of woodland, and in the open savannah. It is believed that this change in habitat led to a complex series of anatomical and behavioural changes. First, in their bodies, these apes adapted to upright walking. Their feet became more like human feet and less like hands. They did not entirely give up tree-based existence. Trees provided them with both food and protection from predators. While they were skilful climbers, they may have been less adept at walking. Senut & Tardieu suggest that while humans are endowed with lax elbow joints and solid knee-joints, making us good at walking but not so good at climbing, *Australopithecines* had lax knee-joints and solid elbow-joints – good for climbing but not so good for walking[280]. Sellers has shown that they lacked the human Achilles heel tendon and that their big toes were splayed out rather than parallel with the other toes as ours are. They were therefore not efficient runners[281].

Australopithecine skulls and teeth were still ape-like. The brain was not much bigger than an ape's, and the ratio of neocortex (new brain) to the overall brain is very similar in *Australopithecus afarensis* (3.29), to chimpanzee (3.15)[282]. There is little evidence of any 'speech areas' in endocasts of Australopithecine skulls. The males had the pointed canines of apes, though smaller in size.

They were quite small. Females were on average just over a metre tall, and males 1.7 metres. This level of sexual dimorphism is roughly the same proportion as among modern chimpanzees[283]. It might appear then that relations between the sexes were the same as among chimpanzees, where the general condition is that one large male dominate a 'harem' of females, and that every so often males fight to establish who is to be alpha male.

280 Senut and Tardieu 1985.

281 Sellers 2005.

282 Aiello & Dunbar 93; p. 188.

283 practically the same as for chimpanzees. Among *Homo erectus* the figure is 83% - McHenry 1994, cited by Aiello 1994; p. 11).; among humans 85%: Campbell 1998; p. 147.

However, there is one significant piece of evidence to suggest that this relationship may have been altering. There was a marked reduction in the size of male's canine teeth. This is partly a necessary consequence of chewing tough vegetation[284], for which molars become more important and canines less so, but the reduction of canines also suggests that males had less use of them for fighting or for threat display. Large canines are an exclusively male feature among chimpanzees, and thus not a reflection of their diet. Their reduction among *Australopithecines*[285] may be an indication that social relations within groups and between the sexes had started to become more co-operative.

It has also been suggested that the small size of female Australopithecines may have been not so much a result of sexual inequality, but more an adaptation to the harshness of their environment. Fossil evidence suggests a poor, low protein diet, and seasonally unreliable food sources. The adaptation to these conditions may well have been that females matured early, and gave birth at a more frequent rate than chimpanzees. It is interesting to note that Migliano explains the small stature of modern pygmy populations as just such an adaptation to the difficult conditions of forest life and high infant mortality rates[286]. A less stable environment gives rise to a need to replace infants quickly if they die. This feature persists in humans today in that female fertility resumes within three to six months, compared to two to three years for apes.[287] In this respect humans are similar to baboons, which also live on the edge of forests and in the savannah.

It is even more remarkable then to come across evidence from the fossils that in this period babies spent longer in the womb and, after birth grew slower, with a longer period of childhood, and therefore of dependence on adult care[288]. In other words, adults did not get bigger, but babies got smaller – they were born at a less mature stage, with more growing to do.[289] One reason for the small size of babies could have been upright walking, which narrowed women's hips and therefore the birth canal. The consequence of this is that babies are born less mature, with a longer period of helplessness and dependence on adult care. Since the need to care for babies is in many ways a disadvantage for a troop of apes on the move, it must have been compensated by the advantages of a long learning period for children. This implies that the *Australopithecine* way of life permitted the learning of a greater number of survival

284 Campbell 1988; p. 231-3; Wind 1983; p. 26.
285 Klein 1989; p. 401.
286 Migliano 2007.
287 Ragir 1985; p. 454.
288 Ragir 1994; p. 2.
289 for example, Macaca mulata monkeys have achieved 65% of adult cranial capacity at birth; chimpanzees 40%; humans only 23% (Gould 1977; 371-2), whereas Australopithecines are estimated to have a capacity of between 25 and 37 % (Leutenegger, q. Ragir 1985; 456).

techniques than any previous apes, and that the young had to learn these skills in order to survive.

Bipedality has an effect on sexual signalling. The sexual swellings of the female ape would no longer be so obvious if they walked upright, so females may have had to develop other ways of showing sexual interest in males – gestures, facial expression, vocalisation[290]. Concealed ovulation has a number of advantages for women. She has the choice of which male to mate with, or indeed whether to mate or not; and since males cannot tell whether she is fertile, they are more likely to stay around and provide food, help to feed her babies, less likely to fight over her[291]. Tanner & Zihlman [292]emphasise the important part played by female choice in the development of social life. The selection of non-aggressive, co-operative males must have happened at some point in our development as humans. It may well have started among the Australopithecines.

The current view of life among Australopithecines is that they lived in a close-knit, but undifferentiated family or troop. When our ancestors moved out of the trees, their habitat was hazardous and exposed to predators and new competitors. Two choices faced our ancestors then: the competitive and the co-operative. The competitive response to danger is that males grow larger and behave jealously, keeping their females and young close to them all the time, as do certain types of baboons. This has advantages, because it means the male is constantly on hand to defend against predators. The disadvantage is that because the dominant male denies other males access to females, fighting takes place and the biggest most aggressive male will end up taking over.

The alternative, co-operative, possibility is to form a large troop of both male and female adults, both sexes cooperating in obtaining food and caring for the young. For this to work, behaviour and with it anatomy have to change to minimise in-fighting and maximise co-operation. As we have seen, there is at least as much evidence pointing to the co-operative solution as to the competitive one.

A number of anthropologists have concluded that the form of social organisation among Australopithecines was the troop, rather than the harem.[293] Woolfson supports Engels' point that early humans living in the primitive troop would have been unable to build more enduring human collectives unless 'zoological egoism' began to be subordinated

290 Tanner & Zihlman 1976b; p. 606.
291 Tanner & Zihlman 1976b; Campbell 1988; p. 244.
292 Tanner & Zihlman 1976b.
293 Donald 1991; p. 45; Livingstone 1973; p. 26; Woolfson 1982; p. 33.

to the social co-operation required for collective labour.[294] Foley & Lee stress the importance to females of stable alliances with males, either individuals or 'with the entire alliance of males'[295].

Eventually membership of the troop – we cannot at this stage use the term 'tribe' – must have become indispensable for survival. Learning started to be a selective factor, so that those who lived with the troop, learning skills from others, became fitter to survive than those independent spirits who, however strong or fit, were more vulnerable to predators or to starvation in lean times because of their isolation. Here is a real material basis for co-operative behaviour. The first step of social organisation along the road to humanity must have been female choice rather than male domination, and co-operation rather than competition.

Tools

There is little evidence of these upright apes making tools of stone, though no doubt they used tools of sticks and unchipped rocks, as do chimpanzees today.

Australopithecine language?

As to the question of whether Australopithecines spoke, or gestured, we can find little evidence from fossils, or from what we know about their lives. Life in the open savannah may have fostered the ability to produce sounds at will, to drive away predators, or drive rival scavengers from carcasses. However, the upper respiratory system of the *Australopithecus* fossil at Sterkfontein 5 is found to be similar to that of great apes,[296] suggesting that Australopithecines would be making ape-noises, rather than human sounds. Nor is there any evidence of the division of labour that has been suggested as the necessary prerequisite for making and exchanging meanings. In the troop, individuals behave the same way, except for the sexual behaviour that is driven by instinct.

Probably the most significant piece of evidence is the fossil record of the transitional period that saw the disappearance of some Australopithecine species and the appearance of *Homo habilis* [297]. There may have been two, three or more varieties of upright ape before 2.5 million BP. Then the African climate changed dramatically, growing suddenly cooler and drier[298]. In the fossil record we no longer find evidence of the small-brained *Australopithecus afarensis* and cousins, but instead at least two larger

294 Woolfson 1982; p. 33.
295 Foley & Lee 1989; p. 904.
296 Laitman et al. 1979.
297 Milo & Quiatt 1993; p.573.
298 Vrba 1985.

upright creatures, one (or two) robust varieties with huge teeth and jaws, apparently adapted to eating coarse vegetation – *Australopithecus boisei/robustus.* The other hominid is smaller in frame ('gracile') and smaller-teethed, but with a larger brain, known to us as *Homo habilis*. There was, in evolutionary terms, a 'speciation' – the emergence of separate species, distinct in morphology and apparently in behaviour. Archaeologists speculate[299] that the two existed side by side, specialising in procuring food from different parts of the habitat, for as long as a million years. The fact that the two species remained separate for all this time, without interbreeding, suggests strongly that they, and by implication their common ancestors, had no way of communicating with each other. We would be justified in our present state of knowledge in concluding that Australopithecines had a system of communication little developed beyond that of apes. Learning and passing on of skills would be largely on the basis of observing and imitating. Cooperative life, however, meant that individuals within the troop may have been more sensitive to, and aware of each other's activities and intentions than today's chimpanzee or bonobo.

Homo habilis and Homo erectus

The global reduction in temperature and associated alterations in rainfall around 2.5 – 2 million BP led to environmental changes in E and S Africa. It is about this time that *Homo habilis* fossils appear in the archaeological record[300], and some time after that, about 1.7 million BP, fossils of *Homo erectus*. *Homo habilis* seems to have been a transitional form between the Australopithecines and *Homo erectus*. Its brain size is variable, though larger than that of the early Australopithecines.[301] The Oldowan tool culture associated with *Homo habilis* finds is very primitive, and it may even be that some Oldowan tools could have been made by Australopithecines. A recent find in South Afrcia seems to represent a late version of *Australopithecus,* one that has many features of *Homo*[302].

Homo erectus signals what is clearly a different species, more human in appearance, size, stature and culture. *Homo erectus* anatomy remained stable for a long time until about 250,000 BP.[303] These were the first unmistakable humans.

299 e.g. Leakey & Lewin 1992, who suggest that the robust Australopithecine may have been hunted and eaten by *Homo* p. 171.

300 Vrba 1985; p.66.

301 see Leakey & Lewin 1992; pp. 110-2.

302 Berger *et al* 2010.

303 Rightmire 1985.

Anatomy of Homo Erectus

Homo erectus can be regarded as having a more or less human body, but a head that still retains some ape features. Long lower limbs gave increased stride length. The feet are more human-like with the big toe parallel to the other toes (Harris, feb 27 2009, Science) and an Achilles tendon like ours– suggesting that these humans could run efficiently. *Homo* was bigger than the Australopithecines and the brain was noticeably larger, the hands more human and capable of the power grip.[304]

The jaw and mandible were shorter, and this reduction resulted in further changes in dentition, and in the shape of the mouth. The roof of the mouth that is flat in apes started to arch. This may have been a consequence of a more varied diet, which would also further reduce the canines in males.

Sexual dimorphism reduced

Throughout the *Homo erectus* period there is evidence of an increase in the relative size of females. Some explain this increase as due to environmental factors, such as adjustment to heat[305] However it is more likely that the increase in size indicates that females were obtaining more high-quality food than previously. *Homo erectus* ate more meat than any modern primate, meat mostly obtained by men but shared with women.

Brain Size

Homo erectus' brain is larger than the Australopithecine brain (900 cc., going up to 1100 cc.). Its skull is human in appearance, with a relatively flat face and high domed cranium, but prominent brow ridges, sloping forehead and heavy jaws. Over a million years the brain size stayed relatively steady, though there is an illusion of average brain growth of the species, due to the increase in female body size mentioned above, while male brains probably remained about the same.[306]

The brain cooling system changed markedly. Endocasts show traces of blood vessels on the inner skull, which suggests that *Homo* species were more efficient than Australopithecines at physical exertion, or long-distance running[307]

Tools and technology

Homo habilis and *Homo erectus* are associated at first with Oldowan or 'pebble' tools – simple stone tools with a single face – and later with Acheulean, bi-faced tools. It is presumed that other simple forms of technology were part of the Acheulean culture.

304 Clarke 1969; p.9.
305 Wheeler 1992.
306 Aiello 1993.
307 Falk 1980.

Evidence suggests that *Homo erectus* made containers, shelters, clothing, traps and may even have started to use fire. In other words they achieved levels of technology and culture well beyond anything that apes are capable of.[308] *Homo erectus* tools are often made at a place remote from where the tool is finally used, implying that materials were carried from one place to another, and possibly exchanged between human groups. There are clearly identified sites where tool-making goes on.[309]

The Acheulean hand-axe is found from sites dated to 1.5 million BP. This is a tool made by chipping stone from two sides to produce a sharp edge. It is symmetrical, regular in form; it fits neatly into the hand. It is found in Africa and the Middle East, but not in Europe or SE Asia until some considerable time later – between 0.7 and 0.5 million BP, possibly in association with archaic *Homo sapiens*. In the areas where it is used, it hardly changes over a period of a million years; what it was used for is not quite clear. Suggestions include a cutter of flesh, a sharp discus for knocking out prey, a kind of all-purpose chopper, or even a digging tool.[310] It is not easy to make – as Toth & Schick have shown in their own attempts to reproduce the technique[311].

Homo erectus spread from Africa into Europe and Asia. This geographical spread in itself is evidence for their capacity to adapt limited technology to a variety of uses.[312]

Hunters?

Homo erectus were probably not great hunters. They are more likely to have been scavengers or foragers, and one of the purposes of their stone tools may have been for cutting the flesh of thick-skinned carcasses. However there is probably not a hard and fast line between hunting and scavenging. It is not so romantic to discover that our ancestors had a lot in common with hyenas, but they were probably in direct competition with them, as suggested by the fact that many carnivore species such as wild dogs decreased in numbers after 2 million BP.[313]

Children

Homo erectus females had a larger pelvis than apes. Tooth eruption patterns appear to be delayed among young *Homo habilis* and *Homo erectus*. These two factors suggest a continuation of the trend to infant helplessness, and prolongation of childhood, that started among Australopithecines. The *Homo erectus* birth canal was probably smaller

308 Campbell 1988; p. 318; Wynn 1988; p. 280.
309 Woolfson 1982 mentions Koobi Fora where tools have apparently been carried from elsewhere p. 13.
310 Gibson & Ingold 1993; p. 33-4.
311 Toth & Schick 1993.
312 Marshack 1989; p. 30.
313 Klein 1989; 182.

than the modern human, suggesting that babies were born small and helpless like modern humans. Leakey shows that babies tripled their brain size between birth and maturity – the modern human ratio[314] – and that while the brain grew quickly, the body (including face and jaws, therefore teeth) grew relatively slowly until adolescence. The Turkana boy, an early *Homo erectus,* was reckoned by Leakey to have been weaned at less than four years and to be sexually mature at 14/15 years.[315] He concludes that the length of childhood was extended over the *Homo erectus* period. This gave ample time for learning the culture of the tribe.

The human factor

To Leakey, *Homo erectus* is a landmark, standing at the dawn of humanity. All before *Homo erectus* is ape-like, all after is more and more human.

Clearly something quite dramatic happened in the period around 2.5 m BP, when some Australopithecines became extinct, some evolved into large, more robust species, and from somewhere emerged the first representatives of the genus *Homo.*[316] What could have been the factor that enabled early forms of *Homo* to survive a natural catastrophe and to set out along the path of humanity? By now it is not only bipedality, since we have both *Homo* and upright Australopithecines. Some Australopithecine species survived by adapting physically, becoming more robust, and specialising apparently in chewing tough vegetation. The gracile *Homo habilis* had no such physical adaptation. If anything they grew less robust, but their brain size increased. To what use was this increased brain capacity put?

The best suggestion we can find is a new form of social behaviour organised round the practice of sharing food – meaning specifically males sharing food with females. and with children. Bearing in mind that babies are born smaller and more vulnerable among hominids than among apes and that they have a longer period of dependency, greater need of care from adults, and more social skills to learn, this would be a critical development that would enable hominids to survive what appears to be a catastrophe at around this time. Elizabeth Burke Leacock makes the point:

> Institutionalized specialization by sex must have been critical somewhere along the line of human emergence. A lengthening period of childhood dependency accompanied growing reliance upon tool manufacture, increasing learning capacity and expanding co-operation, and this prolongation of childhood had important implications for group composition and optimum size. My point is that to meet the problems this posed – or to take advantage of the potentials it offered – the

314 Leakey & Lewin 1992; p. 161; also Milo & Quiatt 1993, p. 571.

315 Leakey & Lewin 1992; p. 143.

316 Foley 1994 shows that extinctions are often linked to catastrophic climatic changes; speciations less frequently so.

> institutionalization of exchange between women and men ... was the revolutionary solution.[317]

The helplessness of babies, combined with the ability of adult *Homo erectus* to travel long distances, implies that the needs of nursing mothers and therefore the survival of the species required a different form of organisation than a large troop chasing around searching for food.

By 1.6 million BP both men and women are eating more meat than any extant primate. This implies male co-operation in food acquisition. Social organisation must have been marked either by alliances of males to prevent fighting over females, or by specific male-female links, maybe polygamous[318]. In other words, emerging from the troop was some form of early tribal organisation.

The home base and the generation taboo

A number of archaeologists have suggested that a feature of *Homo erectus* life was the establishment of temporary camps or 'home-bases'[319]. At some sites evidence has been found of rudimentary shelters, circles of stones and so on[320]. It is suggested that at these sites nursing mothers and children, possibly accompanied by the old and the sick, would feed on locally available sources of food, while other adults, men and adolescents, would forage farther afield for plant food and, increasingly, for meat. The result would be the division of the tribe into two groups, one staying at the base, foraging for nearby foods, the other travelling out to forage at a further distance. The exchange of food gathered by the two groups would thereby become a central feature of social life.

This elementary division of labour solves a number of problems, such as the long period of child care, care of the sick, increased demands for food. The dependency of the young on their mothers makes the choice of a mate more important for women, and this may have led to the gradual emergence of a taboo against their mating with older males – with what would have been the dominant alpha male. It would simply make more economic sense for a woman to choose as mate a fit young man (or men) who could

317 Burke Leacock 1981; p. 229.

318 Foley & Lee 1989; p. 905.

319 e.g. Isaac 1976. Binford 1989, however, questions whether such occupations are 'planned' and integrated into conscious design, suggesting they may be accidental by-products of behaviour 1989 p. 25. This view does not fundamentally alter our argument - just its time-scale.

320 see Klein 1989; p. 403; Campbell 1988; pp. 238-242; Isaac 19762; Donald 1991; p. 114, Hewes 1976 p. 67, Milo & Quiatt 1993; 571. Leakey & Lewin conclude a description of a long debate over Site 50 at Karari, that it was a temporary hunter-gatherer camp, not just the accidental site of a kill - Origins p. 198. The interpretation of these sites has been contested by Binford 1985, who suggests that sites where stone tools are found may coincide with plants requiring bashing, not with residence of hominids. 1989 p. 27.

cover long distances in search of food, particularly in view of short life expectancy. From the point of view of the men, any potential jealousy over who has access to females while they are away is overcome by the taboo on older men mating with the women at the home-base. This would be a first step to language, rules of social behaviour, awareness of 'right' and 'wrong'. Some would see such a level of sophistication as emerging much later in human history – only with modern-type humans in fact[321]. But they then have great difficulty both in explaining what humans were doing for millions of years, and in explaining how the change from ape to human happened when it did.

Home-base organisation would provide the economic basis for the first form of 'family' that Engels and Morgan identified[322] – the generation marriage, the product of a kinship division by generations. In the original form of 'group marriage' proposed by Morgan, all the men of the tribe are regarded as the 'husbands' of all the women, who are the 'wives' of all the men – potentially. This does not imply that everyone had sex promiscuously with everybody else. It does mean that the kinship ties were interpreted in this way.

How are taboos relevant to language?

There is no indisputable evidence for such a development. The theories of Morgan and Engels have been criticised in the past, some for sound reasons, some from moral outrage. Morgan's suggestion is still the only realistic explanation as to how the social organisation of early humans might have advanced from the troop to the kinship systems known to obtain within tribal societies:

- Chimpanzees have no institutional taboos; modern humans have. Therefore some explanation is called for. Chimpanzees may have ways of avoiding incest, for example, adolescents may change groups. It would probably be harder for hominids to do so in close-knit groups out on the savannah. Human populations were very small in the past[323], and therefore there must have been strong pressure on humans for incestuous mating. For society, and for co-operation to develop, some way had to be found of overcoming the twin problems of jealousy and genetics.
- No better or more logical proposal has been put forward than that of Morgan/Engels. The mechanism for this form of marriage is simple. One rule explains it, the generation taboo, a rule with a sound socio-economic basis. With the first form of family would come the institutionalisation of practices associated with sharing food and raising the young.

321 Binford 1985, 1989 ; Davidson & Noble 1989; Mellars 1991; Milo & Quiatt 1993.

322 Engels 1978, much of whose argument is based on Morgan 1877. The suggestion is dismissed by many, not for its implausibility but for lack of convincing evidence.

323 Rouhani 1989; p. 49 estimates population density in the archaic *Homo sapiens* period as 50 people per 500 square miles - one person per ten square miles.

- The relevance of this development to language is clear. Kinship leads to naming of individuals in respect of their social roles. The first such names would be *mother* (though probably not *father*) – *child; brother; sister.* Evelyn Reed suggests also the importance for the individual of identifying with the *totem* of the emerging tribe[324]. So these forms of ideality, symbolising the rules and relationships of the emerging system of kinship, would be much more than simple labels. They would provide a new organising principle for social life.
- As we shall see below, the second step is as simple as the first, and brings us easily to the stage of humanity.

Language in this period

There are still widely differing views as to whether *Homo erectus* had language or not, ranging from those who believe that *Homo erectus* could articulate, to those who hold that language and cognitive planning hardly existed till anatomically modern humans. A number of points suggest that *Homo erectus* were at a particular transitional stage of language development. Matthiessen suggests this stage can be compared to that of children when they start creating one and two-word sentences, with a crude grammar[325].

There is evidence for social organisation around activities requiring tools and there can be no doubt that the needs of child-rearing presuppose some kind of social organisation related to the sharing of food, such as organisation around temporary home bases. This division of labour would hardly be possible without some form of communication.

Homo erectus spread through much of the Old World, from Africa to China, with recognisably similar anatomical features and, in some places, Acheulean tools. If there had been no communication between hominid groups, we should expect evidence of speciation. Few archaeologists claim to find such speciation.

At the end of this period, when brain size started to increase, there was no division among the various *Homo erectus* groups into distinct species. Instead archaeologists recognise a variety of anatomical specimens in different parts of the world, combining features of *Homo erectus* and modern humans. This is indirect evidence for inter-group contacts, without which speciation would have been likely. The transitional forms that archaeologists have grouped together under the catch-all phrase 'archaic *Homo sapiens',* have one thing in common – increasingly large brains. After a certain period no fossils are found with brains as small as *Homo erectus* anywhere in the world. If a geographical or a linguistic separation, had caused *Homo erectus* in one part of the world

324 Reed 1975.

325 Matthiessen 2000.

to become cut off from other hominids, we would expect to find fossils of different species, with different brain sizes – but this does not appear to have happened. The so-called 'hobbits' on Flores may be a remarkable, isolated exception[326]. We now know of another archaic human type, known as 'Denisovan', on the basis of DNA analysis of a human fossil found in Denisova, Siberia. This human relative lived in Central Asia between 48,000 and 30,000 years ago. Krause et al reckon this human is a descendant of Homo erectus, split from the common ancestor of human and Neanderthal 1 million years ago[327].

The conclusion to be drawn is that by the end of *Homo erectus* period there were systematic contacts between human groups in all parts of the world. There was one species, with geographical variations[328]. As among modern foraging groups, they must have had agreements over access to land, exchanged gifts, exchanged information, even personnel and so on. They may have had a system of inter-group communication resembling a simple version of the Plains Indians' gestural language described by Skelly[329].

The transition from Australopithecus to Homo erectus conforms to Gould's picture of bush-like growth – both speciation and extinction of species. However, the transition from *Homo erectus* to modern *Homo sapiens* presents a different picture – an apparently rapid shift from one species to another, with no evidence of extinction, or of bush-like speciation. The record shows a variety of fossils, but no easy grouping into a new species, as happened at the earlier boundary. All the varieties are classified as *Homo*. All have large brains, and a mixture of archaic and modern features, in differing proportions.

This development would fit the picture of a species which already had advanced social communication, alliances, exchange of mates and therefore of genes between groups. When sudden climate change reduced temperatures and brought about sharp changes in the ecology, selective pressure favoured those whose brains, and collective culture, were sufficiently advanced to devise ways of surviving.

One group of *Homo* got shut off from the rest of the world by ice-sheets, but survived the harsh conditions of the Ice Age in Europe for 100,000 years or so. The apparent specialisation of the Neanderthals and the subsequent disappearance of Neanderthal

326 van Oosterzee and Morwood 2007.

327 Krause *et al* 2010.

328 The 'multiregional hypothesis' is argued by Wolpoff 1989; 1992, and seems to be less hotly contested these days.

329 Skelly 1979, and see Chapter 4.

features around 30,000 BP, is evidence of what might have happened at the earlier period, had inter-group communication not already been established.

Tools and language

It has proved difficult to make any general deductions about intelligence and language from tools, though a number of studies have suggested close connections between brain functions governing tool-use and language[330]. In the case of the distribution of Acheulean tool technology we have quite specific evidence of the relation between technology and language.

The lack of apparent innovation over a period of approximately a million years has been put forward as an argument against language among *Homo erectus*. It is argued[331] that skills may have been passed on by imitation alone. Instruction by imitation, it is said, reinforces conservatism, whereas talking about a technique may lead to innovation.

The interesting fact about Acheulean hand-axes is that they are found in some parts of the world in association with *Homo erectus* fossils but not in others, for example Europe, till a great deal later. The key factor determining the presence or otherwise of Acheulean tools seems to be the presence of suitable materials for their manufacture. Toth & Schick argue:

> Even if biface technology was learned primarily through demonstration and non-verbal communication it may well have depended for its long-term survival on verbalised knowledge and traditions to carry it through times and places in which the necessary raw material was unavailable or its location undiscovered. *Homo erectus* may well have been deficient in the ability to verbalize the traditions of Acheulean technology sufficiently to pass such accumulated knowledge on to succeeding generations in a verbal rather than a demonstrative way.[332]

The implication is that the importance of language for the technique of tool-making is not in the matter of teaching the skill, which can still today be done by showing how rather than explaining. Where language makes a difference is in an oral (or gestural-sign) tradition, capable of conserving and transmitting the lessons of past generations, beyond the point where tool-making materials are temporarily unavailable. It seems from the evidence that such a tradition was not established among early *Homo erectus* cultures, and on the basis of the spread of Acheulean technology, not until between 700,000 and 500,000 BP.

330 as suggested in Wynn 1993; Gibson & Ingold 1993; Greenfield 1991.

331 Davidson & Noble 1989.

332 Toth & Schick 1993; p. 35.

Language of Homo erectus?

The possibility of a gestural language among *Homo erectus* has been proposed by a number of writers from various fields.[333] Merlin Donald has suggested that this would have developed out of what he calls 'mimesis', something that is different from imitation and mimicry in that it involves the invention of intentional representations – as in e.g. pantomime[334].

> Mimesis is the basis of group co-ordination. In the absence of words and symbols, thought is pretty well limited to the act of event modelling and representation; no further analysis is possible.[335]

The requirement to co-operate in activity not only makes possible an increase in the ability to control the environment. It also leads to the basis of mimesis – the recognition of the importance of other members of the group, and the importance of their activity to one's own survival.

Archaic Homo sapiens

After a million years or more of *Homo erectus*, a further change in climate between 0.9 and 0.5 million BP led to a series of changes in human populations. The remaining Australopithecines became extinct[336], and among *Homo erectus* a phase of brain size increase, and other anatomical changes, led into the transitional types generally labelled archaic *Homo sapiens.* Aiello (1994) shows how brain size increased dramatically starting around 500,000 BP.

It was once thought that this period saw two evolutionary leaps, one from *Homo erectus* to archaic *Homo sapiens*, including the Neanderthals, and then a subsequent leap to anatomically modern humans at about 50,000 BP. That view has been abandoned as the origin of moderns is progressively being pushed back to round 200,000 BP[337]. It now seems more accurate to say that modern humans were one variety emerging in southern Africa, at the same time as the Neanderthals were living in Europe, cut off from the rest of humanity by Ice.

During the transition, from 5-400,000 BP, brain size started to grow, as smaller brained hominids disappear from the record. Transitional types appear in Africa, Asia and Europe, showing modern features mixed with archaic ones, like brow ridges. Specimens

333 Lock 1983, Donald 1991, Jaynes 1976a, Hewes passim, Milo & Quiatt 1993.

334 Donald 1991; p. 171.

335 Donald 1991, p.176.

336 *Australopithecus robustus* and *boisei* - Vrba, p. 68, though others see the extinction of robust australopithecines earlier - 1.5 mya, according to Milo & Quiatt 1993. Foley (1994) shows that climatic changes correlate quite well with extinctions, not so well with arrival of new species.

337 Or even 300,000 if the dating of the Moroccan skeleton are confirmed – see Gibbon 2017.

found in Java, Beijing, Heidelberg in Germany, Broken Hill in Southern Africa, Petralona in Greece, are all examples of intermediate types. Leakey's description of the Petralona find illustrates this mixture of features:

> Petralona ... is older than any Neanderthal, possibly dating to about 300,000 years ago. It has a big brain, about 1250 cc, which is a hundred less than that of the average living human; its face is thrust forward less than in *Homo erectus* but more than in modern humans; its brow ridges are less prominent than *Homo erectus* but more than in modern humans; the cranial bone is thick. A good mix of old and new, an apparent mosaic of features.[338]

The transition from *Homo Erectus* to archaic *Homo sapiens* takes on quite a different appearance from the earlier transition. It is as if a whole species underwent a tortuous change in anatomy, as a variety of routes were followed to an adaptation of skull and neck that could accommodate a larger brain.

The fact that clearly separated species cannot be identified throughout this period, and that transitional types are found in all three continents of the Old World, suggests strongly that hominid groups are in contact, and genetic features are being exchanged between the groups. The number of humans in the world at this time was extremely small – maybe a million individuals in all.[339] Therefore contacts between groups would have been a matter of some importance.

Technology

Around 250,000 BP the improvements marking the Mousterian tradition in stone tools – the 'core and flake' technique – start to appear. This technique involves preparing a core, then knocking flakes off the core, either by precise punching or applying pressure. Archaeologists who have attempted to replicate these tools find that it takes a lot of learning:

> Experiments with graduate students show that whereas one day and simple imitation and observation are enough to learn how to make the earlier type of simple tools, it takes more than one semester and specific instruction to master the core-and-flake technique.[340]

Complexity of tools and technology does not ultimately provide conclusive evidence for either social complexity or cultural development, but it gives an idea of the level of manual and therefore mental skill attained by archaic *Homo sapiens* in the Mousterian period. Other evidence of cultural achievements – control of fire; construction of shelters; preparation of animal hides for clothing; – are strongly suggestive of well-

338 Leakey pp. 209-210.

339 Rouhani 1989; 49.

340 Lieberman, quoting Washburn 1969; 175), p. 160.

developed social organisation and culture, based on co-operative labour and hence some form of language.

Marshack has assessed the level of skill involved in such achievements as the construction of a shelter based on posts in holes by archaic *Homo sapiens* at Terra Amata, around 3-400,00 BP:

> The pre-Mousterian structure at Terra Amata, therefore, suggests planned activity, practical and symbolic, the presence of some sort of cognitive map and model of the functional, cultural territory that was structured in time and space, the use of diverse materials and technologies, and use of the 'hole' and perhaps the container.[341]

Fire, diet and anatomy

While there is some evidence of use of fire among *Homo erectus*, the consistent control of fire appears during the transitional period.[342] Second to stone tools, the control of fire is probably the most significant human technology. Fire externalises part of the digestive process; not only making meat easier to digest, but also vastly increasing the range of vegetable foods that can be eaten. Brain size increase at this transition could be related to increases in animal protein in the diet and more energy-efficient food preparation. The suggestion is that this meat was obtained by new techniques of long-range hunting[343], and made efficient use of by fire and cooking.

So growth of the human brain is a result of human technique – a wonderful illustration of the truth that 'Humans made themselves'. The human brain seems to have stabilised at the modern size by about 300,000 BP in these transitional early *Homo sapiens.* Some Neanderthal fossils have slightly larger brains even than modern humans, but this may be because their body mass is larger, requiring more neural connections for their muscles.

Social effects of Fire

Fire solves once and for all the problem of male selfishness, which so vexes those who see humans as intrinsically competitive. Their problem is to explain how, once the techniques of hunting are acquired by humans, women can ensure that male hunters bring back their meat to be shared. This problem has led to a number of fanciful accounts (such as Knight's sex-strike theory[344]), which become redundant when you realise that once the human body becomes accustomed to eating cooked meat, it is not possible for

341 Marshack 1989; p. 12.
342 Ragir 1985; 1994; Strauss 1989; p. 490; de Grolier 1990; p. 90.
343 Brace 2000.
344 Knight 1991.

it to digest raw meat any more[345]. Hunters, having been reared to eat cooked meat, could not keep meat to themselves, even if they wanted to, as long as fire-tending was the province of the women at the home-base.
Leslie Aiello points out:

> With the use of fire for cooking, females acquired, perhaps for the first time, through control of food preparation, systematic access to meat. Easy-to-digest higher-protein diets for females not only reduced the size dimorphism between adult males and females but also maximised foetal growth, resulting in increased cranial volume and body size in both sexes.[346]

And Sonia Ragir argues:

> Controlling fire for cooking marks the first undeniable evidence for modern human social organization – the accumulation of food, sexual-based division of labor and redistribution of produce.[347]

Fire is also of course an indirect form of evidence of the use of language as a psychological tool. Bickerton makes the point that it is hard to imagine fire being handled by a species with no system of signs, to overcome fear and panic. Language would 'uncouple stimulus and response'.[348] We use language to overcome not only our environment but our own natures – animals' instinctive fear of fire.[349] The reaction of the chimpanzee Austin to an indoor sparkler, signing 'straw give scare', suggests the instinctive reaction that had to be overcome.

Forms of language must have arisen arose around fire-keeping and fire-making, to conserve and transmit details of this crucial technology – one of the first technical registers.

Thus archaic *Homo sapiens* developed a technology to help survival in glacial conditions, and make possible survival in Ice Age Europe.

Anatomy for language among archaic *Homo sapiens*?

Fire and cooking contributed to further anatomical changes. At the beginning of this period, Aiello notes that the human rib cage changes from tent to bell-like, as the gut reduces, consistent with the reduction of demands on the digestive system.[350] Fire may also have had an influence on the evolution of speech. The mouth, teeth and jaws have

345 See Wobber et al 2008.
346 Aiello 1993, quoted by Ragir 1994; p. 589.
347 Ragir 1994; p.13.
348 Bickerton 1990; p. 141.
349 Sherman and the sparkler: "straw give scare" - Savage-Rumbaugh 1986; p. 284.
350 Aiello 1993.

less work to do once food is cooked, so the jaw reduces further, re-shaping the face. A more generalised diet also means the mouth is less specialised, leading probably to increased flexibility of the tongue.[351] Laitman (1983), considers that archaic *Homo sapiens* around 300,000 BP had the vocal apparatus requisite for human speech.

Language among archaic Homo sapiens*?*

We have seen that at the end of the long *Homo erectus* period, brain size increase led to humans with modern-size brains. Brain tissue is expensive to maintain – it requires above all protein, and therefore meat. The species must have needed that extra brain capacity, and we have to ask what were they using it for? Clearly a whole range of new social activities characterise archaic *Homo sapiens* life – the building of shelters, making of fires, and other skills become a regular part of life.

Are these activities evidence for language? There seems little doubt. Perhaps the most revealing activity is tool-making, where we can compare the distribution of the Acheulean hand-axe and the Mousterian core-and-flake technique associated with the later stages of the archaic transition. The fact that the Mousterian technology spreads across large parts of the world, whereas Acheulean hand-axe technology seems to have stopped short at the point where materials were no longer available is suggestive of the kind of advance that must have taken place in communication in this period.

A true transition

At the end of the long and stable period of *Homo erectus* a number of changes were taking place among human populations across the world, changes that foreshadow modern human existence – a sophisticated tool-making technique, the control of fire, the development of technologies of construction, clothes-making, the development of inter-group contacts and clear evidence of a sexual division of labour. Diet improved, brain size and bodily proportions approached modern human form, while the picture of child growth approached the modern pattern.

These were unmistakably human people. We do not know whether they were speaking languages like ours, but there are strong suggestions that they had the capability to do so, and certainly that they had some form of oral/manual sign tradition of conserving and transmitting information across generations.

The Neanderthals

Despite a wealth of archaeological evidence about the Neanderthals and volumes of commentary, it is still very hard to get a clear picture of Neanderthal existence. The

351 Brace 1979; Wind 1976; 1989.

picture is undoubtedly clouded by at least a century of prejudice – what C L Brace calls 'Neandrophobia'. This prejudice is fast disappearing, since the discovery that modern Eurasian humans share a small but significant proportion of Neanderthal DNA[352]

Neanderthals lived from around 300,000 BP to 30,000 BP[353]. Like anatomically modern humans (AMHs), they evolved from archaic *Homo sapiens*, but in a different direction, apparently developing an anatomy adapted to life in cold northern conditions, and to a specialised technology and culture. After about 30,000 BP they, or at least their anatomy, seem to have disappeared completely[354]. It is still not certain whether they were displaced or integrated into the mainstream of AMH life[355].

At many sites in Europe and SW Asia, over a period of almost 60,000 years Neanderthals and AMHs lived practically side by side, though whether simultaneously, or whether their occupations of sites alternated – Neanderthals in colder weather, AMHs in warmer weather, is still unclear.

Anatomy

Neanderthal anatomy differs from that of AMHs in a number of ways. The Neanderthal head had a distinctive shape, dominated by a long, projecting face that seems to be related to the size and strength of the front teeth. Biomechanical studies of their facial morphology, and evidence of accelerated rates of wear on these teeth, indicate that they habitually put great strain on their front teeth, for purposes not associated with eating, possibly using them as a vice. Their heavy brow ridges were probably associated with the size of the teeth and jaws – the brow-ridge strengthening the skull at a point where jaw muscles are anchored[356], and possibly also protecting against the cold, air chambers behind them acting as insulation. Their skulls were also distinguished by an occipital bun – a projection at the back of the skull, whose function is again obscure, but which may have had the function of balancing the weight of bone in the face and jaws.

Like other archaic humans, they were powerfully muscled, in both upper and lower limbs. Compared to moderns, their arms were not so well adapted to throwing, and their

352 See Pääbo 2014.

353 these dates are constantly changing. For example, a recent find at Altamura, dating as far back as 400,000 BP, has been proposed as an early Neanderthal: Dorozynski 1993.

354 Shackley suggests that sightings of "wildmen" in parts of the world may reflect survival of some Neanderthals.

355 Beaken 2017.

356 Trinkaus 1989; p. 52-3.

hands shaped to maximise power rather than precision in their grip[357]. While Neanderthals used spears, it was probably for thrusting rather than throwing.[358]

Neanderthal limbs show great strength and endurance which suggests they spent a significant portion of their waking hours moving continuously across the landscape, far more than did early modern humans. Evidence for a very active lifestyle is also found in the muscle attachments to bones. Their noses were big and capacious, apparently designed to dissipate heat and therefore an adaptation to a vigorous lifestyle.[359] Neanderthal brains were as big as those of modern humans, in some cases even slightly bigger[360];

Between 50,000 and 30,000 BP., AMHs made their way into Western Europe, probably from Africa via S W Asia. After 30,000 BP there are no further records of classic European Neanderthals.

Were they a separate species?

It would be a mistake to think in terms of a simple division of all late archaic *Homo sapiens* into two types, one Neanderthal and one looking like ourselves. There was throughout the archaic *Homo sapiens* transition a great variety of anatomical types, and the development of modern humans was not smooth[361]. In fossils found at Kebara in S W Asia, Arensburg claims to find such a mosaic of characteristics, modern, Neanderthal and archaic traits, that he prefers to talk of the diverse types in the period 90-35,000 BP as 'Mousterian' – defining them by culture rather than anatomy[362]. Wolpoff, Frayer, CL Brace are reluctant to accept that Neanderthals form a separate species, seeing them as a regional variation of a general human species. Marshack too sees the Neanderthals not as a separate species, but part of the general human line, which had great variation.

Nevertheless it is clear that there is a distinct physical type associated with the 'classic' Neanderthals of western Europe, central Europe and the Levant, and that this was probably a combination of anatomical and behavioural adaptations to the conditions of the Ice Age, and to a long period of isolation of Western Europe behind extensive glaciers.

357 Trinkaus 1989; p. 49.
358 Trinkaus 1989; p. 51.
359 Trinkaus 1989; p. 57.
360 Leakey & Lewin 1992; p. 204.
361 Kidder et al 1992; p. 175.
362 Arensburg et al 1989; p. 170.

Neandrophobia

For over a century studies of the Neanderthals have been distorted by a tendency to look on them, backwards from our time, as defective human beings, rather than as a successful adaptation to the circumstances of their time.

One school of thought is that once AMHs moved into Western Europe from the South and East, the Neanderthals gave way in the face of a superior people, gradually being driven away from their sources of food and becoming more and more marginalised.

Trinkaus' explanation is that modern humans in Africa had undergone a transition to the classic hunter-gatherer way of life, with flaked stone tools, and techniques for long-range hunting. When they found their way into Europe, and encountered the Neanderthals, the technological superiority of the moderns enabled them to supplant the Neanderthals:

Western Europe, as a geographical cul-de-sac, stands out relative to the rest of the western Old World, in the lateness of the transition, its rapidity and the essentially fully developed modern human nature of the emerging hunter-gatherer adaptation. It may well be that by the time the transition took place in that region, most of the primary elements of the transition had taken place elsewhere, the different core aspects of a modern human hunter-gatherer adaptation had coalesced, and the contrast between the human population spreading westwards from central Europe and the resident Neanderthals was sufficient to lead primarily to replacement through competition rather than the gradual blending and reorganisation of elements apparent elsewhere. [363]

The assumption that they did become extinct has led to a search for reasons for extinction, most of which have focused on supposed deficiencies of the Neanderthals. Some have suggested cognitive deficiencies, proposing that in comparison with AMHs Neanderthals were culturally conservative, their tool-making imitative, rather than innovative; that they were inefficient hunters, not planning their operations, but dashing around after their prey in an ad hoc fashion; that they may have been incapable of moving in a straight line over the landscape[364]; that their tool kits reflect an immediate response to immediate problems – on the spot improvisations, lacking planning and forethought[365]; that they had a 'shallower group memory', and therefore a denser

363 Trinkaus 1989; p.65-6.

364 an inference drawn from observations of different cross-section of leg-bones in Neanderthals and AMHs. For Trinkaus, their 'endurance- and strength -related locomotion was thus also poorly directed towards points in the landscape' Trinkaus 1989; p. 55.

365 Binford, cited by Mellars 91; p. 70 referring not just to Neanderthals but to the Middle Palaeolithic generally.

population relative to the carrying capacity of the environment[366]; that their fires were thermally less efficient[367]; that their life-style was a lot harder, and their children died relatively young. It is also implied that they were so ugly that no self-respecting human would want to have sex with them.

Many of these myths have been answered by those who have studied the Neanderthals carefully. The Neanderthals were not particularly unusual for their time, the Middle Stone Age. Humans in Africa, contemporary with the Neanderthals, were no more advanced culturally. Marshack insists:

> the available evidence for complex problem-solving... is greater among the Neanderthals during the Mousterian period than it is during the same period in areas outside of Europe, including the Near East and sub-Saharan area of supposedly anatomically modern origin.[368]

At the nearby Middle East sites of Kebara (Neanderthal site) and Qafzeh (AMH site), were found basically the same types of tool and the same types of activity – not even minor variations in tool use. This challenges the idea that these constituted behaviourally and cognitively different populations. Marshack argues:

> Bit by bit, the accumulating data seem to be suggesting that despite morphological and historical cultural differences, the range of potential capacity for problem-solving and symbolizing among the two hominid groups was similar and comparable, if not precisely 'equal.[369]

Other writers have pointed out their considerable achievements. They buried their dead. They used the technique of producing red ochre from yellow stones by fire. They used animal parts in ritual ways. They built shelters, using posts for construction, and possibly animal skins for the fabric[370]. They were probably specialised in the treatment of hides and in clothes-making[371]. They had the skill to hunt large animals such as bison, and in so doing often suffered serious injuries[372]. They hafted stone points onto handles[373]. They exchanged materials, such as stone, over long distances[374]. Their core-and-flake tool-making technique required a high level of skill.

366 Whallon 1989; p. 452, referring to the Middle Palaeolithic.
367 Trinkaus 1989; p. 63.
368 Marshack 1989: pp 1-2.
369 Marshack 1989; p. 24.
370 Marshack 1989; p.9, stressing the conceptual advance implied by the use of holes in construction.
371 Campbell 1988; 413.
372 Hayden 1993; p. 138.
373 Marshack 1989; p. 11.
374 Hayden 1993; p. 137.

Significantly, the last Neanderthals found at St-Césaire are associated with the Chatelperronian industry – recognisably modern forms of tools and body ornamentation[375], evidence of the ability of Neanderthals to participate in the culture of AMHs.[376]

It is quite clear that the Neanderthals must have had a functioning language, enabling them to organise labour and social life. If it is borne in mind that they are part of the world population of archaic *Homo sapiens,* they are as well endowed linguistically as any contemporary human group.

Could they speak?

In studies of Neanderthal capacities for speech we find a similar tendency to judge them from our viewpoint, looking backwards. Lieberman's suggestion that the Neanderthal vocal tract was so different from the modern human that they could not produce the same vowels was called into question by the discovery of the Neanderthal at Kebara, with a hyoid bone very similar in shape and position to the AMH hyoid[377]. The hyoid bone is attached to the vocal cords in our throat. The discovery indicates that Neanderthals had the physical capacity to speak as well as we can.

In any case, it is a mistake – as Schepartz has argued – to assume that human speech can only be produced by anatomy exactly like modern humans. The human larynx and supralaryngeal arrangement is only one of a number of configurations that are capable of producing speech with the full array of human characteristics[378]. We can speak with a cold, with cleft palate, with 'tied tongue', and when parts of the tongue or even the whole of the larynx are removed by surgery. Mynah birds and parrots, with very different anatomies from ours, are well-known for their ability to produce very human-like sounds.

There is certainly no basis for proposing that Neanderthals became extinct because they were not efficient speakers, and no reason to suppose that Neanderthals could not also learn to speak and communicate with AMHs perfectly well. There is certainly no evidence for the physical liquidation of Neanderthals by AMHs. The emergence of co-operative, egalitarian foraging society is hardly likely to have been based on mass slaughter.[379] It is reasonable to suppose that Neanderthals became integrated with AMHs. The Châtelperronian finds indicate that they were able to adopt the latest

375 so modern that some have ascribed them to anatomically modern humans, though it is fairly certain that they are associated with Neanderthals - Schepartz 1993; p. 117.

376 Mellars 1991; p. 72.

377 Arensburg et al 1989.

378 Schepartz 1993; p. 103.

379 bearing in mind that this replacement must have taken place world-wide.

technology, to start to take part in regional alliances and trade networks[380], in short, to live as part of the modern human world.

Wolpoff's solution to the puzzle is gene flow (interbreeding), with selection. He argues that the Aurignacians, a later group of humans, have features of both Neanderthal and AMH, plus other features that are unique. As technology came more and more to carry out the tasks that had been previously required of anatomy, selection would favour the more gracile, and reduce the archaic characteristics, the mid-facial projections, the large teeth, the brow ridges, the heavy muscling and heavy bones.[381]

Reduction in robustness is a form of selection for economy of energy in the organism[382]. Female AMHs showed reduction in robustness somewhat earlier than Neanderthals did,[383] though nobody talks about the disappearance of archaic *Homo sapiens* women.

Trinkaus' question, 'What were the selective advantages of the modern human adaptive pattern?'[384] is easier to answer if reversed: 'What were the disadvantages of the archaic anatomy?' Simply, it was expensive to maintain. Gracility is cheap, easy to maintain. Why retain muscle that you do not use?

Many features of Neanderthal anatomy – brow-ridges, flat skull shape, robust anatomy, heavy jaws and large teeth – are typical of archaic *Homo sapiens* across the world, and these features disappeared throughout the world[385]. The explanation that they disappeared because they became redundant, and were expensive to maintain, once technology replaced anatomy as a way of achieving the same ends, is more convincing than a world-wide displacement by AMHs, or world-wide extinction.

What happened in Europe?

If there really was a dramatic change prior to the Upper Palaeolithic in Europe,[386] the most likely explanation is that while the European Neanderthals, isolated among the glaciers, stagnated culturally and technically, AMHs humans elsewhere in the world advanced. When this new culture reached Europe, Neanderthals, or at least some of

380 Wolpoff 1989; p.124.

381 Interbreeding between humans and Neanderthals is now proven: see Pääbo 2014.

382 Frayer 1992; p. 220.

383 Soffer 1992.

384 Trinkaus 1989; p. 48.

385 Though heavy brow ridges can still be seen among European men. See for example the statue of Charles Darwin in the Natural History Science Museum, London – http://en.wikipedia.org/wiki/Natural_History_Museum

386 this is disputed by Bednark, who sees the so-called middle to Upper Palaeolithic transition as an invention of archaeologists, that can only really be sustained in Europe; elsewhere, there is no evidence for an abrupt transition. 1994; 381. See also McBrearty and Brooks 2000.

them, assimilated it, and underwent gracilisation. A comparison can be made with a later stage of human history, when Africans, who had missed out on Bronze Age technology, proved quite capable of assimilating Iron Age technology when it was introduced.

All the significant achievements associated with modern humans – the cave art, body ornaments, the delicate stone tools, all the evidence of a higher forms of culture – came long after the end of the Neanderthal period, between 5 and 10,000 years later. It is these that are usually put forward as evidence of the superior cognitive abilities of modern humans, but the time lapse before they are found in the archaeological record undermines the argument[387].

Genetic tests

The question of whether Neanderthals were eliminated or absorbed by the incoming modern humans still remains unanswered. Geneticists have proposed a familiar way of finding the answer – a DNA test. The work of Svante Paabo and his colleagues has demonstrated that there was certainly some interbreeding between Neanderthals and humans in Europe and Asia. An identifiable amount of Neanderthal DNA, between 2 and 5 percent – was found in a sample of modern Eurasian humans – but none was found in the Africans in the same sample[388].

The idea that Neanderthals were absorbed into modern human populations is also supported by some fossil evidence indicating possible intermixing of the two population. The Lapedo Valley fossil of a four-year-old child buried some 24,000 years ago revealed a combination of features, such as a modern-looking chin and Neanderthal limb proportions, suggesting that the child resulted from interbreeding between Neanderthals and modern humans[389].

The 'human revolution'

For years people have marvelled at the centuries-old paintings in caves such as Lascaux in southern France. These were the creation of modern humans in the Late Stone Age, some 30,000 years BP. This period has been found to be extraordinarily rich in cultural achievements. Not only cave paintings but other evidence of a rich cultural life – fine tools, body ornaments, antler carvings. Evidence also of more sophisticated hunting techniques than ever before[390].

387 Campbell 1988, pp. 394, 442.
388 Pääbo 2014.
389 Trinkaus et al 1999.
390 Binford 1989; p.35-6.

The argument has been proposed that the cultural and technical advances of this period were the result of the final step in the creation of complex, fully syntactic, fully modern human language.[391] It has been termed 'The Human Revolution', as if this was the first appearance of modern hunter-gatherer culture. However, those who take this view have to explain how human language could suddenly appear, in evolutionary terms almost overnight. Such an interpretation is almost forced to fall back on the explanation of language as the biological product of a new species of human. The argument is increasingly undermined as the period of the origins of modern anatomy is pushed further and further back, currently to around 200,000 years BP, nearly 150,000 years before the 'human revolution'.[392]

McBrearty and Brooks reject the idea that Europe was the place where modern human behaviour and culture emerged. They see evidence that this was happening in Africa long before the European Late Stone Age[393]. Schepartz similarly finds no evidence for the hypothesis that this cultural explosion was the result of a sudden arrival of human language.[394] 'The capacity for complex language was part of the human adaptation for a very long time.'[395]

It seems more likely that the achievements of the Late Stone Age in Europe were the culmination of a development of human social organisation and technology that had been going on for thousands of years. Marshack finds time and again, in a whole range of activities – hafting, use of bone, use of red and black ochre – that there is no major leap or major invention in this period, but simply a change in technology and culture. Moreover, it was one that did not persist, or spread very widely to other areas.[396]

The best explanation of the flowering of the Upper Palaeolithic – the magnificent cave paintings, ivory carvings and so on – may be a fortuitous abundance of game, the result of climatic conditions, that in fact disappeared in the later Mesolithic period, when a warmer climate replaced grassland with forest, and the large herds of bison and antelope disappeared. In this later period the cave paintings and many other forms of art similarly disappear from the archaeological record[397].

391 Mellars 1991. Davidson & Noble 1989 argue that 'depiction' was the crucial factor in developing both language and art.

392 Evidence from studies of mitochondrial DNA, while extremely interesting and provocative, tend to shift their ground from one study to the next, and do not all support the out-of-Africa replacement hypothesis - see Templeton 1993; Cochran and Harpending 2009.

393 McBrearty & Brooks 2000.

394 Schepartz 1993; p. 119.

395 Schepartz 1993; p.120.

396 Marshack 1989.

397 as suggested by Gordon Childe 1965.

Development of the tribe

It was suggested earlier in this chapter that the form of the tribe changes to fit in with ways of obtaining and distributing food at different historical stages. In the transition from ape to human society, organisation of foraging around a temporary home-base may have led to division of the Australopithecine troop into two groups, on the basis of which a first incest taboo was established, prohibiting mating or marriage between parents and children.

According to Morgan, the next stage of kinship sees a division among children of the same generation, such that brothers and sisters do not marry.[398] Morgan's scheme is simple, and quite elegant. In the troop, there are no divisions. Everybody belongs to everybody else; all children are the responsibility of the troop; all old people are regarded as the parents of all young people. The first division of the troop, by age, introduces the generation taboo. The second division, by gender, introduces the brother-sister taboo, and that splits the tribe into two clans.

We know that both these steps must have taken place at some point in human history, in order for the modern form of the family to have emerged. The only question is, when?

The brother-sister taboo may have been the eventual result of a development of the division of labour, when men and women started to specialise in their food-gathering – women gathering plants, and men foraging (either hunting live animals or scavenging). There are serious disagreements about when this division of labour and the consequent practice of sharing food might have been established. Binford suggests that it was really quite late, just before the appearance of modern humans[399]. Others set the time much further back. It may not even have been the development of hunting that was the crucial development, but the discovery of the control of fire, which was certainly well established among archaic *Homo Sapiens*, from 500,000 BP. If females were the ones to tend the fire, this would ensure that hunted or scavenged meat was shared.

Brother looks after sister

We know that kinship systems in foraging societies are generally organised around the obligation of brothers to feed their sisters' children, rather than that of husbands to feed their wives', and therefore their own, children, as in more recent societies. This obligation would seem to be a fundamental organising principle of the exchange of food, and must have a history as long as that of the family. The close relationship between brother and sister to which it attests suggests that brother-sister mating may indeed have been a feature of early human kinship, and that it may have been abandoned

398 Engels 1954; p. 42.
399 Binford 1985.

relatively late in the history of our species. What reason might be found to explain the gradual abandoning and eventual prohibition of this relationship?

Effect of taboos

One practical effect of incest taboos is that they force individuals to seek mates outside their immediate family circle, encouraging alliances across groups and even across tribes. This is easily understood if you imagine the effect on a woman's children with and without the incest taboo. Suppose a woman has ten surviving children, five boys and five girls. Without any taboos, the children would simply form part of a large troop, travelling around, procuring food together, mating freely. Males would provide food for their sisters' children, and women's' control of fire would help ensure that food continued to be brought back home by their brothers.

However, once the brother-sister taboo is established, the effect on social organisation would be dramatic. Instead of ten individuals in one group, we would have two groups, each of five children, plus five mates from other groups. Instantly you have not only twice the number of adults active, in two clans within the group, but also a series of links with up to ten other human groups, based, we assume on the basis of present-day arrangements among foragers, on agreements by husbands to provide food to the wife's family, in addition to the traditional obligation of brother to provide food for the sister's children. Each woman has now potentially doubled the supply of food for herself and her children, and each individual is for the first time part of a network of marriage-based alliances. The importance of alliances is not only their part in stimulating the collection and distribution of food, but also the fact that in bad times, you can turn to your in-laws for support, and vice-versa. The more alliances a group has, the better chances it has of survival. It may have been this very practical consideration that led human groups slowly to abandon and finally forbid incestuous marriages.

If, as Hayden argues, recruitment is important to foragers,[400] exogamy is the logical step to increase recruitment and alliances. The harder life is for a human community, the more taboos they are found to observe. For example, among aboriginal Australians in some arid areas, men may have to travel for hundreds of miles to find a woman they are allowed to marry, because of the number of kinship taboos in operation. The more taboos, the more pressure on the individual to take part in forming alliances over long distances and the better insurance against hard times[401]. The smaller your group internally, the greater your need to build its alliances externally. Kinship systems thus provide a flexible means of responding to varying resources.

400 Hayden 1993.

401 Whallon 1989. The importance of alliances for survival in the Arctic is emphasised by Chance 1990.

There is evidence just prior to the Upper Palaeolithic period in Europe, of the beginnings of regional trading networks, long-distance exchange of goods and so on.[402] Interestingly they are first noticed among the Chatelperronians, the culture marked by adoption of modern human technology by the resident archaic human population – the meeting, as it were, of two cultures:

> First established in the Chatelperronian ... an industry associated with the latest Neanderthals of the region, these networks expanded to include extraordinarily broad areas that came to be characterized by singular cultural norms.[403]

While this is not a conclusive argument for the establishment of the incest taboo at this time, it sets a final date for its establishment[404]. Such a system of alliances is indeed what you would expect the incest taboo to produce. If it was contact with AMHs that led to this dramatic change in the culture of Neanderthals, then it would be reasonable to want to explore the possibility that the 'intangible difference' of the Neanderthals is the result of their kinship structure, transitional between apes and humans – where a generation taboo is established, but not yet the brother-sister taboo.

The picture that emerges of human society after the Upper Palaeolithic transition resembles that of today's foraging societies – small bands, whose members are allied by cross-marriages with neighbouring bands[405]. O'Shea & Zvelebil note an extensive contact network in the foraging society of northern Russia in the much later Mesolithic, a period much poorer in resource terms than the European Upper Palaeolithic, in an environment of low population density.[406]

Hayden has argued that we might expect to find evidence of alliances and aggregations among people prior to the Upper Palaeolithic[407] – but it is not clear that there is any such evidence yet. Evidence for the emergence of cross-group alliances, with exchange of goods, regular gatherings of the clans, would confirm or disprove the hypothesis proposed here – that it was exogamy that made the difference between Neanderthals and modern human cultures.

Origins of Hunter Gatherer Life

One thing on which there is general agreement is that after the Upper Palaeolithic, certainly by about 20,000 BP, human beings in Europe, Asia, Africa, were living more or

402 Binford 1989; p. 36.
403 Wolpoff 1989; 124.
404 Headland and Reid (1989) have argued that inter-group contacts between foraging groups have a much longer history than commonly supposed.
405 Whallon 1989.
406 O'Shea & Zvelebil 1984; p. 37.
407 Hayden 1993.

less as today's hunter gatherer societies today, perhaps without some of the more ingenious technology such as poisoned arrows or boomerangs.[408] Whallon has shown that the hunter gatherer adaptation enables humans to live in a less resource-rich and more unpredictable environment than primate models of dominance and limited co-operation would permit, [409] and for Lee and de Vore,

> the hunter gatherer way of life has been the most successful and persistent adaptation man has ever achieved.[410]

Features of Hunter Gatherer life

The three major principles of the hunter gatherer means of subsistence are defined by Power (1994), on the basis of studies of people in 6 parts of the world who live entirely by foraging: San; Inuit; Australian; Hadza; Fueguans; NW Coastal Indians.

- Immediate return feeding – in other words, food is eaten as soon as it is gathered.
- Food is not stored or processed. There is no permanent wealth. Lee: 'the environment is our wealth'. [411]
- Tools are simple and portable, easily made and easily replaced. The only personal property or equipment is what can be carried.

The effect of these techniques on social organisation can be summed up in general features of hunter gatherer societies.

Egalitarianism

The organising principle of every foraging society is distribution of food on the basis of complete equality of all. All food is shared, not consumed by a family but shared out within the band of 20-30 members so that every member gets an equitable share This principle of generalised reciprocity within the camp is reported for foragers on every continent and in all kinds of environment.[412]. Exchange of goods is instituted in marriage. Egalitarian organisation is created and actively maintained by cultural mechanisms,[413] for example, to discourage arrogance and stinginess.[414] [415] Insulting the meat, a practice with the function of preventing arrogance among successful hunters, is recorded among

408 Harrold 1989; p. 224; Clark & Lindly 1989; p.666.
409 Lee & de Vore 1989; p. 449.
410 Lee and deVore 1968; 3 - q. Barnard 1988; 36.
411 Lee 1979; p. 458.
412 Lee 1979; p. 118.
413 Lee 1979; p. 460.
414 Lee 1979; p. 458; Whallon 1989; p. 448.
415 Chance 1990; pp. 130-1.

the !Kung[416] and the Arctic Iñupiat[417] ; sharing arrows among !Kung hunters similarly reduces opportunities for bragging, since the owner of the first arrow is owner of the animal killed, rather than the one who shot the arrow. This practice also strengthens bonds between men, such as brothers-in-law, reducing opportunities for disputes[418]

Women have a central role in production and in group discussions. Relation between sexes is equal-but-different, e.g. among the Ju/hoansi gathered food belongs to the woman who gathers it, and it is women who share out the meat obtained by men. Since the supply of hunted meat is not reliable, this gives women considerable economic importance.[419] Women exercise control over reproduction, birth etc.

No formal system of political organisation or control

Land ownership is vested in the collective, and all decisions are taken and carried out by the collective. Foraging group size tends to be about 30 people, on average 6 families, the ideal number for effective decision-making[420]. If there is any leadership it is 'charismatic', based on the personal qualities of the leader, and not inherited, nor reflected in unequal distribution of resources.

All problems are dealt with collectively

Everyone in the band is responsible for helping solve the problems of other band members, whether in sickness or interpersonal tensions. Healing is a social responsibility for all. When a member of the group is ill, it is seen, for example by Kalahari foragers, as an attack by ghosts or spirits, and it is then the responsibility of all present to unite to defend themselves, in ritual healing[421]. The solidarity of the group is a key factor in this activity.

Mutual dependence across groups,

Kinship and alliances are centrally important. There is reciprocal access to food resources, land, and water holes. People are in constant circulation. Strangers are generally welcomed, on the principle of recruitment rather than rivalry. Headland & Reid (1989) emphasise that contact with neighbouring peoples is a regular feature of modern foragers and, by implication, has been for a large part of human history.

416 Lee 1979; p. 220.

417 Chance 1990; p.130.

418 Lee 1979; p. 247.

419 Male-female proportions in food-gathering are approx. 66-33 in favour of women. When weight and calories are combined, 56% female, 44% male. Lee 1979; p. 452; also Burke Leacock 1981; Biesele 1993.

420 Whallon 1989; p. 446. Lee 1979; p. 447.

421 Biesele 1993.

Goods are exchanged in the form of gifts, rather than in commercially based exchange. This acts as a way of establishing alliances between peoples, cementing social relationships[422]. Part of the foraging life is extensive travelling, visiting, group ceremonies – activities which maintain the flow of information over wide distances. Large gatherings, usually seasonally timed, are a feature of most foraging societies. They are the occasion for establishing law, social regulation, marriage-arranging, settling disputes, but also sacred rituals, reinforcing links with tradition, continuity with ancestors[423].

Group size and resources

Whallon shows how group size adapts to resources available, by means of social devices such as kinship taboos – not to the average but to the resource lows, so as to ensure that the group is always living within the carrying capacity of its environment[424].

Importance of totemism

The hunter gatherer tribe is organised in clans – two or more. Each clan is identified strongly with a totem. The totem is normally an animal bird or source of food (Thomson describes an Australian tribe one of whose clans is identified with the witchety grub). For each individual in the clan the totem is central to their material life and to their thinking. For example, they are forbidden to eat the food that is their totem, except at special ritual ceremonies. They are forbidden to mate with members of the other sex within their clan. In fact all members of their clan are regarded as kin, as close kin as brother, sister, mother or child.

Language for survival among foragers

Having seen that something similar to today's hunter gatherer way of life was established by the time of the Upper Palaeolithic period, it is worth considering the part played in this way of life by language. Language is associated not simply directly with labour, but with the function of planning for, and organising, labour. Even when individuals are apparently working alone, they are in reality engaging in collective labour, since the notions and concepts used to organise their labour are themselves social in origin. The grinder of corn, the hunter, the potter, all are using skills passed on from preceding generations, and understand the process of their work by means of internalised notions and concepts.

422 Leach, intro. to Malinowski 1996, vol. 1; p. xv.
423 Leakey & Lewin 1992; p. 259; Lee 1979.
424 Whallon 1989; p. 444.

Oral traditions for survival

At a higher level, that of culture, socially created language forms also play a vital part in social life. Forms of oral tradition – myths, narratives, play a role in sustaining the social order, just as much as daily forms of social interaction.

We have already noticed the range of speech-based activities among hunter gatherers designed to maintain egalitarian relations. Insulting the meat, for example, prevents arrogance on the part of a successful hunter.

Whallon emphasises the importance of long-term, seasonal planning to foraging life. One important social activity that fulfils this function story-telling. For example, Minc, in a study of the Arctic Inuit, shows how myths and narratives act to conserve vital information relevant to the movements of their source of food – caribou, or whales. Tales of how ancient ancestors behaved in times of crisis conserve these lessons well beyond the limit of what one generation might consider important to pass on to their children as practical advice. More generally, oral forms transmit values vital for survival. Another study of Arctic people by Chance shows how myths and narratives constantly stress the importance of co-operation, of making extensive social contacts and alliances to fall back on in hard times[425].

A contemporary proof of the value of oral tradition was seen during the tsunami of December 2005. It was feared that the tidal wave would devastate the Stone Age islanders living on the low-lying Andaman, Onge and Nicobar islands in the Bay of Bengal. To many people's astonishment, very few of the islanders died. The islanders seemed to have a long-term memory of similar events that enabled them to decide what to do to protect themselves. Their oral culture which entailed sensitivity to the behaviour of birds and animals, and to that of the sea itself, seems to have provided them with advance warning of the catastrophe that engulfed more advanced people living along the shorelines of S E Asia. They simply moved inland.

Magic as part of oral tradition

Magic, though it appears to be the complete converse of rational thought, scientific analysis of the world, and practical technical skill, nevertheless plays an important part in the social life of hunter gatherer societies. It can be shown to assist human efforts to transform the world. Magic has two aspects: on the one hand observation of economically vital phenomena. So for example rain is associated with crop growing; the moon with successful hunting. On the other hand, these associations are interpreted in terms of agency relations, as if rain and moon had human attributes. The agency is then addressed as a human with special powers – the spirit of Rain, the Moon God and so on.

425 Chance 1990; p.131.

Magic is both a product of the power of language, and at the same time a result of the lack of power of human beings. Luria and Vygotsky explain magic as the necessary product of the desire to control both nature and one's own behaviour, from the primitive union of 'naive psychology and naive physics'[426].

Magic can be understood as a special instance of oral tradition, with the function of transmitting and conserving information. The true relevance of magic to human progress may in fact be the converse of the role that science plays today. Whereas science is constantly pushing forward, transforming nature, Magic plays the role of a conserving mechanism, keeping alive the technical knowledge that needs to be passed on from one generation to the next. This passage from Gordon Childe suggests as much:

> All the industries named, [garden culture, weaving, fishing, hunting, stock-breeding], have been rendered possible only by the accumulation of experience and the application of deductions therefrom. Each and all repose on practical science ... Thus there grows up to be handed on a great body of craft lore – snippets of botany, geology and chemistry, one might say. If we may judge from the procedure of modern barbarians[427], the legitimate deductions from experience are inextricably mixed up with what we should call useless magic. Each operation of every craft must be accompanied by the proper spells and the prescribed ritual acts. All this body of rules, practical and magical, forms part of the craft tradition.[428]

If the function of magic is here to help the memory, Malinowski's study of magic language in the Trobriand Islands shows how forms of language in spells and magic chants are made more memorable by what he calls 'weirdness', words that do not occur in everyday speech, particular grammatical forms; archaic forms; forms with no apparent etymology; *abracadabras*. The overall effect is to create a language of spells that cannot be confused with everyday speech. Verbal taboos prevent these special words from being integrated into everyday language. Magic language thus conserves and transmits knowledge that is essential for survival[429].

Magic in the Upper Palaeolithic

The art of the Upper Palaeolithic, the cave paintings and carvings, are generally agreed to have fulfilled magic functions. These artistic forms are seen by Marshack as having

426 Luria & Vygotsky 1992; p.84.

427 this term which we would now consider offensive was widely used in the study of prehistory and anthropology to describe a stage of socio-economic development, roughly that of early agriculture.

428 Gordon Childe 1965; p. 96.

429 In this respect it can be compared to mnemonics, which have no meaning in themselves, no relationship between the memorising material and the phenomenon to be remembered. For example, *Richard Of York Gave Battle In Vain*, has no connection with colours of the rainbow except the initial letters, and the mnemonic is only memorisable because it calls upon knowledge that we already have.

had forerunners in earlier periods, in simple forms of information processing among the archaic humans (simple lunar calendars of bone, and so on).[430] The fully blown forms of magic continue to fulfil this function, alongside other social and ritual functions, enshrouded in mystical, psychologically extremely powerful forms.

Summary

There was no language among the upright apes, but continual pressure from their life on the savannah led them to develop cooperative habits and awareness of each other's intentions and thoughts.

By the end of the long period of *Homo Erectus* – the Acheulean – it is almost certain that some form of language had emerged. However, it was not sufficient to transmit information down through the generations in the way that the Andaman islanders have demonstrated. It can be hypothesised that *Homo Erectus* communicated with simple, mimetic forms of gesture combined with inarticulate speech sounds.

Forms of kinship appear to develop early among *Homo erectus* or possibly archaic *Homo sapiens* groups. The division of labour that appears in social organisation around the home-base, and that must certainly have emerged by the time human groups learnt to control fire, is assumed to lead to a simple form of human kinship, based initially on a generation taboo. This development was not possible without some form of simple language.

The anatomy of archaic Homo Sapiens is capable of fully-formed speech. The fact that human brains cease to grow after this point suggests that humans no longer rely on their anatomy for extra memory storage. Memory is now externalised, in the form of language.

The culture and technology of late archaic *Homo sapiens* reaches a point where further progress is impossible within the group. Inbreeding may in any case have presented a genetic problem for the species. In isolated Ice Age Europe, humanity cannot develop further, remaining in what is apparently a cultural backwater, in small, isolated groups.

In Africa, S W Asia, central and southern Europe, where human groups mingle and exchange information, genes and technology, a new form of social organisation emerges based on the brother-sister taboo – what we would recognise as exogamy, or marriage. The result of the taboo is to encourage the formation of alliances between neighbouring groups, to stimulate production and techniques of food procurement, hunting and so on.

430 Marshack 1989.

The Chatelperronian, the culture that seems to represent systematic contact between Neanderthal and AMH sees the first evidence in western Europe of alliances and exchanges between groups. These alliances persist even during the Mesolithic, when the spectacularly abundant resources of the Upper Palaeolithic in Europe recede.

There is no reason to suppose that spoken language was the fundamental factor in the cultural achievements of the European Upper Palaeolithic, many of which might be the accidental product of a period of temporary abundance of game.

At the Upper Palaeolithic, the hunter gatherer way of life is established in a form that we would recognise today, though it may well have developed much earlier among modern human groups in Africa. As a way of life it is remarkably similar across the world. Its egalitarian principles are actively sustained by language – forms of ideality that encapsulate social relations of kinship and family obligations, and cultural forms that transmit essential information.

6 The making of speech

The question of speech origins is the one that has led to some of the most fanciful and bizarre theories. Yet at the same time if we cannot address this vital question we shall never be able to understand language adequately.

Biological bases of speech?

One of the few instinctive behaviours humans display appears at about six months, when babies start babbling. Babbling is a vocal behaviour, during which babies utter, for no apparent reason, a wide variety of speech sounds, some of which are those of adult language, others not. It's as if babies are playing with, and exploring the possibilities of their vocal anatomy. This does not appear to be a survival behaviour, though it may be crucial for establishing communication with adults. The reaction of adults to babies' babbling is nearly always to respond in some vocal fashion – and so habits of vocal communication are established that are crucial to the babies' task of learning language.

Whether there is anything else instinctive underlying our speech is open to question. It is observed in studies of children's learning to speak, that babbling often stops just before children utter their first words – as if a separate process is taking place. Instinctive babbling is replaced by efforts at learning to speak adult words.

Why replace gesture?

We have taken the position that gesture preceded speech, as outlined previously. In fact the questions surrounding the origins of speech are the same whether we accept a gestural origin or not. If gesture came first, the question is why did speech replace it[431]? If speech was the predominant form of language from the start, how did it grow out of human life to its present state?

Advantages of speech

It is not difficult to demonstrate that spoken communication has certain advantages over gestural signing. Some immediate advantages are, for example:

- Speech is effective when your audience is looking away, or inattentive

431 Kendon 1991; p. 215 'if language began as gesture, why did it not stay that way?

- Speech is effective when your hands are occupied
- Speech is effective in the dark[432] and when the audience is out of sight
- There is a limit on the number of gestural signs that can be created, but no practical limit on the number of spoken words that can be invented
- The converse of the universality of natural gestures is their ambiguity
- Speech generally requires less energy than gesturing

However, spelling out these differences does nothing to explain the origins of speech, or the transition between gestural and spoken language, any more than spelling out the advantages of upright gait explains how we came to be walkers.

Fossil Evidence for Speech

Could examination of fossils answer the question of how and when speech developed? Some have looked to evidence from fossil brains, for the development of the so-called speech areas in brain endocasts. These areas are not found in Australopithecine fossils[433], are rudimentary at the *Homo habilis*[434] stage, but are developed in *Homo erectus* and *Homo sapiens*[435]. However, while the development of these brain areas might show that language is starting to appear, it cannot of course differentiate between gesture and speech. In any case, these areas of the brain may not always have been associated primarily with speech. It has already been shown that Broca's area in the brain is associated not only with the musculature of the mouth and throat, but also with generalised motor skills governing the arm, hand and fingers. The association with speech that is now proposed in brain studies may be a case of the colonisation of these areas by language – as explained in Chapter 1.

Lieberman argues that there are special brain mechanisms for the lips, tongue, vocal cords, larynx, lungs – specifically to do with speech.[436] But it is impossible to separate for example the use of the muscles of the mouth in speech from their use in facial expressions. The former might be said to be speech-related, the latter gesture-related. Given that we can be fairly sure that the growth of the brain was accompanied by a growth in neural connections between the parts of the brain active in language processing, we have to conclude there is no evidence from the brain of when, where and how speech, as opposed to gesture, originated.

432 though Hewes 1976 argues that our light palmar pigmentation is a result of the need to continue communicating in poor light, or at night around fire.

433 Falk 1980b.

434 Tobias 1987: p.756.

435 Falk 1980a, b; Laitman et al 1988.

436 Lieberman 1991; p. 82-3.

We come back to the question raised earlier – what does the brain do? It is part of the central nervous system, a massive storehouse for receiving and sending out signals – a processor of information. What the steady increase of brain size in evolution tells us is that individual hominids came to handle increasing amounts of information. At a certain point, however, the brain stopped expanding. The fossil record shows that the period when the brain stabilises is not at the stage of anatomically modern humans, but earlier, among the transitional archaic *Homo sapiens,* at about 500,000 years ago.

Clearly we did not suddenly reach a point where the amount of information required for continued human survival stopped increasing; Humans today handle far more information than the archaic *Homo sapiens* forager, but with roughly the same size brain. So what happened at that historical point? If the individual brain ceased to expand, another form of memory must have appeared – an 'external memory store' – in other words, language. The point where human brains stop increasing, must be the point at which language is firmly established as a social practice[437].

Language as Memory

The collective knowledge of a group of humans is as effective a memory store as the individual brain, and much more long-lasting. The oral tradition – stories, myths, songs, rituals, spells, mnemonic forms, proverbs and so on – stores and passes on information using all the brains of the group rather than placing the burden on the individual brain. Specialisation and division of labour in memorising make the process more efficient. Old people become good story tellers – acting as the memory of the whole group, and contributing to collective activity beyond the age when they cease to be physically active themselves.

It may well have been at the transition between *Homo Erectus* and archaic *Homo Sapiens* that spoken language originated, but it is impossible to be completely sure. We have to consider whether gestural signing could fulfil the functions that vocal, oral traditions fulfil among present-day hunter gatherers. Think again about deaf signing. Deaf signers can tell stories, recite poetry, create names, tell jokes, trade insults and so on. So while we can be sure that some kind of communicative tradition must have become an established part of behaviour, we still cannot be sure that it was based on speech. We have seen the strong support for the idea that *Homo erectus* communicated with gesture. Among archaic *Homo sapiens* there are three possibilities – either a more developed form of gestural signing, or a language using signing and speaking together, or a form of spoken language.

437 Interestingly this is also the point where cooking is established as a social practice, according to Brace 2000.

Anatomical changes in the Vocal tract

If we cannot infer speech from the brain, what about evidence of changes in the airways – the lungs, throat and mouth – found in fossils? We can trace a number of evolutionary changes in the mouth and the throat, some of them associated with the enlargement of the skull.

The lowering of the larynx

It was for some time thought that a crucial feature of human anatomy was the low position of the larynx in the throat. In the chimpanzee, the larynx or voice-box is high in the throat, so high that it can be drawn up to touch the roof of the mouth during swallowing. This enables the chimpanzee to breathe while swallowing food. Air passes from the nose through the larynx into the wind-pipe, while food passes down two channels at the side of the larynx into the gut. Pulleyblank puts it nicely – apes 'have no throat'[438].

Human babies are similar to apes in being able to breathe and swallow simultaneously, but after a few years our larynx starts to descend into our throat, and for ever after if we try to eat and breathe at the same time we are in danger of choking. The larynx is roughly level with the fifth vertebra in the adult male human, slightly higher in the female. The unusually long human throat is said to be important in producing the *quantal vowels* [i], [u] and [a] ('ee', 'oo' and 'ah')[439] though it has to be said that the larynx is still fairly high in four and five-year old children, who seem to be able to produce these quantal vowels perfectly well.

The larynx is made of cartilage, not bone, and does not survive in fossils. Rather than observe laryngeal descent directly, its position is generally reconstructed (a scientific way of saying 'guessed') from measurements of the angle of basicranial flexion, derived from various points on the base of a fossil skull[440]. The conclusion of these measurements is that basicranial flexion, hence larynx position, among Australopithecines is no different from that of apes. Among *Homo habilis* and *Homo erectus* it starts to develop in the human direction, and human proportions are found among archaic *Homo sapiens*[441]. Correlation of basicranial flexion with lower larynx position, while not proof that archaic *Homo sapiens* spoke, certainly indicates that they could have done.

438 Pulleyblank 1983; p. 375.

439 vowels that enable the listener to calibrate the acoustic information coming from a speaker - Lieberman 1991: pp. 57-8.

440 a technique first suggested by Wind, and carried out in some detail by Laitman and colleagues - see Laitman et al 1979; 1988.

441 Laitman et al 1988; p. 359).

The course of basicranium development is not a smooth progression, unlike brain size growth. Neanderthal basicranial flexion is apparently no more advanced than some *Homo erectus* specimens, representing a regression in respect of the angle of basicranial flexion442, oddly, since Neanderthals are assumed to have evolved from archaic *Homo sapiens*.

But why did the larynx lower? We cannot be sure it was a result of speech – the first changes in basicranial flexion are observed among species for which there is no evidence of speaking. More likely explanations are:

- the skull, growing in size to accommodate the increasing brain, pushed the larynx downwards
- standing upright, gravity caused the larynx to move downward, once the necessity for a high larynx was removed (i.e. no need for smell, so separated from epiglottis; no need to breathe and eat simultaneously – especially as food became easier to chew and masticate.
- Negus argues that the backward passage of the tongue pushes the larynx down in the throat[443].
- Krantz argues that laryngeal descent took place in two stages, the first noticed in archaic *Homo sapiens*[444]. The result of this first stage of lowering was to enable 'easy and controlled exhalation though the mouth'.[445] This change may well have had nothing to do with speech, being an adaptation to long-distance running, associated with pursuing game.[446] Taking in oxygen efficiently through the mouth would certainly have been a big enough advantage to outweigh the disadvantages of food passing over the opening to the windpipe. Our larynx still lowers in the throat, and our tongue retracts, when we inhale deeply.

Recent discoveries have shown that many other animals may lower their larynx at times. Studies of dogs barking reveal that their larynx is lowered temporarily while they bark[447]; so the larynx position may not be as crucial as was previously thought.

The theory that a lower larynx enables men to sound more threatening so as to scare away predators is a nice one, but then, the larynx is equally low among women, who

442 Lieberman 1988; p. 407 - though criticisms have been made of the method of obtaining the measurements from the La Chappelle fossil on which Lieberman's findings are based. See e.g. Burr 1976; Houghton 1993.

443 quoted by Schepartz, p. 99.

444 Krantz 1988; p.175.

445 Krantz 1988; p.179.

446 Campbell 1988; p.326. It is suggested that the first human hunting was predominantly persistence hunting, relying on endurance and strength more than skill and technology.

447 BBC Horizon, January 2010.

have higher pitched voices – and in any case, it is the size of men's larynx, not its position, that gives them a deeper voice[448].

Changes in the glottis

The glottis is the narrowing of the air-passage inside the larynx, the point at which voice is produced. The internal shape of the glottis is somewhat complex, as Fig. 6.1 shows.

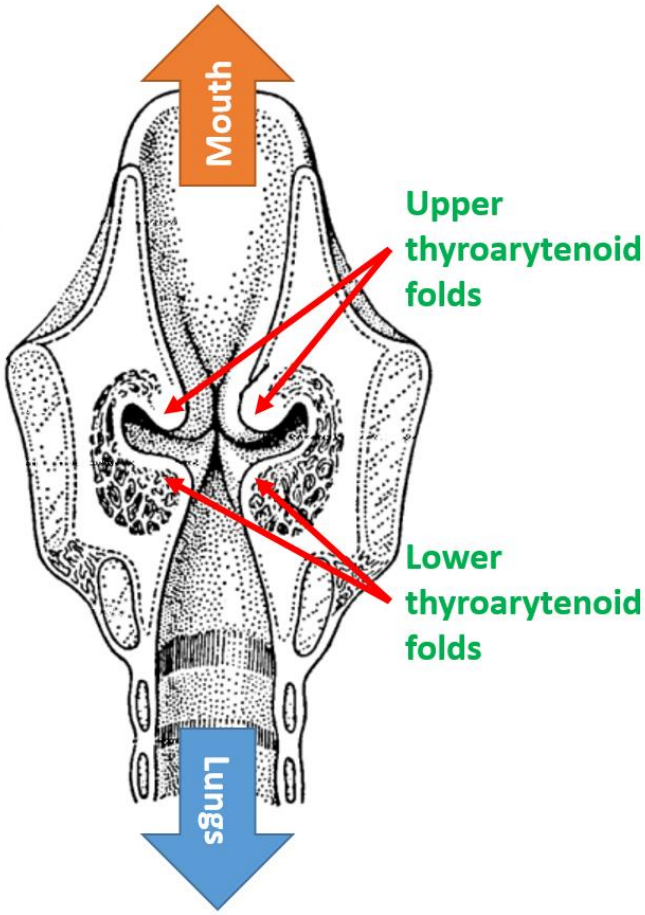

Figure 6.1 – Glottis, upper and lower thyroarytenoid folds

There are actually two points where the airway can be blocked – the upper and the lower thyroarytenoid folds. Because of its shape the glottis can function both as an inlet valve and an outlet valve. The lower folds are the inlet valve. They close to stop air entering the lung. Humans also use these to produce voice, so they have become known as the vocal cords. The upper folds are the outlet valve. They stop air escaping from the lungs. They can also make noise when they vibrate, producing a kind of grunt. They are known as 'false vocal cords'.

448 A discussion of this issue is in Kenneally 2007; pp.147-149.

In climbing species, such as lemurs, monkeys, gibbons, chimpanzees, the inlet valve function of the lower folds is very important. The action of jumping from branch to branch and grasping with the forelimbs throws a tremendous strain on the chest muscles. If the lungs can be immobilised, to stop them either emptying or filling with air, the chest is strengthened. At the moment of grasping the branch, the glottis is closed, the lungs cannot fill and expand, and the result is as Negus explains:

> a mechanical process to conserve energy, by increasing efficiency of forelimbs and relieving the abdominal muscles of strain.[449]

In the more terrestrial species – baboon, gorilla, human – this function of the larynx is less important, and therefore less effective[450].

The lower folds can also close and stop outgoing air, for mildly strenuous activities, such as lifting and for manual operations. Even for quite delicate operations we use these folds to hold our breath. Effort with the forelimbs is most efficient when the chest is half full of air, but for greater exertions it is sometimes necessary to fill the chest and hold in the air. This is when the upper thyro-arytenoid folds are used. The most important of such exertions is probably the pushing down that is necessary at childbirth. Other cases include swimming underwater, the straining of constipated individuals, the grunting of athletes (e.g. tennis players when serving), and so on.

What has happened in the evolution from ape to human, is the development of a larynx more suited to terrestrial tasks. Because the inlet valve function of the lower folds is less important to us now, these folds are softer than in the chimpanzee, with less cartilage and more muscle[451], and provide the voicing that is the basis for speech. Negus tells us that species

> with very efficient valvular folds, such as Lemurs, most Monkeys, and Chimpanzees, have voices of a piercing quality and great volume, but others, with slightly less sharp folds, have a less strident voice, and amongst these [are humans].[452]

Shape of jaw, teeth, tongue

Dietary and behavioural changes from the *Homo erectus* stage on led to changes in jaws and teeth, which became less important in procuring food, as the hands (and tools) took on more importance. While the jaws reduced and the face flattened, the tongue did not reduce to the same extent, and started to take a shape less like the chimpanzees' long flat tongue, nearer to the modern human, round and bunched up when seen from the side. Omnivorous diet meant that the tongue had to cope with a variety of foods, and

449 Negus 1949; p.106.
450 Negus 1949; p. 107.
451 cf. Wind 1976 ; p.22.
452 Negus 1949; p. 137.

became more flexible[453]. As a result of the reduction of the jaws, the position of the tongue in the oral-pharyngeal cavity has altered such that it can be retracted towards the pharyngeal wall.

Changes in breathing

An interesting feature of the anatomy of *Homo erectus* from the point of view of speech is that its spinal column in the region of the lungs does not show the 'mid-thoracic spinal neural canal enlargement' characteristic of modern humans – suggesting that it has less fine control of the muscles used to control the movements of the ribs in the sustained vocalisation associated with speech[454]. The conclusion from this small piece of evidence is that the control of breathing required for speech would be difficult for *Homo erectus*.

Summing up, fossil evidence cannot tell us when speech appeared, but it suggests that it was probably not a feature of human communication before the archaic *Homo sapiens* period, in other words, about 4-500,000 years ago[455].

Theories of Speech Origins

In this section, we look at some theories of how speech might have become established as human behaviour. Notice that if gestural signing developed to a stage where humans had systems of communication based on a mixture of iconic and arbitrary signs, with some embryonic forms of grammar, the problem is not a great one – we have to account not for syntax, semantics, brain areas specific to language and so on., but a relatively simple task – why communication came to be based predominantly on sound rather than gestural sign.

From animal call

Some who see no clear dividing line between animals and humans suggest that speech may have developed from animal calls – in other words, that such calls persisted through millions of years, to be incorporated into human behaviour when meanings started to be exchanged[456]. The implication is that human vocal activity evolved from animals' instinctive cries[457]. However, animal calls have a quite different function than human speech. They provide emotional release and social contact, as opposed to the linguistic function of representation[458] These primitive functions can still be seen in human

453 Aiello 1994; p. 13.

454 the specimen known as *Homo ergaster* at Nariokotome - (MacLarnon, q. Aiello 1994; 15).

455 Hewes 1996 suggests spoken language is not likely to have been earlier than 300,000 years ago p.82.

456 the theory of 'vocal blending' as Hockett 1978 calls it.

457 Pulleyblank 1983; p. 375.

458 see Kozulin 1990; p. 153.

behaviour, when we laugh, cry, scream with fear, gasp in response to pain, and so on. But these emotional, instinct-based vocalisations are not the roots of speech. Babies' crying does not develop into children's speech; it remains quite separate, and most humans have learnt to speak through sobbing or laughter. The only area of language that has come to be linked with our 'limbic' or emotional system is swearing (see Chapter 1)[459].

It is hardly to the point that monkeys and primates can produce very human-like sounds[460], or that gelada monkeys can make human sounds[461]. They cannot usually produce them at will, but only in response to external stimuli. They cannot exchange messages. There is an unequal relationship between the monkey that produces a call and the rest of the group that responds. Their calls are not structured into consonants and vowels the way that human speech is, and ironically the apes that are genetically closest to us, chimpanzees, are also those with the least human-sounding cries[462].

Speech from music, song, dance?

A related suggestion is that human speech derives from animal social behaviour, evolving into singing, music[463] and activities such as the chanting and dancing that accompany ritual[464].

The idea that human ritual (as practised among foraging people at significant moments, among religious groups, etc.) is a continuation of instinctive behaviour from animals has to be rejected. Primate collective singing has no meaning and no such individual psychological functions. Dunbar's term 'vocal grooming' expresses it well[465]: Human ritual as we have already seen is essentially re-enactment of significant activity – in other words, it is based on prior human activity, not instinctive behaviour.

Mimicry as source of speech

Mimicry of animals, or natural phenomena (wind, thunder, water) is often suggested as a possible source of spoken language. The argument is based on chimpanzees ability to imitate the behaviour of other creatures (though they cannot imitate sound well), and

459 and in certain cases of brain dysfunction swearing persists when all other forms of language are disordered - as in coprolalia – Hewes 1976.

460 Wind 92; p.26.

461 Richman 1976.

462 cf. Kelemen 1948.

463 Donald 1991 p.38 quotes Darwin on the subject.

464 Richman 1993.

465 Aiello & Dunbar's phrase (1993).

on the presence of some words in our language that are obviously imitations – *cuckoo, cock-a-doodle-doo* (Jespersen terms this the *bow-wow* theory[466]).

The human respiratory/vocal tract is very good at imitating – we are probably the best animal mimics there are (better than parrots, because more versatile). There is no doubt that imitation is a factor in the formation of words, both historically and today. But it is not sufficient cause in itself. For an imitation (gesture or sound) to become a sign, functioning in communication, would require joint attention of speaker and audience on the phenomenon to be imitated – three-way, or triadic communication[467]. Attention depends on two communicators sharing an interest in the phenomenon in question. So imitation of animals, for example, would only happen once we started depending on certain animals for food, whether scavenging, hunting, or competing with them – only when the animal or bird in question has become a solution to a joint problem. Such a focus of interest on the imitated phenomenon presupposes the development of collective activity, and therefore society to a certain level.

Motor Theory

A more developed theory of imitation is the Motor theory, or mouth-gesture theory of speech[468]. This proposes that there are basic elementary motor programs from which all bodily movements are constructed, controlling the precise movements of the hand and arm. These programs when redirected to the articulatory organs produce an equivalent set of elementary speech sounds.

Gestures of the hand and arm represent the contours of perceived objects or of larger bodily actions, and every gesture structured by a perceived or recalled object or action can be redirected to produce an equivalent articulatory action. So specific articulatory gestures generate specific phonetic utterances.

This is a well-worked out theory with a number of eminent protagonists. However, like the theory of imitation, the mouth-gesture explanation still requires the prior development of a joint focus of attention on the object. Collective activity again has to develop to a certain level before individuals can develop gestural representations of the objects of their interest with the hand or the mouth.

466 Jespersen 1922; p. 413.

467 Tomasello 1999 – see Chapter 2.

468 an idea with a long history, from Paget 1944. See also Allott 1992, Lieberman 2006.

Sound symbolism

The motor theory of speech is a version of the more general theory of sound symbolism[469]. This theory suggests that speech originated in iconic forms, where the sound of the word is related to its meaning in some way, including not only imitation and onomatopoeia, but also relations between size, shape, location, and sound. So, for example, a sequence of sounds like [pipi], in many languages of the world is associated with meanings like small, high-pitched. [kaka] would have connotations of large, lumpy. World wide coincidences of sound and meaning are too frequent to be accounted for by chance, and Sapir showed in a series of experiments that speakers of different languages reacted to unfamiliar words in very similar ways that could be predicted on the basis of the relation of sound to meaning. Given a pair like [*takete*] and [*maluma*], the majority of people associate the former with a thin or spiky figure, and the latter with a round dumpy figure.[470]

Nevertheless, this is no reason to suppose that spoken words were all formed on these principles. Iconic signs probably remain in the language because they are easy to remember,[471] or are felt to be appropriate in certain situations. In other situations, iconic forms are avoided. So in English we have the words *little*, which is iconic, and *small*, which is not. Sound symbolism reaches far into every language, and is probably responsible for many associations between what might appear remotely related terms. For example the English final *-le*, has a meaning that is hard to define but is clearly there – the 'iterative' or 'repeating' meaning in *tickle, juggle, giggle, chuckle, wiggle, muddle*. While the subject is one of great interest, it seems to apply very particularly to certain registers – nursery talk, expressive language – and not to be a central organising principle of language. The estimate that no more than 10% of the vocabulary of any language is iconic in this sense[472] seems about right, the proportion being roughly the same in spoken and gestural languages.

Like imitation generally, sound-symbolism would only affect individual's choice of sounds when other aspects of social behaviour had progressed to a certain level – the level of a sufficient social awareness to be able to name objects of joint attention, to be able to imitate phenomena of joint interest, to be able to distinguish individuals within the group on the basis of different social roles.

While there is no doubt that imitation and sound-symbolism does play some role in languages, influencing word-formation and word-retention, these theories do not have

469 Cf. Mary Foster's 'phememic' theory of language origins - Foster 1983.
470 Sapir 1929.
471 Englefield 1977; 51.
472 De Grolier's survey 1990; p.145.

sufficient explanatory power to account for the origin of speech as a medium, and certainly not for the origin of language as a system.

Hewes comments:

> To be sure, mouth-gesture theory and sound-symbolism research still leave most of the postulated transformation from gestural to a vocal language unexplained.[473]

Secret languages

A number of accounts of gestural origins, explain the transition to speech as the result of secrecy or conspiracy on the part of a small group[474]. Englefield argues that whereas gesture is an iconic, public medium, speech is arbitrary in form, and would therefore lend itself to secrecy and mystery. For Marr the original spoken language consisted of a small number of words, derived from tribal names[475], and more recently Knight has proposed that speech was created secretly by women in devising ritual dances[476]

Englefield's argument is worth examining in some detail, since it highlights the difficulty of explaining the transition from gesture to speech:

- An exclusively vocal language cannot function in daily life until vocabulary has reached a critical size. So there is no question of a wholesale replacement of gestural signs by spoken words.
- Natural gesture signs are relatively easily understood, but the number of natural vocal signs (onomatopoeia, animal imitations, sound symbolism) and their restricted range of reference are insufficient to create a working vocabulary.
- The bulk of spoken words are conventional, and have to be learnt. This implies a heavy memory load for both vocabulary and syntax
- If a spoken language is to be established it must be within a living generation. People who have not learnt to speak in childhood must agree within a short time to use signs with the same meaning, and use them frequently enough for them to stay in the memory, and be transmitted to the next generation.
- Therefore spoken language could not emerge gradually from gestural communication. It must in the first instance have been the work of a small group of people, who had time to spend together, and who had a common purpose, restricted enough for them to be able to develop a relatively small vocabulary of names and actions, and who wanted to keep their communications secret[477].

473 Hewes 1976; p. 70.

474 Most notably Nicolai Marr. See Brandist and Chown 2010.

475 Marr variously suggested twelve, then four - and even claimed to be able to identify the four – ber, ros, sal, yon, surviving in the names Iberian, Etruscan, Salmatian, Ionic. - see Matthews 1950; Ellis and Davies 1951.

476 Knight 1991.

477 Englefield 1977; p. 89.

- Later this spoken language would be adopted by the whole group, replacing gestural signs.

The theory of speech as an invention raises a number of difficulties.

- Who exactly were the inventors? On this the proponents cannot agree. For Marr it was druid-priests. For Knight it is the coalition of women, organising a 'collective deception' of men. For Englefield it is unspecified, but the motivation is not magic. Marr's description depends on the interests of druid-priests differing from those of the rest of society – in other words, a class society before people could even speak. But if hunter gatherer society is accurately described as egalitarian, there would be no fundamental difference of interests between one group of people and another – and therefore no motivation for a secret language. Knight's model is based on a fundamental difference of interests between males and females. Again, there is no evidence that this was the case in early human societies, or that it is the case in modern foraging societies.
- The theory requires the inventors of speech to translate gestures into spoken words. Englefield rightly points out that the invention of new terms is not a normal feature of language. In so doing he puts forward the strongest objection to his own theory. In the history of natural human languages, neologisms are rare, and the majority of words are learnt from an older generation. Natural languages do not duplicate words needlessly. If you can communicate satisfactorily with gesture, why bother to learn a whole new set of spoken words?
- The model also requires the abandoning of previously established gestural signs. This too is hard to explain – why should people give up forms of language that are perfectly adequate for communication?
- It is true that there are many attested cases of secret languages among both adults and children, where invention of words occurs and develops rapidly.[478] In Britain, Cockney 'rhyming slang' is still actively producing new forms today. Indeed, for a secret language to remain secret it is forced continually to innovate, as its secrets are continually liable to escape. Cockney rhyming slang is a good example of a secret language whose phraseology is often adopted by Standard English speakers, for particular effects. In order to remain secret it also has to be obscure and inaccessible to outsiders, and therefore not suitable as a general medium of communication. Malinowski's description of magic language, with its 'coefficient of weirdness', makes this point. Halliday's study of antilanguages – the languages of out-groups, of the underworld, languages of beggars, thieves,

478 Englefield 1977; p. 87-8; Kendon 1991 for secret languages among the original Australians.

and so on, interprets them as reflections, distortions of existing language.[479] It follows they cannot therefore be the origins of language for general use.

- However, when we look for other areas of activity that lead to the invention of terms, we find that invention can and does occur when a new form of social activity arises, leading to new forms of communication. This fact provides the solution to our problem. If spoken communication developed in connection with certain activities, at first restricted, while gesture continued to be used for traditional purposes and for a *lingua franca*, then the problem of wholesale replacement of gestured with spoken signs does not arise. Speech in this restricted circumstance would be relatively easily learnt, and would have a relatively small number of terms, overcoming the problem presented by a large vocabulary with an arbitrary connection between form and meaning. Speech could then spread from these very specific registers, only slowly diffusing to other forms of communication. Children would then have a language to learn consisting of some gesture and some speech. Over time the habits of speaking would become widespread among the whole group.

Origins of speech sounds

A number of theories of the origin of language have had to be rejected as partial explanations. Many of them could provide explanations for processes of word-formation, but they do not seem adequate as explanations of the origins of speech. All seem to take the position that speech, language, meaning, all emerged at once. But this is not necessarily so, and we see speech as having a long slow development, with many of the key developments happening long before spoken language emerged. Englefield recognises that 'we cannot explain how humans could `adapt' a form of behaviour which did not exist'[480], so must assume that the sounds of speech were at least in part available before the time came for them to be appropriated to the needs of the community.

Taking as our starting-point the vocalisation of apes, an evolutionary account has to explain:

- how vocalisation came to be freed from instinct and brought under the voluntary control of individuals. This is in part a question of anatomy, but we also have to account for things like the control of muscular movements governing breathing and the pitch, volume and rhythm of vocalisations.
- how the structure of human vocalisations, with their characteristic consonant-vowel (CV) form developed. Chimpanzee vocalisation may have a rhythmic structure, but it is not CV organised. Rhythm in chimps' cries, for example their

479 Halliday 1978; pp. 164-182.

480 Englefield 1977; 86.

pant-hoots, is often a product of alternate inward and outward breathing,[481] whereas human speech is based on the rhythmic alternation of vowels and consonants on an outward air stream. Vowels are produced by the unrestricted flow of voiced sounds coming from the lungs through the open mouth, and consonants by the obstruction of the air stream at some point in the mouth.

- How structured phonetic syllables came to be used to convey contrastive meanings.
- In all three of these developments, there appears to be no alternative but to focus on the development of social activities.

Vocalisation freed from instinct

First we look at three possible activities that might lead to early hominids gaining control over their vocalisations: intimidation; calling; co-ordination.

Self-defence and Intimidation

Observers have noted the ability of chimpanzees to turn on a display of noise to drive away predators, and of individual males to turn on a noisy display to establish their dominance in a group. A chimpanzee display is not totally under control, since the individuals first need to be 'hyped up'. However it is quite easy to appreciate the way that the circumstances of a foraging life, on the open savannah, would encourage control of vocalisation to drive away predators, or rival scavengers from a carcass, gradually bringing it under individual control. Intimidating use of noise would be most effective if the whole of the group participated.

It is suggested that archaic *Homo sapiens* may have organised mass hunts, using the technique of 'driving' animals into places where they could be immobilised and killed. Hunting by driving is an adaptation of the intimidatory effect of sound on other creatures. It is still debatable whether such hunts took place or not. If they could be established beyond doubt, we would have clear proof of control of intentional vocalisation – without which such a hunting technique would not be possible.

Ohala has suggested that the enlargement of the human male larynx and consequent deepening of the male voice – a feature not observed among apes – may have had the evolutionary function of creating the impression of a large powerful creature, related to the need to drive off other species.[482]

481 as is the donkey's 'hee-haw'.

482 Ohala 1983; 1984.

Calling

Long-distance calling is observed among groups of chimpanzees, and it would certainly have continued among early hominids, especially in the dangerous habitat of the savannah. Calling would grow in importance when, among *Homo erectus,* foraging groups started to travel out from a home-base.

Singing

All human communities sing. Mothers sing to babies, Song accompanies work, precedes work, records work. Apes cannot sing, but they can dance – as the next section will discuss. So dancing may have started to be accompanied by sound, leading over a long period of time to control of vocalisation.

Co-ordinating activities

The co-ordination of work is another area of human activity which would encourage speech, Gesture is more or less ruled out when the hands are engaged in work and attention is on the job in hand. In such circumstances noise as both a way of attracting attention and as a way of co-ordinating activities would be favoured. Clearly the more advanced co-operative techniques and social organisation become, the greater the predisposition to co-ordinate with sound.

All these activities would lead to control by individuals of sound-making, they do not imply structured speech. Nor do they suggest how the organisation of the syllable in terms of CV structure might have originated.

The structure of human vocalisations

CV Structure – why is it important?

Speculating on the possible nature of the first meaningful sounds, there are two forms these words might take. On the one hand, there is a great variety of distinct sounds that our anatomy can make, sounds that are a part of our conscious repertoire of sounds, but are not structured in consonants and vowels in the same way as words. We can and do make a variety of non-linguistic interjections, expressed in print as ‘tut’, ‘phew’, ‘ouch’ (a sharp intake of breath), and so on. It is quite easy to think up fifty or more such interjections, not including imitations of animals, machines and so on. Any individual might have at their disposal around a hundred or so such *quasi-signs*. Observers of babies’ babbling have noted both vowel and consonant sounds of a great variety. It is as if some babies run through all the phonetic possibilities of the languages of the world, before settling down to the task of learning their parents’ language.

Quasi-signs are generally expressive of emotional reactions to a situation – annoyance, amusement, pleasure, though they are more under control than the clearly emotional reactions of laughing, crying, and so on. Now the question is whether speech might have emerged from these quasi-signs, or whether, from the start, it consisted of structured sound. Jespersen suggested that early utterances were totalities – sentences contained in single utterances – and that therefore the first vocal forms could also be totalities, complex articulatory gestures such as quasi-signs.[483]

But if we consider that human activity has the goal of establishing order in the world, we should expect communication based on such activity to seek to create order out of the complex of sound types available to the human anatomy. There comes a point where learning cannot cope with hundreds of different and unrelated sounds. The sound structure of today's languages is based on the combination of a relatively small number of vowels and consonants to produce an almost infinite number of words. This is so much easier to learn. Compare the learning of our phonetic alphabet, with the learning of the thousands of Chinese characters.

It is observed that the babbling that precedes the infants' first words, appears to grow out of a period of relatively unstructured sound production (cooing), resolving eventually into the form of repeated syllables of CV form – syllables like [dadada], [gugugu]; [wowowo]. Whereas cooing is simple vocal activity, analogous to babies' kicking of legs and waving of arms, babbling is directed, conscious activity of the articulators.

Babbling is not language, any more than play is real activity, or singing is speech, but it does seem to provide a necessary preliminary stage of ordering and structuring sound production. Infants' babbling suddenly ceases when the child starts to attempt consciously to make words and meanings.

True words are structured in terms of a few simple consonants and vowels, the number varying from one language to the next, but averaging between thirty and forty. From this limited number of sounds vast numbers of words can be constructed.

We therefore suggest that early humans must have learned to produce structured CV syllables before they started using them for meaningful communication, and that once speech began, words would be structured in consonants, vowels and semivowels, as modern languages are. But we have now to explain the prior stage where hominids learnt to control their sound output – to play around with sounds until they learnt to alternate vowel and consonant.

483 Jespersen 1922; p. 421.

Where do vowels come from?

There is little problem in explaining the origin of the vowels we use in speech. Many, though not all, are present in a primitive form in chimpanzee vocalisations. In de Waal's study of bonobo vocalisations we find the following functional descriptions: low hooting, both ingressive and egressive; high hooting: pant-hoot; high-pitched whooping; wiew-bark: contest hooting: greeting grunts; panting laugh; pout moan 'hoo hoo'; whistle-bark; food peep associated with foraging and feeding; alarm peep; peep yelp; scream.[484]. All these are vocalic type sounds; there is no hint of a consonant here. The vowels appear from de Waal's description to be formed in a way similar to human [o]; [a], [e][485].

The activities we have considered above – calling, intimidation and work co-ordination – all require considerable volume. Vowel-like sounds[486] therefore appear as carriers of sound, possibly with pitch and rhythmic variation. The use of noise for intimidation would require the loudest possible noise – opening the mouth wide, to produce a sound like [aa], or, if the vocalisation started while the mouth was not fully open, [wa].

A sound that is often associated with long-distance calling is a long rounded back vowel [o]. This may be associated with an extension of the lips (protrusion and rounding) in the direction of those being called – pointing with the lips, as it were.

Sounds that accompany work may take a different form. We have seen that one anatomical feature that may distinguish chimpanzee and human is the human ability completely to close the glottis[487], the action we perform when we hold our breath to carry out a conscious, delicate movement. One vocalisation which may have developed from this is the syllable that we associate with strenuous effort [ha], produced by initially closing the glottis, then releasing the air from our lungs, to produce the consonant [h]. As the flow of air slows slightly the vocal cords in the glottis start to vibrate together, producing an indistinct open or half-open vowel.

We see then that it is not a great problem to suggest routes by which at least three distinctive vowels might find their way into the vocal activities of our ancestors.

484 de Waal 1989.

485 We will not for the moment contest Lieberman's suggestion that chimpanzees cannot produce the quantal vowels [i] and [u] - it does seem they can make something like an [a].

486 The Term *vowel* implies some contrastive function, so it is not strictly correct to use the term here - but it is much easier to do this than use an unfamiliar term like *vocoid*, *vocable, vocalisation*.

487 Aiello & Dean 1990; p. 240-241.

Where do consonants come from?

It is a somewhat harder problem to suggest how consonants might emerge from the vowel-dominated sound activity of hominids at the upright ape stage. We cannot suppose that consonants came out of nowhere to start signifying meanings. We need to look for an activity that will lead to the emergence of consonants without meaning.

Children's babbling and its rhythmic basis may provide the clue. In babbling vowels follow one another in succession, and the function of the consonant is at first merely a divider, a trough between two crests, breaking the vowels up into rhythmic units. From what are at first rather variable articulatory movements in the mouth, the infant gradually establishes sufficient articulatory control to be able to produce consistent consonants between the vowels, and simple syllable structure is established.

The route to control of consonants may then have emerged from some kind of rhythmic sound-based activity, in other words singing or chanting, probably accompanied by dancing[488]. Music among humans is a controlled, and therefore learned, activity, not a development of the ape's instinctive reaction to excitement, but based on conscious, intentional activity. The next chapter considers the complex question of the function of music in human activity and human society.

Regulating social and individual activity

The suggestion that work-based chants and songs may be the origin of speech was made originally by Noiré[489], and characterised by Jespersen as the *yo-he-ho* theory[490]. While we do not suggest that such activity could lead immediately to meaningful use of sounds in spoken words, we can see that it would have played a vital role in the development of a repertoire of sounds that would later be available for sound contrasts.

Prosodic control of the voice – pitch, tone, loudness etc. – is logically prior to phonetic control. Darwin supposed the origin of speech to have been song. Thompson suggests it is strongly tied to the co-ordination of work, either group work – though at what stage humans started to undertake large-scale works we cannot say – or the work of the individual. In the case of the !Kung, the Inupiat and so on we see that skills tend to be passed on from adult to child, the activity of the craft accompanied by song or chant. In other words, learning the craft implies learning the song or chant. Work-related song or chant has two functions. There is the recording in words and music of the technical content of how to do it. There is also the psychological tool function – the chant helping

488 as Richman 1993 suggests.

489 Noiré 1917; also Thompson 1975.

490 Jespersen 1922; p. 415.

the timing, the rhythm of the work. The tongue co-ordinates with the hands in manual work.

Rhythmic chanting on a vowel base, leads to the control of mouth and tongue movements, to separate vowels from each other. The first and most basic movement is the opening and closing of the lips, which an ape can in theory do, but in practice does not. [mamama]; [bababa]; [wawawa]. Opening and closing of the glottis is also in principle possible for apes, and would become easier over time, with the development of the human glottis, to produce [hahaha]; [‘a’a’a][491]. As the tongue grew more flexible other consonants would appear – [d], [t], [n]. These sounds are produced with the tongue tip, and could be made by ape vocal tracts, if only they had sufficient muscular control of their tongue muscles. At a later stage sounds like the velars [k] [g], uvulars and other sounds of the modern human repertoire would appear, but not until the jaw and face had altered sufficiently to produce the characteristic round human tongue[492].

Work song as psychological tool

The psychological function of sound and song in accompanying and motivating work may have been important before the transfer of meaning from gesture to sound. It may be that the making of artefacts, or the preparation of food, (for example, rhythmically pounding roots and tubers with stone tools till they are soft enough to eat) came to be accompanied by song or chant, in the form of rhythmic successions of initially meaningless syllables.

More complex activities may then have led to a further development of sound as it accompanied manual work. The process of making core and flake tools, for example, is extremely complex. It involves creating first a stone core, and then knocking from it long flakes or blades. It is not inconceivable that the tool-makers had a series of vocalisations which served to accompany their work. These vocalisations may have been meaningless to start with, but would have helped the tool-maker to a) memorise the sequence of actions; b) help concentration and timing; c) help pass on the skills to the next generation. Gestures would of course be unavailable in the function of guiding the actions of the tool-maker, whose hands would be fully occupied. These meaningless syllables would then, over time, come to be associated with specific parts of the core-and-flake toolmaking process. The first technical register would be created.

The beginnings of contrastive sound

Thus it seems plausible to trace the origins of speech sounds back to socially-based activities. These activities are by no means primitive. They all presuppose a certain level

491 where [’] represents the glottal stop.

492 Lieberman 1991; p. 58-9, reporting studies by K Stevens.

of technical and social development, reinforcing the case for gestural communication as an initial organiser of social life while speech skills were slowly developing. We have shown in the discussion of factors traditionally supposed to give rise to speech, such as imitation and sound symbolism, that they presuppose a degree of attention and consciousness that can only be associated with the development of a certain level of labour.

The emergence of meaningful sound

If, as we have suggested, speech developed late, it would not be the result of inherent properties of speech as a vehicle of abstract thought, nor of any inherent deficiency of gestural signing as a way of handling meanings and thoughts. The initial motivation for the development of spoken forms could well have been, as we have shown, quite practical, and work-related. However, its long-term effect was that language took one step away from activity, towards a capacity to reflect on and organise that activity.

A variety of factors led to the changes that prepared our anatomy for the eventual arrival of speech. It is possible that once speech was established as a human behaviour it may have influenced anatomy somewhat further[493]. However, the origin of speech appears to be a case of humans using the physical apparatus available, adapting it to communicative purposes, at the historical time when they were ready to speak.

493 as argued by Krantz 1988; p.174; Lieberman 1991; p.408; Bickerton 1990; p.144.

7 The making of music

This chapter examines the relationship between music, language and collective activity. Music is a feature of all human societies, yet the topic of its origins has only recently started to receive attention from commentators. Darwin in The Descent of Man found music to be mysterious. Pinker considers the topic unworthy of attention, dismissing it as 'auditory cheesecake'[494].

Yet it is clear that like language, music is a means of communication between humans that has a significant part to play in human life. Oliver Sacks says:

> Music is the most direct and mysterious way of conveying and evoking feeling. It is a way of connecting one consciousness to another. I think the nearest thing to telepathy is making music together.[495]

Like language, human music is a socially acquired accomplishment in which we use the physical attributes of the human body and materials around us to make intentional sounds. We combine rhythm melody and speech in a way unlike any other species.

While the proponents of UG continue to argue for a genetic basis of language, they have little success in making a convincing case for a biological basis for music[496]. They also have difficulty in finding a mechanism of natural selection that might explain the phenomenon.

Few commentators have succeeded in addressing the question of the origins of music. The only convincing route to answering this question is in connecting it to human activity. George Thomson has contributed more than any other to our understanding in this area.

This chapter considers the physical basis of human music, its relation to activity, parallels between music and language and finally the question – what use is music?

494 Pinker 1997.
495 Sacks 2007.
496 McDermott and Hauser 2005 attempt to do so, but seem to have more questions than answers.

Universality of Music

Music is known to be a feature of all human societies, accompanying a wide range of activities. In every know society, mothers sing to children. In all societies lullabies have the same characteristics – slow in tempo, simple and repetitive, with more descending intervals than other melodies[497]. Work songs are also found in every known society. Ted Gioia has collected examples from a wide range of pre-political people[498]. Dissanayake describes how in small-scale societies communal music interweaves with almost every activity[499]. In tribal societies dance and song are simultaneous – and everybody joins in[500].

Another apparently universal feature of music is the pentatonic scale – a simple scale of five notes that underlies such Western songs as *Auld Lang Syne* and *Swing Low, Sweet Chariot*[501]. Bobby McFerrin has demonstrated the universal recognition of this scale with audiences across the world[502].

The emotions conveyed by music seem also to be universally recognised. Fritz and Koelsch carried out a study in the remotest part of Africa they could find. Subjects from the Mafa people, who they believed had never before heard Western music, could nevertheless recognize emotional expressions of happiness, sadness, and fear in Western music more often than would be expected by chance[503].

A study by Hansen *et al* asked subjects to manipulate dynamics of music such as tempo, loudness and phrasing to produce emotional effects in a song, using adjusting slides to make the song sound happy, sad, scary, peaceful or tranquil. They found that all their participants — both expert musicians and, in another study, seven-year-old children — showed similarities in the dynamics they chose to express the different emotions[504].

497 Schellenberg and Trehub 1996.

498 Gioia 2006.

499 Dissanayake 2005; p. 378.

500 George Thomson 1948, p. ????.

501 Howard Goodall's TV programme *How Music Works* - Channel 4, November 2006 - demonstrated a number of such cases. Music based on the pentatonic scale is attested in folk music across the world.

502 See the *Notes and Neurons* website, at http://www.worldsciencefestival.com/video/notes-neurons-full

503 Fritz *et al* 2009 report that the Mafa showed considerable variability in their performance, with two of twenty-one study participants performing at chance level. You have also to wonder whether there really are still people in the world who have never had access to media playing Western music.

504 Hansen *et al* 2009.

Even a disability such as autism, which interferes with the ability to recognise other people's emotions, does not necessarily cut an individual off from the emotions that music communicates. A study by Heaton asked groups of both autistic and normal children to match music to emotions, choosing between happy and sad. In later studies a more complex range of emotions were introduced, such as triumph, contentment and anger. It was found that autistic children performed just as well as normal children, indicating that music can reliably convey feelings even in people who have trouble picking up social cues for emotions.

Music and the body

Brains

In our culture that is so concerned with 'men of genius', it would be natural for investigators to look for areas of the human brain associated with music. Mysteriously, though, nobody has managed to identify any such areas of the brain. Investigators are agreed that all parts of the brain and both hemispheres are activated when we listen to or produce music[505].

McDermott & Hauser conclude,

> it remains unclear whether any music-specific mechanisms might be hard-wired into the brain and thus candidates for the product of natural selection.....There is little evidence for neural circuitry dedicated to music.[506]

Finnish scientists claim to have found a gene associated with 'musical aptitude', but this does not provide any kind of explanation for the universality of music, and goes against the generality of findings in musicology[507]. In any case, their search was not for an explanation of general musical abilities, but for the exceptional.

One consistent finding from studies of people with brain damage is that the music and words of songs can be recalled by patients with failing brains even when most other areas of language performance are impaired. It appears that music may 'colonise' those deep-seated areas of the brain – the limbic system associated with strong emotions – and can persist there longer than other intellectual activities[508].

Brain studies have shown that areas of the brain associated with bodily movement are often activated by music. It is a common experience that hearing music gets us moving parts of our bodies – tapping our feet, moving our hands, head, legs. The motor regions

505 Laurence Parsons, on the website *Notes and Neurons* (see above).

506 McDermott and Hauser 2005; p..51.

507 AVPR1A-Haplotypes, according to Ukkola et al 2009.

508 See the discussion of the brain in Chapter 1, and Sacks 2007.

of the brain that respond to music include premotor areas, which prepare a person for action, the cerebellum, which coordinates physical movement, and those traditional speech areas – Broca's and Wernicke's[509]. This power of music may stem from the way it echoes and synchronizes our activities. Rhythm and physical action would tend to evoke each other in the nervous system. Zatorre points out, "All sound is produced by movement. When you hear a sound, it's because something has moved."[510]

Physical basis of music

The universality of music may be partly due to the fact that we respond similarly to the acoustic signals by which music is transmitted. Certain musical intervals appear to be present in all the music of the world. This may have nothing to do with brain structures, being simply an understandable response to the physics of sound.

The note concert A – the note to which orchestras tune up – has a measured frequency of 440 Hz (or cycles per second). Its octave, eight notes higher, is exactly double its frequency at 880 Hz, and the octave below it is exactly half – 220 Hz. In some way, this seems to make octaves easy for us to hear. The interval of a fifth (five notes up from the basic or key note of a scale) is two-thirds of the octave, and other musical intervals similarly have fairly simple mathematical ratios[511].

By contrast the 'tritone' – an interval that falls outside the pentatonic scale – has a complex mathematical relation of 32:45[512]. This interval, sometimes known as 'the devil's interval', was avoided in early Western music for being so difficult to sing – but is much favoured in Jazz.

Experiments by Schellenberg and Trehub reinforce the notion that natural musical intervals are easy to grasp for young infants and many adults – whereas unnatural intervals are not[513]. This does not require any innate propensity. It is simply that these intervals are easier to hear and to remember. It may be similar to the fact that the two times table is easier to remember than the thirteen times.

Mathematical ratios may not explain everything. Mc Dermott and Hauser in studies of melodies across the world, find that large intervals such as fifths or octaves are less frequent than small intervals, such as one or two semitones[514]. Semitone and tone

509 McDermott & Hauser 2005.

510 Quoted by Schrock 2009.

511 The major third has a ratio 5:4; the perfect fourth 4:3; major sixth 5:3. See also Dowling & Harwood 1986.

512 This interval is also described as flattened fifth, sharp eleventh or augmented fourth.

513 Schellenberg & Trehub 1996.

514 McDermott & Hauser 2005, p.33.

intervals have fairly complex mathematical ratios[515], but it may be that a melody consisting of simple semitones or tones up or down[516] is easier for a young untrained singer to hear and to produce than one with larger intervals.

There are also quite logical reasons behind the human preference for certain musical scales. Most musical scales consist of unequal steps, and are a combination of tones and semitones. This makes it possible for each note to have a unique relation with other notes of the scale – so a listener or singer can easily assign a note to its position in the scale, and therefore base a melody on its tonic successfully. Equal interval melodies are harder for subjects to remember – logically enough, since the tonic, or keynote, cannot be easily identified.

Another significant aspect of human music is the recognition of relative pitch – that is, we can hear and sing the same melody in different keys. This may be linked to the ability that infants acquire early to tune into voices at a range of pitches – from the bass of a deep man's voice to the high pitched voice of a child. It appears that while some other species, such as monkeys, can learn a melody, they cannot recognize it when its pitch is raised, even to an octave higher[517].

One possibility is that human music and some animal and bird songs may have been shaped by common perceptual constraints, for instance on what sorts of acoustic patterns are easy to remember or to produce. This may be why some bird songs, such as those of blackbirds, seem to us to conform to human ideas of melody.

Origins of Music in Activity

While many have speculated on the origins of language, there are few who have proposed a way in which music may have originated. The connexion of music and collective activity however enables us to construct a likely scenario. It is frequently noted how in tribal societies dance and music are inseparable – so in seeking the origins of music we need to look simultaneously for the origin of dance.

There are hints at how dance might have originated in chimpanzee behaviour. Williams (1980) notes that while chimpanzees do not seem able to sing or hoot together, they can come together in uncoordinated dances[518]. Jane Goodall observed a 'rain dance', where a group of male chimpanzees jumped about and vocalized together during a violent thunderstorm. She also noted how young chimpanzees danced together in

515 15:16 and 8: 9 respectively.

516 'Frère Jacques' would be an example.

517 McDermott & Hauser 2005, p. 41.

518 L Williams 1980.

play[519]. Descriptions of chimpanzees hunting recount that while the hunt itself is carried out in silence, the achievement of the kill is accompanied by a frenzy of hooting and leaping about – a precursor of a celebratory dance. There is also a report by Pruetz & Thomas of a 'fire-dance', performed during a bush fire by a solitary chimpanzee[520].

It is therefore easy to see how dances could become part of the first upright apes' activity in times of excitement, in celebration of accomplishments such as a successful hunt, a discovery of a new food source, or success at driving away a predator[521]. Their enforced new way of life on the savannah being so much harder than their old life in the rain forest, these hominids would probably need to celebrate every small achievement. Such celebratory dances may well have developed over time into a record of significant activities, and finally have become a controlled rehearsal of the activity. They thus become *mimetic* dances, as described by George Thomson[522].

Thomson's account shows how music is connected from the earliest time to collective activity. At first, he suggests, activity was always collective. Many hands worked together, and in these conditions cries and utterances came to be elaborated and systematised, so as to coordinate the actions of the group. Then as technique improved, so the vocal accompaniment ceased to be a physical necessity, as men and women became capable of working individually. However the collective consciousness of the group that had worked together did not disappear. The group's memory of its activities took the form of mimetic dances, which were performed before the real task, reproducing in some way the essential movements of the task.

Ray Mears has recorded an existing version of such dances, as performed by a group of aboriginal women in Australia. The dance rehearses the technique used to gather tubers from the ground and prepare them as food[523].

We should not at this early stage be talking of language. These dances are most likely a precursor to both speech and music. Steven Brown actually proposes that speech and music come from a common ancestor which he calls 'musilanguage'[524].

519 Goodall 1988.

520 Jill Pruetz recounts that the male faced the fire with "a really exaggerated slow-motion display" before redirecting his display at chimps sheltering in a nearby baobab tree. Barking vocalisations from the male, never heard in more than 2000 hours of monitoring the group, were also heard.

521 We see even in modern humans the tendency spontaneously to dance in celebration of exciting events – witness the behaviour of a football crowd at a goal.

522 Thomson 1948, p. 438.

523 Ray Mears; 'Bushtucker Man' BBC TV.

524 Brown 2001. This implies that Steven Mithen's theory that Neanderthals could not speak, but communicated only with music, is anachronistic – see Mithen 2005.

Merlin Donald's account of the mimetic culture of early humans bears some similarity to Thomson's[525]. Like Thomson he sees this culture as leading on the one hand to the development of technical abilities and on the other to symbolic forms of communication. Thomson sees these early dances as setting humans on the road to song, to magic, and to poetry. He points out that music in tribal societies is never a separate or specialized activity, as it is in modern urban society. In the original tribal dance, rhythm, words and melody are combined in a single activity[526].

The importance of Rhythm

Most studies of music in the West focus on melody, whereas if we are to fully understand the relationship between music and activity, we need to appreciate the importance of rhythm. This puzzles some investigators. McDermott and Hauser note that the enjoyment of rhythm and dancing is also apparently universal, but then comment, 'At present very little is known about these most mysterious features of music'[527].

If we start to look for the origins of rhythm in music, it is hard to avoid the conclusion that it relates to the rhythms of human activity – as Thomson emphasizes:

> the ictus or beat of rhythm is rooted in the primitive labour process – the successive pulls at the log, or the strokes of the tool on stick or stone. It goes back to the very beginning of human life …..That is why it stirs us so deeply.[528]

The simple structure of the labour cry is in two parts – effort and rest. This is the basis of the work song, in which the unchanging chorus accompanies and coordinates the effort, while the variable verse represents rest, and preparation for the next effort[529]. Thomson goes on to relate this structure to the chorus and verse structure that underlies traditional song and poetry. The subsequent story of music Thomson sums up:

> The three arts of dance, music and poetry began as one. Their source was the rhythmical movement of human bodies engaged in collective labour This movement had two components – corporal and oral. The first was the germ of dancing, the second of language. Starting from inarticulate cries marking the rhythm, language was differentiated into poetical speech and common speech. Discarded by the voice and reproduced by percussion with the tools, the inarticulate cries became the nucleus of instrumental music.[530]

525 he talks about an 'adaptation', implying a biological restructuring of the growing neocortex - see Donald *Origins of the Modern Mind*.

526 See Thomson 1948, p.438 for an account of collective labour leading to speech - and not only to speech, but also to the origins of dance, poetry and song.

527 McDermott & Hauser, p.52.

528 Thomson 1972; p.447.

529 Thomson 1972: p.449.

530 Thomson 1972: p.451.

Even in ancient Greece, poetry and music were not separated. There was no purely instrumental music, and most poetry was sung to musical accompaniment. In the 1940s, when George Thomson was writing in Ireland, he found this also to be true of Irish poetry[531].

This is not to say that instrumental music is without a long history, however. Kunej and Turk describe a bone flute found at bone flute found at a Neanderthal site in Slovenia, dated to 50,000 years ago. They claim that it is possible with it to produce notes consistent with the modern diatonic scale[532].

The components of early song and dance came to be separated as a result of class society, the onset of individualism and specialization, patronage of specialist musicians. The growing complexity of music led to the need for intensive practice of instruments or voice and eventually the need to write and read musical scores.

Music and Language

Some commentators have pointed out that there are many similarities between language and music, reflecting perhaps their common origin. Both language and music are organized in a way that groups smaller components – words or notes – into phrases, and these phrases into melodies or sentences. In their more complex forms, both display the property of recursion (see Chapter 1).

Jamshed Barouche has studied how the voice uses musical intervals. A voice will be interpreted as sad if it uses a descending minor third, but as angry if it uses an ascending semitone[533]. Negative emotions have clear musical connotations, though there is no such finding as yet for positive emotions – presumably since failure to recognize a negative emotion has more drastic consequences.

It is noticeable that when speech becomes more chant-like it is predominantly intervals of the pentatonic scale that are used. I once spent some time waiting for a train on York station, and passed the time working out that I could sing the station announcements using just the first four notes of that scale – *doh, re, mi, so*.

Another study of the acoustics of speech sounds by Ross *et al* has found that the relationships between the frequencies that a speaker uses to make vowel sounds correspond neatly with the relationships between notes of the 12-tone chromatic scale of music. In acoustic terms, vowels are composed of formants – bands of sound at

531 Thomson 1972: p. 435.
532 Kunej & Turk 2000.
533 *Notes and Neurons* website.

certain frequencies. In this respect they resemble musical chords. The researchers found that the intervals between these formants related to the 12-tone chromatic scale – and that this was true of both Chinese and English vowels[534].

Intonation is the aspect of speech closest to music. Even individuals who are said to suffer *amusia* or tone deafness can still produce exactly the same intonation patterns as other speakers of their language[535]. Brain studies of normal speech indicate that when the melody of speech is processed there is a dynamic interplay between the left and right hemispheres of the brain. It appears that the brain's right hemisphere processes the melodic aspects of speech, while the left hemisphere processes linguistic information[536].

Music for survival

Finally in this chapter it is worth considering the question – what use is music? Huron discusses this question at length, and it is worth examining in some detail his speculative suggestions of the benefits of music to human groups:

- caring and raising children. An obvious example is mothers singing lullabies, but there is also 'Motherese', at the border between music and speech, the distinctive melodic way that adults talk to babies[537]. Children learn to listen and coordinate with others through the singing of simple songs. Huron mentions also the fact that oxytocin, a hormone released in the brain after birth that is said to promote the bonding of mother and child, is apparently released while people participate in music[538].
- encouraging social mixing, as in dancing, courtship songs etc. – and therefore ultimately mating. In many societies, if you don't dance, you don't get a mate
- Passing on knowledge. Work songs often contain details of the work they accompany. Ray Mears' gives the example of a song by Australian aboriginal women searching for edible tubers. Yoruba hunters in Western Nigeria have a chant they sing before setting out to catch the *otolo,* the waterbuck. This is Abrahams' translation:

  > Waterbuck, son of her who secures her baby on her back with rags and enters a place full of dew! Waterbuck whose death at the hands of the hunter is greeted by him with merry laughter! The waterbuck awakes, pastures and sets off in the early morning. Having set out yesterday, his return will be by the same route as he took then.[539]

534 Ross *et al* 2007.
535 Peretz and Hyde 2003, p.36.
536 Gandour *et al*. 2000.
537 Dean Falk 2004.
538 Freeman, cited by Huron 2001; p.57.
539 Abrahams 1958; p. 493.

That piece of information about the deer returning by the same route would prove very useful to the hunter. Danny Kaye in the film *Hans Christian Andersen* even has a song to make memorable Pythagoras' theorem.

- Social cohesion, 'bonding' in groups, and the reduction of conflict. Music's ability to convey and induce feelings may underlie one of its most important benefits. In most cultures, music is a communal event. Everyone gets together to sing and dance. Even in Western societies, which differentiate musical performers from listeners, people enjoy music together in a wide variety of settings, such as singing or dancing at social gatherings – Christmas carols, *Happy Birthday* at parties and so on. Music not only cements groups, but can contribute to the creation of groups with distinctive sub-cultures, such as today's Mods, Punks, Goths. Historically songs such as the *Marseillaise*, the workers' *Internationale*, served to express and cement political cohesion on a large scale[540].
- Group effort (collective labour) – work songs and chants, marching songs, sea shanties and so on coordinate physical activity of groups. Individually too songs may provide motivation for difficult tasks. George Thomson gives an example:

> The Maoris have a potato dance. The young crop is liable to be blasted by east winds, so the girls go into the fields and dance, simulating with their bodies the rush of wind and rain and the sprouting and blossoming of the crop; and as they dance, they sing, calling on the crop to follow their example. They enact in fantasy the fulfilment of the desired reality. That is magic, an illusory technique supplementary to the real technique. But though illusory it is not futile. The dance cannot have any direct effect on the potatoes, but it can and does have an appreciable effect on the girls themselves. Inspired by the dance in the belief that it will save the crop, they proceed to the task of tending it with greater confidence and so greater energy than before. And so it does have an effect on the crop after all. It changes their subjective attitude to reality, and so indirectly it changes reality.[541]

In short, the function of music is to unite us with other individuals. It consolidates and bonds the human groups that form society, and it motivates us in collective activity.

Summary

Music is a form of communication, and an essentially collective activity. It is in collective activity that its roots are to be found. Song and dance have served not only to consolidate the bonds of human groups – between mothers and children, between fellow members of kinship groups – but also acted as the first form of collective memory, where the techniques of labour were consolidated in a mimetic dance that held great power for the early human.

540 And *I'm forever blowing bubbles* for fans of my football club West Ham.

541 Thomson 1972, p.485.

The rhythm of the labour process is replicated in the labour song, and this rhythm is the basis of our music and our dance. Melody comes later, possibly developing from the modulations of the voice that originated in mother-child interaction.

Dance, song, rhythm and melody, all were initially combined in one activity joining together all the members of the social group – the primeval troop. These elements of the musical experience later separated out into distinct activities. Rhythmic chanting may well have been one of the factors that led to the human ability to produce syllables structured into consonant and vowel.

8 The making of grammar

What is grammar and where does it come from?

This chapter considers the question of the origins of grammar, and specifically of syntax. Linguists make a distinction between these two terms, using grammar to refer to the overall organisation of a language, including words, word-meanings, pronunciation and sentence structure. Syntax refers to the last of these parts of grammar, that is, the way sentences are organized, the classes of words involved, the word order and morphemes – the little bits that get attached to words to change their meaning or their function.

Although there is little evidence for how it happened, it is worth looking at the few speculative accounts of the origins of grammar that have been produced, to see how they might match up to a view of humans as cooperative and active creators of their own language.

The First Words

Of course we can never know what the first words or first sentences were like, but a comparative approach might throw some light. We can consider how children learn to speak and how grammar is created in languages of today, and link these observations to what is known of recorded *pre-political* or tribal languages.

It has already been recognised that the first steps towards language were not words at all, but were – well, steps, the steps and gestures of the mimetic dance. Once groups of early humans had reached an understanding that it was worth paying attention to what fellow beings were doing, then true communication between individuals became a possibility. However, the material for this communication had to be developed painfully slowly. How did it happen?

Comparisons with infants' learning

To reconstruct a possible line of development for grammar, a reasonable strategy is to start by looking at the way grammar develops in human children to follow. Matthiessen has constructed an outline of language development based on Halliday's model of child

language development. He sees there being three stages. The first is *protolanguage*[542] – a form of communication exemplified by young children, and experimentally in communication with apes. It is based on body movements, gestures, facial expression, cries and other elementary forms of communication.

Our upright ape ancestors could be capable of such communication. As they became more aware of each other's feelings and intentions, groups of apes may have developed three-way communication. Observers of chimpanzees note that pointing is generally absent from their behaviour, whereas it is an important first stage in infants' communication with those around them. So pointing could well have been a first step towards language. Another development at this stage would be the mimetic dance, as discussed in the previous chapter. Iconic gestures, where there is a clear link between action and gesture, develop.

The second stage of development Matthiessen sees as transitional between protolanguage and human language, and he suggests that this may have been a feature of *Homo erectus* communication. This is analogous to the stage of first words in humans. For a while children's utterances are of one word only, and many of these words are of their own creation. This is known as the 'holophrastic' stage – one sentence, one word, with a complex meaning. The same 'word' can be used in many different contexts to mean different things. A word like *goggy* may mean 'dog', but also 'cat', 'horse', 'teddy bear', in other words, any four-legged animal.

Some have suggested that the first words of, say, *Homo erectus*, were similarly holophrastic – one complex utterance that had a variety of meanings, depending on the context. This has been proposed by Alison Wray[543]. Since human groups at this stage must have been very small and very close-knit, speakers could rely on their hearers to grasp their intentions easily, so there would be little pressure on them to develop more elaborate forms of expression. Wray and Grace call this kind of communication *esoteric,* a form of communication that resembles a shared, secret language, which to an outsider would seem complex and impenetrable. *Exoteric* communication, on the other hand, is communication with outsiders. This would be fairly simple. The signs or words would be self-explanatory, iconic, easy to decipher. Such a language might well look like a simple form of the gestural *lingua franca* of the North American Plains Indians, described in chapter 4. It is possible that *Homo erectus* individuals would be using both types of communication, as groups came into contact with each other.

Children at the one-word stage are surrounded by talkers, and as language is so central to modern human life, they learn words rapidly, progressing quickly to the stage where

542 A term introduced by Bickerton, 1990.

543 Wray & Grace 2007.

words start to be combined into more complex utterances. The circumstances of *Homo Erectus* life were quite different, and so this stage would probably have lasted a long time. One-word utterances would slowly, over the next million years, develop into two-word sentences structured in a similar way to children's early sentences.

Was there grammar, in the modern sense, at this stage? Some commentators have suggested that as most of a baby's first words are names of objects, naming things can be seen as the most basic use of language, so that the first words can be classified as nouns. Schleicher suggested as much in the 1860s, and the idea has been restated recently by Heine and Kuteva[544]. For them nouns were the very first 'layer' of grammar, to be followed first by verbs and then elements of syntax like prepositions.

But, while children's first spoken 'words' may be names of people and objects, there is a stage before spoken words, of actions – gestures, often replicating actions, such as *pick me up, give me that*. So the first 'signs' may equally well have described actions.

In any case, in a situation where one sentence is one word, it is pointless to try and describe that one word in terms of today's grammar.

All communication, even the very simplest, has two components not one. If you indicate 'food', you must also have the additional thought, 'eat'. If you indicate 'fruit on tree', you are implying 'climb up and get'. Hurford argues that even the vervet monkey's instinctive cries must have this kind of propositional structure[545]. If the monkey utters a cry in response to a bird overhead, the observer may attribute to it a meaning such as 'eagle', but it also implies 'hide in bush'. In nearly every utterance there is an argument and a predicate, a topic and a comment. However, it is possible to reconcile these two ideas, once you recognise that in everyday speech (as opposed to formal speech or writing) the argument or topic is often implicit, and not spelt out. Being already present in the context of their communication, it is understood between speaker and hearer. Thus a one-word sentence may still have a two-part semantic structure.

When children at the one-word stage have acquired a vocabulary approaching a hundred words they then start to combine words in sentences. Some of these sentences appear to follow adult models – *Silly Daddy* – but others are clearly their own creation, such as *Allgone train; No tickle*. Pursuing the parallel further, it could now be that among *Homo Erectus* communication starts to take the form of well-formed gestural signs rather than pantomimed gestures. Very slowly, groups of humans start to create longer utterances.

544 Heine & Kuteva 2007.
545 Hurford 2007.

Halliday shows that children's speech at this transitional stage has two functions, which he calls *pragmatic* – getting things done – and *mathetic* – finding out. It is reasonable to suppose that the pragmatic function would dominate early communication. Language is fundamentally about getting things done, and at the beginning this must have meant getting somebody else to help you in a crucial task. The two basic requirements of language in this case would be a call to attention (*Hey, you!)* and a request for action (*Pull! Lift! Carry! Run!)*. Both these tasks could be carried out with gesture – a poke to get somebody's attention, then a pantomime of the required action. It is much more efficient, though, to call somebody's name than to have continually to poke them. Similarly, when your hands are busy pulling a log or carrying a carcass, speech is more effective than gesture. These could well have been the first forms of spoken utterance, as George Thomson argues. He relates these two language functions to forms of the noun and the verb in both Ancient Greek and Latin. In these languages, spoken many thousands of years after these early beginnings, these two forms – the 'vocative' case, in other words the call to attention, and the 'imperative' verb – the call to action – remained in their basic, uninflected form, that is, with no formal ending. By contrast, nouns and verbs with other functions in these languages over time developed complex systems of inflections[546].

Further development at this stage would consist of adding to the action specified in the verb the object of the action. Now we are justified in talking of simple syntax, with verbs and nouns *You lift log; You give fruit*. Here the basic semantic relations of human labour have appeared: *agent – action – patient.*

Grammaticisation

So far we have looked at the way nouns and verbs might find their way into early language. Notice that there is no mention so far of adjectives and adverbs, which seem to feature in languages as at a much later stage.

However, the stock of words in any language is made up not only of meaningful 'content' words such as nouns and verbs, but also the little grammatical connecting words that serve to join them together into sentences – words like the English articles *a, an, the*, and prepositions *in, of, to*. Sometimes these bits of grammar are not independent words, but are attachments to the content words, such as the way that English forms the past tense of verbs by adding *-ed*, or the possessive form of names, by adding *-s*.

There is no particular mystery about the way these *morphemes* are formed. Linguists have used the term grammaticisation (or grammaticalisation), to explain it, and see it as

546 Thomson 1972, p. ????.

arising in a fairly natural way out of habitual communication. Ingold sees syntax rising inevitably out of communication:

> Where an intelligent creature is placed in a developmental context which imposes a situational need for complex communication with similarly intelligent creatures in the social environment, syntactic structures are bound to emerge as necessary solutions to the communication problem.[547]

To create a sentence we need to do more than simply string words together. We need the morphemes, small and apparently meaningless words, to indicate the relations between one word and another.

The point is expanded by Savage-Rumbaugh and Rumbaugh (1993), who see syntax as a disambiguating device that becomes necessary when the content of messages grows too great for single words or compounds to suffice. In their example *Tickle Jane Sue*, produced by a chimpanzee, the number of potential relationships that can be assumed between Jane and Sue is too numerous to specify what the speaker wants to happen in a tickling bout. Some means is needed to specify agent and patient; the listener must be told more about the way in which the nouns are to relate via the verb. A grammatical device must be invented if it does not exist.

Recently Joan Bybee has explored the phenomenon of grammaticisation. She describes the process by which a word that has proved useful to speakers loses its meaning through constant use and becomes a morpheme. Examples in English are words like *can* and *will. Can* was originally a verb meaning 'to know', but is now a modal verb with a variety of functions but no one clear meaning. *Will* originally meant to 'want', but now expresses the future. Another future expression *going to* started off as a verb of direction. It is so frequent in use that it is normally pronounced in a reduced form *gonna*. As we shall see later, *have*, whose original meaning was to hold or to possess, is used in grammar in many functions – for example to create the tense known as the 'perfect', implying that an action has been completed – as in *Have you had breakfast?*

It is not only words that can develop into grammatical forms. The African language Yoruba has a wonderful system of tones that change the meanings of words, and also carry out basic grammatical tasks such as making a sentence negative or expressing possession.

In some languages it may simply be the word order that tells listeners who is the 'agent' and who the 'patient'. In other languages it is the endings of words, or *inflexions*. In many Indo-European language, including Latin and Greek, meaningful words became reduced and attached to the ends of words to form a complex system of noun cases and

547 Ingold 1993; p. 41.

verb declensions A good example is the – m of the 1st person pronoun (as in English 'me', 'my'), that came to form the ending of the first person verb, as in the Latin *amabam* 'I used to love'. These case endings can be very complex – but they can nearly all be traced back to words that have over time lost their meaning and been reduced to morphemes.

There are many similarities across languages in the devices they use to carry out these basic grammatical functions. Joan Bybee's point is that these common patterns exist between grammars because only a limited number of solutions to the same problem are workable.[548]She traces

> the discovery that all around the world, in languages that are not related genetically or geographically, we find examples of definite articles developing from demonstratives, indefinite articles from the numeral 'one', future tenses from verbs meaning 'want' and auxiliaries indicating possibility and permission from verbs meaning 'know' and 'be able'.[549]

For instance, in many European languages, an indefinite article has developed out of the numeral 'one': English *a/an*, German *ein*, French and Spanish *un*, Modern Greek *ena*. In unrelated languages the same development occurs: in Moré, a Gur language of the Upper Volta, *a yérmé* 'one' becomes the indefinite article[550].

Words and phrases undergoing grammaticisation are phonetically reduced, with reductions, assimilations and deletions of consonants and vowels producing sequences that require less energy to produce. For example, *want to* becomes *wanna*, just as *does not* has become *doesn't* and *will not* has become *won't*.

Syntax and discourse

Givon (1979) has examined the process of the development of syntax that occurs as pidgin languages – the crude forms of communication that develop as speakers of different languages trade or work together – develop into creoles. When a pidgin language becomes established as the common language of a settled community of people, and learnt by succeeding generations of children, the language becomes a creole, with a system of grammar as fully-formed as more ancient languages.

Givon's study of the creole spoken in Hawaii distinguishes two types of discourse, the product of distinct uses of language. He calls these *pragmatic* and *syntactic* discourse[551.] His account shows how socio-cultural factors produce quite dramatic differences in grammar.

548 Savage-Rumbaugh and Rumbaugh 1993; p.105.
549 Bybee et al. 1994.
550 Bybee *et al*. 1994.
551 Givon 1979; pp 207-8.

Pidgin languages are examples of pragmatic discourse, resulting from

- communicative need to exchange information, but with no common language
- little shared information or background knowledge
- immediately obvious context

The resulting form of language has pragmatic characteristics. Though its message is quite clear, its syntax is simple, but unstable, inconsistent and difficult to formalise.[552] Among other features it has a variable word-order, where the element that is most important to the speaker is put first. Clauses are loosely co-ordinated. There is a low ratio of nouns to verbs – typically one noun per verb. There are few grammatical words. Verbs are generally not marked for tense or aspect, and there is no distinction between singular and plural in nouns.

The factors that would cause such a pidgin to develop into a full grammatical creole would include many that are clearly non-linguistic, such as 'expanded geographical range'; 'specialised sociocultural activities'; 'increased size and variety of social units'; 'contact with other bands'; 'slow dissolution of society of intimates and move towards the urban society of strangers' [553]

These factors would lead to a shift from pragmatic to syntactic discourse. Such a shift would involve

- grammaticisation of the more frequently used words,
- the grammatical word-order of subject-verb-object,
- subordination of clauses in the sentence,
- a higher ratio of nouns to verbs,
- some grammatical marking of case,
- grammatical forms of noun plurals,
- verb tense, aspect and modality,
- pronouns and demonstratives.[554]

Givon views the growth of creole from pidgin as the result of the normal processes governing the life of a community:

> Years of living together have created an increasing body of common knowledge of members of the community, their personality and motivation. On this facilitating background, the syntactic mode of communication, with its condensation, time-saving and structuralized, automated coding procedures, can proceed.[555]

552 Givon 1979; pp 224-6.
553 Givon 1979; p. 297.
554 Givon 79; p. 305.
555 Givon 1979; p. 226.

In short, a close-knit community, with a body of common knowledge, and a well-understood social life, produces a close-knit syntax (what Wray would call esoteric), just as a loose conglomeration of individuals produces a loose type of syntax (exoteric). His account would explain very neatly the way syntax might have developed, over a long period of time, among our ancestors, perhaps at the stage of the transition between *Homo erectus* and archaic *Homo Sapiens*.

This study of the pidgin-creole transition is a very interesting and important analysis of the relation between social factors and grammatical form. It is in the true sense a functional study. The only odd thing about it is Givon's description of the determining factors as 'discourse' principles, which is to give an extremely broad definition of discourse. Many of the factors that account for the transition he describes, such as 'specialised sociocultural activities' are obviously social factors, relating to the socio-economic activity of speakers – that is to say, they are aspects of labour, rather than aspects of the autonomous linguistic phenomenon of discourse.

In these accounts of grammaticisation, of the process that turns content word into grammatical morpheme, something is missing to complete the picture. An important question remains to be answered, and that is, what is it that makes the word that is the origin of a morpheme, so meaningful to speakers that it is used all the time?

There is a clue in Malinowski's study of the Trobriand Islanders' language, Kiriwinian (or Kirivila). There is in this language a morpheme *ka'i*, that is attached to words describing wooden objects, or long thin objects. His explanation of this morpheme, which he calls a 'classificatory formative', is illuminating:

> The more important the term, the more pronounced is the tendency to use it over a wide range of meanings. *Ka'i*, for example, means anything from 'tree', 'plant', 'vegetable', 'wood as material', 'shrub', 'magical herbs', 'leaves', 'stick' to the abstract concept 'made of wood' or 'long object'; in this latter sense it also functions as a classificatory formative.[556]

The explanation relates the origin – the grammaticisation – of the morpheme to the centrality of gardening (growing yams and vegetables) in Trobriand islanders' society. The answer to our question about grammaticisation is answered here. The reason why some words, and not others, become morphemes is their importance to the collective activity of its speakers.

556 Malinowski 1966 vol. 2; p.68.

Grammar as reflection of practical activity

In this section we look further into the hypothesis that grammar is the outcome of the collective activity of speakers. To provide some perspective on this idea, it will be useful first to examine a recent example of grammar in activity, produced not by a human being but by an ape. Sue Savage-Rumbaugh and Duane Rumbaugh have produced a record of the bonobo Kanzi's utterances. These were not spoken words, but composed using a lexigram, a keyboard consisting of abstract symbols rather than letters.

In Kanzi's 'grammar' we find not only utterances with semantic relations similar to those of humans sentences – agent-action; action-patient, but also some utterances that would fall outside a human model of grammar. These include action-action utterances like *tickle bite*, and some sentences, such as *food blackberry,* whose semantic structure is quite idiosyncratic, and can only be described as food-food. Action-action sequences actually form quite a large proportion of Kanzi's utterances.[557]

Now among humans, both adults and children learning to speak, action-action utterances are relatively rare, but consider for a moment the peculiar life of Kanzi, a chimpanzee in a human experiment, Kanzi spends much of his life in actions that have no apparent purpose to him. Many of his actions are merely for the purpose of further action – chase in order to tickle, and so on. As important as his spells of activity are intervals for food and drink. In this context, his preference for these specifically Kanzi sentence relations makes sense. His is a strange and rather sad existence as an experimental talking ape. Kanzi's particular form of life (there's no doubt that no chimpanzee before Kanzi has ever lived a life quite like his!) has given rise to particular forms of expression.

Pre-political languages

The development of our ancestors' social existence culminated in the establishment some time between 300,000 and 30,000 years ago of the classic hunter gatherer way of life. So to get another angle on the possible ways that grammar formed among human groups it is worth looking in more detail at the languages spoken in today's hunter gatherer and other similar societies. The term *pre-political* was first used by Elizabeth Burke Leacock to define societies whose development has not reached a stage to support towns and cities. It includes hunter gatherer society, societies practising simple agriculture, and pastoralist societies, herding cattle sheep or goats. These societies cover an enormous range of environments and ways of life. What they have in common and what differentiates them from urbanised societies is that they are dependent entirely on the resources of their environment. Their social organisation and culture,

557 Savage-Rumbaugh et al 1993; p.101. Of 724 two-element utterances, the category of action-action utterances is the third largest - 92 utterances.

was at one time described as 'primitive communism', an expression that has not really been supplanted.

Characteristics of pre-political languages

When we examine reports of pre-political languages, we find that they have certain striking common characteristics, such as

- huge vocabularies, rich in details of the environment
- focus on visual appearance and movement,
- a high incidence of names for topographical features – hills, rivers, woods, rocks,
- a lack of abstract or generic terms, and often few words for numbers,
- well developed systems of gestural signing,
- two ways of expressing the relationship of possession – 'alienable' and 'inalienable',
- at the same time as the absence of the verb 'have'
- grammar based on classification of nouns

These features taken together form a set of properties that are a response to the tasks of languages in the particular ways of life of their speakers.

The Russian linguist Klimov has noted a number of other less obvious properties of pre-political languages, on the basis of which he has attempted to establish a 'typology', that has become known as the *active typology*.[558] This is a kind of template that defines pre-political languages. The purpose of such a template is to help reconstruct early stages of known languages, which they are assumed to have gone through. This has actually proved very successful in reconstructing an early stage of the parent language of the Indo-European language family.

Pre-political ways of life depend absolutely on resources available in the environment. Lee quotes the Ju/hoansi saying : 'the environment is our wealth'.[559] It is therefore essential that every member of the community should be aware which plants, animals, other sources of food are available, where, when, how to obtain them, cook them, preserve them. Encyclopaedic knowledge of the environment, and the way it changes with the seasons, follows naturally from this requirement. Reports such as the following, from Luria & Vygotsky, are representative:

> One of the Northern primitive peoples, for example, has a host of terms for the different species of reindeer. There is a special word for reindeer aged 1,2,3,4,5,6 and 7 years; twenty words for ice, eleven for the cold; forty-one for snow in its

558 Klimov 1974.

559 Lee 1979: p. 458.

> various forms, and twenty-six verbs for freezing and thawing. It is for this reason that they oppose the attempt to make them change from their own language to Norwegian, which they find too poor in this regard.[560]

Along with this feature of language goes the high incidence of names for topographical features. Heeschen reckons 'more than half of the nouns in languages of mountain dwelling Papuans refer to plants and animals'[561].

Dixon mentions the value that Dyirbal speakers attach to detail in description:

> Vagueness is held to be a severe fault. All descriptions should be as specific as possible. This has often been misrepresented as a failure of the aborigines to develop generic thinking.[562]

The suggestion that these languages lack abstract or generic terms is worth examining in some detail. Lakoff comments on the often-quoted example of the many words for snow in Alaskan languages: 'when an entire culture is expert in a domain ... they have a suitably large vocabulary. It's no surprise and it's no big deal.'[563] He suggests a contemporary example would be our interest in cars, for which we could find hundreds of terms if we wanted to. In fact Lakoff is wrong here; there is a very real difference between the languages of industrial societies and pre-political societies. In the latter, a surprising fact is that although there may be hundreds of terms applying to important activities, the comment is found time and again in the literature, that there are few if any abstract or generic terms. It is as if we talked about cars by their names, their registration numbers, their colour, but did not have any general terms such as *car, convertible, hatchback, Ford, Toyota,* and so on.

This lack of general, generic terms, and the precision of detailed description, completely baffled the anthropologist Heckenwilde as he tried to record the folk biology of the Delaware Indians in the 19th century: Heckenwilde says he would point to objects, and write down the name:

> At last, when I had written about half a dozen sheets, I found that I had more than a dozen names for "tree", as many for "fish" and so on with other things, and yet I had not a single generic name. What was still worse, when I pointed to something, repeating the name or one of the names I had been taught to call it, I was sure to excite a laugh; and when, in order to be set right, I put the question.... I would receive for an answer a new word or name which I had never heard before.

560 Luria & Vygotsky 1962; p.63.
561 Heeschen 2001; p184.
562 Dixon; 1972; p. 30.
563 Lakoff 1987; p. 308.

Sometimes, as Malinowski argues, the lack of general terms is simply because a certain type of concept is not needed. Among the horticulturists of the Trobriand islands everybody is engaged in gardening, so no general word for *gardening* is necessary, since everybody has a garden, and there are no people who do not garden at all[564] This has nothing to do with people's inability to think abstractly, but rather the result of a way of life where disinterested reflection and abstraction has no place.

Foragers, horticulturists, pastoralists, all are dependent on the vagaries of climate and unpredictable changes in resources. There is no point in developing the capacity to make plans, reflect, consider alternatives, when the technical means are not present to translate ideas into practice. This is nicely illustrated in Chance (1990), who shows that the culture of the Alaskan Inupiat reflects an unwillingness to make firm predictions about the future. They have only one word that means both *if* and *when* in reference to the future. It annoyed the Christian missionaries in his village that the phrase 'when Jesus comes' was consistently translated 'if Jesus comes'[565].

Many languages are from our point of view deficient in numbers, it being frequently reported that there may be only a few number terms – sometimes just *one, two* and *many*. Needless to say, the lack of counting in the language is not a result of mental inability to handle quantities. The same reports often comment on complex systems of counting, using fingers, palm of the hand, arm and other parts of the body. This contrast between elaborate counting systems and a lack of grammatical numerals is particularly telling. Because there is no need for abstract arithmetical operations in the life of these people, a grammatical system of numerals has not developed. Manual counting is accurate enough, so why develop further?

The emphasis of these languages on aspects of shape, movement, and other visual properties is widely reported, as in Miller's study of Delaware, where there are 'at least eight alternative classifications based on form, habitat, colour, movement, sound, use, relationship and appearance'[566]

Levy-Bruhl's study of Klamath notes the variety of different expressions used to convey motion, in a straight line, motion to the side, along a curve and so on. 'In a word, the spatial relationships that the Klamath language expresses so precisely may in particular be retained and reproduced by the visual and muscular memory' [567], and Lévy-Bruhl goes on to suggest 'if verbal language, therefore, describes and delineates in detail positions, motions, distances, forms and contours, it is because gesture languages use

564 Malinowski 1966, vol. 2; p.67.
565 Chance 1990; p. 127.
566 Miller 1975; 436.
567 Lévy-Bruhl, quoted by Luria & Vygotsky 1992; p. 65.

exactly the same means of expression'. As we saw in an earlier chapter, if the interest of speakers is on visual aspects of phenomena and movement, then gestural signing is clearly equal to and in many cases superior to speech – a further validation of Gesture Theory.

The tasks of a pre-political language

Luria & Vygotsky see an explanation of the above features in the two tasks that are the priority for a foraging people – the need to record accurately the environment, and to commit to memory the information required to survive in this environment.[568] More generally, foraging and early agricultural ways of life are closely tied to concrete activity, where abstract thinking has little or no value, but a well-developed memory, sensitivity to changes in the environment, and a name for all relevant aspects of the environment relevant to food-gathering are essentials.

Division of labour between men and women.

Whereas in our modern industrial societies women are still struggling to achieve anything like equality with men, hunter gatherer society features equality between the sexes. Morgan, Evelyn Reed, Elizabeth Burke Leacock and many other anthropologists have confirmed that in early human societies women maintained a central position in human groups.

An interesting example of this relation between life, perception and language is found in Alpher's study of grammatical gender in the Amerindian language Iroquois[569]. In this language the feminine gender is unmarked, that is, it is the norm to assign nouns to the feminine gender, and masculine items are marked by a special subject-prefix. This is the converse of most languages with a system of grammatical gender, where masculine tends to be the norm, and feminine is specially 'marked'. Alpher's analysis of this system relates it to social relations among the Iroquois, who were traditionally a matrilineally-organised society. Women held the land, passed it on to their heirs in the female line, organised agricultural production, held or withheld the food produced by themselves and by men, controlled the wealth, arranged marriages, selected and deposed chiefs. While men were the warriors, women could even veto wars.[570] Men might be absent, often for years at a time in periods of war.

> The semantics of the pronominal subject-prefixes strikingly mirrors the resulting spread of people over space: all-male groups at the periphery, mixed sex-groups of women and children and some men at the centre: one non-singular subject prefix for the former and another for the latter.

568 Luria & Vygotsky 1992; p. 69.
569 Alpher 1987.
570 Alpher 1987; p.183.

In other words, Iroquois grammar is organised from the viewpoint of those at the centre of society – the women. Alpher goes on to suggest that grammatical systems where feminine is the unmarked gender are more common than previously supposed.[571]. Sex gender in modern languages is discussed in the following chapter.

In sum, we see that these languages are dominated by activity, by immediate visual impressions of the physical environment, relevant to vital socioeconomic activities, and by the requirements of precise description, accurate recording and memorising. Because abstract, theoretical operations are absent from the lives of speakers, they are therefore absent from the grammar of their languages. There is no need for 'recursion' or abstract syntactic operations typical of modern languages of industrial literate societies.

Our focus on the tasks of languages has produced an adequate explanation, but is this simply because the tasks of speakers are so concrete? Not all languages can be so simply specified in terms of the tasks they carry out. We need to consider other factors that may shape syntax.

Grammar as reflection of worldview

Society is the sum of human activities at any time, though certain activities are more influential than others, and it is not always obvious which are the determining ones. Ideological activities are often just as influential as practical ones. Beliefs, values, loyalties, worldview (what Humboldt called *Weltanschauung*) may shape language just as much as tool-making, trade, family structures or systems of procuring food.

Chapter 1 discussed linguistic determinism, the idea that the way our language is structured will affect the way we view the world, and pointed out its shortcomings. But suppose this idea was turned around. Could it be that the way we view the world affects the structure of our language? This is a long-established idea that stretches back to the days of Wilhelm Humboldt, and it is in principle perfectly sound. For Searle, for example, 'the way that language represents the world is an extension and realisation of the way the mind represents the world'[572].

Only there is a gap to be bridged, to connect our language to our lives. It seems correct to say that our view of the world should be reflected in our language. But what is it that creates our view of the world?

571 Alpher 1987; p. 173. Corbett 1991 mentions a number of other languages where women occupy a favoured linguistic, if not social, position: p. 30.

572 Searle 1983; p. 197.

To answer this question we need to turn once again to Marx and Engels, who pointed out that it is our material existence that determines the way we view the world, summed up in the phrase, 'Being determines consciousness'. Material existence is in turn determined by the means of production at any given time, and the resulting organisation of society.

In pre-political societies thinking and worldview, as has been shown, is dominated by practical activity, but also by the projection of tribal organisation onto the world around – so the natural world is perceived in terms of kinship and of totemism. For example in account after account of tribal societies' understanding of cosmology, the sun is seen as a woman, being the giver of life, and the moon as her husband, because of its associations with hunting. This relationship changed dramatically when matrilineal society was replaced by patriarchy, and the sun then became a man, and the moon an unrelated woman, as Marija Gimbutas has shown[573].

All aspects of a language can be affected by our views of the world. Even pronunciation is subject to this influence,. For example, some people keep the same pronunciation from childhood, while others may modify it in line with social aspirations, in order to identify with another social group than the one they were born into.

Noun-class grammar.

We conclude this chapter by looking at a particular feature of certain pre-political languages that illustrates the part played by many of the above factors in shaping the general form of grammar – noun class systems. A noun-class system is based on a grouping of nouns into grammatical classes, membership of which is indicated by morphemes or classificatory particles. With these particles the noun is linked to the verb or to other parts of speech.

In this example from Swahili, the particle *ki* links the noun and the numeral to the verb[574]:

1. *ki*-dole *ki*-moja ha-*ki*-vunja chawa
'finger one not kill louse ('One finger cannot kill a louse')

In languages of this type, spoken widely in Africa, but also in Melanesia, Australasia, and among American Indians[575], the nominal class markers perform a variety of functions, linking noun-verb, noun-pronoun, noun-adjective, specifying numerals, demonstratives and so on. As Corbett says of Nunggubuyu – these markers are the glue that holds the

573 Gimbutas 1991.
574 Creider 1975 p.128.
575 Breitborde 1975.

language together.[576] The categories that make up these classes of nouns demonstrate the close relationship between the speakers' lives, their worldview and their language.

The number of classes in languages is extremely variable. There may be as many as 20 in some languages [577]. It is widely accepted that nominal classes derive from what were originally semantically organised groupings of nouns,[578] and in many languages it is still possible to discern the principles on which nouns are grouped.

Proto-Bantu, the language from which the many Bantu languages of Africa are generally believed to have derived, had an elaborate system of noun classes. Creider's account suggests that the classes were based on the properties of

- shape, including long, curved, round/protruded
- animate v. inanimate
- human v. non-human
- other properties of mass substances, including sticky, liquid, lumpy

Hundreds of modern Bantu languages derive from this proto-language, most of them retaining this characteristic of Bantu grammar[579].

The Trobriand language Kiriwinian described by Malinowski also appears to have a system of at least five nominal classes[580]:

- *tay/to/tau* Human
- *na* Female, animal
- *kay* trees, plants, wooden things, long objects
- *kway* round or bulky objects, stones, abstract nouns
- *ya* flat thin objects, objects of fibre or leaf

What is the principle of the categories?

The Trobriand classification given above is a classic example. The classes seem to encapsulate all the important aspects of the horticulturist or 'gardening' life of its people[581]. The same might be said of the Proto-Bantu classifications. It is hard to see why classes such as 'sticky', 'lumpy' should be so important, but presumably they relate

576 Corbett 1991; p. 322.
577 e.g. in Fula - Corbett 1991; p.45.
578 Corbett 1991; p. 49.
579 Creider 1975.
580 Malinowski initially says there are three genders, 'as in Slavonic languages', but later adds two, and a possible sixth.
581 A great many classifier systems in S E Asia are based on the shapes round (of fruit); rod (stick) and leaf (flat) - Becker 1975; 118.

to a time when food was gathered rather than farmed, and so reflect the role of the women in the tribe.

However some classifications found in pre-political languages seem at first sight quite bizarre. For example, the Australian language Dyirbal, described by Dixon, has four classes that Lakoff found to 'boggle the mind'[582].

- (*bayi*), contains men, kangaroos, possums, bats, most snakes, most fish, fishing equipment, insects, the moon, storms, rainbows boomerangs, some spears, the willy wagtail bird.
- (*balan*) contains women, some snakes, some fish, most birds, the sun, firefly, scorpion, crickets, the hairy Mary grub, fire, water and things connected with them, shields, spears, some trees
- (*balam*) contains all edible plant foods, the plants that bear them, and honey
- (*bala*) parts of the body, meat, bees, wind, some spears, most tress and vines, grass, mud, stones, noises, language and a jumble of others

This apparent jumble of nouns, becomes more consistent once related to the beliefs of the Dyirbal, as Dixon's study does. For example, in myth, the moon and the sun are married, so it is quite natural to classify the moon with men and sun with women. The hairy Mary grub gives a sting that feels like sun-burn or fire, so it should be classified as *balan*. Similarly in myth, birds represent the spirits of dead women[583], so they are *balan*, except for the willy wagtails, which are believed to be men.

The classifications reflect a focus on the physical, concrete, spatial properties of objects, plants, animals, cross-cut by categories from mythical beliefs. Classifications according to role in mythology are found all over the world.[584] For example, the classification of the sun as feminine and the moon as masculine is very widespread.[585] Similarly, languages from widely separated parts of the world have classes of round things, of long thin things, and flat leafy things, which are clearly related to the interest people have in plants as sources of food.

These classifications are far from logical. To adopt the terminology of Vygotsky's work on children's thinking, they seem to show the characteristic of thinking in complexes or sets – in other words, arrangement of phenomena on the basis of accidental resemblances, the kind of associations that characterise children's early word-meanings and associations. In line with Vygotsky's observations about complex thinking, the criteria for these categories, apart from the vital categories of living and human, are

582 Lakoff 1987; p.92.
583 as in many other Australian languages - Alpher 1987; p.178.
584 Corbett 1991; p.10.
585 in almost all languages that have gender -based classification - except the Indo-European family.

overwhelmingly visual – shapes, movements, physical properties, and reflect the dominance of immediate sense impressions in the perception of these speakers.

Leakey on Kikuyu

Leakey's introductory grammar of Kikuyu, a Bantu language spoken in Kenya, suggests that the nominal class system in this language expresses a hierarchical view of the world, reflecting a belief in a hierarchy of spirits. The class of humans and spirits of humans is the highest class. Next in degree of importance are the 'second-class spirits' – of large trees and plants, epidemic diseases (which are spirit-borne), animals and certain reptiles. The third class of spirits includes birds, reptiles, insects, mammals, lesser plants, weeds and grasses, and demoted humans. A separate class includes religious and magical objects, and the remaining classes are categorised on semantic bases.

As with Dixon's account of Dyirbal, the linguist who has some knowledge of the material life, beliefs, values – and therefore the social metaphors – of a people[586] is able to give some explanation of the grammar of their language, rather than the mystified, 'mind-boggled' reaction expressed by Lakoff.

Becker's study of Burmese classifiers relates the system both to the real world and to the Buddhist view of the world[587]. For example, one classifier is used to group together the sun, airplanes, the ocean and needles, among other things.

> Unless one knows that the traditional Burmese pictorial map of the cosmos has man located on an island, from the center of which flows a river in a spiral course to the sea, one may question why rivers and oceans are classified here along with arrows and needles, which move in circular orbits.[588]

The Burmese classifier system is 'a linguistic image of speakers' world-view', but this world-view has no direct relation to speakers' material existence; it is mediated through a fairly elaborate ideological system.

These classification systems do not always represent a simple mechanical translation of important elements of life into language. It is rather a case of the incorporation into grammar of a system of values, values that work to keep society together, and in some societies have developed into a fairly elaborate ideological system. The Kikuyu system of ancestor spirits, the Burmese Buddhist world-view, Dyirbal beliefs and mythology – all clearly play a role in the lives, and also in the grammar of their speakers, though the connection with day to day activity is by now tenuous.

586 based on Creider 1975, p.129. Whether Leakey's account is correct is hard to assess; I have not been able to obtain the original textbook.

587 Becker 1975.

588 Becker 1975; p.118.

Decline of world view

Further proof of this connection between life and language comes in the fact that when the socio-economic life that gave rise to the system of values underlying classifications starts to disintegrate, these features of language correspondingly disappear or atrophy.

Recent generations of Dyirbal speakers, the children and grandchildren of Dixon's traditional Dyirbal speakers, have experienced marked changes in their lives, such that English is replacing Dyirbal, and the language is dying. In its later phases, the system of nominal classes is breaking down, into one resembling a simple gender system. Class 3 (*balam*), the class of edible foods, has disappeared. Only human females are now assigned to class 2 (*balan*). The mythical association of birds with spirits of dead women has been lost, and birds are now in *bayi* – the class of animate beings[589].

Burton and Kirk's study in modern Nairobi similarly finds that noun-class divisions of experience no longer correspond to the intuitions of native Kikuyu speakers[590]. This is hardly surprising given the difference between the material existence of the original Kikuyu speakers and the residents of a cosmopolitan capital city.

Conclusion

We have seen that speakers' lives are reflected in the grammar of their language. In the languages of pre-political people there can be found a reflection of collective activity, of social relations, and of speakers' worldview. In more advanced languages the reflection may be less obvious, as relations between people are based less on immediate physical tasks, and more on indirect relations resulting from the move into cities. That will partly be the focus of the next chapter.

589 Dixon 1991.

590 Burton & Kirk 1976; p. 173.

9 Is there progress in language?

The idea of human progress might seem inappropriate in these days when we are faced with the possibility of humans destroying the world we live in. Nevertheless, the scientific knowledge that the human species has accumulated in a quarter of a million years offers us the potential to make a world where warfare, poverty, destruction of species and of the environment can be brought to an end, and replaced by a rational system based on production for need rather than for profit. In this sense, and perhaps in this sense alone, humanity has advanced.

The question of whether progress can be observed in languages is less clear. Linguists have long held to the tenet of the universal equality of languages, implying that no language is more primitive or more advanced than any other. Proponents of UG hold that this is because we are all endowed with the same biological capacity for language. This notion was dismissed in Chapter 1. The crux here is in the word 'equal'. There is no doubt that all languages are equally good at carrying out the communicative tasks of their speakers. Equal is not the same as different though, and it is the differences in languages, and the way that these differences emerge as societies develop, that we are concerned with here.

The early stages of language show a progression from simple to complex, but that is not the case with the development of language over the whole period of the human story. Complexity is in fact a rather nebulous concept when it comes to languages, because simplicity in one aspect of a language's structure may well be matched by complexity in another[591]. Perhaps a better way of viewing the way languages develop is that there is a constant movement from orderly to chaotic, then back to orderly.

What is clearly observed in language over time is a move from concrete to abstract. There are two aspects to this tendency. The previous chapter showed how the process of grammaticisation takes meaningful words and reduces them to grammatical morphemes. This process appears to be going on all the time. However, there is a much larger-scale, overall movement in grammar from concrete to abstract, that stretches over the later years of the vast period we have been considering. It is not a general

591 Sampson's edited collection goes into the question of complexity in detail.

feature of all languages at all time, but emerges most clearly with the move into cities. The accumulation of technique and knowledge of human beings, the rise of class societies, and the increasing complexity of city life is reflected in urbanised languages.

This move from concrete to abstract is a familiar observation among linguists. Thomson says, 'historically the abstract has been preceded by the concrete, which, moreover, is constantly reasserting itself'[592]. Two questions arise in this connection. First is the issue of whether this is progressive – or whether, in Bickerton's words, languages are merely "recycling the limited alternatives that [the] biological envelope makes available'[593]. The second question is what causes it.

What this chapter investigates is whether there are correspondences between stages of society and developments in language. If language is an expression of worldview, then we should expect, as conditions of life change, so too will world view and with it forms of language.

This is a huge topic, and one that led Soviet linguistics in the 1930s into difficult territory. In our attempt to relate language and social development, we shall limit ourselves to examine four different areas of language: vocabulary, sex gender, forms of possession and finally the historic development of grammars from concrete to abstract.

Culture and Language

Pre-political societies cover an enormous range of different activities. Over time, simple hunter gatherer society, such as that of the Kalahari !Kung and Ju/hoansi peoples, has developed first into simple shifting horticulture, such as 'slash-and-burn' and then to more complex agricultural and pastoral societies. A number of studies have traced the way that their languages develop with this economic and cultural advance. Changes can be traced in both vocabulary and in syntax. As Vachek says,

> the development of language can only be satisfactorily accounted for as due to an incessant adaptation of the means of expression to the ever-increasing communicative needs obtaining in the given language community.[594]

Vocabulary

Berlin & Kay noticed in 1969 that colour terms are relatively simple in the languages of some pre-political people, and that systems of colour terminology apparently develop in complexity with technological and cultural advance. What is interesting though is that the development is always along the same lines. If a language has only two colour terms,

592 Thomson 2, p.40, and see also Cassirer 1944; 135.

593 Bickerton 2005; 511.

594 Vachek, 1973, p. 315.

they are always black and white. The next term is red, and then green or blue. In 1969 Berlin & Kay were tentative in suggesting that the sequence accompanied increasing technological and cultural advancement, but their suggestion was confirmed in studies by Naroll in 1970[595].

In 1977 Steven Brown showed a similar sequence in terms for botanical life forms. The sequence, as with colour terms, was the same across all languages studied. From a state where there were no general terms for plants, but only specific names – as in the Delaware study by Heckenwilde quoted above, p.xx, languages acquired first a term for *tree*, then for (non-tree) *plants*, then *vine*, *bush*, *fern*. Burris (1979) in a study of 72 languages, found a similar developmental sequence in geometric shapes in the order *circle; square; triangle; rectangle,* while Brown repeated his earlier study with zoological life forms, which he found to emerge along the following lines: there are five stages in the growth of folk zoological life-forms, with one life-form term being added at each stage. From Stage 1 to Stage 3 three life-form terms are acquired, *fish, bird* and *snake*, although in no particular order. *Snake* may encompass elongated animals such as worms and lizards in addition to snakes. A fourth life-form appears at stage 4 – *wug (*composite of *bug+worm)*. This includes insects and other very small animals such as spiders and is commonly extended to worms, and sometimes other small creatures such as snails, frogs, tortoises, crabs, and lizards. Finally, *mammal* is added at Stage 5. This category includes most large creatures, occasionally encompassing even large reptiles and large amphibians.

These sequences seem to represent the development of what Vygotsky calls 'sets'. They categorise aspects of experience in a visual way – but they nevertheless represent steps on the way to forming general categories, and thus towards abstraction.

Perkins' study of grammatical features of language similarly shows a trend that is applicable across a wide range of languages, to reduce the number of deictic distinctions[596]. Deictics are elements of language used to indicate where a speaker's attention is directed. Even in English we can notice this trend. Today most speakers make use of two deictics for place – *here,* and *there, this* and *that*. Most of us though are aware of a third older form *yon*, or *yonder*, that can be used to point beyond the range of 'that'.

Pre-political languages have a whole number of deictics of this type. As was pointed out in the previous chapter, their languages are full of expressions that enable detailed specification of shape, movement, and also of position. As culture and technology

595 Berlin & Kay, 1969:16 - p. 45; Naroll (1970: 1278).

596 Perkins 1992, p.24.

improve, and with them speaker's feeling of being in control of their environment, these specifications become less important.

Class society and sex gender

Another example of the way social life influences grammar arises from a detail of language history that has long puzzled linguists, as it does people attempting to learn European languages, and that is the rise of sex-based gender marking in European languages.

Heine remarks, 'The origin of gender constitutes one of the mysteries in linguistic reconstruction ... our historical methods do not offer us convincing clues as to how such systems originated"[597], though Heine's guess is that it is connected with family structure.

The term *gender* refers to the marking of nouns as masculine, feminine or neuter. Many linguists have adopted the term to describe other such features as noun classification systems, but this is a Eurocentric misuse of the term.

It was Brugmann who first established that gender distinctions appeared in the Indo-European parent language between 6,000 and 5,000 BC[598]. Brosman shows that they appeared at a fairly precise date – shortly after the separation of Anatolian languages from the main Indo-European language family[599]. The Anatolian Hittite language had no gender, and divided nouns into two categories, common and neuter, categories that are apparently derived from the two cases of the active language type. In the main branch of the family some nouns with female connotations started to be given the ending *-a* and eventually a system dividing common nouns into feminine and masculine was established, with different endings for the feminine and the masculine.

At this time, according to Gamkrelidze and Ivanov the Indo-Europeans' culture was based on cattle-breeding, agriculture, horse-riding and wheeled transport. Their culture is associated historically with the displacement of matrilineal systems by patrilineal. For Marija Gimbutas, the invasions of the Indo-European tribes into Europe were instrumental in the replacement of a fairly peaceful matrilineal civilisation in Old Europe, based on settled agricultural societies, with a warlike patriarchal culture based on horse-riding warriors. These invasions started around 4,400 and continued sporadically until 3,000 BC[600]. The outcome was a drastic change in the roles and status of women in Indo-

597 Heine 1983 p. 263.
598 Brugmann 1891.
599 Brosman 1982; Corbett 1991, p. 309.
600 Gimbutas 1991, p.352.

European society. From being central figures, women were reduced to a subservient status, and in many cases to a status less important than that of a horse[601].

The change was accompanied by a complete reversal of the system of values in the cultures of Europe. Worship of the goddess was replaced by religion based on the Sun God. The Old European systems of values changed drastically. Even the values of colours changed. From being the colour of the earth and of fertility, black became the colour of death and of mourning. From being the colour associated with death, white became the colour of purity, virginity – of weddings[602].

Although Engels did not have precise information about these events, it is what he had in mind when he talked about 'the historic world-wide defeat of the female sex'[603].

So it may not be by chance that at this time was introduced into grammar the consistent distinction between male and female expressed in the gender system. The demarcation of items as feminine – presumably those items associated with the role a woman played in this new patriarchal society – is matched also by a denigration in Indo-European languages of terms associated with women. This is apparent in English today, if you think of the associations of words such as 'hussy' – a derivation of housewife, 'mistress' as opposed to master; 'spinster' as opposed to bachelor, 'bitch' and 'cow'. In German the negative associations of the feminine ending are such that to avoid them the word for a young woman – **mädchen** is classified in the grammar as neuter.

This is not an isolated case either. Nilotic languages spoken in the Sudan and East Africa have a developed system of sex-gender. Gimbutas makes a connection between this and the Indo-European case, showing that there was a transition to patriarchy and violence in Saharasia, prompted by the pressures of severe desertification around 4,000 BC [604] Oliver produces an interesting comparison between the Nilotic language family and the Bantu language family in the forests to the south. Bantu peoples in the early Iron Age were agriculturalist, limiting themselves to favourable forested/woodland environments through central East and SE Africa. In drier savannah environments, the Nilotic-speaking peoples were pastoralist, raising cattle. The systems of inheritance were matrilineal among the Bantu, patrilineal among the Nilotic. The Nilotic culture featured such practices as identification of a man with a particular ox; poetry in praise of cattle, and other reflections of the importance of cattle-herding[605]. It is no coincidence then that it was among the Nilotic languages that sex gender developed,

601 As in the Law of the Hittites quoted by Gamkrelidze and Ivanov, 1995.
602 Gimbutas 1982.
603 Engels 1942.
604 Gimbutas, 1991; p. 352.
605 Oliver 1982; p. 437.

but not the Bantu. Heine shows that the original proto-Eastern Nilotic had no nominal gender. The system is therefore relatively young, as is the case of Indo-European. The grammatical markers of gender can even be identified. They are grammaticised prefixes that derive from nouns denoting 'girl' or 'daughter' – not, notice, "wife" or "woman" – but the marriageable commodity.

Forms of possession

Our aim to show that forms of social life result in different forms of grammar can be furthered by a brief look at forms of property and their expression in language.

The relationship that we know as 'owning' is unique to latter-day humans. Among animals we may talk about animals possessing instincts, fur coats, caves, territory – but this is an anthropomorphic metaphor. Animals' possession of a territory is not a socially recognised right, it's rather the product of instinctive behaviour, and is established by fighting or aggressive display. Animals occupy territory; they do not own it. They cannot pass it on to their children and indeed may have to fight their children to continue living there. Among humans, by contrast, despite all that is said about human aggression, ownership rights are socially agreed and socially maintained over long periods of time.

Relationships that are labelled 'possessive' in languages may be of different types:

- permanent relationship of whole to part – as body parts, or kinship, parent to child; my mother, my people.
- locative – place where a thing belongs, also as in body parts, location of a bodily sensation – pain in the neck, etc. my house, my village, my tribe.
- relationship of product to its maker – my arrow, my pot, my house.
- temporary attachment of an object to a person – my drink; my meal; my money;
- temporary attachment of a person to another person – my husband; my friend.

Notice that in modern English all these forms of possession are indicated in the same way. In many languages of pre-political societies however there are different forms for some of these relationships.

In pre-political society there is virtually no private property and things we treat as property – land, animals, weapons – are shared. Social practices, such as the Ju/hoansi practice of sharing arrows, 'insulting the meat' and so on, promote sharing and egalitarianism. There are no land rights among foragers. Neighbouring groups generally share each others' land, waterholes, hunting grounds in co-operative, agreed fashion.

Most pre-political languages distinguish in their grammar two forms of possession – what linguists call alienable and inalienable possession.[606] Inalienable possession refers to items that are permanently attached or very close to an individual. In this class are not only body parts, but also kinship relationships such as mother, father, sister, uncle; the products of your own hand, such as arrows; items that stay with you throughout your life such as your home, your name and so on.

The class of alienable possession includes kinship relations that are not the result of birth; food; resources that are gathered or produced to be eaten or exchanged; goods that are exchanged.

For example, In the Melanesian language Mekeo we find the personal pronoun *-gu* placed after the noun for inalienable possession, and before the noun for alienable possession:

- a manua-*gu* my wound
- a subana-*gu* remains of my meal
- hahin i-*gu* my sister
- anu-*gu* tunan my man (husband)
- anu-*gu* hahin my wife

Interestingly, husband and wife are excluded from the class of close possessions, while wound and remains of meal are included. This distinction is in line with the social practice of exogamy (marrying outside your clan), as a result of which husband and wife belong to different clans, and are not seen as 'part of' me. Husband and wife are not regarded as being related in the same way as brother and sister, and it is quite natural that the possessive pronoun should not be affixed after these nouns. It is affixed to the noun **sister** because she is of the same clan.[607] Thus the individual is to the clan or family what the limb is to the living body. In thousands of other languages this relationship is observed, though through different grammatical forms, 'names of relationships and names of parts of the body make one in reality'[608].

In many languages, the expression of the inalienable relationship may have no specific grammatical form, or else is performed very simply, using a personal pronoun in the possessive function. So for example, *my* in

my house

606 Also sometimes 'organic' and 'inorganic' possession. It may be easiest to think of alienable/inorganic possessions as transferable, though languages classify what is transferable or not very differently.

607 Levy-Bruhl 1965; p. 73.

608 Levy-Bruhl 1965; p. 76.

and *I* in

I take

would be the same grammatical form. On the other hand, alienable possession often gives rise to quite complex forms.

In the Trobriand language Kiriwinian, Malinowski distinguishes four degrees of possession,

- nearest is for parts of body and kin;
- dress and food as owned, rather than
- food to be eaten.
- the class of furthest possession is 'really the most important class used with regard to such relationships as the full or legal ownership of land, houses, movable possessions'[609]

It is interesting to see that portable property – money – would be regarded by the Trobrianders as being the furthest removed from the body. This can be linked to Malinowski's comments about how difficult Europeans of his time found it to get the Trobrianders to accept Western gold coins along with tobacco and whisky.

Bahr's study of the Mexican language Pima-Papago similarly reveals a system struggling to come to terms with money. In this language the possessive ending for things that are alienable is -ga. Objects that are inalienable have no ending. So in

- 1. n-ki: my house
- 2. n-cu:kug my flesh
- 3. n-gogs-ga my dog
- 4. n-cu:kug-ga my meat

2 and 4 show the same word, one signifying part of me, one signifying meat I can eat. In this language virtually all items of material culture (pots, pans, houses), are classed as inalienable, along with body parts. Things that can take -ga are either previously unowned by humans e.g. a wild cactus, or things that are likely to have a succession of owners. Natural resources and domesticates (i.e. food reared, cultivated or collected in the wild – cactus, corn, cow) are always -ga. They clearly either start off without ownership, or can change ownership subsequently – after harvesting or cooking.

Inalienable possession, then refers among the Pima-Papago to kinfolk, body parts and artefacts that you are likely to keep with you all your life, while alienable objects are those that have no ownership or are to be passed on. Money comes into this category[610]. Bahr comments that it is interesting to see how little impact money has had on the

609 Malinowski 1966.

610 Bahr 1986.

culture of the Pima-Papago people, despite some 300 years of contact with Spanish and Texans.

Absence of the verb have

Although pre-political languages have sophisticated systems of dealing with ownership, few show the presence of a verb resembling our modern *have*. A study by Webb shows that this verb does not feature in the language of any people that do not recognise private property.

Lehmann explains:

> active languages lack a verb for *have*. They may express the meaning through use of a locative, comparable to the use of the dative in Latin, as in *mihi est liber* = 'I have a book'.[611]

Proto-Indo-European and some other early languages such as Sumerian have been found to be of this type.[612] We can regard this feature too as a result of the absence or relatively weak development of private property relations, as the study by Webb makes explicit.

Rich people have existed for a long time, but private property did not emerge in a clearly recognisable form until the development of money and specifically the form of coins, among the Greeks. However even in early forms of Greek and Latin this verb was not strongly established. Vincent shows how forms of *habeo*, the Latin for 'have', originally an active verb with the meaning 'hold', appeared in Latin first with lexical meaning and then with grammatical functions, establishing themselves in the Romance languages as they evolved from their original Latin forms[613].

In this example from Vergil:

> 4. Hostis *habet* mures
> 'The army holds the walls'[614]

the verb is still used in its active sense.

A later form, in Vincent's example from Cicero is a precursor of the grammatical use of *habeo* as a verbal auxiliary. Interestingly the example has a very modern commercial feel:

> 5. in ea provincia pecunias magnas collocatas *habent*

611 Lehmann 1992; p. 108.
612 Lehmann 1992; p. 248.
613 Vincent 1982.
614 Vincent 1982; p. 65.

'in that province they have large sums of money invested'[615].

When we look at modern English we find as we would expect the use of *have* as a grammatical item firmly established and widespread. The use of the word as a grammatical form now excites no interest. Most people would argue that there was little connection between the *have* in

6. Have you finished

and the same word in

7. Have you any children?'

Linguists classify have in (6) as an auxiliary verb, and in (7) as a main verb, as if they were not really connected. Yet at one time they clearly were. How do we relate the two? One explanation is that the value placed on ownership in our world, leads to a widespread social metaphor of ownership, that causes us to view a wide range of experiences in terms of this relationship, even when the experience has little or nothing to do with ownership or property[616].

Every meaningful utterance is an interpretation of experience, seeing a relationship between events in the world about us. When we want to express a new experience, we turn first to familiar social metaphors. One of the social metaphors available to us to describe relationships between individuals and the world is that of ownership. So medical problems, social problems, technical problems, military problems, all fall easily and naturally into this form : *I've got a cold; I've got a problem; I've got a job to finish ; we have a crisis situation; we have lift-off; we have a melt-down*.

The expressions *have, get, take, give,* expressions of property and exchange of property, have become embedded in the grammar to the point where we do not even notice anything odd about it. So *have* is used to express the past tense, *I've eaten;* to express necessity, *I have to go;* to express the future, *I have some work to do;* to express agency, *Have a think about it* so on.

Halliday describes this use of have as a 'metaphor turned grammar'[617]. The metaphor has become part of the system of English to such an extent that forms like *she bathed* are now archaic, and the standard form is *she had a bath; she took a bath,* even *she got a bath*.

Interestingly although the possessive form in modern English is applied to nearly all the relationships listed at the beginning of this section, products of labour do not generally

615 Vincent 1982; p. 82.
616 See Beaken 1999.
617 Halliday 1990; p. 327.

take the possessive form *my* any more. Whereas the arrow made by the !Kung hunter is 'my arrow', workers in car factories cannot talk about 'my car'. Once it has left the factory, the car no longer belongs to its makers. We only attribute ownership of product of labour to intellectual products – *my book; her film*.

Halliday would probably call the use of *have* as we have described it here a 'grammatical conspiracy', suggesting that it leads us to view the world in a certain way, even when this is against our own interests. To counter this, we have to make clear that we see social metaphors as temporary, changeable phenomena, subject to the ebb and flow of opinion, of practical daily struggles going on in society, that can easily produce a re-evaluation and a change in the direction that social values take.

Summary

- No animal society has anything like possession
- In its fundamental forms it represents human relationships, of connections with each other, commitments, social obligations, people belonging to each other; especially in relations of kinship
- The distinction between alienable and inalienable possession is a characteristic of many if not all pre-political societies, along with absence of a verb *have*.
- Once commodity exchange becomes an organising principle of social life, the relationship of ownership comes to dominate us, to take on a life of its own. In this process, it comes also to permeate our language, so subtly that we hardly notice it.

Concrete to Abstract in Grammar

Finally we consider the general movement of modern urbanised languages to move from a concrete, semantic based grammar, to a relational, syntactic one. Here are some pairs illustrating concrete and abstract expression:

6a. Fair shares for all! (concrete)
6b. Liberty, Equality, Fraternity! (abstract)
7a. He wants to be able to drive fast cars and wear expensive clothes (concrete)
7b. He is ambitious (abstract)
8a. 'the blanket of the dark' – (Shakespeare – concrete)
8b 'the palpable obscure' – (Milton – abstract)

The concrete is in fact logically prior to the abstract in human experience. That is, we cannot apprehend an experience in abstract terms, and cannot generalise from it, unless we have first apprehended it concretely.

Malinowski, in his study of the Trobriand Islanders, ponders the question, why the lack of generic terms in Trobriand languages? His answer is that a general word such as

agriculture, or *gardening*, is unnecessary when everybody has a garden, and there are no people who do not garden at all[618]-. The word *agriculture* might mean something to these people if they found a reason to use it. It would be essential, for example, for explaining about their society to an outsider, or analysing it for themselves.

The previous chapter argued that pre-political languages show a strong alignment with the physical details of speakers' lives, reflecting their tribal organisation, the physical world around them and a world view based on life that depends entirely on the resources available in the environment. This category of languages, which includes the noun class languages and active languages described there, has recently been redefined as languages of *Semantic alignment*[619].

The semantic basis of noun class languages is clear. Grammar is held together, as it were, by morphemes that identify nouns and verbs as belonging to such very concrete classes as *male, female, insect, long-and-thin, round*, and so on.

Active languages are also organised along semantic lines. There are two classes of nouns, one the 'active', class, including animate beings and other phenomena that might be regarded as having life, such as fire and water, and the other the 'inactive' class – phenomena that have no life. Nouns from the active class may only be combined with active verbs, and nouns from the inactive class with inactive or 'stative' verbs.

We might illustrate this distinction of active and stative verbs with the modern English pair of verbs *lie* and *lay*, as in

9a. The hen laid an egg (active)
9b. Books were lying on the table (stative)

Though modern-day linguists can recognise categories such as Subject, Verb, Object in active languages, Klimov (1979) points out that "the main principles of the lexical organisation of substantives in active languages only bear superficial similarity to those of ergative and nominative languages" (p. 328). It has been demonstrated by Gamkrelidze & Ivanov that the parent Indo-European language was of this active type. For example, the language contained two words for water – an active form that has descended as Spanish *agua*, French *eau* (Indo-European *aqā*), and an inactive form, seen in German *Wasser*, English *water* (Indo-European *wodā*). There were also two forms of 'fire' – the inactive *fire feuer,* feu (Indo-European *pāwr*) and the active in the Latin ignis (Indo-European *ecnis*).

618 Malinowski 2, p.67.
619 Wichman etc.

Pre-political societies and semantic grammar

The point about pre-political societies is that they have not developed to the point where sufficient wealth has been accumulated to be able to form large towns and cities. They have not yet developed to the stage where the social complex of activities and interactions starts to approach that of urban life.

City life developed slowly, starting with the early civilisations of the Middle East, China, Egypt and India. Greek civilisation was relatively late, but we have a wealth of information about its development. The evidence shows that when the Greeks started to develop the complex productive activities and social interactions that are typical of city life, then their language started to change in an adaptation to the new requirements of city life.

City life and abstract notions

These requirements included the need to talk about relatively abstract notions – notions concerned with social status, with value, with legal, political and philosophical categories. These new ways of representing experience focused on aspects of the world quite different from those that their tribal ancestors had dealt with. The change in content was paralleled by a shift in linguistic form, such that the organisation of grammar started to develop in the direction of more abstract, syntax-based structures.

It is not possible at the moment to trace the development of the originally active Proto-Indo-European through all its offspring languages to the nominative-accusative Greek of 7th century Athens. All we have are traces of the beginnings and a disproportionate amount of information about this end of the process, but it is interesting to take a stage on the way. Here is Thomson's (1960) description of changes that took place in the language at the end of the prehistoric period. A previous stage of the Greek language was based on a system of inflecting nouns, with a complex system of case endings, whereas the verb system was relatively simple. This changed, as:

> the verb was elaborated as a highly flexible instrument capable of expressing with great subtlety ideas of motion and change. It dominated the syntax of the language ... The noun, on the other hand, was simplified. Of the eight IE cases (including the vocative) three were discarded, and five retained. The discarded cases were those that had expressed concrete relations (separation, location, instrument); those that were retained (except the vocative) expressed abstract, purely grammatical relations (subject, object, dependence). This development from concrete to abstract in the noun may be compared with the development from aspect (concrete) to tense (abstract) in the verb... Finally, in order to compensate for the restrictions imposed on sentence intonation by the fixed pitch accent ... a wealth of modal particles was evolved.[620]

620 Thomson 1960; pp. 30-31.

Semantic and syntactic grammars compared

The difference between semantic and syntactic grammars can be described as follows: In the semantic grammar there is a direct connection between words and experiences, and the principles of sentence formation are transparent. In a syntactic grammar, relations between words, or more precisely, between syntactic categories, are more important than relations between words and experiences. The elements of the sentence – subject, verb, object – now appear to dominate experience, and the requirements of syntax may even force speakers to express their experience of the world in strange ways. For example, when we notice rain there is really only one idea – 'rain', but we say *It's raining*, adding the meaningless *it*, simply because we are now forced by the rules of syntax to have a subject for this sentence[621].

This is what is meant by autonomous grammar, grammar that is relatively independent of experience and sensations. This autonomy of syntax is the result of a long diachronic process, both prehistoric and historical, and not to be explained with the facile device of a 'language instinct'.

City Life and Language

It has been suggested that the transition from a grammar of semantic alignment to the accusative syntax of modern languages coincided with the rise of cities. This suggestion needs amplifying, with an examination of some of aspects of city life that might affect grammar.

When cities arose on the basis of a surplus of food sufficient to sustain a class of non-labourers – kings, priests, administrators – simple exchange of goods came to be regulated and institutionalised, with taxes, tributes and the start of systematic distribution of goods. The development of the activities of weighing, measuring and recording transactions must have become central to the organisation of life.

Schmandt-Besserat shows how a system of recording agricultural produce developed in Mesopotamia from about 8,000 BO. It was based initially on shaped clay tokens, each shape representing a different commodity. For example 1 sphere = 1 bushel of grain; 1 lenticular disk = 1 flock of sheep; 1 small tetrahedron – a day's work; 1 large tetrahedron = a week's work, or the work of a gang. [622]

The practice developed over time of enclosing the tokens in clay envelopes, marked on the outside with the symbols representing the tokens. Later, tokens were omitted and

621 See Ruwet's (1991) treatment of the syntax of weather.

622 Schmandt-Besserat 1992, p. 162).

a flat tablet was marked with cuneiform shapes derived from the shapes of the token, and other symbols representing numbers.

By the third millennium BC this system of record-keeping had developed into what we now know as cuneiform writing. Between 3500 and 2500 BC the Sumerian civilisation had a redistribution economy involving the production of surplus goods by commoners that were surrendered to the temple. An elite administered the communal property and the temple conferred meaning and pomp on the act of giving. Schmandt-Besserat sums up:

> In sum, the plain tokens of the 8th to 5th millennium BC made possible the rise of a rank society, preparing the background for the powerful 4th to 3rd millennium bureaucracy. I also postulate that, vice versa, the development of political power was based on the development of reckoning technology and could not have occurred in the same way without it. According to Levi-Strauss, the first use of writing was, ultimately a control on the production of real goods – but so were the first tokens.[623]

Here we have evidence that both writing and counting systems developed at the same time, not out of the heads of writers and mathematicians but from the organisation of a vital administrative activity centrally connected to the distribution of goods.

These were the first steps to literacy, although for a long time the scribes and tax collectors kept the secrets of their skills closely guarded. This secrecy was partly maintained by the complexity of the writing systems developed in Sumerian, Egypt and China. It was only with the development of phonetic alphabets that literacy became available to all.

Weights and measures

The collection of temple tributes described by Schmandt-Besserat must have entailed a system of weights and measures. Stone weights dated to the Uruk period showed that goods were being weighed and measured form an early period. The activity of weighing and measuring must have been one of the mechanisms breaking down the old semantic grammars and introducing syntactic relations. Although they are apparently practical activities, they introduce into human life the necessity to handle abstract relations such as weight, measure and value – early forms of ideality, as explained in chapter 2. The requirement to express forms of value started to have an effect on the shape of sentences, introducing new forms of grammar. This point can be illustrated by looking at ways of handling weights and measures in English. So we can say:

9a) The trader weighed the chicken

9b) The chicken was weighed by the trader

623 Schmandt-Besserat, p. 178.

9c) The chicken weighs a kilo

but not

9d) *The chicken weighs

9e) *A kilo is weighed by the chicken

The verb *weigh* in these examples is both an action and an expression of value. In 9(a) and 9(b), as an action it has an agent (the active person) and a patient (the object of the verb's action). In 9(c), as a value expression, the verb has a patient as its subject, not an agent. In the position of 'object' is an expression of value. The verb in 9(c) is transitive – it has to have an object. That is why 9(d) is ungrammatical. But the object in 9(c) is not a patient, and as 9(e) shows it cannot become the subject of a passive.

The verb in (a) and (b) is an action. These sentences would be handled well by active grammar. But (c) is no longer a simple expression of an action, but the expression of a relation, specifically the relation between a commodity and a value. As a verb expressing a value relation it must be followed by an item of value – normally a numerical value.

It appears then that the institutionalised activity of exchange will lead eventually to abstraction and to the replacing of semantic grammar with relational syntax. When a horse, a chicken, or even a slave, can be exchanged for goods on the same basis as a cloth or a bag of wheat, it is clear that some kind of generalisation or abstraction is taking place.

The copula

Incidentally, in an active language it is possible that a sentence such as 9(d) above may occur. This would be a stative verb – a verb expressing a state – and would express the idea in English

9(f) The chicken is heavy.

The difference between this sentence and the one in 9(d) is that English uses the copula (the verb 'to be') to connect a noun with a word describing a state – an adjective. In many languages of semantic alignment there is no copula. States of being – what we would describe with adjectives or even with nouns – are expressed with a stative verb. These are verbs that we would translate as 'to be dead', 'to be white', 'to be large', 'to be round', and even (in this example from the Lakota (Sioux) language) 'to be a man': *wimáčhaša* (I am a man)[624].

One of the diachronic changes noted in the transition from semantic to syntactic grammar is the emergence of the copula. It is as if it shakes itself free from what are

624 Luria & Vygotsky 1992.

originally stative verbs, and in so doing frees the adjectives, and makes possible simple statements of truth or equivalence, such as **Lions are carnivores; Babies are helpless.** The copula can be compared to the mathematicians' zero – an abstract element that makes the work of talking about relationships simpler.

This example is certainly not the whole story of how syntactic grammar came about, but offers a suggestion of the kind of factors that would lead eventually to syntax based on relations between phenomena, rather than the direct representations of visual or physical form.

Gordon Childe notes that between 6000 and 3000 BC humans learnt to harness the force of oxen and of winds, invented the plough, the wheeled cart and the sailing boat, discovered the chemical processes involved in smelting copper ore and later iron and began to work out an accurate solar calendar. They thereby equipped themselves for urban life, and prepared the way for civilisations which required writing, processes of reckoning and measurement – instruments of a new way of transmitting knowledge and of exact sciences. In no period of history until Galileo's days was progress in knowledge so rapid[625].

The rise of cities at this time saw an expansion in the range of activities undertaken by individuals and in the number of distinct social roles. Each social role, each administrative or practical task would bring with it an accompanying linguistic register, with specific forms of vocabulary and of grammar. Many of these registers would further the process of adapting semantic grammar to new relational, syntactic functions.

The classifications underlying noun-class systems, and active languages may be compared to the associative systems – complexes or sets – identified by Vygotsky. A history of syntactic development has to explain how thinking progressed beyond such associations to the stage of generalisation, thinking in notions and then in concepts. The rise of the state and urban life would have a part to play in this development. Individuals moved over time from kinship relations based on clans or tribes, to new social relations based on functional categories – priest, farmer, soldier, maybe slave.

Halliday on Science

The move to abstraction in grammar, which started with urbanisation, developed still further in the 17th century with the flowering of science and philosophy. The Greeks had already developed philosophy to a high level, but Thomson points out they could really go no further in understanding the physical nature of the world[626]. The development of

625 Gordon Childe 1965, p. 105.

626 Thomson 1972.

science in the 17th century gave philosophy a new impetus, which was also reflected in our language. Halliday discusses the impact on thinking and on language of scientific writing originating in the seventeenth century with Newton and Galileo. He shows how scientific language takes particular forms, related to the tasks of science as an activity. This develops in stages.

In the first stage, concrete actions are transformed into nouns, in a process descried as nominalisation – producing **action** from act, **movement** from move, **expansion** from expand and so on. These nominalised actions then become the subject of a sentence. They are thus transformed into agents of a further action, as in Newton's

> the flux and reflux of the sea arises from the actions of the sun and moon.

Here, he explains the action of the sea as the result of another action of sun and moon.

> The extension, hardness, impenetrability and inertia of the whole result from the extension, hardness, impenetrability mobility and inertia of the parts.

A number of other features of scientific English are enumerated. Baggio's study of the language of Newton and of Galileo shows the same grammatical features in scientific English and scientific Italian of the seventeenth century.

Neither Galileo nor Newton was inventing new forms of language. Probably all the grammatical features of their discourse already existed in Italian or English. What they did, in conjunction with others taking part in the activity of science, was to create a new register, a register whose structures and vocabulary subsequently influenced both thinking and language across Europe.

Perhaps the most important feature of scientific language noted by Halliday is the newly emerging clause type:

> happening (a) caused happening (b)[627]

Here two nominalised processes are linked by a verb expressing a logical, causal relationship between them.

The effect of the trend that started in scientific language, of converting actions and processes into things can be seen in today's techno-bureaucratic language, which has reached a stage where new nouns such as *spend, savings, throughput*, are created and equally rapidly discarded. Similar tendencies are found in other registers such as scientific and technical writing, journalism, political discourse, indicating a general trend towards what Halliday calls 'thinginess'[628].

627 Halliday 1994, p. 78.
628 Halliday 1994, p.68.

This is not just a one-way process, because verbs can also be formed from nouns. This is also a common feature of business language, in line with the emphasis in business on getting things done. So we find forms such as *to action, to brainstorm, to workshop.* Other linguistic forms can be more and more freely interchanged. Aitcheson predicts 'the eventual result may be complete interchangeability of items such as nouns and verbs which were once kept rigidly apart'[629].

As an example of such convertibility, here is an extract from the scientist Steven Rose writing in the Guardian[630]:

> The competitive nature of the grant system and its 3-year cycle means that sort-termism is endemic and safety essential, so research bandwagons as anxious me-tooers chase the market leaders who have developed this year's fashionable model.

In one sentence there are three creative uses of innovative forms – *short-termism*, an ideology noun formed from an adjectival phrase; *bandwagon*, a verb formed from a noun, *me-tooers*, an agentive noun formed from a phrase.

Struggles to change language

Voloshinov recognised that there is no such thing as a neutral language, and commented 'Every sign is an arena of class struggle'. Familiar examples from today's world are 'liberal' and 'terrorist'.

Critical Discourse Analysis (CDA) was built on this recognition[631]. It is a movement of linguists whose aim is to make us more aware of the way that words and language structures may be used to distort our view of the world. It was very popular for a while, and became part of the movement that is now often denigrated as 'political correctness'. This phrase is itself is an instance of ideological struggle over a word. Those who sneer at 'political correctness gone mad' are in effect attacking attempts to change attitudes to inequality in contemporary society. It is fair to say that attempts to change attitudes by proscribing certain types of language are not likely to go far, if those attempts do not address the causes of inequality that lie within the economic system. This may explain why CDA may appear to some to be an exercise in sitting on the sidelines.

Finally

This book started with Engels' comment: ' people in the making found they had something to say to each other' Today we have more and more to say to each other,

629 Aitchison 1991, p. 118.
630 *Guardian* 17 November 1994.
631 See Fairclough 1995.

and it is inevitable that language should shape itself to make this possible. So the answer to the question at the beginning of this chapter is that language changes are progressive, not in the sense that today's languages are any better than those that preceded them, but only in the sense that we have today more and more to say about the world. Our languages continue to adapt and expand the means to express this understanding of the world – and will enable us one day to transform our world for the better.

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In this revised 2nd edition, Mike Beaken argues that the origins of human communication and ultimately of grammatical language lie in the interactions that are at the heart of cooperative labour. From early human interactions such as foraging, hunting, and also music, dance and chanting, has arisen spoken language. It is through the development of registers of speech associated with the varied activities of human existence, such as collective labour, the raising of children, or the regulation of social relationships, that human societies have established bodies of rules that we recognise as grammar. As human societies have moved from foraging to agriculture and finally to city life, so grammars have evolved from 'semantic alignment' into the more relational syntax of modern languages. As Professor Jim Hurford said of an earlier edition, 'the book provides much to get to argumentative grips with, wrapped up in a very humane and civilised package'.

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