

As a kind of introduction to the topic for next Wednesday, I am sending some notes taken from an interesting book (Peter Watson. Ideas. 2005, NY Harper Perennial. Pb).

My hope is that, apart from the technicalities in the text, it gives rise to some discussion on the importance of language in the development of humans & how language came to be.

A different viewpoint, that could be dealt with at another time and that was my first idea, is how language in fact works & what it shows of “human nature”. Jose M. Sainz j_sainz@hotmail.com

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I.- Ideas Before Language

Several species of *bipedal* ape have now been discovered in Africa, all the way back to *Sahelanthropus*, who lived six to seven million years ago in the Djurab desert of Chad & was close to the common ancestor for chimpanzees & humans. But the human ancestor which illustrates bipedalism best is *Australopithecus afarensis*, better known as ‘Lucy’. By 3.4 to 2.9 million years ago, early humans were bipedal. In the new, open, savannah-type environment walking upright freed the arms & hands to transport food to the more widely scattered trees where other group members were living. It was *bipedalism* which 1- freed the hands to make stone tools, which helped early man change his diet to a *carnivorous* one which, in providing much more calorie-rich food, enabled further brain growth. But there was a second important consequence: the upright posture also made possible 2- the *descent of the larynx*, which lies much lower in the throat of humans than in the apes. At its new level, *the larynx was in a much better position to form vowels & consonants*. In addition, bipedalism also changed the 3- *pattern of breathing*, which improved the quality of sound. Finally, 4- *meat*, as well as being more nutritious, was *easier to chew than tough plant material*, & this helped modify the structure of the jaw, encouraging fine muscles to develop which, among other things, *enabled subtler movements of the tongue*, necessary for the varied range of sounds used in speech. *Cutting-tools* also supplemented 5- *teeth* which may therefore have become smaller, helpful in the development of speech. None of this was ‘intended’, of course; it was a ‘*spin-off*’ as a result of *bipedalism & meat-eating*. A final consequence of bipedalism was that 6- females could only give birth to *relatively small-brained offspring*—because mothers needed *relatively narrow pelvises to be able to walk efficiently*. From this it followed that the 7- *infants would be dependent on their mothers for a considerable period*, which in turn stimulated the 8- *division of labour between males & females*, males being required to bring back food for their mates & offspring. Over time this arrangement would have facilitated the development of the 9- *nuclear family*, making the social structure of the cognitive group more complex. This complex structure, in which people were required to predict the behaviour of others in social situations, is generally regarded as the mechanism by which 10- *consciousness* evolved. In predicting the behaviour of others, an individual would have acquired a sense of self.

Quite a neat story ... if we keep in mind that early bipedal apes lived in environments where trees were plentiful, which may suggest that “the real reason humans became *bipedal* was as a way to appear bigger & more threatening in contests with other animals & in so doing avoid punishing conflicts & gain access to food”.

The emergence of *stone tools*: The link between stone tools & man’s later biological development was momentous. This is because, *until 2.5 million years ago, early man’s diet was vegetarian*. The invention of stone tools enabled him to eat meat & this had major consequences for the development of the brain. That some major change in brain structure—in size and/or organisation occurred about 2.5 million years ago is not in doubt.

By the time tools appear, *various species of hominid co-existed in Africa*, two or three of which are given the family name *Paranthropus* (‘alongside man’), also known as *A. robustus* & *A. boisei*, with the others belonging to *Homo*—these are *H. habilis* (‘Handy man’), *H. rudolfensis* & *H. ergaster*. These different hominids varied in interesting ways that make the exact line of descent to ourselves difficult to fathom. All had bigger brains than ‘Lucy’ (500–800 cc, as compared with 400–500 cc). Some archaeologists have conceived the *primitive mind* as consisting of three entities: a *technical intelligence* (producing stone tools), a *natural history intelligence* (understanding the landscape & wildlife around him/her), & a *social intelligence* (the skills needed to live in groups). At the level of *H. habilis* there is no evidence that social intelligence was integrated with the other two. The stone tools are associated with animal bones—the victims of early hunters. But from the evidence so far obtained there is no social separation of tools & food, no evidence at all of organised group activity—the earliest archaeological sites are just a jumble of tools & bones.

A major step forward was taken some time between 1.8 & 1.6 million years ago, with the appearance of another new species, *Homo erectus*—upright man—found first at *Koobi Fora* & then in *Java*. With his ‘sad, wary face & flat nose’, *H. erectus* was the *first human to leave Africa*, showing a further increase in brain size, the second-most sizeable jump—but perhaps the most important of all—to 750–1,250 cc.

Apart from what we may call a ‘*technology lag*’ of about 400,000 years, we find that at around 1.4 million years ago, the *earliest true hand-axes* appear. These are known as *Acheulian*. These hand-axes appear abruptly in the archaeological record in Africa, Europe & parts of Asia. *H. erectus* was a *hunter*, the first true hunter, rather than a scavenger. His better tools enabled him to spread across Eurasia. *Homo erectus* may also have invented *cooking*. This is inferred because, although he was 60 per cent larger than his predecessors, he had a smaller gut & teeth. This could be accounted for by cooking which, in breaking down the indigestible fibre of plants into energy-giving carbohydrate, puts fewer demands on the teeth & alimentary canal. Early humans may have followed fire, because roasted animal flesh is better preserved.

It was man's control of fire which helped convert him from being the prey of the big cats to being a predator—fire offered protection that earlier man lacked; & in Spain there is evidence of the use of fire as a way to corral elephants into a bog, where they were butchered. Later, keeping a fire alive continuously would have encouraged social organisation. The *control & use of fire may therefore count as one of primitive man's three earliest ideas.*

One thing seems to have happened for nearly a million years. This was the '*standardisation*' of the hand axe, around 700,000 years ago. The standardised tool was 'a fossil idea' & that it needed a certain capacity for abstract thought on the part of *H. erectus*. In order to produce a standardised tool early man needed some sort of image of tools in general. "Hand-axes show that the mental apparatus already existed for basic mathematical transformations without the benefit of pen, paper or ruler. It was essentially the same operation as **Euclid** was to formalise hundreds of thousands of years later."

A third spurt in brain size occurred around 500,000–300,000 years ago, with a jump from 750–1,250 cc (for *H. erectus*), to 1,100–1,400 cc. In Africa, this new, larger-brained individual is known as *archaic H. sapiens*, & it would later give rise to the *Neanderthals*. The first signs of *undisputed intentional burial* date to 120,000 to 90,000 years ago, at the *Qafzeh & Skhul caves in Israel*. From about 70,000 years ago, both the Neanderthals & *Homo sapiens* were, at least sometimes, *burying their dead*. Burial may indicate an early concern with the afterlife, & a primitive form of religion. The Neanderthals developed more or less in parallel with modern humans.

The *anatomically modern humans, who seem to have arisen in Africa between 200,000 & 100,000 years ago* spread out across the globe. Descendants from *archaic H. sapiens*, or *H. heidelbergensis*, with smaller teeth, no brow ridges, & a brain size of between 1,200 & 1,700 cc. Until around 31,000 years ago, when we find the last traces of the Neanderthals, these two forms of humanity lived side-by-side. Both *Neanderthals & H. sapiens* showed evidence of 'modern behaviour'.

In the so-called *Neanderthal graves*, it is quite possible that the Neanderthals buried their dead with an associated ritual that implies some form of early religion. Three factors worth discussing. One is the *age & sex of the bodies buried*. Many were children or juveniles, enough to suggest that there was a '*cult of the dead*', in particular of children. *More males than females* were buried, hinting that males enjoyed higher status than females. A third factor is that in one case of a Neanderthal discovered in the Shanidar caves in northern Iraq the man was blind, suffered from arthritis & had his right arm amputated just above the elbow.

Prior to about 60,000–40,000 years ago, archaic H. sapiens & H. neanderthalensis did not show symbolic behaviour & had a fairly limited capacity to plan ahead. Could this have been accomplished without language? Some palaeontologists believe that the emergence of complicated tool making is, in brain terms, analogous to speech & that the two activities emerged at the same time. In modern experiments, it has been found that, on average, 301 strikes were needed to form Acheulian biface hand-axes, taking 24 minutes. Such a sequence is like constructing sentences. Damage to *Broca's area* in the brain results in impairment to both language & hand & arm gestures.

The period 400,000–50,000 years ago, has been identified by **Merlin Donald** as possibly the most momentous stage in history. He has identified *four stages in the development of the modern mind, involving three transitions*. The 1- first mode he calls '*episodic*' thinking, as is shown in the great apes. Their behaviour consists of *short-term responses to the environment*. The second form of thinking/behaving, 2- typified by *H. erectus*, is '*mimetic*'. The world of *H. erectus* is qualitatively different from all that went before & this is what makes it so important. Erectus lived in a '*society where cooperation & social coordination of action were central to the species' survival strategy*'. *Without language*, Erectus nonetheless slowly developed a *culture based on mimetics intentional mime & imitation, facial expression, mimicry of sounds, gestures etc.* This was a qualitative change because *it allowed for intentionality, creativity, reference, coordination &, perhaps above all, pedagogy, the acculturation of the young.* It was a momentous change. Even so, *mimesis was slow—it probably took Erectus half a million years to domesticate fire & three-quarters of a million to adapt to the cold.* Many cultural artefacts had been produced by Erectus before language & the next transition, 3- to '*mythic*' thinking, which necessitates language. The shift to mimesis was the Great Hominid escape from the nervous system.'

The re-creation of the first ideas of early man, inferring his mental life from the meagre remains of crude stone tools & assorted remains, is itself an intellectual achievement of the first order by palaeontologists of our own day. The remains tell—or have been made to tell—a consistent story. At about 60,000–40,000 years ago, however, the agreement breaks down. According to one set of palaeontologists & archaeologists, at around this time we no longer need to rely on unpropitious lumps of stone & bone fragments to infer the behaviour of our ancient ancestors. In the space of a (relatively) short amount of time, we have a quite fantastic richness of material which together amply justify historian **John Pfeiffer**'s characterisation of this period as a '*creative explosion*'. In the other camp are the 'gradualists', who believe there was no real explosion at all but that man's intellectual abilities steadily expanded. By 140,000 years ago, 'half of the important clues to cognitive skills & behaviour which underpinned those that eventually took us to the Moon were already present'.

It is the sudden appearance, around 40,000 years ago, of very beautiful, very accomplished, & very modern-looking art that captures the imagination of all who encounter it. This art takes three main forms—the famous *cave paintings*, predominantly but not exclusively found in Europe, the so-called *Venus figurines*, found in a broad swathe across western & eastern Europe, & *multi coloured beads*, which in some respects are the most important evidence of all. In northern Spain (Altamira) the art consists mainly of engravings but the paintings extend from south-west France to Australia.

The advent of art is so sudden & so widespread, that many scientists think it must reflect an important change in the development of early man's mental state, '*when the final major re-design of the mind took place*'. There was a *time lag*, between the appearance of anatomically modern humans, around 150,000 / 100,000 years ago, & the creative explosion, at 60,000–40,000 years ago. One explanation is 1- *the climate*. As the glaciers expanded & retreated, the available game changed in response, & a greater variety of equipment was needed. Also needed was a record of the animals available & their seasonal movement. Perhaps this is, again, too neat. A second—and more controversial—climatic explanation is that the 2- eruption of the *Mount Toba* (Sumatra) volcano at 71,000 years ago led to a worldwide volcanic winter, lasting ten thousand years & drastically reducing both the human & animal population. This would have been followed by a period of *severe competition for resources*, resulting in rapid development among very disparate groups, fuelling innovation. Another explanation for the 'creative explosion' derives from 3- the art itself. In *north-eastern Spain* & south western France (but not elsewhere) much is contained in highly inaccessible caves, where the superimposition of one image over another implies that these subterranean niches & crevices were *returned to time & again*—over centuries, over thousands of years. The suspicion is, therefore, that *cave art is in fact to be understood as writing as much as art*, a secret & sacred recording of the animals which early man relied upon for food. 4- The caves may also have been ritual temples, chosen not only for inaccessibility but because they were thought to be in some sense gateways to & from the underworld.

Professor Klein argues that 'a suite of 5- language & creativity genes, perhaps as few as ten or as many as 1,000, developed as a result of random mutation', giving rise to a new pattern of human culture. He cites as an example the gene **FOXP2**, which was discovered in 2001. Another explanation of the cultural explosion arises from 6- demography.

The gradualists say this is all illusion, that art & other symbolic behaviour was developing for perhaps 100,000 to 250,000 years before the apparent 'explosion' but has either perished or is still waiting to be found.

The *meaning of the art* is more complex. Between 40,000 & 30,000 years ago we see a huge number of developments—not just the striking cave paintings of Lascaux, Altamira & Chauvet that have become famous, but the first production of items for personal decoration such as beads, pendants & perforated animal teeth, carved ivories which have the body of a man & the head of different animals, such as lion & bison, & scores of V-shaped signs etched on rocks.

The widespread depiction of the female form in Palaeolithic art also needs some explanation & comment. There are the so-called '*Venus pebbles*'; most important of all there are the '*Venus figurines*'. We should be careful in reading too much sex into these figures, but it remains true that sex is one of the main images in early art, & that the depiction of female sex organs is far more widespread than the depiction of male organs. Early humans worshipped a 'Great Goddess', rather than a male god? Mystery of birth?

Beads were common by 18,000 years ago, but their most dramatic arrival is seen towards the end of the 'creative explosion' in a series of burials. The very presence of grave goods, of whatever kind, suggests that ancient people believed at least in the possibility of an afterlife, & this in turn would have implied a belief in supernatural beings. Anthropologists distinguish three requirements for *religion*: that a non-physical component of an individual can survive after death (the 'soul'); that certain individuals within a society are particularly likely to receive direct inspiration from supernatural agencies; & that certain rituals can bring about changes in the present world. **David Lewis-Williams** is convinced of the shamanistic nature of the first religions & their link to the layout of cave art: With the emergence of language, early humans would have been able to share the experience of two & possibly three altered states of consciousness: dreams, drug-induced hallucinations, & trance. What we can be certain of, however, is that none of the complex art, & the ancient ceremonies that surrounded the painted caves, could have been accomplished *without language*. For **Merlin Donald** the transition to mimetic cognition & communication was the all-important transformation in history, but the arrival of spoken language was hardly less of a breakthrough.

Language & mimetic cognition are the most important characteristic that separates Homo sapiens from other animals.

II.- *The Emergence of Language & the Conquest of Cold* {See also: [Origin of language - Wikipedia](#)}

The **acquisition of language** is perhaps the most controversial & interesting aspect of early humans' intellectual life. It is, together with *mimetic cognition* the most important characteristic that separates *Homo sapiens* from other animals.

Why did it develop? The brain size of *Homo habilis* showed a marked increase over what went before, & this was associated with an advance in *stone tool* technology. The discovery of stone tools up to ten kilometres from the raw material source implies that, beginning with *H. habilis*, early man was capable of 'mental maps', planning ahead, predicting where game would be & transporting tools to those sites, presumably in advance. This is *intellectual behaviour* already far beyond the capacities of other primates. A relationship has been observed by some zoologists between *brain volume & the average size of social groups among primates*. Brain size is correlated with social intelligence. *The australopithecines* lived in groups with an average size of 60-70 individuals, whereas **H. habilis** groups averaged around **80**. These provided the *basic 'cognitive group' of early man*, the group he had to deal with on an everyday basis, & the increasing size of this cognitive group would have *stimulated the growth of man's social intelligence*.

A marked *change in technology* in the Upper Palaeolithic & in *hunting technique* are difficult to imagine without language. A whole range of tools appear—including hafted tools, harpoons & spear throwers made of shaped antler & bone (the first 'plastics'); at the same time we see the development of blades, produced as 'standardised blanks' that could be turned into burins, scrapers, awls ^(Punzones) or needles as required.

They also developed projectiles such as the bow & arrow that allowed them to attack prey at a distance, & also *harpoons* for fishing. Could such co-operation have been achieved without language? Could the concept of the harpoon barb be passed on without a word for it?

The sudden appearance of early humans in *Siberia* is important because the *conquest of cold was man's greatest achievement before the invention of agriculture*, & because it was the jumping-off point for what turned out to be the greatest natural experiment in mankind's history—the *peopling of America*. And, we may ask, would any of this been possible without language? Many sites in greater Siberia have been dated to at least 200,000 years ago & their very existence raises the question of *fire* (again) & of *clothing*. In 2004 it was reported by biologists at the *Max Planck Institute for Evolutionary Anthropology* at *Leipzig*, in Germany, that *body lice* are different from hair lice. Mark Stoneking & his colleagues infer that body lice 'probably evolved from hair lice when a new ecological niche—clothing—became available'. Based on the rate of mutation, they date this to 75,000 BP.

To conquer *Siberia* & *Australia*, early humans would have needed not only needles, to make clothes, but in the case of *Australia* *rafting vessels*, & in both places an elaborate *social structure*, involving kin & not-kin (and an appreciation of the differences). All of which would have required *elaborate communication between individuals—i.e., language*. By 'communication', we mean *proto-languages*, which probably lacked both tenses & subordinate clauses, where the action & thought is displaced from the face-to-face here-and-now.

Between 25,000 & 10,000 years ago, the area of sea that now separates Siberia from America—the Bering Strait—was land, & ancient man was able to walk from Eurasia to Alaska. In fact, during the last ice age that part of the world was configured quite differently from the way it is now. Not only was the land that is now submerged above water but Alaska & parts of what is now Yukon & the Northwest Territories, in Canada, were separated from the rest of the Americas by two gigantic ice sheets. *Beringia* stretched as an unbroken landmass from deepest Siberia across the strait & for three or four hundred miles into north America. Then, around 10,000 BP the seas rose again as the world warmed up & the glaciers melted. Earth was effectively divided into two huge landmasses—Eurasia & Africa on the one hand, the Americas on the other. Early man then set about developing on the two landmasses, each for the most part unaware of the other's existence. The similarities & the differences in the course of that independent existence tell us a great deal about humanity's fundamental nature.

Studies of *H. erectus skulls found in China* show around a dozen tantalising & highly controversial similarities with those of Mongoloids & native Americans. These similarities include a midline ridge along the top of the skull, a growth of the lower jaw which is especially common among Eskimos, & similar shovel-shaped incisors. Taken together, these traits suggest that *Chinese H. erectus contributed some genes to later Asian & native American Homo sapiens*, though this evidence is very controversial. At the same time, it is important to stress that *no trace of H. erectus or H. neanderthalensis has ever been found in America or, for that matter, above the 53° north parallel*. This suggests that *only H. sapiens successfully adapted to very cold weather*. Most likely, *modern humans arrived in Siberia between 40,000 & 30,000 years ago*, after evolving in Africa. Three of the women depicted on Siberian art are shown wearing clothing.

Homo sapiens' move into Siberia may have had something to do with a *change in climate*: It was much drier in the last ice age, producing vast expanses of steppe-tundra (treeless plains with arctic vegetation) in the north, & taiga, or coniferous forest, in the south. This move to the north & east is associated with an increase in *big game hunting*. The migration reflected the development of *portable blade blanks*, artefacts that were light enough to transport over large distances & were then turned into tools of whatever kind were needed—knives, borers, spear heads as the case might be. They began to build more elaborate structures with *mammoth bones as foundations*, topped with hides & saplings. They decorated the mammoth bones with red ochre & carved stylised human & geometric designs on them. Many of the *camp sites* were relatively permanent, which shows that *these primitive societies could resolve disputes & had an emerging social stratification*. The settlements supported populations in the *30 to 100 range* & must have had language.

The taiga—the coniferous forest of Siberia—may have been so dense as to prevent human penetration, which would mean that *Homo sapiens* reached the Bering Strait by either a very northerly or a far more southerly trek. The dominant culture of the area appears to be that known as *the Dyukhtai*, first discovered in 1967 at a site close to the floodplain of the river Aldan (around the modern town of *Yakutsk*, 3,000 miles east of Moscow). *Dyukhtai* sites were found across the Bering Strait in *Alaska* & as far south as *British Columbia*.

So far as we can tell, the *land bridge* between what is now *Russia* & *Alaska* was open between *20,000 & 12,000 years ago*, after which the seas again rose & it was submerged. There would have been few trees but, especially in summer, this would have been attractive territory for grazing herbivores, & large mammals like mammoth & bison. Fossil insects found in *Alaska* & *Siberia* are those associated with *hoofed animals*. A legend among the Netsi Kutchiri Indians of the Brooks range, in Canada's *Yukon Territory*, has it that in the 'original land' there were 'no trees', only low willows.

Of course, early man may have *sailed across the straits*. No artefacts have actually been recovered from the land under the water, but mammoth bones have been brought up. We know that 60,000–55,000 years ago *Australia* was discovered, & that must have involved sailing or rafting over distances of about fifty miles, roughly the width of the Bering Strait; & the *fauna is identical on both sides of the strait*, proving that animals walked across. There were at the time *two huge ice sheets covering much of north America*, the *Laurentide* & the *Cordilleran*, extending as far west as what is now the border between the Yukon & the Northwest Territories. To early man, the landmass to the west of the ice would have been one continuous area. Indeed, *Beringia* was 'a cultural province unto itself', showing a biotic unity; it may have had a higher population than now.

The evidence for a migration across the strait falls into what we may call the *geological*, the zoological, the biological or medical, the archaeological, & the linguistic. On both sides of the present strait there are identical features, such as raised beaches now some miles inland, showing that the two continents share a similar geological history. *Zoologically*, it has long been observed that the tropical animals & plants of the Old World & the New have very little in common, but that the nearer the strait one gets, the greater the similarities. *Biologically*, native Americans are closest to the Mongoloid people of Asia. This shows in the visible physical characteristics they share, from their coarse, straight black hair, relatively hairless faces & bodies, brown eyes & a similar brown shading to the skin, high cheek bones & a high frequency of shovel shaped incisor teeth. Such people are known to biologists as *sinodonts* (meaning their teeth have Chinese characteristics, which separates them from *sundadonts*, who do not). Teeth found in the skulls of ancient man from western Asia & Europe do not display *sinodonty* (which is mainly a hollowing out of the incisors, developed for the dentally demanding vegetation in northern Asia). All native Americans show *sinodonty*. Finally, on the *biological* front, it has been found by physical anthropologists that the blood proteins of native Americans & Asians are very close. In fact, we can go further & say that native American blood proteins, as well as sharing similarities with Asians, fall into three dominant groups. These correspond to the *palaeo-Indians* of north, central & southern America, the *Eskimo-Aleut* populations, & the *Athabaskans* (Apache & Navaho Indians, situated in New Mexico). This, according to some scholars, may underlie other evidence, from linguistics & DNA studies, which indicate *not one but three & even four migrations of early man into the New World*. Some scholars argue that there was an 'early arrival' of the Amerinds (perhaps as early as 34,000–26,000 BP), a later arrival (12,000-10,000 BP) of the Amerinds, & a third wave (10,000–7000 BP) of the Eskimos & the Na-Dene speakers

There are no securely dated sites in Alaska earlier than the *Bluefish caves in the eastern Yukon Territory*, which date to between 15,000 & 12,000 years ago. Nevertheless, there is little doubt that there are many features common to both sides of the Beringia area. One element is the '*Northwest Microblade*' tradition, a particular type of microblade, which was wedge-shaped & made from a distinctive core, found all over Beringia. These cores have been associated with one site in particular, *Denali*, the eastern outpost of Dyukhtai culture, with at least twenty locations in Alaska. (Denali is situated in & around Tangle Lakes in Alaska.) *Dyukhtai culture* is not older than 18,000 years ago & Denali was gone by 8000 BP. That early man crossed the Bering land bridge between 18,000 & 12,000 years ago is also supported by details from the *Meadowcroft rock shelter in western Pennsylvania*, where remains have been calculated, on eight separate occasions, to between 17,000 & 11,000 BC. & by the fact that the presence of *early man at Tierra del Fuego*, 'the end of the road' at the southern tip of South America, has been dated to about **9000 BC**.

Early man's discovery of the New World may not seem, on the face of it, to fall into the category of 'ideas'. But there are three reasons for including it. 1- One is because *the conquest of cold* was a major advance in early humans' capabilities. Second, in 2- *being cut off for so long*, & from such an early date (say 15,000 BP to AD 1492, 14,500 years) the *parallel development of the Old World & the New* provides a neat natural experiment, to compare how & in what order different ideas developed. Third, as we shall now see, this separation throws 3- crucial light on the development of language.

Lions hunt game in groups—fairly successfully—without the benefit of language. We cannot say, therefore, that as man turned to the hunting of big game he necessarily had more than the rudiments of language. On the other hand, it would seem highly unlikely that he could manufacture standardised tools, or cave paintings, or beads, without language. But these are all inferential forms of evidence. Is there anything more direct?

Modern studies, of people living today, show that *two areas of the brain are chiefly responsible for language*—what are called Broca's area, & Wernicke's area. *Broca's area* is located in the left hemisphere, towards the front of the brain, & about half-way up. Individuals with damage to that area generally lose some of their facility with words. *Wernicke's area*, slightly larger than Broca's area, is also in the left hemisphere, but behind it, also about half way up. Damage to Wernicke's area affects comprehension. There is much more to the brain than this, of course, in relation to language. However, studies of the skulls of *H. habilis* show that *Broca's area was present with the earliest of the hominids but not with the australopithecines*. Several experiments in the late twentieth century show that chimps possess a nascent language ability, they could learn American Sign Language.

In line with such reasoning, each of the skulls unearthed at Skhul & Qafzeh in Israel & dated to 95,000–90,000 BP, had a completely modern supra laryngeal vocal tract: 'These fossil hominids probably had modern speech & language.' Palaeontological anatomists also find no reason why early humans should not have had modern syntax. This suggests that *H. habilis* had a form of language, more sophisticated than the half-dozen or so calls that may be distinguished among chimpanzees & gorillas, but still not a full language in our sense of the term. *Neanderthal ear bones* recovered in 2004 from excavations in Spain showed that 'their hearing was attuned to pick up the same frequency as those used in human speech'.

Could the *standardisation of stone tools* have happened without language? Language would have been needed, they argue, for the teacher to impress upon the student what the exact form the new tool should be. In the same way, the *development of elaborate kin systems* would also have required the development of words, to describe the relationships between various relatives. Some primates, such as chimpanzees & gorillas, have rudimentary kin systems: brothers occasionally recognise each other, & mothers their offspring. But this is not highly developed, is inconsistent & unreliable. Gorilla 'family units', for example, are not kin groups as we would recognise them.

In 2002 a team led by **Svante Paabo** at the *Max Planck Institute for Evolutionary Anthropology* in Leipzig, Germany, announced that it had identified two critical mutations which appeared approximately 200,000 years ago in a *gene linked to language*, & then swept through the population at the time anatomically modern humans spread out & began to dominate the planet.

This change may thus have played a central role in the development of modern humans' ability to speak. The mutant gene conferred on early humans a *finer degree of control over the muscles of the face, mouth & throat*, 'possibly giving those ancestors a rich new palette of sounds that could serve as the foundation of language'. The researchers did not know exactly what role the gene, known as *FOXP2*, plays in the body, but all mammals have versions, suggesting it serves one or more crucial functions, possibly in foetal development. In a paper published in *Nature*, the researchers reported that the mutation that distinguishes humans from chimpanzees occurred quite recently in evolution & then spread rapidly, entirely replacing the more primitive version within 500 to 1,000 human generations—10,000 to 20,000 years.

According to Yuval Noah Harari (*Sapiens, A Brief History of the Humankind*, NY 2015, HarperCollins Publisher. Pgs 21f), the appearance of new ways of thinking & communicating, between 70,000 & 30,000 years ago, constitutes the *Cognitive Revolution*. What caused it? The most commonly believed theory argues that *accidental genetic mutations changed the inner wiring of the brains of Sapiens, enabling them to think in unprecedented ways & to communicate using an altogether new type of language*. We might call it the *Tree of Knowledge mutation*. Why did it occur in Sapiens DNA rather than in that of Neanderthals? It was a matter of pure chance ... It was not the first language. Every animal has some kind of language. Even insects, such as bees & ants, know how to communicate in sophisticated ways, informing one another of the whereabouts of food. Neither was it the first vocal language. Many animals, including all ape & monkey species, have vocal languages. For example, green monkeys use calls of various kinds to communicate ... What, then, is so special about our language?... We can connect a limited number of sounds & signs to produce an infinite number of sentences, each with a distinct meaning. We can thereby ingest, store & communicate a prodigious amount of information about the surrounding world ... With this information, the members can put their heads together & discuss what next ... According to a second theory our unique language evolved as a way of *gossiping*. According to this theory Homo sapiens is primarily a social animal. Social cooperation is our key for survival & reproduction. It is not enough for individual men & women to know the whereabouts of lions & bison. It's much more important for them to know who in their band hates whom, who is sleeping with whom, who is honest, & who is a cheat.

Even more controversial than the debate over when language began have been the attempts to *recreate early languages*. One view is that language emerged in the click sounds of certain tribes in southern Africa (the San, for example, or the Hadzabe), clicks being used because they enabled the hunters to exchange information without frightening away their prey on the open savannah. Another view is that *language emerged 300,000–400,000 years ago, & even 1.75 million years ago*, when early man would *sing or hum in a rhythmical way*. Initially, these sounds were '*distance calls*', by which males from one group attracted females from another group (as happens with some species of chimpanzee), but then the rhythmic chanting acted as a form of social bonding, to distinguish one tribe from another.

From *contemporary hunter-gatherer tribes*, we find that there is about *one language for every thousand or two thousand people*. This means that, at the time man crossed from Siberia to Alaska, when the world population was roughly 10 million, there may have been as many languages in existence then as there are today, close to 7000. Despite this seeming handicap, some linguists think that it is possible to work back from the similarities between languages of today to create—with a knowledge of pre-history—what the original languages sounded like. The most striking attempt is the work of the American **Joseph Greenberg** who distinguishes within the many native American languages just *three basic groupings*, known as *Eskimo-Aleut, Na-Dene & Amerind*.

More controversial still is the work of the Danish linguist **Holger Pederson** & the Russians **Vladislav Illich-Svitych** & **Aron Dolgopolsky**, who believe that all languages of Europe & Asia & even north Africa—the so-called Indo European tongues, Semitic, Uralic, Altaic & even the Eskimo-Aleut languages across the Bering Strait in Canada—were descended from a remote 'ancestor', called *Nostratic*, from the Latin adjective *nostras*, meaning 'of our country, native'. (And meaning that, of 6 billion people in the world today, 4 billion speak *Nostratic languages*.) This act of 'linguistic palaeontology' takes us back, they say, some 12,000–15,000 years. It has an even more controversial relationship with an equally contentious entity, known as *Dene-Sino-Caucasian*, which includes languages as diverse as Basque, Chinese, Sumerian & Haida (spoken in British Columbia & Alaska). The relationship between Chinese & Na-Dene has been recognised since the 1920s but, besides being further proof of the links between New World peoples & those of eastern Asia, it raises an even more controversial possibility: Perhaps, *proto-Dene-Sino-Caucasian was spoken by the original inhabitants of Eurasia, & the people who moved into the Americas, but then the earliest farmers, who spoke proto-Nostratic, overcame them, & displaced them & their language*. This theory is supported by the very latest evidence, which finds a particular mutation of mitochondrial DNA shared between India, Pakistan, central Asia & Europe.

Is there a connection between all the world's languages? **Dolgopolsky's** construction of the actual words in proto-Nostratic shows that the speakers of the language 'were not familiar with agriculture, animal husbandry & pottery'. He was also able to reconstruct *what foods* were available (eggs, fish, honey), a variety of tools (flint knives, hooks, poles), leather footwear, parts of the body (spleen, the neck), kinship terms (father, mother, in-laws, members of the clan) & supernatural entities (casting of spells, magic). He found no word for a large body of water & so, partly for this reason, located the *original homeland of Nostratic speakers inland in south-west Asia*.

Attempts have also been made to reconstruct the way & order in which languages formed. **Steven Pinker** argues that language began 'two to four million years ago' & **Robin Dunbar** suggests that *speech developed from grooming in chimpanzees*. In effect, sounds allowed early humans to 'groom' more than one person at a time.

No less intriguing & controversial than the emergence of language is the emergence of **consciousness**. One consequence of *bipedalism* was an increase in the division of labour between males & females, leading to the *nuclear family*. This in itself might have been enough to stimulate an awareness of human differences, between men & women & between self & not-self, at the least a rudimentary form of consciousness. Then, as humans came to *live in larger groups, co-operating with each other & competing against other groups*, the appreciation of human differences would have been all-important in developing a sense of self, & the prediction of the future—what other groups might do in certain circumstances—would have highlighted the present & how it should be organised. The recognition of kin would also have been significant in evolving a sense of self, as would the development of techniques of deception in one's own self-interest. *Self/not self & present/future* were the *basis not just of consciousness but of morality* (the rules by which we live) but the scenario-building which was required to help evolve such social/intellectual activities as humour, art, music, myth, religion, drama & literature.

Merlin Donald has a different view. For him, the *first two modes of thought* were '1- *episodic*' (in apes) & 2- '*mimetic*' (in H. erectus). His 2nd transition, to the 3rd mode, was to 3- '*mythic*' thought. "Language was first used to create conceptual models of the universe, grand unifying syntheses, as individual & group self consciousness emerged with language". Language may eventually have been used in many other ways, he says, but this was its first use & purpose. The final transition was to 4- *theoretic thinking or culture*. This is shown in the inventions & artefacts that suggest the existence of apparently *analytic thought skills* that contain germinal elements 'leading to later theoretic developments.' The final phase in the demythologising of thought came with the development of 5- *natural philosophy, or science*, in classical Greece.

Many of the discoveries described are piecemeal & fragmentary. Taken together they show the *gradual development of rudimentary ideas*. It is a picture full of gaps but in recent years some palaeontologists & archaeologists have begun to build a synthesis. Inevitably, this too involves speculation.

One aspect of this synthesis is to say that '*civilisation*', which has traditionally been held to develop in western Asia around 5,000 years ago, can now be held to have begun much earlier. Many researchers have noticed that in the Upper Palaeolithic there are regional variations in stone tools—as if local 'cultures' were developing. Cave art, Venus figurines, the existence of grinding stones at 47,000 BP & textiles at 20,000+ BP & various forms of notation, in fact amount to civilisation.

One of the most important examples of early notation has recently been re-evaluated in a potentially significant way. This is the '*La Marche antler*'. Discovered in the cave of *La Marche*, in the Vienne department of western France, in 1938, this shows an engraving of two horses, with several rows of marks above them. The antler first came to prominence in 1972 when it was analysed by **Alexander Marshack**, who concluded that it was a *record of lunar notation*, accumulated over seven-and-a-half months. In the 1990s, it was reexamined by **Francesco d'Errico**, who examined the notches on the La Marche antler under a powerful microscope. He concluded that *the marks had all been made at the same time, & were not dissimilar from the notches used in cuneiform writing*.

Paul Bahn has suggested that there appears to be a link between the decorated caves of the Pyrenees & eastern Cantabria & the many thermal & mineral springs in the vicinity of these sites. Perhaps, he says, these centres played a *role in the mythology of Palaeolithic times*. The widespread occurrence of serpentine & zig-zag lines, almost invariably associated with water, is no accident and, he speculates, may be associated with a *mother goddess cult*. Many specialists claim that *carved or notched bones are tallies of hunters*, others say that the signs can be divided into male (lines & dots) & female (ovals & triangles) & that Ice Age humans really were on the brink of an alphabet. *Embryonic writing* is perhaps the best description.

The term '*civilisation*' generally implies four characteristics 1- writing, 2- cities with monumental architecture, 3- organised religion & 4- specialised occupations. We cannot say that Palaeolithic humans got there fully (cities, for example, lay some way in the future). But the study of language, & writing, in civilisation—advanced though it now is—may still have some way to go. **Merlin Donald**, for example, has highlighted *certain important stages in language development*, in particular 1- rhetoric, 2- logic (dialectic) & 3- grammar. As he also points out, these comprised the medieval *trivium* in Christendom, which separated these basic skills, these rules of thinking, from the *quadrivium* mathematics, astronomy, geometry & music, which were specific subjects.

In so far as ideographic, hieroglyphic & alphabetical systems of writing vary in their rhetorical, logistical & grammatical possibilities,

Does this difference help account for the different trajectories of the disparate civilisations around the world?

Does the physical form of writing affect thinking in a fundamental way? The trivium was based on the idea that dispute—argument was a trainable skill.

Was it this which, at base, would provide the crucial difference between the West & the rest, & did it encourage the assault on religious authority, the all important break with mythic thinking? It is something to keep in the back of one's mind.

According to Michael Corballis, professor of psychology at the University of Auckland in New Zealand, *language may have developed out of gestures*. He makes the point that chimpanzees are much better at sign language than speaking & that, in their brains, the area corresponding to *Broca's area* is involved with making & perceiving hand & arm movements. Deaf humans also have no difficulty developing sign languages. Corballis speculates that *bipedalism enabled early man to develop hand & facial gestures first & that speech only developed after the rules had been laid down in the brain for grammar, syntax*.