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Macromemetics: Towards a Framework for the Re-unification of Philosophy

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Abstract

The review of the philosophical and scientific antecedents of memetics by Elan Moritz [\[27\]](#) is extended to cover 20th century philosophy. It is proposed that 'macromemetics', ie. the study of the evolution of entire meme pools, is in many respects a similar enterprise to that attempted by the cultural evolutionist school of anthropology which flourished in the late 19th and early 20th centuries. Memetics may provide a new, and more rigorously Darwinian, slant to this rather neglected branch of anthropology.

Furthermore, it is proposed that much of the terminology and conceptual apparatus of memetics may be reconciled with that used by recent Continental philosophers in their studies of culture, thus suggesting a possible Darwinian framework for the re-unification of Western philosophy.

Key words: meme, culture, evolution, Structuralism, philosophy, reductionism, anthropology, civilisation.

1 Introduction and Summary

This article reviews the divided state of Western Philosophy, and points out certain areas in which the Continental and Anglo-American schools may be reconciled by the use of a memetic approach. Firstly, the similarities between Popper's hierarchical dissection of his *World 3* concept and the hierarchical nature of the gene/meme analogy are discussed. Special attention is paid to the lowest level, that of fundamental propositions or memetic '*nucleotides*', and the highest level, that of the meme pool. The study of meme pool evolution is compared with the cultural evolutionary school of social anthropology. Additionally, incipient memetical ideas are detected and examined in the work of Peirce, Saussure, Wittgenstein, Toynbee, Foucault and Derrida. The principal conclusion is that wherever philosophy is concerned with informational entities, a memetical approach may be applied. Both the cultural subject matter of Continental philosophy and the logical and linguistic concerns of the Anglo-American tradition can be re-expressed memetically. Memetics thus provides some possible common ground for the reunification of the two traditions.

2 Western Philosophy Divided

Since the time of Immanuel Kant (1724-1804), Western philosophy has been split into two main traditions, namely Continental philosophy which took its lead from J.G. Fichte (1762-1814) and developed via G.W.F. Hegel (1770-1831) and Karl Marx (1818-1883) into 20th century Existentialism and Structuralism, and secondly Anglo-American philosophy which continued the radical empiricist tradition of David Hume (1711-1776) as developed by Bertrand Russell (1872-1970). The labels *Continental* and *Anglo-American* are unfortunate in that they imply some kind of geographical separation of the two traditions. While this is true to a certain degree, many of the principal figures in the Anglo-American tradition have been native German-speakers, such as Ludwig Wittgenstein (1889-1951), Karl Popper (1902-1994) and the various members of the Vienna circle. Conversely, Continental philosophy is now increasingly popular in Britain and the USA, although usually in academic departments of literature and cultural studies rather than those of philosophy (concise reviews of the two traditions are provided by Scruton [\[40\]](#) and Pears & Kenny [\[29\]](#)).

Anglo-American philosophy primarily concerns itself with logic, philosophy of science and linguistic analysis of meaning. Continental philosophy, on the other hand, is interested in politics, aesthetics, culture and '*mind*', all topics generally regarded as too diffuse and intangible for the more logic- and science-oriented Anglo-Americans. In recent years a certain cross-fertilisation has taken place, with Wittgenstein's later work being of influence in both main branches [\[51\]](#). Additionally, with the development of what is known as Cognitive Science, the subject of '*mind*' and consciousness is becoming respectable again in the Anglo-American philosophical world (reviewed by Gardner [\[17\]](#)).

The principal thesis of this essay is that memetics, being applicable to all transmitted information whether scientific or more generally cultural, provides a means for reuniting Western philosophy. Many of the concerns of Continental philosophers, such as the state of society and social change, are approachable using memetics, and much of their terminology and conceptual framework can be re-expressed in memetic terms. This is not so unlikely as one might initially suspect, since the roots of Structuralism are in 19th century cultural evolutionism. Before dealing with this proposal in more detail,

some consideration will be given to the meme-gene analogy and its relevance to the subject of `culture'.

3 The Hierarchical Structure of the Meme Pool and Popper's World 3

Memes are not transmitted independently. A religious education, for instance, imparts an enormous bundle of memes to an individual which are generally delivered all together or not at all. They are, to borrow from genetic terminology, `linked'. Indeed many of these memes may be dependent on each other (in what Speel [41] has termed a `memplex'). The process of growing up and living in a certain culture at a certain time means that an individual is very likely to share a vast quantity of memes with other individuals in the same circumstances. This is what may be termed the meme pool of that group or society. Where a society is highly pluralistic, several meme pools may coexist and partially overlap. Unlike higher eukaryotic gene pools [52], meme pools are not closed systems between which absolutely no interaction can take place. The Roman Empire, for instance, played host to a vast plethora of cultures and religions. Much meme flow between diverse meme pools took place; for instance the interaction between Greek and Jewish thought which produced the work of Philo of Alexandria (c. 30 BCE - 40 CE) and had a seminal influence on early Christianity. However, despite this extensive interaction the Jewish and Hellenistic meme pools remained sufficiently different to be clearly recognisable as distinct cultures. Although this cultural diversity was reduced in the Middle Ages, Christianity was regularly riven with heresies and schisms even before the Reformation. Memetic mutation and recombination, like their genetic analogues, are omnipresent features of meme pools. Nevertheless, the tendency of memes to be transmitted en bloc rather than as an independent assortment, suggests that we are justified in regarding the meme pool as a useful concept. A more difficult question is how to subdivide the meme pool.

Dawkins [9] cites the work of Karl Popper as one of his inspirations for the meme concept. Popper [34, 36] introduced the term `World 3' to refer to the objective contents of thought. His discussion of these contents is almost identical to Dawkins' presentation of examples of memes. Compare Dawkins' original definition:

`Examples of memes are tunes, ideas, catch-phrases, clothes fashions, ways of making pots or of building arches'[9],

with Popper's definition of World 3:

`theoretical systems.... problems and problem situations.... critical arguments..... the contents of journals, books and libraries' ([34], p. 107).

It is clear from this that Popper and Dawkins have similar concepts in mind. Although Popper's first three specific examples could be grouped under the heading of Dawkins' third example ie. `ideas', his inclusion of printed artifacts such as the contents of libraries demonstrates that Popper, like Dawkins, also wishes to include the physical manifestations of transmitted information in his definition. In other words, both authors fail to make a clear distinction between what Speel [42] terms the memotype and the phemotype. Popper also intends that World 3 should include all objective thought contents both past and present. Concepts evolve in World 3 just as genes evolve in World 1, but World 3 does not itself evolve. Meme pools are collections of memes available to human populations at points in space and time, and they therefore evolve, diversify, go extinct etc. World 3 may thus be regarded as the set of all meme pools, possible and actual. However, the point in this instance is that the contents of meme pools correspond to the contents of World 3, and that both may be hierarchically structured (Popper [35]). This process strengthens the meme/gene analogy and eliminates the possible criticism that memes are difficult to

define precisely, since genes are also non-discrete elements arranged hierarchically in the genome.

The lowest and most fundamental level is that of simple propositions. These will be shared by almost all the higher level structures. For instance, some propositions of logic may fall into this category. Higher level memetic structures such as religions or science or political beliefs may be widely different, or even incompatible, but are often based on the same simple propositions. Despite the uneasy relationship between Christianity and science over the last 400 years, a case can be made that both are derivatives of Platonism. They share what Peter van Inwagen [46] has called the Common Western Metaphysic. A further injection of ancient Greek thought into Christianity was provided by Thomas Aquinas (1224-1274) who reintroduced Aristotelian logic. Indian philosophy, by contrast, has its own system of logic known as Nyaya (Phillips [32]), and a metaphysical structure that is quite different to the Western Metaphysic outlined by van Inwagen [46]. A little more will be said later about the Logical Atomist school of Anglo-American philosophy for whom the simple propositions of Western logic were the main topic of study. However, at present it will suffice, following Popper, to regard fundamental propositions as the primary basis of any higher level memetic structures. In the gene-meme analogy they are the memetic '*nucleotides*'. Most strands of Western thought, whatever their differences at more complex levels, have a common basis at this lowest '*nucleotide*' level.

Popper is less specific about the intermediate levels of his hierarchy but envisages a progressive building upwards to '*complex ideas*'. This would presumably include entities like scientific theories, specific religious doctrines or points of political dogma. These complex memes have many component parts, and may stand alone, but are at their most effective when combined with other complex memes. For example, Einstein's Special Theory of Relativity is a robust meme which may be transmitted alone, but will generally be replicated more accurately (and possibly also more efficiently) if when delivered as part of a general education in physics including other complex memes such as Maxwell's Equations and the Copenhagen Interpretation.

Above the level of the complex meme - which may perhaps be analogous to the gene as a functional, possibly '*selfish*', but not strictly independent unit - we have co-transmitted aggregates of memes. Examples of these might include religions, scientific disciplines or artistic schools considered as wholes. These are what might be termed the '*linkage groups*' of memetics or '*memplexes*' (Speel [41]).

Finally we arrive at the total meme pool, or World 3. As emphasised above, Popper's choice of the word '*World*' is appropriate in that he wishes to include every single content of objective thought. There is only one World 3. On the other hand, meme pools exist in the plural, being more analogous to the gene pools of biology in that they may be permanently separate, or at most in intermittent communication, and located at varying points in time and space. Since in a biological context, gene pools correspond roughly to species, or at least to sub-species or incipient species, it is here proposed that meme pools are the appropriate species-level entity in a memetic context. This is contrary to Benzon [3] who sees '*paradigms*' as the species-level memetic entity. If the meme pool/species equivalence is maintained, then paradigms are closer to gene-level entities, like Popper's '*complex ideas*' discussed above. Although meme pools are not completely isolated in the way that higher eukaryotic gene pools are, the analogy is still acceptable if one thinks of prokaryotic gene pools where much horizontal transfer of genetic information takes place (Speel [42]).

3.1 Meme pools and the total cultural apparatus of societies

A unanimously acceptable definition of '*culture*' has always been difficult to obtain (see the review by White [47] for a history of the controversy). Two broad strands of opinion may be identified; those that believe that culture is what people think, do and produce, and most importantly see culture as a learned and retransmitted entity (Leach [24] p. 9), and in contrast those who see it as primarily an advanced

biological adaptation to the environment. The latter school has recently been strengthened by support from sociobiologists (Wilson [49]). Although this is a major controversy in anthropology, from the point of view of memetics it is perhaps not necessary to reach a final decision in favour of one view over the other. Sociobiologists see culture as the product of selection on behaviour, but that the primary consequences of that selection are genetic, and only secondarily memetic. For sociobiologists, culture is only likely to be efficiently replicated when the appropriate genetic basis is already there. For instance, a sociobiologist might point out that belief in the undesirability of incest may stem ultimately from the undesirable medical consequences of inbreeding. Those who are genetically predisposed to avoid incest (eg. through genetically influenced feelings of disgust) may do so highly efficiently, and thus raise less inbred and consequently healthier children to whom they will also pass their incest-avoidance genes. Incest avoidance is an almost (but not quite, eg. ancient Egypt - Hopkins [19]) universal feature of human societies, which tends to support the opinion that it is an adaptation with an ultimately genetic origin. However, the resulting behaviour of incest avoidance may still be treated as a meme, ie. one may learn an incest taboo from a person who genetically avoids incest, even though one may not be oneself genetically predisposed to avoid incest. The incest avoidance meme is also subject to selection, and will spread if incest avoidance produces healthier progeny who then learn incest avoidance themselves. The question of learning versus sociobiology thus seems to lose some of its difficulty when viewed from a memetical standpoint.

Conversely, ideas, like genes, that are maladaptive to individuals may still spread within populations. Incest avoidance memes, like incest avoidance genes, increase the fertility of those who carry them, but suicide cults are obviously highly counter-adaptive to the individuals who sacrifice their lives under their influence. However, a suicide cult meme may procure an advantage to the culture in which it occurs, where the incidence of such suicide is tightly culturally controlled. For example, kamikaze fighter pilots were a formidable military weapon for early-modern Japanese culture. On the other hand, the James Jones mass suicide in Guyana was a unique event which eliminated the entire culture in which it occurred. A genetic predisposition to suicide may exist (possibly associated with some genetic form of depressive illness), but suicidal behaviour may also be learned by indoctrination. Thus, both adaptive and maladaptive behaviours may be considered as selectable memes, whether or not there is also a genetic basis. Genetics has also traditionally focused, until very recently, on the individual as the unit of selection. Part of the appeal of memetics is its compatibility with gene-centred models of selection (Dawkins [9], Williams [48]). Focusing on the spread of memes permits explanation of behaviours which are maladaptive to the individual.

In summary, the traditional divide between culture-as-transmitted-information and culture-as-advanced-adaptation may not be so serious, if transmitted information is also subject to selection. Nature versus nurture debates of the past generally relied on the assumption that only nature was subject to Darwinian selection. Nurture, ie. transmitted information, was generally regarded as being independent of external forces, a pure product of human superstition and/or rationality, or alternatively subject to dialectics of a Hegelian or Marxist variety. Memetics, by positing a strictly Darwinian process for nurture, thus questions the division between environment and biology, since both are evolving under the same dynamic.

Meme pools may exist in isolation for thousands of years, as was the case for many of the indigenous peoples of the globe before the European expansion beginning in the late 15th century. As Benzon [3] has illustrated, the isolation of early migratory groups of humans would have resulted in both genetic and cultural divergence, by both genetic/memetic drift and selection for adaptation to local conditions. As the globe became more populated, isolated meme pools regained contact. When Christopher Columbus stepped ashore at Watling Island in 1492, contact was established between two meme pools whose nearest common ancestor was at least some 12,000 years in the past. New meme pools may result from the contact of previously isolated ones, or one meme pool may virtually swamp and displace another, as

was the case in the Americas in the aftermath of Columbus. Much anthropological investigation has been carried out in 'acculturation', ie. the consequences of culture contact, usually between an indigenous society and a Western colonising power (Beattie [2] p. 241). If memetics is to be of any value for the study of society as a whole, it is important to judge to what extent memetic phenomena may be seen at work at the level of the meme pool. This is not likely to be an easy task: macroevolution is still the most challenging problem of biological evolutionary theory, and is exacerbated by the fact that macroevolutionists are limited to observation rather than experimentation (Stanley [44]). Fortunately for would-be 'macromemeticists', much study has already been devoted to evolution of cultures as wholes. Unfortunately, much of that work is by now rather old and somewhat out of favour. Nevertheless, a reassessment from a memetic point of view is desirable.

4 The Cultural Evolutionary School of Social Anthropology

In 1786, Sir William Jones reported the results of his comparative studies in the Sanskrit, Latin and ancient Greek languages. His conclusion was that all three were descended from a common progenitor (Gardner [17] p. 196). This primitive phylogeny of the Indo-European languages was one of the first strands of evidence for any kind of evolutionary process, and was a factor which profoundly influenced Darwin:

'We find in distinct languages striking homologies due to community of descent, and analogies due to a similar process of formation' (Darwin 1871, quoted by Dennett [11]).

The study of cultural evolution was thus technically a predecessor of that of biological evolution, but fell behind in the following century and a half.

Darwin's contemporary, Herbert Spencer (1820-1903), was the first to take an evolutionary view of society as a whole, seeing it as progressing through various stages with Victorian English civilisation rather suspiciously at the pinnacle [43]. Unfortunately, in the hands of his lesser successors, Spencer's ideas deteriorated into a pseudo-scientific justification for imperialist exploitation of 'inferior' societies (rev. by Dobzhansky [15]). Spencer, like Darwin, had a broad view of evolution as primarily a result of natural selection on naturally occurring variation producing gradual and progressive change. Those anthropologists who adopted the evolutionary theory of culture also took the gradualist line. One of the first of these was Lewis Morgan (1818-1881), who set out an evolutionary theory of society with three stages, namely savagery, barbarism and civilisation, which he posited as corresponding to the evolution of one species from another (Beattie [2] p. 6). Just as Darwin had concerned himself with the origin of species, so were the evolutionary anthropologists concerned with the origin of civilisation.

A remarkable pioneer was Edward Burnett Tylor (1832-1917) who was the first to use the comparative method. Preparing a database of customs, practices and beliefs and subjecting them to statistical analyses, Tylor's 'social arithmetic' sounds like a premonition of the reductionist approach of memetics ([25] p. 23). Tylor (1871, quoted by Leach ([24] pp. 38-39)) defines his field of study as follows:

'....that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities acquired by man as a member of society.....the first step in the study of civilisation is to dissect into details, and classify these into their proper groups.'

Tylor's use of the word 'acquired' demonstrates that he was interested in all that was transmitted and copied. The 'proper groups' into which he sought to break down this transmitted information include:

'weapons, textile arts, myths, rites and ceremonies.....laws of marriage and

property.....special moral and religious doctrines' (Leach [24] p. 39).

Tylor is in the same subject area as memetics and approaches it in the same reductionist spirit. He even sketches an idea of memetic linkage in his concept of '*adhesion*', ie. identification of those cultural traits which tends to be co-transmitted, even in different cultures (Gardner [17] p. 228). Tylor's only deficiency is the absence of a neo-Darwinian technique with which to study the evolution of culture, which of course was not available at that time.

By the early 20th century the cultural evolutionists had split into two schools, those which saw the development of civilisation as an inevitable progression from a less civilised state which had occurred many times at different locations, and the '*diffusionists*' who put forward the idea of civilisation having originated once in ancient Egypt and radiating out from there (Kuper [23] p. 3). In more neo-Darwinian terms they differed on the question of whether civilisation was polyphyletic or monophyletic. There seems no a priori reason from a memetic point of view to prefer either opinion, but archaeological evidence has resolved the debate against the diffusionists.

The major anthropological theorist at the turn of the century was James Frazer (1854-1941) whose work, *The Golden Bough*, published in several volumes from 1890 onwards, was a grand synthesis searching for regularities or general laws in cultural evolution. Despite the immense arsenal of examples that Frazer brought to bear on the question, the eventual general consensus was that he had failed, and ever since then one influential strand of social anthropology has sought to deny that anything approximating to general laws may be found in the subject (Beattie [2] p. 44). Memetics holds out some fresh hope that a general body of laws capable of explaining social change may be found, and that that body is already with us, namely Neo-Darwinian theory applied to informational transmission.

Cultural evolutionism did not quite die in the aftermath of Frazer, but persisted to a certain extent in the work of Bronislaw Malinowski (1884-1942), Alfred Radcliffe-Brown (1881-1955) and Emile Durkheim (1858-1917). These thinkers tended to see societies as organic wholes, a view often referred to (not always congenially) as '*functionalism*'. Whereas the memetic approach sees societies as meme pools, the functionalist metaphor was more that of a physiological system. Cultural components of societies were seen as the organs of a body rather than as memes under selection (Mair [25] p. 36). One of the adverse consequences of this was the tendency to see societies as balanced homeostatic entities which played down the process of change ([2] pp. 56-59).

It should not be thought that modern anthropology is totally adverse to the concept of memetics. Anthropologists have devoted a great deal of time to understanding the belief basis of culture, which is ideal material for memetic analysis. For example, much study has been carried out into the potlatch, a custom of the Kwakiutl people of Canada's western seaboard. The potlatch involves the conspicuous consumption, and occasionally destruction, of wealth and the products of labour (Beattie [2] p. 198). Even more extreme examples have been identified by anthropologists. For instance, in 1856 the Xhosa nation of southern Africa, under great pressure from European encroachment, came under the influence of a prophet who ordered them to destroy food stocks and cattle. Many starved to death as a consequence (Beattie [2] p. 263). The anthropological literature also provides interesting examples of other phenomena of memetic relevance. One interesting instance is the rapid spread of the Ghost Dance religion among the Plains Indians in the late 1890s. The Plains Indian culture was itself a fairly recent development which resulted from the westward retreat of the indigenous peoples of the eastern seaboard of the USA from the process of European colonisation. New meme pools were created as previously isolated tribes banded together in new political and social units. Interestingly, the Navajo people who were indigenous to the mid-West and, unlike the Plains tribes, were not a new and transient cultural entity, were completely resistant to the Ghost Dance religion and apparently much amused by it (Beattie [2] p. 261). The Ghost Dance illustrates how societies of diverse memetic origin and subject to

intense pressures may evolve memetically in unpredictable and sudden ways. The Navajo, by contrast, were more memetically homogeneous and under less pressure from the European colonists. Another example which was consequent on the contact of previously isolated meme pools with colonial powers was the so-called '*cargo cult*' of Melanesia which spread rapidly throughout the region in the early 20th century.

These examples illustrate how complex memetic analysis may become. Claude Levi-Strauss refers to '*la pensee sauvage*' or '*mytho-logics*', implying that the memetic constitution of a culture may have virtually nothing in common with our own Western meme pool. Exactly what constitutes the basis of our meme pool can be found in the work of Peter van Inwagen [46], who has deduced a '*Common Western Metaphysic*', a set of assumptions agreed upon by all Western thought, whether religious or scientific. The phrase '*mytho-logics*' is used to imply that even the rules of logic, the memetic nucleotides alluded to earlier in this article, may be different in non-Western societies. The logic is mythical. Other anthropologists do not take such an extreme view but nevertheless are prone to make much reference to Wittgenstein's arguments about '*language games*' and '*family resemblances*' (Leach [24], Wittgenstein [51]). Wittgenstein will be dealt with further in the section on philosophy. Levi-Strauss's conclusions, although tremendously influential, are by no means undisputed. Lucien Levy-Bruhl was a forerunner of Levi-Strauss in his idea that primitive societies had fundamentally different systems of reasoning to their Western counterparts, but had abandoned this view by the end of his life (Gardner [17] pp. 223-259).

The fact that modern anthropologists have occasionally thought along lines that have brought them very close to what we would now term memetics is illustrated by White [47]. Writing about a definition of culture in a purely anthropological context, White postulates the unit of culture to be a '*symbolate*', which is defined as '*a thing or event dependent on symboling*'. Symbolates produce both '*somatic*' culture (ie. beliefs, behaviour, rituals, customs etc.), and '*exosomatic*' culture (ie. artefacts, buildings, clothing, machines etc.). The symbolate thus corresponds quite well to Dawkins' definition of the meme as including '*ways of making pots or building arches*', as well as beliefs, religion etc. The reason why White's system, like that of his proto-memetic predecessor Tylor mentioned above, does not quite correspond to memetics is that no explicit reference to selection or evolution of symbolates is made. However, in his reference to somatic and exosomatic symbolates, White provides categories which correspond to the phemotype and the memotype (Speel [42]).

4.1 Evolutionary Analysis of Civilisations

Anthropology tends to deal with indigenous peoples who have no written history. Where written records are available, the historian takes over. Some historians have seen patterns in the rise and fall of civilisations that are interpretable in memetic evolutionary terms. The most prominent exponents of this approach have been Oswald Spengler (1880-1936) and Arnold Toynbee (1889-1976). Toynbee's vocabulary is explicitly biological, with words like '*species*', '*genus*' and '*mutation*' regularly utilised, albeit in a somewhat loose manner. If a civilisation can be seen as analogous to a large, sophisticated meme pool, then, like the gene pools of biological species, civilisations may speciate, evolve directionally in response to selection, or go extinct. Toynbee [45] identified 34 civilisations of which he regarded 15 as being still in existence. It is notable that Toynbee gives a great deal of prominence to ideology as a defining characteristic, thus suggesting strong parallels between his definition of separate civilisations and the concept of the meme pool. The lifetime of civilisations may be short - for instance the Minoan civilisation of Crete only lasted about 6 centuries from 2000 BCE to 1400 BCE - or very long - such as the Mayan civilisation of the Yucatan which may have lasted as long as 43 centuries from about 2500 BCE to its final destruction by the Spanish in 1680 CE. Just as no species is immortal, so it appears that civilisations also have a finite lifetime, after which memetic resources are exhausted and, if no

'speciation' has taken place, extinction is the result. A more sudden extinction may be the consequence of a genocidal obliteration of meme pools by rival civilisations.

As far as '*speciation*' is concerned, Toynbee regarded some civilisations as derivatives of others. For instance, he posited that the Sumeric civilisation of the Euphrates-Tigris Delta gave rise to the Babylonian civilisation between 1700 and 1500 BCE. The Babylonian civilisation was abruptly terminated in 538 BCE at the destruction of Babylon by the Medes and Persians. However, the meme pool of Babylonian civilisation left a potent memetic residue in the form of astrology, which survives to a certain extent even today (much to the dismay of scientists). An earlier offshoot of the Sumeric civilisation was the Indic civilisation of northern India which survived until the end of the Gupta Empire around 475 CE. Toynbee regarded later Indian civilisation as being sufficiently different from the Indic to constitute a different civilisation which he termed Hindu, and which survives today. There is therefore a limited memetic continuity between the modern Indian meme pool and Sumeric ancestors. The modern Western meme pool developed in Europe in the Dark Ages, but is an offshoot of the Hellenic civilisation which included the Roman Empire and began in Greece and the Aegean around 1300 BCE. The predecessor of the Hellenic civilisation was the Minoan which originated in Crete around 2000 BCE. The Minoan meme pool is thus the ultimate ancestor of our own.

Speciation and extinction, since they are often definite historical events, are easier to identify than directional evolution under selection. Perhaps the high rate of technological development in Western society since the mid-18th century can be seen as such a directional evolution, where the selective pressure is the economic and political power associated with new technology (Hull [20]). Another example may be the progressive elaboration of an immensely complicated calendar by the Mayan civilisation where the selective pressure was the social power and status associated with accurate ability to predict eclipses and other astronomical events. Notice that the selective pressure posited in these cases is associated with power of one sort or another accruing in the hands of elites (priests, scientists) who are capable of generating novel memes or combinations of memes. This is perhaps the easiest answer but not necessarily the only one. Alternatives are suggested by Benzon [3], and in the work of the 19th century American philosopher, Charles Sanders Peirce, who will be dealt with at greater length below.

Toynbee's system suggests that there may be reasonable grounds for placing meme pools at the species level in the gene-meme analogy. Of course one may have some doubts about his interpretation of various details, and many would dispute his diffusionist tendencies (see above), but the general picture he paints, of lines of descent, extinctions and speciations, is highly compatible with a view that treats meme pools as equivalent to species. However, as briefly mentioned previously, meme pools are rarely totally isolated. Toynbee may see the Minoan meme pool as the ultimate ancestor of the Western, but it is arguable that Middle Eastern memes constitute a strong component of the Western meme pool through the influence of Judaism on Christianity. There could be no biological equivalent of this extensive meme flow from one species-level entity to another (except in a bacterial system with extensive horizontal transmission (Speel [42])).

Pursuing this line of analogy just a little further, we might also speculate that, just as small gene pools are more likely to disappear than large ones, small societies are often the most vulnerable to memetic extinction. What is the necessary size of the meme pool to maintain cultural viability? The Tikopia, for instance, subjects of a classic anthropological study by Raymond Firth in the 1920s (Leach [24] p. 27), were a population of about 1300 individuals on a Pacific island of some three square miles in size. This population had been there for some thousands of years, a meme pool in total isolation but nevertheless viable. Only contact with European missionaries finally destroyed it. However, much smaller meme pools like those of the Pitcairn mutineers or the Californian Yahi isolate (Diamond [13], [14]), numbering only some dozens of founding individuals, are frequently subject to a form of cultural decay rather analogous to genetic load (Muller [28]), which might be termed 'memetic load'.

Benzon [3] presents an interesting scheme for the evolution of civilisations through four 'cognitive ranks' of paradigmatic sophistication, namely 1 - preliterate, 2 - literate but non-numerate, 3 - numerate/algorithimical/scientific, and finally 4 - computational/data manipulative. Each of these is postulated to increase its memetic complexity in a sigmoidal manner, before a transition to the next rank. This analysis suggests many interesting lines of research, for instance in how cognitive rank transition may correspond to paradigm shift in science (Kuhn [22]) or to sociological phenomena.

In summary, memetics suggests many new possibilities for the analysis of civilisations. The state of modern Western civilisation, and how it has changed over time, are primary concerns for modern Continental philosophers. Therefore a discussion of how memetics relates to Continental philosophy is relevant at this point.

5 Memetics and 20th Century Philosophy

Popper's hierarchical concept of World 3 leads to the postulation above of the fundamental propositions of logic as memetic nucleotides. It is important to note that we are not here concerned with what may or may not be true about ancient or modern systems of logic. Logic is learned and therefore subject to the same selective pressures as all other memes.

The basic propositions of logic were very much the concern of Anglo-American philosophers at the turn of the century. Bertrand Russell (1872-1970) and Alfred North Whitehead (1861-1947), having produced their magnum opus on the logical foundations of mathematics, *Principia Mathematica*, were concerned to extend this solid foundation to all language. This endeavour, Logical Atomism, was designed to provide an ideal language which would be the foundation of all sciences. Their failure to do so resulted in Whitehead's rapid movement into mysticism, while Russell turned to other activities such as history and political campaigning.

Despite the despondency of the Cambridge philosophers, the torch of Logical Atomism was taken up by a young Austrian, Ludwig Wittgenstein. In his main early work, *Tractatus Logico-Philosophicus* [50], Wittgenstein describes a logical world built from 'atomic facts', the constituents of simple propositions, which are either true or false. 'The World' is the totality of true propositions. There are also pseudo-propositions which arise owing to the illogical structure of human language. For memeticists, the 'truth-value' of a proposition is of less importance than its ability to replicate; both genuine propositions and pseudo-propositions can be considered as memes.

At this point, it should be pointed out that caution must be exercised in co-opting Wittgenstein and the Logical Atomists as forerunners of memetics. Wittgenstein's world of propositions is static and he has little if anything to say about change, let alone evolution, whereas memes are to be regarded as the component parts of an evolving meme pool, much of which, it must be remembered, may be pseudo-propositional. Wittgenstein ([50], Section 6) regards logic, the a priori part of science, mathematics, ethics and philosophy as pseudo-propositional. Interestingly, an early draft of the *Tractatus* includes the phrase 'a theme in music is a proposition' (*Prototractatus* 3.16021 quoted by Kenny [21]), but the final draft omits this phrase, confining itself to consideration of what is or is not the case, and excluding the vagaries of the symbolic, ethical or artistic as things which, as Wittgenstein insisted, cannot be said, only shown. Nevertheless, a memeticist may retort that what can be shown can be transmitted, and therefore can evolve. One philosopher who was very much concerned with evolution of the symbolic was the founder of what became the discipline of Semiotics, Charles Sanders Peirce (1839-1914).

5.1 Memes and Pragmatism

Peirce [30] was one of the first to reject Hegelian dialectic and assert that consciousness evolves in a Darwinian manner, regarding mental variations as random and negative selection as removing those that are non-functional (tychastic evolution, in his terminology). Peirce's view of thought as consisting of a complex array of atomistic signs and symbols, comes close to the meme concept. His following description of the evolution of symbols bears many similarities to Dawkins' idea of mutating and recombining memes:

'Symbols grow. They come into being by development out of other signs.....we think only in signs...it is only out of symbols that a new symbol can grow... a symbol, once in being, spreads among the symbols. Such words as force, wealth, law, marriage, bear for us different meanings from those they bore for our barbarous ancestors' (Peirce [31]).

Peirce's symbols do not have to be linguistic - his theory leaves room for music and other cultural manifestations. The modern discipline of semiology is a development of Peirce's thought. Aside from Peircian semiology's historical interest as a precursor of the meme concept, his theory of the nature of truth, known as Pragmatism, offers a model for the way that memes can evolve. His world of signs has more flexibility, if less order, than that of early Wittgenstein's Logical Atomism. The basic description of a meme, or sign, does not contain any truth function, that is a meme may be an undeniable fact or a highly absurd piece of nonsense or what Wittgenstein [50] would have termed a pseudo-proposition. There is nothing to indicate how 'true' a meme may be until it is tested in the world. The Pragmatic approach to 'truth' by trial and error offers a potential cultural equivalent of Darwinian evolution in genetics.

5.2 Popper and Evolutionary Epistemology

Before leaving Anglo-American philosophy, Popper must be mentioned again. His concept of World 3 and its similarity to the meme pool have already been discussed. This is one of the strands of thought that leads to the philosophical school known as Evolutionary Epistemology which developed in parallel to the decline of Logical Atomism. In the inter-war era, even Wittgenstein abandoned philosophy for some years and his immediate followers in the Vienna Circle were broken up by the Nazi invasion of Austria. Wittgenstein's later work emphasised the context dependence of language in the form of 'language games'. In *Philosophical Investigations* (Wittgenstein [51]), he ruminates on how an analysis of language treated independently of the language game or 'form of life' in which it is used is essentially meaningless. This led to the post-war school known as Linguistic Philosophy led initially by J.L. Austin (1911-1960) [1]. Opposition to this tendency was provided by Popper, although Moritz Schlick (1882-1936) of the Vienna Circle seems to be prefiguring Popper's concept of World 3 in his *Allgemeine Erkenntnislehre* [31].

The term '*Evolutionary Epistemology*' was coined by D.T. Campbell [5] in a commentary on Popper's work, and has been reviewed recently by Henry Plotkin [33]. A crucial paper is by Leda Cosmides [8], the title of which, 'Has natural selection shaped the way humans reason?' neatly sums up the whole approach, echoing Peirce but in a neo-Darwinian format. Evolutionary Epistemology has become the major trend in epistemology within the Anglo-American world, thus placing the Darwinian analysis of thought at the very centre of that tradition. In order to begin to reconcile Anglo-American epistemology with Continental post-structuralist thought, it is necessary to examine the Darwinian roots of Structuralism.

5.3 Saussure and Signifiers

The founder of 20th century Continental philosophy was a Swiss linguist named Ferdinand de Saussure

(1857-1913). Virtually unknown in his lifetime, his posthumous influence was immense, due to the publication in 1916 of notes taken at his lectures by two pupils. Many of his concerns were the same as those of the Anglo-American philosophers of his day: the nature of language, meaning and its correspondence with reality etc., but his results were very different from those of his contemporaries Whitehead and Russell. Saussure was originally a comparative linguist working on the evolution of the Indo-European languages, but his later theories tended to emphasise the 'synchronic' ie. the existing structure of language at a given point in time, over the 'diachronic', ie. the evolution of language over the course of time. Nevertheless, much of his terminology is still compatible with the memetic approach.

Saussure's theory revolves around the notions of the '*signifier*' and the '*signified*'. To use an example provided by Sarup ([37] p. 3), in the case of an apple, the signifier is the sound image made by the word '*apple*', but it is the concept of an apple which is the signified (not, as one might imagine, the apple itself). The '*sign*' in Saussure's terminology is the relationship between the signifier and the signified, and it is arbitrary, depending on convention. A case has already been made for equating the propositions and pseudo-propositions of Logical Atomism with memes, but in this case the correspondence is not so easy to tease out. Is the signified the meme? or the signifier? or the sign?

A further difficulty is provided by the fact that Saussure's followers, the Structuralists, like the Logical Atomists, were not particularly interested in change. Structuralism emphasises the study of structural relations existing at one moment in time, ie. the '*synchronic*', over the way that these relations change through time, ie. the '*diachronic*', and thus relegates evolution to a position of lesser importance. As Structuralism has turned into Post-Structuralism, there has been a tendency to concentrate on the signifier rather than the signified, which has been interpreted as an attempt to remove the one-to-one correspondence between propositions and reality. This presents a considerable philosophical challenge (especially for Anglo-Americans), but in effect it brings Structuralism closer to memetics. The potential ambiguity present in Saussure's complex triadic system of signifier, signified and sign is removed. For the Post-Structuralists, the signifier is now the dominant unit and can be considered as analogous to the meme. We thus have 'the play of the signifiers' (*le jeu des signifiers*) much beloved of the school of Post-Structuralism known as the Deconstructionists. The process of breaking a text down into its component signifiers is a similarly reductionist process to memetics. Memeticists analysing a complex belief system are concerned with identifying, dissecting and describing the memes that are present in it, in terms of their replicative powers, adaptiveness, selfishness etc.

The leading Deconstructionist Jacques Derrida has presented the notion that we are made out of language. This seems a strange idea to many scientists and Anglo-American philosophers. However, Daniel Dennett [10] has used the meme concept to say something very similar about consciousness. Dennett sees memes as a kind of software for the '*virtual machine*' of consciousness which runs on the '*hardware of the brain*'. To say that we (or our consciousnesses) are '*made of*' language, following Derrida, is not too far from Dennett's view that our consciousnesses are '*made*' from the complex interaction of memes.

As mentioned above, the deconstructive process which Derrida and his followers apply to texts is the sort of process that memeticists have to apply to culture in general, in order to reduce it to its basic components, the memes or memetic nucleotides. One example of the lengths to which Deconstruction will go to dissect a text is provided by Derrida [12] who devotes a 139 page book to an examination of the word '*Geist*' in the work of Heidegger. Whereas with the Deconstructionists the process is designed to '*shatter*' meaning (Sarup [37]), in memetics the process is intended to dissect the way that culture has evolved. Deconstruction sees itself as a process of reading texts in a radical new way, different to the traditional way of seeing things. So too is memetics a new approach to culture and science and indeed all human learned behaviour and belief - not merely just a revival of cultural evolutionism but a more truly Darwinian reductionist approach to culture.

5.4 Foucault and the Episteme

Just as Deconstructionism and detailed memetic analysis display parallels at the lower levels of the memetic hierarchy, similarities can also be seen between the 'macromemetic' approach of cultural evolutionism and the theory of succeeding 'epistemes', or total systems of thought, described in the famous structuralist work of the 1960s, *Les Mots et les Choses* [16], by Michel Foucault (1926-1984). Foucault advances an argument for a saltatory view of cultural change, with epistemes replacing each other in periods of revolutionary cultural change. The early cultural evolutionists considered above were gradualists in the spirit of early Darwinism. Now that it is apparent that punctuated equilibria may be a feature of biological evolution (Stanley [44]), macromemetics may also admit revolutionary changes. As Madan Sarup points out [37], there are many similarities between Foucault's notion of the 'normative society' and Thomas Kuhn's independently developed concept of normal science interrupted by periods of scientific revolution [22]. Kuhn's 'paradigms' are similar to Foucault's epistemes, except that they apply more narrowly to science rather than to culture as a whole.

One of Foucault's principal concerns was to reject any possibility of a single unifying theory. He thus rejects Marxism. It might be objected that he would have done the same to memetics. However, in defence of our nascent discipline, it must be emphasised that memetics is not really a totalising metanarrative. It is not really a 'grand récit', like Marxism, where the world is evolving towards a certain inevitable endpoint, for instance in Marxism the endpoint is the achievement of world Communism. Darwinian evolution has no 'guiding hand' behind it. It may have direction, but that is only in response to consistent selection pressure (Gould [18]). If the selection pressure changes, the direction trend of the response may be diverted or go into reverse. The occasional structuralist accusation that evolution is a 'grand récit'/metanarrative is therefore unjustified.

6 Conclusion: The Role of Memetics

Dawkins [9] acknowledges his indebtedness to Popper, and to Cloak [7], for paving the way to the meme concept. Memetics thus has both philosophical and anthropological precedents. On the philosophical side, Popper's World 3 is populated with many elements which might be described as memes. Cloak comes from the anthropological tradition, and much 19th and early 20th century anthropology had a strong evolutionary component. Dawkins' real contribution can be seen as the fusion of cultural evolutionism with a reductionist approach derived from the gene selectionist school of evolutionary biology. Cavalli-Sforza and Feldman's 'culturgens' [6] and perhaps even White's 'symbolants' [47], were partial anticipations of this approach. Saussure's work on 'signifiers' stemmed from his early research in the evolution of languages. 20th century structuralist philosophy thus has its roots in evolutionary theory. The emphasis that Structuralists place on discontinuous change and an opposition to metanarratives, has led some of the proponents of Structuralism to insist that it is incompatible with Darwinian evolution. However, now that it is appreciated that discontinuous changes eg. saltations, may occasionally appear in biological evolution, the incompatibility no longer applies. One of Anglo-American philosophy's most flourishing branches is Evolutionary Epistemology, which also derives from Popper's Darwinian approach to the themes of consciousness and the history of ideas. Memetics thus represents a possible framework for the reconciliation of the two main branches of Western philosophy.

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