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Symbiosism, Symbiomism and
the perils of memetic management

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Symbiosis is a widespread phenomenon in the living world that has been recognised for about as long as natural selection has been. Most multicellular life forms arose ontogenetically as symbiomes. Language too is an organism which arose as a semiotic symbiont within the hominid brain. The etymology of the term *meme* and a number of competing definitions thereof as the unit of selection in cultural evolution are explained. A concise exposition of Symbiosism and Symbiomism is provided, distilled from previous writings. The perils of memetic management are discussed, and the desirability and necessity of memetic management are called into question.

1 Evolution and symbiosis

Evolution as a phenomenon in the natural world resulting from cumulative changes in heritable traits from one generation to the next looms large in the writings of Pierre-Louis Moreau de Maupertuis (1698–1759), Georges-Louis Leclerc, Comte de Buffon (1707–1788), Jean-Baptiste Pierre Antoine de Monet, Chevalier de Lamarck (1744–1829) and Thomas Robert Malthus (1766–1834). Inspired by the writings of Malthus, the naturalist Alfred Russel Wallace conceived of natural selection as the key mechanism that drove evolution, and in 1856 at the age of thirty-three Wallace seeded the brain of Charles Darwin, then aged forty-seven, with this seminal idea in a letter which he wrote from the Indonesian archipelago. Darwin eagerly incorporated Wallace's ideas into his own writings and propagated natural selection as the principal mechanism driving evolutionary change.

Generations of biologists have heaped obloquy onto Lamarck and his conception of evolution, for it is too easily forgotten that Darwin too was a Lamarckian. Not only were Wallace and Darwin both deeply influenced by the 1844 English popularisation of Lamarck's work, entitled *Vestiges of the Natural*

History of Creation, Darwin explicitly counted ‘the inherited effects of use and disuse’ as being amongst the ‘general causes’ and ‘general laws’ which govern whether or not variations are transmitted to offspring (1871, I: 9). Darwin’s views are clearly spelt out in the *Descent of Man* (e.g. 1871, I: 116-121). He conceived of ‘natural selection’ as ‘the chief agent of change, though largely aided by the inherited effects of habit, and slightly by the direct action of the surrounding conditions’ (1871, I: 152-153).

With respect to the inheritance of characteristics acquired during the lifetime of an organism, Darwin was just as much a Lamarckian as Lamarck. As the celebrated linguist Friedrich Max Müller pointed out, ‘Darwin’s real merit consisted, not in discovering evolution, but in suggesting new explanations of evolution, such as natural selection, survival of the fittest, influence of environment, sexual selection, etc.’ (1889: 273). Meanwhile, in light of the promiscuous intricacies of molecular genetics, the old polemic about Lamarckian vs. Darwinian evolution will have come to strike readers today as a trifle dated, for our understanding of evolutionary dynamics has progressed well beyond such a simplistic confrontation of dogmas.

In the same period that natural selection came to be understood as a pivotal mechanism operative in evolution, the role of symbiosis in evolution began likewise to be understood. Pierre Joseph van Beneden, professor at the Catholic University at Leuven, adopted the term *mutuellisme*, brandished by the French social reformer Pierre-Joseph Proudhon for his ostensibly benign variety of communism, to apply to mutually beneficial relationships between species. The Flemish marine biologist later popularised the idea in his 1876 book *Les commensaux et les parasites*, which also appeared in German and English translations that same year. He distinguished various types of symbiotic relationship, i.e. parasite, free-living commensal, resident or obligate commensal and mutualist.

In the natural world van Beneden observed that beneficial reciprocity was as prevalent as commensalism. He described in detail how commensalism and mutualism contrasted strongly with the deleterious effects of parasitism, and he likewise carefully distinguished between various forms of commensalism and the intimate and reciprocally beneficial interdependency which characterised mutualism. The most far-reaching form of symbiosis is a relationship in which both organisms can no longer live without the other and so in time effectively become as one life form. It is understood today that most life forms on the planet originated as symbiotic relationships.

The influential work of van Beneden inspired the German botanist Heinrich Anton de Bary, who in 1879 popularised the word *Symbiose* ‘symbiosis’. He used this already extant term of Greek origin in a public address to German biologists and physicians at Cassel as a cover term to designate all forms of ‘Zusammenleben ungleichnamiger Organismen’, i.e. the living together of organisms with different names, viz. belonging to differently named taxa. Symbiosis included ‘der *vollständige Parasitismus*’ (viz. full-fledged parasit-

ism, which de Bary for some reason considered to be the ‘most exquisite’ form of symbiosis), various types of commensals, and what de Bary called ‘van Beneden’s *Mutualisten*’, which were neither parasitic nor commensal. Anton de Bary’s most fascinating examples were lichens. All lichens are symbiomes of fungi of the phylum ascomycetes with either algae or cyanobacteria. His description of these fascinating symbiomes made lichens into the emblematic classroom example of symbiosis.

Friedrich Schmitz, professor of botany in Bonn, observed that the chloroplasts of eukaryotic algae, along with their associated starch-accumulating structures called pyrenoids, were not fabricated anew in the cytoplasm, but reproduced independently by division within individual cells (1882). Schmitz first made this observation in 1880 ‘für eine Anzahl von Algen . . . während eines Aufenthaltes an der Zoologischen Station zu Neapel’, but within two years he had established that the independent reproduction of *Chromatophoren* or chloroplasts was a feature of all eukaryotic algae.

This observation regarding the autonomous nature of chloroplasts in eukaryotic algae inspired botanist Andreas Schimper, who in 1883 showed that *Chlorophyllkörner* or chloroplasts in green plants too ‘nicht durch Neubildung aus dem Zellplasma, sondern durch Theilung aus einander entstehen’ (1883: 106). This discovery led Schimper to venture that all green plants had originated through an original symbiotic association of two unlike organisms: ‘Möglich-erweise verdanken die grünen Pflanzen wirklich einer Vereinigung eines farblosen Organismus mit einem mit Chlorophyll gleichmäßig tingierten ihren Ursprung’. In a similar vein, the botanist Albert Bernard Frank (1885) afterwards recognised mycorrhiza too to be a symbiotic relationship between terrestrial plants and subterranean fungi which subsist on their roots and provide these plants with essential nitrogen and minerals.

In Russia, Constantin Mereschkowksy made the same observation in 1905 that Schmitz had made in 1880 and Schimper in 1883, namely that chloroplasts are not assembled from scratch in the cytoplasm, but are cytoplasmically inherited and replicate themselves autonomously within the host cell. However, Mereschkowksy went a step further than Schmitz and Schimper in claiming that chloroplasts remained genetically independent of the nucleus. Mereschkowksy also argued that ‘*Cyanophyceae*’ or cyanobacteria, which until relatively recently used to be called blue-green algae, were basically free living chloroplasts that had not entered into the cytoplasm of a host cell, where they had taken up a reduced symbiotic existence and rendered the host cell autotrophic. For the genesis of a new life form through symbiosis, Mereschkowksy coined the term *symbiogenesis* in 1909.

Mereschkowksy had drawn inspiration from the work of Andrej Sergeevič Famintsyn, who studied the ontogeny of chloroplasts in green plants (1889, 1893, 1907). In Famintsyn’s writings, the term *symbiosis* began to acquire a new anodyne flavour because he reserved the term *symbiosis* for relationships that were mutually beneficial in the sense of van Beneden’s mutualism rather

than in the broader sense of de Bary's symbiosis. Since then a spectrum of symbiotic relationships has been identified, ranging from inquilinism, parasymbiosis, social parasymbiosis, phoresy to symbiotrophism. One of the most striking example of symbiosis is fundamental to our own existence as a life form and to that of most aerobic life forms on the planet.

Mitochondria are organelles in the cells of aerobic life forms which assemble and metabolise the energy-rich molecule adenosine triphosphate (ATP). Richard Altmann first discovered what he called *Bioblasten* within cells using a new staining technique at Leipzig, and he published his results in *Die Elementarorganismen* in 1890. Altmann speculated that bioblasts replicated themselves. Carl Benda renamed these organelles *Mitochondrien* or *Fadenkörnchen* 'thread granules' in 1898. The French marine biologist Paul Jules Portier of the Institut Océanographique de Monaco argued that symbiosis was a widespread process in the evolution of complex life and in 1918 hypothesised that even mitochondria had originated as *symbiotes*. Portier's once daring hypothesis has become today's biological orthodoxy.

The first step in the emergence of aerobic eukaryotic life took place about 1,800 million years ago when a protist organism incorporated a free swimming, facultatively oxygen breathing α -protæobacterium very much like the purple bacteria of the genera *Bdellovibrio* or *Paracoccus*. Mitochondria are the oxygen respiring descendants of this bacterium. After these bacteria had taken up residence within the host organism, the original number of mitochondrial genes was reduced from probably well over a thousand to a baker's dozen because, as endosymbionts, our ancestral mitochondria were compelled to enjoy the luxury of relinquishing central control to the nucleus, whither much of their genes were transferred in the course of time.

Endosymbiosis resulting from the entry of prokaryotes and archaea into the cytoplasm of eukaryotes, whether by ingestion or intrusion, thus led to transfer and incorporation of endosymbiont genes into the host cell nucleus, indelibly altering the genetic composition of the host genome (Ku *et al.* 2015). Yet the DNA of chloroplasts and mitochondria still retains its original circular shape, reminiscent of the bacterial genophore, and mitochondria and chloroplasts have kept their own machinery for protein synthesis, including their own ribosomes.

1.1 The semiotic symbiont and the history of the meme

Language is an organism that lives within us. Language exhibits the essential traits of a life form. Languages and language-borne units can reproduce themselves, and languages and language-borne units can die and go extinct. Language can grow and change, and language exhibits a panoply of functional activities that other living organisms display. The idea that language is a life form in its own right was already popular amongst linguists in Germany in the early 19th century. Friedrich von Schlegel described language as 'ein lebendiges Gewebe' (1808: 64), and Wilhelm von Humboldt spoke of the 'Organismus

der Sprache' (1812: 8). Yet language differs from all other known organisms. As distinct from other life forms, language is a semiotic organism. Unlike other symbionts, language first arose and then evolved within its host rather than invading the host's brain and colonising the host organism from outside.

The high-fidelity replicators of which language consists are fecund and possess considerable longevity. For a unit of natural selection in cultural evolution the term *meme* was proposed in 1976, though the preceding etymological history of this word is not widely known and the competing definitions for the term which have arisen since then are not generally appreciated. Of greater antiquity than the term *meme* itself is the historically widely propounded view, espoused by various lineages of linguists and semioticians, that words or linguistic signs are the replicators which sustain language as an organism.

An idea often takes shape in more than just one human brain. Sometimes the same idea occurs independently to the minds of different individuals at very different times or even recurrently to various people throughout history. Alternatively, the cultural environment may be ripe for an idea which occurs independently to the minds of different individuals at roughly the same time in history. Yet scholars seldom recount the course of events in precisely that way, and the history of ideas is usually told as a tale that does not reflect this more complex reality. The view of culture as a dynamic evolving process in which words and ideas act as the transmitted units of evolution is in fact a rather obvious way of looking at human culture, and so this conception of culture has occurred to many people. For those well versed in his writings, it is obvious that Victor Hugo was not just toying with a metaphor when he wrote 'le mot, qu'on le sache, est un Être vivant' (1856, I: l. 675).

Darwin's *On the Origin of Species* was published on the 24th of November 1859. The German translation by the palaeontologist Heinrich Georg Bronn appeared in 1860 as *Über die Entstehung der Arten*. The maverick German biologist Ernst Haeckel sent a copy of the German translation to his friend, the linguist August Schleicher. Inspired by this work, Schleicher adopted the view of individual languages as species, which compete against each other 'im Kampfe ums Dasein' (1863).

By contrast, Friedrich Max Müller conceived language as such to be an organism. On the 6th of January 1870, in the very first issue of the journal *Nature*, Müller took issue with Schleicher's idea of the survival of languages in terms of 'die Erhaltung der höher entwickelten Organismen' and instead argued that language evolution was a more complex issue.

Although this struggle for life among separate languages exhibits some analogy with the struggle for life among the more or less favoured species in the animal and vegetable kingdoms, there is this important difference that the defect and the gradual extinction of languages depend frequently on external causes, i.e. not on the weaknesses of the languages themselves, but on the weakness, physical, moral or political, of those who speak them. A much more striking analogy, therefore, than the struggle for life among separate

languages, is the struggle for life among words and grammatical forms which is constantly going on in each language. Here the better, the shorter, the easier forms are constantly gaining the upper hand, and they really owe their success to their inherent virtue. (1870: 257)

It is moot whether we should consider these two contrasting approaches, i.e. language as an organism vs. individual languages as species, as representing opposing or complementary conceptions of language evolution. Until recently, I was less receptive to the latter of the two approaches (van Driem 2015).

Müller was a vocal proponent of evolution by natural selection and applied the theory not just to language, but also to religion and cultural evolution. In his *Descent of Man*, Darwin cites Müller and explicitly adopts his conception of language evolution, saying ‘The survival or preservation of certain favoured words in the struggle for existence is natural selection’ (1871, I: 60-61). Darwin ventured to add ‘novelty’ to Müller’s repertoire of traits that might enhance the appeal and thus survival potential of a word. In the same vein, Gottlob Adolf Krause wrote: ‘Für mich ist jedes Wort ein sprechendes Lebewesen, das seine Geschichte erzählt, sobald ich es kennengelernt habe. Ich sehe die Zeit kommen wo man von einer etymologischen Biologie sprechen wird’ (1885: 257). So, already in the nineteenth century, *words* and *grammatical forms* were conceived as the living units of cultural evolution by Hugo, Müller, Darwin and Krause.

In a related but different vein, a zoologist in Germany began to contemplate the notion of transmissible neural entities. It was Richard Wolfgang Semon who coined the term *Mneme*. Semon was born on the 22nd of August 1859 in Berlin. He became Ernst Haeckel’s favourite student at Jena, conducted zoological expeditions to Africa and Australia, produced a number of zoological studies, converted from Judaism to Protestantism in 1885, and later became a Monist, all before he developed his mneme theory. Semon published the book *Die Mneme als erhaltendes Prinzip im Wechsel des organischen Geschehens* in Leipzig in 1904, two revised editions of which appeared in 1908 and in 1911. A first sequel to *Die Mneme* appeared in 1909 entitled *Die mnemischen Empfindungen*. Yet Semon never completed the second sequel about ‘die Pathologie der Mneme’. Unable to reconcile himself with the defeat of Germany at the end of the First World War, he shot himself through the head on the 27th of December 1918. His lifeless body was found the following day sprawled out on the old black, white and red German tricolour.

Imbued with the work of Darwin and Haeckel, Semon’s conception of the mneme was an idea which biological theoreticians would later brand as Lamarckian. Semon developed an epigenetic theory of memory based on the notion of the *Engramm*, a modification in the neural tissues corresponding to a memory triggered by a *Reiz* ‘stimulus’. Semon conceived of the mneme as the collective set of *Engrammata* or neural memory traces, whether conscious or subconscious, that he believed were inherited genetically. Semon described the *Mneme* as ‘das für die organische Entwicklung unumgänglich notwendige er-

haltende Prinzip, das die Umbildungen bewahrt, welche die Außenwelt fort und fort schafft' (1911: 407). Largely forgotten today, Semon's ideas were quite influential in the first half of the twentieth century, and some of his other coinages such as *Engramm*, *Engraphie* and *Ekphorie* have likewise taken up lives of their own, both in the scientific literature as well as in the genre of science fiction.

The term *Mneme* was adopted as *mnème* by the Belgian entomologist, poet and playwright Maurice Maeterlinck, whose work was preoccupied with symbolism and who won the Nobel prize for literature in 1911. His entomological works *La vie des abeilles*, first published in 1901, and *La vie des termites*, first published in 1926, were translated as *The Life of the Bee* and *The Soul of the White Ant* respectively. Both books went into numerous printings in English in the first half of the twentieth century. Maeterlinck invoked Semon's Lamarckian heresy, whereby 'la plupart des instincts ont à l'origine un acte raisonné et conscient', to explain hereditary patterns of complex behaviour in termites, bees and ants in terms of 'des engrammes de la mnème collective, comprenant aussi leurs ephories' (1928: 202). Only much later was it noticed that, with the exception of his incorporation of Semon's concepts, Maeterlinck's book had been largely plagiarised from the beautiful Afrikaans original *Die Siel van die Mier* by the South African naturalist and literary figure Eugène Marais.

After the discovery of the double helical structure of deoxyribose nucleic acid (DNA) and the chemical identity of genes in the Cavendish lab in Cambridge by Francis Crick, James Watson and Rosalind Franklin in 1953, Müller's view of language evolution being driven by natural selection operating on 'words and grammatical forms', which had resonated so well with Darwin, was rapidly and widely succeeded by a more general public awareness that there existed units of cultural replication analogous to the gene.

Leslie White came up with the term *symbolate* for 'something that results from the action or process of symboling', coarsely conceived as encompassing all 'phenomena dependent upon symboling' (1959: 231, 246). The term *symbolate* had been used already by Lady Victoria Welby much earlier in the sense of 'thing symbolised' (1896: 196). For White, however, symbolates were observable not only as acts and external events, but, in keeping with his neoevolutionist definition of culture, symbolates also included 'concepts, beliefs, emotions, attitudes' within the human brain and acts and events mediated by 'symboling' and all external objects and events which are cultural artefacts or in some way the result of human intervention (1959: 235).

An awareness of cultural evolution as a Darwinian process prompted Hudson Hoagland in 1962 to state an idea that had surely long occurred to many people when he proposed that *ideas* are the units of selection and that 'ideas may be considered to social evolution what genes are to biological evolution' (Huxley 1962: 203). For Hoagland competing ideas were units of 'psychosocial selection'. In 1964, Henry A. Murray coined the term *idene* as an analogue in social evolution to the gene in biological evolution (Hoagland 1964: 111). In

1963, inspired by the works of Semon and Maeterlinck, Harold Blum coined the term *mnemotype* for a unit of 'information determining the cultural pattern of a society' residing 'in the brains of its members where it is stored as personal sets of memory images'. Blum envisaged the cultural evolution of a society in terms of 'changes in the collective mnemotype', and that these innovations were precipitated by 'changes in the individual mnemotypes which compose it' (1963: 39).

Ralph Burhoe coined the term *culturetype* for assemblages of cultural and linguistic information. He saw this as a new type of information in evolution representing a relatively stable, transmissible 'heritage' largely independent of the genotype, but just as subject to natural selection (1967: 83). Carl Swanson (1973: 313) proposed the term *socio-genes* for the ideas or cultural molecules as units of selection in a process of cultural evolution governed by the principles of Darwin and Mendel. Cloak wrote of the 'natural selection of cultural things', such as behavioural instructions which he termed *tuitions* and defined as 'the programming of an instruction upon one's hearing a linguistic analogue of that instruction uttered by a conspecific', a process which 'is almost surely unique to humans' (1975: 167). Cloak described *tuitions* as 'corpuscles of culture' residing in the central nervous system.

It was amidst this flurry of activity to devise neologisms for the widely assumed units of cultural selection that Richard Dawkins coined the term *meme* in 1976. Laurent (1999) identified Maeterlinck's *mnème* as the direct source of Dawkins' coinage, just as *mnème* had earlier spawned Blum's *mnemotype*. Yet in terms of substance, the Oxford zoologist departed from all earlier definitions of cultural replicators for which various labels had previously been proposed such as *words*, *symbolates*, *ideas*, *mnemotypes*, *idenes*, *culturetypes*, *socio-genes* and *tuition*. Whereas the putative units of cultural selection had all previously been conceived as linguistic or language-mediated entities, Dawkins defined his meme as 'a unit of *imitation*', with the italics supplied by himself (1976: 206).

As opposed to earlier views of the unit of cultural selection, Dawkins' *meme* was inspired as much by the mindless mimicry observed in the patterns on butterfly wings or actual learnt behaviours such as some types of bird song as it was by human culture. With its single-minded focus on imitation, a deafening silence reigned about the crucial role of language. In contrast to earlier conceptions of the units of selection in cultural evolution, the meme in Dawkins' conception was therefore actually a substantive step backward. Several years later, he brought his definition of the meme slightly more into line with the earlier conceptions of a unit of cultural selection by adding that a meme was 'a unit of information residing in the brain' (1982). This later modification clearly establishes that Dawkins had essentially done no more than to anglicise Semon's original term, just as Maeterlinck before him had rendered the term into French. Accordingly, Dawkins' meme remained fundamentally a 'unit of imita-

tion', and therefore something neither specifically human nor necessarily linguistic.

This definition found its way into the Oxford English Dictionary as 'an element of a culture that may be considered to be passed on by non-genetic means, esp. imitation'. The Oxonian meme is not essentially a semiotic construct. Blackmore, an ardent proponent of Dawkins' view of the meme, envisaged 'spoken grammatical language' as resulting from 'the success of copyable sounds' and, rather astonishingly, explicitly denied the relevance of the meanings borne by linguistic signs (1999). The inadequacy of the Oxonian *meme* underlay Kortlandt's choice not to use the term in the early 1980s in his treatment of the replicating units of language, viz. linguistic signs whose meanings exhibit the propensities of non-constructible sets in the constructivist mathematical sense.

Pursuant to the discovery of the double helical structure of DNA in 1953, the coinage *gene*, by truncation from *genetic*, aided and abetted the popularisation of the term that was anglicised as *meme* in 1976 so that the label *meme* soon outcompeted all other coinages. The inadequacy of the Oxonian conception of this unit of selection, however, necessitated either the redefinition or replacement of the term. The term's popularity and its largely unknown but interesting etymological lineage, traceable directly back to Semon, made it more expedient to redefine the term in 2001 rather than to coin yet another neologism. The Leiden definition brought the term back into line with the conception of earlier thinkers by redefining the meme as a neuroanatomical unit corresponding to a sign in the Saussurean sense.

A meme *sensu Lugdunensi* is a meaning together with its associated phonological form and grammatical ramifications. Each linguistic sign has a practically isofunctional but speaker-specific neuroanatomical manifestation in the brains of the individual speakers within the same speech community. By contrast, a meme *sensu Oxoniensi* is a unit of imitation, whereas in Leiden a unit of imitation was termed a *mime*. In contrast to a meme, a mime fails to meet the criteria of fecundity, high-fidelity replication and longevity which could qualify it as a successful life-sustaining replicator. Amongst memes the competition between observable populations of patterns is more fierce than in the case of mimes.

Meaning and language account for the difference between the behaviour of pre-linguistic mimes, such as the rice washing of Japanese macaques or the elaborate songs of whales, as opposed to the comportment of post-linguistic mimes, such as music, clothing fashions, dancing styles. In ethology, the term *culture* has come to apply to complex learnt behaviours transmitted between conspecifics in numerous species other than just our own. This usage is apt, but an essential difference persists between the semiotically enriched culture of our species and the mimetic culture of other species, whose brains have not come to be inhabited by a language organism. Other species lack memes in the Leiden sense of a Saussurean sign.

Mimes behave differently once they have come to find themselves awash in a sea of linguistic meanings with their multitudinous neuronal associations and interconnections. Our patterns of imitation as humans are more elaborate because our mimetic culture has been semiotically enriched and enmeshed with our inordinately more complex language-mediated or memetic culture. Yet the melodic themes of Johann Pachelbel's canon in D major or Anthony Holborne's *Muy Linda* are none the less mimes, not memes. Music is a paralinguistic phenomenon that is causally intimately connected with the evolutionary emergence of language, but music is not language, and music may, in part, actually serve to drown out the memetic din and temporarily to assuage the relentless tides and untamed randomness of language-mediated thoughts.

The Leiden redefinition of the meme as a linguistic sign would have rendered the term superfluous, except that meanings characteristically travel in packs within which a hierarchical structure obtains. In popular usage, the term *meme* has evolved to denote a plethora of phenomena such as internet messages, video clips and digital posters which 'go viral' for some fleeting episode of time. As explained in previous writings, natural selection operates at various semiotic levels. The random example which I adduced in Prague in 2003 was that the idea that 'America is one nation, under God, with liberty and justice for all' is not a linguistic sign. Independent of the truth value of this statement and any of its component assertions and in-built assumptions, this sentence is a syntactically articulate idea composed of a number of constituent lexical and grammatical linguistic signs.

Both this idea as well as its various constituent parts are subject to natural selection. The decomposability of units of function, such as words, phrases, sentences and narrative, is a central feature of linguistic phenomena and underscores the need for analysis to be conducted at the different levels of granularity traditionally distinguished in linguistics. The smallest structural units in language, viz. phonemes, tend usually to be smaller than the smallest semiotic units, viz. single morphemes and monomorphemic words, though on occasion a phoneme does of course incidentally happen to be equal in size to a word or a morpheme.

Expositions of the Leiden model of language evolution with its multi-tiered ramifications for the dynamics of linguistic replicators by natural selection have been available for some time in the writings of Kortlandt, Salverda, Wiedenhof and myself. Recently, Hadikin (2015) has come around to embracing view that 'words' and 'extended lexical units' are replicators. However, Hadikin erroneously traces this notion of the linguistic replicator to Dawkins. As we have seen, the Oxonian definition actually represented a deviation from the linguistically informed conception of semiotic units subject to natural selection which had preceded it. The linguistic view was rendered explicit by Müller, whose insights were appreciatively adopted by Darwin, and this conception of language evolution has been espoused by many linguists ever since, and it is to this older view that Hadikin has now essentially returned.

Meanings that have colonised a human brain seek to reproduce through meaningful contacts. Just as an ant or termite that has strayed far afield may discover a new source of food, so too meanings find new conceptual havens from which to proliferate. The dynamics of this process yields vast repertoires of linguistics meanings. During reproduction in the process of transfer from one host to another, a meaning is reduced and, as it were, stripped of its connotations and associations, which are constructed anew in the brain of the new host. Just as a human is reduced to a haploid sperm cell in the process of reproduction, the isofunctional set of neuronal configurations constructed in the brain of a new host is unique and microanatomically specific to that individual. Just as the needs and prerogatives of an ant colony supersede those of the individual ant, language and linguistically mediated thought shape human societies and may supersede the interests of the individual.

2 The first utterance, Symbiosism and Symbiomism

The expositions of Wiedenhof (1996) and Kortlandt (1985, 1998, 2003) attempt to explain how syntax arose from meaning and argue that naming and syntax are two faces of the same phenomenon. The first primaeva holistic utterances with a meaning in the linguistic sense inherently constituted projections of reality with a temporal dimension. First-order predication arose when such a holistic utterance was split. This point of view was already put forward by Pierre de Maupertuis (1756, III: 444) and Hugo Schuchardt (1919a, 1919b) and contrasts with the naïve view that syntax arose from the concatenation of labels or names. The splitting of a signal for something like ‘The baby has fallen out of the tree’ could have yielded meanings such as ‘That which has fallen out of the tree is our baby’ and ‘What the baby has done is to fall out of the tree’. Mária Ujhelyi (1998) has considered long-call structures in apes in this regard, and recently Wray (2000) too has begun to champion the idea of an original holistic utterance.

The empirical basis for the Leiden conception of language is language’s own lingering and tangible evolutionary legacy in the shape of the semiotic workings of meaning. The arbitrary nature of the linguistic sign is a perennial theme which goes back at least to Plato’s *Cratylus*. Ferdinand de Saussure cautioned his students vigilantly to distinguish, however, between the meaning of a linguistic sign and its reference in extra-linguistic reality. It is the relationship between the phonological form of a sign and the associated meaning which is arbitrary. On the other hand, the relationship between the meaning of a linguistic sign and its reference has presented a conundrum to philosophers, who have often failed to distinguish between the two. Charles Lutwidge Dodgson, alias Lewis Carroll, spoke through the voice of Humpty Dumpty to express his delight at the apparent quandary:

‘When *I* use a word,’ Humpty Dumpty said, in rather a scornful tone, ‘it means just what I choose it to mean — neither more nor less.’ ‘The question is,’ said Alice, ‘whether you *can* make words mean so many different things.’ ‘The question is,’ said Humpty Dumpty, ‘which is to be master — that’s all.’ (Carroll 1872: 124)

The problem is elucidated by Kortlandt, who wrote that ‘a linguistic meaning thrives by virtue of its applications, which cannot be deduced from its implications. The latter must be derived from its applicability, rather than the other way around. Thus, a linguistic meaning has the properties of a non-constructible set’ (1985: 480).

This insight led Kortlandt, rather morosely, to view language as a parasite: ‘The view of language as a tool of the human species is less well-founded than its converse’ (1985: 478). The fact that language has augmented our reproductive fitness to the detriment of countless other species and is also likely to have contributed to the extinction of several hominid species which whom our ancestors stood in direct competition would instead indicate that language is a mutualist symbiont. Our language-driven pre-eminence has made us the blight of the biosphere. I call this opposing model Symbiosism, and this model has been explained in greater detail on previous occasions (van Driem 2001b, 2003, 2004, 2005, 2008a, 2008b, 2015).

Language is part of us, and we are not fully human without it, as shown by the sad example of feral children (Ball 1880, Burnett 1784, de la Condamine 1755, Dresserus 1577, Itard 1801, 1894, Mason 1942, Rauber 1885, Singh and Zingg 1942, Sleeman 1858, Squires 1927). We humans are not just flesh and blood, for we are also what we think and believe. We are symbiomes of body and soul, whereby the soul is not to be construed as some metaphysical entity but instead as a semiotic one, subsisting on the neuronal substrate of a hominid brain. From this particular physicalist perspective, we may reinterpret Helen Keller’s use of the word *soul* when she described as her ‘soul’s sudden awakening’ the moment on the 5th of April 1887, when suddenly and heart-rendingly ‘the mystery of language was revealed to’ her (1905: 23). As a species, we are incomplete without language or, as Wilhelm von Humboldt put it, ‘Der Mensch ist nur Mensch durch Sprache’ (1822: 244).

Our species is a unique type of symbiome in the natural world. A human being is the symbiotic relationship of the hominid body of a particular variety of great ape with all of its inherited primate social and physiological propensities and a semiotic symbiont lodged in its brain, which has grown bloated in the long course of the human host’s coevolution with the language organism which has arisen within it. Our soul is this semiotic organism residing within our skull along with everything else inside our brain that happens to be mediated by language. The whole panoply of language-mediated thought, conceptions and sensibilities make up our human soul.

Our brain houses a consciousness which sustains the illusion of a thinking self with a free will. In reality, our feelings, thoughts, yearnings and behaviour are the outcome of the jostle and interplay of the biological propensities and lust for creature comforts of the human host in symbiotic association with a capricious linguistic symbiont which serves as the vehicle for the ideas waging war within us. So when we speak, who is doing the talking? As individuals we are both body and soul, and human behaviour and health can best be understood in terms of the complex anatomy of this relationship. The key to good health and contentment is keeping both components of the symbiome happy, healthy and in some kind of harmonious equilibrium. This guideline embodies the essence of Symbiomism, the practical philosophy entailed by Symbiosism.

3 The perils of memetic management

In my previous writings, I have qualified religion as a disease of language and contended that many characteristically human behaviours must be understood as language-mediated psychopathologies (2008: 394). These ideas are not entirely original. Friedrich Max Müller called mythology ‘an affection, or even as a disease, of language’ (1889), and his understanding of mythology was quite comprehensive, although he was prudent enough to phrase his insights gingerly. In North America, we have recently seen proponents of secularism combat the teaching of intelligent design and creationism in schools, where creationists present the theory of evolution as if it were merely some alternative opinion. The atheist fervour of Richard Dawkins and Bobby Henderson is admirable, but it may prove to be an exercise in futility to strive to eradicate empirically unsupported belief systems from our culture entirely.

We humans are inoculated with language at birth, and language infests our brain and stays with us until we are entirely brain-dead. Müller forecast:

Mythology is inevitable, it is natural, it is an inherent necessity of language, if we recognise in language the outward form and manifestation of thought: it is, in fact, the dark shadow which language throws on thought, and which can never disappear till language becomes altogether commensurate with thought, which it never will. Mythology, no doubt, breaks out more fiercely during the early periods of the history of human thought, but it never disappears altogether. Depend upon it, there is mythology now as there was in the time of Homer, only we do not perceive it, because we ourselves live in the very shadow of it, and because we all shrink from the full meridian light of truth. (1881 [1871]: 590, 1895: 168)

Our brains teem with linguistic signs, and each time a linguistic form with its associated meaning is activated in our brain, a Darwinian generation time elapses in terms of the neuronal group selection which characterises the rapid life cycle of linguistic signs. A passage in the writings of Douglas Adams captures

with appropriate levity the mental predicament which afflicted our ancestors once language had taken root in our brains.

They knew that when the rains came, it was a sign.

When the rains departed, it was a sign.

When the winds rose, it was a sign.

When the winds fell, it was a sign.

When in the land there was born at the midnight of a full moon a goat with three heads, that was a sign.

When in the land there was born at some time in the afternoon a perfectly normal cat or pig with no birth complications, or even just a child with a re-troussé nose, that, too, would often be taken as a sign. (1996: 466)

Symbiosism predicts rites and rituals, ideologies, suicide, hypocrisy, sports, theatre, the belief in gods or a God, the supernatural, crusades and jihads and numerous other cultural and psychological phenomena, both delightful and baneful, that result from language and make us uniquely human, marking our species as an anomaly in the biological world.

If it feels good to live in a linguistically constructed reality, can this delusion really be so bad for us? In those cases where we are driven to immolate ourselves for some abstract ideal, or to kill ourselves and murder others for the sake of some tenet or belief, then the answer to this question might strike us as obvious. Perhaps it is misguided, however, to fight against belief systems such as astrology, as Dawkins has done with religious zeal, since the scientifically untrained and the intellectually challenged may perhaps always require a modicum of mythology, and a bit of make-belief and self-delusion may even provide some comfort and solace to intellectual giants. Not all empirically unsupported belief systems are obviously deleterious, and the feel-good quality and non-hostile doctrine of popular astrology, for example, renders this belief system perhaps no more than a harmless distraction which an omniscient physician might even choose to prescribe as a suitable opium for the people.

Memetic management or thought control is a reality which has been with us or a long time. The thought police of the past burnt heretics, blasphemers and homosexuals, with the *auto-da-fé* providing an abject form of community entertainment, of which we still see many perverse forms in different parts of the world today. Today's mainstream Western corporate news media tend to exhibit such a blatant bias that collusion with government is as obvious as it was in the erstwhile Soviet press. Fashions of political correctness can at times be socially enforced with as much intolerance today as they were in the historical past. The internet offers hope, yet the internet has from the outset been both conspicuously as well as surreptitiously managed. Certain content is restricted, monitored and flagged. Eric Arthur Blair, alias George Orwell (1949), predicted that governmental infringements upon privacy and personal freedom would lead to a dystopian surveillance state, and the internet has provided a powerful tool to those who work towards effectuating a form of totalitarianism thinly veiled.

Today's corporate and governmental memetic manipulators and both the covert and unabashedly outspoken enemies of privacy master and zealously practise the arts of newspeak and doublethink described by Orwell.

In November 2003, the social website face-pic already had more than one million users worldwide (<http://web.archive.org/web/20031124030457/http://face-pic.com/>). By the autumn of 2004, the site enjoyed considerable popularity amongst young users in Europe, India and the rest of the world. The Wikipedia article about face-pic has been suppressed since 2008, perhaps because the holders of certain vested interests have sought to squelch historical evidence that might indicate that the originators of Facebook may directly have copied the idea from a then already thriving social website. Facemash opened as a social website for Harvard university students in October 2003. In 2004, Zuckerberg was accused of stealing ideas from his fellow Harvard students, and a settlement was reached, ultimately awarding his victims assets worth \$300 million. That same year, the company was renamed Facebook and moved to Palo Alto, California. In September 2005, Facebook experimentally opened its site to secondary school students. In 2006, Facebook expanded membership eligibility to the employees of Apple and Microsoft. Only in September 2006 did Facebook open membership to everyone aged 13 years or older with a valid email address (<https://en.wikipedia.org/wiki/Facebook>, accessed 23 August 2014).

According to disclosures in the European press, Facebook entered into partnership with the NSA and FBI some time between 2006 and 2009, spying on its customers and passing on their private data. In chronological order, Microsoft, Yahoo, Google, PalTalk, YouTube, Skype, AOL and Apple also reportedly each entered into the PRISM spying programme between 2007 and 2012, and their complicity sometimes extends to the pre-installation in citizens' devices of malware *sensu* Stallmann (2015). In sequel to these revelations in the press, Max Schrems filed a class action lawsuit against Facebook on the 1st of August 2014. On the 6th of October 2015, the Court of Justice of the European Union in Luxembourg declared the European Data Protection Commission's U.S. Safe Harbour Decision invalid because the persistent and pervasive prying into people's privacy perpetrated by the National Security Agency, often in collusion with private corporations, as exposed by whistleblower Edward Snowden, 'enables interference, by United States public authorities, with the fundamental rights of persons' (Judgment in Case C-362/14).

In the wake of Brezhnev's invasion of Afghanistan, certain Western actors made a very unwise choice to fan the flames of militant Islam as a tool against the Soviet occupation. Close reading of the Qur'ān and the Ḥadīth would have enabled memetic content assessors to realise that they were letting a genie out of a bottle. The ongoing situation in the Near East in combination with the plight of the dissident Edward Snowden, who was compelled to seek asylum in what used to be the Soviet Union, appear to indicate that today's thought police are neither necessarily competent nor altogether benign. We are urged to dis-

miss as conspiracy theories any of the ubiquitous indicators that an actual malignancy may have taken hold in the halls of power.

The late George Carlin pointed out that the act of entertaining hypotheses such as ‘that powerful people would get together and plan for certain outcomes’, that ‘powerful interests would operate outside of the law and maybe even kill people’ or that ‘secret government agencies might feel the need to assassinate a person and cover it up’ renders a person prone to being considered a ‘kook’ or discredited as a ‘conspiracy buff’. Linguistic signs such as *character assassination*, *set up*, *patsy*, *identity theft* and *false flag* no doubt very much have real-world referents, and the phenomena denoted by such lexical items highlight the vulnerability of all citizens in a surveillance state, and not just those who would have the temerity to question the established order.

The exploitation of highly volatile belief systems does not offer a benevolent, safe or prudent strategy for securing access to oil supplies, effectuating the compliance of client states or toppling the regime of a rival’s client state. Memetic management, if exercised at all, should ideally be minimalist, never meddlesome. Those who strive to control, censor or suppress information content ought to ponder whether a natural ecology of freely circulating ideas might perhaps just yield the optimal equilibrium. Non-intervention and relinquishing the reins might be the best policy, but such advice is liable to fall on deaf ears. Surveillance and the policing of content are sadly likely to grow ever more intrusive and oppressive, not just because proponents of memetic management will act on the knowledge that some language-borne packages of ideas can either be beneficial or demonstrably deleterious to the individual human host and to society at large, but probably more so due to the circumstance that particular established actors will continue to exercise a prerogative to defend their vested interests by whatever means.

Bridling the open exchange of information and suppressing free speech is directly hostile to democracy, but many in the West who adopt the politically expedient posture of paying lip service to democracy may very well privately not believe in the desirability or even the feasibility of attempting ultimately to realise this ideal. Predictably, the gradual introduction of increasingly decentralised democracy in Bhutan, where this process was driven from the very centre of power by the highly enlightened fourth hereditary king, has at the local level in some places led to compromises mitigating the country’s otherwise stringent policy of nature conservancy. Given the country’s population growth, though at present this is still modest, the immediate needs of local people have at times predictably begun to prevail above their ideological attachment to preserving their natural environment against man-made encroachments. Ironically, this process of democratisation was first set into motion by the third hereditary king, who was both an autocrat and very much a nature conservationist *avant la lettre*.

The new situation in Bhutan has already held for quite some time on a global scale. In the context of habitat destruction, anthropogenic climate change

and the general ecological degradation of the planet, Nico Stehr (2015) strives to retain an optimistic attitude towards democracy whilst he reiterates Friedrich Hayek's pessimistic admonition regarding the inexorable conflict between the ecologist and conservationist interests of the scientifically well-informed and the democratic tendency to appease the immediate needs of a relentlessly burgeoning and not uniformly well-informed human population, the indulging of whose wants may often be at variance with the well-being of the planet as a whole. Yet Stehr's discussion begs the question inasmuch as a government by a scientific élite has not yet ever been attempted, although Aldous Huxley (1932) did once ponder one conceivable scenario in which such an arrangement might culminate. Instead, throughout history the services of scientists and scholars have hitherto been customarily recruited by extant power brokers, whilst those scientists and scholars whose services cannot be bought are on occasion liable to be perceived as a threat.

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