

## **The Language Organism**

### **The Leiden theory of language evolution**

Prof. Dr. George van Driem <Dzongkha@compuserve.com>, fax 31 71 527 7569  
Himalayan Languages Project, Leiden University, Postbus 9515, Leiden 2300 RA, the Netherlands

#### ***Language is meaning.***

Meaning is the basis of language. Any approach to the evolution of language which sidesteps the issue of the nature of linguistic meaning is incomplete, non-empirical or both. The nature of a meaning is a direct function of its neuroanatomy, as first modelled by Hebb (1949), and later elaborated by Changeux (1983), Edelman (1987) and Pulvermüller (2002). The Leiden theory of language evolution is based on the insight that meanings in natural language have the properties of non-constructible sets in the mathematical sense. The inherently dynamic character of meanings is modelled in terms of intuitionist set theory or constructivist mathematics, as developed by L.E.J. Brouwer in the first half of the 20th century. Brouwerian semantics dovetails with neuroanatomical reality and the observable behaviour of categories of meaning as units in the Darwinian process of neuronal group selection. This view was developed in the early 1980s by Kortlandt (1985) and is further developed in my handbook of the greater Himalayan region (van Driem 2001b).

Though non-constructible sets, meanings together with the corresponding neuronal representation of its associated linguistic form replicate themselves from brain to brain. Such a self-replicating entity in the central nervous system may be called a mneme (Semon 1904) or a meme (Dawkins 1976), as redefined by van Driem (2000a, 2000b, 2001a, 2001b). The Leiden conception of language evolution provides a linguistically informed definition of the meme. Other recent characterisations of the meme by Dawkins (1976), Delius (1991) and Blackmore (1999) fall short of identifying the fecund high-fidelity replicators of extra-genetic evolution.

The Leiden approach to linguistic forms as vehicles for the reproduction of meaningful elements in the hominid brain differs fundamentally from both the functionalist or European structuralist conception of language, whereby linguistic forms are seen as instruments used to convey meaningful elements, and the formalist or generative approach, whereby linguistic forms are treated as abstract structures which can be filled with meaningful elements. Naming and syntax can be shown to be two faces of the same phenomenon.

#### ***Language is an organism.***

Language is a symbiotic organism. Language is neither an organ, nor is it an instinct. In the past two and a half million years, we have acquired a genetic predisposition to serve as the host for this symbiont. The marine biologist Pierre Joseph van Beneden first distinguished between parasites, free-living commensals, obligate commensals and mutualists (1876). Later the botanist Heinrich Anton de Bary coined the term *Symbiose* 'symbiosis' as a cover term encompassing all forms of 'Zusammenleben ungleichnamiger Organismen', i.e. the living together of organisms belonging to differently named taxa (1879). The analogy between language, the memetic organism, and

a biological organism is imperfect. The differences between the language symbiont and a biological organism should be understood in terms of the neuroanatomy of language and the nature of linguistic meaning.

Like any mutualist symbiont, language enhances our reproductive fitness. We cannot change the grammatical structure of language or fundamentally change its lexicon by an act of will, even though we might be able to coin a new word or aid and abet the popularity of a turn of phrase. Language changes, but not because we want it to. We are inoculated with our native language in our infancy. Like any other life form, language consists of a self-replicating core. The units of this self-replicating core are neuronal correlates of signs in the sense of Ferdinand de Saussure, i.e. of meanings and of their associated sound forms.

Whereas the language symbiont itself is a mutualist, not all meanings borne by language are mutualists. As in any symbiotic relationship, it can be predicted that categories of meaning which are vertically transmitted from the parent host to his or her offspring are more likely to be mutualistic in nature. Such are the grammatical categories of a language and much of the core vocabulary which is structural to a given language. Categories of meaning which are readily horizontally transmitted from host to host within a single generation are less likely to be beneficial and may even be deleterious to the host. Some meanings and constellations of meanings can be downright parasitic. Such are notions of reality embodied by meanings which spread opportunistically such as jihad, racial purity, proletariat and other brands of political correctness.

***A meme is a meaning, not a unit of imitation.***

In the 19th century, *words* were conceived as the living units of cultural evolution by Victor Hugo (1856) and Gottlob Krause (1885). Charles Darwin (1871) explicitly saw words as units of evolution subject to natural selection. From the time of Darwin, many thinkers have envisioned cultural evolution as a Darwinian process. This view has survived the rise and fall of the numerous misunderstandings which made up the edifice known as Social Darwinism. In the mid 20th century, various terms were proposed for the bits of information which propagate themselves as the units of cultural evolution, e.g. *idea* (Hoagland 1962), *mnemotype* (Blum 1963), *idene* (Murray 1964), *culturetype* (Burhoe 1967), *socio-gene* (Swanson 1973) and *tuition* (Cloak 1975). All these writers saw cultural evolution as a process governed by the principles of Darwin and Mendel, and many saw the units as unique to humans and explicitly as entities residing within the central nervous system.

In 1975 Dawkins coined the term *meme*, apparently inspired by Semon's 1904 term *mneme*, which originally denoted a replicating package of hereditary engrams. Like his predecessors, Dawkins saw the unit of cultural evolution as a replicator. However, Dawkins' meme deviated from previous concepts in being defined specifically as a 'unit of imitation', and therefore as something neither specifically human nor at all necessarily linguistic. Blackmore, a prominent proponent of Dawkins' view of the meme envisages 'spoken grammatical language' as 'the success of copyable sounds' and explicitly denies the relevance of the meanings borne by language (1999).

In comparison to earlier conceptions of the units of selection in cultural evolution, the meme was therefore actually a step backward. Dawkins later brought his definition of the

meme more into line with earlier concepts by adding that a meme was ‘a unit of information residing in the brain’ (1982). Yet fundamentally Dawkins’ meme remained a ‘unit of imitation’, and 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’. This, therefore, is the Oxford definition of the meme.

Pursuant to the discovery of the double helical structure of DNA in 1953, the increasing popularity of the coinage *gene* — by truncation from *genetic* — aided and abetted the popularisation of the later coinage *meme* so that *meme* has now outcompeted other coinages. Though the Oxonian conception of the unit of cultural evolution is deficient, the success of the coinage made it more expedient to redefine the term than to coin yet another neologism. The Leiden school of language evolution therefore redefined the meme as a neuroanatomical unit corresponding to a sign in the Saussurean sense, i.e. the neuronal correlate of a meaning along with the neuronal representations of its associated phonological form or grammatical manifestation. This, then, is the Leiden definition of the meme.

In Leiden, a unit of imitation was termed a *mime*. In contrast to a meme, a mime does not meet the criteria of fecundity, high-fidelity replication and longevity required to qualify as a successful life-sustaining replicator. With 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, and that of post-linguistic memes, such as music, clothing fashions and dancing styles. Mimes behave differently once they are awash in a sea of linguistic meanings with their multitudinous neuronal associations and interconnections. Yet the theme of Beethoven’s 9th symphony none the less remains a mime, and is not a meme. Music is a paralinguistic phenomenon causally intimately connected with the evolutionary emergence of language, but music is not language.

***Polysemy and grounding are no explanations for the nature of meaning.***

Language thrives by virtue of meaning. Grammatical memes, i.e. the meanings of grammatical categories, are the systemic memes of any given language and are demonstrably language-specific. The meanings of words, morphemes and fixed idiomatic expressions are lexical memes. Some lexical memes are systemic and structural for a given language. Some are free-wheeling and parasitic. Some occupy an intermediate status.

The idea that America is one nation under God, indivisible with liberty and justice for all, is not a meme in the Leiden sense. It is a syntactically articulate idea composed of a number of constituent lexical and grammatical memes, and this idea and its constituent parts are subject to Darwinian natural selection. Some meaning theorists hold the view that sentence meaning is primary and word meaning derived. Whilst this may have held true for some primitive stage in the evolution of language, it is not or no longer true for modern language. What a speaker intends when wielding a particular configuration of meanings is an altogether different matter from the meanings themselves.

In a similar vein, researchers in the field of artificial intelligence and generative linguists fail to address the problem of meaning when they resort to propositional logic and assume the adequacy of such an approach as long as the variables are ‘grounded’. By grounding,

logicians mean that there is some determinate way in which variables or symbols refer to their referents. Yet natural meaning does not obey the laws of Aristotelian logic or Boolean propositional calculus. Truth is not the key to meaning, and classical logic does not reflect how meaning operates, as argued by the Dutch mathematician L.E.J. Brouwer when he developed intuitionist set theory.

A meaning *thrives* by virtue of its applications, which cannot be deduced from its implications. The implications of a meaning must be derived by its applicability, rather than the other way around. By consequence, a meaning has the properties of a non-constructible set in the mathematical sense.

The behaviour of the English meaning *open* is such that ‘The door is open’ can be said of a shut but unlocked door, in that the door is not locked. Likewise, of the same door it can be said that ‘The door is not open’, for it is shut. It is a cop-out to postulate polysemy to clarify such usages because the meaning of English *open* remains unchanged in either case. The same situation can be truthfully referred to by a linguistic meaning as well as by its contradiction. Yet there is no way of formalising a contradiction in traditional logic because of the principle of the excluded middle, i.e. *tertium non datur*.

This principle, which dates back to Aristotle, renders classical logic a powerful tool and simultaneously makes classical logic a mode of thought which is at variance with the logic of natural language. The insight that meaning operates according to the mathematics of non-constructible sets was set forth by Frederik Kortlandt in 1985 in a seminal article entitled ‘On the parasitology of non-constructible sets’. The insight that human language operates independently of the principle of the excluded middle led Brouwer to reject the principle of the excluded middle for language. Brouwer went as far as to warn mankind that linguistically-mediated ideas and language itself were inherently dangerous.

### ***Tertium datur.***

The fact that meanings have the nature of non-constructible sets does not mean that meanings are fuzzy. Rather, meanings correspond to sets which are indeterminate in that there is no *a priori* way of saying whether a particular referent can or cannot be identified as a member of a set. If a homeless person in Amsterdam calls a cardboard box a house, that box becomes a referent of the word *house* by his or her very speech act. The first bear most children are likely to see today is a cuddly doll from a toy store and not a member of a species of the *Ursidae* family.

Errett Bishop, chief proponent of the school of constructivist mathematics which grew out of intuitionist set theory, also rejected the principle of the excluded middle. He observed that ‘a choice function exists in constructivist mathematics because it is implied by the very meaning of existence’ (1967: 9). Even though Willard Quine adhered to the principle of the excluded middle throughout his life because of its utility as ‘a norm governing efficient logical regimentation’, he conceded that this Aristotelian tenet was ‘not a fact of life’, and was in fact ‘bizarre’ (1987: 57).

Classical logical analysis requires the identifiability of distinguishable elements as belonging to the same set. In the case of an extensional definition, it presupposes a sufficient degree of similarity between the indicated and the intended elements. In the case of an intensional definition, it presupposes the applicability of a criterion, which depends on the degree of similarity between the indicated property and the perceptible

characteristics of the intended objects. The constructibility of a set is determined by the identifiability of its elements. Language generally does not satisfy this fundamental requirement of logic.

The nature of meaning is a direct function of its neural microanatomy and the way neurons branch and establish their webs of circuitry in our brains. The parasitic nature of linguistically mediated meanings does not mean that there is no such thing as invariant meanings or *Gesamtbedeutungen* of individual lexical and grammatical categories within a given speech community. Invariant meanings are functionally equivalent within a speech community and can be empirically documented through Wierzbickian radical semantic analysis. Yet meanings remain implicit by nature, as argued by Dummett (1976).

Language began to live in our brains as an organismal memetic symbiont when these brains became host to the first replicating meaning. The difference between a meaning and a signal such as a mating call or a predator-specific alarm call such as those of vervet monkeys is that a meaning can be used for the sake of argument, has the properties of a non-constructible set and has a temporal dimension.

***Syntax is a consequence of meaning, and God is an artefact of language.***

Syntax arose from meaning. Syntax did not arise from combining labels or names for things. Syntax arose when a signal was first split. In 1919, Hugo Schuchardt argued that the first utterance arose from the splitting of a holistic primaeval utterance, not from the concatenation of grunts or names. First-order predication arose automatically when the first signal was split. For example, the splitting of a signal for ‘The baby has fallen out of the tree’ yields the meanings ‘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 has considered long-call structures in apes in this regard.

The ability to intentionally deceive is a capacity that we share with other apes and even with monkeys. In using an utterance for the sake of argument, the first wordsmith went beyond the capacity to deceive. He or she used an utterance in good faith, splitting a signal so that meanings arose, yielding a projection of reality with a temporal dimension.

Since when has language resided in our brains? The idea that the Upper Palaeolithic Horizon is the *terminus ante quem* for the emergence of language dates back at least to the 1950s. The sudden emergence of art, ritual symbolism, glyphs, rock paintings and animal and venus figurines 60,000 to 40,000 years ago set the world ablaze with new colours and forms. The collective neurosis of ritual activity is an unambiguous manifestation of linguistically mediated thought.

Rudimentary stages of language must have existed much earlier, at least as early as two and a half million years ago, but all these rudimentary stages of language are now extinct along with the early hominids who spoke them. Rather, what the Upper Palaeolithic Horizon offers is the first clear evidence of the existence of God. The Leiden theory explains religion as a disease of language and predicts the existence of God and other such parasitic mental constructs as artefacts of language. God is the quintessential prototype of the non-constructible set because it can mean anything. This makes God the meme almighty. The British anthropologist Verrier Elwin quoted the Anglican bishop Charles Gore as follows:

I once had a talk with Bishop Gore and told him that I had doubts about, for example, the truth of the Bible, the Virgin Birth and the Resurrection. ‘All this, my dear boy, is nothing. The real snag in the Christian, or any other religion, is the belief in God. If you can swallow God, you can swallow anything.’ (1964: 99)

To chart the relationship between the neuronal correlates of language and those of religious experience will be to unravel what has hitherto been a divine mystery.

The brain of our species has grown phenomenally as compared with that of gracile australopithecines or modern bonobos, even when we make allowances for our overall increase in body size. Initially the availability of a large brain provided the green pastures in which language could settle and flourish. Once meanings began to reproduce within the brain, hominid brain evolution came to be driven by language at least as radically as any symbiont determines the evolution of its host species. Language drove hominid brain evolution. Language engendered the tripling of brain volume from a mean brain size of 440 cc to 1400 cc in two and a half million years and the expansion of the available surface area through an increasingly convoluted topography of the neocortex.

The role of innate vs. learned behaviour in the emergence of language is an artificial controversy when viewed in light of the relationship between a biological host and a memetic symbiont lodged in its bloated brain. In the past 2.5 million years, our species has evolved in such a way as to acquire the symbiont readily from earliest childhood. Our very perceptions and conceptualisation of reality are shaped and moulded by the symbiont and by the constellations of neuronal groups which language sustains and mediates. This paper is a brief statement about the Leiden theory of language evolution. A fuller treatment lies beyond the scope of a statement of this brevity and will appear as a book.

de Bary, Heinrich Anton. 1879. *Die Erscheinung der Symbiose: Vortrag gehalten auf der Versammlung Deutscher Naturforscher und Aerzte zu Cassel*. Straßburg: Verlag von Karl J. Trübner. .

van Beneden, Pierre Joseph. 1876. *Die Schmarotzer des Thierreichs*. Leipzig: F.A. Brockhaus. .

Bishop, Errett. 1967. *Foundations of Constructive Analysis*. New York: McGraw-Hill.

Blackmore, Susan. 1999. *The Meme Machine*. Oxford: Oxford University Press.

Brouwer, Luitzen Egbertus Jan. 1908. ‘De onbetrouwbaarheid der logische principes’, *Tijdschrift voor Wijsbegeerte*, 2: 152-158.

Brouwer, Luitzen Egbertus Jan. 1933. ‘Willen, weten, spreken’, *Euclides*, 9: 177-193.

Brouwer, Luitzen Egbertus Jan. 1948. ‘Consciousness, philosophy and mathematics’, pp. 1235-1249 in E.W. Beth, H.J. Pos and J.H.A. Hollack, eds., *Proceedings of the Tenth International Congress of Philosophy (Amsterdam, August 11-18, 1948), Volume I, Fascicule II*. Amsterdam: North-Holland Publishing Company.

Changeux, Jean-Pierre. 1983. *L’homme neuronal*. Paris: Librairie Arthème Fayard.

Darwin, Sir Charles Robert. 1871. *The Descent of Man and Selection in Relation to Sex* (2 vols.). London: John Murray.

Dawkins, Richard. 1976. *The Selfish Gene*. Oxford: Oxford University Press.

- Delius, Juan D. 1991. 'The nature of culture', pp. 75-99 in Marian Stamp Dawkins, Timothy R., Halliday and Richard Dawkins, eds., *The Tinbergen Legacy*. London: Chapman and Hall.
- van Driem, George. 2000a. 'De evolutie van taal: Beginselen van de biologische taalwetenschap', public lecture delivered in Paradiso, Amsterdam, 16 April 2000.
- van Driem, George. 2000b. 'The language organism: A symbiotic theory of language', paper presented at the Belgian-Dutch Workshop on the Evolution of Language held at the Atomium in Brussels, 17 November 2000.
- van Driem, George. 2001a. *Taal en Taalwetenschap*. Leiden: Research School of Asian, African and Amerindian Studies CNWS.
- van Driem, George. 2001b. *Languages of the Himalayas: An Ethnolinguistic Handbook of the Greater Himalayan Region with an Introduction to the Symbiotic Theory of Language* (2 vols.). Leiden: Brill.
- van Driem, George. forthcoming. *The Language Organism*.
- Dummett, Michael. 1976. 'What is a theory of meaning?', pp. 67-137 in G. Evans and J. McDowell, eds., *Truth and Meaning*. Oxford: Oxford University Press.
- Edelman, Gerald M. 1987. *Neural Darwinism: The Theory of Neuronal Group Selection*. New York: Basic Books.
- Elwin, Verrier. 1964. *The Tribal World of Verrier Elwin*. London: Oxford University Press.
- Hebb, Donald Olding. 1949. *The Organization of Behavior: A Neurophysiological Theory*. New York: John Wiley & Sons.
- Hugo, Victor. 1856. *Les contemplations* (2 vols.). Bruxelles: Lebegue.
- Kortlandt, Frederik Herman Henri. 1985. 'A parasitological view of non-constructible sets', pp. 477-483 in Pieper and Stickel, eds., *Studia linguistica diachronica et synchronica: Werner Winter sexagenario anno MCMLXXXIII gratis animis ab eius collegis, amicis discipulisque oblata*. Berlin: Mouton de Gruyter.
- Krause, Gottlob Adolf. 1885. 'Die Stellung des Temne innerhalb der Bantu-Sprachen', *Zeitschrift für afrikanische und oceanische Sprachen, mit besonderer Berücksichtigung der Deutschen Kolonien*, I: 250-267.
- Pulvermüller, Friedemann. 2003. *The Neuroscience of Language: On Brain Circuitry of Words and Serial Order*. Cambridge: Cambridge University Press.
- Quine, Willard Van Orman. 1987. *Quiddities: An Intermittently Philosophical Dictionary*. Cambridge, Massachusetts: Harvard University Press.
- Schuchardt, Hugo. 1919a. 'Sprachursprung. I' (vorgelegt am 17. Juli 1919), *Sitzungsberichte der Preussischen Akademie der Wissenschaften*, XLII: 716-720.
- Schuchardt, Hugo. 1919b. 'Sprachursprung. II' (vorgelegt am 30. Oktober 1919), *Sitzungsberichte der Preussischen Akademie der Wissenschaften*, XLII: 863-869.
- Semon, Richard Wolfgang. 1911 [1904] *Die Mneme als erhaltendes Prinzip im Wechsel des organischen Lebens* (dritte Auflage). Leipzig: Wilhelm Engelmann.