

Postscript

Grammar and Language

A study of the ways in which grammar creates and is created by language
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Martin Edwardes
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After completion of the dissertation the book *Lingua Ex Machina* by William Calvin and Derek Bickerton was published. (MIT press, 2000). In this book the Anthropological Linguist Bickerton and the Neurophysiologist Calvin collaborated to bring Darwinian evolution mechanics and Chomskyan language mechanics together into a single model. The Simple Grammar/Lexical grammar model bears more than a passing resemblance to this model.

The thesis of *Lingua Ex Machina* is that social calculus leads to social structure; and, at the other end, protolanguage and syntax must create language. The gap between social structure (as demonstrated by apes) and protolanguage forms the chasm of unknown that separates humans from non-humans. However, if protolanguage is a human attribute, why did it take so long for full language to emerge?

Bickerton: "I've claimed that protolanguage has been around for maybe as long as two million years, and that a social calculus has been around for a lot longer than that. So how was it that, when protolanguage first emerged, the social calculus didn't immediately get mapped onto it to give us syntax and modern language a couple of million years ago? Why was syntax delayed?"

Calvin: "... I can suggest a step up in efficiency that might make a structured sentence a frequent occurrence rather than a slowly created affair dependent on learning. Because my step has critical mass ... it might well provide ... the sort of improvement in higher intellectual function that might have produced the great surge in technological and artistic innovation ..."¹

The step-up that Calvin proposes is the autonomic process of throwing. Apes can fling, but only humans appear to be able to throw accurately. This process of accurate throwing requires a series of movements of different parts of the arm, which need to be coordinated to give accurate range and direction. It also requires a planning phase, wherein the throw is mentally rehearsed (not necessarily consciously) and adjusted to achieve the required result. This is very similar to the way in which different syntactic elements of a sentence are generated so that they reach speech in the right order.

Of course, this is only one of many human features that appear to be salient in species definition, and Calvin lists the following requirements:

In my opinion, the big beyond-the-chimps developments are:

- *accurate throwing* (not just flinging) and its associated rehearsal,
- *extensive toolmaking* (especially tools to make tools),
- *reciprocal altruism* (the expansion of food sharing and such),
- *symbols* (not just species-specific calls but arbitrary on the fly inventions denoting shared meaning),
- *protolanguage* (real words used in short combinations),

- *structured language* (long sentences with recursive embedding of phrases and clauses),
- *planning* for uncertain futures (not just the seasons),
- *logical trains of inference* (that allow us to connect remote causes to present effects, and on to future implications),
- *ethics* (much of which requires an ability to estimate the consequences of a proposed course of action, and judge it from another's standpoint),
- *concealed ovulation* (the lack of obvious estrus behaviors tended to force males into prolonged sharing with a female and her offspring),
- *games* with made-up rules,
- music (not just rhythm but structure such as harmony),
- and our extensive offline *creativity* (an ability to speculate, to shape up quality by bootstrapping from rude beginnings, yet without necessarily acting in the real world).²

From the point of view of this dissertation it is clear that protolanguage maps to simple grammar, and structured language maps to lexical grammar. All of the other items are concerned, directly or indirectly, with the manipulation of symbols (analogy and metaphor) in the minds of sender and receiver. They map to lexis in a variety of ways. Thus the Calvin-Bickerton model and the Component Grammar models describe the same structure.

Another issue raised by Bickerton is the repudiation by Chomsky of his Standard Theory of Grammar. This has not been headlined in the Linguistics community, but is stated by Chomsky as follows:

A linguistic expression of L is at least a pair (π, λ) meeting this condition [capable of Full Interpretation] – and under minimalist assumptions, at most such a pair, meaning that there are no levels of linguistic structure apart from the two interface levels PF and LF [Phonetic Form and Logical Form]; specifically, no levels of D Structure or S Structure.³

However, the relationship of the new monolith of language to Universal Grammar structures remains unclear, and this new form introduces more discontinuity into the understanding of language production. For this reason the older Chomskyan structures were explored in the dissertation. The Calvin-Bickerton model seems to solve the discontinuities, and so it would have had a crucial effect upon the dissertation if timing had been different.

Footnotes:

¹ [ibid](#), pp150-151.

² [ibid](#), p165.

³ [Noam Chomsky](#), The Minimalist Program, MIT, 1995, p219.