

A good complement to Philip Lieberman's "Eve Spoke", Stephen Pinker's "The Language Instinct," and John McWhorter's "The Power of Babel." Each has its own niche. Pinker approaches the question from the structure of the brain, and the structure of language itself. McWhorter is a linguist; he talks about how languages are put together.

Lieberman and Burling occupy themselves with the evolutionary question. How did language come about? Their works complement each other quite nicely. Lieberman examines the physiological changes that were required in the evolution of the sound production mechanism that is so unique and so characterizes *Homo sapiens*. Burling approaches the same question from a linguist's perspective. How could language of all in such a way that each step represented an evolutionary advantage over the prior step, but yet the overall result was a qualitative leap which he says went from analog to digital communications.

Burling advances a number of large theories. The kinds of theories that would be impossible to prove given the fact that speech leaves no historical record, and even the archaeological record of the evolution of the speech apparatus is fairly spotty.

He proposes that the evolution of language was driven by listening and perception rather than production. The ability to produce speech would have been worthless unless it was paired with listeners capable of interpreting it. Conversely, superior ability to understand utterances of other members of a social group would always be advantageous to the animal possessed of that ability. This ties in quite well with Lieberman's timeline for the development of the human speech apparatus. Lieberman goes into a lot of detail about the differences between Neanderthal and *Homo sapiens*' vocal tracks, evolutionary differences that occurred very recently, in the last 200,000 years or so. I believe this would make sense to Burling; the production mechanism evolved quickly once the listening mechanisms were substantially in place. Lieberman notes that the human vocal tract imposes a number of disadvantages. We're the only animal that can asphyxiate in the process of swallowing. The location of our larynx impedes airflow for maximum aerobic performance, and requires that we have smaller and less useful jaws. It could only have evolved the way it did if language had a high selective advantage.

Burling observes that that human speech is digital whereas most animal communication is analog. Words are discrete from one another; they do not fall on a continuum. Bat and bag are two different words. Our hearing apparatus may err in choosing between them, but our brain will form one concept or the other. Compare this with a baby's cry, which can vary continuously from a whimper to a full-blown scream.

Both authors address the question of why a speech is a vocal rather than a gestural matter. It is both, on both the analog and the digital side. On the analog-visual side, a smile can represent quite a continuum of emotion. On the digital-visual side you have true languages like American sign language, and gestures such as a nodding head or an extended finger. Their conclusion is practical. The vocal tract can operate quickly, can operate in the dark, and it leaves the hands free. Lieberman cites statistical analyses showing that speech is about five times faster than any other mode by which people could communicate with one another. It evolved because it was highly efficient. Primatologists have written that grooming behaviors limit group size. It takes a lot of time to maintain social hierarchies picking nits from one another. Speech makes us more efficient nit pickers.

Burling asserts that there are five specific cognitive tools that are essential to learning a language:

1. A rich conceptual understanding of the world around us.
2. Joint attention: the ability of two individuals to focus on a single object, such as a tree to which one is pointing, or a coffee cup was holding.

3. The ability to imitate. If I make a sound or a gesture, you can imitate it.
4. The ability to understand pointing gestures, and representative signals such as "big" and "small," to establish abstract thoughts that can be verbalized as adjectives and adverbs, for instance.
5. The assumption that language will be patterned and repetitive ways. For instance, in a given language the subject will precede the verb and the object will follow it, or vice versa.

People are good at this. A trained anthropologist can sit with a person whose language is totally unknown to him and figure out how to communicate within a matter of hours or days. Even our closest primate relatives are fairly weak on these abilities.

Burling addresses the evolution of the structure of language. The first major question is words. There are 60,000 or so in the average vocabulary. Where and how they are stored is a mystery that is only now being unraveled. What is clear is that no such memory and retrieval system was required when communication was largely analog. We need syntax to hold our words together in meaningful relationships. Burling talks about how elements of syntax are likely to have evolved from independent, standalone words. See the McWhorter book for a more extended discussion.

Burling is fascinated with the question as to why language provided such a strong selective advantage. In his field work in rural India he notes that most tasks within a village can be accomplished without a great deal of verbal communication. People learn those tasks involved in agriculture by observation. Deaf-mutes can master the tasks about as well as hearing people. He offers a number of theories, the most intriguing of which is sexual selection. The peacock's tail is supposed to have evolved not because it gives the male peacock any advantage in life, but simply because it is more attractive to the peahen. Other authors have posited that sexual selection is the reason that blonde hair, blue eyes, hairless bodies and large breasts crept into the human populations. There is no doubt that both men and women prefer articulate partners, and that articulate people rise to the top of any human social grouping. They will have more mating opportunities. Burling notes as well that we measure intelligence in large measure as the expression of verbal ability. Upon this premise, he would say that there is sexual selection for intelligence.

The question that led me to read these books is the assertion that McWhorter makes that human speech is only 150,000 years old. The conclusion I get from both these authors is that the 150,000 year figure applies to speech by *Homo sapiens*. The production mechanisms we use were available about that long ago. A lot of the mental mechanics, the word storage, the syntax, and some of the production had to be in place much earlier.

It is interesting to superimpose the 150,000 year figure over the timeline of human migrations. Most authors believe that modern humans arose in Africa about 200,000 years ago and left about 50,000 years ago. We might expect the same kinds of evolutionary differentiation in linguistic abilities that occurred in human physiognomy. Neither author addresses the question, but on the very morning that I write this review there is an article in *The Economist* that a Dr. Dediu and a Dr. Ladd have found genetic differences between people who speak tonal languages such as Chinese and the rest of us. There is more to be learned about this most essential character of the human animal.