

In various places this has been called “Darwin’s problem” or, more appropriately, “Wallace’s problem”—after the codiscoverer of evolution by natural selection, Alfred Russel Wallace. Wallace was the first to call attention to the difficulties for any conventional Darwinian, adaptationist account of human language, since he could perceive no biological function that could not already be met by a species without language.¹

Language does indeed pose a severe challenge for evolutionary explanation. On the one hand, Darwinian thinking typically calls for gradual descent from an ancestor via a sequence of slight modifications. On the other hand, since no other animal has language, it appears to be a biological leap, violating Linnaeus’s and Darwin’s principle, *natura non facit saltum*: “For natural selection can act only by taking advantage of slight successive variations; she can never take a leap, but must advance by the shortest and slowest steps” (Darwin 1859, 194). We firmly believe that this tension between Darwinian continuity and change can be resolved. That’s one key goal of these essays.

What of Darwin? Never wavering from his strong principles of infinitesimal evolutionary change and continuity, in his *The Descent of Man* (1871) Darwin himself advanced a “Caruso” theory for the evolution of language: males who could sing better were sexually selected by females, and this, in turn, led to perfection of the vocal apparatus, like the peacock’s tail. Better vocal competence went hand in hand with a general increase in brain size that led, in turn, to language—language used for internal mental thought:

As the voice was used more and more, the vocal organs would have been strengthened and perfected through the principle of the inherited effects of use; and this would have reacted on the power of speech. But the relation between the continued use of language and

the development of the brain has no doubt been far more important. The mental powers in some early progenitor of man must have been more highly developed than in any existing ape, before even the most imperfect form of speech could have come into use; but we may confidently believe that the continued use and advancement of this power would have reacted on the mind by enabling and encouraging it to carry on long trains of thought. A long and complex train of thought can no more be carried on without the aid of words, whether spoken or silent, than a long calculation without the use of figures or algebra. (Darwin 1871, 57)

Darwin's Caruso theory has recently undergone something of a revival. In fact, one of us (Berwick) advanced an updated version at the very first "Evolang" conference at Edinburgh in 1996, grounded on the modern linguistic theory of metrical structure.² Most recently perhaps, no one has done more to champion a version of Darwin's "musical protolanguage" theory than Fitch (2010). As he notes, Darwin's theory was in many ways remarkably prescient and modern. We share Darwin's view in the passage cited above that language is closely allied with thought, an "internal mental tool" in the words of the paleoneurologist Harry Jerison (1973, 55). We provide empirical linguistic support for this position in chapter 3.

Contrary to certain views, discussion of the evolution of language as "Darwin's problem" was not a taboo topic until its "revival" in the 1990s—like some quirky relative that had been squirreled away for thirty years in an upstairs attic. On the contrary, it was a subject of intense interest in Cambridge, Massachusetts, during the 1950s and 1960s and then throughout the 1970s. This deep interest is directly reflected in Eric Lenneberg's September 1966 preface to his *Biological Foundations of Language* (1967, viii), where he notes his debt "over the past 15 years" to a roll call of famous and familiar names: Roger Brown, Jerome Bruner, George Miller, Hans Teuber, Philip Liberman, Ernst Mayr, Charles Gross—and also Noam