Chapter 4. Something else that influenced us: Sophisticated Language conceived as Invented rather than Innate, Socio-Cultural as well as Biological

Whether we are talking about the origins of life or the origins of language in the hominization of primates, we are talking about a big mystery. All of these new ideas and new questions bring us to the edge of knowledge and a horizon in which perception and imagination, like earth and sky, meet.

W. Thompson, 1996, p.32.

4.1 How did Humans become able to Speak?

Speech is civilization itself. The word, even the most contradictory word, preserves contact—it is silence which isolates.

Thomas Mann

As a means of relaxing before going to bed, I sometimes watch movies on my computer. One of the films I like to see is an old one (1982) shot in Scotland, Iceland, Canada, and Kenya, called “Quest for Fire.” Even though it was made for popular entertainment, and is not a scientific documentary, its makers evidently took some pains to try to portray things accurately. For example, a publicist claims (on the back of the DVD jacket) that this movie “offers fascinating insights into prehistoric man’s survival”; and the credits of the film include two contributions that presumably were made by experts—namely, “Special Languages Created by Anthony Burgess,” and “Body Language and Gestures by Desmond Morris.”

Although I am neither an archeologist nor a film critic, since the time this film was released, I have learned a few things about human prehistory from reading books and articles
written by archeologists and paleoanthropologists, which have convinced me that one of the central ideas of this movie must be mistaken. Let me explain what the central idea is to which I refer, and what led me to form this opinion. Referring again to the back of the DVD jacket, the movie is set in several unspecified places in the Old World, at the time of 80,000 years ago. More specifically, it “. . . follows the lives of four tribes of early man—each with their own customs and stages of development.” One thing that is supposed to distinguish the tribes just mentioned is that each of them speaks its own complex, fluent, and syntactically organized language. However, recent archeologists tell us there is strong evidence to show that no language of this type existed on Earth until approximately 60,000 years ago. As I already explained in the first chapter of my 2003 book, the Upper Paleolithic Revolution (or what Jared Diamond calls “the Great Leap Forward”) is a large-scale event that occurred in our species’ comparatively early history, between about 60,000 and 30,000 years ago, which archeologists did not discover until the twentieth century. This event (hereafter “UPR”) was what allowed some members of our species to move beyond the technologies and behaviors that were characteristic of the Middle Paleolithic period, so that they could begin to employ the new ways of thinking and behaving that defined the Upper Paleolithic era.

As mentioned in section 2.2, researchers say that during more than half the time our species has been in existence, our ancestors acted in ways that were almost indistinguishable from the behavior of our closest relatives—namely, members of the “cousin” hominid species, *Homo neanderthalensis*. For instance, I previously noted that, in the view of Alan Thorne and Milford Wolpoff (1992, p.78), in the Levant (along the eastern shore of the Mediterranean Sea), where both of these species lived in close proximity for a long period, “‘modern’ people had a culture that apparently was identical with that of their local
Neanderthal contemporaries: they made the same types of stone tools with the same technologies and at the same frequencies; they had the same stylized burial customs, hunted the same game and even used the same butchering procedures.” (Also see Tattersall, 1998, pp.150-80, and 1999, Chapter 8.) This situation remained in effect until—in the case of some sapiens, but not in the case of the Neanderthals—the Middle Paleolithic or Old Stone Age gave way to the Later or Upper Paleolithic. For example, in the well-studied and extensively documented instance of Europe, this revolutionary event happened approximately 40,000 years ago.1

Concerning the instance just mentioned, Paul Mellars (1998, pp.91-2) says that he, along with other archeologists, considers the beginning of the Upper Paleolithic to be “the most radical episode of cultural, technological and general behavioral change in the entire

1 A related comment from Steven Mithen (1996, p.152):

Yet if we look a little more closely at the boundary . . . we see that there is not so much a single big bang as a whole series of cultural sparks that occur at slightly different times in different parts of the world between 60,000 and 30,000 years ago. The colonization of Australia, for instance, seems to reflect a cultural spark which happened between 60,000 and 30,000 years ago, yet at this time all remained relatively quiet elsewhere in the world. In the Near East a cultural spark happened between 50,000 and 45,000 years ago when the Levallois technology was replaced by that of blade cores. The cultural spark in Europe seems not to have been until 40,000 years ago with the appearance of the first objects of art. Indeed, it is perhaps only after 30,000 years ago that we can be confident that the hectic pace of cultural change had begun in earnest throughout the globe.
history of the European continent.” Is this statement an exaggeration? Should Mellars have said instead that the most profound change that ever occurred in the life of European humans happened at the start of the Neolithic or New Stone Age, roughly 10,000 years ago? After all, this last date was the time of the invention of agriculture, irrigation, the domestication of quite a few large and very useful animals, settled city life, and the institutions of government, military organization, and law. (This last view is the opinion, for instance, of University of Frankfort prehistorian Jens Lüning. See Lemonick, 1992, p.53.)

At least from the perspective of cognitive science, I think the answer to the preceding question is No. In other words, we have no reasons for supposing that the Neolithic transition was basic in a cognitive sense of the word, since it is clear from hindsight that this last transition did not amount to much more than a working out of various mental capacities that humans had acquired at a much earlier time. In fact, all the intellectual resources that finally produced the Neolithic revolution already seem to have been present—again, for some but not for all of the members of our species—at least 50,000 years before that time, at the start of the Upper Paleolithic.

What specific effects on human thought did the Upper Paleolithic Revolution have? The simplest answer is that what took place at that time, enabled humans to begin thinking in ways that were explicitly and consciously symbolic. As a means of providing a clearer idea of what this means, let me again quote a passage that also appears in my previous book (2003, p.15) as well as in a separate paper (2005, p.505-6)—namely, Mellars’ following list

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2 The title of Terrence Deacon’s book *The Symbolic Species* (1997) apparently is meant to express something like this same point.
of seven major changes that occurred at the start of the Upper Paleolithic (all of them extensively documented from archeological materials):

1. The appearance of much more widespread “blade” and “bladelet” as opposed to “flake”-based technologies.

2. The appearance of a wide range of entirely new forms of stone tools, some of which . . . reflect an entirely new component of conceptual or visual form and standardization in the production of stone tools.

3. The effective explosion of bone, antler and ivory technology, involving . . . a remarkably wide range of new and tightly standardized tool forms.

4. The appearance of the first reliably documented beads, pendants and other items of personal decoration.

5. The transportation of sea shells and other materials over remarkable distances . . .

6. The appearance of the first unmistakable sound-producing instruments.

7. Most dramatic of all, the sudden appearance of explicitly “artistic” activity, in a remarkable variety of forms. . . . (Mellars, 1998, p.92)

Mellars fails to mention at least four other relevant points. The first of these is that humans first started to build and employ ocean-going boats at this time. The second is that human numbers also increased dramatically at the start of the Upper Paleolithic era. (On this point see Stringer and McKie, 1996, pp.196-7). The third is that—for the first time—the societies that came into existence after the UPR (and which were larger than any that had been known before) differed from one other in many striking ways. The fourth, and in my

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3 Klein and Edgar (2002, pp.187-9) say:
opinion by far the most important consideration about which Mellars remains silent, is that
this was the time when, in the opinion of many investigators, humans first began to speak and
think in terms of a sophisticated, syntactical language. The reason this last point is more
important than the other three is that it is arguably true to say that humans’ learning to use
such language was the *cause* of the whole set of interrelated phenomena that suddenly
appeared at the beginning of the Upper Paleolithic. (See e.g., Ian Tattersall, 1998, p.232 and

Particular types [of artifacts] are often restricted to certain times and places,
which has allowed archeologists to define multiple Upper Paleolthic cultures.
Among the most famous are the Aurignacian Culture, which stretched from
Bulgaria to Spain between about 37,000 and 29,000 years ago, the Gravettian
Culture, which extended from Portugal across southern and central Europe to
European Russia between roughly 28,000 and 21,000 years ago, the Solutrean
Culture which existed in France and Spain between about 21,000 and 16,500
years ago, and the Magdalenian Culture, which occupied France, northern
Spain, Switzerland, Germany, Belgium, and southern Britain between about
16,500 and 11,000 years ago.

4 Some authors (including me) occasionally have exaggerated the novelty of at least some
aspects of this list. For example, we now know that some human beings made use of ocher
pigments (presumably for bodily adornment) as early as the time of *Homo erectus*, and
therefore long before the occurrence of the UPR. All things considered, however, I still do
not think such errors of relative detail undercut the general point I am proposing to make
about the historical importance of this event. (On this subject, also see David Lewis-Williams
and David Pearce, 2003, pp.17-8.)
2000, p.62, and Jared Diamond, 1992/2006, p. 364.) In other words, acquiring (or perfecting) language of this kind seems to have been the “trigger” that led our ancestors, within the same comparatively short space of time, to begin acting in all the ways just listed, presumably because language allowed them to engage in a new type of thinking that quickened the pace and insightfulness of their inventiveness, and helped them meet the challenges and solve the problems that were implicit in those new behaviors.5 Thus, a crucially important part of my

5 More completely, Tattersall says (2000, p.62):

. . . [A]natomically modern humans behaved archaically for a long time before adopting modern behaviors. That discrepancy may be the result of the late appearance of some key hard-wired innovation not reflected in the skeleton, which is all that fossilizes. But this seems unlikely, because it would have necessitated a wholesale Old World-wide replacement of hominid populations in a very short time, something for which there is no evidence. It is much more likely that the modern human capacity was born at—or close to—the origin of *H. sapiens*, as an ability that lay fallow until it was activated by a cultural stimulus of some kind. If sufficiently advantageous, this behavioral novelty could then have spread rapidly by cultural contact among populations that already had the potential to acquire it. No population replacement would have been necessary. It is impossible to be sure what this innovation might have been, but *the best current bet is that it was the invention of language*. For language is not simply the medium by which we express our ideas and experiences to each other. Rather it is fundamental to the thought process itself. It involves categorizing and naming objects and sensations in the outer
attempt to describe and account for the existence and structure of the particular kind of human nature we possess at the present moment is to ask when, where, how, and why syntactically organized language first came into being.

To be still more specific, I said in other writings that I was willing to accept roughly the same view on these matters as Tattersall, Diamond, and other paleoarcheologists already had proposed. On reflection, however, it now seems to me that what those people said does not probe as deeply as it should, or as deeply as I am trying to do in this book. The main trouble with Tattersall’s view is that it merely replaces the original question of what caused the Upper Paleolithic Revolution with the equally mysterious puzzle of what caused syntactical language to appear at the particular time and place it did. Thus, his view does not really succeed in explaining and solving the first problem, but merely re-describes all the above-listed empirical points in slightly more detail, and from a slightly different angle. To express the same point in different terms, the Upper Paleolithic Revolution—along with the special sort of language that played a fundamental role in it—was not magic. It came from somewhere and out of something. But exactly what was that something? I do not believe (or at any rate, do not believe any longer) that it is possible to provide a satisfactory explanation of the UPR—Tattersall style—simply by saying it was triggered by the cultural stimulus of humans’ having acquired an advanced form of language, since that idea immediately leads to and inner worlds and making associations between resulting mental symbols.

It is, in effect, impossible for us to conceive of thought (as we are familiar with it) in the absence of language, and it is the ability to form mental symbols that is the fount of our creativity, for only once we create such symbols can we recombine them and ask such questions as ”What if . . .?” [Italics added.]
the exactly similar question of what created language. Thus, my project in this chapter, as well as the chapter that preceded it, and the one that follows it, is to outline what I take to be a defensible solution to the second, more basic problem just mentioned—namely, the problem of what were the cultural factors and conditions out of which the special sort of language that had the power to bring the Upper Paleolithic era into existence first arose?

4.2 A Preparatory Comment: To say that certain Humans Invented Language is not to claim (nor does it entail) that those same people also Created Everything Language either Includes or Presupposes

As a preliminary to the following discussion, I want to make a brief remark about what it means to invent something. To say that person \( P \) invented device \( D \) does not mean that \( P \) succeeded in bringing \( D \) into existence out of empty space. Instead it means that \( P \) assembled \( D \) out of various pre-existing raw materials. For example, what Alexander Graham Bell did in order to invent the telephone was to put together into a single working assembly, various things that already were known and familiar, like wires, electrical currents, and microphones. So similarly, I claim that if human beings invented syntactical language at a certain point in their history, the way they did this was by fashioning it out of certain raw materials that already existed.

What sort of items is it appropriate to think of as raw materials for the invention of language? Let me propose just one simple case. Noam Chomsky tells us (2000, pp.24-5) that—for unknown reasons—every language linguists so far have discovered and analyzed employs the device of “traces” as a means of keeping track of hierarchically organized levels of reference. For example, a silent trace is present in the sentence “Jacks wants to marry Belinda,” immediately after the word “wants.” Although that trace virtually never is filled in,
and recognized in an explicit fashion, it would be possible to do that by adding the word “Jack” in that place, so the completed sentence would read: “Jack wants [Jack] to marry Belinda.” A slightly more complicated instance of the same phenomenon, which Chomsky proposed, is this: “The book seems [the book] to have been stolen [the book].”

None of us has any idea of exactly what the reasons are for the existence of this method of organizing sentences. One sign that this is true is the fact that we do not (and very probably could not) employ a similar trace system, to organize one or more of the various artificial languages we devise for scientific purposes, like the codes with which we program computers and the symbolic languages of logic. In fact, it seems to be the case that we have no conscious control over our use of traces in language, since we are simply determined to use them in the particular way we do, by certain parts of our inherited biological nature. The suggestion I want to make here is that the particular function or aspect of our biological make-up that I just have been describing counts as an elementary instance, among many others that might have been mentioned instead, of the sort of inherited resources (i.e. presupposed raw materials) out of which our ancestors first fashioned language.

I do not maintain that each of the three basic, prehistoric inventions discussed in this book was made by a single brilliant individual (like Alexander Graham Bell), getting an idea about some particular matter (like the telephone) on a particular occasion (some year, month, week, day, hour, and minute). Rather, as we already have seen from the example in the preceding chapter about how the first non-human animals—dogs—were domesticated, it is more likely that these inventions were ones that arose gradually over time, and in a more or less accidental, unconscious, and non-intentional fashion, from a whole group of people who, perhaps partly for genetic and physiological reasons, happened to share a certain attitude and
way of looking at things. Nevertheless, I still consider it appropriate to speak of all three of
these developments as inventions, because it strikes me as probable that each of them was an
expression of the personalities, interests, values, and ideas of an distinctive and unusual
group of people, who finally became able to pass on what they had found and accomplished
to the other members of their societies as well.

4.3 A Semi-Digression: Talking does not have to be associated with Counting

Counting is the religion of this
generation; it is its hope and
salvation.

Gertrude Stein

Homer’s story of the *Odyssey* ends the following way. After a long and hard campaign of
fighting in the Trojan War, and following that, an equally long, arduous, and dangerous
return trip during which all his companions were killed, and he himself narrowly escaped
death innumerable times, Odysseus finally succeeds in reasserting his authority, and
reuniting himself with his wife Penelope, in their island home of Ithaca. But soon afterwards,
he tells Penelope it is necessary for him to undertake still another journey. This second
journey, he says, is one he must take alone, on foot, and carrying an oar on his shoulder. It
only will end when he comes to a place where the first people he meets will look at the oar
and say, “What is that?” At that point, Odysseus says, he will bury the oar deep in the
ground, and then turn again towards Ithaca, having found peace at last.

How, more precisely, is it appropriate to describe Odysseus’ motivation for taking
this second, strange journey? I propose that, in the light of everything he had experienced up
to that point in his life, he was haunted by the depressing thought that all humans might be
fated to spend their lives in an endless struggle, both against one another, and against the
elemental forces that were present in the natural world. However, if he could find even a few people who never had known the back-breaking, perilous work of using oars to push a boat through water, then that would provide grounds for suspecting that a struggle of that sort was not inevitable after all. In other words, such a discovery would support the idea that there were at least some people who had retained the “natural,” “unaltered,” “innocent” state with which they were born, in such a way as to allow those individuals (unlike most others) to retain their gods-given freedom to choose among a very wide range of styles of life. It also would show that it was not necessary for humans, considered in general, to live their lives in any specifically determined way, just because of the circumstances into which they happened to be born. To express the same thought in still another fashion, my interpretation of Homer’s final story within his story is that Odysseus was searching for “natural noblemen” who, because they had not allowed themselves to become enslaved either to accidents of history, or to the artificial constraints and demands imposed by the society in which they lived, had not lost contact with the full range of possibilities and powers that were implicit in their original human nature.

In a somewhat analogous fashion, there was a flurry of excitement a few years ago, not just in scientific journals, but also in popular media like newspapers, topical magazines, and television programs, about a series of Odysseus-like experiments conducted by the Columbia University psychologist, Peter Gordon, on members of a small Amazonian aboriginal, mainly hunter-gatherer tribe called the Pirahã. One reason for this excitement was that those experiments seemed to have confirmed the truth of one clear instance of the strong version of Whorfianism—i.e. the idea, suggested about 60 years ago by the amateur linguist Benjamin Lee Whorf, that any person whose language does not include the use of a certain
(kind of) word also cannot possess the corresponding mental concept which is presupposed by that word, or to which it refers. (See Strauss, 2004, and Ingram, 2004.)

The tribe just mentioned has a population of less than 200 people, living in small villages of 10 to 20 each, along the banks of the Maici River in the Lowland Amazonia region of Brazil. They speak a very simple language; they have no art of any kind; they do not recognize any distinct words for colors; they do not farm and have no domesticated animals; and they use a barter system rather than money. But as far as Gordon’s theoretical and experimental purposes were concerned, the most important fact about them was that their language had a system of counting that was based on the notions of “one, two, and many.”

The idea of there being languages of this sort has been with us for a long time. For example, the author of one of the newspaper articles to which I just referred (Ingram) said that, when he was a boy, he read in one of the footnotes in a Reader’s Digest magazine whose job it was to offer tiny but interesting snippets of information, about a primitive tribe (living in a place whose name he no longer remembers) that had such a language. As the years went by, however, he discounted that story (presumably because he never heard any further details about the tribe) as nothing more than a fanciful and unsubstantiated myth. But that situation changed when, in the year 2004, he and others became aware of Peter Gordon’s research.

What changes have taken place in the world, between the 1950’s, when both I and the author of the newspaper article were young, and this first decade of the twenty-first century,

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6 By contrast, weak Whorfianism is the banal thesis nearly everyone would be willing to accept, that languages have at least *some* influence—of various sorts—on the thinking of the people who speak them.
which account for the difference just mentioned? The main change relevant to the topics discussed in this chapter is that, in the 1950’s, there still were many relatively forgotten corners of the world that were inaccessible, unknown, and dangerous for outsiders to visit. But now, at the beginning of the new millennium, almost all of those places have become pacified, well explored, and integrated into larger, political and technological environments. This in turn has made it possible for people from outside to visit those places, and to conduct serious, detailed, and well-publicized scientific investigations there.

To illustrate the sort of factual information Gordon’s work made available to a wide audience, let me now describe some of those experiments. Gordon tells us that the Pirahã language has distinct words only for the first two numbers: “hói” (falling tone = “one”) and “hoí” (rising tone = two”). All numbers larger than two are designated as “baagi” or “aibai” (= “many”). Over the course of a little more than two years, he and his associates first designed, then also administered to a number of the speakers of this language, a standard series of eight tests of progressively increasing difficulty. The goal of those investigations was to see whether the contrast between the behavior of these subjects under well defined experimental conditions, and the behavior that most other people who now live on Earth (who are not members of that tribe) would have displayed in approximately the same circumstances, could reveal some general facts about the organization of the human mind.7

7 Twentieth- and twenty-first-century anthropologists and linguists do not take pleasure in recalling the unsubtle, snobbish, and racist views of primitive cultures and peoples, to which most scientists in those disciplines subscribed in the nineteenth century. Thus, consider the following paragraph from an essay by Stephen Jay Gould (1980b, pp.54-5), where he comments on some of the opinions of Darwin’s younger associate, Alfred Russel Wallace:
In an article published in the journal, *Science*, Peter Gordon presented a figure or diagram summarizing the experimental results he had obtained from a typical series of tests administered to a group of seven Pirahã villagers (see Gordon, 2004, p.497). Since a picture often is worth a thousand words, I have reproduced that figure and its caption in my text—see below. This diagram shows that, of Gordon’s series of eight experiments (A through H), the first four (A through D) are matching tests of increasing difficulty. All four of those tests were conducted on the surface of a table, where the experimenter sat on one side and the

Of course, in calling Wallace a nonracist, I do not mean to imply that he regarded the cultural practices of all peoples as equal in intrinsic worth. Wallace, like most of his contemporaries, was a cultural chauvinist who did not doubt the evident superiority of European ways. He may have been bullish on the capability of “savages,” but he certainly had a low opinion of their life, as he mistook it: “Our law, our government, and our science continually require us to reason through a variety of complicated phenomena to the expected result. Even our games such as chess, compel us to exercise all these faculties in a remarkable degree. Compare this with the savage languages, which contain no words for abstract conceptions; the utter want of foresight of the savage man beyond his simplest necessities; his inability to combine, or to compare, or to reason on any general subject that does not immediately appeal to his senses.” I wonder how would Gordon propose to compare and relate his view of the Pirahã tribe and their language, with the opinions that Wallace and other nineteen-century scientists had of similar people.
subject on the other. The goal was for each of the subjects to duplicate, or “make the same,” an array of objects on his or her side of the table (separated down the middle by a wooden stick), with an “example array” which the experimenter arranged on his side. The first and apparently simplest of the tests (A) was a “1-1 Line Match” where the experimenter laid out different numbers (1 through 10) of AA batteries in an evenly spaced line, and where the subject’s job was simply to reproduce that same arrangement and number of batteries on his side of the table. In the case of this first matching test, Gordon found (in a manner apparently consistent with strong Whorfianism) that all seven of the villagers were able to perform correctly for each of the numbers 1 and 2, for which their language had corresponding words. (In fact, they also managed to line up right arrays of three batteries as well, even though their language had no separate name for the number 3.) But they performed much more poorly for the cases of four and five, where the proportion of correct responses dropped to only about 70%; and in the case of seven, their correct responses dropped further still, to just above 50%.

[Place Figure 3.1 approximately here.]

The second test (B) was a “Cluster Line Match” where, instead of lining up batteries to correspond with a neat line of batteries located on the experimenter’s side of the table, the subjects’ job was to line up batteries in an array that matched the number of a small cluster (not a line) of ground nuts (not batteries) that appeared on the experimenter’s side. Here again, although the subjects gave correct responses for the numbers one and two, their proportion of correct responses for all numbers higher than that dropped off rapidly. In fact, for the numbers nine and ten, none of the seven villagers was able to give any correct
response at all. The third test (C) was an “Orthogonal Line Match” where the subjects’ task was correctly to line up the corresponding number of batteries as in the experimenter’s array, not in the same direction as the batteries in the experimenter’s array, but instead in a line at right angles to the experimenter’s line. Again, the subjects’ responses were correct for the numbers 1 and 2, but were much worse for all the higher numbers, and dropped to zero for the number 9. The last of the four matching tasks (D) was an “Uneven Line Match” where the “target” batteries no longer were presented in a neat and evenly spaced array, but instead in a line with uneven gaps in it. As usual, the results here were correct for the numbers 1 and 2, but worse for higher numbers. Nevertheless, a “clumping” effect appeared here, where subjects sometimes were able to improve their results by treating groups of batteries as if they were single items—for example, correctly reproducing an array of eight batteries, by considering two groups of four batteries, as if they were just two single elements.

The remaining four tests in Gordon’s series (E through H) were more diverse. The first of these (E), which Gordon entitled a “Line Draw Copy” test, was one that any reader of this chapter would have found easy, but which all the Pirahã subjects had great difficulty negotiating. (In fact, it resulted in one of the worst performances of all.) The reason for this was that the test required subjects to reproduce, by drawing straight lines with a pen on a piece of paper, the same number of such lines that the experimenter already had drawn on another piece of paper. But, as Gordon says (p.498), “Not only do the Pirahã not count, but they also do not draw.” In other words, because all the members of our society have been trained to do things like this since childhood, none of us would have had the slightest trouble in doing it. But because the Pirahã had not been trained the same way, they not only did very
poorly at it, but also experienced a great deal of distress—expressed in the form of “heavy sighs and groans”—in trying to accomplish the assigned task.

The sixth, “Brief Presentation” test (F) was the same as the second, “Cluster Line Match” test (B) already described, except for one thing. The one differentiating point was that, instead of allowing subjects to examine the cluster of ground nuts they were asked to duplicate with a corresponding line of batteries, as closely, and for as long a time as they liked, they now were allowed only one second to see that array of nuts. That change—beginning with the set size three—had an immediate and dramatically negative effect on their experimental performance.

The final two tests (G and H) were both “out of sight” cases. That is, G, the “Nuts-in-Can Task,” consisted in putting a bunch of nuts into a can, then taking them out one by one, and asking participants to say, after each withdrawal, whether the can still contained any nuts, or whether it was empty. In H, the “Candy-in-Box Task,” there was a direct reward for good performance. Here the experimenter put candy inside a box with a certain number of fish drawn on the lid. The box was then hidden, and after that it was brought out again along with a second box that had either one more or one fewer fish drawn on its lid. At that point, subjects were given the task of guessing which box contained the candy. And, as the diagram shows, the results for these last two tasks were very bad—in a way, worse than for any of the others—since here subjects did not perform well even in the case of the numbers one and two and, for many of the higher numbers, they performed at a level that was no better than chance.

How did Gordon propose to summarize the results of these studies, in his article? His main conclusion (see 2004, pp.498-9) was that his experimental tests had confirmed one
instance of strong Whorfian linguistic determinism, because they showed that the Pirahã language was “incommensurate with” languages such as English, French, and Japanese, which allowed for exact counting and enumeration. He also claimed that the Pirahã subjects he tested showed evidence of using processes of analogue magnitude estimation, which allowed them to keep track of the different sizes of various sets of objects, by mentally comparing those sizes to one or another analogous, continuously varying magnitude, like the length of a line or the volume of a sphere. He speculated that the reason subjects did well in cases with a “target” group of one, two, or three objects was that the “analogue competence” of estimating the numbers 1, 2, and 3, did not rely on words at all. In his view, that competence with those numbers was a basic fact about human mentality. Gordon then posed the question of whether the Pirahã (who were different from most people on our planet today, because they had not learned, and had not been exposed to, a number system during the time they were growing up) could represent exact quantities for medium-sized sets of four or five objects. His tests showed that the answer to this last question was No.

These conclusions are similar to the ones Pica et al. also drew in an article published in the same issue of *Science* where Gordon’s article appeared (see 2004). The four French researchers just mentioned conducted roughly similar investigations of members of the Mundurukú tribe of the Amazonian region of Brazil, whose language did not have number words beyond five. Like Gordon, their results showed that, although the Mundurukú were able to compare, add, and subtract large approximate numbers that were far beyond their naming range, they could not understand or make use of exact arithmetic for any numbers larger than 4 or 5. In a striking statement they made towards the end of their paper (see 2004, p.503) these researchers claimed that all non-disabled Western children, at about the age of 3,
exhibited an abrupt change in the way they processed and thought about numbers, because they suddenly came to realize that each of their count words referred to a precise quantity. But this same kind of “crystallization of discrete numbers out of an initially approximate continuum of numerical magnitudes” apparently never did occur among the Mundurukú.

One point I want to make here is that the very existence of people like the Pirahã and Mundurukú constitutes a direct challenge to one of the principles of the Chomskean theory of language. Chomsky assumes that our grasp of arithmetic is directly based on our innately given ability to use and understand language. He says:

> We might think of the human number faculty as essentially an “abstraction” from human language, preserving the mechanisms of discrete infinity [i.e. infinity of the sort that belongs to natural numbers] and eliminating the other special features of language (1988, p.169).

Language is recursive, in the sense that speakers have a power to nest phrases within the scope of other, larger phrases, apparently without limit. (A simple example is this: “John believes that Mary believes that Ralph believes that Susan believes that Egburt believes that Nigel believes that Cassandra believes [and so on indefinitely] . . . that snow is white.” See Pica et al., 2004, p.499, and Hurford, 1987.) But to suppose in the way Chomsky does, that language, as opposed to an evolutionarily ancient ability to process numbers without the help of symbols, must be the source of our sense of recursion begs the question. That is, this way of talking sets up the problem in a way that allows for only one possible solution, like the child who says, “Heads I win, tails you lose.” Furthermore, there is at least one well-confirmed empirical fact that supports the anti-Chomskean notion that arithmetical ability (including the ability to count) is independent of language rather than derived from it. The
fact of which I now am speaking is that, even though it is clear that non-human animals have no language, many of them possess a number sense that is roughly similar to our own. For instance, crows are not able to speak in the same way and sense as modern humans do. But—as noted in the previous chapter—some animal behaviorists believe they are more intelligent than non-human creatures of practically any other sort. One factor that leads observers to attribute this high level of intelligence to these birds is their ability to estimate the size of quantities (and in this respect, to count), at least up to the number six. (E.g. see Savage, 1995, p.4.)

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8 Candace Savage says:

From the point of view of science, a raven is nothing more or less than an oversized crow. Jacob was an ordinary raven that lived in the laboratory of a German ethologist named Otto Koehler. For reasons of his own, Koehler believed that birds might have an innate sense of number. To test this conjecture, he designed a series of experiments in which Jacob the Raven was presented with a group of two, three, four, five or six small objects. Beside this “key” was placed a set of five small boxes, each identified with two, three, four, five or six black marks. The objects in the key and the marks on the boxes differed in size, shape and positioning and were changed from trial to trial. Jacob’s task was to match the number of objects with the number of marks on one of the lids, open the correct box and obtain a food reward. In trial after trial, this is exactly what he did. Without the aid of language, Jacob the Raven could count to six.
Thus, Gordon and his associates, as well as the French team, have drawn attention to certain basic mental powers that belong to all modern homo sapiens. For example, their investigations show that non-damaged members of our species have the first and, if conditions are right, also may have the second, of two types of numerical abilities. One of these is the ability to estimate sizes and quantities in an approximate fashion. The other is the ability to refer to and work with exact numbers larger than three. The first of these powers seems to be something that is innate in, and inherited by, every present-day human. Therefore, only the second is capable of being affected by either the presence or the absence of number words in a speaker’s language.

In spite of the useful work these researchers have done, I do not agree with the specific way in which they propose to interpret their data. In particular, I see no good reasons for believing that experimental observations like the ones summarized before provide support for the view known as strong Whorfianism. In my view, it was not just the Pirahãs’ and Mundurukús’ languages that caused those people to respond in the ways they did under the conditions of the experimenters’ tests. Instead, what made them behave in these ways was something more general—namely, their societies, histories, and cultures.

Strong Whorfianism implies the literal truth of statements like the following one that I once saw printed on a poster at the Toronto branch of the language school called *Alliance Francaise*—“There are some things you only can say in French.” That is, this doctrine is the idea is that languages have such a powerfully determining effect on the thoughts of their speakers, that it is impossible to replace various words and phrases which occur in one

(I also have discussed the subject of counting in non-human animals, in my paper, “‘Brutes Believe Not’,” 1988.)
language with (or “translate them into”) corresponding words in another language. Since
Gordon thinks the language of the Pirahã is “incommensurable” with every language that has
an explicit counting system, he believes his investigations have confirmed one clear instance
of the truth of that principle. But the conclusion he draws only would be justified, if we
always had access to some natural, neat, self-consistent, and universally agreed upon means
of dividing any given language (including all of what Gordon refers to as its “intrinsic parts”)
on one side, from the cultural environment in which that language is set on the other. Gordon
shows himself to be somewhat sensitive to the problem to which I am referring, when he
claims (2004, p.496) that terms like “molecule” and “quark,” which would not exist in any
culture that lacked advanced scientific institutions, do not count as “proper parts” of English,
because people spoke English long before those terms were invented. Accordingly, he says,
failure to understand what a molecule or quark is, cannot be a sign that one does not
understand English, because English is only constituted by its “basic vocabulary and
grammar.”

But the trouble implicit in this way of talking is that languages constantly change; and
therefore it follows, as Chomsky has reminded us, that none of them possesses an “essence”
upon which all of its speakers can agree. Consider a trivial example. In order to improve my
shaky command of the French language, I sometimes listen to an audio-cassette of a French
translation of Lewis Carroll’s Alice in Wonderland, while driving in my car. In that
translation, whenever the size of Alice’s body changes as a result of her having eaten one or
another bit of magic mushroom, her new size is consistently reported in terms of meters and
centimeters rather than (as in the story’s original English version) in feet and inches. Were
the makers of this cassette right to assume that the metric system of measurement is part of
the “basic grammar” of the French language, and therefore that one always has to refer to meters and centimeters rather than feet and inches in any proper French translation? In my opinion, we have no clear and unambiguously correct answers either to this question, or to the very great number of other questions that are similar to it.

In particular, do memorized counting procedures amount to essential parts of the basic grammar of certain languages? Or are procedures of this sort nothing more than extra-linguistic activities that speakers learn to perform with—or using—various strings of words and sounds contained in the languages they speak? Again, I see no reason to agree with Gordon’s assumption that it is possible to draw a sharp line between language, on one hand, and things and activities that are external to language on the other. Furthermore, even if one grants, for the sake of argument, that it is feasible and legitimate to recognize some distinction of this general sort, it is not clear to me that Gordon or anyone else is justified in locating words like “molecule,” “quark,” “feet,” and “inches” outside language, while putting memorized counting procedures inside it.

It seems to me that theorists who suppose that languages are independent entities that do or can have a determining influence on culture put the cart in front of the horse. In my view, it is more realistic to conceive of each language as a constantly evolving expression and product of the particular cultural tradition with which it is associated. For example, it is appropriate to ask: (i) In what physical environment do the Pirahã live?; and (ii) what past culturally influenced choices did they make, which led and encouraged them to adopt the particular type of language they now speak? The answer to the first of these questions is that they live in an undeveloped and undomesticated jungle and river environment, which has prevented them from becoming, or at least which was not conducive to their becoming,
herders, or farmers, or traders, or soldiers, or money users, or writers, or artists, or historians, or scientists—any one of which professions would have required them to develop skills of exact enumeration. Furthermore, long-term observations of the Pirahã by anthropologists like Daniel Everett (see the references to him in Strauss, 2004) show that the Pirahã take pride in rejecting all the practices, professions, and pursuits just mentioned, even though they are constantly exposed to things of that sort as a result of their interactions with the outsiders who surround them. Everett (quoted by Strauss) says:

. . . what the Pirahã case demonstrates is a fundamental cultural principle working itself out in language and behaviour. The principle is that the Pirahã see themselves as intrinsically different from, and better than, the people around them; everything they do is to prevent them from being like anyone else or being absorbed into the wider world. One of the ways they do this is by not abstracting anything: numbers, colours, or future events. This is the reason why the Pirahã have survived as Pirahã while tribes around them have been absorbed into Brazilian culture.

Despite the culturally-based attitude described by Everett, all the Pirahã subjects Gordon tested evidently wanted to perform well, and tried their best to do so, when they participated in the tests he gave them. Does this last point imply that, in a manner dictated by Whorfian theory, the language spoken by the adult members of the Pirahã tribe has made it impossible for them to think in the same ways as those that are characteristic of the readers of this book do? I do not believe the answer is Yes. Consider, for instance, the “deep sighs and groans” that issued from the mouths of Pirahã subjects whenever they attempted to draw straight lines on pieces of paper, in order to duplicate lines the experimenter already had
drawn on another piece of paper. What was the symptomatic meaning of those groans? It seems to me they were obvious signs of the fact that, at the time in question, those people were taking a first few steps down a long and painful path which, if they had followed it to the end, would have resulted in their learning to think in a much different way than they do now. At least implicitly, in other words, I believe those people have an ability to do everything we do. But—of course—it also would not be possible for them to learn to think in such a revised fashion immediately, in just one step, without their first having gone through a lengthy process of training and retraining themselves.

We have reached the following main conclusions in this section. Neither Chomsky’s reasoning, nor the experimental discoveries made by anthropologists like Gordon and the team of Pica et al., prove it is appropriate to think of language as the foundation for everything else that occurs in present-day human nature. (This is true, even if it also is necessary to grant that language plays an important, and sometimes indispensable role, relative to certain parts of that nature—e.g., to the ability to count up to numbers over a hundred.) Instead, anyone who wants to understand present-day human nature should not focus just on language by itself, but on the cultures and general cultural practices with which languages are associated, and out of which they have arisen. In other words, I claim the least misleading way of conceiving of a language is as an expression—admittedly, a very important expression—of a culture.

4.4 The idea that one of the Main Functions of Language is to enable us to think in certain ways, can help us distinguish Speech from Codes, and thus also from the Communication Systems employed by many Non-Human Animals

“Two heads are better than one.”
Chris Weyers, who says he talks to himself at work at a U.S. financial-service company

In a manner once favored by Darwin himself, quite a few present-day followers of Darwin—e.g. Jared Diamond (1992), Richard Leakey (1994), Steven Pinker (1994, 1997), and Philip Lieberman (1991, 2000)—claim (i) there is no “difference of principle” that separates humans from organisms of other kinds, and—as an important instance of that point—(ii) it is impossible to draw a sharp line between language on one side and the systems of communication used by non-human creatures on the other. I do not believe either of these two claims is true. More especially, I shall argue in this section that the second of them (and therefore also the first) must be false, if people like Chomsky are right to say that one important job language performs is not just to help two or more humans exchange information, but instead to act as something that allows each person to engage in internal processes of thinking, by himself or herself. To say the same thing another way, if this general conception of language is correct, then this provides us with a means of drawing a line between language on one side and codes on the other. Furthermore, that same conception also can allow us to distinguish language from the code-like systems of communication that many non-human animals employ, as well as from the communication systems pre-linguistic—i.e. pre-UPR—members of our own species presumably once used.

There are two slightly different forms of the “official” Darwinian view of language, to which I am opposed. The first is based on the notion that the special factor essential to language occurs in many different versions and places throughout nature; and because of that, many non-human animals possess a relatively simple form of language, which only differs in complexity from the language that belongs to mature and undamaged present-day
humans. By contrast, the second, roughly similar form of the Darwinian account of language says there is no one special thing, property, or type of things associated with the use of language so that, again, those human communication systems to which we arbitrarily give the name of “language” do not differ in significant respects from the ways other creatures communicate.9

I do not believe careful observations have the effect of confirming the assumptions made by Darwin and his followers about the nature of language, and therefore also about how language must have come into existence. One example that leads me to draw this conclusion is the troubles Japanese code breakers had with a set of cryptic systems utilized by the United States Marines, in their “island hopping” campaign in the Pacific during the Second World War. For instance, the code breakers to whom I am referring were faced with the puzzling fact that, no matter how hard and long they tried, their usual techniques for analyzing repeated patterns of sounds in passages of code they heard on the radio, did not allow them to decipher those passages. (In fact, some historians say this particular system was the only code used by any Allied military organization during the war, which the Japanese never succeeded in breaking.) Furthermore, Japanese experts who worked on the so-called code even found it difficult to distinguish the individual sounds and phonemes of the code they heard, so they could not re-identify those sounds in such a way as to put them

9 Still another person who subscribes to either the first or the second version of the Darwinian view of language is the linguist Steven Roger Fischer. For example, he claims it is impossible to specify exactly when language came into existence, because (1999, p.8) “. . . any living being, in any epoch, that has used some means of conveying information to other animates has used ‘language’ of some sort. Language is apparently a universal faculty.”
together into repeatable sequences. For example, after the war, some of them reported that their impression at the time was that the American speakers on the radio were “talking under water.”

In order to understand the significance of this situation, let us consider some points reviewed in the part of the U.S. Navy’s official website that bears the title, “Navajo Code Talkers: World War II Fact Sheet.” First, Navaho code talkers took part in every assault the U.S. Marines conducted in the Pacific between 1942 and 1945, including Guadalcanal, Tarawa, Peleliu, and Iwo Jima. For instance, Major Howard Conner, 5th Marine Division signal officer, said “Were it not for the Navajos, the Marines would never have taken Iwo Jima.” Conner had six Navajo code talkers working around the clock during the first two days of that battle; and in that time, those six individuals sent and received over 800 messages, all without error.

Let me now quote several passages from the same website, on the grounds that it explains matters at least as clearly as I could do myself:

The idea to use Navajo for secure communications came from Philip Johnston, the son of a missionary to the Navajos and one of the few non-Navajos who spoke their language fluently. Johnston, reared on the Navajo reservation, was a World War I veteran who knew of the military’s search for a code that would withstand all attempts to decipher it. He also knew that

10 Where did I get this piece of information? I confess I obtained it from a not very scholarly source (which I hope at least is basically accurate)—namely, from the screenplay of a 2002 Hollywood movie staring Nicolas Cage, entitled “Windtalkers.”

11 My students, Jason Kennedy and Martin Veser, helped me locate this information.
Native American languages—notably Choctaw—had been used in World War I to encode messages.

Johnston believed Navajo answered the military requirement for an undecipherable code because Navajo is an unwritten language of extreme complexity. Its syntax and tonal qualities, not to mention dialects, make it unintelligible to anyone without extensive exposure and training. It has no alphabet or symbols, and is spoken only on the Navajo lands of the American Southwest. One estimate indicates that less than 30 non-Navajos, none of them Japanese, could understand the language at the outbreak of World War II.

Early in 1942, Johnston met with Major General Clayton B. Vogel, the commanding general of Amphibious Corps, Pacific Fleet, and his staff to convince them of the Navajo language’s value as code. Johnston staged tests under simulated combat conditions, demonstrating that Navajos could encode, transmit, and decode a three-line English message in 20 seconds. Machines of the time required 30 minutes to perform the same job. Convinced, Vogel recommended to the Commandant of the Marine Corps that the Marines recruit 200 Navajos.

In May 1942, the first 29 Navajo recruits attended boot camp. Then, at Camp Pendleton, Oceanside, California, this first group created the Navajo code. They developed a dictionary and numerous words for military terms. The dictionary and all code words had to be memorized during training.
Once a Navajo code talker completed his training, he was sent to a Marine unit deployed in the Pacific theater. The code talker’s primary job was to talk, transmitting information on tactics and troop movements, orders and other vital battlefield communications over telephones and radios. They also acted as messengers, and performed general Marine duties.

The Japanese, who were skilled code breakers, remained baffled by the Navajo language. The Japanese chief of intelligence, Lieutenant General Seizo Arisue, said that while they were able to decipher the codes used by the U.S. Army and Army Air Corps, they never cracked the code used by the Marines. The Navajo code talkers even stymied a Navajo soldier taken prisoner at Bataan. (About 20 Navajos served in the U.S. Army in the Philippines.) The Navajo soldier, forced to listen to the jumbled words of talker transmissions, said to a code talker after the war, “I never figured out what you guys who got me into all that trouble were saying.”

In 1942, there were about 50,000 Navajo tribe members. As of 1945, about 540 Navajos served as Marines. From 375 to 420 of those trained as code talkers; the rest served in other capacities.

The Navajo Code Talker’s Dictionary

When a Navajo code talker received a message, what he heard was a string of seemingly unrelated Navajo words. The code talker first had to translate each Navajo word into its English equivalent. Then he used only the first letter of
the English equivalent in spelling an English word. Thus, the Navajo words
“wol-la-chee” (ant), “be-la-sana” (apple) and “tse-nill” (axe) all stood for the
letter “a.” One way to say the word “Navy” in Navajo code would be “tsah
(needle) wol-la-chee (ant) an-keh-di -glini (victor) tsah-ah-dzoh (yucca).”

Most letters had more than one Navajo word representing them. Not
all words had to be spelled out letter by letter. The developers of the original
code assigned Navajo words to represent about 450 frequently used military
terms that did not exist in the Navajo language. Several examples: “besh -lo”
(iron fish) meant “submarine,” “dah-he -tih-hi” (hummingbird) meant “fighter
plane” and “debeh-li-zine” (black street) meant “squad.”

The following is still another quotation relevant to the subject, which I have taken
from the website—http://en.wikipedia.org/wiki/Code_talker:

An unfamiliar spoken human language is harder to crack than a code based on
a familiar language. The languages chosen had no written literature, so
researching them was impossible. Also, many grammatical structures in these
languages are quite different from any the enemies would be expected to
know, adding another layer of incomprehensibility. Non-speakers would find
it extremely difficult to accurately distinguish unfamiliar sounds used in these
languages. Additionally, a speaker who used the language all his life sounds
distinctly different from a person who learned it in adulthood, thus reducing
the chance of successful impostors sending false messages. Finally, the
additional layer of an alphabet cipher was added to prevent interception by
native speakers not trained as code talkers, in the event of their capture by the Japanese. A similar system employing Welsh was used by British forces, but not to any great extent.

What thoughts do I have about the odd and, in certain respects, nearly unprecedented case we now are discussing? Part of the answer is that I consider it wrong, or at least seriously misleading, for historians and other commentators to describe what the Marines were using as an “unbroken code,” and for them to say things like “[a]n unfamiliar spoken human language is harder to crack than a code based on a familiar language.” My reason for saying this is that—contrary to Fischer—it strikes me as an obvious point, which every reflective person ought to accept, that a language—any language—is not a code at all. Many facts indicate the truth of this idea. For one thing, although a language is able to convey a potentially unlimited number of messages, none of those messages is hidden, in a sense that would require hearers familiar with the language to reconstruct it by employing a series of indirect and relatively unnatural procedures. For example, the basic job Navajo code talkers were required to perform for the Marines was simply for them to speak with one another over the radio, in a manner they found fairly comfortable and unconstrained, in their first-learned, “mother” tongue. Still more specifically, their duty was to engage in an unforced exchange of thinking about certain topics, in ways that were basically appropriate to their cultural background, and then to formulate and express conclusions that arose from that exchange, in the words, accents, dialects, and sounds that were characteristic of their mother language and of the cultural tradition in which they had learned to participate as children. Of course, once the Japanese had taken a few Navajo prisoners whom they could use to help them get a grasp
of the Navajo language and culture, it then became necessary for Marine instructors to introduce cipher-like elements into the conversations of the code-talkers, as an additional means of disguising what was being said. In spite of that, however, as compared to the Japanese experts’ near mastery of English, which they had gained over many years of study, all of their efforts to get a sufficient amount of familiarity with the Navajo language so as to be able to comprehend what was going on in the broadcasts they heard, turned out to be “too little too late.”

The upshot, then, is that there is no “Darwinian continuum” between languages and codes. Instead, one can distinguish fairly sharply between items of these two sorts, because languages—unlike codes—are not explicitly planned systems of artificially stipulated rules. For instance, ordinary experience teaches us that people learn and employ languages in a very different fashion than they decipher codes. The basic thing one does to acquire a language is to go through a long and repetitive process of “getting used to it.” For example, an adult who reads the bedtime story to children, about Chicken-Licken, Goosey-Loosey, Ducky-Lucky, and Turkey-Lurkey going to tell the king that the sky was falling, soon becomes aware that children need a great deal of repetition to become competent users of English. Furthermore, if that same adult then enters a program of trying to learn some previously unknown language himself or herself, he soon discovers that he also needs exactly the same kind and amount of repetition as children do, to accomplish this similar goal.

What happens when a person familiarizes himself with a language? What kind of change does this process bring about? The answer seems to be that repetitive practice with the elements and forms of a language gradually transforms the brain of each individual learner, so that the learner finally comes to be in a state that allows him or her to understand
and respond appropriately to the sounds of the new language in an automatic fashion, without having to think about technical details such as grammatical rules or vocabulary. Thus, people—including Japanese linguists listening to strings of Navajo words on the radio—who have not engaged in such a lengthy process of sharpening their skills of comprehending, responding to, and speaking Navajo by means of practice, will find they cannot even hear and distinguish the various sounds of that language in a clear, reliable, and accurate manner.

Even more explicitly, we can distinguish between (i) a typical way of thinking and expressing some thought E, which speakers of English employ; (ii) a typical way of thinking and expressing a thought J, which speakers of Japanese employ; and (iii) a typical way of thinking and expressing a thought N, which speakers of Navaho employ. The Japanese code-breakers’ method was to look for E-like patterns of thinking, expressed in the sounds they heard from the mouths of the American code users, then to employ those patterns as a basis for reconstructing the disguised English messages they believed must underlie the particular coded passages in question. But this method was bound to fail because (at least for the most part), when they were confronted with the sounds of the Navaho language being spoken by native speakers, there were no genuine E-like patterns of thought present in what the Americans said, but only N patterns which, of course, the Japanese had no way of recognizing. The reason for that in turn was that the Japanese were not hearing a code at all, but instead were simply hearing native speakers of a language, speaking in that language.

— In Lewis Carroll’s Alice’s Adventures in Wonderland, the Duchess makes the wise remark to Alice (which she afterwards presents to her as a gift), “Take care of the sense, and the sounds will take care of themselves.”
In the case of the vast majority of non-human animals, it seems to me that the sounds they make do not constitute a language of any sort, not even a very simple one. The reason this is true is that those sounds are not a means by which the animals express thoughts and make choices, but are merely ways in which they have been determined to behave by ordinary natural selection. In my view, language always results from a certain kind of cultural and artificial selection, as opposed to natural selection, because language is something that speakers employ to express their own intentions and make their own choices. By contrast, sounds that are determined by natural selection—as implied by the phrase itself—are ones that nature has “chosen” for, or on behalf of, the particular animals that make those sounds.

To summarize, the crucial thing about a language is that it functions in something like the same way as an additional part, aspect, or member of the person who learns it (like a new arm), but the same thing is not true of a deciphered code. For example, whenever someone speaks in a spontaneous, unconstrained, and honest fashion (as opposed—for example—to his or her operating as a real estate agent trying to sell a house, an actor on a stage, an applicant for a job, a student taking a viva voce examination, a person threatened with torture, etc.), hearers are entitled to interpret what the speaker says as an expression of his own ideas, values, and personality. This is because the words they hear him or her speaking issue from thoughts he either has now or has had in the past, and those same thoughts also are based on choices he either has made or is now in the process of making. By contrast, codes are and always remain “external” to their users, since their purpose is not to reveal what someone considers to be the “real meaning” of the objects, facts, and situations with which he or she is concerned, but instead is to disguise and bury those meanings, by making it difficult—even
comparatively difficult for those who possess the code’s key—to recover them. For instance, the military codes invented by Julius Caesar (one of the first people to employ such things) were simple systems for substituting and reshuffling letters, to accomplish the goal of scrambling, and thereby concealing, messages written in ordinary Latin. Thus, what we now refer to as a “Caesarian cipher” is a means of reordering the 26 letters of the Roman alphabet, by putting a previously agreed code word at the beginning of the alphabet, and then continuing on with the rest of the letters in their usual order, minus the letters that occur in the code word. Here is an example. Suppose the code word chosen for the cipher—which is known by both its senders and its receivers—is “rex” (the Latin word for “king”). In that case, a sender would replace all instances of the letter “a” in his original written message with the letter “r,” replace the letter “b” with the letter “e,” replace “c” with the letter “x,” “d” with “a,” “e” with “b,” “f” with “c,” “g” with “d,” “h” with “f,” “i” with “g,” “j” with “h,” “k” with “g,” “l” with “h,” and so on.13

Let us now turn to another topic that seems to me to be related to the matters we just have been discussing. What is it appropriate to say about the vocalizations and other sounds made by non-human animals, which those animals apparently use in at least quasi-communicative ways—e.g., the songs of birds and whales, the roaring of lions, the howling

13 By the way, people who know more about this subject than I do have informed me that the era of deciphering military codes is now part of past history. This is because each of the vast majority of codes military people employ today is generated with the help of powerful computers that employ one or more randomizers. Furthermore, any such code always is replaced by another one, before the time it would take equally intelligent enemy experts, working with equally powerful computational tools, to “break” it.
of wolves and howler monkeys, the cries of seagulls, the caws and croaks of crows, the sound a rattlesnake makes with its tail, the chirping of crickets? Are followers of Darwin right to say that all those behaviors are at least analogous with, and may even be simple approximations to, the speaking of a language? Or are there better and more accurate ways of describing them? I believe the right answer is that none of the behaviors just mentioned is even remotely similar to language, since (a) none of them is an expression of thought, (b) none is based on choices, and therefore (c) all are “externally related” to the animals from which they issue, in the sense of not expressing anything that is distinctive and personal about the animals that use them. In fact, in view of the preceding points, I suggest that animal vocalizations are more like codes than they are like languages.14

Consider a concrete case. The English poet Robert Browning famously wrote:

That’s the wise thrush; he sings each song twice over,
Lest you should think he never could recapture
The first fine careless rapture!

The charm of these lines lies in the fact that they are a means of pretending that something is the case that the poet and his readers know is actually false. That is, the thrush does not

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14 I limit this claim only to “most” animals because I think researchers have established (by means various sorts of “double-blind” tests) that a few, highly trained, non-human animals have become able to understand and make use of something like meaningful, human-like language. For example, Sue Savage-Rumbaugh has shown this for the case of the bonobo named Kanzi (see Savage-Rumbaugh, Shanker, Taylor, 1998, pp.3-74) and Irene Pepperberg has demonstrated it for the case of the African Grey Parrot named Alex (see Pepperberg, 2008, passim, especially pp.103-8).
repeat its song in order to affirm or prove something to its human hearers. Instead, all of us are implicitly aware of the fact that the real reason a thrush repeats its song is that it cannot stop itself from doing so.

Analogous to what I just said about codes, there is an important difference between the way post-UPR humans like us acquire languages, and the manner in which members of other species produce (as well as the way earlier members of our own species once produced) the sounds typical of them. After a period of encountering the sounds of one or more languages being spoken around him or her, a young human child begins to believe in the “rightness” of certain interpretations he observes speakers giving to those sounds. To say the same thing another way, he starts to think of those sound combinations as words. Even more generally, the child begins to suppose that the special way his mother tongue(s) designate entities in his environment is natural, fit, and appropriate, since—according to his or her way of thinking—that language or those languages are a reflection of “what things really are.” Furthermore, he also begins to define himself and his own personality—e.g. his attitudes, prejudices, hopes, fears, and deepest values—in ways consistent with the character and peculiarities of the particular language(s) and culture(s) he has learned. By contrast, nonhuman animals do not go through a similar process of accepting and assimilating into

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15 The reason I use the plural form here is that children often learn two or more languages when they are growing up. For example, one of the early prime ministers of Canada reported later that, as a child, he was not aware that there was one language called “English” and another language called “French.” All he knew was that there was one way in which he had to talk to his mother, and another way in which it was necessary to speak to his father.
their own personalities, the special characteristics of the sound patterns they hear, and of the ways they observe those sounds being used by other members of their species.

To return to a previous example, thrushes do not “recapture” their songs by first learning them and then accurately reconstructing them at a later time. Instead, even before those birds are hatched, they carry an innate “template” that eventually enables them to produce all the songs they will sing during their lifetimes. Admittedly, members of any particular species of thrushes, who live in different areas, often sing in recognizably different dialects. But in spite of that observed fact, the basic pattern for each of their songs (for example, that which one expert\textsuperscript{16} has described as the \textit{whee-wheeno-titi-whee} call of the Grey-Cheeked thrush) is the same for all the members of that species. Thus, heard sounds do not gradually acquire a meaning for thrushes; and meanings associated with those sounds do not influence, and then finally become a part of, each of personalities of the thrushes themselves. Furthermore, it seems to me that (excluding cases like Kanzi and Alex) even the non-human animal sounds that strike people as being comparatively more human-like and language-like than most other cases—e.g., vervet monkeys’ use of three different “words” to warn of attacks by leopards, snakes, and eagles—do not differ in principle from the situation typical of thrushes.

As already noted in our discussion of linguistic “traces” in section 4.2, post-UPR humans like us have at least some thrush-like characteristics. That is, we also possess various innately given templates that dictate many of the properties that belong to all of the languages we are able to learn. For instance, one of those templates requires that every word and phrase occurring in a properly constructed sentence of a learnable language should be

organized in a hierarchical manner, so that linguists can describe the structure of every sentence by means of a “tree diagram.” Nevertheless, contrary to the views of “innatists” like Chomsky and Pinker, I consider it true—a point based on reflection on certain events discovered to have occurred during our species’ pre-history—that those language-templates are not sufficient, simply by themselves, to produce (as opposed merely to support, undergird, and help to organize) language, without the assistance of a crucially important contribution from culture.

Accordingly, then, the only kind of meaning it is sensible to associate either with a code, or a code-like animal vocalization, is one that completely depends on—or to use a slightly more colorful word, that is parasitical on—various objects, facts, and situations that exist outside the code or vocalization itself. Thus, there is a sense in which all codes, and code-like animal calls and cries, are essentially similar to and interchangeable with one another. On the other hand, languages are far more varied and different from one another, and are far more detached from the things with which they deal, than is the case with codes and animal vocalizations. This is because each language (or to state the point more correctly, each person who speaks that language, and therefore also thinks in and by means of it) interprets and describes its referents in terms of forms and conventions that are intrinsic to the language itself, and in ways consistent with the special viewpoint that also is characteristic of that language.

Chomsky and people who follow his leadership do not accept this idea. According to them, all the properties of language are dictated by various biological and genetic processes that belong to our shared human nature, and therefore all the languages that exist on Earth are and must be basically similar. For example, Chomsky says (see e.g., 1997a, p.25) an
extraterrestrial scientist visiting Earth would conclude that, except for a few trivial surface
details, all human beings spoke the same language. But if what was said in the preceding
paragraph is correct, this way of thinking leaves out an important point. As opposed to
Chomsky’s view, I maintain that every particular language is influenced in non-trivial
respects by the special culture and history of the humans who speak that language, and
therefore each language counts as an important and typical part of the human culture with
which it is associated.

As a simple illustration of this idea, consider what some military historians have said
about the roles respectively played by the English and Japanese languages, in determining the
outcomes of various battles that took place during the Second World War. Winston Churchill
provided a summary of this view, in the following sentence:

The rigidity of Japanese planning and the tendency to abandon the object
when their plans did not go according to schedule is thought to have been
largely due to the cumbersome and imprecise nature of their language, which
rendered it extremely difficult to improvise by means of signaled
communications. (1950, p.253.)

Although I do not speak Japanese, my impression—formed from things I have learned from
the historical record—is that there is some truth in this statement. Nevertheless, Churchill’s
sentence is far too simple. Which came first, the rigidity of the planning done by certain
members of the Japanese army and navy in World War II, or the cumbersome and imprecise
nature of their language? The right answer, it seems to me, is that neither of these things
deserves to be thought of as the cause of the other, or as having preceded the other, because

17 My friend, David Weind, pointed out this sentence to me.
both the items just mentioned—not just in the past, but also continuing on into the present
and future—are aspects of the same historical and cultural tradition. In other words, not just
this language, but its speakers, their history, and their culturally determined ways of thinking
and behaving, can be described as (e.g.) precise, responsible, detailed, and therefore also
often rigid. (A further comment: Why can we make points of this sort about humans, but not
about animals of other species? The basic answer is that human cultures are far stronger,
deeper, and more complex, than cultures associated with other known creatures—see e.g.,
Whiten and Boesch, 2001.)

All the codes about which we been speaking up to this point are “mixed” cases that
are only capable of being employed by non-infantile, modern, and literate humans, because
the target for referential substitution in those codes is pre-existing linguistic texts. To be
more specific, I have been talking so far about military codes and ciphers which, as
mentioned before, are systems designed to encrypt—and thereby hide—phrases, formulas,
and sentences in written messages. Nevertheless, it is also clear that there are code-like ways
of communicating that do not make use of language, since they are composed of “natural
signs” which not aimed at linguistic targets. 18 Consider, for example, the bodily signals
someone uses to prompt, lead, and guide either a dance partner or a horse. A rider (man or
woman) is able to communicate effectively with a non-speaking horse, in roughly the same
way a male dance partner communicates with his female partner, because in both these cases,

18 Derek Bickerton claims that other types of what he calls “protolanguage”—e.g. pidgins,
the speech of very young children, and the linguistic accomplishments of trained apes—are
more or less like this as well. See his 1990, especially Chapter 7.
the code used to do this is expressed in terms of bodily movements aimed at eliciting an appropriate, “answering” set of responses.19

By the way, why does horsemanship remain a regular part of the training of cadet officers in military academies around the world today—long after horses have ceased to be our principal means of transportation? The reason for this, I submit, is that individuals whose job it is to organize the curricula of those educational institutions are aware of the fact, confirmed over thousands of years, that the mental and physical habits cadets must develop in order to ride horses, also are useful to them for performance of their more important job of leading and commanding troops and subordinate officers. Since horses cannot talk, all the techniques riders must master to acquire a satisfactory level of horsemanship are non-linguistic ones that only involve factors like bearing, poise, assurance, determination, authority, and other aspects of “body-language.” (Of course, human body language often includes use of the voice as well. But these vocal effects might be accomplished just as well by gibberish, as by grammatically correct words and phrases that occur in recognized languages like English, German, Russian, or Mandarin Chinese.)

In view of these “larger” implications of horsemanship, the most insulting thing Thomas Paine could think to say about George Washington—a person he detested—was that even though Washington often chose to address his soldiers from the back of a horse, the horse on which he sat, according to Paine, was only barely under his control. Still more explicitly, Paine’s remark implied that, if Washington was not even able to gain the respectful subservience of his own horse, then it could only be an absurd fantasy to imagine

19 I hope lady dancers with whom I am acquainted will not be insulted by my having mentioned these two cases in the same breath.
that he also was qualified to serve as the first president of the new nation he supposedly represented.\textsuperscript{20}

Code-like systems that have nothing essential to do with language are the means non-human animals use (and that pre-UPR humans also once employed) in order to communicate. For example, certain movements in the dance of honeybees act as elements in the non-linguistic code these animals use, which allows them to indicate (by means of simple substitutions) the direction of the sun from the hive, and the direction from the hive of a newly discovered stand of pollinating flowers. Again, it is plausible to believe that the patterns of sounds in the song of male humpback whales (only the males sing) have roughly the same function as the mating display of brightly colored glass, feathers, leaves, etc. that male bowerbirds in New Guinea create in order to impress females with their intelligence, industry, esthetic taste, and other qualities that show them to be desirable breeding partners. In other words, these sounds refer to (by being substitutions for) certain sexually desirable qualities possessed by those male humpbacks.\textsuperscript{21}

\textsuperscript{20} Still another parenthetical remark: If bodily and (gibberish) verbal techniques work just as well for commanding language-using humans, as for controlling horses, then it apparently follows that the broad foundation of human nature (as opposed to the more specialized aspects of it that separate modern homo sapiens from other living things) must be something we share with a large number of non-human creatures, including horses.

\textsuperscript{21} Can readers bear to hear me quote yet another short article from my newspaper? On page ID4 of \textit{Toronto Star} for Sunday, March 16, 2008, the following anonymously authored story entitled “Sexy Singing” appeared.
A problem we now face is this: How, at a certain time in the past, did humans succeeded in moving away from a previously exclusive reliance on non-linguistic codes, and into a new situation where they gained the power to use language in addition to codes? The

On spring mornings, the male western song sparrow (Melospiza melodia morphna) hardly stops singing in the mixed forests of southern Ontario. To other males, he’s staking a claim to a patch of trees. To non-singing females, he’s proclaiming his virtues as a potential mate. Scientists already knew that female song sparrows go for the males who sing the local tunes. Now, Canadian research published in the current issue of Biology Letters from the Royal Society in Britain has provided the first clues about why. For her Ph.D., researcher Kathryn Stewart recorded and analyzed several hundred songs from more than two dozen male song sparrows at the forest biological station maintained by Queen’s University, north of Kingston. Overall, the songs contained more than 130 “syllables” or repeated combinations of sounds. Individual males produced anywhere from 19 to 28 syllables. Stewart’s investigation showed that even when the male sparrows were similar genetically, the females still preferred the ones whose songs had the highest proportion of local content. The males who sang the local songs also proved to be in better condition than non-local songsters, with fewer parasites and evidence of more testosterone. “If you fit in better with the acoustical environment, then when you sing, it will be a more effective territorial signal,” says University of Western Ontario biology professor Elizabeth MacDougall-Shackleton, who supervised Stewart’s Ph.D.
general answer to this question is that language developed out of a special type of cultural tradition that only was available to modern humans—a culture of creative innovation. To be more specific, language was invented, and therefore came into existence in roughly the same fashion as every other major human invention. For example, language was similar in that respect to controlled fire, cooked food, spear throwers, fishnets, needles, shoes, shoelaces, and hobbles for horses. Furthermore it was an invention, like all of those just mentioned, which—given a certain preparation—was both (a) highly useful and (b) fairly obvious. Because of this, it should not be surprising for us to learn from archeologists’ reports that several groups of people succeeded in thinking of it independently, at different places and times. Nevertheless, although I conceive of language as a comparatively intuitive and natural invention, it does not follow from this point (nor do I claim, in the style of theorists like Chomsky, Donald, and Mithen) that it was inevitable, in the sense of something that had to happen. Rather I believe that, in every case, language began as a product of the creative thinking of some unusual and remarkable person, or a very small number of remarkable people, who happened to be born into an equally remarkable set of circumstances.

In my view, then, codes are systematic means of substituting one set of things for another. Codes sometimes can be useful for communication because such correlation and substitution can serve as a means of identifying, referring to, and keeping track of certain items in terms of certain others. There are codes of two general types: (1) those that are unlearned, like the cries of birds, the songs of whales, the dances of bees, human and animal body languages, etc., and (2) those that are invented and learned, like military ciphers, ballroom dancing, riding horses, and (perhaps) artistic expression. I agree that languages are only incidentally useful for communication, since their primary function is to allow humans
to think in various ways. For example, they are not systematic substitutions for things, persons, and situations, but means by which people become able to describe things, to explain them, and to make personal comments about them. Although codes often are useful to us, it nevertheless is true that we are externally related to them. In this respect, they are similar to physical tools like hammers and pliers which, no matter how familiar and precious they might become to us, are not really parts of us. By contrast, languages that express and grow out of one or another cultural tradition, gradually become assimilated into one’s being and personality. In fact, as suggested before, the process of learning a language is like growing an extra part of one’s body, like another arm, leg, tongue, or—more especially—an additional (part of the) brain.  

4.5 Was Helen Keller Right to Believe she Suddenly had been Transformed from an Animal into a Human?  

What Helen Keller considered the most significant event that ever happened to her, was something she took a great deal of care to recall accurately, and to describe in detail in her autobiographical writings. Here is one of her descriptions (1903/1996, p.12):

> We walked down the path to the well-house, attracted by the fragrance of the honeysuckle with which it was covered. Some one was drawing water and my teacher [Miss Anne Mansfield Sullivan] placed my hand under the spout. As the cool stream gushed over one hand she spelled into the other the word

22 Some physiologists say learning another language can be like taking out an insurance policy. Their reason for claiming this is that if, under some circumstances, a person suffers a stroke that robs him or her of the use of his first language, the second language might survive intact.
water, first slowly, then rapidly. I stood still, my whole attention fixed upon the motions of her fingers. Suddenly I felt a misty consciousness as of something forgotten—a thrill of returning thought; and somehow the mystery of language was revealed to me. I knew then that “w-a-t-e-r” meant the wonderful cool something that was flowing over my hand. That living word awakened my soul, gave it light, hope, joy, set it free! There were barriers still, it is true, but barriers that could in time be swept away. I left the well-house eager to learn. Everything had a name, and each name gave birth to a new thought.

Still more explicitly, Helen reported that after she had acquired the meaning of the hand-signed word for water, she ran excitedly to one after another of many other nearby objects, and demanded that her teacher show her the hand-signed words for all those other things as well. Thus, it seemed to be the case that the single meaningful word she had learned was “expandable” in a way that allowed it quickly to be joined by a potentially infinite number of other such words.

Quite a few interesting points are connected with this story. For one thing, when Helen was a small child, she already had used the word “water” to communicate with other people for a short time, before she caught the illness (possibly scarlet fever) that was to leave her totally blind and totally deaf. This presumably explains the fact that she referred in the passage just quoted to “a misty consciousness as of something forgotten—a thrill of returning thought.” Again, what motivated her to say: “somehow the mystery of language was revealed to me”? She spoke this way, it seems to me, because she knew there were puzzling problems connected with the idea of someone acquiring a first meaningful word. For instance, this idea
apparently leads to the further question of what prepared, and made it possible, for symbolic meaning to “get started” in the mind of the learner.

Keller concluded from the incident of learning the meaning of the sign for water that she had not been a fully functioning human being before then, but had become such a human immediately afterwards. Thus she says (in her book 1908, quoted by Dennett in 1991, p.227):

Before my teacher came to me, I did not know that I am. I lived in a world that was a no-world. I cannot hope to describe adequately that unconscious, yet unconscious time of nothingness. . . . Since I had no power of thought, I did not compare one mental state with another.

Psychologist Louis Carini reminds us (1970, p.165) that Helen Keller already used a certain sort of meaning before the occurrence described above, but claims that this incident added to her mental repertoire, by enabling her to recognize and employ another, alternative type of meaning as well. He says:

Before Helen Keller discovered at the well that everything had a name, she had attained about 30 tactile terms for individual items, among them baby, which represented her sister, and doll, the doll that Anne Sullivan had given her (Keller, 1954). She had learned the tactile pattern water, for the warm water in the bathtub, on the morning of the fateful day. When, a few minutes later that morning, Anne Sullivan tried to get Helen to use the tactile pattern doll for a second doll, Helen refused, resisting the idea that the two dolls could share the same name so strongly that she even broke the second doll. It was directly after this incident that Anne Sullivan took her to the pumphouse, where the cold water on the hand brought her a new realization. What
happened psychologically at that instant was that she moved from *one pattern-one doll* to *one pattern-two waters*—from the realm of actualities to the one of possibilities, the symbolic realm.

A word is symbolic in that it represents and means or relates something or some things. The word *water* became a symbol for Helen Keller in that it no longer represented one actual water—or even two actual waters—but any possible water, and, furthermore, in that it related all waters—hot or cold, fresh or salt—to one another. By relating all possible waters, *water* came to mean the conception of water; and this conception can be held in the mind, so that if you say the word *water* I am likely to have in mind some such questions as, “What about water? What aspect of water would you have me consider?” With the incident at the well, Helen Keller ceased to be an undifferentiated sign-using, or naming, organism and became a symbol-using human being; she began to differ in kind from all other animals.

For Helen Keller . . . the term *water* functioned so as to allow her to conceive of hot water, cold water, any water at all—eventually, even the water in the phrase “cleansed in the water of candor.” No chimpanzee can conceive of metaphorical water. . . . only man is capable of metaphor, and with that capacity the ratio of a term to its possible referents becomes one to infinity.

It would be silly to suppose that Helen Keller changed species as a result of having a certain realization when her hand was held under the pump. Even though, for most of the roughly 200 millennia our species has been on Earth, the members of that species did not
have any symbolic and syntactical language (despite the fact that they were the smartest and most intellectually accomplished primates that had existed up to that moment), all of them still counted as homo sapiens. Nevertheless, I suggest Keller was correct in supposing that, until the time of her illumination, she did not yet possess the sort of culturally created nature that belongs to the vast majority of human beings today. I propose to express this point (following the suggestions of Carini) by saying that both our pre-linguistic ancestors, and Helen Keller before the time of the incident, thought only in terms of a 1-1 linguistic code, and were not yet able to employ a 1-infinity human language.

4.6 Ravens plus Wolves plus Something Else: Our ancestors may have Learned their First “correct” and “extendible” Word through a Shared Memory fixed in their minds by something like Divinely Inspired Revelation

So they wake: first the catbirds and cardinals and some I do not know. Later the song sparrows and the wrens. Last of all the doves and crows. The waking of crows is most like the waking of men: querulous, noisy, and raw.

Thomas Merton

As already noted, many observers believe the insightfulness and problem-solving abilities of the birds called corvids—crows, ravens, magpies, jays, etc.—at least are equal, and in some respects are superior, to those of non-human primates like chimpanzees. In particular, the unusually wide range of sounds ravens make might be a sign that it is appropriate to think of this species as the most intellectually gifted of all the corvids. Candice Savage says (1995, p.87):
Although corvid song often includes imitated sounds, it is primarily composed of the birds’ “natural” calls. These, of course, vary from species to species—crows caw, ravens croak, jays scream, magpies chatter. Like the whimpers, sighs, giggles and shouts of a human being, these utterances are not learned but come as part of the organisms’ species-specific genetic package, in which each call has a preassigned function. Thus, Eurasian jays mew querulously when they are hungry and murmur tenderly when they come to offer food. They screech when they are alarmed and pant huskily if they intend to attack. American crows are even more versatile, with an estimated vocabulary of more than two dozen separate vocalizations: assembly calls, scolding calls, dispersal calls, threat calls, contact calls, hunger calls, feeding calls and many more. At least some of these sounds appear to correlate with specific moods (of peacefulness or aggression, for example) and may serve to communicate these feelings to other birds. Ravens—which probably produce a greater variety of sounds than any other animal except ourselves—are variously estimated to have between eighteen and sixty-four recognizably different kaa’s, kruk’s, krrk’s, nuk’s, clucks, rattles and trills, which presumably permits them to express a variety of meanings. The “language” of corvids has been a favorite subject for study and comment for millennia. Yet as Bernd Heinrich laments, “I’m convinced that there is nothing that we know less about.” The innate and supposedly stereotyped calls of ravens, for instance, have turned out to be confusingly variable. In the end, it may well be revealed that birds in Maine speak a different dialect of Ravenese from those in Alaska.
or Wyoming or Germany. Perhaps this explains why a list of calls that is compiled in one area never coincides neatly with one developed in another region. It also seems likely that the standard quorks and croaks of a species’ repertoire are subtly altered by the individual’s emotions and its circumstances.

Before the advent of human language, sapiens’ vocalizations might have been like the sounds made at the present time by ravens. A point Savage does not mention in her book, but that I want to make explicit here, is this. Many calls in the repertoire of ravens are inherited products of instinct, and thus are more or less standardized ones (analogous—e.g.—to humans’ sound of laughter) that are shared by all the undamaged individuals in the species. Nevertheless, because inventiveness is as much a mark of intelligence as diversity, it is also plausible to believe that some others of their sounds are not shared. That is, certain calls of ravens might be inventions that certain individual birds have made, and therefore count as expressions of thoughts and desires that are characteristic of those particular ravens, as opposed to being common to all the members of their species. Presumably, invented sounds of this sort are not widely shared, but are only employed (as well as mixed, revised, scrambled, and run together) by small family-based groups of birds associated with the inventors of the sounds.

In several other respects, however, it seems to me that our pre-linguistic ancestors were more like wolves than ravens. As noted in the preceding chapter, ravens and crows congregate in large flocks at certain times of the year—especially in winter. But even when they gather in this fashion, these birds continue to act in a very independent and individualistic fashion, since the only organizing principle that appears to apply to the
members of those flocks is “intelligence without leadership.” But humans are not like this. Relative to this last characteristic, humans are more similar to wolves than like ravens, since both human and wolf societies take the form of relatively small, tightly-knit, hierarchically organized sets or packs, which do not become either submerged or dissipated if individuals come together in larger groups and concentrations.

I speculate that pre-linguistic members of our species probably made some non-inherited sound innovations which, like those I attributed to ravens, were ephemeral in the sense of not lasting very long. What finally allowed some humans to move beyond that raven-like situation, by inventing a language that was capable of being passed down from one generation to another?

Modern sapiens (somewhat analogous to planets in a double star system) tend to think, and thus also to organize the groups in which they live, in a bi-polar fashion, because they recognize two different types of authority respectively associated with chiefs, generals, and bosses on one side, and priests, commissars, and seers on the other. The principal job and authority of a chief, which approximately corresponds to the role of the alpha wolf in a wolf pack, is to direct and control the relatively superficial events that make up what we might call “the foreground of life”—e.g. where group members will live, what and when they will eat, how they will defend themselves against rivals and other enemies, how their social hierarchy will be constituted, and so on. On the other hand, the authority of a priest or priests (to which nothing corresponds in a wolf pack) is basically moral and spiritual rather than physical in nature. A priest’s main job is to explain the present, predict the future, and help to put other tribe members in contact with the mysterious powers that are assumed to control “life’s general background.”
Something else I consider relevant to the explanation of language is Chomsky’s claim that every genuine language needs to be characterized by one or another form of “discrete infinity.” Chomsky would deny that either ravens or wolves have genuine language on the grounds that, although ravens (as Savage noted) make as many as sixty-four recognizably different sounds, and wolves employ some smaller but still relatively large number of significant sounds and gestures, neither of those species is capable of producing a potentially infinite number of such signs. In terms of the example of counting discussed in section 4.3, although ravens and crows have been observed to keep track of (i.e. count) as many as six to twelve different items, that is as far as they can go. By contrast, there is no limit to the number of items language-using humans (including members of the Pirahã tribe) are potentially able to recognize. To consider an example of a slightly different sort, the communication system of honeybees contains an infinite number of possible expressions; but the sense of the word “infinite” that applies to that system is not the correct one for language, since it is continuous rather than composed of separate and discrete elements. Chomsky says (1988, p.169):

> At this point one can only speculate, but it is possible that the number faculty developed as a by-product of the language faculty. The latter has features that are quite unusual, perhaps unique in the biological world. In technical terms it has the property of “discrete infinity.” To put it simply, each sentence has a fixed number of words: one, two, three, forty-seven, ninety-three, etc. and there is no limit in principle to how many words the sentence may contain. Other systems known in the animal world are quite different. Thus the system of ape calls is finite; there are a fixed number, say, forty. The so-called bee
language, on the other hand, is infinite, but it is not discrete. A bee signals the distance of a flower from the hive by some form of motion; the greater the distance, the more the motion. Between any two signals there is in principle another, signaling a distance in between the first two, and this continues down to the ability to discriminate. One might argue that this system is even “richer” than human language, because it contains “more signals” in a certain mathematically well-defined sense. But this is meaningless. It is simply a different system, with an entirely different basis. To call it a “language” is simply to use a misleading metaphor.

If—analogous to the case of Helen Keller—on a certain day tens of thousands of years ago, one or more sapiens who previously had no power to speak managed to learn just a single meaningful word, that would be a reason for supposing that, at least in principle, the person or people in question also might obtain a (whole) language, along with that word. However, in some respects, the example of Keller is misleading for our purposes. None of our pre-historic ancestors had a teacher who already knew language, and who therefore could guide his or her students towards rediscovering the same phenomenon for themselves. Still more specifically, there was no language-using chief, boss, seer, or priest who could manipulate and persuade other tribe members to acquire language for themselves. Also—as

23 Let me (D.M.J.) propose an elementary example to make the meaning of non-discrete infinity even clearer. A bee’s dance can indicate that the direction in which a patch of clover lies, relative to the hive is NW, or NNW, or NNNW, or NNNNNW, or NNNNNNW, and so on, potentially without limit.
mentioned before—even before Helen Keller met her teacher, she had learned quite a few tactile and bodily signs from people around her, which were similar in character to language. For instance, Helen had learned to affirm and accept some things proposed to her, and deny and reject others, by placing people’s hands on her head, and then nodding up and down for “Yes” and shaking her head from side to side for “No.” I never have heard of wild chimpanzees employing signs of that sort for communicating with one another; and our forebears who lived before the UPR presumably were approximately in the same position as chimpanzees.

Two sorts of considerations are relevant here: (i) the background, preparation, and presuppositions for humans’ acquisition of language; (ii) the particular event or series of events that distilled or triggered explicit language out of that background. Keller’s preparation for acquiring the meaningful word “water,” included her previous, repetitive practice with hand-signs (directed by her teacher), including the sign for water. Another background factor was a vague memory of having spoken that same word, and having at least partially understood it, when she still was a sighted and hearing child. Analogously, I claimed in the previous chapter that part of pre-linguistic humans’ preparation for their acquisition of language might have been their domestication of animals like dogs, because experience with those creatures gave them practice in setting aside instinctual inclinations inherited from their mammalian and primate ancestors, and helped them to develop new inclinations in place of the old ones. Nevertheless, I mainly intend to discuss the second factor in what remains of this chapter—i.e. the eliciting cause for humans’ becoming able to learn at least one word—because it seems to me that enough has been said for the time being about preparations. The thesis I shall defend here is that the event that may have put an end
to early sapiens’ wolf- and raven-like existence was connected with what some psychologists call “flashbulb memory.”

Let me give some examples to show what I mean. Several insightful observations about the workings of human memory occur in the classic Arabian story, Ali Baba and the Forty Thieves. This story focuses on two brothers, Cassim and Ali Baba, who inherited equal amounts of money and goods from their father, but who eventually came to quite different fates. At first Cassim was the more successful of the two, because he acquired a fortune by marrying a wealthy widow, while Ali Baba married a woman as poor as himself, and finally was reduced to earning a meager living by gathering and selling firewood from a nearby forest. However, when he was working in the forest one day, Ali Baba had the good (but risky) fortune to overhear, from a hiding place in the branches of a nearby tree, the preparations a band of caravan robbers were making to enter the cave-like grotto where they and their predecessors had hidden booty over the course of many generations. The key thing Ali Baba heard during that time—while fearing for his life, lest he be discovered—was the voice of the captain of the thieves pronouncing the password that opened the grotto’s door: “Open Sesame.” After the thieves had finished their business and left, Ali Baba’s knowledge of that password allowed him to enter the cave and take away some of the treasure. On the following day, Cassim also learned this same password from Ali Baba, by threatening to denounce Ali Baba to legal authorities, unless he revealed it. Cassim then immediately set out to find the grotto himself, taking along 10 mules loaded with large empty chests, in which he intended to carry away a much greater share of the thieves’ booty than Ali Baba had taken. But when Cassim entered the thieves’ cave, and looked at the many marvelous things it contained, he soon forgot the password. Then he fell into a panic in which, the harder he
tried to remember the words, the more impossible it became for him to do so. The next day the thieves returned to the grotto, found Cassim trapped inside, and killed him. By contrast, Ali Baba had no trouble remembering the passwords, to the end of his long and (eventually) fortunate life. Why could he remember the password, while Cassim could not? The answer, I suggest, is that the circumstances in which Ali Baba first heard those words were so unusual, dramatic, remarkable, and fearful that they had the effect on him of creating an indelible memory.

Next, if someone does something that I always wanted to do myself but never succeeded in doing, or if he or she breaks a piece of news that I was looking forward to telling others, before I have a chance to do so, I might say of this person that he has “stolen my thunder.” What is the origin of this odd but familiar English phrase? Using the internet, I found the following short account of it.

The Saying: STEAL MY THUNDER

Who Said It: John Dennis

When: 1709

The Story behind It: John Dennis, English critic and playwright, invented a new way of simulating the sound of thunder on stage and used the method in one of his plays, Appius and Virginia. Dennis “made” thunder by using “troughs of wood with stops in them” instead of the large mustard bowls

24 It never is explained in the story why neither Ali Baba nor Cassim wrote the password down, or (if they happened to be illiterate) why they did not devise some other visual reminder of it, like carrying a small bag full of sesame seeds on a string around the neck.

usually employed. The thunder was a great success, but Dennis’s play was a
dismal failure. The manager at Drury Lane, where the play was performed,
canceled its run after only a few performances. A short time later, Dennis
returned to Drury Lane to see Shakespeare’s Macbeth. As he sat in the pit, he
was horrified to discover that his method of making thunder was being used.
Jumping to his feet, Dennis screamed at the audience, “That’s my thunder, by
God! The villains will not play my play but they steal my thunder.”

Since this incident was spontaneous and unplanned, no one had the slightest idea about the
profound effect it eventually was going to have on English ways of speaking. Nevertheless,
its consequences turned out to be surprisingly powerful, because of the unique and
emotionally charged situation in which a large number of people first heard that phrase.

A possibly similar case is the insulting English expression, “old bag,” that some
people apply to any older woman who is romantically interested in a younger man. For
roughly forty years, I carried around in my head the following couplet: “If my love hath a
bag of gold, what care I if the bag be old?” I assumed during all that time that Shakespeare
was the author of the couplet (I certainly am not clever enough to have dreamed it up
myself). Furthermore, I assumed that this sentence had served as the flashbulb-memory-like
source of the insulting phrase just mentioned. But now I no longer can defend the idea that
the two claims just mentioned are true, since I was not able to confirm either of them in the
searching and inquiring I did to prepare this chapter. Nevertheless, I did not have the heart to
leave this example out of the chapter entirely, for three reasons. The first (a) is that I love it
so much; the second (b) is that “old bag” sounds like the kind of thing that is likely to have
started in the way we are discussing here; and the third (c) is that the book you are reading is
neither about Shakespeare, nor the English language in particular; and therefore its author feels he should not be required to be rigorously accurate about exactly which poet or dramatist said what, where, when, and under what circumstances.

The last example I want to mention—which, happily, I do know something about—is the furor that surrounded the death of the then president of the United States, Franklin Delano Roosevelt, on April 12, 1945. At the time Roosevelt died, the enormous armed conflict of World War II, in which he had played a major role, was just coming to an end. Nevertheless, many people on the Allied side still felt a great deal of anxiety and fear about bringing the war to a quick, successful, and honorable conclusion, and felt that “this was no time for Roosevelt to die.” As a result, they were nervously unsettled and saddened, while others (prominently including enemy combatants) were elated, to receive the news that the leader of the Allies suddenly was gone. At that time, for instance, Adolph Hitler, the leader of the enemy state of Germany, was living from day to day in an underground bunker in Berlin, taking whatever desperate measures he could muster to avoid total defeat. When he heard about Roosevelt’s death, he experienced a brief period of renewed hope, in which he started to believe once more that (as in the career of his hero, Frederick the Great) events might be coming together to save him at the last minute. Similarly, Japanese-American soldiers fighting with the United States army in Germany did not choose to remember Roosevelt as the man who had signed the document that had put their families into internment camps, but instead as the person who had given them a chance to prove their loyalty by enlisting in the country’s armed services. When these people were told about Roosevelt’s death, the way they proposed to pay homage to him was by spontaneously gathering up their weapons and going out to attack German positions, without having received orders to do so, without
having any coherent strategy or plan, and without much regard for their own safety. Thus, quite a few people all around the world were able to say exactly where they were and what they were doing when they received the news of his death. Also—at least during the period immediately following the announcement—those same people found it difficult to remember the name of Roosevelt’s successor, Harry S. Truman.

I was too young to be a full participant in all this, since I was born in May of 1939, four months before the war began in September. But even in my case, there is a small story to tell. I was a five-year old child living with my father, mother, and baby sister in Ogden, Utah, when Roosevelt died. My mother, like many others, was very impressed and saddened when she heard about his death on the radio and read about it in the newspaper. (My father was temporarily absent because of his job.) I have a very clear memory of the occasion, almost certainly because of the part my mother played in it. She looked into my eyes, took me by the shoulders and shook me hard, saying, “David, I want you to remember this day!” I recall being embarrassed by all this, because it struck me as silly, undignified, and completely unnecessary. Therefore I repeatedly assured her that I would remember, and she did not need to make this great fuss to help me do so. But of course, all of those assurances almost certainly were false, since it now seems clear to me that I never would have remembered the day of Roosevelt’s death, if she had not helped me do so in the way she did.

If Chomsky is allowed to make up fanciful and speculative but explanatory tales in the indirect service of science, I claim the right to do so as well. Here is my story. Suppose that 60,000 years ago, before any humans had learned to speak, there was a tribe of sapiens living in a mountainous area, whose members were involved (like the forces of Hitler at the time mentioned before) in an increasingly desperate and dispiriting war against a strong,
aggressive, and determined enemy—a neighboring tribe from a nearby valley. The people of the mountain tribe, like virtually all other humans then alive, were frightened and baffled by the phenomenon of lightning. Relatively speaking, however, they had become used to it, because they lived in a place where thunderstorms were common. On the other hand, despite the fact that all the warriors from the valley tribe who now surrounded their settlement were courageous and fearsome, they also were skittish about any lightning strikes that happened to land close to them, since they were not used to seeing and hearing lightning except from a safe distance. Then, at a culminating moment of the battle, when the valley people almost had given up hope that they could avoid being systematically slaughtered, their leader—a loved and respected, Roosevelt-like man of great experience, strength, and moral authority—spontaneously yelped out the sound “Leet!” at the moment when he was startled and killed by a shaft of lightning that struck his front-line position at a place very close to the main thrust of the attackers. The loss of this leader obviously gave the members of the mountain tribe still another reason to be discouraged. Nevertheless, the nearby members of the attacking tribe from the valley were far more terrified by the power and noise of this lethal lightning strike they witnessed, than any of the defenders were. At that moment, in fact, a wave of panic began to spread through the ranks of the attackers, so that all of them finally were transformed into a frightened and dispirited mob who turned their backs and ran down from the mountain never to return, leaving the defenders to shout out their relief and joy, and to weep with gratitude for their dramatically unexpected salvation.

Because this incident was an impressive, emotionally drenched “flashbulb,” it might have been sufficient to establish the sound “leet” among the mountain people as the objectively correct and universally valid word for lightning, from that day forward. For
example, they might have interpreted that spoken sound as a name revealed to them by the spirit or god who had sent the gift of lightning to rescue them at the moment of their greatest need and vulnerability. Furthermore I propose that, in a way roughly analogous to the experience of Helen Keller, almost immediately after the mountain people had obtained that one word by what they thought of as “divine revelation,” they also began to learn—i.e. spontaneously to invent—many other words as well, in fact, a potentially infinite number of them. In this way, they some became the first creatures on Earth to possess a language.

Some readers will complain that the story I just told is unrealistic, because we know that nearly all the young children we encounter today are able to acquire a language, without their having to go through any such elaborate, strange, and complicated events like the ones just described. My answer to this objection is to remind critics that I am talking about members of our species who lived many years ago, not people alive now. As noted before, in section 3.2, it does not appear to be true that humans’ evolutionary development has either slowed or stopped since the prehistoric time of the UPR; and therefore it is plausible for us to assume that the genetic make-up of people today is quite different from what it was 60,000 years ago. Scientists tell us that humans’ biological nature almost certainly has changed along with the social conditions in which they have lived, so that, for example, people now are less biologically suited to climb trees, and more biologically suited to live in large cities, and less suited to climb trees, than their ancestors were. Thus, since all the cultural groups into which humans are born today are bombarded by, and saturated with, language it is not surprising that present-day children should be “fitted” so as to learn language quickly and without any apparent difficulty. Nevertheless, the hard question is how this situation that now has become familiar to us managed to get started in the first place. My answer to that
question is that individual humans did not begin—in fact, could not have begun—to speak simply by willing to do so. Instead, this probably happened, in each of the several separate instances of the occurrence of the UPR, because of one or another emotionally charged, perhaps apparently divinely ordained connection of ideas that happened to be formed at the same time by a relatively large group of people, all of whom shared the same cultural tradition.