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Edited by Claire Lefebvre, Bernard Comrie and Henri Cohen

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Preface

During the last two weeks of June 2010, more than 150 scholars and students from the Americas, Europe, and Asia gathered in Montreal to study and discuss the origins and evolution of language, one of "the hardest problems in science." How did *Homo sapiens* make the transition from prelinguistic systems to communication systems with languages such as are used today? These questions concerning how, when, and where language originated and evolved are of interest to a growing number of disciplines (anthropology, archeology, biology, computer science, linguistics, paleontology, philosophy, primatology, psychology, and neuroscience), all represented at this interdisciplinary Summer Institute that was jointly organized by Université du Québec à Montréal (Claire Lefebvre), the Max Planck Institute for Evolutionary Anthropology (Bernard Comrie), and Université Paris Descartes (Henri Cohen), under the sponsorship of the Institut des Sciences Cognitives (UQAM).

In recent years, there has been a strong resurgence of interest in the emergence of language from an evolutionary perspective, as attested to by the large number of collaborative efforts and publications. The chapters of this book build on a selection of the presentations that were made at the 2010 Summer Institute on the Origins of Language. All of them contribute some aspect of or perspective on language origins that is seldom explored in other works. They also provide important guidelines for future work on and approaches to language evolution, especially as they reveal the importance of focusing on questions of social, historical, and scientific significance in seeking a biologically plausible, computationally feasible, and behaviorally adequate understanding of the emergence of language.

We are grateful to the authors for contributing their work to this volume. We thank the numerous anonymous reviewers for their valuable comments on all chapters. We also thank Zofia Laubitz for her thorough attention to all copy-editing aspects of this book.

Claire Lefebvre
Bernard Comrie
Henri Cohen

Introduction

The question of how language emerged is one of the most fascinating problems in science. It has been of interest to modern humankind for several millennia. Philosophers in antiquity, thinkers and poets, prophets and historians, scientists and scholars – all have offered a staggering diversity of views, explanations, and theories of how language came to our species. This complex problem is made more difficult by the fact that none of us was around to observe how language arose, evolved, and matured into the most complex of cognitive tools.

Recurrent questions about the origins of language include the following. At what time in history did language appear? What are the physiological, cognitive, and social prerequisites for the emergence of language? How did human language emerge? Did it evolve from animal communication or is it qualitatively distinct from it? Did a protolanguage precede language? Did language emerge abruptly or gradually? Did it appear in a single location or in several locations at the same time? Why does it have the form it has? Over the last decades, several disciplines, including Anthropology, Archeology, Biology, Computer Science, Linguistics, the Neurosciences, Paleontology, Philosophy, Primatology, Psychology, and Zoology, have sought for coherent answers to these questions.

In this book, we present perspectives that highlight scenarios of language origin and the conditions and prerequisites for language, based on new developments and discoveries and refined research methods. Answers to the central question of language origins are considerably helped by the convergence of approaches, methods, and ideas from several disciplines now partnering together to achieve a common goal. Biological, social, cultural, and paleontological forays into the conditions that brought forth and favored language emergence are now augmented by insights from sister disciplines. It is clear that the interpretation of the available evidence is the topic of ongoing and open discussion; it is also aided, to a great extent, by computer modeling and neural networks.

The selection of contributions in this book shows that we understand far more than we did only a decade ago. This progress enables us to better define the problem space and pursue particularly relevant lines of research. The 21 chapters in the book are divided into five sections. The first section establishes the historical, social, and cognitive background for the question. The second section focuses on the prerequisites for the emergence of language. The third section discusses the relationship between communication systems and language origins. The fourth section brings together linguistic

views on various aspects of language origins. The fifth section bears on computational modeling of language origins. A central tenet is that a good understanding of the general problem of the origin of language cannot be achieved by studying a single level of analysis. It must rest upon an integration of multiple levels. From this perspective, each section of this book presents specific key aspects within sister disciplines, in an effort to illustrate how complex elements contribute to defining a coherent picture of how language came to be.

The first section sets the historical, social, and cognitive background for the study of language origins. It is generally agreed that the origins of language are closely tied to the origins of modern human behavior, but there is little agreement about the implications and directionality of this connection. The basis for this general agreement has never been spelled out and it is worth considering the historical timeline and the social progression of how this idea emerged and evolved. In the opening chapter, Cohen reviews early theories of language and pre-Darwinian views on language origins. Plato's etymological account of words, Dante Alighieri's historical treatment of languages, and Condillac's emphasis on manual sign language all influenced Darwinian and even contemporary theories of language origin. He also evaluates the early language deprivation experiments conducted in Egypt, India, and Scotland, and shows how the conduct and interpretation of these experiments reflect on the understanding of science. Cultural and ideological biases and interests are not confined to antiquity or the Middle Ages. Herder's treatise on the question viewed language as a fairly recent happening, in line with traditional views that humanity was not much older than the writing of the *Iliad* and the *Odyssey*. Cohen also debunks the common misperception – and misconception – of the ban on the discussion of language origin by the Société de Linguistique de Paris in 1866, and highlights the complex political and scientific interactions that led to its proposal and to its subsequent annulment. Darwin's views on the evolution of language, often missing from such discussions, are also presented and their newfound relevance to current research on the general question is also highlighted. The chapter concludes with an overview of current perspectives and suggestions for evolutionary linguistics, finally suggesting that efforts should focus on understanding the biological capacities and their precursors that enabled humans or early hominins to acquire and use language, and on identifying selective pressures on language origin and evolution instead of reconstructing each step of the general process. Auroux, for his part, considers that the eighteenth century constitutes a turning point in our intellectual tradition, when the origin of language became a topic of choice for philosophers. He presents an analysis of two theoretical models of the period. The *speculative* model focused on the efforts of individuals and attempted to establish a scenario from parsimonious hypotheses. Condillac, for example, considered that thoughts are the essential driver of language evolution. The *historical* model used empirical knowledge to determine the historical and familial relations between languages and found that the various

Indo-European languages evolved from a common ancestor. This approach found favor with the Société de Linguistique de Paris and was not included in the ban; it also led to the emergence of historical linguistics, an important component of modern linguistics. From an anthropological perspective, Barnard explores the cognitive and social aspects of language origins. Starting with the premise that all languages are far more complex than they need to be for one-to-one communication, his view is that language developed in several phases. It started with the signifying revolution, when early *Homo sapiens* began using words to classify objects and things, followed by the syntactic revolution, when rudimentary syntax emerged to formulate complex kinship descriptions, culminating in the symbolic revolution, when fully developed syntax, music, art, and kinship structures all became available. He suggests that storytelling – more specifically, recounting of myths – requires linguistic complexity in general and recursion in particular. This culturally important means of expression thus played a significant part in creating the linguistic complexity we see today.

The next section focuses on some of the prerequisites for the emergence of language. Biological, paleontological, archeological, and cultural perspectives are represented here, in an effort to offer convergent perspectives on the general problem. It is generally agreed that the time range for the evolution of language and its anatomical prerequisites extends from the phylogenetic divergence of *Homo* from *Pan* (about 6 million years ago) to the emergence of full functional language modernity (about 200,000 years ago). From this perspective, Boë et al. introduce a method of reconstructing vocal tract geometry from skulls with mandibles and vertebra. They show how the study of reconstructed vocal tracts from fossil hominins can help us understand the emergence of speech. Combining ontogenetic observations and phylogenetic reconstruction, they argue, against Lieberman, that a lower larynx is not necessary to produce the full range of phonetic contrasts between the cardinal vowels /i/, /u/, and /a/ in either Neanderthals or infants. With support from analyses of head morphology and genetic data, Boë argues that it is the cognitive capacity for motor control, as in the feeding gestures exapted for the control of speech production, that was necessary for the emergence of speech. Adopting the view that language is the counterpart of symbolic thought, Tattersall holds that evidence of language is to be sought not necessarily in the fossil evidence but in the archeological record, that is, in the material evidence of past human behaviors. He explores the view that the intimate relationship between language and symbolic cognition implies that the possession of language may only be confidently inferred from the material products of symbolic minds. For Tattersall, the appearance of modern symbolic cognition (situated ca. 70,000 years ago) considerably postdates that of anatomically modern humans. He thus argues, in agreement with Boë, that the peripheral structures permitting speech must have been acquired in an exaptive context, probably unrelated to language use. Furthermore, besides being an internal conduit for thought, language must also have been an excellent candidate for the role

of cultural releaser. Dubreuil and Henshilwood take a different stand – one based on a Chomskyan perspective. The focus is not so much on the symbolization process as on symbol processing. In their view, material culture provides evidence not of syntactic construction but rather of social cognition, which they see as the infrastructure from which both symbolic reference and complex grammar emerge. They consider that the creation of such symbolic artifacts relies upon a higher-level theory of mind that is absent in nonhuman primates and in young children, because they are limited in their social categorization abilities. Since such a higher-level theory of mind is apparently an important prerequisite for language, it follows that the appearance of symbolic artifacts implies the existence of some form of language. The chapter by Corballis explores several lines of evidence suggesting that human language originated as a manual rather than a vocal phenomenon. This possibility was raised by Condillac in the eighteenth century and revived more recently by Gordon Hewes in the latter part of the twentieth century. Language, it is argued, switched to a vocal mode relatively recently in hominin evolution, perhaps with the emergence of *Homo sapiens*. Interestingly, this is an idea that has not found much support among linguists or anthropologists, perhaps because there is no direct evidence that any of our hominin ancestors gestured rather than spoke. Even so, arguments in its favor have continued to be made. The modern evidence from the gestures of great apes, development of signed languages, and studies on handedness and cerebral asymmetry favors a "gestural protolanguage hypothesis," which states that protolanguage was probably in the form of gestures. Indirect support for this view comes from the recently found mirror neuron system in monkeys and the overlap between mirror neurons in monkeys and the homologous language areas in humans, indicating that language could be incorporated in the human mirror neuron system – a possibility explored in more detail by Arbib. Corballis proposes a number of causes for the shift from manual gestures to vocal gestures, such as pedagogy and energy demand, and points out that, despite the present dominance of speech, manual gestures still accompany speech in various ways.

The chapters in the third section explore the relationship between communication systems and language origins. Zuberbühler studies mental concepts and mental operations in nonhuman primates in natural environments. Analyses of vocal communication from noninvasive field playback experiments reveal that primates perform basic mental operations when attending to each other's calls and that they can combine elements of their repertoire to create meanings that are independent of the constituent parts. Compared with human communication, a number of preadaptations such as social awareness, shared intentionality, and call combination have frequently been observed; these features indicate that, in the recent evolutionary history of primates, only minor modifications may have been necessary to endow humans with language. The focus of White's interest is birdsong. She uses male zebra finches as a behaviorally and physiologically relevant model to study song learning and regulation of FOXP2,

and probes the neural circuitry that gives rise to this behavior. FOXP2 mRNA declines rapidly and specifically within Area X, the striatal song control region, when birds sing, but remains stable in nonsinging birds. The real-time modulation of FOXP2 during vocalization also seems to depend on the social context, as the decline was observed when males practiced alone but not when they performed for females. While birdsong and speech evolved independently, it appears that the brain found similar biological solutions to the challenge of learning to communicate vocally. Tzourio-Mazoyer and Courtin study the relationship between brain lateralization and the emergence of language. They show that anatomical factors such as brain volume, in addition to handedness, have influenced the leftward asymmetry of language areas, and in particular the left planum temporale. It seems that there is a genetic influence on hemispheric specialization for language, and that perceptual constraints on speech processing are compatible with a motor or gestural theory of language origin. Ménard examines the relationships between the organization of vowel, consonant, and syllable patterns in the world's languages and finds that that they can be explained in light of sensorimotor constraints that are deeply rooted in the physical properties of the speaker's vocal tract and the listener's perceptual mechanisms. She shows that motor control properties and auditory properties shape sound systems. The alternating open-close jaw cycle, which Ménard presumes to be at the origin of speech, is a key component of articulatory and perceptual organization. At the syllabic level, languages combine sounds in optimal sequences in terms of articulation and perceptual saliency. Constraints related to motor control and perceptual ease can explain the preferred syllabic patterns in the world's languages. Categorization as a central mechanism in the origin of language is the view espoused by Harnad et al. Their hypothesis is that language began when purposive miming became conventionalized into sequences of shared arbitrary category names that made it possible for members of our species to transmit new categories to one another. Most categorical knowledge is learned either through direct experience or through word of mouth (only in humans). Artificial life simulations demonstrate the evolutionary advantage of instruction over induction. In addition, Harnad et al. show that our dictionaries are made up of a core set of concrete words acquired early from experience with the world, combined with a later set acquired through instruction.

The focus of linguistic studies in the fourth section, in contrast to approaches that examine the general cognitive capacities or behavior repertoire in humans and other species, or the processing of artificial languages by artificial or natural agents, relies on historical or ontogenetic linguistic observations and data. MacNeilage explores the idea that the sound patterns of languages and their links with concepts originated in a baby talk context. Three forms of phonetic production in the babbling of infants constitute the fundamental properties of speech and could explain the emergence of language. They are CV-like syllables: coronal stop consonants with front vowels, dorsal stop consonants with back vowels, and bilabial nasal consonants with central or low

vowels. This would account for how the syllable-based sound patterns of present-day languages evolved, as well as for the remarkable phonetic uniformity in the *contrasting sound patterns* of words for the two parents in the languages of the world. Bancel and Matthey de l'Etang claim that the global convergence of *papa/mama* words in world languages cannot be due to chance. In agreement with MacNeilage, they argue that *papa/mama* sound sequences are the obligatory first steps toward mastering articulate speech. Building on the work of John Locke, they show how children and parents cooperate in the transmission of *papa/mama* words. They present data from thousands of languages worldwide, arguing that most *papa/mama* words can only have been inherited from a common Proto-Sapiens language, with lines of evidence converging on a scenario in which kinship appellatives must have played a prominent role early on in the evolution of speech in humans. Heine et al. introduce grammaticalization theory as a tool for reconstructing earlier phases in the evolution of languages, using diachronic data as a window on historical changes in syntax and phonology. Their theory aims to assess the role of linguistic fossils in discourse organization, with an emphasis on what such possible fossils can tell us about the structure of early human language. Bouchard offers a philosophical perspective on the origin of two structural properties in language: arbitrary signs and recursion. These properties are derived from a complex human adaptive suite, evolved from microanatomical brain systems with offline potential, allowing the linking of percepts and concepts to form signs, and later signifiers and combinations of these representations. There is thus no need to postulate language-specific brain systems such as the innate principles and parameters of a Universal Grammar device. What we have is a language-ready brain with neuronal networks that are unique to our species. In the literature on the origins and evolution of language, the general assumption has been that language started as a restricted code, referred to as a protolanguage. Since there is no direct access to data manifesting the nature of incipient human language, some authors, including Derek Bickerton, have inferred that the restricted linguistic codes that are presently available, such as pidgin languages, may shed light on the nature of protolanguage. Lefebvre revisits this approach in light of data on pidgins and creoles around the world. She shows that even restricted pidgins are too elaborate to serve as analogues of protolanguage. She concludes, in contrast to Bickerton, that pidgins and creoles do not offer a window on the protolanguage/language sequence, since they emerge in multilingual environments in need of a *lingua franca*, and hence, are not created *ex nihilo.*

Computational modeling, the central topic of the fifth section in this book, has become a tool of choice in exploring hypotheses about language evolution. In large measure, this stems from the fact that, in the absence of time travel, the origins of language are not observable, a fact that has led some more traditional linguists to argue that the issue is not worth discussing, since we will never know the answer. However, essentially the same problem is presented to those who study the origins of

the Universe, and here modeling has made immense strides in narrowing down the range of plausible hypotheses, thanks to the possibility of setting accurate parameters and testing their implications. The same general approach is now bearing fruit in language origins research. Investigating the relations between cultural and biological evolution, Christiansen attempts to determine the extent to which cultural transmission processes have shaped language to fit domain-general constraints deriving from the human brain. Based on Jeff Elman's recurrent network model, he suggests that cultural evolution can overpower biological adaptation and that language can emerge from sequential learning constraints. Experiments conducted with human subjects also revealed similar neural and genetic bases for sequential learning and language. The goal of Steels' chapter is to reflect on the methodology that can be used to develop the field of evolutionary linguistics. He suggests that evolutionary biology may be a source of inspiration. Following on his recruitment theory – that language originates and evolves by recruiting cognitive operations for the purpose of symbolic communication – Steels shows how robots and artificial agents can develop complex features in language (e.g. color lexicon, tense). The conclusion is that the recruitment mechanism and the neuro-computational functions adopted are not necessarily unique to language. Nolfi illustrates how simple communication systems originate and evolve in robots adapting to a specific environment or performing a specific task. These experiments shed light on how communication can emerge in a population of initially noncommunicating individuals, what conditions constitute prerequisites for the emergence of a communication system, how the communication system can become more complex, and how signals and meanings become grounded in the robots' sensorimotor states. Although such forms of communication are rather naive compared with language, they nonetheless show that these kinds of experiments can be useful in exploring fundamental conditions and strategies in the origin of language. Arbib considers the questions that any theory of language evolution should address. After arguing against a role for an innate Universal Grammar in language acquisition, he examines the emergence of Nicaraguan Sign Language and the neural bases for the gestural origin of language. He presents the mirror system for the execution and observation of actions, and uses it as an analogy to the mirror neuron system for the production and perception of words and constructions in language.

The chapters in this book include the latest available information on the topic of language origins. The overview of perspectives on language origins through history (Cohen) and the analysis of perspectives on the topic by eighteenth-century philosophers (Auroux) provide the background for current perspectives on language origins. To our knowledge, such a synthesis is unique. The chapters in this book also contain new ideas on the prerequisites for language, such as the properties of the vocal cords (Boë et al.), social cognition (Dubreuil and Henshilwood), brain lateralization (Tzourio-Mazoyer and Courtin), the physical properties of the speaker's vocal

track and the listener's perceptual mechanisms (Ménard), capacity for categorization (Harnad et al.). Hypotheses on how complexity developed in language are explored (Barnard, Heine et al.). New methodologies to investigate language origins are applied in several chapters. This includes new discoveries from biology, such as mirror neurons and the *FOXP2* gene, but also those relating more specifically to the origin of speech, such as developments in the study of the evolution of the vocal tract (Boë et al. Tattersall, White). Some accepted methodologies are questioned, such as recourse to restricted codes like pidgins to explain language origins (Lefebvre). This book also includes the latest work from cognitive and social perspectives, such as the relative extent to which other species share the characteristically human episodic memory (for the non-here-and-now) (Zuberbühler), or how social cognition provides prerequisites for human language (Dubreuil and Henshilwood). In the absence of direct evidence for the appearance of human language, conclusions drawn from archeologically documented human activities play an important role ("to do X, humans must have already had language") (Tattersall). Interpreting such evidence is difficult; an important role is therefore also played by modeling, which enables us to evaluate the plausibility of hypotheses within the overall problem space (Christiansen, Steels, Nolfi, Arbib). New hypotheses regarding the first vowels in language (Ménard, MacNeilage), the first words (Bancel and Matthey de l'Etang), and the emergence of function words (Heine et al.) are presented. Arguments against the need for a Language Acquisition Device *à la* Chomsky are introduced (Arbib, Bouchard). Finally, new insights on theories of language origins appear in various chapters: for example, the gestural theory of language origins (Arbib, Corballis), and the abruptness – as opposed to gradualness – of language origins (Bouchard).

While much remains unknown, it is clear from the chapters in this book that we know much more now than we did just ten years ago and that this knowledge does indeed enable us to constrain the problem space and pursue particularly promising lines of further research.

Claire Lefebvre, Bernard Comrie, Henri Cohen

PART 1

General perspectives and issues on language origins

Historical, Darwinian, and current perspectives on the origin(s) of language

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Language has universally been felt to constitute the attribute that sets humans apart from other species. The quest to understand why and how the capacity to speak came to be has been central to our understanding of the nature of humankind. In this chapter, we focus on the speculations and explanations of the origin and evolution of language, highlighting attempts to answer this question from the ancient Greeks to the present day. A number of perspectives are presented, more or less in phase with the chronological development of the related ideas. Early thoughts on language origin in antiquity, the language deprivation experiments, and the Christian-era reflections on the origin of language constitute the first perspectives. Next, some pre-Darwinian accounts of the origin of language are explored, specifically Condillac's and Monboddo's views, as best reflecting the spirit of the Enlightenment, and Herder's treatise on the subject. The historical context of the Société de Linguistique de Paris's ban on this very topic is then examined, revealing the enduring misperception of its nature and causes. Charles Darwin's views, seldom part of discussions on the origin of language, are also presented. We close the chapter with a brief overview of current questions and directions that characterize contemporary efforts at elucidating this fascinating problem.

1. Introduction

Discovering the origin of life – of the universe – has been one of humanity's most abiding fascinations since the dawn of recorded history. Virtually all cultures have composed myths to explain their own roots. But the quest to understand why and how the capacity to speak came to be has generated much attention, speculation, and study throughout the centuries. Indeed, this quest has been central to our understanding of the nature of humankind. Language has always been felt to constitute the attribute that, more than any other, sets humans apart from other species. Is it part of our biological heritage, the product of learning by a social creature, or was it divinely

inspired, as some scholars have proposed? These questions have been raised, in various forms, since antiquity. The ancient Greek philosophers, who saw speech as a unique accomplishment of the human mind, used the term *logos* to designate both articulate discourse and the faculty underlying speech, which differentiates humanity from all other living species and provides the foundation for the classical definition of the human being as a rational animal. Most early contributions to the origins question were "motivated by a desire to establish the essential nature of man as either Godlike or animal-like" (Brown 1986, p. 435). Today, the debate on this question is as lively as ever, illuminated from many perspectives by the emergence of new disciplines – with increasingly varied and sophisticated solutions to a serious methodological problem: none of us was around to observe what was happening in our species' past.

In this chapter, we focus on the speculations and explanations of the origin(s) and evolution of language, highlighting attempts to answer this question from the ancient Greeks to current viewpoints. A number of perspectives are presented, more or less in phase with the chronological development of the related ideas. Early thoughts on language origin in antiquity, the language deprivation experiments, and the Christian-era reflections on the origin of language constitute the first perspectives. Next, some pre-Darwinian accounts of the origin of language are explored, setting the stage for Charles Darwin's views on the subject. The historical context of the Société de Linguistique de Paris's ban on this very topic is then examined. Charles Darwin's views, seldom part of discussions on the origin of language, are also presented. We close the chapter with a brief overview of current questions and directions that characterize contemporary efforts at elucidating this fascinating problem.

2. First reflections on language origins

Philosophers have reflected on language since antiquity. The first generation of Sophists, like Protagoras (490–420 BCE) and Gorgias (ca. 485–? BCE), were best known as teachers of rhetoric. They taught about the power of words to manipulate and win an argument in court and politics. For Protagoras, language was a poor tool for communicating meaning, because words were mere symbols of reality influenced by the bias of individual perception. Language was thus seen as a framework for expressing the implications of actions (our experience is the only source of knowledge) and how decisions about such actions are made. It seems that the main distinction emerging from pre-Socratic philosophy was between origin-oriented and function-oriented interpretations of the nature of language.

Plato (424–348 BCE), writing on the association between words and ideas in *Cratylus* (360 BCE), gives frequent evidence of the influence of the Sophists. In *Cratylus*, Plato presents an etymological account of the origin of words as the smallest elements (*stocheia*) of meaning. Names are allotted arbitrarily to persons and objects. In one of the

Cratylus dialogues, Hermogenes maintains that all the words of a language were formed by an agreement of people among themselves, and that some individuals were better skilled than others at naming things. Cratylus himself, realizing the constantly changing nature of words, renounced his power of speech and limited his communication to moving his finger. The puzzling conclusion of the dialogue is that there exists no stable element of meaning in language itself, but only outside language in atemporal, fixed ideas. With this notion, Plato paved the way for classic mentalism, which is hard to integrate into naturalistic accounts of the origin of language. Aristotle (384–322 BCE) also devoted much labor to the phenomenon of language in his *On Interpretation* and other analyses of the *Organon* and considered that poetry is an imitation of language. A few centuries later, grammarians such as Dionysius Thrax (170–190 BCE) and Varro Reatinus (116–127 BCE) systematically described the structure and grammatical elements of Greek and Latin, respectively, and introduced categories that are still in use today.

There is almost no consideration of the biological origin of language in the philosophical literature, since the ability to speak was mainly seen as a mental act of mapping words onto ideas – although there were questions of rational doubt about language being natural or established by man. As well, philosophical thought was mainly engaged by Platonic essentialism, which denied the existence of temporal evolution, and thus also of our biological ability to speak. We do, however, find one such account in antiquity. Empedocles (490–430 BCE) considered that there was an intimately connected understanding between reality, the body and the senses, language, death, and divine consciousness. He proposed that external events caused people to utter a specific noise in response to a particular stimulus. The sharing of these pairings between events and specific noises suggests how joint reference could emerge.

The views expressed in *Cratylus* did not go unchallenged. The Epicurean view (from Epicurus, 341–270 BCE) on this subject contradicts an idealist Platonic theory that there is by convention only one correct name for anything, which is known only to the expert. Rather, the doctrine holds that the original beginnings of speech arose naturally and spontaneously from the necessities of life, just like vision or digestion, and that it is absurd to believe that one man could have thought out and imposed a whole vocabulary upon his fellows (Chilton 1962). It never occurred to the Greeks to compare the characteristics of different language families to gain a scientific knowledge of language. Plato and others did notice the similarity of some Phrygian words to Greek, but no systematic comparison seems ever to have been conducted.

3. Early language deprivation experiments

Human beings have long been intrigued by the identity of humankind's first language and the origins of language. Accounts abound throughout much of recorded history of determined efforts to answer these questions. There have also been periodic attempts

to resolve these issues empirically, by rearing infants in settings devoid of any spoken communication. Presumably, the first meaningful utterances produced by these children would offer a clue as to the identity of the first language.

In the *Histories*, Herodotus (ca. 484–ca. 425 BCE; 2003) begins his description of the land and people of Egypt with a remarkable story that has since been inscribed in western reflections on language. Psammetichus I (664–610 BCE), the protagonist of the story, contrived an experiment to determine which among the peoples of the earth was truly the oldest. Allegedly, he gave two newborn children of humble parents into the sole care of a shepherd, with the instruction that the children should be kept in a dwelling by themselves and that no one should speak to them. As soon as the indistinct babblings of infancy were over, the children were to be brought to Psammetichus so he could hear which language they would speak first. When one of the children repeatedly called out *bekos,* Psammetichus found that this sound was the word for bread in Phrygian, and conceded that the Phrygians were an older people than the Egyptians.

A surprising story, if true. As told, the explicit purpose of the story was not linguistic but ethnographic, as Psammetichus sought to determine on the basis of linguistic evidence which was the first human society. Although there are aspects of the story that suggest that it is credible, the production of *bekos* by young children who have not been exposed to speech is problematic. The fact that Herodotus is not the primary source of the story (he was informed by Egyptian priests almost two centuries after these events occurred), together with the national and political aspirations of the human societies in this area (Rawlinson 1858), also gives us reason enough to exercise caution and to doubt whether this experiment ever occurred.

Psammetichus' inquiry, however, has been more valued for its contribution to discussions on language, as it played an important role in the controversy about the identity of a natural, first human language. Its contribution, from an epistemological perspective, is also enduring when it is cast as an investigation of the source of linguistic knowledge or as a first reflection of the nature-nurture debate (Hoff 2001), a popular theme in research on language learning. Indeed, the advent of generative grammar in the 1960s renewed the interest and relevance of the story for the acquisition of language, and in particular what part is determined by biology and what part by culture.

Frederick II of Sicily (1194–1250) replicated Psammetichus' experiment in medieval times. He was alleged to have carried out experiments on people such as feeding two prisoners, sending one out to hunt and the other to bed and then having them disemboweled to see which had digested his meal better; or shutting a prisoner in a cask to see if the soul could be observed escaping through a hole when the prisoner died. Knowledge of these experiments comes from the *Chronicle* of Salimbene di Adam, a Franciscan friar for whom Frederick was a man of heroic proportions in his very sins:

> Of faith in God, he had none; he was crafty, wily, avaricious, … and yet a gallant man at times when he would show his kindness or courtesy. … He knew to read, write, and sing, and … to speak with many and varied tongues. … Like

> Psammetichus in Herodotus, he made linguistic experiments on the vile bodies of hapless infants, bidding foster-mothers and nurses to suckle and bathe and wash the children, but in no wise to prattle or speak with them; for he would have learnt whether they would speak the Hebrew language (which had been the first), or Greek, or Latin, or Arabic, or perchance the tongue of their parents of whom they had been born. But he laboured in vain, for the children could not live without clapping of the hands, and gestures, and gladness of countenance, and blandishments. (Coulton 1907, p. 242)

History records a strikingly similar instance of Psammetichus' experiment, with quite a different result this time. James IV (1473–1513) was King of Scotland and a true Renaissance prince, a well-educated polyglot with a strong interest in scientific matters. He is one of the rulers reported to have conducted a language deprivation experiment to determine whether language was innate or learned, sending two babies into the care of a mute woman alone on the island of Inchkeith. The outcome was reportedly good Hebrew (Lindesay 1899). For many of the early fathers of Christianity, Hebrew was the primordial language. The claim that these children reared in isolation spoke Hebrew was probably considered as a vindication of belief in the scriptures.

Another account involving a remarkable historical figure comes to us from a number of sources. Jalal-ud-Din Muhammad Akbar (Akbar the Great, 1542–1605), third Mogul emperor of India (Hindustan), was a particularly tolerant and refined sovereign open to cultures and religions – a rather rare phenomenon in the world at that time. He had Jesuit missionaries and scholars debate about religion at his court. It is possible that his interest in the fundamental aspects of religion may have influenced him to conduct a language deprivation experiment. A first report of this experiment was written by Father Jerónimo Xavier (1549–1617), head of the Jesuit mission to Akbar's court, in 1595. The aim of these missions was to persuade Akbar to consider the Gospel and, it was hoped, to convert (Davies 1933). In a 1598 letter to his superior, Xavier writes that Akbar told him that 20 years ago he had placed 30 infants in a house before they had begun to speak. Guards were placed there to ensure that the nurses would not teach language to the children. Akbar's object, according to Father Xavier, was to see what language the children would speak when they grew older. None of the children ever spoke distinctly and the enterprise was viewed as a failure. Father François Catrou, a French historian and Jesuit, reports a somewhat different account of the experiment. Drawing from Niccolao Manucci's book[1] and from other contemporary sources, Catrou writes:

> It may be said that curiosity and a thirst for knowledge were the ruling passions of Akebar. He was desirous to ascertain the language in which the children would

1. Manucci's book was not printed until 1907, a few years after it turned up in Berlin. Manucci spent practically his entire life in India and is almost second to none as an historian of the later Mogul dynasty.

> express themselves, who had been kept in ignorance of the articulate sounds of any known language. The emperor had been informed that the Hebrew was the original language of the Human race, and the one, which all who had not been taught any other, would naturally speak. In order to secure a conviction on this point, he ordered twelve children to be taken from the breast, and to be closely confined in a castle, which is situated six leagues from Agra. They had given to them, for nurses, twelve women who were dumb. When the children had attained the age of twelve years, Akebar commanded that they should be brought into his presence. He then assembled in his palace persons skilled in various languages. A Jew, who was at Agra, was appointed to the office of deciding whether the language to which they might give utterance was Hebrew. The capital furnished Arabians and Chaldeans in abundance. The Indian philosophers, on their side, contended that the children would speak the Sanscrit, which is the dialect of the learned of the country, and holds among them the same place as does the Latin among the learned in Europe. When the children appeared before the emperor, to the surprise of every one, they were found incapable of expressing themselves in any language, or even uttering any articulate sounds. They used certain gestures to express their thoughts, and these were all the means they possessed of conveying their ideas, or a sense of their wants. They were indeed so extremely shy and, at the same time, of an aspect and manners so uncouth and uncultivated, that it required great labour and perseverance to bring them under any discipline, and to enable them the proper use of their tongues, of which they previously almost entirely denied themselves the exercise. (Catrou 1708/1826, pp. 116–117)

In a Persian account of this experiment by Abul Fazal, the incident of the "testing of the silent speech" (Fazal 1993), Akbar held that speech does not arise spontaneously in children. Language is learned by people listening to each other; therefore, a child could not develop language alone. Indeed, the children in the experiment did not acquire speech, "which made it evident that letters and language are not natural to man, that is, cannot be used unless they have been acquired by instruction, and it is then only that the use of conversation becomes possible."

Interest in whether the essentials of being human, and the faculty of language in particular, are given to us by nature or by nurture has a long pedigree. There are numerous cases of so-called feral children, abandoned at an early age and adopted by monkeys, wolves, bears, and other animals, who exemplify a natural form of complete social deprivation. Carl Linnaeus, the father of modern taxonomy, introduced a new species of man, *Homo sapiens ferus*, characterizing the creature as a mute quadruped covered with hair (Linnaeus 1758). The phenomenon of feral children was, however, regarded with skepticism by academicians. Robert Kerr, whose translation of Linnaeus was published in 1792, dismissed the claim as exaggeration. Lévi-Strauss saw most of these children as "congenital defectives and their imbecility was the cause of their initial abandonment and not, as might sometimes be insisted, the result" (1969, p. 5). There are over 80 reported cases of feral children. It is true that a few of them, such as

the Lucknow child (discovered in 1954) and the first Ugandan monkey-child (in 1982) were physically or cognitively handicapped. Many others, however, were not, and neither were they abandoned. In several cases described by persons of standing, they had escaped from parental abuse or were lost by accident or in the chaos of war. That these children survived without human help is testimony to considerable intelligence. One of the most documented cases is that of Victor, *l'enfant sauvage de l'Aveyron*, described by Jean Itard, the French physician who devoted five years to educating the child and teaching him to speak and communicate (Lane 1976). Although Itard did have some significant successes with respect to general aspects of Victor's behavior, the child was never able to use any conventional means of communication.

Closer to us, the most extensively studied cases of children culturally deprived are those of Genie and the Burundi child. Genie was raised in conditions of extreme isolation and neglect, until puberty. She was confined to a small room, harnessed by day to an infant's potty seat, caged at night into another restraining garment, in a crib with wire mesh sides and cover. Genie did not hear any language and received practically no auditory stimulation. Her father would beat her when she attempted to attract attention; she learned to keep silent. When Genie was admitted to Children's Hospital, Los Angeles, in 1970, it was found that she did not speak. It was almost impossible to test her intellect. Following intensive, careful rehabilitation, and with loving attention from Jean Butler ("Mibbi" to Genie), Genie made considerable progress in a relatively short period of time but attempts to impart language to her have failed. Except for a rudimentary capacity to understand simple verbal messages, she has not shown any signs of the ability to use language as children who have enjoyed a normal upbringing do with their native tongue (Curtiss 1977). The Burundi boy, also an adolescent without language, had been living with monkeys when he was found in central Africa, in 1976; he walked on his hands and feet[2] and climbed trees as expertly as an ape (Claasen 1991). As was the case with Genie, he has not been able to learn to speak like humans who have had the benefit of a normal upbringing.

A prince could do a beautiful experiment, wrote Montesquieu (1748/1964),

> Raise three or four children like animals, with goats or deaf-mute nurses. They would make a language for themselves. Examine this language. See nature in itself, and freed from the prejudices of education; learn from them, after they are instructed, what they had thought; exercise their mind by giving them all the things necessary to invent; finally, write the history of the experiment.

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2. Chomsky on comparing walking to language: "Well, take for example the facility of walking. If a child is raised by a bird, does he end up flying? No. Or if a dog is raised by a person, does it end up walking on its hind legs? No. That we are designed to walk is uncontroversial. That we are taught to walk is highly implausible" (Rymer 1993, p. 35).

The history of these experiments, however, reveals that they invariably fail to deliver. The records of disappointment abound and the children themselves were abandoned to further neglect. If such "forbidden experiments" (Shattuck 1980) shed light on any aspect of language evolution or acquisition, it is to demonstrate that a necessary ingredient for the emergence and development of language is the society of other human beings with language.

4. Christian era reflections on language origins

The prominent hypothesis derived from the Book of Genesis was that all men were first of one language and one speech until the confusion of tongues at the Tower of Babel, in the plain of Shinar, the ultimate cause of the dispersal of mankind over the earth. The words of each separate language were believed to stem from this original tongue. As Hebrew was the language of the chosen people, it was assumed that the original tongue was Hebrew. This remained a long-standing belief and topic of debate during the Middle Ages in Europe, until the Renaissance.

Hence we find Dante Alighieri (1265–1321) expounding in chapters IV through X of *De Vulgari Eloquentia* (1304–1307/1996), his views concerning the nature, origin, and development of language. "So the power of speech was given only to human beings, … I think it now also incumbent upon me to find out to which human being that power was first granted, and what he first said, and to whom, and where, and when; and also in what language that primal utterance was made" (IV.1). Dante finds it reasonable that a man, rather than a woman, was first to receive the power of speech, and that the first word uttered in Paradise must have been *El*, the name of God, addressed to God himself. Also, "the Hebrew language was that which the lips of the first speaker moulded." It was the generally accepted medieval view that Hebrew was the archetypal language spoken by Adam. Later, after the confusion at the Tower of Babel, only the descendants of Shem who had not assisted in building the tower continued to speak Hebrew. In this discussion of the origin of speech, Dante was influenced by the traditional writings and the patristic fathers, in particular Thomas of Aquinas (Ewert 1940).

Dante's theory of the relatedness of European languages is, however, of special interest. In Chapter VII, Dante uses the Tower of Babel story as part of his explanation of the causes of language diversity. Each occupational group at Babel came to employ its own common language. A building project of this magnitude required specialized, technical languages. Thus, there were as many spoken languages as there were activities.

> Only among those who were engaged in a particular activity did their language remain unchanged; so, for instance, there was one for all the architects, one for all the carriers of stones, one for all the stone-breakers, and so on for all the different operations. As many as were the types of work involved in the enterprise, so many

> were the languages by which the human race was fragmented; and the more skill required for the type of work, the more rudimentary and barbaric the language they now spoke." (VII.7)

Language began with Hebrew, in the East. After the confusion of tongues, the different languages were dispersed and, writes Dante, the language group reaching Europe included three major divisions: the Northern or Germanic subgroup, the Southern or Romance subgroup, and Greek. He distinguished further divisions in the Southern group of languages, namely French, Italian, and Spanish. Italian then separated into several dialects. Thus, Dante traced the development of language from the primordial tongue all the way to the dialect of his beloved Tuscany (Paustian 1963).

In an essay published in 1699, at the close of the Age of Discovery, John Webb proposed that Chinese was the primitive language of mankind. He questions whether the primitive language (i.e. "… when the whole Earth was of one Language and one Lip"; p. 17) that Noah carried into the Ark was Hebrew, and whether it continued uninterrupted in the "Universal World." His history of the events following the flood, and before the confusion of tongues at Shinar, informs us that these "Eastern parts of the World were the first peopled Countries after the flood … by the posterity of Sem before the undertaking at Babel. … And thus may the language of the Empire of China be preferred to all others" (Webb 1669, p. 81–82). To those objecting that Hebrew was the first original language spoken by Adam, Webb replies that the "answer is obvious. That the Names might first be imposed in the Primitive language, and that it was an easie matter for the succeeding ages, understanding by tradition what they meant, to transfer them into the Hebrew tongue" (p. 45). Webb's hypothesis followed on the theory expounded by Jakob Gohl, a Dutch orientalist, who postulated that the Chinese language had been "invented all at once in order to establish a verbal intercourse between the large number of different nations." After hearing the theory, Gottfried Wilhelm Leibniz (1646–1716) sought to investigate whether or not the Chinese written language could be employed as a universal language. He was interested in a system of communication that would allow philosophers from around the world to communicate abstract ideas with precision and accuracy. It seemed that an ideographic system of writing would most likely suit such needs. However, Leibniz was not satisfied with the Chinese system of writing, as the Chinese characters were "apparently content in [giving] several connotations." (Cook & Rosemont 1981).

Writing at the end of the nineteenth century, Mirza Ghulam Ahmad, a religious figure from India and founder of the Ahmadiyya Movement, wrote a treatise attempting to prove that Arabic, not Hebrew, was the mother language (Ahmad 1895/1979). His argument is that an examination of the different languages of the world shows that all of them have common features. A deeper examination establishes the fact that the mother of all these languages is Arabic, from which all the other languages have emerged. The rationale laid down by Ahmad is that Arabic is the language of

divine inspiration, taught to man in the beginning. As the other languages had not been invented, they are "corruptions" that have evolved from this divine language. This is shown in three stages. The first is promptly dispatched: "The common origin of languages has been settled so clearly that no further action can be conceived … and [it has been] shown that Arabic covers common ground with every other language" (p. 8). The second stage shows the common features between the languages and Arabic. An example: "Again, in the native American and Sanskrit languages, there are inflexions for the expression of change of meaning. These inflexions are to be found in Arabic. There are no inflexions on the Chinese Language" (p. 11). The third and final stage is to prove Arabic to be an inspired language by reason of its extraordinary features, which Ahmad does by listing five "points of excellence."

5. Pre-Darwinian theories of language origins

Emerging from centuries of traditional authority and ignorance into a new age enlightened by reason, science, and humanity, eighteenth-century philosophy sought to find in human affairs natural laws similar to those science had discovered in the physical world. Western Europe's devotion to reason was expressed in philosophical ideas known collectively as the Enlightenment. Faith in nature and belief in human progress were the fundamental concepts. The early Enlightenment was deeply rooted in the Scientific Revolution (the greatest impact of Newtonian science) and was particularly influenced by Locke (1690) in England. After the Peace of Utrecht (1713), the Enlightenment became mostly a French affair, considerably aided by the *salonnières*, the socially conscious and learned women who entertained the *philosophes* and helped disseminate their works and ideas. Some of the prominent thinkers (and their works) who shaped the ideas of that century and helped advance human progress were Hume (1740/1967), Montesquieu (1748/1964), Diderot and d'Alembert (1751), Voltaire (1759), Rousseau (1762), and Kant (1781), among others.

The Enlightenment regarded language as one of the most significant achievements of humanity, and theories of the origin of language form an integral part of the eighteenth-century approach to the scientific study of man. It was generally believed that man had been created in the form in which he exists today. Thus, speech might well be accepted as part of his original endowment, like his senses or his reason. Three facts, however, came to be recognized that encouraged eighteenth-century speculation on the origin of language: there are a large number of different languages; all languages seem subject to gradual change; children do not biologically inherit their language. Assessing the evolution of human progress, it was natural to believe that earliest man was inventive. Many thinkers thus did not see why man could not have invented signs for communication. In this respect, the contributions by Condillac

(1746), Monboddo (1774) and Thomas Reid are probably those that best reflect the spirit of the Enlightenment.

Where Locke considered the human mind capable of clear and distinct knowledge prior to the use of verbal language, thereby giving language meaning arbitrarily by deciding which ideas are to be related to which sounds, Condillac understood the role of language as a means for acquiring, memorizing, and discussing clear and distinct ideas. Condillac stressed that man's first efforts at communication must have involved only the use of signs that are self-explanatory (such as threatening postures), not signs whose meaning depends on convention. The first signs were not intended as such but were the normal reactions to particular situations. In time, men would learn the effects of their movements on their companions and would come to perform deliberately actions that had at first no reference to other persons. An important point in Condillac's argument is that actions not originally intended as signals to others at all came in time to be deliberately made as signals; in other words, the secondary effect of these actions was first noted and then exploited. For Condillac, the use of signs led to the development of mental powers, which in turn led to an improvement in the use of signs. What is expressed in the initial stages of language is principally declamation of emotion and appetites, graduating to an intermediate state where responses to emotion and sentiment dominate man's increasingly elaborate use of language, before it is finally used as a vehicle for abstract ideas.

How did explanatory gestures and pantomime lead to the sound-based languages of today? It was no doubt the difficulty of understanding this transition that led many to ignore gesture and pantomime in their accounts of language's origin, and propose theories where speech derived from a natural and unique human impulse. What causes man to make sounds in the first place, before he can think of adapting them for purposes of communication? Again, for Condillac, cries of various kinds were among initial natural reactions and came to be used as signs in the same way as gestures did: becoming converted to signs, they gradually lost their natural emphasis and were imitated by controlled or articulate sounds. A groan was originally a spontaneous expression of emotion, but when it was deliberately made in order to summon help, it became a simulated groan. Once a certain number of such sounds had come to be used in this way, others would be added by analogy; because they were accompanied by gestures, they came to be associated with the objects to which the gestures referred. Condillac held that the elements of spoken language must at first have followed the order of acquisition that was natural in sign language, and that common objects (e.g. fruit, tree) would be the first to be named. These views were probably based on theoretical considerations and it is interesting that later investigations of the gesture language of deaf-mutes revealed that the order of the signs is determined by the relative importance in the communication of the constituent ideas (e.g. Tylor 1871).

Monboddo held that there was no need for language until men came together in communities (Herder argued strongly against this view). Facial expressions, gestures, paintings, inarticulate cries, and imitative sounds would have comprised the early repertoire of communication abilities. Monboddo assumed that sounds must have been available before they could be used for communication. He suggested that man is predisposed to imitate the noises of birds and animals and, gradually, builds an onomatopoeic repertoire of articulated sounds and enlarges his stock of words. He was aware that the number of words derived from natural sounds (e.g. *buzz*, *snap*, *gurgle*, *crash*) made up an insignificant part of language, but he could not explain how man came to express complex ideas using the vocal elements acquired by imitation. Since language is not instinctive, he reasoned that it must be the result of habit. Like many early psychologists, however, Monboddo made no clear distinction between behaviors based on conditioned reflexes and those implying an understanding of the relationship between means and end: "Every animal that does not act from instinct, like the bee or the spider, must act with knowledge of the end" (Monboddo 1774, p. 459).

A rather detailed theory of language origin and development comes from Giambattista Vico, in his *Scienza Nuova* (1744), a work presented as a science of reasoning. The publication of Bergin and Fisch's (1948) translation of *The new science* has made his work more accessible. It offers a fresh approach to the question of language and language origins, out of step with the Cartesian, rationalistic philosophy of the times. The first humans were poets[3] by "a demonstrated necessity of nature" (p. 19), and poetry was a "faculty born with them" causing them to marvel at reality and to greatly admire those things for which they had no explanation (p. 104). For Vico, the senses are the only means through which man comes to know things. Thus, the process of language generation relies on the imagination and universal thoughts, derived from the iconic nature of our representations. For Vico, metaphor is the locus of man's primordial cognitive experience of being. Metaphor allows for a fundamental concrete way of knowing things through analogy, the senses, and iconicity: "metaphors give soul and movement to meaningless things" (p. 133). Language and thought emerge both ontogenetically and phylogenetically by virtue of an imagination that is "wholly corporeal" (p. 105). In his ideal history, Vico conjectures three discrete ages characterized by specific human modes of thought, speech and social organization. The first, a prelinguistic or "mute" age of concrete signs and objects, he names "hieroglyphic"; the second or "heroic" phase of "vivid representations, similes, images, and metaphors" is the primordial figurative language; and the last is the age of analytical reasoning and propositional speech. Vico based his view on the apparent discontinuities between the *Iliad* and the *Odyssey*, which he saw as substantiating the ontogenetic pattern that

3. "… 'poets' is Greek for *makers*" (p. 105).

underlies the history of human intellectual evolution. Achilles, in the *Iliad*, represents an emotional and barbaric primitive stage in human development, lacking "reflective capacity"; Ulysses, the hero of the *Odyssey*, reveals the wisdom and caution of old age as well as the rationality and critical acuity of a late, developed, and cognitively sophisticated civilization.

The general view of the times was that language was not invented at one sitting or discovered spontaneously. Condillac writes of a process encompassing thousands of years, and Darwin understands the invention of language to be "a process completed by innumerable steps, half consciously made" (1871). From the early nineteenth century, the premises that language is an invention and that nonvocal forms of communication preceded the oral languages of today were, however, regarded as unacceptable. This was in part due to the influence of Johann Gottfried Herder's treatise of 1772. Herder begins his *Abhandlung* by accepting that languages comprising conventional sounds were preceded by natural languages consisting of gestures, postures, exclamations of emotion, and onomatopoeic sounds. It is surprising, then, when he declares that the origin of human language is not to be explained by reference to the expression of these emotions and cries. His argument is that no transition is possible between a cry of pain and making a sound and informing others of one's emotional state. Herder proposes to look at what distinguishes man from other animals and may be responsible for his unique character of speech. Man is not guided by instincts to the same degree as other animals are. He is also surpassed in every one of his senses by other animals. It appears that the sharper the organism's specialization and the more wonderful its skills, then the smaller is its *Kreis* – the sphere in which it can operate. A spider, for example, is highly specialized and exact, guided by instinct when spinning a web; its *Kreis* is also very limited. Man, however, has to attend to many things, so his behavior is less assured, less instinctive. Herder declares that it is this singularity in man that provides the clue to his special gift of language. The argument is not unscientific, but it is constrained by the comparative vagueness of the *Wirkungskreis*, the sphere of activity. Herder does not explain the difference in mechanism between an animal with highly precise and specialized behavior and a mammal with a much broader range of behavior.

Herder no longer regarded language as an invention, since we cannot suppose "men should ever have had a good conception of the uses of language before any language existed" (Wells 1986, p. 168). He was also opposed to the notion that it was of divine origin. "A higher origin has nothing speaking for it, not even the testimony of the Eastern texts to which it appeals, for this text clearly gives language a human beginning through the naming of animals." He imagines a primitive man contemplating a landscape in which a lamb appears. Being man, the only creature that is free and independent from nature, he has a disinterested curiosity that is fulfilled when he has noted and labeled a fact, without relating it to his interests. He believes that knowing

an object is possible only by means of a *Merkmal*, a mark or auditory feature – the bleat, in the case of the lamb. Wells (1986) notes that what is new in Herder's presentation is the assertion that there is an innate urge to discover audible marks, without any purpose of communication. Herder attempts to give a natural foundation of language without invoking invention. He belittles Condillac and Rousseau's views of the origin of language as "philosophical novels," in contrast to his own work "at collecting firm data from the human soul, human organization, the structure of all ancient and savage languages …."

The significance of the fossil record was not really appreciated in the eighteenth century. This is probably why Herder believed that much of Greek poetry (which he took for the oldest extant) was written when languages of conventional sounds had only just begun to come into general use. The profusion of imagery and metaphors in old poetry was accounted for by the difficulty of expressing abstract ideas at that early stage in the history of oral language, when only concrete phenomena had been named. In this view, language originated only a few thousand years ago, almost synchronously with the advent of writing. In a preface to a German translation of Monboddo's book, Herder (1784) held that the human race was not much older than its oldest historical records. It was also inconceivable that there had ever been a speechless people, since man's capacities were not to be regarded as acquired but as given (Herder 1784/1888). In contrast, Condillac, and Monboddo to a certain extent, envisaged how language could have come into existence by consulting their knowledge of man's inventive powers, needs, and resources. Both held the view that language was essential for communicating intention and wants from one individual to another. Thomas Reid also agreed that language should be understood as "all those signs which mankind use in order to communicate to others their thoughts and intentions, their purposes and desires" (1785, p. 92). Herder, however, asserted that there was no need for a hearer or for any power of utterance and that man developed speech inwardly. Humboldt agreed with Herder that the force that generates language is thus indistinguishable from that which generates thought (1883). It follows, as Grimm wrote explicitly, that animals do not talk because they do not think (1851/1911). More recently, Chomsky has implied that thinking can be understood as merely speaking to oneself (Salmon 1969).

In Herder, we read much about the relationship between reason and language, but little about the reasoning process. Darwin (1871) was able to give examples of the reasoning power of animals, and Wolfgang Köhler (1925) revealed the insightful behavior of chimpanzees: imagining a present situation and a desired one, and proceeding to effect the conversion (see also Call & Tomasello 2005). It is the case that much human behavior of a practical kind is of this nature. From this perspective, Englefield (1977) has already argued that serious thinking is mental experimentation and does not depend upon the use of language.

A plausible reason for abandoning the view that language was invented came from contact between Europeans and "uncivilized" peoples. It was felt that these primitive races, with their "irrational" views on matters of cosmology or religion, could certainly not have elaborated such a perfect system. A proponent of this attitude was Wilhelm Wundt (1863), who argued against introducing the idea of invention into the conception of the language-forming processes (p. 339). The fact that these same peoples appeared capable of rational invention in matters of clothing, weapons, or transportation appeared to have been of no serious concern to Herder's successors.

6. The SLP ban (1866)

Founded in 1863, the Société de Linguistique de Paris (SLP) adopted a set of bylaws, imposing a ban on all discussions related to the question of the origin of language. The first two articles, taken from the SLP's archives, read:

> **Article premier.** – La Société de Linguistique a pour but l'étude des langues, celle des légendes, traditions, coutumes, documents, pouvant éclairer la science ethnographique. Tout autre objet d'études est rigoureusement interdit.
> **ART. 2.** – La Société n'admet aucune communication concernant, soit l'origine du langage ~ soit la création d'une langue universelle (Société Linguistique de Paris 1871).[4]

These bylaws were approved by the then Ministry of Education, on March 8, 1866. The motivation for this drastic action has often been interpreted as a consequence of the outlandish speculations, unfounded theories, and conjectures that were bandied about at the time; that the question of the origin of language should be abandoned because it was an insoluble enigma of the phylogenesis of speech; that questions about the origins of language were contentious; or that the SLP was beset by papers purporting to solve the question of glottogenesis (e.g. Aarsleff 1976; Christiansen & Kirby 2003; Hewes 1976; Wescott 1967). It is, however, important to appreciate that the motivation for the SLP's ban on discussions of the origin of language was ideological, and not based on the apparently frivolous nature of the question. Understanding the context of the period sheds light on the complex situation that the ban represented, and how

4. Translation: Article 1. – The Society of Linguistics aims to study languages, legends, traditions, customs, and documents that can inform ethnographic science. Any other object of study is strictly forbidden.

ART. 2. – The Society does not accept any communication concerning either the origin of language or the creation of a universal language.

the question of the origin of language was actually an issue of critical importance for all parties concerned.

For most of the nineteenth century, social science in France was concentrated in and around a single, little-mentioned institution, the Académie des Sciences Morales et Politiques. This institution was inaugurated in 1832 and was the official center and granting agency for moral and political studies, under the constitutional regime of the *Monarchie de Juillet* (July Monarchy 1830–1848). In the 1860s, the Académie was under the control of monarchists, civil servants, and Catholics, who were generally opposed to Darwin's recently published materialistic explanation of life.

The SLP was inauguratedto[5] oppose the Société d'Anthropologie de Paris (SAP), founded by Pierre-Paul Broca in 1859 as a direct response to the growing debate over racial differentiation in France (and more narrowly, to the rejection of one of his papers on the subject by the Société de Biologie). These debates opposed polygenists, who held that humanity consisted of several distinct races, against monogenists who argued for the essential unity of the human species. Broca was inspired by Honoré Chavée, a positivist thinker and linguist, who founded the first French journal of linguistics, and saw the study of languages as a useful tool in ethnological investigations. Anthropology was not yet the science of differences that it would become; it was a science of nationalities, drawing on the notion that human groups were characterized by specific "personalities" (Saada 2002). The official motivation for the creation of the SLP was thus to compete with the materialistically inspired SAP and to promote monarchist and Catholic ideas via the study of languages.

Broca entertained both close and conflicting intellectual relationships with Darwinism. In a letter to Darwin, he writes "The first part [of a communication called *Sur le Transformisme*] was a historical exposition and there I could speak of you with the regards due to a great naturalist, but the second part was a critical discussion and you will perhaps pardon me for a few strong passages against natural selection. In spite of that, I beg you not to confound me with the herd of your systematic adversaries …" [Paul Broca to Charles Darwin; September 4, 1870] (translation in Engels & Glick 2008). Following his neurological investigations and the clinical characterization of aphasia (1861), Broca's interest in language shifted from viewing it as a specific characteristic of the species to a specific property of the speaker. He rapidly abandoned the classification of peoples on the basis of language and favored physical anthropometric methods, such as measurements of skulls or of iris pigmentation.

Broca's reticence toward Darwin's views (he was still pushing Lamarck's doctrine of gradual transformation of one species into another by descent with modification)

5. Linguists had actually been meeting in Paris since the early 1830s, but were not yet organized in an officially supported *Société*.

caused linguistic Darwinism to migrate to Germany, where the *Origin of Species* was enthusiastically acclaimed by August Schleicher, an eminent Indo-Europeanist. Prior to reading Darwin, Schleicher seems to have already convinced himself that human beings had derived from lower animals. As early as 1848, his experience told him that all languages must certainly undergo some kind of change; he also viewed "language as a natural organism with a life of its own – growth, maturity and decline" (Andersen & Bache 1976, p. 429). The preface to the French translation of Schleicher's 1863 essay on Darwin's theory and linguistics was by Michel Bréal, the elected and permanent secretary of the SLP.

It may seem surprising that a prominent member of the SLP would write an extensive introduction to a work extolling a Darwinian view of linguistics. It is clear that a compromise must have been negotiated with great difficulty between the Catholic founders, the young university scholars (Bréal was also at the Collège de France), and the top-ranking officials in the Ministère de l'Instruction Publique, which led the SLP to include the infamous Article 2 in its constitution. The purpose of including this article was thus not the consequence of a dogmatic definition of a scientific domain: the main objective was to dispose of competition with the SAP members and neutralize the Catholics who had come from the Société d'Ethnographie.[6] In later years, the membership of the SLP changed considerably. There was new blood in the form of the *comparativists,* and most of the 1863 founders had resigned (to found the Société de Philologie, in 1869). In 1874, a wind of change was blowing from the Ministry, which threatened to withdraw financial support and required a new set of bylaws. In 1876, with the adoption of new articles and no mention of any ban, the SLP became a learned society ready for international scientific confrontation, especially with Germany.

Language was seen as a *fait accompli*, and hence as legitimate a subject of scientific enquiry as many other problems far removed in time and space. It was evident that the original SLP bylaw banning discussion of the origin of language could not be – and should not have been – taken seriously.

7. Darwin's views on language origins

In formulating his ideas on evolution, Charles Darwin was of necessity brought into contact with some of the problems of cognitive evolution. In *The Origin of Species,* Chapter VII is devoted to "the diversities of instinct and of the other mental qualities of animals within the same class" (1859, p. 207). Darwin's discovery that biological species were

6. The Société d'Ethnographie Orientale et Américaine, created almost simultaneously with the SAP, focused on the study of the religious and cultural aspects of human societies.

subject to mutation was the capstone of a long erosion of Aristotelian science, which had assumed the immutability of the forms and structures of both nature and history and which regarded temporal flux as merely the cycle of "coming to be and passing away" (Niebuhr 1958, p. 30). Numerous voices expressed strong opposition to Darwin's theory of natural selection and seized on the special quality of the human mind and language to battle against him. The argument from the absence of language had frequently been advanced. Alfred Wallace, the codiscoverer of natural selection, believed in a nonmaterial origin for the higher human faculties and objected to evolutionary approaches to the mind. Max Müller, a prolific writer and popular lecturer, well known for his essays on comparative linguistics, philosophy and thought, language, and the origins and development of the world's religions, was also a formidable opponent. Müller agreed with Darwin that "brutes have certain common endowments with man." With respect to language, however, he held the unequivocal view that here was a distinctly human attribute:

> What is it that man can do, and of which we find no signs, no rudiments, in the whole brute world? I answer without hesitation: the one great barrier between the brute and man is Language. Man speaks, and no brute has ever uttered a word. Language is our Rubicon, and no brute will dare to cross it. … Language is something more palpable than a fold of the brain, or an angle in the skull. It admits of no cavilling, and no process of natural selection will ever distill significant words out of the notes of birds or the cries of beasts.
>
> (Müller 1861, pp. 360–361)

The problem of language had captured Darwin's attention from a quite early period in his theorizing about species' descent. In Darwin's early correspondence, it is astonishing to learn that his first appreciation of the Earth's great age came from the linguistic speculation that the Chinese and English languages share a common ancestry. Thus, he was already familiar with the idea of descent through modification in languages before he had a clear picture of biological species descending from a shared ancestor. This view is a recurrent theme in his correspondence.

> You tell me you do not see what is new in Sir J. Herschel's idea about the chronology of the old Testament being wrong – I have used the word Chronology in dubious manner, it is not to the days of Creation which he refers, but to the lapse of years since the first man made his wonderful appearance on this world – As far as I know everyone has yet thought that the six thousand odd years has been the right period but Sir J. thinks that a far greater number must have passed since the Chinese, […],[7] the Caucasian languages separated from one stock.
>
> [To Caroline Darwin; February 27, 1837;
> shortly before setting off on his voyage around the world]

7. J. F. W. Herschel's views on Old Testament chronology were expressed in a letter to Charles Lyell on February 20, 1836: "When we see what amount of change 2000 years has been able

He was also interested in the analogy between geology and language. "Your metaphor of the pebbles of preexisting languages, reminds me that I heard Sir J. Herschel at the Cape say, how he wished someone wd treat languages, as you had Geology & study the existing causes of change & apply the deductions to old languages" [To Charles Lyell; March 8, 1850]. "I remember years ago at the C. of Good Hope; Sir J. Herschel saying to me – I wish someone would treat language as Lyell has treated Geology" [To J. M. Rodwell; November 5, 1860]. In 1863, Lyell took up the challenge and included, in his *Antiquity of Man*, a section exploring the similarity between geological, biological, and linguistic change.

Louis Agassiz, who had proposed that the Earth had been subject to a past ice age, was also resistant to Darwin's ideas on language. "I wish I had time to write you an account of the very absurd lengths to which Bowen & Agassiz … are going … coming near to deny that we are genetically descended from our great-great-grandfather; & insisting that evidently affiliated languages e.g. Latin Greek Sanscrit owe none of their similarities to a community of origin, – are all autochthonal. Agassiz (foolish man) admits that the derivation of languages & that of Species or forms stand on the same foundation & that he must allow the latter if he allows the former – which I tell him is perfectly logical." [To C. Lyell; February 2, 1861]. "You have amused me much by your account of Agassiz's denying the community of descent of allied languages." [To A. Gray; Feb 17, 1862].

Darwin had also read Müller's lectures on language. His take on Müller's essay is expressed in a letter to Asa Gray: "… I quite agree that it is extremely interesting, but the latter part about first origin of language much the least satisfactory. It is a marvelous problem. I have heard, whether truly or not, I do not know, but the book has rather given me the same impression, that he is dreadfully afraid of not being thought strictly orthodox. He even hints at truth of Tower of Babel!" [To Asa Gray, November 6, 1862].

When Darwin followed with the detailed discussions in *The Descent of Man*, it was his purpose to show that there is no fundamental difference between man and the higher mammals in their mental faculties. "If no organic being excepting man," he wrote, "had possessed any mental power, or if his powers had been of a wholly different nature from those of the lower animals, then we should never have been able to convince ourselves that our high faculties had been gradually developed. But it can be clearly shown that there is no fundamental difference of this kind" (Darwin 1871, p. 35). Darwin gave serious consideration to Wallace and Müller's positions.

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to produce in the languages of Greece & Italy or 1000 in those of Germany France & Spain we naturally begin to ask how long a period must have lapsed since the Chinese, the Hebrew, the Delaware & the Malesass [Malagasy] had a point in common with the German & Italian & each other. – Time! Time! Time! – we must not impugn the Scripture Chronology, but we must interpret it in accordance with whatever shall appear on fair enquiry to be the truth for there cannot be two truths" (Cannon 1961, p. 312) Extracts were published in Babbage (1837).

In Chapter II, on the "Comparison of the mental powers of man and the lower animals," he presents, in compact and well-reasoned arguments, his explanation of the evolution of language (pp. 53–62).

Drawing on the most qualified scientific observations available, Darwin brought together a wealth of comparative, empirical data on nonhuman primate behaviors and insight from other vertebrates, presenting a biological perspective and evolutionary understanding well ahead of his time. In Chapter II, "Mental powers," he laid the groundwork for comparative cognition, showing that animals share many mental traits in common with humans. Language, however, remains a key issue. "This faculty has justly been considered as one of the chief distinctions between man and the lower animals" (Darwin 1871, p. 53). Language is a complex phenomenon and there must have been, by necessity, several mechanisms to produce it. Darwin exhibited great caution and modesty: his model of language evolution answers to the same general laws and principles of evolutionary theory applied to the other mammals, birds, or insects. From this perspective, the general principle of sexual selection also explains how language came to be.

Darwin first noted that

> … articulate language is, however, peculiar to man; but he uses in common with the lower animals inarticulate cries to express his meaning, aided by gestures and the movements of the muscles of the face. … It is not the mere power of articulation that distinguishes man from other animals, for as everyone knows, parrots can talk; but it is his large power of connecting definite sounds with definite ideas; and this obviously depends on the development of the mental faculties. (1871, p. 54)

He also drew an important distinction between the faculty of language and learning a specific language. He saw the language faculty as an instinctive tendency to speak, as can be seen in the babbling of infants, but "not a true instinct as every language has to be learnt" (p. 55). Darwin also noted how the "sounds uttered by songbirds offer in several respects the nearest analogy to language": some bird species have fully instinctive calls and an instinct to sing, "but the actual song, and even the call-notes are learnt from their parents or foster parents," suggesting ample evidence of regional dialects and cultural transmission. These songs are "no more innate than language is to man."

Taking into account the contrasting views of Schleicher (1863) and Müller (1861), among others, on the origin of language, Darwin entertained "no doubt that [articulate] language owes its origin to the imitation and modification, aided by signs and gestures, of various natural sounds, the voices of other animals, and man's instinctive cries" (1871, p. 56). Darwin supposed that primeval man, or an early progenitor, used his voice much as present-day gibbons or nonhuman primates do, producing sounds in cadence, that is, singing. This would have been useful in courting a mate, in expressing a state or emotion, or in challenging a rival. These articulate sounds would

have gradually evolved into words. "It does not appear altogether incredible, that some unusually wise ape-like animal should have thought of imitating the growl of a beast of prey, so as to indicate to his fellow monkeys the nature of the expected danger. And this would have been a first step in the formation of language" (p. 57).

The interaction between the continued use of language and the development of the brain is, however, a crucial element in Darwin's view. He sees the superior development of protohuman cognition as reflecting an increase in intelligence in the hominid lineage under the influence of selection pressures. "The mental powers in some early progenitor of man must have been more highly developed than in any existing ape, before even the most imperfect form of speech could have come into use; but we may confidently believe that the continued use of language and the development of the brain has no doubt been far more important" (p. 57). He noted the effect of brain lesions on the selective breakdown of speech; he considered that language might be necessary to carry "long trains of thought," but that there was also ample evidence that thought and reason could occur without language.

Thus, the evolutionary steps leading to spoken language were initiated by vocal imitation and driven by sexual selection. The main point of sexual selection is that mate choice is a key element in reproductive success. Since the cost of reproduction is usually higher for females than for males, they should be far more selective about whom they mate with than males. These simple biological facts provide an excellent understanding of the courtship behavior and appearance of animal species, within the framework of evolutionary theory. These characteristics are there simply to make the animal, especially the male animal, attractive to members of the opposite sex. A recent review of the human fossil record and comparative primate evidence strongly suggests that singing (and perhaps dancing) may have promoted reproductive success (Mithen 2005). Thus, at some point in human descent, singing was used in courtship, the expression of emotion, and the assertion of territoriality, and this vocal imitation evolved analogously in humans and songbirds. But how was the transition effected from musical protolanguage to meaningful and complex language? How did humans become "a singing creature, only associating thoughts with the tones?" (Humboldt 1836). This is a challenging question for all musical protolanguage theories (Fitch 2011; see also Mithen's, 2005, thorough treatment of this issue).

Darwin also tackled the issue of the relative contribution of gestures and speech in the evolution of language. Although he explicitly acknowledged the role of gesture in meaning, he maintained that this was a secondary role at best (vocal communication was "aided by signs and gestures").

> We might have used our fingers as efficient instruments, for a person with practice can report to a deaf man every word of a speech rapidly delivered at a public meeting; but the loss of our hands, whilst thus employed, would have been a serious

> inconvenience. As all the higher mammals possess vocal organs constructed on the same general plan with ours, and which are used as a means of communication, it was obviously probable, if the power of communication had to be improved, that these same organs would have been still further developed. (p. 59)

Sir Richard Arthur Surtees Paget, one of the last "gentlemen scientists," proposed a more central, causal role for gesture in the evolution of language: early humans communicated via "pantomime," unconsciously making the same gestures with their mouths; eventually, they dedicated their hands fully to labor and spoke orally instead. In his lectures, he often exclaimed "Darwin has not only given us the origin of species, but also the origin of speeches!" (Mills 2009). Modern proponents of a gestural origin of language agree with Darwin that language has arisen through natural processes, but insist, on the basis of studies conducted with chimpanzees, that manual gestures might have constituted a primary mode of communication (e.g. Hewes 1973; see also Arbib 2008; Corballis 2010, for recent discussions on this issue).

It is surprising that Darwin's theory of language evolution has generally received scant attention in discussions of the origin of language. Some of his ideas were indeed pursued by a few researchers such as Livingstone (1973), who considered that the communication system of songbirds supported an adequate functional hypothesis. But Darwin's views on the subject were largely ignored. The virtual dominance of Noam Chomsky since 1957 (e.g. 1957, 1965, 1981, 1986), with his rationalistic model of linguistic theory, may have been partly responsible for this state of affairs. Recent genetic advances in our understanding of the relationship between genes and aspects of language have, however, rekindled interest in Darwin's views. The point mutation in the forkhead box P2 (FOXP2) coding sequence, a transcription factor, was recently identified as contributing to an inherited speech and language disorder in members of the "KE" family. Human speech and birdsong are the best-characterized exemplars of vocal learning. There is now good evidence of the evolutionary, developmental, and real-time roles of FOXP2 in vocal learners, especially in humans and songbirds (Enard 2011; White, this volume; White, Fischer, Geschwind, Scharff & Holy 2006), and a derived variant was shared with Neanderthals (Krause et al. 2007).

8. Current perspectives

The first major concerted effort to examine the origin of language, bringing together over 100 contributors from quite diverse disciplines, was the 1976 conference organized by Harnad, Steklis, and Lancaster (see Harnad, Steklis & Lancaster 1976). It was also the first time that the distinct but related notions of *origins* and *evolution*, and *language* and *speech,* were addressed, revealing the complex nature of the question and heralding the multifaceted developments that were to follow. Modern attempts to shed light on the evolution of language and speech now come from many areas, including

studies of primate social behavior (de Waal 2002; Seyfarth, Cheney & Marler 1980) or animal communication and consciousness (Donald 1991; Slabbekoom & Smith 2002; Smith 1977); the development of language in children (Halliday 1975; Newport 1990; Tomasello 2003); the diversity of existing human languages (Fitch 2011; Haspelmath, Dryer, Gil & Comrie 2005); learning theory (Kymissis & Poulson 1990; Lopez Ornat & Gallo 2004); the anatomical and genetic correlates of language competence (Deacon 1997; Enard 2011; Vargha-Khadem, Gadian, Copp & Mishkin 2005); and theoretical approaches to cultural evolution (Stone & Lurquin 2007). Moreover, the discovery of artifacts and evidence of sophisticated activity on the part of early humans (e.g. Henshilwood, d'Errico, Marean, Milo & Yates 2001; see also Henshilwood and Dubreuil, this volume), coupled with our understanding of the fundamental and clinical significance of the FOXP2 transcription factor, is gradually forcing a unified synthesis on the evolution of language.

Detailed examinations of remarkable Middle Stone Age bone tools recovered in situ at Blombos Cave, dated ca. 70,000 years ago, support the view that the formal production of tools and implements was the result of deliberate technical choices, pushing the occurrence of symbolic and cognitive abilities considerably farther back in time. As well, the relevance of FOXP2 in the vocal production of humans and songbirds and its presence in Neanderthal bones and in all mammals for which a complete genome is available indicate that language should be viewed as a complex adaptive system – in contrast to the static system of grammatical principles characteristic of the generativist approach (e.g. Beckner et al. 2009).

How human language evolved from animal communication remains one of the most challenging questions. Contrasting views on this question abound. For some, the observation that language is a true "species property," "biologically isolated" and instinctively acquired (e.g. Chomsky 2000), leads them to question how language could have arisen from Darwinian evolution. According to the linguistic nativists, children have an innate expectation of universal grammar, as suggested by the "poverty of the stimulus" argument (How can children learn the grammatical rules of their native language by hearing a small subset of correct sentences?). For others, the observation that primates apparently do not have complex language does not contradict its evolution. The implication is that complex language must have originated in our ancestral lines after the separation from chimpanzees, about seven million years ago, giving us a few hundred thousand generations to build our language instinct. Thus, we need not keep looking for homologues to language in other species to account for the existence of language in evolutionary terms. The left brain centers constituting the language organ (e.g. Pinker 1994) are also taken as evidence of a quite special and specifically human brain architecture. However, the linguistic foundations of the classical Wernicke-Geschwind model of the neuroanatomy of language are impoverished and conceptually underspecified, the anatomical assertions of the model have not been proven, and there is good evidence that these brain areas are nonlanguage

computation centers (Deacon 1997; see also Poeppel & Hickok 2004). In addition, the predominant size and anatomical pattern of the *planum temporale* in the left hemisphere, a crucial language area of the human brain (Wernicke's area), are also found in chimpanzees (this feature was found in 17 of 18 chimpanzees examined; Gannon, Holloway, Broadfield & Braun 1998). It would appear that the *planum temporale*, which was already asymmetrical in the common ancestor, further evolved independently to subserve the species-specific repertoires that characterize human and chimpanzee communication and cognition (Gannon et al. 1998, p. 222).

Other issues and questions pertinent to the origin and evolution of language focus on the possible role (and existence) of mirror neurons, gestural primacy in the emergence of language, the genetic determinants of vocal and sequential learning and associated disorders, and the common properties and structural diversity of the world's languages, among other factors. Although an evolutionary framework for the emergence of language is favored, debates on different aspects of the question of origins remain as lively as ever.

Whatever the nature of these debates, progress in our understanding of how language emerged would be greatly advanced by a cogent and coherent view of language evolution. This is still lacking. Such a view should consider how language and the human genome shaped each other (and how language may have contributed to the evolution of the brain); how culture and biology interacted; and when natural selection came into play in the path of language evolution – and for what aspects of language.

In 1769, the Berlin Academy set the *Origin of language* as its prize essay topic for 1771: "Supposing that men are abandoned to their natural faculties, are they in a position to invent language? And by what means might they arrive at this invention by themselves? What is required is a hypothesis which will explain the matter clearly and satisfy all the difficulties." Although Herder won that competition with his essay, his answers to the questions posed are far from satisfactory or inspiring. The jury, however, probably found it comforting to believe that man has special qualities and attributes, distancing our species from the rest of nature. This sentiment is still present in some current views or approaches to the problem of how language came to be.

> In examining the history of mankind, as well as in examining the phenomena of the material world, when we cannot trace the process by which an event has been produced, it is often of importance to be able to show how it may have been produced by natural causes. Thus, although it is impossible to determine with certainty what the steps were by which any particular language was formed, yet if we can show, from the known principles of human nature, how all its various parts might gradually have arisen, the mind is not only to a certain degree satisfied, but a check is given to that indolent philosophy which refers to a miracle whatever appearances, both in the natural and moral worlds, it is unable to explain. (Stewart 1818, p. 24)

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The origin of language as seen by eighteenth-century philosophy

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The eighteenth century constituted a "turning point" in our intellectual tradition: the question of the origin of languages became a question for "natural philosophy" or speculation, which in most cases avoided recourse to religion. This change had solid philosophical bases. By refusing to accept Descartes' idea that language could be innate, the empiricists were obliged to discuss its initial appearance or, in the most extreme cases, the faculties that make it possible to obtain ideas and form them into coherent representations. Two influential models are contrasted. In the speculative model, the important thing was to establish a plausible scenario on the basis of minimal hypotheses. The origin of languages is a fundamental building block in the formation of knowledge, as we can see in Condillac's *Traité sur l'origine des connaissances* (1744). In the historical model, which continued well into the next century, it is the accumulation of knowledge that necessarily stimulated questions about the nature of language and of humanity. In his *Monde Primitif Comparé et Analysé avec le Monde Moderne* (1773–1782), Antoine Court de Gébelin relied on comparisons between the grammars and vocabularies of the languages of the world, and on the vast progress in phonetics made in the eighteenth century from a physiological and acoustic perspective. Thus, these Enlightenment scholars placed the question of language origin in a new scientific/natural and secular context; they were devoted to increasing knowledge and discussing hypotheses on the basis of an ever-growing body of linguistic data. From this point of view, we are all the heirs of the Enlightenment.

1. The "turning point"

In the West, the origin of language and languages has been the subject, in one way or another, of numerous works since Antiquity (Auroux 2007). Although there are few Greek and Roman myths on the subject, the philosophers (following Plato in the *Cratylus*) clearly discussed the fiction of a *nomenclator* or namer who originally assigned names to things. The question was not a trivial one: since the truth of propositions

entails that they have a univocal relationship with the world, is this better ensured by a strict and arbitrary baptism[1] (Hermogenes' thesis) or by homology between the structures of names and things (Cratylus's thesis)? This is not an easy question and it is still alive today in the opposition that philosopher Saul Kripke (1980) posits between "causalism" and "descriptivism." But although the theme of the *Cratylus* has been revisited many times, in a trivial way ("Cratylism" is often reduced to the idea that language arises from the imitation of things), it is treated more as a question for cognitive philosophy than an approach to the origin of languages in the sense we mean here.

When one is interested in the "origin of languages," what is at issue is the fact that humans (and only humans, according to almost unanimous opinion[2] throughout history) speak and they do so with the help of different languages that share certain resemblances, which may be both "generic" (they share the properties that mean that they are languages) and genetic (possible derivations among them). In the Christian West, the representations and discussions have been dominated by the biblical myth (Genesis, *Old Testament*) that introduced the long-lived concepts of primitive monolingualism and genealogical derivation. Adam named the creatures that God assembled in front of him. The building of the Tower of Babel angered God, who "confounded the language of all the Earth." After the Flood, the descendants of Noah induced the parallelism between the genealogies of peoples and of languages. Both the structure and the content of the myth were to frame medieval reflection. In the seventh century C.E., Isidore of Seville revisited these ideas in Book 9 of his *Etymologies* and proposed a genealogy of languages and peoples that can be summarized in the tree in Figure 1.

The eighteenth century constituted a "turning point" in our intellectual tradition: the question of the origin of languages became a question for "natural philosophy" or speculation, which in most cases avoided recourse to religion (secularization). This change had solid philosophical bases. Cartesianism and the natural philosophies that succeeded it posited man as a *spiritual entity* with a *physical substrate* that was becoming increasingly well understood, or as an *individual subject* endowed with *universal properties* (*intellectual* – today we would say *cognitive* – and affective capacities). The specific list of properties remained a much discussed philosophical problem (especially between rationalists and empiricists, who did not agree on what the primitive elementary properties were). As Descartes claims in the celebrated fifth part of his *Discourse*

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1. This is what happens when a geometer writes, "Given a circle C, with a center O…," or when twentieth-century logicians used variables or assignments of variables. Locke maintained that we have retained the freedom Adam had to give names to things.

2. There are Amerindian myths in which all the animals originally possessed speech, but only humans retained it after certain events took place (e.g. a troubled relationship between a jaguar and a human female).

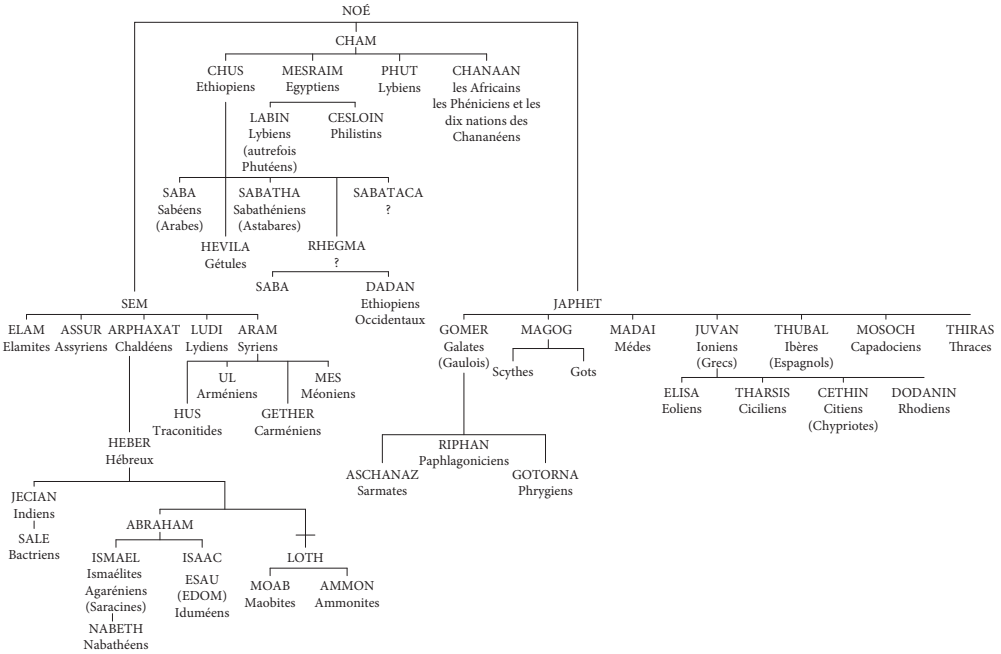

Figure 1. Genealogical tree of languages according to Isidore of Seville

on Method (1636), language, as much as reason (and because of it), is a discriminating feature of humanity. By refusing to accept that the content of reason (ideas) could be innate, the empiricists were obliged to discuss its initial appearance (the origin of knowledge) or even, in the most extreme cases (Condillac), the faculties that make it possible to obtain ideas and form them into coherent representations.

In addition, contact with other civilizations – since the great discoveries of the late fifteenth and sixteenth centuries – disseminated in numerous accounts and reports, led to the recognition (to some extent, at least) of *diversity*. From that point on, most authors assumed a dichotomy between *human nature* (the minimum universal essence, diversely defined) and the *different states of humanity*, known by their institutions (family, society, commerce, etc.). Humans had not remained in their initial state (the "state of nature"); they had created what in the nineteenth century would be named culture. For most thinkers, languages and language belonged to the realm of culture; this meant they had an *origin* and a *history,* which ought to be studied. Most of the great thinkers were interested in this matter, particularly in the eighteenth century, during the Enlightenment. In 1769, the Berlin Academy of Sciences (of which the Frenchman Maupertuis was president) put that question up for discussion, thereby giving official status to a debate that had started some 20 years before:

> Supposing that men were abandoned to their natural faculties, are they in a position to invent language? By what means would they do so? We require a hypothesis that explains the matter clearly and satisfies all difficulties.[3]

2. What is meant by the "origin" of languages?

The question of the origin of languages may refer to two different kinds of facts:

A. The beginning[4] or first appearance of a set of facts that are currently observable and recorded as a discrete set: the origin of French, the origin of Tahitian (*origin of a particular language*), etc.
B. The beginning or first appearance of the entire order of facts to which A relates (*origin of language*).

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3. Unless otherwise indicated, all translations are ours.

4. The distinction between *beginning*, as the first attestable fact in a given category, and *origin,* as the legal foundation of an order of phenomena, was only made explicitly by Kant, in his *Critique of Pure Reason* (1781). However, one can recognize that supporters of the speculative model (see below) dealt with origins more than beginnings; those who, like Rousseau, examined the origin of law were evidently speaking of its foundation.

These two series of facts correspond to questions that are structurally quite different. For A: What is French (or English or Tagalog)? Where does it come from? Of L_1 and L_2, which is older? What was the first language of humanity? For B: What is human language? Where is the difference between what is language and what is not, between humans and other animals? In other words, research on the origin of language is research on the essence (the defining properties) of human language. Today, we tend to consider that these are two very different kinds of questions: one set considers the origin of languages, the other the origin of the faculty of language. For the scholars of the eighteenth century, the distinction was not so clear-cut: one could very well, in a single cognitive movement, envisage constructing a genealogical tree of known languages, determine what its root was (the first human language), and address the issue of its emergence. In these conditions (which largely define what we call the "historical model"), there is no clear demarcation between the origin of languages and the origin of language.

Questions of type A are profoundly influenced by progress in the knowledge of languages, what is sometimes called the "grammatization" of the languages of the world (see below). It is not particularly surprising to meet with considerable diversity in methods and theses. Nevertheless, one can distinguish between two general research models: an abstract or "speculative" model and a more concrete or "historical" model.

3. The speculative model

By speculative model, we mean any approach that constructs a development model that rules out chronological determination or, more specifically, excludes from its investigation the question of the historical reality of what it describes (it is not a matter of reconstructing humanity's first language). Rousseau's injunction, "Let us begin, then, by laying aside facts" (*On the Origin of Inequality,* 1755), formulated in the domain of law (since it referred to the opposition between law and facts), was undoubtedly excessive. Nevertheless, it constituted a critical reference for Condillac, in situating the exact scope of his research: "When I speak of a first language, I do not claim to establish what men did; I think only that they could have done it" (*Grammaire*, 1775/1947–1951, I.II). In other words, we remain in the world of the possible, that is, of essences. In no way, though, does this rule out the use of anthropological facts to illustrate or define the possible.

In modern terms, we can say that the important thing was to establish a plausible scenario on the basis of minimal hypotheses. The first hypothesis (or founding axiom for this kind of research): in the state of nature (without society), humans do not have language in the sense we give it; they must create it (cf. the formulation of the

Berlin Academy). Second hypothesis (this is actually a class of possible hypotheses): humans, as subjects (individuals), have a certain number of properties. These properties may be: (1) intellectual faculties: reflection (in Locke's terms), circumspection (*Besonnenheit*, for Herder), or reason (Maupertuis); and/or (2) more feeling faculties: need (Condillac), an instinct of sociability (pity) for Rousseau, imitative capacity, etc.; and/or (3) physical properties: ability to produce certain sounds (based on physiological and acoustic determinants), as a function of certain motivations. The aptitudes at issue in the various hypotheses used by these authors presuppose an activation by initial causes (which are not necessarily the zero-level for humans); in other words, placed in certain circumstances, men (or more rarely a single man, as for Maupertuis) with certain faculties created the first language and developed it to the state of present-day languages.

The main texts on the origin of languages were produced by empiricist philosophers addressing the origin of knowledge (Hobbes, Locke, Rousseau, Condillac), by their critics (Leibniz), or in grammars (see below on Condillac, who was far from being a unique case). The question was addressed by authors who were interested in the relationship between thoughts and languages (another question posed by the Berlin Academy), such as Michaelis and Süssmilch. One also finds numerous *ad hoc* treatises. The best known are listed below:

Pierre Louis Maupertuis, 1748/1768, *Réflexions philosophiques sur l'origine des langues et la signification des mots*.

Anne-Robert-Jacques Turgot, 1750, *Remarques critiques sur les Réflexions philosophiques sur l'origine des langues et la signification des mots*.

Etienne Formey, 1762, *Réunion des principaux moyens employés pour découvrir l'origine du langage, des idées et des connaissances humaines*.

Johann Herder, 1770, *Abhandlung* über *den Ursprung der Sprache*.

Jean-Jacques Rousseau, 1782, *Essai sur l'origine des langues* (first publication of a text originally sketched out when he was writing the *Essai sur l'origine de l'inégalité*).

Adam Smith, 1784, *Considerations Concerning the First Formation of Languages and the Different Genius of Original and Compounded Languages.*

The origin of languages is a fundamental building block in the formation of knowledge, as we can see in Condillac's *Traité sur l'origine des connaissances* (1744). As feeling animals, plunged in the flow of information that the world conveys to them, humans can only acquire memory, an indispensable faculty for all knowledge, with the help of signs, that is to say, a connection between at least two elements. Such signs may belong

to three classes. Objects linked to our ideas by the circumstances of our encounters with the elements of the world may "awaken" these ideas when they reappear. Thus, they are *accidental signs* of our ideas. Nature (the physiology of our body) links certain cries to our feelings; these are the *natural signs* of these feelings, which by empathy are likely to trigger these feelings in other people. With the concept of natural sign and its functioning in the case of a human receptor external to the subject, we are entering the domain of communication. Moreover, it is no longer objects of the world that are the signs of our representations, but sounds that are the signs of certain mental states. Nevertheless, this does not yet constitute the mastery of a language: we are not yet the "masters" of signs, since they are not available in response to our will but are governed by the circumstances that trigger our feelings. Only the *instituted signs* that we choose ourselves can be recalled at the subject's will; that is, the subject is the "arbiter." Consequently, the signs are "arbitrary" and give people the real possibility of remembering and constructing knowledge voluntarily. These signs alone correspond to what should be considered as language.[5]

Arbitrary signs are not natural signs that have been instituted, since the two classes are incompatible. Thus, there is an absolute and fundamental discontinuity between the third class of signs and the other two. This qualitative leap (or demarcation principle) separates humans from other animals, "nature" (all immutable entities) from culture. It inserts humans into history, which also separates them from God. Condillac concluded that, since God has no existence in time, given that he is unchanging and coexists with all time, he neither speaks nor counts.

What Condillac shows in his *Traité* is that there are conditions on the appearance of knowledge, namely the possession of signs with certain properties. This was a question for the philosophy of knowledge, rather than a complete examination of the origin of languages. The latter question was to be addressed more fully in the *Grammaire* (1775).

The first means that humans possessed to express themselves were gestures, facial movements, and inarticulate sounds. They constitute the *language of action,* which is natural to all individuals of a single species but needs to be learned. From the observation of one's own expressive activity, one moves on to the interpretation of what other people thereby experience. Communication therefore emerges from the projection of the means of expression each subject has at his or her disposal.

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5. In modern terms, we would say that Condillac considered that *semantic independence,* the fact that human language is independent of external stimuli in its use, is its essential characteristic. This independence is acquired, whereas for the rationalists, it results from an intrinsic capacity of the mind (e.g. for Kant, original synthetic apperception).

Although for empirical philosophers, there are no innate ideas, there is still an *innate* and *natural language*.[6] In this natural language, there is simultaneity[7] in the designation of what occurs at the same time. But the language of action allows for the analysis and decomposition of thought and thus it extends by analogy[8] with the help of *artificial signs*.[9] In so doing, we represent things not according to their nature but according to our representations.[10] The transition to vocal language is an extension of the expressive capacity of cries, due to their preferential link to the expression of our inner life. Voices (cries) belong in fact to the language of action, but they are particularly appropriate to express what one feels and thus are artificially perfected.

We have stressed the great schism between nature and culture that led to the concepts of instituted sign and arbitrary sound in Condillac's *Traité*. In his *Grammaire*, the question of "nature" and its relationship to language is indisputably more complex: "(…) languages are the work of nature; (…) they are formed, so to speak, without us; (…) by working on them, we have only made them servilely obey our manner of seeing and feeling." We can clearly see the schism between natural entity and cultural entity (the institution), between what is a human production (artificial) and what is not. But "nature" and "natural" possess an ambiguity that we find with a goodly number of Enlightenment thinkers. Nature is first of all the *initial situation*; in this sense, it

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6. An "innate language" without innate ideas is in some sense a set of *signifiants* that pre-exist *significations*.

7. By simultaneity, we mean the fact that, in the representation of an object that impinges on our senses, all the properties of this object are present at the same time; only later does the analysis of this representation make it possible to distinguish among them. In Condillac's view, well-constructed knowledge is a successful analysis; in his posthumous work *La logique*, published in 1780, he would claim that this is a well-constructed language.

8. The analogy (which can be seen in languages evolved by derivation) refers to the fact that the relation between the different representations must be homothetic to the relation that connects the various objects of these representations. If two elements arise out of the decomposition of a representation, all three signs concerned must show this relationship by means of a certain link between them.

9. This refers to signs created by humans, which therefore do not pre-exist the act that instituted them. Condillac asserts that they are not "arbitrary." In fact, he abandons the meaning of this word used in the *Traité* (which was already out of date at that time) in favor of the more general meaning of "without reason." Signs cannot be absolutely anything given that they must be linked by analogy.

10. In this point, we must see a condemnation of Cratylism, which posits an original resemblance between things and our representations of them. For philosophers like Condillac, who follow the Cartesians in this regard (Spinoza: the idea of a circle is not round), this is an absurd hypothesis since our immaterial representations (which therefore have no spatial dimension) do not belong to the same ontological order as the material world.

is something *absolutely universal* and *independent of human will*. Finally, the natural is also whatever was active at the time of this initial universality and its universal deployment. In some sense, language, which only fully exists in its institution outside nature, comes from "nature" and is "natural" to humans. The only limitations on it are those on the progress of our culture: "(…) languages cease to progress when men, ceasing to create new needs, also cease to create new ideas." This kind of ambiguity may appear to nullify the argument. Language is born naturally from nature, it develops in natural steps with the help of instituted signs, but there is an insurmountable gulf between the essences of the institution and of nature.

The status of the models of language origins that we find in authors such as Condillac (whom we have used as a canonical example because his theory is probably the finest-grained and most complex) is quite clear. His model is a thought experiment of the same kind as that evoked by empiricist theoreticians of knowledge (Diderot used the concept of a "theoretical mute"); we can call it "*fiction*." These fictions make profound contributions regarding the nature of language (e.g. its characterization by semantic independence). Their contributions to the question of the origin of languages (other than the undeniable fact of clearly posing the question in rational terms) are more tenuous. All the discussions concerned various a priori concepts of human nature; the opposing solutions themselves therefore depended on a priori assumptions. There was no possibility of falsification (and little of confirmation!): there were no sufficiently well-established facts, not even in the domain of physiology, to reject a model or discuss it on an empirical basis. Paleontology did not yet exist and the anthropology contained in the accounts of travelers and missionaries gave only sporadic results. These models inevitably raise a profound question for us today: What might constitute a "fact" in the question of the origin of languages? If it happened that we could only make use of facts concerning our faculty of language, would we not have do as these authors implicitly did, namely distinguish between the question of the origin of languages and the question of the first language, which would remain beyond our reach?

4. The historical model

For a long time, the West was content to provide "linguistic tools" (mainly grammars and dictionaries) for one common language of culture (Greek) or, by transference, for another language that replaced it in that role (generally Latin).[11] With the Renaissance, the grammatization process experienced exponential growth: the colonization of the

11. For a survey of the history of the language sciences, see Auroux (1989–2000).

world led to the grammatization of the languages that were encountered there, while the development of nation states formalized the European languages (Auroux 1994). It might seem surprising today, but the grammatization of the European vernacular languages was strictly contemporary with that of the other world languages. (The first manuscript grammar of Nahuatl dates from 1547, while Nebrija's Castilian grammar goes back only to 1492!) To grasp the massive nature of the phenomenon, one need only consider the example of Spanish linguistic works on the Amerindian languages: end of the sixteenth century, 33 languages; end of the seventeenth century, 86 languages; end of the eighteenth century, 158 languages! The knowledge of these languages was gained through a process of in-depth grammatization; when one does not possess true linguistic tools, one starts out by establishing basic vocabularies, which may then give rise to comparisons and relationships (Muller 1984).

This kind of accumulation of knowledge necessarily stimulated questions about the nature of language and of humanity. By collecting all the materials available, one may form a plan to answer such questions. This is what two well-known authors actually did:

Antoine Court de Gébelin, *Monde Primitif Comparé et Analysé avec le Monde Moderne*, 1773–1782

James Burnet, Lord Monboddo, *Of the Origin and Progress of Language*, 1773

These two weighty and celebrated works had a fundamental philosophical aim: for the former (representing the Reformed Church of France), it was to show the continuity between nature and culture, while for the latter it was to take stock of empiricism and Aristotelianism. Thereafter, numerous compilations appeared that represented this type of program, with more emphasis on the compilation aspects:

Abbé Lorenzo Hervas y Panduro, *Catalogo delle lingue conosciute e notizia della loro affinita e diversita*, 1784; *Catalogo de las lenguas de las naciones conocidas, y numeracion, division y clases de estas segun la diversidad de sus idiomas y dialectos*, 1800–1805.

Peter Simon Pallas, *Linguarum totius orbis vocabularia comparativa Augustissimae cura collecta*, 1787–1789 (based on a survey ordered by Catherine II).

Johann Christoph Adelung and **Johann Severin Vater**, *Mithridates oder algemeine Sprachenkunde mit dem Vater unser als Sprachprobe in bey nahe fünfhundert Sprachen und Mundarten*, 1806–1817.

Adrienno Balbi, *Atlas ethnographique du Globe ou classification des peuples anciens et modernes d'après leurs langues*, 1824.

This movement therefore continued systematically into the next century, often using short texts such as the Lord's Prayer as a basis of comparison (Adelung and Vater).

The languages surveyed increased from around 60 in Court de Gébelin's work to 500 for Balbi, who conjectured that there might be 2,000 languages in the world. The first work of the "comparativists" (by whom we mean the linguists who were to dominate the nineteenth century) was done in series of this type, some of which had more limited scope (e.g. only Asia or Europe). It was Vater who, in the preface to volume 2 of *Mithridates* (1808), used the neologism *Linguistik* to designate the science that studies "the properties of different languages, classifies them, and, on that basis, draws conclusions regarding their genealogy and their properties" (see Auroux 1987). Not only did this grouping into families possess the same structure (genealogical tree) as the biblical myth but its systematic pursuit (in particular by comparison of basic vocabularies, but also by comparison of grammars) was not a new feature of the end of the eighteenth century (and still less of the comparative grammar of the nineteenth). Scholars started working to establish families almost automatically as soon as they had sufficient information in one place. In the seventeenth century, the Semitic[12] and Neo-Latin families were easily isolated; in the eighteenth, it was the turn of the Carib, Sioux, Algonquian, Austronesian (or rather, as they said in the nineteenth century, Malayo-Polynesian), Finno-Ugric,[13] and, of course, "European,"[14] the unity of which had already been presupposed by the concept of "Japhetic languages," then the more secular one of "Scythic languages" (Droixhe 1978).

Needless to say, this huge increase in knowledge was not free of errors. Hervas (1800–1805) did not hesitate to claim that Sanskrit[15] was the source of all the languages of India, including the Dravidian ones. But this was undeniably a constructive field, which was making progress by mastering new information, forming hypotheses, and discussing (or correcting) the latter on the basis of known facts. If we rely on the content and frequency of publications, we can say that, in the last third of the eighteenth century, this concrete model quantitatively supplanted the speculative model, although there was never any open opposition and the latter model was never totally overcome. The dominant factor in the new model was evidently learning. Hervas' work cannot be understood apart from his position as Vatican librarian, where he questioned the Jesuits on their return from the Americas after their expulsion. Of course, regardless

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12. In fact, as early as 1554, Angelo Canini had made considerable progress in this regard.

13. Samuel Gyarmathi (1799).

14. Abbé Carlos Denina (1804).

15. The first information about Sanskrit goes back to Sassetti (1583/1995). The similarity of the third-person singular of the present form of the verb 'to be' in Greek (*esti*) and Sanskrit (*asti*) was an intuitive commonplace. However, Sanskrit remained little known by Westerners (the first Western grammar of the language, by Paulinus of St. Bartholomew, was published in Rome in 1790) until the work of William Jones (see below).

of the importance of the strictly compilational nature of the research, it raised some general linguistic and anthropological hypotheses. This was true for Monboddo and it is easy to understand that the Jesuit Hervas was unable to renounce the unity of human nature or deny the role of God. Nevertheless, to transform this comparative methodology into a research program on the origin of languages, it had to be related to the growth in the material knowledge of the human articulatory system.

The eighteenth century witnessed undeniable progress in phonetics, from both a physiological and an acoustic point of view, as well as by comparing the two. To get an idea of the level of physiological description achieved by physicians, one need only examine one of the anatomical plates published by Court de Gébelin.

In addition to a more accurate physiological description of the phonatory apparatus, progress had also been made in acoustics since Sauveur (1701) developed the theory of vibrating cords and scholars had noted the analogy with wind instruments (flute).[16] The ability to distinguish between sound (periodic) and noise (nonperiodic) and to give an acoustic definition of vowels and consonants emerged at the same time (Harduin 1760, *Dissertation sur les voyelles et sur les consonnes*). It was immediately translated into a physiologically interpretable model. Vowels were seen as sounds produced in the trachea (viewed as a kind of flute), while consonants were noises produced by the interposition of an organ (lips, throat, teeth, palate, tongue) that interrupted the sound.[17] Progress in acoustics did have its limitations; only in the mid-nineteenth century was the role of resonance understood (Helmholtz), and consequently scholars were unaware of the function of the different formants due to the nasal, oral, and laryngeal cavities. The consequence was grave: the difference between vowels was assimilated to a difference in pitch (the linear model[18] of the flute) and *a* was treated as a primitive vowel, a conception that would continue to affect the first discussions of Indo-European vowels in the 1830s and 1840s. Thus, discoveries at that time did not always have good consequences from the point of view of linguistics. This was true, for example, of the role of the vocal cords, the "lips of the glottis" (Dodart 1700 in a paper presented to the Academy of Sciences; Ferrein 1741 in his thesis on

16. The analogy so often made between musical instruments and the phonatory apparatus was the basis for some extrapolations that appear astonishing today: in Rousseau's view, music and language have a common origin.

17. To these five organs, certain (French) authors added the nose, ratifying the purely orthographic role of consonants (*m* and *n*, in *em* and *on*) to nasalize vowels.

18. The first (nonlinear) representations of what was to become the vowel triangle are due to Hellwag (1781) and emerged from the consideration of articulatory positions, without recourse to acoustics. For more on the history of phonetics, see Auroux (1979, pp. 245–268; 1989–2000, vol. 2, pp. 598–606).

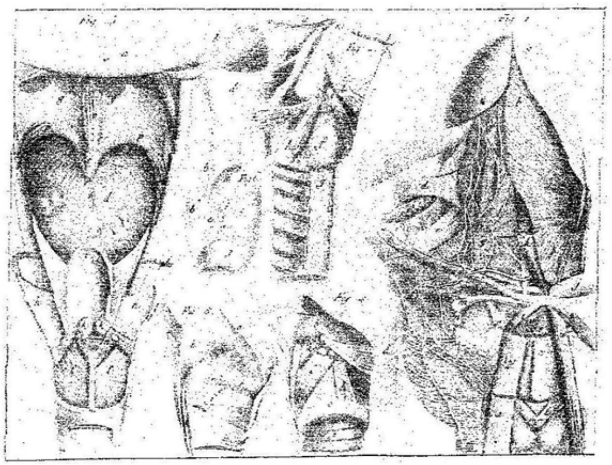

Planche anatomique extraite de l'Histoire Naturelle de la Parole (1776) d'Antoine Court de Gébelin. (See note 21)
Les figures de cette planche ont été dessinées d'après nature et gravées par M. Gauthier Dagoty, père. Les explications sont de M. Dessault chirurgien à Paris.
Figure 1. — *Partie antérieure du larynx et du haut de la trachère artère vus par en bas et du côté droit.*
Figure 2. — *L'os hyoïde, le larynx et le haut de la trachée artère. vus par derrière et du côté gauche.*
Figure 3. — *Partie postérieure de la tête, du larynx et du haut de la trachée artère.*
Figure 4. — *Partie postérieure droite du larynx et du haut de la trachée artère.*
Figure 5. — *Intérieur du côté gauche du larynx, coupe verticalement de devant en arrière.*
Figure 6. — *Côté gauche du larynx dont la portion gauche du cartilage tyroïde a été coupée.*

Figure 2. The phonatory apparatus according to Court de Gébelin

medicine). The recognition that the key factor was vibration speed and not openness, as had been believed since Antiquity, became possible thanks to the vibrating cords model; however, this recognition led many grammarians to replace the opposition between voiceless and voiced consonants by an opposition between strong (fortis) and weak (lenis) ones;[19] we know today that the two sets of concepts are not equivalent.

It was the conjunction of purely philological discoveries concerning the languages of the world and their relationships with the discoveries regarding the physiology and acoustics of speech that gave rise to the first great scientific program on the origin of languages. This was first formulated by the parliamentarian Charles de Brosses in his treatise on the mechanical formation of languages (1765). "Mechanical" here means

19. The musical acuity of men at that time led them to distinguish between voiceless and voiced consonants (some consonants were "preceded by a small release of voice") by ear and to deny the composite nature of nasals (Dangeau 1694). It should be noted that in French, the voiceless stops (*p, t, k*) are also fortis and the voiced ones (*b, d, g*) are lenis.

"resulting from the arrangement of parts" and thus is both "natural" and "physical." The first language was made up of "natural," primitive sounds: these would include the vowel *a* and the consonants produced by the five organs. For language to exist, these elements had to have meaning: in de Brosses's view, they were naturally related, by an affinity related to imitation, to certain elements in the world and thus constituted the first language of humanity. Therein lies the great theoretical weakness of conceptions of language origins, which still persists today. If, for example, labials are related to the idea of "discharge," what is the status of this "idea"? How can it be defined in the absence of other elements? Is it truly the meaning of an element in a given language or is it a way of classifying a set of derivative phenomena in the grammarian's metalanguage? Whatever the case might be, once the concept of primitive language was admitted, the President of the Parliament of Burgundy adopted the idea of derivation from this language of all the other languages of humanity, which their history had then made largely arbitrary. The great novelty of this program was using the regressive approach: by comparing the languages of the world, one should be able to work back to the primitive elements. He launched the *Universal Nomenclator* program, which would make it possible to classify all words by their natural origin.[20] Thus, the program had a basis for empirical confirmation, by means of comparison. It was Antoine Court de Gébelin who would apply this ambitious program.

Even in the prospectus for his *Monde Primitif* in 1772, Court de Gébelin planned to connect the "primitive world" of nature with the world of the mind. In some sense, it was nature itself that, in humans, became meaningful through language and gave rise to the world of symbols and the mind. There would not be another project so huge (or so crazy!) until Hegel, at the height of Romanticism. There was therefore *one* "natural" and universal language: the organic language discovered by de Brosses from which all languages were derived. To demonstrate this, all that had to be done was to compare all languages (represented by their basic vocabularies) according to a scientific method and thereby to reconstruct the "primitive language," for which Court de Gébelin planned to write the dictionary. This method is clear. The word is the fundamental element of all change. Inside the word, sounds can change in a contingent (arbitrary) fashion, while remaining in the domain of the same articulatory organ. If one can relate one word to others by (contingent) sound changes, due to linguistic devices (metaplasm, such as permutation, metathesis, etc.), then provided one can relate their meanings by a "figure of meaning" (trope such as metaphor, metonymy, etc.) or a series of such figures, one is

20. De Brosses favored the method of positing relationships by comparing basic vocabularies. He made extensive use of it in his *Histoire des navigations aux terres australes* (1760), which empirically envisaged the possibility that were was a continent in the south Pacific. The French interest in this question was reflected by Bougainville's voyage and the discovery of Tahiti, which we will consider at greater length in relation to Court de Gébelin.