Consciousness, communication, speech: A condensed view of the origins of language

Walter A. Koch
Ruhr-Universität Bochum

0. Introduction

The following bits of thought are to outline a general framework for reconstructing the origin of language. More particularly, they will dissuade us from indulging in ‘single step’ or ‘big bang’ kinds of theory. The evolution of language needs many modes and many stages. We should more properly speak of the ORIGINS of language. And, even more specifically, it is proposed that one of the decisive sub-steps in the evolution of modern oral language – contrary to widespread theories – is a trend-setting innovation in LEXICON, rather than in syntax.

Figure 1: Language as a stabilizing factor for consciousness. The graph is not exactly drawn ‘to scale’ (‘bya’ = billion years ago, ‘mya’ = million years ago, ‘kya’ = thousand years ago).

1. Consciousness

As a rule, consciousness, not unlike any other emergent phenomenon, boasts many related phenomena which precede and follow it. It seems of great importance to know which of the many stages in the crude continuity of evolution is to be considered as an innovative PROTOTYPE. Figure 1 proposes a preliminary
version for the co-evolution of consciousness, communication, and language. One might argue about whether consciousness\(^1\) starts out with the particular brain structure of early mammals (100 mya\(^2\)) or as late as with the advent of hominids (Changeux 1985). Similar things hold true for the onset of communication. It could be said to start as early as physical evolution (cf. Figure 5) or, more prototypically, with the stereotypic communication (‘displays\(^3\)’ of early primates, some 50 mya. The main point here is to emphasize the importance of \textit{continuity}, the need for finding as many discontinuous stages as possible, and, finally, the singling out of prototypes. We need elaborate pictures of prototypically segmented co-evolution in order to assess the various types and directions of \textit{selection}. In Figure 1, oral language, whose prototypical onset is assumed to have occurred 100 kya, is thought to have contributed to a greater stabilization\(^4\) of communication and consciousness.

Figure 2: Prototype(s) for evolution of language. A = Helen Keller; B,C = British Sign Language (BSL; after Miles 1988) signs for ‘short’ (B) and ‘discouraged’ (C); D = simple hypothesis as to the origin of modal varieties of language.

\section*{2. Continuity and prototypes}

In the long list of prototypes for human communication, the prototype for ‘language’ tout court is often located in a ‘core grammar\(^5\)’ which is common to
all of today’s oral languages. If, however, we are really interested in the structural (or ‘neural’) site for primary, secondary, etc. innovations, it may be unwise to concentrate on oral language. Is the modern capacity for language not something deeper in the mind? As the blind, deaf-mute Helen Keller poignantly demonstrated, the said capacity does not depend on orality. Similar things obtain for spontaneous and established sign languages such as British Sign Language (Figure 2, B, C). The prototype we are searching for may reside in a pantomimic language (Figure 2, D), an ordered combination of pantomime, gesture, and vocal signs. The – as yet unanswered – question remains, of course, to what extent a pantomimic prototype could have alleviated the burden of innovation for the prototype of oral language.

Figure 3: Co-evolution and bi-perspective for language origin

3. Co-evolution and bi-perspective

Besides more or less elaborated versions of the traditional linguistic approach to the topic of language origin, there are external approaches such as those of neurocognition or neurophysiology. Ultimately, there is an entire eco-environment of coevolving systems. The minimal constellation for reconstructing
the evolution of language is the bi-perspective between an inside (Figure 3: shaded box) and an outside view. Figure 3 gives us an example of the eco-genesis of language. Here, language is aided and abetted by the emergence of the particular ‘mother-infant dyad’ of early hominids (e.g., Wilson & Keil 1999, Langton 1995, Steels 1997, this volume, Pinel 1990, and Joseph 1990). This was a particular condition for orality, then, and not necessarily for pantomime or gesture.

4. Bickerton’s Three-Stage Model

Among the theories arising from the more traditional approach\(^\text{10}\), it is especially those developed by Derek Bickerton (Bickerton 1981-1999, Calvin & Bickerton 2000) that, to my mind, stand out as a felicitous combination of powerful theorizing and challenging hypotheses on concrete language material. Bickerton comes to think of three stages in linguistic evolution: (1) no language, (2) proto-language, (3) language. ‘Proto-language’ is manifested in ape talk, the two-word stage of small children, pidgins, etc. ‘Language’ in its (morpho-syntactic) core is said to be due to an innate bio-program. The existence of the latter is suggested to manifest itself in first-generation Creole children who ‘invent’ morpho-syntactic rules – apparently without any help from linguistic input\(^\text{11}\).

![Diagram of single-step emergence of language](Bickerton 1999: 352)
5. Bickerton's single-step explanation

One has the impression that the sole dramatic point in the evolution of language is thought to be the transition between Proto-language and Language. Bickerton pinpoints this supposed transition in what appears to be a singular event. Figure 4 reproduces the graphic rendition of his hypothesis. The pinnacle of language evolution is the capacity for modern syntax. The latter could evolve only on the basis of the ‘representation of phonetic structure’. Rudimentary syntax, on the other hand, is said to have been prefigured by the ‘thematic roles’ of which pre-human primates are supposed to have been capable. The decisive (‘catastrophic’) step is said to be the sudden emergence of a neurofunctional link (‘A’ in Figure 4) brought about by some reshuffling in the human genome. This link provided humans with modern syntax and, thus, with their present-day language.

Bickerton’s theories will turn out – in my view – to be over-dramatizations of restricted perspectives. Against the backdrop of his main arguments, I will sketch out ten areas (sections 6 through 15) in which complexity has not been sufficiently considered.

6. Evolution of communication

‘Information’ is a basic aspect of the cosmos and of any physical system. While information is, in principle, unidirectional, ‘communication’ is at least bidirectional. Here, feedback is an essential ingredient. Thus, in Figure 5, communication starts with the big bang, 20 bya (Barrow & Silk 1988: 166). On our graph, in addition, nine more stages are being proposed. Communication within systems is called endocommunication (e.g. hormones within the body). Exocommunication is the exchange of information between systems. ‘Perception’ is a case in point. ‘Stereotyped’ refers to the fact that certain processes have become truncated or abbreviated. The abbreviated version is more flexible and agile. The shorter version therefore becomes the sign of the longer version. Signifier and signified are in a relationship of pars pro toto or index (Nöth 1990: 107ff.). An example is the teeth baring involved in the scream-call of a chimpanzee. It is a display (Wilson 1972, Smith 1977) that communicates anger or fear. Teeth baring originated from ‘the real thing’, namely biting. It is its initial phase.

Almost all of the millions of different displays in the animal kingdom are indices. Within bodies, nature has found ingenious ways for producing the next, more powerful stage of signing, namely the icon. Put very simply, an icon makes a copy of what it refers to. An antibody of the immune system reacts with the antigen in a lock-and-key fashion, i.e. it behaves like an icon of the intruder. There are many such iconizing processes in endocommunication. Exocommunication hit upon the idea of icon when it invented perception some 500 mya. But for almost 300 million years, stereotyped exocommunication, i.e. ‘animal communication’ stricto sensu, has tried in vain to harness the icon to its particular purposes.
Figure 5: The evolution of communication (c).

Schemes are prototypes of the differences between systems evolving from 20 bya up to the present. Endo-c = _, exo-c = _, stereotyped (foreshortened) exo-c = _, communicative partners = _, O, _, From B/VI onwards, only one communication partner (_) is explicit. Each partner in exo-c has two components: s(ensory) input and m(otor) output. When sensory _ evolves into an ‘overload’, it exercises pres sure (       ) (but without any avail) on a corresponding _, which is too simple. It is only with Homo sapiens sapiens that this perceptual/cognitive overload is enabled to spill over (       ) into stereotypes, i.e. ‘language’ (for details, cf. Koch 1998: 709ff.).
There has been, over millions of years, an intrinsic asymmetry between the sensory part of ‘normal’ behavior (Figure 5: VIIB through IXB) and the motor part of animal communication (VIIC through IXC). The iconicity of perception and of the growing complexity of its processing (‘thinking’) was faced with an extremely poor potential for expressing itself. For eons, there has been a cognitive pressure for expression. Only humans succeeded in inventing an initial key to iconicity, which, little by little, opened up successive areas of human cognition: lexicon, sentence, text, metaphor, myth, world models, etc. The question is what kind of sensory-motor niceties led humans to this ‘clever’ ploy. But before we go into this question, let us remember one simple law of sign evolution:

(1) nonsign > index > icon

Figure 6: Content (cognition) vs. expression. There is a fundamental polarity in communication between ‘content’ and ‘expression’, ‘cognition’ and ‘communication’, ‘reference’ and ‘manifestation’, and between ‘signified’ and ‘signifier’. The organization of the vertical interrelation between sensory (S) input and motor (M) output ultimately leads to stratification. By contrast, the horizontal dimension is planification: text (T), syntax (S), words (Lo), and morphemes (Mo) are ‘planes’. (Remember that ‘_’ refers to index and ‘_' refers to icon, cf. Figure 5).

7. Evolutionary hierarchy of manifestation

Figure 6 gives us a simple picture of the evolutionary hierarchy of manifestation and cognition. Let us focus on the manifestation or motor behavior (M). In Figure 6, evolution proceeds in the direction of the open arrows. Thus there is a mirror symmetry between cognition and expression. As far as human observers...
can make out, cognition (including perception) is more discrete and realizes more objects and processes than becomes evident in the corresponding motor behavior (MΔ). That is exactly why, through millions of years, 'cognition presses for expression'. Manifestation of cognition becomes richer and more efficient through the invention of 'stereotyped exocommunication, i.e. of animal communication (M\(\uparrow\))}. We assume that cognition makes a leap forward when prototypically human communication or 'language' is invented. Its overall manifestation will at first be PANTOMIMIC (M\(\downarrow\)\(\uparrow\))\(^{22}\). We assume that Homo habilis\(^{23}\) becomes essentially capable of making manifestation iconic. Later, pantomime will condense into GESTURE (M\(\downarrow\)\(\uparrow\)) and, finally, into VOCAL GESTURE (M\(\downarrow\)\(\uparrow\)), i.e. phonemic representation will take over. Today, human communication is being expressed by all five types of manifestation, with oral language being by far the most powerful one. In other words, iconicity was the crucial pacemaker and had to be reinvented ( reapplied) many times (i.e. it reemerged in stages 2, 3, and 4 of Figure 6).

8. Evolutionary hierarchy of cognition

It does not seem to be entirely clear how thinking (especially with respect to syntax) is structured before being put into oral language. Bickerton (1999) seems to attribute theta rules to 'primate thinking', i.e. to a stage when we have, at best, animal communication. It would be extremely helpful if we knew more about units and their combination in any type of cognition (cf. the five types of S in Figure 6\(^{24}\)). But it seems to be clear from the outset that hominids had more at their disposal than their primate cousins had. It is very likely that, two million years ago, Homo habilis boasted a pantomimic language (M\(\downarrow\)\(\uparrow\)), i.e. a means for correlating motor output with cognitive (sensory) input in an iconic fashion (stage 2). If this can be assumed, subsequent inventions (or 'discoveries'), namely gestural and vocal iconicity, lose some – certainly not all – of their 'punctuated' miraculousness.

9. Planification of language

The vertical dimension of the language model in Figure 7 is tantamount to the relationship between cognition and manifestation, a dimension we have been discussing in the preceding paragraph (Figure 6). The horizontal dimension is what I call 'planification'. The smallest plane is the morpheme (Mo), the most complex one the ‘N-Texteme’ (NT), i.e. a definite number of different texts which enter into a mutual relationship, as in a debate. It is obvious that the text plane (texteme, discourse: T) should not go without its surrounding situation (Si) or its PRAGMATICS. This much will do for a preliminary comment on the L-model (Koch 1971, 1974).

In the diachrony of language and also in its larger-scale evolution, there is a tendency of structural transport which leads from higher to lower planes:

\[ (2) \quad T > S > Lo > Mo \]
The origin of language thus saw, first of all, ‘T’ (or ‘BT’, for that matter). When texts became more numerous and longer, smaller segments emerged: sentences (S), words (Lo), and morphemes (Mo). But this picture becomes more complicated when we think of T and S as being initially manifested by only one word. So, in the beginning, we have only the word – used as an utterance or text. A many-word sentence should follow certain rules as to the relative position of its words. We will have to enquire about the evolutionary background of such rules (section 10). Yet, at the very beginning of language, we are faced with a more fundamental problem: Where do we get the raw material for language?

Bickerton and many other researchers seem to take the human discovery of words for granted. The ingenuity of Bickerton’s Creole children became manifest in their applying their inborn syntax to the only linguistic input they seemed to have, i.e. to the seemingly unordered series of pidgin words. Such words themselves seemed to be available everywhere, from times immemorial. They did not appear to have any evolutionary history. And it seems ‘natural’ to Bickerton that they should be essentially arbitrary, to boot.26

I hope to make it fairly clear that ‘arbitrariness’ or ‘convention’ are characterizations of structural behavior or mental processing which humans are,
no doubt, capable of, but which are not so easily come by – out of the blue, as it were. Convention (or Peircean SYMBOLICNESS\(^{27}\)) will only be trusted if it is based on motivated naturalness, i.e. on indexicality or iconicity. I claim that it is on the iconicity of words that 'all the rest' hinges.

10. Evolution of syntax

Even in mainstream linguistics, there seems to be agreement as to some portion of iconicity being present in modern syntax. Iconicity and phenomena of its erosion (Haiman 1985a,b, Givón 1990) are recurrent topics. In principle, and as far as the supposedly underlying neuroconnections (cf., e.g., Givón 1990: 976ff.) are concerned, iconicity in syntax is simpler, more self-evident than in lexicon. And (left-hemispheric) syntax certainly is a wonderful thing. It has its evolutionary relatives in the intricate patterns of bird song, in the human talent for dance and music, in the inexhaustible potential for developing mathematical structures, etc. But syntax cannot simply be transferred from earlier behavioral-cognitive modules. One suspects that there is a reasoned (iconic or right-hemispheric) LINK between the syntax of oral language and that of its communicational predecessors (cf. Figure 6). I submit that COLLOCATIONAL rules\(^{28}\) be iconically passed on from one language plane to the next:

\[
\begin{align*}
(3) & \text{pragmatics} > \text{semantics} > \text{syntax} \\
(4) & \text{speech acts} > \text{thematic roles} > \text{syntax} \\
(5) & \text{gestural syntax} > \text{oral syntax}
\end{align*}
\]

Modern syntax has introduced a high amount of convention in that, for instance, specific types of naturally possible ‘word order’ have become generalized. The syntax of individual types of language has arbitrarily chosen specific types of order from an originally common thesaurus of iconic possibilities.

11. Evolution of lexicon

While it seems obvious that word-like units in pantomime and gestures be imbued with iconicity, the iconic quality of words in vocal language is held to be of a peripheral kind. Oral language and, by extension, language in general, is thought to be essentially of an ARBITRARY nature\(^{29}\). My hypothesis is that no mode of language, be it pantomimic, gestural or vocal, creates its words without an iconizing motivation. In order to lend plausibility to this hypothesis I would need quite a few pages. I have to cut my story very short here\(^{30}\).
Correlation with the schemata in I. The lists are in no way complete. They are especially incomplete with regard to non-Indo-European languages. The only reflex of the latter is  

| English | anchor (< Greek ἀκρος “a bend”), hand  
German: Hand, Kante, Pranke  
Latin: branca  
Greek: onyx, bronchia  
Russian: noga, ruka (< *ranka), gnat'  

*KANO “arm etc.” |
| English | arrow, gnaw, chin, condyle  
German: gähnen, nagen, Inn, Wange  
Latin: gene  
Greek: geneion, xainein, gnathos, kondylos  

***GINI “tooth etc.” |
| English | know, ken, think, cognition, ignorance, diagnosis  
German: kennen, Können, Kunst  
Latin: cognito, ignorare, ignotus  
Greek: gnosis, gignskein  
Russian: znat'  

***? |
| English | bow, bend, pend, bind, bag, gab, gap  
German: bogen, biegen, beugen, binden, Bug, Zweig, Buckel, zwingen, Bucht, Bausch, Bache  
Latin: gibber, hucca  
Greek: kampein, gabathon  
Russian: gorb  

***BU(N)KA “bend, knee” |

Figure 8: Sensori-motor schemata and their DING DONG correspondences. The examples given for words in actual languages (II) are not systematically ordered. The NK- or NG-ingredient is, however, obvious or etymologically indubitable, and so is the correlation with the schemata in I. The lists are in no way complete. They are especially incomplete with regard to non-Indo-European languages. The only reflex of the latter is to be found in the respective reconstruction of ‘global etymologies’ (**KUNA etc.). ‘♂’ in I is to indicate a part of the respective schema under special focus (Koch in preparation).
I claim that it is highly likely that ultimately any word or morpheme in any language can be traced back to some iconic etymology. Humans have evolved three primary successive design schemes for word formation: (1) the TA TA scheme (as in words like *mama* or *papa*), (2) the BOW WOW scheme (as in words like *cuckoo* or *bowwow*), and (3) the DING DONG scheme (as in words like *weeny, teeny, tiny*). Figure 8 discusses a particular DING DONG root (which may be about 30,000 years old), namely, °KUNA, °KONA, ... This supposedly ancient Homo-sapiens-sapiens root was related to such meanings as ‘woman’, ‘to give birth to’, ‘knee’, i.e. ‘the joint in the leg’, etc. DING DONG is the latest and most powerful ‘sound-symbolic’ scheme to evolve. It consists in translating a visual sensory stimulus into an auditory motor response. Let us concentrate on the visual scheme I,1 in Figure 8: An outstretched limb (or, more abstractly, a linear segment) tends to be manifested by the consonantal sequence KT or TK. The basis of observation is the actogenesis of language (experiments on sound symbolism, the interpretation of various types of onomatopoeia in different types of language, etc.), ontogenesis (baby talk, ‘first words’, etc. Perceptual schemata that include an IN-part, i.e. a ‘joint’ or a ‘pivot’, have a nasal consonant in their vocal equivalents: N. Proto-words such as °KANAT, °KUNA, °KONA, °GUNA, and °ANKA are iconically suitable to render such concepts as ‘knee’, ‘haunch’, ‘finger’, ‘chin’, and, by extension, ‘angle’, ‘anger’, ‘queen’, ‘gynecology’, ‘gene’, ‘genesis’, etc. – note that these particular present-day words have somehow kept the ancient K + N. Figure 8 lists a series of words containing °KUNA/ANKA etc. as their deep etymologies. Of course, for normal speakers most modern words have become entirely opaque or arbitrary. But the point is that, at the time of their initial invention, roots were indeed iconic. Thus, the starting point of our root/concept was some such idea as ‘the flexing of a limb’, which, through ‘(pressing one’s) knees’ or ‘giving birth to’ led to such words as Greek *gynè*, Russian _ena, Gothic *qino* – all meaning ‘woman’ –, and, of course, also to English *quean* and *queen*. Similar roots for ‘woman’ can be found in all language phyla of the world. It is highly probable that human vocabularies during the Würm glaciation should have been fairly transparent and iconic. It goes without saying that there is a specific rationale for the powerful translation trick of the DING DONG scheme, one which we cannot go into now.

12. Laws of sign evolution

Many laws of sign evolution await their discovery. One such law is the sequence

\[(6) \text{ index > icon > symbol}^{35}\]

Whenever attention can afford to release sign processes from its central focus, icons degenerate into symbols. Icons need the interaction of the left and right hemispheres of the brain, whereas symbols could make do with the left-hemispheric association cortex. Symbols are easy; whenever they can, learning
processes prefer them. CREATIVE processes, on the other hand, search for something more reliable: icons (cf. Figure 9).

Figure 9: The main sites for indexicality, iconicity, and symbolicity in language (left hemisphere of brain; cf. Pinel 1990: 143). Indices are created in parts of the brain which are about 200 my old. Icons in language depend on the interaction of the left and right hemispheres. The right hemisphere seems to be dominant for iconicity. Symbols make use of the associative cortex (relying especially on the prefrontal cortex; cf. Deacon 1997: 264ff.). Symbols emerge as the by-product of iconicity, or even of indexicality (cf. Koch in preparation: 69).
13. Echogenesis of language

Figure 10 gives us a collocation of the various parts of echogenesis. Not unlike biology\textsuperscript{36}, linguistics could see ontogenesis ‘echo’ phylogenesis. The phylogeny of language, which, as any phylogeny, is not immediately accessible, can be compared, in its stages etc., to developments such as child language (ontogeny), aphasia (pathogeny), language universals and typology (actogenesis), the laws of language change (homeogenesis), language creation, home signing, autonomous languages, Creoles and pidgins (ceno-genesis in eugenesis), and language capacities in apes (cryptogenesis). What I call echoes here has, of course, been acknowledged as providing extra clues to phylogeny by many other researchers (cf. Hawkins & Gell-Mann 1992, Mayerthaler 1988). But often – as with Bickerton – everything that is not standard oral language tends to be lumped together and ascribed to a primitive ‘proto-language’. However, we have to expect that any ‘echo’ is prone, in some way or other, to recapitulating stages of phylogeny. In other words, we should be interested not just in pidgins (as part of a putative proto-language) but rather hope to find stages in pidgin, i.e. rules of genesis that may shed light on other types of genesis\textsuperscript{37}.

Figure 10: Echogenesis, glotto-evolution and bio-evolution within cosmo-evolution (from Koch 1992: 181).

Bio-evolution (‘phylogeny’) is supposed to be ‘echoed’ in various forms of development. Development in language is understood as exhibiting the domains of ontogenesis through cryptogenesis. The direction of evolution at large is anagenetical. The ultimate ‘fate’ of the cosmos, however, seems to head towards ‘catagenesis’ (i.e. the dissolution of complexity).
Figure 11: First hypothesis on the phylogeny of language. A sequence of ten design schemes (explanation of symbols: Figure 11A). Principles of naming and formation of (proto)words seem to have been decisive in coloring differences in design schemes (cf. Koch 1991b).

<table>
<thead>
<tr>
<th>Layer</th>
<th>time</th>
<th>schemes</th>
<th>physiology of v-scheme</th>
<th>situation of v-scheme</th>
<th>phonic system</th>
<th>syntax</th>
<th>signifier-signified relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>30 mya</td>
<td>g: gestural c.</td>
<td>v: POOH POOH</td>
<td>v: PT K(X)</td>
<td>g: F + C</td>
<td>g: index (icon)</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>2 mya</td>
<td>g: gestural c.</td>
<td>v: BLA BLA</td>
<td>v: PT K(X)</td>
<td>g: F + C + F</td>
<td>g: index</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>1 mya</td>
<td>g: gestural c.</td>
<td>v: CLICK CLICK</td>
<td>v: PT K(X)</td>
<td>g: (FC)</td>
<td>v: index/icon</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>300 kya</td>
<td>g: gestural c.</td>
<td>v: T A T A</td>
<td>v: PT K(X)</td>
<td>g: Pr + An + At</td>
<td>g: index</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>200 kya</td>
<td>g: gestural c.</td>
<td>v: B O W W O W</td>
<td>v: PT K(X)</td>
<td>g: F + C</td>
<td>v: index</td>
<td></td>
</tr>
<tr>
<td>VI</td>
<td>100 kya</td>
<td>g: gestural c.</td>
<td>v: DING DONG II</td>
<td>v: PT K(X)</td>
<td>g: Pr + An + At</td>
<td>g: index</td>
<td></td>
</tr>
<tr>
<td>VII</td>
<td>60 kya</td>
<td>g: gestural c.</td>
<td>v: SING SONG II</td>
<td>v: PT K(X)</td>
<td>g: At + An + Pt</td>
<td>g: index</td>
<td></td>
</tr>
<tr>
<td>VIII</td>
<td>40 kya</td>
<td>g: gestural c.</td>
<td>v: CONVENTION</td>
<td>v: PT K(X)</td>
<td>g: At + An + Pt</td>
<td>g: icon</td>
<td></td>
</tr>
<tr>
<td>IX</td>
<td>20 kya</td>
<td>g: gestural c.</td>
<td>v: &quot;UPS&quot;</td>
<td>v: PT K(X)</td>
<td>g: At + An + Pt</td>
<td>g: icon</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>~5 kya</td>
<td>g: gestural c.</td>
<td>v: PL II PL I</td>
<td>v: PT K(X)</td>
<td>g: At + An + Pt</td>
<td>g: icon</td>
<td></td>
</tr>
</tbody>
</table>
14. Genes for language

A cursory look at the phylogeny of communication (Figure 5) or at that of language (Figure 11) tells us something direct and indirect about so many drastic differences in stages that it appears trivial to assume that an indefinite number of genes must have been involved. Any stage is a candidate for a change in the genome. Most linguists concentrate on the putatively singular step that changed some sort of proto-language into language. The debate has shifted from one mutation/one gene (Bickerton 1994: 2882) to a reshuffle via recombination (Bickerton 1999: 352). Since most of the processes we have been discussing are rooted in nonvocal language or even in modules that emerged before gestural language, it is likely that genes gave the decisive modeling impulses to a COGNITIVE SYSTEM, rather than to anything else (cf. Gopnik 1990a,b, 199738). But then the question arises at to what kinds of gene were most likely to act on the structures of the nervous system. A few revirements in the REGULATOR GENES could have sufficed to bring about drastic changes in the neural phenotype (Edelman 1992, Elman et al. 1996). If we only think of the crude chain gene > protein > peptide > enzyme > hormone > neurotransmitter > neuronal assembly, we realize that a slight raise in quantity 39 at any locus in the cascades of gene-governed sequences would engineer not only morphological, but also ‘simple’ functional changes in the brain. The persistent idea that particular genes – as candidates for explanation - linger in the background may prove quite salutary (cf. Pinker 1994), but we must not forget that the genes in question have so far been more of an explanandum than an explanans.

15. Mosaic for the reconstruction of the evolution of language

We will focus on vocal (Figure 11: ‘v’) language, with pantomime and gesture (‘g’) lingering in the background. Figure 11 shows a reduced format of a mosaic. (A real mosaic should include eco-factors such as social structure, habitat, etc.) In the horizontal dimension we have 5 DESIGN LEVELS. In the vertical we have 10 DESIGN SCHEMES. The first design scheme is called POOH POOH. It is typical of pre-human primates. Its vocalizations are mainly limbic, not cortical. Its communicative situation specifies ‘To whom it may concern’. There are no definite phonic segments. Syntax is rudimentary in that two phases, Focus (F) and Comment (C), are merged into one (vocal) call. Thus, a particular scream says ‘I am here and I am angry’, but in one segment. Primate calls are indexical. The next scheme sets in 2 mya. Homo habilis engages in vocal BLA BLA. It is equivalent to ontogenetic ‘babbling’. Phonic segments emerge, as well as intonation and, especially, face-to-face communication. Proto-words resemble primate calls. There is nothing but index. However, the repetitive staccato rhythm of babbling and cooing conveys an emotional-cognitive atmosphere of mutual attention.
Phonation becomes more cortical, regular, and syllabic. The mother-infant dyad is the cradle of vocal communication. There is an eco-chain of coevolving
factors: Ice-age climate (Geist 1978: 352f. and passim) > neoteny (Gould 1977, Geist 1978) and neophily41 > mother-infant dyad42 (cf. Figure 3). While adults probably used pantomime and gestural communication, mother and infant evolved, in their specific emotional-cognitive niche, a vocal strategy that slowly developed one new scheme after the other, until, about 100 kya, the DING DONG scheme proved very flexible and was subsequently admitted into the adult sphere.

What made DING DONG so successful? The preceding schemes made copies of auditory stimuli. DING DONG enables humans to copy visual stimuli (i.e. 95 per cent of perception) via the auditory. Phonic acuity becomes extreme. Vowel contrasts enter into the picture and phases of referents come into focus: ‘ding’ and ‘dong’ etc. Syntax remains iconic in that thematic roles are copied from the cognitive. The standard word order could have been: patient + action + agent. In the course of the following schemes, vocal communication leaves the mother-infant niche behind and becomes more and more integrated into adult communication. Words and sentences lose more of their iconicity as soon as texts become longer and the repertoires of word and sentence types grow more numerous (cf. ‘CONVENTION’ in scheme VIII). Iconicity becomes the preserve of higher cultural units such as poetry and mythology, while symbols (bought cheaply from the mere erosion of icons) have the advantage of offering a greater range for the collocation of segments. Thus, in contrast to Bickerton, I assume that the phonic takeover of syntax was not particularly dramatic. And symbolic syntax thus came relatively late. Bickerton’s main units participating in the crucial step from proto-language to LANGUAGE, namely ‘phonetic structure’, ‘theta rules’, and ‘conceptual structure’, constitute crucial innovations by themselves which emerge at fairly different times, namely in BLA BLA and in DING DONG, respectively, while the quality of conventionality, which is indirectly the main asset of syntax and lexicon in Bickerton’s view, is evolving again as a separate phenomenon.

16. DING DONG in Bickerton’s scheme

Bickerton’s graph (Figure 4) should be modified as in Figure 12. Simple frames and arrows belong to Bickerton’s original graph. Double frames and double arrows are additions of mine. The new figure roughly characterizes what, to my mind, happened some 100 kya. The decisive step occurred when vocal motor control found an (unconscious?) cognitive translation formula or icon for the corresponding control of visual percepts, i.e. percepts that were originally independent of oral language. These new percepts, controlled by oral language from then on, in turn led to more complex (OL-controlled) concepts and later paved the way to conventionality for both lexicon and syntax in human vocal communication or ‘speech’.

Needless to say, I am aware of the fact that my sketches and hypotheses are in need of elaboration.
Figure 12: Bickerton’s original graph (Figure 4) modified. I retain, as much as possible, Bickerton’s frames and arrows. I add a few double frames and double arrows. The decisive step in the evolution of oral language (OL), to my mind, was the iconic extension of the vocal motor control to the control of perception. Perception, formerly independent of OL, became OL-controlled (and therefore more communicable) via the iconic match between a constructed sensory scheme (simplification) of the independent percept and the analogous characteristics of vocal motor control. (Thus, [n] would refer to (‘control’) ‘within-ness’, ‘input’, ‘joint’, etc. in perceptual schemata (cf. Figure 8).)

References


Fouts, Roger. 1997. *Unsere nächsten Verwandten*. [Transl. of *Next of kin: What chimpanzees have taught me about what we are.*] Munich: Limes.


Steels, Luc. this volume. Language as a complex adaptive system.


Notes

1 Studies of consciousness tend to develop into a sort of hyper-interdiscipline. Although they cannot agree on what consciousness is and where, evolutionarily speaking, it should be assumed to start, students of consciousness at least concur in that anything – from protozoa to humans – is worth discussing. Wilber (2000: 7) suggests that, on analogy with the Human Genome Project, there should be a Human Consciousness Project. On the scope of consciousness studies, see Chalmers (1996), Velmans (1996), Dennett (1991), and Eccles (1994).
The nerve cell – a prerequisite to consciousness – emerges ca. 700 mya (Anderson 1989, Joseph 1993; cf. Figure 5). Unicellular organisms, which are even older evolutionarily (e.g. *Escherichia coli* or *Euglena gracilis*), at least have rudimentary reflex systems – forerunners of the neuron (cf. Cotterill 2001: 4ff.). Yet nervous systems are not sufficient. Recent research seems to corroborate the idea that consciousness arises from the interplay between motor-planning areas and sensory processing. Sensation and, ultimately, consciousness process their input in terms of another sequence which really sets in only later: movement (Cotterill 2001: 10). With respect to communication, this idea accords an unusual import to the signifier vis-à-vis the signified. A signifier or communicational motor response may thus be regarded as a cognition-guided intermediary substitute for a noncommunicational motor response: Cognition presses for expression (since expression may be badly needed for sponsoring the continuation of the cognitive process itself). This communicational substitute emerges also for the sake of abbreviating the longer processing and execution of a normal motor response – which may be deemed too costly in risky situations (and this may be an ‘explanation’ for the abbreviating character of the primitive sign-type of index vis-à-vis its referent: the ‘normal motor response’; cf. note 17). But then an index may not yet guarantee consciousness. Anyhow, consciousness cannot be much older than the palaeomammalian brain (on the latter, cf. MacLean 1969, 1990, Jones & Peters 1990: 285-309, and Eccles 1994: 118).

On stereotyped exocommunication, see Koch (1991a). Reptiles and dinosaurs will, of course, have been capable of displays, i.e. of animal communication (Smith 1977, Hauser 1997). Yet the total number of displays (vocal, postural, facial, gestural) in individual primate species outnumbers the display repertoires of other mammals and of other classes of vertebrates (cf. Wilson 1972, 1975 and Tembrock 1971). Monkeys and apes are especially flexible in using displays. Vervet monkeys have been observed (Cheney 1984) to use three kinds of alarm call and, deriving from them, twelve interrelated categories referred to by twelve interrelated vocal displays – a phenomenon which I interpret as showing rudiments of icon (Koch 1989, in preparation). All in all, the neo-mammalian (primate) brain (MacLean 1990) is a candidate for the prototype of (rich, full-fledged) indexical exocommunication or display (although birds are not bad at it either, see Hauser 1997).


There is affinity (not identity) between such concepts as ‘core grammar’, ‘language bioprogram hypothesis’ (Bickerton 1981), and Chomsky’s ‘minimalist program’ (on the latter, see Marantz 1995 and Calvin & Bickerton 2000: 216ff.).

Keller (1880-1968) based her language and her understanding of the universe manifested in it on the exclusive association between tactile signifiers and tactile signifieds. The entire complexity of the – largely audiovisual – cosmos belongs, as far as Helen’s brain is concerned, almost exclusively to what Russell (1910) understood by ‘knowledge by description’. The foundation for everything ever thought and communicated in her brain was built only on what Helen could touch with her hand (Russell’s ‘knowledge by acquaintance’). Such a foundation appears to be minuscule and flimsy. The relationship between tactile signifier and signified was – fortunately for Helen and her teacher Anne Sullivan (Keller 1974, Lash 1980) – ultimately based on Anne’s vocal kind of arbitrariness. Iconicity in the language Helen was taught by her teacher would not have led anywhere as a start, since Helen did not in any way have sufficient access to percepts to project lexical icons onto. And what is more, Anne, who finger-spelled the arbitrary English language into Helen’s hand, would not have known how to invent a new language which would have been thoroughly transparent and iconic. Thus, Helen’s basics were tactile experience on one hand, and arbitrary (‘easily’ learnable) lexical and syntactic associations on the other. Accordingly, the remainder that really made up her understanding of the world and her discoursing upon it (she gave academic lectures on philosophical topics) must have consisted of rules and meta-rules of an ever increasing order, which ultimately attained a complexity that matched that of her normally equipped ‘interlocutors’. The rules of order themselves (which belong to cognition rather than to grammar) must in some way have been highly iconic, since even in modern sophisticated languages, arbitrariness can be
Consciousness, communication, speech
tolerated only at a low – subservient – level (such as in the inventory of kinemes/graphemes in finger-spelling, Braille, etc., and in lexicon or syntax). What saved Helen was iconicity of a higher order, then. And what saved the evolution of the human brain some 500 kya was, again, iconicity, not arbitrariness – in this case already at a low level, since, in the very beginning of inventing the first stock of lexemes, nobody could have made use of arbitrariness by the expedient of simple learning or teaching (on the role of imitation in the phylogeny of language, see Donald 1991: 162ff. – though I do not agree with many theories and details offered there). But let us not forget the main lesson Helen taught us, that cognition and the capacity for inventing ever new modes of communication do NOT inexorably depend on ORAL LANGUAGE.

Finally, we ought to be interested in Helen’s even more deeply engrained language capacity for pantomime. Keller (1908: 115) reported on the attempts she made towards rudimentary communication. It was at a time when she had not yet made any approach towards learning language. When about five years old, she wanted to convey to her mother that she wanted to have ‘ice cream’. In a first move, she nudged her mother in order to get her attention. In a second move, she tried to re-enact the movements her mother used to make when employing the ice machine. To make her reference redundantly clear, Helen added a pantomime of ‘quivering with cold’. After that she must have waited demandingly for her mother to comply with her request (Schmitt 1954: 13). From the point of view of modern vocal language, this is a rather roundabout way for saying ‘ice cream’. From the point of view of innate cognitive maneuvering, however, it represents a logical way of using an exclusively tactile or proprioceptive pantomime.


To a certain degree, such a combination was typical of pre-human primates: gesture (index) + pantomime (icon/index) + vocal accompaniment (e.g., aggressive call; index). Early humans will have gained the capacity for iconizing pantomime and gestures on a large scale, thus developing a flexible language. ‘David’, a typical isolated deaf-mute child, produced, from very early on, frequent utterance/sentence types such as this one (ACTION + AGENT):

Eat (= biting pantomime) + Susan (= pointing gesture at Susan)

which equaled the standard oral language version (SUBJECT + VERB):

Susan is eating/should eat.

A vocal accompaniment (e.g. intonation, grunts) was, in this case, not reported by the observing linguists (Feldman et al. 1978: 373).

Neoteny and pedomorphosis led to an extended childhood in primates in general and in hominids in particular, which in turn fostered a more intimate mother-infant dyad (Gould 1977). This dyad was the cradle of newly emergent communication systems (Bruner 1976, 1977 and Trevarthen 1987, 1990).

Despite the ban on the linguistic topic of ‘the origin of language’, pronounced by the Société de Linguistique de Paris in 1866 (cf. Lock & Peters 1996: vi), there have been innumerable treatises published ever since (cf. Hewes 1975). The traditional approaches to the theme were those that concentrated on the purely LINGUISTIC aspect (the ‘view from within’; cf. Figure 3): Steinthal (1888), Whitney (1867), and Jespersen (1922) were among the early protagonists. In the meantime, the topic has positioned itself at the crossroads of many additional disciplines. Recently, there has been a host of proceedings of symposia on the subject (cf., especially, Hawkins & Gell-Mann 1992). Two groups of linguists are particularly active in this respect, the first one gathering around Bernard H. Bichakjian, the other one led by James R. Hurford (two of the respective proceedings are to be found in Bichakjian et al. 2000 and in Hurford et al. 1999).

Apparently, there was hardly any input, as far as the morpho-syntactic rules elaborated by Creole children are concerned. On the other hand, Bickerton generally seems to underestimate such input (cf. the open peer commentary in Bickerton 1984). Such structures as there already were in pidgins had, of course, their own particular origins (e.g. lexemes), which were left ‘unexplained’.

The apparent intellectual priority of syntax over semantics, pragmatics etc. is due to what seems to me a positivist bias towards the (especially American brand of) philosophy of science. The overriding influence of such movements as ‘Unified Science’ (Neurath et al. 1938) during
the 1940s through the 1960s remains noticeable up until today. The superiority of mathematics, symbolic logic, computer sciences, etc. – i.e. of incarnations of what Morris dubbed ‘SYNTACTICS’ – over other sciences may have triggered the linguist’s special veneration for syntax.

In various sciences, a dual scenario has developed: Either evolution is slow and GRADUAL or it is (ultra-)rapid and PUNCTUATED. Theories have recently taken a fancy to punctualism. Thus evolution seems to be dictated by sudden leaps, catastrophes, attractors, emergent bifurcations, inflation models, etc., rather than by their more anodyne counterparts (cf. in biology: Eldredge & Gould 1972, Stanley 1979; in chaos theory: Thom 1972, Kauffman 1995; see also Fraser et al. 1994). In the present context, we should not forget that the idea of a catastrophe is not a suitable substitute for a possibly finer-grained map of the territory to be analyzed.

As I intend to show, there is hardly any special need for a new neurofunctional link, since what oral syntax exhibits (in its earlier stages) is nothing more than what evolutionarily preceding syntaxes had already elaborated: gestural syntax, pantomimic syntax, etc. The transition from thematic roles to conventional syntax (i.e. the syntax of ‘language’ in Bickerton’s (1999) sense) is connected with the conditions that favored an increasing relative influence of arbitrariness to the disadvantage of iconicity (cf. Figure 11 – especially stages VI, VII, VIII – and Figure 12). But the main point is that this transition probably occurred in its entirety WITHIN oral language and its predecessors. The question of which of these and many other transitional changes could not happen without a corresponding change in the genome outreaches our imagination, let alone our present state of knowledge.

INFORMATION belongs to the primes of physics. It is the mental pole that corresponds to the material pole of ENERGY (Davies 1987: 192, Koch 1998: 696, 702).

Cf. motions of attack that, in the course of evolution, become foreshortened and ritualized into threatening displays. Ultimately, any display is an ‘intentional movement’ which derives from a more complete ‘original movement’. The former becomes a sign of the latter (cf. Eibl-Eibesfeldt 1967: 125, Immelmann 1983: 117, 190).

An additional pointer to a possible law of semiosis (or ‘index formation’) may be found in the tendency of endocommunicational units to derive from longer versions of bodily units, which they then regulate in communicative circuits. Thus, structurally, neurotransmitters (and sometimes mere amino-acids) tend to be snippets of longer peptides (enzymes, hormones, etc.), and these are in turn mere snippets as compared to the very long POLYPEPTIDES (normal proteins), the routine building blocks of living cells, whose destruction and construction is governed by the dictates of DNA on one hand, and by communicative stimulation (hormones, enzymes, neurotransmitters, etc.) on the other (cf. Campbell et al. 1994, Lodish et al. 1995).

There are very few cases where we could suspect rudiments of iconicity: e.g. with bees (?), with bonobos or vervet monkeys (cf. note 3).

Cf. Scheikov (1982). In general, what neurobiologists call ‘information substances’ (transmitters, peptides, hormones, protein ligands, etc.; cf. Pert 1999: 139) dock in on receptors or ‘substrates’ that are anti-symmetrical to the substances themselves.

The phrase ‘has tried’ implies an intention of reference. This can be encountered in nine-month old infants and apes. An even more basic prerequisite to the search for icons is to be found in the capacity for DECEPTIVE behavior (cf. Byrne & Whiten 1991). One of the most basic phenomena of the brain contributing to the emergence of icons in stereotyped exocommunication is INTENTIONALITY (Dennett 1991: 76ff.). Thus, index, although sometimes called ‘intentional movement’ (cf. note 16), is hardly hooked up to intention, while icons (for language or animal communication) presuppose intentions and a high amount of attention (i.e. a higher implication of the forebrain). It comes as no surprise that such icons should contribute to a heightening of consciousness.

In Peirce’s complex philosophy, we keep coming across the following systematic (and also genetic) overall sequence: icon > index > symbol (cf. other (implicit) semiotic sequences, as, e.g., with Sebeok, Nöth 1990: 108; see also Bouissac 1998: 308ff.). In the context of the evolution of signs and of evolution in general, structural logic calls for a different sequence, namely the one we mention in (1) and later – as a continuation – in (6).

‘Pantomimes’ are the most rudimentary attempts at body language. As compared to gestures and established sign languages (cf. Figure 2, B, C), pantomimes are more extended, more redundant, and more variable. On one hand they are an abbreviated version of the still more
Consciousness, communication, speech

extensive and intensive original movements and attitudes they refer to, and in this respect they are typical indices. On the other, they belong to the wholesale imitative attitude of Homo habilis so that pantomiming on a large scale ushers us into the era of the icon. Cf. Donald’s ideas on the transition to ‘Mimetic Culture’ (Donald 1991: 177ff. and Donald 2000: 109ff.). On the difference and transition between pantomime and gesture, see Klima & Bellugi (1979).

The pervasive communication system of Homo habilis might have been pantomime (note 22). (Cf. also, in ontogeny, the autonomous gesturing of such isolated deaf-mute children as ‘David’, note 8.) This system may have been interspersed with more definitely iconic units. There may have been a step from self-related pantomime to such AUTONOMOUS GESTURES as can be found in today’s running gestural commentary on the Bushman’s hunt in progress: stereotyped iconic hand-gestures imitating ostrich, lion, etc. (Howell 1965: 184ff.). On the nature and origin of autonomous gestures or EMBLEMS, cf. Kendon (1986: 29ff.). On the various types of development of pantomime and gesture, see Schulz (2000).

To me, it appears hard to find simple models concerning the complexity of the entire organization of sensory-cognitive-motor transitions (cf. the simple model for sensory organization in Pinel 1990: 180ff.). But we have to include different types of cognition (processing of sensory input) and their respective interconnections (five types of S in Figure 6). And what exactly do we know about the underlying neuroconnections (cf. Arbib 1999 and Wilson & Keil 1999)?

In other words, there are many words that – in the last analysis – have originated, by some sort of abbreviation, from units of the higher-layered plane, i.e. from sentences or syntactic structures (e.g. phrases). There are no morphemes that will not, ultimately, have derived from words etc. (cf. Lüdtke 1980, Givón 1979: 83). Grammatical devices of whatever degree of abstractness are the DIACHRONIC result of a structural transport of the kind indicated in (2) (cf. processes of ‘grammaticization’ in Heine et al. 1991: 213 and in Hopper & Traugott 1993: 107).

Like most linguists, Bickerton (1995: 17ff.) believes lexical iconicity to be marginal and lexical arbitrariness to be essential. One of the things he and others seem to overlook is that there is, in this context, an important difference between the CREATION and the RECEPTION (use) of lexical units. Many – if not most – of the lexemes Creole children use have already been used by their ‘pidgin’ parents, and this, as always, in an unquestioning, arbitrary way. When Creole speakers (and, to a degree, pidgin speakers) lack a word for a particular concept (and they cannot – for whatever reasons – borrow the word from a substrate, superstrate, etc. language), they are bound to fall back on natural motivation, either on simple iconicity or on metaphor and compounding. Thus, many Creoles (pidgins) have the notorious ‘grass-belong-head’ (for ‘hair’) as a spontaneous, independent neologism. In contrast to syntax, lexicon has an entire ARRAY of natural (also iconic) possibilities even for one particular creative problem, a phenomenon that makes the nonarbitrary basis for words less transparent.


There seems to be, for instance, some evidence for specific SVO/SOV collocations in oral syntax that are due to natural gestural proto-VO/OV patterns (Yau 1992).

From antiquity onwards, the question of the origin of language was intimately connected with the seemingly undeniable quality of arbitrariness. An elegant reductio ad absurdum of a potential thesis of the (iconic) naturalness of lexicon seems to be performed by such simple statements as that made by Pinker (1994: 152), to the effect that the ‘onomatopoetic’ endeavors of English and Japanese fail miserably (as seen from the standard of some absolute iconicity): The pig in English gives off an /oink oink/, while in Japanese it brings about only a paltry and disappointing /bu bu/ (cf. Koch 1995). It would lead us too far to try to unravel the whole story here. The iconic ideal originally common to both English and Japanese could in this case have been an attempt at rendering the characteristic sound of the pig by a combination of /back vowel + pharyngeal + nasal consonant/, i.e. by such forms as /unk/ or /kwun/. The mere SPECIFICITY in the choice of a particular natural form from among a set of variable possibilities already implies an act of arbitrariness. Furthermore, languages are NATURALLY limited, e.g. in the number and systemic (oppositional) arrangement of their phonemes or in their inherent phonotactic rules. Seen from this point of view, the Japanese language was well advised to start
out from the /kwun/ model or a similar ideal. This model could only have been realized as /bu/, since Japanese originally lacked syllable-final /n/ (with the exception of many Chinese loans) and the initial consonant cluster /kw/ (/kw/ or /gw/ being acoustically equivalent to /b/). Fundamentally, any type of iconicity has systemic constraints. It is bound to be accompanied by various sorts of incipient arbitrariness. And, of course, arbitrariness grows on account of all sorts of additional factors, one of them being universal sound change. Whether or not my attempt at illustrating language-relative iconicity is, in this particular case, historically correct, it may have become clear that any (high-fidelity) type of iconicity undergoes transformations before it can be realized. Thus, fundamentally, iconicity and arbitrariness are not mutually exclusive. But there is obviously relative transparency or predominance of one over the other. Yet, what is more, the rationale (or ‘intention’, cf. note 20) of any creative act is fundamentally iconic. Any type of iconicity is bound to make use of relatively limited bases. Iconicity (and related phenomena such as analogy (cf., e.g., Mitchell 1993) produces end products that normally envisage optimum compromises between a target to be copied faithfully and the particular means at its disposal (sets of symbols, neural assemblies, raster points, phonemes, etc.).


31 There is, as far as I am aware, no systematic and historical survey of the hundreds of pertinent experiments on ‘sound symbolism’ which have been conducted for almost two centuries. Among the more original and specific approaches in recent times are Ertel (1969, 1972). A short state of the art can be found in Allott (1989, 1995), and a somewhat longer one in Hinton et al. (1994). As to an attempt at theory, see Voronin (2000).

32 What we need are not the ‘first words’ which we get with standard analyses of infant speech (such as ‘light’ and ‘baby’; cf. Crystal 1987: 246), but rather what Ferguson (1977) called ‘vocables’ or what Reich (1986: 37) called ‘idiomorphs’. We should be concerned with proto-words that are entirely of the infant’s own making – as the famous lakell ‘chair’ with its cognates likill ‘small chair’ and lukull ‘oversuffed chair’. They were reported as words created by a grandchild of Georg von der Gabelentz (Reich 1986: 39). Moreover, part of Baby Talk (Ferguson 1964) is formed by universal principles of sound symbolism (cf. Koch in preparation): mommy, daddy, wee-wee, pee-pee, booboo, teenie-weenie, yam-yam, ...

33 The vocal signifier /kuna/, /kwen/, etc. thus came to be associated with such meanings as ‘bending’, ‘knee’, etc. What makes the use of bending knees prototypical for ‘woman’ is the process of ‘giving birth to babies’. Even modern European women, when in labor, naturally press their hands and bend and press their knees; but they lie on their backs when they do so. In earlier times and even today, in more primitive societies, women resort to a more efficient position of birth giving: They stand semi-erect or squat. The bending of knees thus becomes even more conspicuous. No wonder, then, that “kuna”/”kona”/”anka” ... should become prototypical signifiers for ‘woman’, about 30,000 years ago (Koch 1995).

34 “Kuna, as postulated by a derivation from the ding dong scheme, ‘happens’ to equal the form of a ‘global etymology’ reconstructed on the basis of many languages of all language phyla of the world. And it ‘happens’ to be assigned the meaning of ‘woman’ (Ruhlen 1994a,b). There is, of course, little likelihood that all of this is a matter of chance. The only flaw in this type of ‘reconstruction’ is that the linguists involved in it (cf. Koch 1995) firmly believe their reconstructed lexeme ***kuna to be an instance of sheer arbitrariness. For more details, see Koch (in preparation).

35 Symbols are thus never without a genetic predecessor or semiotic ‘etymology’. As a principle, symbols or arbitrary associations are never invented. They are the natural byproducts of indexical or iconic semiosis. To the association cortex, symbols are no problem. But the association cortex cannot invent words, since it cannot construe icons. And even an index must be hauled up from the deeper (older) recesses of the brain (cf. Figure 9). Symbols are good enough for learning. But index and icon are more reliably anchored in the depths of physiology. Animal communication, though largely an indexical affair, often evinces admixtures of symbolicity: Young male song-sparrows first practice a (largely inborn, i.e. indexical) ‘sub-song’ before they start learning the specific adult variety of the completed or ‘crystallized’ song (Gould & Marler 1991). Birdsong is definitely indexical, but there is a slight dialectal or symbolic hue to it.
In biology, Ernst Haeckel and others cherished the idea of phylogeny being recapitulated in ontogeny. Although the various hypotheses have kept being modified, the kernel of the idea is not as preposterous as many zealous opponents would have it. Various types of genesis and their relative staging and timing are patently interrelated (Gould 1977). Based on this biological phenomenon, the various types of language development ECHO phylogeny and each other (cf. Möller in preparation).

Thus, the seven stages in the development of spontaneous gesturing, elaborated by Schulz (2000: 56f.), are of great heuristic value in the search for further developmental series. This particular sequence of semiotic types repeats itself in the genesis of oral language (cf. Koch in preparation).

I realize that Myrna Gopnik puts in a plea for just the opposite, namely for the interpretation that her findings about innate dysphasia are restricted to very specific linguistic faculties. To my mind, however, it is just as likely that this kind of over-specificity of an inborn defect rather points to a particular interplay between more general (cognitive) strategies.

The particular quantity and quality of various units in this chain is determined by the activity of the genes and by the countercurrent activity of any of the levels of units mentioned. Thus, the particular quality of neuronal structure and growth is no doubt influenced by the input building blocks for the synthesis of specific proteins, neurotransmitters, etc. Thus, the evolutionary importance of a change of diet and/or climate, much despised by purist evolutionists, is a viable consideration. The co-evolution of nature and culture makes for a multiplication of agents of selection. Accordingly, the linguist’s craving for rigor will hardly be gratified by the sole consideration of GENES.

An increase in regularity and speed was not only the hallmark of oral motor behavior (babbling), but also of brachial behavior (Kimura 1982): Homo habilis probably became a fanatic of repetitive, rhythmic stone-knapping. Left-hemispheric lateralization for both communication and tool handling, although very old (Pinel 1990: 424ff.), became more pronounced. Within the wider context of growing bipedalism, the restructuring of the cerebellum (the ‘speeder-upper’ of fine-tuned motor movement) will have boosted the capacities of both tongue and hand (2 mya, and not only with the advent of Homo sapiens, as Bickerton (1999) opined). This new tendency towards the elaboration of neural structures controlling fine motor movements and their coordination is termed NEOKINESIS (cf. MacLean 1990: 548; see also Lieberman 1991: 78ff., Fouts 1997: 134, Allott 1989, and Kasevich 2000).

NEOTENY is involved with longer time spans for NEOPHILY (curiosity): particular types of attention, intention, and consciousness and a prolonged plasticity marking the emergence of hominids (cf. Lorenz 1968).

The favorable situation of the human mother-infant dyad was prepared by the long prehistory and evolution (in mammals and, especially, in primates) of breeding techniques and parental care: from the ‘r-strategy’ of fish, sauri, reptiles, etc. to the ‘K-strategy’ of apes and humans (cf. Johanson & Edey 1982: 398ff.; cf. also Mithen 1996: 111).