

Where do personal pronouns come from?¹

The stunning preservation of 1st and 2nd person pronouns and possessives in low-level language families turns into a relative diversity within and between macrofamilies and phyla. However, the global stock of ancestral pronoun stems exhibit particularities hardly compatible with a completely independent origin. A tentative evolutionary explanation of these apparently contradictory facts is proposed here. In the evolution of language, pronouns may have appeared only with syntactic articulation, often linked to the acceleration of cultural evolution seen in *Homo sapiens* from around 100 kyBP on. Syntax itself must have evolved over a long timespan, and the emergence of pronouns from preexisting words — nominals that were the most frequent subjects and objects of verbs referring to the speaker and the hearer, though this reference indirectly depended from their original meaning — must have taken time as well. The multiple stems reconstructed for each person in macrofamilies (and, to a lesser degree, low-level families) might be a trace of a final stage of this evolution.

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The problem

In two centuries of comparative-historical linguistic research, it has become more and more evident that 1sg and 2sg pronouns and possessives are in nearly all language families like hard rocks standing in a plain, resisting erosion long after most other ancestral words have been swept away by the winds of time. Dolgopolsky (1964) finds 1sg and 2sg pronouns to be the first and third longest-lasting word meanings, respectively. Pagel (2000: 205) calculates the time necessary for words of ancestral languages to disappear from half their descendants — an idea adapted from particle physics —, and also finds the 1sg pronoun to be an extraordinarily enduring word, with a half-life of 166 ky.²

In an extensive study of **m-* and **t-* stems in the Eurasiatic³ macrofamily (Bancel & al. forthcoming), we have calculated their loss rates in the Proto-Indo-European (PIE) 1sg and 2sg pronouns and possessives from nearly 500 IE languages and dialects. In the four paradigms, **m-* and **t-* have survived in 98.5% to 99.6% of IE languages. With an estimated age of 8,000 years for

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² Pagel concedes that this figure “should not be taken literally, and most certainly do[es] not imply [a] time [depth] of 166,000 years or even 15,000 years for the Indo-European data.” In fact, the method relies on an estimated age of the considered family, which is already embedded in the word’s estimated loss rate from which half-life is calculated.

³ We take the term “Eurasiatic” in Greenberg’s (2000–2002) sense, rather than in that adopted by Gell-Mann & al. (2009), but it makes no real difference for our present purpose.

the IE family, these figures correspond to incredibly low loss rates per millennium of 0.05% to 0.24%.⁴ These rates correspond to half-lives of **m-* and **t-* in the range of several hundreds of millennia.⁵ And the situation is much the same in most other Eurasiatic subgroups.

With such inoxidizable pronouns and possessives, one would expect the situation to change very little as one proceeds back in time. By the preservation standards of PIE **m-* and **t-*, the pronouns and possessives of an ancestor language spoken 20 kyBP should be reflected in 96.1% to 99% of its daughter languages. Even the Proto-Sapiens hypothesis should receive quick confirmation from an expected near universality of pronouns and possessives. If Proto-Sapiens was spoken 100 ky ago, as one may reasonably estimate on archeological and genetic grounds, 1sg and 2sg pronouns and possessives should have been preserved in 82.7% to 95.1% of its descendant languages — i.e. all languages of the world — and in a still greater proportion of families, whose proto-languages by definition have had less time to evolve.

However, even at the incomparably younger Eurasiatic stage (often estimated in the 10 kyBP range), we are faced with much more diversity: Turkic, Korean, Japonic and Aleut entirely lost **t-*, and in at least Korean **m-* has vanished as well.⁶ Enlarging our view to families more distantly related to Eurasiatic still worsens the picture. According to most Nostraticists, the families directly related to Eurasiatic are Kartvelian, Dravidian and Afroasiatic — unless it is rather Amerind, as is claimed by Greenberg (2002: 2–3). There are only scattered traces of 1sg **m-* in Afroasiatic (Bomhard 2008: 274), which has however a 2sg **(n)t-*. As to Amerind, we are faced with the uncomfortable situation where **m-* is the stem of 2sg and 2pl pronouns (Greenberg 1987: 277–9, see also Nichols 2008) — though Ruhlen (1994a: 228–9) also posits an Amerind 1pl **ma*. For its part, the Amerind 1sg stem **n-* (Greenberg 1987: 272–5; see also Ruhlen 1994a: 192) is reconstructed in Nostratic as a 1pl (Bomhard 2008: 281–3), including in Indo-European (e.g. Latin *nōs* ‘we, us,’ Gothic *uns* ‘us’), and with lesser reliability as a 2sg stem as well (Bomhard 2008: 287–9).

Finally, if one widens the scope unto the global level, as done by Ruhlen (1994a: 252–60), who compiled lists of 1sg, 1pl, 2sg and 2pl pronouns in the world’s language families,⁷ what one finds is an apparently desperate mess of **m-* and **n-* in the two persons and numbers, **k-* 1sg and 2sg, **t-* 2sg and 1pl, plus numerous erratic forms (Table 1). But is really the global diversity of pronouns a mess, and is it completely desperate? Not exactly.

First of all, phonetic diversity among pronoun stems is not as huge as it seems at first glance, with 40 stem phonemes in Ruhlen’s list of 348 pronominal forms. Six consonants

⁴ The loss rate per millennium r results from the formula $r = 1 - (1 - x)^{1/y}$, where x is the total loss rate over y millennia. Thanks to Sébastien Gaudry (Ecole Centrale Paris) and Sabine Bréchnac (Hôpital Avicenne, Assistance publique-Hôpitaux de Paris) for their contribution to this formula.

⁵ With Pagel’s formula (half-life $t_{50} = -\log_2(0.5)/r$, where r is the loss rate per millennium), a 0.05%/ky loss rate amounts to a 1,386 ky (= 1.4 My!) half-life; a 0.24%/ky loss rate “only” equals a 289 ky half-life. These results, though really indicative of a massive stability of pronoun stems, must be taken with a big grain of salt because of their sensitivity to the size of sample, an important difference with the original half-life method in physics, where all particles of the sample already exist in the beginning of the experimentation, while in language evolution they appear in the course of it with the successive divergences of the proto-language.

⁶ We do not count Korean *uli* ‘we,’ whose *u-* is taken by Greenberg (2000) to be the final outcome of **mu > *bu > wu* (*wuli* ‘we’ is attested dialectally) $> u$ on the account of analogous **m > b* evolutions in Uralic, Altaic and Chukotko-Kamchatkan, as a case in which the stem consonant **m-* has survived. In our Eurasiatic tables, **m-* and **t-* are considered surviving only when the stem consonant left a clear phonetic trace of itself.

⁷ The forms compiled by Ruhlen are either reconstructions (in families where the work was done) or best guesses about the most likely original forms (in each of the other families). Given the extraordinary stability of pronoun stems, there is little doubt that in the latter cases a phonologically informed inspection may allow to identify most original stems nearly as accurately as reconstruction.

alone — namely *m, n, t, k, s, j* — make up nearly two thirds of the sample (217 items, or 62.4%). All six are found on different continents in various distant families. Six more sounds are relatively common: these are *h, ʔ, η, w, i, u* (61 items, or 17.5% of sample). All 28 other sounds occur very scarcely, with from 4 items to a single one each.

Table 1. **Number of occurrences of each stem phoneme in Ruhlen's (1994a) worldwide lists of pronouns.** In CV, CVC, VC and VCV forms, C₁ is considered the stem; in VV forms, V₁ is taken to be the stem. Alternate forms with different C₁ have been counted under each consonant, but alternate forms with the same C₁ have been counted only once. A few complex forms have been discarded from the count. Symbols *j* and *y* most of the time transcribe a palatal glide and have been subsumed under *j* in the table. For both *b*- and *p*- stem consonants, a subcount is given between parentheses of forms alternating with *m*- forms in the same family.

Stems	1sg	1pl	2sg	2pl	Total	% of total
<i>m</i>	11	19	19	17	66	19.0
<i>n</i>	20	19	12	5	56	16.1
<i>t</i>	5	7	10	8	30	8.6
<i>k</i>	17	6	11	5	39	11.2
<i>s</i>	4	1	7	3	15	4.3
<i>j</i>	7	3	0	1	11	3.2
Subtotal 1	64	55	59	39	217	62.4
<i>w</i>	4	1	9	0	14	4.0
<i>η</i>	8	1	4	0	13	3.7
<i>ʔ</i>	5	1	3	2	11	3.2
<i>h</i>	7	1	2	0	10	2.9
<i>i</i>	6	0	1	0	7	2.0
<i>u</i>	4	0	2	0	6	1.7
Subtotal 2	34	4	21	2	61	17.5
<i>p/b</i> (<i>p/b</i> alternating with <i>m</i>)	0/0 (2/2)	0/1 (2/1)	2/0 (4/0)	1/2 (1/0)	3/3 (9/3)	1.7 (3.5)
<i>p b v d z ʃ r t l sw ʦ l š ž č j š^w š^{iv} lž ch ñ g</i> <i>kh kw x xw G h a</i>	18	22	16	14	70	20.1
Average # of occur. of 1/40 stems	2.9	2.0	2.4	1.4	8.7	2.5
Total	116	81	96	55	348	100.0

This is old news, in a way, for it has long been remarked that pronouns in most languages have a tendency to be based on a few stem consonants, which was attributed to a kind of functional convergence due to their huge frequency in discourse. Of course, the pronouns' overall shortness may be (and, in many languages, surely is) independently due to this functional constraint. Nevertheless, frequency cannot explain the massive convergence of pronoun stems on a handful of consonants at the global level, particularly with regard to the inalterable stability of stems in low-level families: if change had always been as slow as is observed in low-level families, there would be no phonetic convergence nor divergence of any kind to be expected. Preservation would be the only choice.

However, things are not that simple. A particular form of change may be observed already in low-level families, and this change almost exclusively consists in simplification: rather than innovating or borrowing pronoun stems, descendant languages may preserve only part of the stems reconstructed in their ancestral language. It may be observed for 1sg in the Indo-European family in our survey covering 500 languages, exactly a third (33.7%) of which lost any reflex of the PIE suppletive nominative **eghom* 'I' (the whole Celtic group — save perhaps Gaulish, see Blažek 2008 —, plus parts of Romance, Tocharian, Iranian, Indic, and Anatolian). And almost no language having (often independently) lost **eghom* did replace it by a new pronoun. Nearly all have generalized a form of the other PIE 1sg stem **m-* instead.

At the Eurasiatic level, the 2sg PIE pronoun stem **t-* is also generally attested in Uralo-Yukaghir, Mongolic, Tungusic⁸, and Chukotko-Kamchatkan as a pronoun stem as well, so that there may be no doubt about its Eurasiatic ancestry. But there is another Eurasiatic 2sg pronoun stem **s-*, found in Turkic, Tungusic, Korean, Japonic, Gilyak, and Kartvelian, also represented in the Eastern Itelmen 2pl *suze* 'you' (cp. 1pl *muze* 'we') and in the Eskimo 2pl subject marker of intransitive verbs *-si* (Greenberg 2000: 74–6). In PIE, it is also represented by a 2sg verb ending — and, since most personal verb endings derive from grammaticalized pronouns, there may be little doubt that the ancestor language of PIE had a 2sg pronoun stem **s-*. Where has gone this Eurasiatic **s-* pronoun stem in the Indo-European, Uralo-Yukaghir, Mongolic, Chukotko-Kamchatkan (save Eastern Itelmen) and Aleut lineages? It clearly underwent a severe loss rate, hardly compatible with those observed in low-level families.

This apparent multiplication of pronoun stems in ancestral languages as one goes farther back in time poses a strong typological problem, aptly spotted and exposed by Babaev (2008: 8): no known language possesses as many pronominal stems as are reconstructed for Proto-Nostratic. However, Babaev's explanation of this ancient variety as an artifact of reconstruction, resulting from innovations having piled up in descendant languages, remains puzzling, precisely because these too numerous Proto-Nostratic pronominal stems do not appear to have been innovated in each descendant language or family, most of them being found in several distant subgroups and being unlikely to have been borrowed. At the global level, with a half-dozen consonants gathering a large majority of low-level ancestral pronoun stems, one may only expect that the stock of pronoun stems in each of the most ancient macrofamilies will more or less be the same, though they will not match systematically with regard to person and number across macrofamilies.

Besides this distribution of pronouns stems over families and time, the global stock of pronoun stems also exhibits a phonetic particularity. As compared to dental-alveolar *t* and velar *k*, plain oral labials are amazingly underrepresented. To be sure, *p-* is not completely absent from Ruhlen's lists, nor is its voiced counterpart *b-* (18 items together, or 5.2% of sample), but exactly two thirds of them (12 out of the 18 items) appear to alternate with an *m-* form, e.g. in Ruhlen's Altaic 1sg forms **mi* ~ **bi*, where **bi* is the suppletive nominative of **mi* and certainly derives from it. This leaves us with only 6 occurrences (1.7% of sample) of undoubtedly original *b-* and *p-* stems (3 each, or 0.9%), to compare to the 66 occurrences of their nasal counterpart *m-*, and the 30 and 39 occurrences, respectively, of their dental *t-* and velar *k-* counterparts. Since plain oral labial stops are among the most widespread consonants in the languages of the world, their discretion among the global stock of pronouns would be a big stroke of luck if pronouns had arisen in complete independence from one another.⁹

⁸ In Tungusic, 2sg **t-* is represented in the 1pl inclusive *miti*, literally 'I-thou' (Greenberg 2000: 72).

⁹ Another distributional particularity in Ruhlen's list is the low number of voiced stops. With 3 *b-*, 4 *d-*, 2 *g-* and 1 *g-*, against 30 *t-* and 39 *k-*, they are nearly 10 times scarcer than their unvoiced counterparts. It may be (and

How to reconcile the extraordinary stability of personal pronouns in low-level families with their relative divergence within deeper-level families, while they however concentrate on very few stem consonants at the global level (though they do not match semantically), and display a typologically striking lack in their phonetic distribution? We will propose below a conjectural solution, deriving them from kinship appellatives like *mama*, *nana*, *tata*, *kaka*, *jaja*, etc., which must have preexisted them.

A solution

Before exposing our arguments, a warning is here in order. We are not reconstructing, with whatever method, be it “standard” or multilateral comparison, the ancestry of such or such pronoun stem, e.g. Eurasiatic **m-* and **t-*, as interpreted by Babaev (2009a: 142) in his review of Bengtson (2008), where our conjecture was first exposed.¹⁰ We did not (nor do today) intend to claim that any particular pronoun stem descends from such or such kinship appellative. In particular, we do not claim that speakers of Proto-Eurasiatic (nor of any other known proto-language) had changed some of their kinship terms into personal pronouns. Rather, we wanted (and still want) to suggest that 1st and 2nd person pronouns *as a category* might — and, in our opinion, may only — have evolved from that of kinship appellatives, in the course of a radical transformation of the nature of language, namely the emergence of syntactic articulation, by far anterior to Eurasiatic and Nostratic (though some of its evolutionary consequences might have lasted up until their respective time periods).

Of course, this conjecture being correct would imply that most pronoun stems in the world's languages, and among them Eurasiatic **m* and **t*, would in all likelihood remotely descend from kinship appellatives. But the demand presented by Babaev (2009a: 142) of typological evidence for such a shift is impossible to satisfy, precisely since pronouns change so little in modern languages — and the situation is absolutely not the same as it was at the time where human language acquired pronouns, both linguistically (1st and 2nd person pronouns now exist in all languages) and sociologically (kinship must have then been the only mode of social organization). As to the comparative evidence required by Babaev, it is also impossible to satisfy, for the same reason — except collectively, with the fact that a great majority of pronoun stem consonants, known not to be innovations (at least within our comparative reach), also are the stem consonants of kinship appellatives, which in turn must have preexisted pronouns (a claim independent from the belief that modern appellatives descend from Proto-Sapiens, as we will see).

We use the results of linguistic comparison to try and gain a view of very ancient facts, which linguistic comparison alone could not attain. Our results may certainly seem less secure than those obtained through regular sound correspondences, but asking questions like “Of the phonetic and syntactic articulations, which one may have appeared first?” or “What does it take for a language to have personal pronouns?” also is historical linguistics, even if sound correspondences alone may never answer them. The reader is thus urged not to apply auto-

surely in some cases is) an artifact of comparison: since initial voiced consonants do not very often get devoiced, one is tempted, when faced with *p- ~ b-*, *t- ~ d-* or *k- ~ g-* correspondences, to posit preferentially an unvoiced original consonant. But, precisely since initial voiced consonants do not often get devoiced, if numerous families have had originally voiced pronoun stems, one should retrieve them in their descendant languages and not be tempted to posit an unvoiced original stem consonant.

¹⁰ Babaev's mistake may in great part be due to the structure of our paper, most of which dealt with Eurasiatic pronouns, then shifted abruptly subject to this conjecture, and to our admittedly unusual method, as well as, and perhaps mainly, to lacunas in our argumentation, which we will try to mend here.

matically his/her knowledge of comparative linguistic procedures (though this and other knowledge may certainly be useful) in assessing our evolutionary arguments. Here they are.

As already mentioned, the six stem consonants (*m, n, t, k, s, j*) grouped in the first part of Table 1, totalizing 62.4% of ancestral pronominal forms worldwide, also are stems of globally-spread kinship appellatives, namely the five Proto-Sapiens words *mama, nana, tata, kaka* and *jaja* (Bengtson & al. 1994: 292–3; Ruhlen 1994b: 122–4; Bancel & al. 2002, 2005, in press; Matthey de l'Étang & al. 2002, 2005, 2008, in press), plus *ise* 'father,' widespread in Eurasiatic, Amerind and Niger-Congo. Most other stems listed in Table 1 may derive phonetically from one or another of these six consonants.¹¹ From a general phonetic viewpoint, this makes kinship appellatives unproblematic ancestors of personal pronouns. But why should they be the pronouns' ancestors? Why could not pronouns always have coexisted with them?

To answer these questions, we must leave the domain of strict linguistic comparison and enter those of general theory of language and human evolution. Human languages are known to be doubly articulated, phonetically and (morpho)syntactically (Martinet 1960: 13–5, 17–8). The phonetic articulation consists in meaningless elements, phonemes, combined into sequences to form simple meaningful elements, called *monemes* by Martinet, a term of his own coinage referring to both simple words and morphemes. In turn, the syntactic articulation consists in the combination of these elementary meaningful monemes into complex sentences.

Martinet orders these two articulations into a first and a second one, and finds that syntax comes first. His reasoning is based on a representation of language, viewed only from the speaker's side, in which the speaker has something to make known to someone else ("*tout fait d'expérience à transmettre, tout besoin qu'on désire faire connaître à autrui*", *ibid.*: 13). The speaker begins analyzing his initial, languageless (?) thought as a bunch of lexical units corresponding (?) to this thought of his,¹² which he arranges in the right order (syntactic articulation) and finally proceeds to convert this word sequence into a phoneme sequence (phonetic articulation). Thus, Martinet's order of syntactic and phonetic articulations exclusively relies on the assumption that a "thought" is entirely converted into an ordered word sequence in the speaker's mind before being passed to the phonetic component, in order to be converted into a phoneme sequence and uttered. With such a sequential processor, speakers should not be able to utter two sentences in a row without at least a marked pause between the two, since they would be able to begin to process the second one only after having finished to utter the first. Also, one never should see a speaker stopping short in the middle of a sentence, searching for a word not yet found in his internal lexicon. But many speakers are perfectly able to utter an indefinite number of sentences with no other pauses than for a short breathe, while everyone utters incomplete sentences everyday.

Instead of processing full thoughts/sentences through all components of their language processor one after another, real speakers must handle many different subparts in extremely short timespans, and we have as much as no understanding of this real-time language processing — albeit it is the only grammar deserving to be called *natural*. Within the timespan of a single sentence, speakers continuously think, spot words and morphemes corresponding to the theme and articulations of their thought (which words may in turn modify their thought, against which they must be checked back), organize them into groups and phrases (again with implications on and neces-

¹¹ Only the basic plain velar nasal *ŋ*, represented in the second part of Table 1, does not appear as a very likely descendant of any of consonants *m, n, t, k, s, j*. We leave the question pending, noting that (i) cases of evolution *m > ŋ*, though not common, are not exceptional, (ii) in our global database of kinship terms, there are relatively numerous instances of an appellative (*ŋ*)*ana* 'mother, grandmother, aunt,' mostly in African, Indo-Pacific and Australian languages, even though they do not make a very strong case for a regional etymology, while Proto-Niger-Kordofanian 1sg independent pronoun **ŋgai* exactly matches Proto-Pama-Nyungan 1sg ind. pr. **ŋgai* (Ehret 2007).

¹² This process, if it existed under the form assumed by Martinet, would be a third articulation of language.

sary checking with their initial thought), process bits of morpheme sequences in the morphological component, then in the phonological, then send them to the motor component to utter the corresponding sounds, and control a posteriori what they have just said with regard to phonetic, syntactic, lexical and logical accuracy, while keeping a pragmatic eye on the interlocutor and his/her reactions. The existence of all these subprocesses is *a contrario* warranted by the most common lexical, syntactic, morphological, phonological and phonetic speech errors (for an example of real-time morphological speech error in children, see Pinker 1999: 220–3).

As for hearers (because hearers are a necessary ingredient of language, and they cannot decently be supposed to begin decoding with syntax before having heard and identified phoneme sequences, and found corresponding words in their inner lexicon), they continuously decode the acoustic signal hitting their eardrums, while processing what they have just heard on both lexical and morphosyntactic levels, controlling the grammaticality of their interpretation as well as its semantic, logical and pragmatic relevance on both levels of discourse and external circumstances, and preselecting the most likely continuations at the phonetic, lexical (e.g. an animate noun after adjectives such as *sympathetic* or *loath*, etc.), syntactic (e.g., in an SVO language, verbs after a subject nominal, direct objects after a transitive verb) and semantic levels to speed up interpretation of the oncoming speech flow, keeping track in a permanently readjusted short-term memory of the few preceding sounds in order to rectify a possible auditory or parsing error, while they keep an eye on possible cues warning them that their speech turn is coming soon and they have to prepare to answer, or to emit some approbative grunt urging their interlocutor to speak on.

How many times these subprocesses are run during a sentence, whether they are run in parallel or not, and if so how they are synchronized, all these questions exceed our understanding today, except that one may be sure that there is a lot of comings and goings between the different components of language within the time of a sentence in the minds of speakers and hearers. As a result, from the vantage point of speech act, not only syntax certainly is not the first articulation of language but ordering the two articulations is wholly devoid of reality.

Nevertheless, it seems that another ordering of the syntactic and phonetic articulations is possible from the phylogenetic viewpoint. Many arguments converge in support of the idea that syntactic articulation must have emerged late in the evolution of language.¹³ The first line of support comes from studies on language acquisition by children, who at the age of 11–12 months start uttering isolated words, then begin (at 15–18 months) to use two- or three-word combinations, and finally begin (around 20–24 months) to acquire morphological and syntactic rules (Brigaudiot & al. 2002): children clearly acquire the phonetic articulation first.

It is also confirmed by observations from apes trained to manipulate symbols, either chimps (e.g. Gardner & al. 1989), gorillas (Patterson 1987), or bonobos (Savage-Rumbaugh & al. 1994). They are able to learn and to relevantly use up to several hundred symbols, but most of their utterances consist in a single symbol, even if the most gifted pupils may occasionally combine two or three of them, exceptionally four, though mostly without determined order.¹⁴ For chimps using symbols, syntax remains beyond their capacities.

¹³ Bickerton's (1990) theory of protolanguage, a misleading name for a primitive stage in the evolution of human language ability without syntactic articulation (and not the ancestral language of any given family), already claims that syntax should have appeared in a relatively recent stage.

¹⁴ For both apes and babies, 1-word utterances are sentences (specialists in language acquisition coined the phrase *holophrastic word* "whole-sentence word" to qualify them), and may convey complex meanings, often with heavy contextual reference, but it is not the point here. The point is that these sentences are not syntactically articulated — if they possibly are semantically, a component neglected by Martinet as if it were not part of language but contained in an extralinguistic "thought," still another dubious axiom.

Finally, the posteriority of the syntactic articulation is supported by mere commonsense: before gathering words into complex sentences, one must have words at one's disposal, which in all languages are made from phonemes. For this reason, any modern speaker must begin by the phonetic articulation in order to build words, and syntactic articulation has to come next.

How could archaic humans have built a syntactically articulated language before having invented the phonetic articulation and progressively built not only two or three articulate signs, but dozens or, more likely, several hundreds of strongly individualized words — otherwise, combining them would have been of little interest? And this initial process may not have been completed overnight. It is unlikely that the first phonetically articulate sequences also bore a truly symbolic meaning, as do modern words and morphemes — otherwise, it would have been like discovering at the same time the law of universal gravitation and the quarks, or the existence of microbes and the DNA. Rather, we would expect them to have fulfilled functions identical or close to preexisting animal vocalizations. Giving them a symbolic value must have been the result of a long subsequent evolution, as more phonemes became utterable with the progressive transformation of the human vocal tract, allowing to enlarge the lexicon enough to specialize some signs to designate clearcut classes of beings, things or actions — i.e. evolving them into words. Both these phonetic and semantic evolutions also must have long been dependent on the growth of brain size and processing power, as well as on such apparently hardwired behavioral evolutions as the emergence of spontaneous attention to articulate speech, the development of babbling in babies — a universal training stage, which may have appeared and spread only after mastering some degree of phonetic complexity had become a selective advantage —, or the tendency to react to speech with speech rather than directly with other acts. As a result, this initial evolution of phonetic articulation must have been anchored for most of its duration to biological evolution, whose pace is much slower than linguistic or cultural evolution.

Thus, there is an order in the two articulations of language, after all, which is historical in nature — and this order is the opposite of that found by Martinet. Phonetic articulation must have come first, and syntax only much later.

In human history, acquiring the second, syntactic articulation may not have been a small event. With syntax, you become able to tell stories, to describe precisely how to design and build any artifact, and to form complex thoughts about new ones. It is a fantastic universal tool for both innovation and transmission — technical as well as social, intellectual and religious. It must have revolutionized the life of the communities where it developed.

It happens to be the case that such a revolution has long been perceived in human prehistory. André Leroi-Gourhan (1964) studied the evolution of technical ability in humans, which he measured in meters of blade obtained per kilogram of rough silex knapped. He found that, since the earliest stone tools, ca. 2 MyBP, it had grown in direct correlation with the growth of endocranial volume, and hence brain size, until around 50 kyBP, at which point skull capacity stopped to grow while technology took off in a way silex blade length could not measure anymore. This 50 kyBP crossroads where cultural evolution finally diverged from the biological was termed the “Sapiens explosion,” since new techniques of all kinds seemed to have suddenly appeared, including seafaring with the first settlement of New Guinea and Australia across at least 100 kilometers of sea (Coupé & al. 2005). For around the same time, our Sapiens ancestors had left their African homeland to colonize the whole Old World, where they quickly supplanted the various human species having evolved there separately since hundreds of millennia, like the European Neandertals.

This cultural explosion must today be relativized with regard to its alleged instantaneity, since it now appears to have been preceded by an evolution in the African homeland of *Homo*

sapiens, as shown by the discoveries at South African sites Klasies River Mouth (Singer & al. 1982), Blombos Cave (Henshilwood & al. 2001, d'Errico & al. 2005, 2009) or Pinnacle Point (Marean & al. 2007). There one finds, as early as 80–130 kyBP (and even 160 kyBP at Pinnacle Point), clear traces of culturally modern behavior: the early *Homo sapiens* who occupied these sites cooked meat and plants on fire, fed on marine resources, made microlithic and polished bone tools, and, at Blombos in layers dated to around 80 kyBP, carved symmetrical geometric patterns on regular parallelepipeds of red ochre, and pierced shell beads (found in clusters which must have been worn in necklaces).¹⁵ All complex behaviors which archeologists rightly link with the necessary use of a form of symbolic language close in complexity to those used by contemporary humans.

Thus, as the consensus¹⁶ grows, the Sapiens cultural “explosion” or, rather, acceleration, would be the archeological landmark left by the apparition and evolution of syntactic articulation in human language. A process which certainly took time itself, because of the quickly growing complexity of the real-time encoding and decoding processes evoked above. And if we may consider that it was already underway around 150 kyBP, had continued to develop around 80–100 kyBP and had still made more progress at 50 kyBP, we have no idea of when it was completed (nor even, to be provocative, whether it is completed today).

Well and good, but what has this discussion about syntactic articulation to do with the origin of pronouns? Simple. The existence of pronouns and person markers directly depends on syntax. Without syntax, they are not only useless but even inconceivable.

Imagine a language without syntactic articulation — with 1-word utterances only for a very long time, and then with 2 or 3 juxtaposed words. There are no subjects, no verbs. There may be calls, and names are useful for this use as they allow to call a particular person. Other symbolic words are used as whole sentences, with the help of context and gestures. What use would be *I* and *thou*? And, above all, how could have appeared these extremely weird words — whose essential semantic feature is to change reference with the speaker? It is the very essence of symbolic language to share symbols which refer to the same objects for all users, and in all languages all words — save person markers — share this precious property, whose acquisition gives babies the key of spoken language. Only 1st and 2nd person pronouns and markers have the exotic particularity that their only meaning is to change reference with the speaker.¹⁷ I am my own and nobody else's I. And so is each of you all — his/her own and nobody else's I. Conversely, each of you is one of my thous, which he/she is not with regard to him/herself, while I am one of your thous, which I am not for myself.¹⁸

1st and 2nd person pronouns and markers are highly useful tools in conversation, and no attested human language seems to lack them. However, even with syntactically fully articulate languages, they are not absolutely necessary. It is always possible to speak in the 3rd person, Benveniste's (1946) non-person, occasionally using personal names to disambiguate who is doing what to whom: *Pierre and Alain tell Readers*. In the beginning of syntactic articulation, when people pro-

¹⁵ Also, the time where the human brain reached its present size must be somewhat relativized, since early *Homo sapiens* like those of Shkul and Qafezh (ca. 90 kyBP) and even earlier *Homo neanderthalensis* (from ca. 300 kyBP on) already attained skull capacities within the range of contemporary humans.

¹⁶ Notably expressed in several papers of Botha & al. (2009; e.g. d'Errico & al.), and in Bickerton (2009).

¹⁷ Other words may include reference to the speaker or the hearer, like *here* ‘around the place where I am,’ *now* ‘at the moment I am speaking,’ or *this* ‘the known or shown thing near me,’ but only 1st and 2nd person pronouns exclusively consist in a reference to the speaker or the hearer.

¹⁸ To be completely true, it may occur in the inner speech that one addresses oneself as a 2nd person — “*Pierre, what did you say?*” This mild symptom of a split personality reflects the fact that self-consciousness amounts to place oneself at a remove from oneself. However, talking about oneself as a 2nd person to somebody else would be considered a symptom of a serious speech or psychic disorder.

gressively became more and more able to combine words and to answer other people's utterances (something which must have been difficult and rare with 1-word utterances), 3rd non-person was certainly the only way to have a subject and a verb, as well as a verb and an object.

How may have appeared 1st and 2nd person pronouns, then? It would be absurd to suppose that they were intentionally invented by people having realized how useful they would be if they existed. Rather, they must have evolved from preexisting words. And the category these words must have belonged to is easy to identify. It is that of nominals which were used to refer to the speaker and the hearer — and hence to human beings —, whose most frequent members may have been turned into pronouns under a shortened phonetic form, as the development of syntactic articulation and the parallel rise of conversation made more and more often necessary to specify who was doing what to whom.

Among these nominals referring to humans, several subcategories do not qualify as the potential ancestors of personal pronouns. It would be very difficult to conceive how ordinary common nouns (like *hunter* or *girl*) or proper nouns (like *Jehan* or *Little Big Woman*) could have given rise to pronouns and acquired the property to switch reference: most common and proper nouns refer to the same object whoever is speaking, and are thus separated from pronouns by an apparently impassable semantic wall.

Moreover, if such ordinary common or proper nouns were the ancestors of pronouns, the global phonetic picture of present-day pronouns would be very difficult to explain in all cases. On the one hand, if all modern pronouns shared a common origin, and descended from a subset of common or proper nouns in a single ancestor language, how could one explain that it is impossible to assign any of the modern pronominal stem consonants to a common global origin? It would be at odds with the exceptional preservation of pronouns in low-level families. On the other hand, if present-day pronouns descended from a subset of proper or common nouns in several different ancestor languages, how could one explain that their stems converge so massively towards a handful of stem consonants, whatever the language family they belong to, while very few seem to have been innovated in the last 10 to 15 ky?

Among nominals likely to refer to the speaker and the hearer, only kinship terms, and in particular kinship appellatives like *mama*, *nana*, *tata*, *kaka*, *jaja*, etc., appear as likely ancestors of personal pronouns. First of all, kinship appellatives definitely are of Proto-Sapiens ancestry — because of their ubiquity and the impossibility, contrary to the widespread belief following Murdock's (1957, 1959) and Jakobson's (1960) famous papers on 'Why Mama and Papa?', that they had resulted from convergent innovations (Ruhlen 1994b: 122–4; Bancel & al. 2002, 2005, in press; Matthey de l'Etang & al. 2002, 2005, 2008, in press).

Kinship appellatives must even be much more ancient than Proto-Sapiens, and certainly played a major role in the emergence of phonetic articulation in Proto-Human. The first phonetically articulate words, uttered by mouths and tongues that had not been designed for speech by evolution, must have been built from the simplest consonants cast into the simplest syllable structures (Lieberman & al. 1972, Lieberman 1992) — which kinship appellatives still are today, with their typical CVCV, VCV or CVC reduplicative structure and their basic plain stops and vowels. Rather than meaning anything in the modern sense, they must have fulfilled some of the functions of prelanguage vocal communication, like calls — which kinship appellatives still are today, and even exclusively in the first uses of 1-year children (Grégoire 1937, approvingly quoted by Jakobson 1960), to only progressively acquire a referential value, thus opening children the door to symbolic representation and meaning.¹⁹ The first phonetically

¹⁹ This succession in the acquisition of language by children is another indication that phonetically articulate sequences are likely to have emerged before symbolic representation.

articulate words also must have been easy to transmit from generation to generation through mouths, brains and ears lacking specialization for language, so that this invention did not get lost — and kinship appellatives, thanks to their particularly simple phonetic structure and functional usefulness, have not get lost until today. All these conditions are fulfilled by nursery kinship terms, and by them only. Finally, as said in the warning beginning this section, even those who think that modern kinship appellatives have not been inherited from Proto-Sapiens, but are innovated by children every now and then, could hardly argue against their ancientness as a category. Since their acquisition by babies is — thanks to their unique phonetic and functional properties — a crucial initial step in the transmission of articulate speech and symbolic representation in all human communities of the world, arguing that kinship appellatives appeared recently would require to explain how babies (and more generally humans) managed to acquire articulate language before.

In the Paleolithic, all humans were hunters-gatherers, a lifestyle implying to live in small bands of a few dozen individuals, most of which are related. All historically known groups of hunters-gatherers have lived this way, and such was certainly the case of all groups since the very origins of the human lineage, as testified by the parallel lineages of bonobos and chimpanzees, who also live in small foraging bands of related individuals — and these bands display primitive features of a kinship-based social organization (De Waal 1982). More generally, evolutionary biologists classically explain how cooperation may have evolved among closely related individuals,²⁰ which is the case of all cooperating animals, whether insects or vertebrates (Hamilton 1963). John Maynard Smith (1964) even coined the now classical cover term of *kin selection* to refer to this branch of evolutionary theory. It is thus a safe bet to assume that, in archaic humans, language and kinship-based social organization, two highly cooperation-oriented institutions, must have evolved together from start.²¹

For these reasons, kinship appellatives must have been around long before the appearance of pronouns and person markers. They must have been in daily use as calls and address terms between Paleolithic hunters-gatherers, as they still are in contemporary societies by children towards parents, and in more traditional societies towards any person, which may be addressed according to age and status as 'son/daughter,' 'brother/sister,' 'cousin,' 'father/mother,' 'uncle/aunt,' or 'grandfather/grandmother.' It is extremely likely that kinship terms have become, in the early times of syntactic articulation, the choice tools to disambiguate the human subjects and objects in sentences, since all humans known to any speaker and likely to be told to and/or about belonged to his kindred.

²⁰ It essentially relies on the fact that related individuals share a great part of their genes, so that a mutation resulting in greater cooperation, even detrimental to an individual's reproduction, may be selected if it enhances reproduction of its relatives, which are likely to share this mutation and hence to propagate it. Bickerton (2009: 113–5) makes the point that high predation pressure on australopithecines in the savanna must have led to the reduction of "within-group competition (and, ultimately, the birth of cooperation)."

²¹ In this respect, evolutionary theorist Richard Dawkins, in his world-famous book *The Selfish Gene* (1976), remarked that a child's mother's brother is the closest male ascendant with whom the child may be sure to share a maximum of genes, and as such is a choice subject for kin selective processes. Dawkins asked anthropologists whether the mother's brother would not have played a role in some human societies. In a footnote to the 2nd edition of his book, he mentions to have received volumes of mail from readers telling him that the mother's brother was a central subject for social anthropologists since more than a century, because of its prominent role in a great many societies worldwide. The globally-spread kinship appellative *kaka* 'mother's brother, grandfather, elder brother' (Ruhlen 1994b : 122–4; Bancel & al. 2002, in press; Matthey de l'Etang & al. 2002, in press) might be the earliest trace of a kin selective process having led to the rise of the mother's brothers' role in the development of human societies.

As for the semantic plausibility of the evolution of kinship appellatives into 1st and 2nd person pronouns, and especially with regard to the switching reference of pronouns, it may be remarked that kinship appellatives are the only other class of nominals to partly share this property. Indeed, they share referential properties with all the major classes of nominals, thus all the more qualifying as the ancestors of the entire category of nominals, beyond their internal features pointing towards their primeval ancientness. Such is the case, for instance, of English *dad*. If I ask ‘*Where is your dad?*’, *dad* is a common noun, but if my interlocutor answers ‘*At the moment, Dad is out for angling,*’ *Dad* is a proper noun referring to a single person — a specificity rendered in writing by the initial capital. But this proper noun, precisely due to the relational nature of kinship terms, is again specific. I am supposed to understand that *Dad* is in fact *my interlocutor’s* father, and if I reply ‘*Oh! That’s why Dad went out so early, they must have gone together,*’ he in turn understands that I am referring to *my own* father. When used as proper nouns, i.e. referring to a determined person, kinship appellatives share with pronouns and person markers the particularity to switch reference with the speaker (though in the case of *Dad* the reference is not to the speaker or the hearer himself, but to a person considered as “inalienable property” of the speaker). Moreover, some kinship terms are reciprocal, i.e. they are likely to be used towards each other by two interacting speakers, like in English *brother* and *sister*. Any male whom I may call *Brother* may call me *Brother* in return if I am a male, and if I am a female any person I may call *Sister* may also call me *Sister*. This switching reciprocal reference of *Brother* and *Sister* is still closer to that of personal pronouns (though it fails to differentiate the two interlocutors in each one’s speech). Thus, kinship appellatives intrinsically share referential properties with all three nominal categories of proper nouns, common nouns, and pronouns. Like common nouns, they can refer to a class of beings, defined by common properties of these beings (in the example, the category of *dads*). Like proper nouns, they can refer to a particular individual (the speaker’s *Dad*). And, in this proper noun use (but contrary to all other proper nouns), they switch reference, like pronouns, from a particular individual to another as the speech turn passes.

In the stage of Proto-Human language that preceded the apparition of pronouns, kinship terms such as *mama*, *tata*, *nana* or *kaka* may have been the most frequent way to address people, so that they might easily have given rise to a 2nd person pronoun. It may seem less straightforward for the 1st person pronoun, since by definition there is no kinship term referring to oneself. However, just like for 2nd person, the 1st person pronoun must have emerged from an earlier nominal used by the speaker to refer to himself, and no other nominal category possesses such a word. It is perfectly conceivable that, in the stage before the emergence of personal pronouns, speakers referred to themselves by the kinship term used towards them by the addressee. In modern languages with personal pronouns, such practice would seem weird, but is occasionally used when speaking to children who do not master the use of personal pronouns, as in ‘*Mum wants Sonny to eat up those peas.*’

From such uses, which may have been general in the first stages of emergence of syntactic articulation, may have arisen an intermediate class of “pronominoids,” made of shortened forms of the most frequent kinship appellatives, able to refer to either the speaker or the hearer (and hence used as both 1st and 2nd person according to circumstances). Their exact status we must admit to ignore, even though it seems likely that the choice among the series was initially determined according to the kinship relation between interlocutors.

In a subsequent phase, each of them would have specialized as a 1st or 2nd person, while they lost any semantic connection with kinship appellatives. If we assume that the most ancient language phyla split up during this period (which may have lasted up to several dozens of millennia), it would explain why all of them have pronoun stems chosen from a very small

consonant set, which appears to coincide with that of the most frequent kinship appellatives. It would also explain why, in spite of this striking convergence, pronoun stems do not match semantically in the different phyla — since in each phylum they would have been selected independently as 1st or 2nd persons, all of them having originally had the two values. In the following millennia, their multiplicity in each language phylum would have naturally led to continuous simplification, explaining why more stems are reconstructed in more ancient ancestor languages than in recent ones, in the frequent absence of innovations in their descendants. The independent simplification processes in different phyla would also explain why not all of them have exactly the same stock of stems.

The strange lack of representation of labial oral stops among the global stock of 1st and 2nd person pronoun stems could also find a plausible explanation. Among kinship appellatives, *papa* ~ *baba* ‘father, grandfather, brother’ is one of the most widespread (it is reflected in about 70% of the some 2,200 languages in our global database of kinship terminologies). As such, if our hypothesis is correct, one would also a priori expect *p*- pronominal stems initially derived from *papa* to be widely represented. However, there is another kinship appellative *tata* ~ *dada*, which at present cannot be distinguished semantically from *papa* ~ *baba*, and is nearly equally well represented worldwide. It is well known that true synonyms cannot coexist for a long time in the same language, and the survival of both *papa* and *tata* in many languages ensures that there must have been a difference between them, whether in their respective meaning or connotation. Perhaps this difference led to preventing *papa* from being used as a pronominal, so that today the global pronoun stem stock still exhibits this typologically unlikely dearth in labial oral stops.

These are the reasons why we think that the very particular word class of 1st and 2nd person pronouns must have descended from preexisting words, and that kinship appellatives are the only possible ancestral class. While it is certainly beyond our proving and disproving capacities, we do not see another, more consistent evolutionary way through which personal pronouns might have appeared in human language.

Conclusion

In the conjecture presented here, not everything is of equal value. Consistently explaining the multiple reconstructions of pronoun stems in deep-level families, converging onto a handful of stem consonants at the global level, in the near absence of innovated pronouns in low-level families, seems to us to be one of its greatest strengths.

Other general points regarding the early prehistory of language, like the anteriority of kinship appellatives with regard to pronouns, and the phylogenetic reordering of the two articulations of language, we consider as pretty well supported by ontogenetic and evolutionary arguments.

The weakest point, in our opinion, certainly is the transition between kinship appellatives and pronouns through the speculatively assumed “pronominal” stage, no evidence of which we may propose to the reader. More thought is needed about this stage, but not thought only, and if this point is by now the weakest it also might in the future prove the most fruitful. Here we are getting closer, both in the time sequence and the matter dealt with, to what most readers of *VJaR/JLR* are accustomed to: reconstructing ancient languages.

Our conjecture essentially relies on the observation of reconstructed pronouns in the Eurasiatic and Nostratic macrofamilies, as well as on a statistical observation of the low-level ancestral pronouns at the world level. Generalizing the Nostratic case is thus predictive. And

the prediction it makes may be confirmed or belied by the historical behavior of pronoun stems in other macrofamilies: in these ones as well, one should find very few innovated stems in the member subgroups, and most of the changes in pronouns should be restricted to loss of some of the macrofamily's ancestral stems. (Of course, this prediction is meant as a general rule, and may encounter counter-examples.)

A prediction it does not make, as highlighted in the beginning of the second section, is that each macrofamily would have changed some of its kinship appellatives into pronouns or pronominals. However, since it assumes that the pronominal stage — or stages — could have lasted for dozens of millennia and perhaps until recently, up into the Proto-Nostratic period, it should not be lost of sight that in some cases there might be after all a closer relation between each macrofamily's particular kinship terms and pronominal stems. Should it prove true in some cases, as the partly parallel distributions of 1sg **ɲgai* and kinship appellative (*ɲ)ana* (see note 10 above) might suggest, it could lead to refine the present conjecture.

As a consequence, advances in the comparison of other ancient language families worldwide are likely to provide us with crucial insights allowing to validate or reject our conjecture.

Finally, let us hope that some readers will have enjoyed the tour, however risky it was, and will take us one day for another visit of their own to the earliest prehistory of language.

German V. Dziebel

Hill Holliday, Boston/Great Russian Encyclopedia, Moscow

On the Co-Evolution of Kin Terms and Pronouns

As Bancel and Matthey d'Etang (BME in the following) are perfectly aware of themselves, their conjectural model of the evolution of personal pronouns from kinship terms around 100,000 years ago is very hypothetical and speculative at this point. Hence, I don't intend my comments below to be a systematic critique of their ideas. They need to be commended for the bold attempt to tie several divergent lines of inquiry in order to reconstruct the beginnings of a historical process by which languages acquired such specialized lexical classes as kin terms and pronouns. Remembering my rather vociferous e-mail exchanges with Pierre and Alain over the evolution of reduplicated kin terms in the early 2000s, I was rather surprised to see us converge, by 2010, on the issue of the origin of pronouns from kin terms. Back in 2001, in my Russian book "The Phenomenon of Kinship" (Dziebel 2001), I drew on anthropology, archaeology, linguistics and population genetics to begin developing a very similar thesis, which can be summarized as follows. Due to the critical importance of social intelligence and kin-structured production in the evolution of *Homo sapiens sapiens* and the Middle-to-Upper Pa-

leolithic transition (see Moyer 2004), the recent evolution of modern humans from an original small deme characterized by a limited level of genetic diversity and a high propensity for kin-structured fissions and fusions (Neel & Salzano 1967; Weaver & Roseman 2005), the pervasive importance of kinship in foraging societies, the systematic nature of the historical transformations of kin terminologies, the undifferentiated referential properties of kin terms, the grammatical peculiarities of kin terms widely attested cross-linguistically (Jonsson 2001; Dahl & Koptjevskaja-Tamm 2001) and the empirical cases of crossover between kin terms, on the one hand, and other lexical classes, on the other (e.g., "kinship verbs" in some Australian, North American Indian and Khoisan languages [Evans 2000; Ōno 1996], "kinship pronouns" and "kintax" in Australian languages [Evans 2003], "kinship zoonyms" in Indo-European languages [Alinei 1985], etc.), kin terms may be thought of as a "language within a language," a phenomenological "proto-language" or an symbolic calculus, from which other lexical classes, including pronouns, common nouns, numerals, verbs, body part terms and proper

nouns could have evolved in the course of the evolutionary transition from hominin vocalizing to fully articulate sapient language. Although back in 1996 and 1997 I had toyed with various long-range etymologies possibly attesting to the evolutionary transition from kin terms to pronouns, body part names, etc., I obtained no solid results and restricted my claim to a strictly synchronic and philosophical level.

I have always thought that these kinds of speculations, albeit interesting and important, shouldn't strive too hard to become theories, as the level of uncertainty will always stay high regardless of the data at hand. Hence, I omitted this level of analysis from my subsequent English-language monograph (Dziebel 2007), although the overall focus on the peculiar linguistic structure of kin terms and their systematic historical transformations remained unchanged. As BME correctly note, kin terms share properties with common nouns (as in *Where is your Dad?*), proper nouns (as in *At the moment, Dad is out for angling*) and pronouns (as in *Mum wants Sonny to eat those peas*). Kin terms also show predicative qualities as, for example, in the expression *John and Bill are brothers* or in languages in which kin terms can be used only with appropriate pronominal markers of inalienable possession. As Gruber (1975, 40) wrote, "inalienable nouns are themselves underlyingly predicates." Ontogenetically speaking, kin terms are relational products, which, unlike elements of personal and spatial deixis, derive their meanings not from the acts of speech but from the acts of language acquisition when a child needs specialized cognitive tools that would allow him to correctly sort incoming stimuli into human and non-human, generic and specific, true and symbolic, subjective and objective "buckets" (see Hirschfeld 1989; 2001).

As an example of such an undifferentiated nature of kin term reference, I'd like to recount a personal story. I'm married to an American woman from a family with a long history of living in New England and with rather tight British, German and Dutch roots. Unlike the majority of Americans, they call 'father' not *dad* or *daddy* but *pop* or *papa*. My father-in-law is *papa* to his daughters and to his grandson (the son of my wife's sister). His wife, my mother-in-law, also refers to him as *papa* when speaking about him to those relatives who address him as *papa*. (His official name is Edgar but he prefers to be called Tony by those like myself who would call him by his first name.) In this one American family, a kin term, therefore, has become a personal name, a family nickname or an honorable title. My in-laws do not like to be called *babushka* and *dedushka*, when I speak to my daughter in Russian. My wife does not like it either. They would

like to be called *granma* or *grammy* and *granpa* or *granpy*. Only my Russian parents are *babushka* and *dedushka* to my daughter. Again, kin terms are treated as proper names, as they become rigid designators of specific individuals. At the same time, my wife and my in-laws realize that my father-in-law cannot be *papa* to my daughter, as in Russian 'father' is *papa*. My in-laws frequently make mistakes, correct themselves, apologize profusely and attract scolding from my wife who cannot understand why it is so difficult for them not to refer to my father-in-law as *papa* of my daughter. This reminds me of an anecdote quoted by Roman Jakobson (1971) in which one child forbids the other to apply pronoun "I" to himself: "don't call yourself I, only I am I." It has nothing to do with the word *papa* being a Russian word. English *papa* and Russian *papa* are the same word but in our English-speaking family an American father-in-law and a Russian son-in-law lay different claims to it. In the end, I am *papa* to my daughter but my father-in-law is *papa* to my wife, my sisters-in-law and my nephew (wife's sister's son) and *granpa* to my daughter. Forms *-pa* and *papa* here are the logical opposites of proper names. They are Jakobsonian shifters or deictic elements that change their reference depending on kinship grade, family status and speech role. In our family parlance, *papa* sometimes groups together me and my daughter and sometimes my father-in-law and his daughters creating collective shifters.

BME's paper contains a promise that high-level hypotheses and hunches pertaining to the origin and evolution of human language may, in fact, eventually become testable. In the meantime, a few critical remarks are in order.¹

1. In all their writings, including the present one, BME treat kin terms as a self-evident class of nouns. Although it's true that kin terms are recognizable as such in every language, internal semantic, pragmatic and formal variation within this set is extraordinary. In 1871, Lewis H. Morgan pioneered the field of kinship studies with his famous *Systems of Consanguinity and Affinity of the Human Family*, in which he divided human kinship terminologies into three types (Turano-Ganowanian, or Iroquois, Hawaiian or Malayan

¹ A caveat should be made here: BME take for granted the existence of deep-level language families (macrofamilies, superphyla) such as Nostratic, Eurasiatic, Dene-Caucasian, Austric, etc. Although I'm very critical of these specific high-level groupings and the way in which some of long-rangers treat kin terms (see Dziebel 2008; 2009), I do not deny that low-level families are somehow related and will not touch on these vexed issues in this review.

and Descriptive or English), pointed to the different patterns of their geographic distribution and suggested a solution to the origin of American Indians (see Morgan 1871). Notably enough, in 1852, German linguist Johann Buschmann, also a student of American Indian languages, published a cross-linguistic study of reduplicated parental kin terms in which he divided them into labial and dental classes and argued that labial classes (*pa, ap* for father and *ma, am* for mother) were more prominent in the Old World, while dental classes (*ta, at* for father, *na, an* for mother) in the New World (Buschmann 1852). There is a striking parallelism between Morgan's focus on the semantic structure of kin terms and Buschmann's focus on the phonetic structure of kin terms. There is also a striking similarity between Buschmann's broad generalizations for kin terms and Joseph Greenberg's broad generalizations regarding Amerind and Eurasiatic pronouns.

In the 20th century, anthropologists developed various evolutionary models to explain the observable diversity of kin terminologies. Following in the footsteps of Morgan and others, I have been operating with a database of 2500 languages and published an updated historical typology of kinship terminologies on its basis (Dziebel 2001; Dziebel 2007). In addition, I amassed a comprehensive bibliography of kinship studies in anthropology, linguistics, logic, psychology, and other disciplines (see www.kinshipstudies.org). BME are apparently unfamiliar with this huge body of theoretical literature, as their studies pertaining to the evolution of kin terms do not reference it. This is a very odd oversight, which may have a negative impact on their theories. For instance, when they reconstruct meaning 'mother's brother' (other possibilities being 'grandfather' and 'older brother') for their proto-Sapiens etymon KAKA (Matthey d'Etang & Bancel 2002), they may find it surprising that 'mother's brother' as a separate meaning may not have existed in early human kinship systems, as it may not have differentiated yet from such meanings as 'man's sister's child' and/or 'spouse's father.' Similarly, 'grandfather' as a category subsuming 'father's father' and 'mother's father' but distinct from grandchild classes is likely a secondary evolutionary development absent from the earliest human kinship systems. Finally, 'older brother' may have existed only as two separate categories, namely 'man's older brother' and 'woman's older brother.' The evolution of human kinship systems is a history of categorical splits and mergers, and the reconstruction of reduplicated kin stems all the way down to the proto-Sapiens level without correlating them with the known global patterns of semantic change makes their whole exercise rather outlandish and hard to relate to.

2. In their writings, BME rely heavily on the argument that the omnipresence of formally reduplicated kin terms such as PAPA, MAMA, TATA, KAKA, etc. in world languages suggests their antiquity. First of all, they lump together CVC, CVCV and VCV kin terms as if they were interchangeable formations. Meanwhile, a quick look at Indo-European languages raises a doubt: while ancient Indo-European languages leaned onto the VCCV/VCV structure (Hitt *atta* 'father', *anna* 'mother', Goth *atta* 'father', Slav **otiči* 'father' with the regular loss of gemination), modern Indo-European languages tend to have CVCV (Russ *mama*)/CVC (Eng *dad*) structure, with no continuity between the ancient and modern reduplicative sets. The ancient set is comprised of basic terms (corresponding to modern *mother, father*, etc. that display complex morphology),² while the modern one encompasses hypocoristics co-existing with morphologically complex forms, which function as basic terms. The reduplicative shape of hypocoristics may be purely accidental (comp. Eng *bud* as contracted *brother*, without reduplication) and derived from various registers of adult speech. The reduplicative shape of ancient basic terms may be plesiomorphic and related to language acquisition by children.³ It seems likely, therefore, that BME's sweeping approach lumps together several functional types of reduplicative formations. For long-range comparison it is important to go beyond similarities in sounds and meanings and identify exactly what *kind* of sound and what *kind* of meaning are in front of us.

BME also overlook the fact that reduplication is only one of several available surface strategies of organizing the phonetic and semantic content in kin terminological systems. Kin terms in general show a strong tendency to develop not only recurrent semantic patterns (Bifur-

² In the Gothic Bible *fadar* is used only once (Gal. 4,6) as an address form for God; the standard word for father is *atta*. The nominative form of *fadar* is unknown (Stiles 1988, 136, n. 3).

³ Although BME argue strongly against Jakobson's (and Buschmann's, for that matter) theory that parental kin terms derive their phonetic properties from baby talk and are therefore convergent innovations, there is little doubt that kin terms guide various linguistic exchanges between adult relatives and children pertaining to the acquisition of language. For instance, among the Hopi the grandfather often calls his grandson *ikwa'a*, lit. 'grandfather' in the effort to teach him kin terms (Titiev 1967). In this case, we may be dealing with "semantic reduplication" as the role distinctions between grandfather and grandson are neutralized. Or, consider a common practice among the speakers of Arabic (or even English-speakers of Middle Eastern origin) to refer to their young sons as "fathers" and their young daughters as "mothers" (Littmann 1902, 134, n. 1) As children grow, these habits of speech fade away.

cate Merging, Generational, Crow-Omaha, Sliding Generational, Alternate-Generational-Self-Reciprocal, etc.) but also recurrent morphosyntactic patterns.

A special class of kin term formations called “Descriptive” or “Cumulative” literally describes a kin relation. Any language can produce descriptive compounds but some languages, e.g., Swedish, use these compounds as the only way to denote a relationship (*farfar* ‘father’s father’, *mormor* ‘mother’s mother’, *farmor* ‘father’s mother’, *morfar* ‘mother’s father’, etc.). Notably, *farfar* and *mormor* are reduplicatives, but, unlike PAPA and MAMA terms, reduplication occurs on the level of a syllable and represents an iconic representation of cumulative kin grades. These descriptive constructions tend to denote collateral and second-generation and higher kinship categories, but in some Niger-Congo and Nilo-Saharan languages, they are employed to generate terms for siblings as well (e.g., Mbay *nggonkom-* lit. ‘child of my mother’, *nggonbom-* ‘child of my father’) (Harvey 1991).

Another recurrent morphosyntactic pattern involves attaching derivational morphology to a basic kin term to arrive at a genealogically derived kin category (e.g., Lat *amitinus* ‘father’s sister’s son’/*amitina* ‘father’s sister’s daughter’ from *amita* ‘father’s sister’). A subset of this compounding technology is the morphosemantic pattern whereby relational adjectives “little” and “big” are attached to a simple kin term with the resulting effect of connoting genealogical distance. This is the function of Eng *grand* and *great* in (*great-*)*grandfather*, (*great-*)*grandmother*, (*great-*)*grandson*, (*great-*)*granddaughter*. In many genetically unrelated languages one can encounter expressions “little father” for ‘father’s brother’ and “little mother” for ‘mother’s sister’.

The pairing of semantically related kin categories is another typical morphosyntactic pattern. In such languages as Spanish, kin categories paired by sex tend to share a stem to which grammatical gender markers are applied (*hermano* B, *hermana* Z, *tio* uncle, *tia* aunt, *hijo* S, *hija* D, etc., with earlier Latin and Greek antecedents). Finally, some languages, e.g., Russian, have developed a whole slew of reduplicated kin terms *diadia* ‘uncle’, *ded* ‘grandfather’, *mama* ‘mother’, *papa* ‘father’, *tiotia* ‘aunt’, etc. that are not part of proto-Slavic kinship inventory and are recent formations driven by category mergers (*diadia* replaced the earlier pair *uji* ‘mother’s brother’ and *stryi* ‘father’s brother’) and lexical diffusions (*mama* and *papa* were borrowed from French by Russian aristocracy in the late 18th century and then trickled down into general usage).

In many Australian languages, reduplication competes with compounding as two paradigmatic strate-

gies for describing kin relations (Harold Koch, pers. comm., 2009). Different morphosyntactic strategies for expressing kin relations frequently blend together. Consider Rus *babushka* ‘grandmother’, which contains a reduplicative stem *bab-* and a derivational morpheme *-ushka* with a diminutive meaning. Comparison between Rus. *tiotia* ‘aunt’ and Span *tia* ‘aunt’/*tio* ‘uncle’ shows that two languages within the same family chose two different ways to utilize reduplication: across two segments of a word in the case of Russian and across a pair of semantically close categories in the case of Spanish. Finally, compounded kin terms typically undergo contraction and simplification, so that the original complex nature of these terms fades away.

Although it’s true that reduplicated kin terms are very frequent and pervasive in languages, so are other morphosyntactic patterns. Moreover, data seems to indicate that some of these morphosyntactic patterns, including reduplication, descriptive compounding and pairing are relatively recent in the history of the low-order language families. It appears, therefore, that reduplication, compounding and pairing are recurrent morphosyntactic patterns that, at different points in time, had wide but always-different geographic distributions because they tend to emerge, compete with each other and disappear from languages under specific historical conditions. If a proto-Sapiens language had reduplicated kin terms, it may have also had compounded and paired kin terms. It must have also had unreduplicated, uncompounded and unpaired kin terms. If these surface patterns tend to recur in extant languages, then they must have recurred in ancient languages and in the incipient languages of our hominid ancestors. If reduplication is somehow more primitive than pairing and compounding, BME have never demonstrated it, and languages for which we have direct diachronic data suggest that reduplication, at least of the CVCV type, is a relatively recent strategy. BME’s narrow focus on these high-order surface strategies (which they apparently perceive as basic) make BME’s grandiloquent theories look rather trite. Finally, if reduplicated kin terms preceded unreduplicated terms, then how did the latter emerge?

In the context of BME’s current paper, it remains unclear why, even if pronouns evolved from kin terms, should they necessarily evolve from reduplicated kin terms. BME acknowledge the lack of transitional forms between kin terms and pronouns and postulate hypothetical “pronomoids” to fill in the gap. The chances of filling the gap between reduplicated kin terms and pronouns are rather slim, since, to the best of my knowledge, pronouns are rarely, if

ever, reduplicated. The existence of recurrent morpho-syntactic patterns of kinship expression also calls into question BME's claim that human language evolved through two discrete stages — phonetic articulation and syntactic articulation. As far as kin terms are concerned, phonology, semantics and syntax are tightly intertwined, and there seems to be no reason to arrange these structural orders into an evolutionary sequence from simple to complex. The syntactic articulations of kin terms may be different from the syntactic role pronouns play, but they seem to have been with human kinship expressions since very ancient times.

3. BME report on the extraordinary stability of personal pronouns in low-level families and their relative divergence and progressive multiplication within deeper-level families. They perceive it as a serious contradiction. Meanwhile, why could not we solve this problem by reconstructing more complexly structured pronoun sets for deeper-level families and then postulate different paths of parallel devolution leading to more simplified pronoun sets in low-level families? There are strong reasons to believe that the evolution of kin terminologies from the Late Pleistocene to the present involved the progressive collapse of a great number of categories produced by various intersections of such variables of relative age, relative sex, self-

reciprocity, etc. (see Dziebel 2007, with further literature). During the same period of time new categories based on genealogical grades have emerged. If the analogy between kin terms and pronouns, for which BME advocate, is valid, then we could expect to find similar categorical reduction in pronoun sets, with such underlying deictic variables as physical distance, social distance, kinship grades, marriage classes, ethnic groups disappearing from more recent language families and branches (comp. familiar vs. respectful 2d person pronouns *tu* and *vu* preserved in French, *ty* and *Vy* in Russian and their loss in modern English, etc.). Kin-sensitive pronoun systems described for about 20 Australian languages are a good example. In Lardil, there are two sets of free pronouns in the non-singular: a harmonic set, for referents related in even-numbered generations, such as siblings, spouses, or grandkin; and a disharmonic set, for referents in odd-numbered generations, such as parents and children (Evans 2003, 24). Pronouns and kin terms may have been evolving independently as distinct sets with their own structure for a long period of time, overlapping in peripheral areas such as plural forms, before finally coalescing at the proto-sapiens or pre-proto-sapiens level when neither pronouns, nor kin terms looked anything like the linguistic items that the speakers of modern languages are used to.

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Reply to Pierre Bancel and Alain Matthey de l'Etang

The origins of personal pronouns in the world's languages is certainly one of the most puzzling questions in diachronic linguistics. As well as the origin of language itself, this issue has seen a lot of most fantastic theories of the genesis of person marking. In the middle of the 19th century, Rudolf Westphal tried to explain Indo-European personal pronouns as the result of further development of personal verbal affixes **-m*, **-t* and others which, in their turn, emerged in human language from nowhere, just to determine syntactic meanings. Nasal sounds, as Westphal put it, 'lay most closely' in the human speech apparatus, and that is why **sta-m* was the first personal form to appear. Next was the third person **sta-t*, with a person marker 'ly-

ing further' in the dental domain [op. cit. Дельбрюк 1904]. Later, in the beginning of the 20th century, Hermann Hirt believed that personal pronouns have common roots with nominal case markers and other affixes: the 1st person singular pronoun **me* was compared with the accusative **-m*, the instrumental **-mo-*, the dative / genitive **-om*, and the derivative suffix **-mo-* [Hirt 1932]. This could look promising upon first glance, and, remarkably, no Indo-European language presented any data to prove that this was wrong.

These are certainly not the most absurd versions of pronominal genesis even if we confine ourselves to Indo-European. Personal pronouns, in most languages, are so short that their comparison with any

other lexical or morphological item is usually limited to a single consonant and/or vowel. And, as long as the early stages of development of any proto-language have not yet been studied properly, there is always enough room for all possible speculations.

The only way to avoid such speculative hypothesis, however, is to base any discussion on the solid platform of knowledge.

Unless we can prove or deny a hypothesis by means of the comparative analysis, linguistic typology remains our most powerful weapon. Among the more than 6,000 languages of the world, many have undergone the genesis of personal pronouns within historically attested periods of time. Having analyzed many of them, one can make general and relatively exact conclusions about the most typical sources of personal pronouns. A detailed and comprehensive description of these sources is given, for instance, in [Helmbrecht 2004], where extensive examples are given from various languages of all continents. According to this and other analytic papers (including a brief survey in [Babaev 2009b]), personal pronouns can indeed develop from nominal items with 'human' meanings, such as 'man', 'speaker', 'body', 'slave' (for the 1st person) or 'master' (for the 2nd person), 'other' or 'the rest' (for the 3rd person). They can develop from deictic particles, including demonstrative pronouns, especially (but not exclusively) in the 3rd person. They also develop from composite constructions of various nature, such as 'it-is-me-who', 'my-body' or 'your-honour'. But almost nowhere do they develop from terms of kinship¹.

For instance, bearing in mind the numerous examples of genesis of the 1st person singular pronoun from the word 'man, person', we can subsequently compare Indo-European **me-*, genitive **mene*, with its Uralic, Altaic, Kartvelian and other cognates, with Nostratic **mān(u)-* 'man, male' postulated by Dolgopolsky [2008: no. 1422]. This version would enjoy phonetic support (CVC structure roughly the same) and make a lot of logical sense. Even if there is not enough internal comparative evidence from Nostratic languages to confirm the idea, typological evidence makes it at least worth digging further.

¹ For the sake of being precise, there are examples when kinship terms act as quasi-pronouns, in the languages of Southeast Asia: e.g., Vietnamese *anh* 'thou' or *em* 'me' literally mean 'elder brother' and 'younger suster', respectively [Cooke 1968]. But these are in fact used for both the 1st and the 2nd persons, and thus, do not carry exact person meanings. Colloquial Russian uses such words as *omeu* 'father' and *ōpam* 'brother' for addressing people in the street, but this does not make them personal pronouns.

The disregard of typological data seems the key disadvantage of the analysis provided by Bancel & Matthey de l'Etang. They explain it with the note that typology might have been totally different at the stage when the human language was only forming. But we do not have any facts confirming this, and in the absence of such, typological verification is one of the few means to support such a hypothesis.

No sufficient logic is presented for the process by means of which kinship terms were transformed into personal pronouns for the first two persons, and the authors emphasize that this should be regarded as their weakest point. They suggest a 'pronominoïd' stage when appellative kinship terms were shortened to be used as pronouns. Actually, this is a good point, because it is precisely the way that older nouns turn into pronouns in many languages of the world (whose history can be traced back). The well known Polish *pan* 'mister' and *pani* 'miss' is just such a 'pronominoïd', in terms of the authors: it is extensively used as the 2nd person plural pronoun in polite and official speech. Spanish *Usted* 'you' < *vuestra Merced* 'your mercy' and Portuguese *voce* < *vossa Merce* also stand in the midway between being nominal constructions and pronominal forms. They still require that the verb be in the 3rd person, thus reminding us of their origin. The next step forward is seen in Romanian *dumneata* 'thou' which is followed by the verb in the 2nd person. However, again, no pronominal construction like that is based on former kinship terms.

Another shortcoming of the paper, which the authors are well aware of, is the focus on the languages of Eurasia that belong to only one macrofamily (Nostratic or Eurasiatic). Evidence from many other language families of the world is only touched upon briefly. However, without a more detailed analysis of pronominal system development outside Eurasia conclusions on the tentative human proto-language remain unbalanced. Indeed, in most branches of Nostratic personal pronouns are quite ancient and seem to have been immune to replacement for millennia. However, this is absolutely not the case in languages of East and South East Asia and the Pacific, where pronouns tend to appear and disappear quite often. These hundreds of languages are good counterexamples to the authors' hypothesis that personal pronouns are always stable in the language. In fact, they are in most cases subject to shortening, analogical change, and replacement by newly-formed pronominal paradigms or even, in rare cases, borrowed items.

Bancel and Matthey de l'Etang's hypothesis that such proto-human kinship terms as **mama*, **tata*, **nana*

etc., could have been sources for personal pronouns in the world's languages may seem appealing because it is comprehensible accessible access. It will be much harder — in our view, quite impossible — to prove it. In the 1920s, Nikolay Marr, a well known Russian linguist, created the 'new doctrine of language' stating that all languages of the world originated from four 'basic elements': *sal, yon, ber, rosh*. The hypothesis was

just as accessible, and plenty of works had been written to substantiate it. But it was never supported by linguistic evidence, and, in the end, was refuted by the scientific community.

Of course, we cannot say that personal pronouns *cannot* be derived from kinship nouns. We only note that the only solid proof to support this hypothesis will be reliable linguistic data.

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Reply to Pierre Bancel and Alain Matthey de l'Etang

The present contribution of Pierre J. Bancel and Alain Matthey de l'Etang continues their series of articles devoted to personal pronouns and kinship terms in a global perspective. They mention that the most frequent consonants forming personal pronouns in most of the world's language families are quite limited in quantity. Considering the fact that the so-called "nursery" kinship terms with the canonical shape *CACA & ACCA* usually consist of a similar set of consonants, they conclude that it is precisely these *Lallwörter* that could have been the source of personal pronouns. This is a very courageous hypothesis, with very little chance, however, to be proven.

One fundamental difference is the fact that pronouns generally conform to standard sound rules, contrary to nursery terms, e.g. Gothic *þu* "thou" vs. *atta* "daddy" respectively. Another objection is that the authors, trying to explain why some of consonants are so "favoured" in nursery terms, e.g. *B* in *BAB(B)A & AB(B)A* ±"father", but not in pronouns, blame this on the existence of the competing synonym *TAT(T)A & AT(T)A*. But the same could be said about the term *NAN(N)A & AN(N)A* ±"mother" that frequently "competes" with the synonymous *MAM(M)A & AM(M)A* — and yet, both *n-* and *m-* are quite frequently met in pronominal stems.

However, trying to analyze processes that the authors themselves date to around 100.000 years BP is only a virtual exercise of the same type as calculating the number of angels on the point of a needle. It would be more useful to evaluate the methodological approach. The method of 'mass comparison', pro-

moted especially by Joseph H. Greenberg and his follower Merritt Ruhlen, is also dominant in the works of Bancel and Matthey de l'Etang. Naturally, it may be valuable to summarize rich lexical or grammatical data from many languages or various language families. It may also be useful to evaluate them statistically. Unfortunately, the method of 'mass comparison', gives us ample opportunities for postulating mistaken pseudo-cognates. This can be illustrated by several examples from other articles of Bancel & Matthey de l'Etang (in the present article we find only minimal concrete data, mostly replaced by 'impressionistic' quasi-reconstructions):

2008a, 435: Old Avestan *tā* "father" appears in *Yasna* 47.3, besides *ptā* in *Yasna* 45.11, 47.2, both from the IE nom. sg. **pātēr* (Barthomae 1904, 905; Hoffmann & Forssman 1996, 151). This means that it is **not** a nursery word.

2008b, 441: Kashmiri *bi* "I" does **not** belong among the *m*-forms where the authors place it. In reality, it reflects the IA plural pronoun **vayam* "we" = Shina *be* "we". The same shift from pl. to sg., but in the oblique stem, appears in Bhojpuri & Maithili *ham* "I" from **hamm* < **amh^o* < **asm^o* "us" (Masica 1991, 252–53).

2008b, 444: Nuristani forms of the 1st person of plural: *Kâmviri imo*, *Kâtaviri imu*, *Sañuvîri ima* are classified as examples of the 1st person *m*-pronoun. But historically they reflect the oblique pronoun **asm^o*, more precisely — such Middle Indo-Aryan case forms as **asmē*, **asmānām*, **asmēhi* (Turner 1966, #986), derivable from **ṛs-(s)m^o*, where the main morpheme carrying the 1st person plural meaning is **ṛs-*. A similar

situation is seen in modern Iranian languages, beginning already from the Middle Iranian period (with the exception of Khotanese, where the original nom. *buhu* is preserved). The original nominative was replaced by the genitive **ahmākam*, still preserved as the gen. in Young Avestan *ahmākam*, Old Persian *amāxam*, but used already as the nom. in Bactrian (α)μαχο, Sogdian /māxu/, Partian /amāx/, Middle Persian /amā/, and in all modern Iranian languages, e.g. Persian, Baluchi *mā*, Azari *āmā*, Kurdish Sorani (*h*)ême, Sivandi *hame*, Bashkardi *yamah*, Ossetic *max*, Yagnobi *mox*, Ormuri *māx*, Shughni *māš*, etc. etc.

On the other hand, the authors would probably

welcome the derivation of the IE pronominal root in **w-*, attested in the 1st person of pl. & du., from the primary cluster **mw-*, following Rasmussen (1999, 266). Although it is not generally accepted (maybe for the reason that this article was published in a journal which is not easy accessible), it represents a legitimate solution.

Summing up, I find useful the summarization of data collected by authors in some of their previous studies. But their present attempt at generalization is quite premature and misleading, since it is not based on the standard historical-comparative method, verified by typological data.

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Reply to replies

German Dziebel seems to find some convergences between his own work and ours. One may find interesting that another scholar having devoted so much work to kinship systems has independently stumbled on the conceptual links between kinship appellatives and personal pronouns. Many interpretations of our present and previous work made by Dziebel in his points 1, 2 or 3 are nevertheless abusive, and sometimes counterfactual.

For instance, in his point 2, he asserts we would claim that “formally reduplicated kin terms such as PAPA, MAMA, TATA, KAKA, etc. in [the] world[s] languages suggest their antiquity,” which he apparently opposes on the ground that incompletely reduplicated terms [like APA, AMA, ATA, AKA and the like] seem to him more ancient: “[W]hile ancient Indo-European languages leaned onto the VCCV/VCV structure (Hitt *atta* ‘father,’ *anna* ‘mother,’ Goth *atta* ‘father,’ Slav **otiči* ‘father’), modern Indo-European languages tend to have CVCV (Russ *mama*) / CVC (Eng *dad*) structure.”

In reality, we never claimed that either syllabic structure ought to be more ancient. Rather, we used (P)APA, (M)AMA, (K)AKA — often though not always with the initial consonant between parentheses, sorry for this graphic inconsistency aiming at better readability —, and the like, as cover labels for CVCV, CVCCV, CVC, VCCV, VCV and even CV or VC attested terms, which cannot be distinguished from one another semantically:

only the root consonant makes a difference. Recall that we do not make reconstructions (see below our reply to Babaev and Blažek), but align words from a huge number of languages with comparable phonetic forms and meanings, and which must thus have some etymological relationship once hypothetical convergence due to babbling is cleared away, as we explained in several papers, some of which are freely accessible on the Nostratic website (www.nostratic.ru).

Moreover, the Indo-European data offered by Dziebel to support the greater ancienty of VCV/VCCV forms are partial: besides his examples above, one finds Sanskrit *tatá*, Greek *mammê* and *pappa*, Latin *mamma*, *pappa* (the latter perhaps borrowed from Greek) and *tata*, and Old Breton and Welsh *tat* and *mam*. One thus has all the possible syllabic structures attested in writing since the most ancient times. Possibly this relative inconsistency in syllabic structure is partly due to interferences from babbling babies, even if most modern forms are individually traceable to very remote etymons or ancient borrowings — there may be little doubt, for instance, that the Modern English form *dad*, isolated within Germanic, was borrowed from Brythonic Celtic, whose modern members all preserved *tad* or *tat* (Vannetais Breton even has a 2sg possessive form *da dad* ‘thy dad’) since centuries.

Still in Dziebel’s point 2, we evidently did not claim that personal pronouns should descend from fully re-

duplicated appellatives rather than from simpler ones! This interpretation must again result from Dzielbe's own tendency to force the distinction between terms with different syllabic structures. Whatever the initial form of the concerned appellatives, they must have been reduced early to monosyllables — in this case, for obvious functional reasons —, since non-reduplicated pronouns are the overwhelmingly majority worldwide.

Our two other reviewers, Václav Blažek and Kirill Babaev, have overlooked our warning that our conjecture should not be assessed through an automatic application of comparative procedures. Rather, they essentially address our lack of regular sound correspondences and our use, instead, of Greenberg's and Ruhlen's multilateral comparison method. We certainly are Greenbergians, and since Greenberg (e.g. 1987, 1995) and Ruhlen (e.g. 1991, 1994b) themselves have abundantly and successfully defended multilateral comparison, we will not answer this critic in detail here. Let us only remind our readers that Greenberg's method allowed him to successfully classify several thousands of languages of Africa, the Americas, Oceania, and Eurasia.

The negative reaction of our critics is all the more difficult to understand as our article does not really rely on multilateral comparison. We have made explicit that our conjecture does not need that modern kinship appellatives descend from Proto-Sapiens — it only needs that kinship appellatives have existed at the time, which seems pretty unescapable given their present global distribution and their crucial role in language acquisition by babies. Nor does our account of pronominal roots rely on multilateral comparison: we have mainly dealt with pronoun roots reconstructed by Nostraticists themselves. Only the global statistic study of low-level ancestral pronoun roots *partly* relies on multilateral comparison (Ruhlen's lists quote reconstructed pronouns in language families where there are reconstructions), but, as stated in our paper, the stability of pronoun roots makes very unlikely that regular reconstruction would change much the statistic picture at the heart of our conjecture.

In this respect, Babaev's objection that in languages from Southeast Asia and the Pacific personal pronouns often are subject to much more change is true and interesting, but certainly does not constitute a major problem. As we underlined, language may function without 1st and 2nd persons, and these languages essentially do so, as had to do all existing languages before pronouns were invented — because they must have been invented at some point in language evolution, even if no doubt involuntarily and progressively. In the languages alluded to by Babaev, person marking is considered unnecessary and even

crude, and hence avoided as much as context allows. In cases demanding disambiguation, they are often rendered by periphrases. Let us note with Babaev that such periphrastic markers may end up as true pronouns, like Spanish *Usted* 'thou (honorific)' < *Vuestra Merced* 'Your Mercy,' or Romanian *dumneată* 'thou (hon.)' < *Domnia Ta* 'Thy Lordship.' Paleolithic hunters-gatherers, however, may not be suspected to have used such appellatives as 'Your Mercy' or 'Thy Lordship' — they undoubtedly were, like all their modern counterparts, light years away from such grotesque obsequiousness. The only appellatives they may have used to disambiguate 1st and 2nd persons in discourse were those kinship appellatives still found in traditional agricultural and hunting-gathering societies, like (T)ATA 'Father/Grandfather,' (M)AMA 'Mother / Grandmother,' or (K)AKA 'Uncle/Elder Brother,' whose implications regarding generational position and relative age amount to acknowledge the (even unrelated) hearer's social status.¹ Babaev's objection finally reinforces our point.

There must have existed somewhere in Southeast Asia an ancestral language (or several of them), which, in the transitional period where 1st and 2nd person markers were in formation, decided for cultural reasons to avoid person-marking — just like several modern IE languages, including English, lost any trace of PIE 2sg **t-* after having generalized the 2pl to address a single hearer. These ancestral languages transmitted person-marking avoidance to their descendants, and probably also influenced several neighboring languages such as Korean or Japanese — which, in spite of their clear Eurasiatic membership, also avoid marking 1st and 2nd persons and hence are the Eurasiatic languages with the poorest ancestral pronoun record. Because the stability of pronouns is nothing magical, but has been shown by Pagel & al. (2007) to be narrowly correlated with their huge frequency in discourse — in language families where they are stable.

We cannot accept, in turn, Babaev's idea to derive Eurasiatic genitive forms *menV-* 'of mine' from Nostratic **män(u)* 'man.' Forms *menV-* 'of mine' are clearly built on **me-* '1st person' + *-nu* 'genitive,' a particle widely represented in Eurasiatic (Greenberg 2000: 130–7, Bomhard 2008: 283–6). Deriving the diverse meaningful elements of a compound form from meaningless parts of a simple root should be at odds with Babaev's own principles, as it is with ours.

¹ Old French still used *oncle* (< Lat. *avunculus* 'mother's brother' < PIE *H₂ewyH₂-* 'grandfather, mother's brother,' a likely derivative of *KAKA*) to address unrelated individuals. Reynart addresses Isengrim with an ironical respect as "mon oncle."

Václav Blažek found three “errors” in our data, not in the present paper but in previous ones. The first one is not an error: our interpretation of the data differs. Matthey de l’Etang & al. (2008) should not have allowed Avestan *tā* ‘father’ into their *TATA* series, Blažek argues, since it must derive from *ptā*, itself derived from PIE **patēr* and found in another Yasna. However, the coexistence of *tā* and *ptā* in contemporary Old Avestan texts is a weak clue that the former descends from the latter, and it certainly does not preclude the possibility that *tā* preexisted — as the two parallel Vedic forms *pitā* ‘father’ and *tatā* ‘daddy’ seem to show.

The two other errors found by Blažek merely result from his having misread us. 1) Contrary to his claim, we did not claim that Kashmiri *bi* ‘I’ derived from **m-*. In Bancel & al. (2008b: 443, last §), we specified that “Gujarati and [...] Kashmiri preserve the alternation between subject and non-subject forms (but replaced the derivative of the Sanskrit subject form *ahám* by new forms),” contrary to other Indic languages (Hindi, Punjabi and Marathi) we had just mentioned, which generalized a *m-* form in the nominative. It unambiguously implied that the Kashmiri subject form *bi* has nothing to do with **m-*. 2) As to the Nuristani *imu* ~ *imo* ~ *ima* forms, Blažek claims they derive from the PIE 1pl instead of 1sg. Undoubtedly — and here again, it is exactly what we said (Bancel & al. 2008b: 444, § 1).

Beyond that, we cannot suspect Blažek of trying to induce readers to think that there is no such thing as a 1sg marker **m-* in either Indo-European, Eurasiatic or even Nostratic. However, if one was to produce regular correspondences between attested forms to prove its existence, one could as well give up immediately the whole idea of a PIE 1sg **m-*. In all descendant languages, the 1sg pronoun paradigm is full of analogical replacements and reductions of the case

and number subparadigms, so that not a single IE language preserves a series of forms directly derived from strictly equivalent PIE forms. The only formal element escaping these innumerable reshapings is precisely the root consonant *m-*, surviving unchanged in 99.6% of 494 IE languages we investigated. As such, its survival does not provide us with a series of regular correspondences, but with a list of highly differentiated words, all essentially having in common their initial *m-* — not a regular correspondence but an isolated identity, nonetheless revealing thanks to its generality. Thus, to sound correspondences ultras, **m-* ‘1st person,’ the best preserved instance of common inheritance in IE languages, should be considered a hoax of lumping crackpots. In the particular case of 1st and 2nd person pronouns, Blažek’s insistence on regular sound correspondences seems exaggerated.

The paper discussed here was written to illustrate how comparative-historical linguistics could contribute to the movement which has developed since two decades in search of the origins of language ability in humans — a question which has repeatedly been called the hardest scientific problem of our time. Respected archeologists, geneticists, primatologists, cognitivists, and synchronic linguists of several obediences and specialties actively work in this field, and have already come to exciting results. An apt summary of these outcomes takes for granted that the comparative method is limited by the usual 5,000-year ceiling (Kenneally 2007: 166–7), revealing the complete absence of long-range comparison from this fundamental debate. We are however persuaded that human language evolution cannot be understood independently from how actual words, morphemes and grammatical categories evolved, something which only language classification and etymological reconstruction may eventually tell.

Literature

- ALINEI, Mario. 1985. Evidence for Totemism in European Dialects // *International Journal of American Linguistics* 51 (4): 331–334.
- BABAEV K.V. 2008. *Proisxoždenie indoevropejskix pokazatelej lica*. Moscow, Eidos.
- BABAEV K.V. 2009a. Review of Bengtson J.D. (2008) // *VjaR/JLR*. 2, 139–43.
- BABAEV K.V. 2009b. О происхождении личных местоимений в языках мира // *Вопросы языкознания*, 4, 119–138.
- BANCEL P.J. & A. MATTHEY DE L’ETANG. 2002. Tracing the Ancestral Kinship System: The Global Etymon *KAKA*. Part I: A Linguistic Study // *Mother Tongue* 7, 209–44.
- BANCEL P.J. & A. MATTHEY DE L’ETANG. 2005. Kin Tongue. A Study of Kin Nursery Terms in Relation to Language Acquisition, with a Historical and Evolutionary Perspective. *Mother Tongue* 9, 171–90.
- BANCEL P.J. & A. MATTHEY DE L’ETANG. 2008a. The age of Mama and Papa // BENGTON (ed.), 417–438.

- BANCEL P.J. & A. MATTHEY DE L'ETANG. 2008b. The Millennial Persistence of Indoeuropean and Eurasiatic Pronouns, and the Origin of Nominals // BENGTON (ed.).
- BANCEL P.J., A. MATTHEY DE L'ETANG & J.D. BENGTON. In press. Back to Proto-Sapiens (Part 2). The Global Kinship Terms Papa, Mama and Kaka // MILICIC & JONES (eds).
- BANCEL P.J., A. MATTHEY DE L'ETANG, K.V. BABAIEV, V. BLAŽEK, J.D. BENGTON & M. RUHLEN. Forthcoming. Reconstructing the Early History of Languages. The Eurasiatic Person Markers *m and *t.
- BARTHOLOMAE, Christian. 1904 [1961]. *Altiranisches Wörterbuch*. Berlin: Walter de Gruyter.
- BENGTON J.D. & M. RUHLEN. 1994. Global Etymologies // RUHLEN 1994a, 277–336.
- BENGTON J.D. (ed.). 2008. *In Hot Pursuit of Language in Prehistory. Essays in the Four Fields of Anthropology in Honor of Harold Crane Fleming*. Amsterdam/Philadelphia, John Benjamins.
- BENVENISTE E. 1946. Structure des relations de personne dans le verbe // *Bull. Soc. Ling.* P. 43–1. [Repr. in E. BENVENISTE, *Problèmes de linguistique générale*, vol. 1, 225–36, Paris, Gallimard.]
- BICKERTON D. 1990. *Language and Species*. Chicago, Chicago Univ. Pr.
- BICKERTON D. 2009. *Adam's Tongue. How Humans Made Language, How Language Made Humans*. New York, Hill & Wang.
- BLAŽEK V. 2008. Gaulish Language // *Sborník prací filozofické fakulty brněnské univerzity / Studia minora facultatis philosophicae universitatis brunensis*, 38–65.
- BOMHARD A.R. 2008. *Reconstructing Proto-Nostratic. Comparative Phonology, Morphology, and Vocabulary*, Vol. I, Leiden, Brill.
- BOTHA R. & C. KNIGHT (eds.). 2009. *The Cradle of Language. Studies in the Evolution of Language*. Oxford, Oxford U. Pr.
- BRIGAUDIOT M. & L. DANON-BOILEAU. 2002. *La Naissance du langage dans les deux premières années*. Paris, P.U.F.
- BUSCHMANN, Johann C. E. 1852. Über den Naturlaut // *Philologische und Historische Abhandlungen der Königlichen Akademie der Wissenschaft zu Berlin* 3: 391–423.
- COUPÉ C. & J.M. HOMBERT. 2005. Les Premières Traversées maritimes. Une fenêtre sur les cultures et les langues de la préhistoire // J.M. HOMBERT (ed.), *Aux origines des langues et du langage*, Paris, Fayard, 118–61.
- D'ERRICO F. & M. VANHAEREN. 2009. Earliest Personal Ornaments and Their Significance for the Origin of Language Debate // BOTHA & al. 2009.
- D'ERRICO F., C.S. HENSHILWOOD, M. VANHAEREN & K. VAN NIEKERK. 2005. *Nassarius kraussianus* Shell Beads from Blombos Cave: Evidence for Symbolic Behaviour in the Middle Stone Age // *J. Hum. Evol.* 48, 3–24.
- DAHL, Östen, and Maria KOPTJEVSKAJA-TAMM. 2001. Kinship in Grammar // *Dimensions of Possession*, edited by I. BARON, M. HERSLUND and F. SØRENSEN. Pp. 201–225. Amsterdam and Philadelphia: John Benjamins.
- DAWKINS R. 1976 [2nd ed. 1989]. *The Selfish Gene*. Oxford, Oxford U. Pr.
- DE WAAL F.B.M. 1982. *Chimpanzee Politics. Power and Sex among Apes*. Baltimore, Johns Hopkins Univ. Pr.
- DELBRÜCK B. 1904. *Введение в изучение языка*. СПб.
- DOLGOPOLSKY, Aharon. 1964. Gipoteza drevnejšego rodstva jazykovyx semej severnoj Evrazii s verojatnostnoj točki zrenija // *Vopr. jazykoznanija*, 2, 53–63. Eng. tr.: A Probabilistic Hypothesis Concerning the Oldest Relationships among Language Families of Northern Eurasia // V.V. SHEVOROSHKIN & T.L. MARKEY (eds), 1986, *Typology, Relationships and Time*, Ann Arbor, Karoma.
- DOLGOPOLSKY, Aharon. 2008. *Nostratic Dictionary*. Cambridge: McDonald Institute for Archaeological Research.
- DZIEBEL, German V. 2001. *Феномен родства: пролегомены к иденетической теории*. СПб., 2001.
- DZIEBEL, German V. 2007. *The Genius of Kinship: The Phenomenon of Human Kinship and the Global Diversity of Kinship Terminologies*. Youngstown, NY: Cambria Press.
- DZIEBEL, German V. 2008. Reconstructing 'our' kinship terminology: Comments on the Indo-European material in A. V. Dybo's and S. V. Kullanda's *The Nostratic terminology of kinship and affinity* // *Алгебра родства* 11. С. 42–92. St. Petersburg.
- DZIEBEL, German V. 2009. Refining the points of an ongoing debate about Indo-European, Nostratic and kinship terminological reconstructions // *Алгебра родства* 12. Сс. 6–19. St. Petersburg.
- EHRET C. 2007. *Proposals on Niger-Kordofanian Pronoun History*. Paper pres. at 18th Int. Conf. of Hist. Ling. (Montreal, August 5–11, 2007).
- EVANS, Nicholas. 2000. Kinship Verbs // *Approaches to the Typology of Word Classes*, ed. by Petra M. VOGEL and Bernard COMRIE. Pp. 103–172. Berlin and New York: Mouton de Gruyter.
- EVANS, Nicholas. 2003. Context, Culture, and Structuration in the Languages of Australia // *Annual Review of Anthropology* 32: 13–40.

- GARDNER R.A., B.T. GARDNER & T.E. VAN CANTFORT (eds.). 1989. *Teaching Sign Language to Chimpanzee*. Albany, SUNY Pr.
- GELL-MANN M., I. PEIROS & G. STAROSTIN 2009. Distant Language Relationship: The Current Perspective // *VJaR/JLR* 1, 13–30.
- GREENBERG J.H. 1987. *Language in the Americas*. Stanford, Stanford Univ. Pr.
- GREENBERG J.H. 1995. The Concept of Proof in Genetic Linguistics // *Mother Tongue* 1, 207–16.
- GREENBERG J.H. 2000–2002. *Indo-European and Its Closest Relatives: The Eurasiatic Language Family*, vol. I (2000): *Grammar*; vol. II (2002): *Lexicon*. Stanford, Stanford Univ. Pr.
- GRÉGOIRE A. 1937. *L'Apprentissage du langage. Les deux premières années*. Paris, Félix Alcan.
- GRUBER, J. S. 1975. Plural predicates in ꞥHõã // A. TRAILL (Ed.), *Bushman and Hottentot linguistic studies* (pp. 1–50). Johannesburg: University of the Witwatersrand, African Studies Institute.
- HAMILTON W.D. 1963. The Evolution of Altruistic Behavior // *Am. Nat.* 97, 354–6.
- HARVEY, Judy A. 1991. Kinship Terms in the Chadian Language of M'Baye // *Georgetown Journal of Languages and Linguistics* 2 (3–4): 243–250.
- HELMBRECHT J. 2004. *Personal Pronouns – Form, Function and Grammaticalization*. Erfurt.
- HENSHILWOOD C.S., F. D'ERRICO, C.W. MAREAN, R.G. MILO & R. YATES. 2001. An Early Bone Tool Industry from the Middle Stone Age at Blombos Cave, South Africa: Implications for the Origins of Modern Human Behaviour, Symbolism, and Language // *J. Hum. Evol.* 41, 631–78.
- HIRSCHFELD, Lawrence A. 1989. Rethinking the Acquisition of Kinship Terms // *International Journal of Behavioral Development* 12 (4): 541–568.
- HIRSCHFELD, Lawrence A. 2001. On a Folk Theory of Society: Children, Evolution, and Mental Representations of Social Groups // *Personality and Social Psychology Review* 5 (2): 107–117.
- HIRT, Hermann. 1932. *Handbuch des Urgermanischen*, vol. II. Heidelberg: Winter.
- HOFFMANN, Karl & FORSSMAN, Bernhard. 1996. *Avestische Laut- und Flexionslehre*. Innsbruck: IBS 84.
- JAKOBSON R. 1960. Why Mama and Papa? // B. KAPLAN & S. WAPNER (eds.), *Perspectives in Psychological Theory. Essays in Honor of Heinz Werner*. New York, Internat. Universities Pr. [repr. in *Selected writings of Roman Jakobson. I. Phonological Studies*, 538–45. The Hague, Mouton].
- JAKOBSON, R. 1971. Shifters, verbal categories and the Russian verb // *Selected writings of Roman Jakobson. II. Word and language* (pp. 130–147). Paris; The Hague: Mouton.
- JONSSON, Niklas. 2001. Kin Terms in Grammar // *Language Typology and Language Universals: An International Handbook*, edited by Martin HASPELMATH, Ekkehard KÖNIG, Wulf OESTERREICHER and Wolfgang RAIBLE. Vol. 2. P. 1203–1214. Berlin and New York: Walter de Gruyter.
- KENNEALLY C. 2007. *The First Word. The Search for the Origins of Language*. New York, Viking.
- LEROI-GOURHAN A. 1964. *Le Geste et la parole*, vol. I: *Technique et langage*. Paris, Albin Michel.
- LITTMANN, Enno. 1902. *Neuarabische Volks poesie*. Berlin: Weidmann. (Abhandlungen der Königlichen Gesellschaft der Wissenschaften zu Göttingen. Philologisch-Historische Klasse 5 (3).)
- MAREAN C.W., M. BAR-MATTHEWS, J. BERNATCHEZ, E. FISHER, P. GOLDBERG, A.I.R. HERRIES, Z. JACOBS, A. JERARDINO, P. KARKANAS, T. MINICHILLO, P.J. NILSSEN, E. THOMPSON, I. WATTS & H.M. WILLIAM. 2007. Early Human Use of Marine Resources and Pigment in South Africa during the Middle Pleistocene // *Nature* 449, 905–8.
- MARTINET A. 1960. *Eléments de linguistique générale*. Paris, Armand Colin.
- MASICA, Colin P. 1991. *The Indo-Aryan Languages*. Cambridge: University Press.
- MATTHEY DE L'ETANG A. & P.J. BANCEL. & M. RUHLEN. In press. Back to Proto-Sapiens (Part 1). The Inherited Kinship Terms *Papa*, *Mama* and *Kaka* // MILICIC & JONES (eds).
- MATTHEY DE L'ETANG A. & P.J. BANCEL. 2002. Tracing the Ancestral Kinship System: The Global Etymon *KAKA*. Part II: An Anthropological Study // *Mother Tongue* 7, 245–58.
- MATTHEY DE L'ETANG A. & P.J. BANCEL. 2005. The Global Distribution of (P)APA and (T)ATA and Their Original Meaning // *Mother Tongue* 9, 133–69.
- MATTHEY DE L'ETANG A. & P.J. BANCEL. 2008. The Age of *Papa* and *Mama* // Bengtson (ed.).
- MAYNARD SMITH J. 1964. Group Selection and Kin Selection // *Nature* 201, 1145–7.
- MILICIC B. & D. JONES (eds). In press. *Kinship, Language, and Prehistory*. *Per Hage and the Renaissance in Kinship Studies* (Proceedings of the Per Hage Memorial Session of the American Anthropological Association 105th Annual Meeting, held at San Jose, Ca, 15–19 Nov. 2006). Salt Lake City, Univ. of Utah Pr.

- MORGAN, Lewis H. 1871. Systems of consanguinity and affinity of the human family // *Smithsonian Contributions to Knowledge*, 17. Washington, DC: Smithsonian Institution.
- MOYER, Colin C. 2004. *The Organisation of Lithic Technology in the Middle and Early Upper Palaeolithic Industries at the Haua Fteah, Libya*. Ph.D. dissertation. University of Cambridge.
- MURDOCK G.P. 1957. World Ethnographic Sample // *Am. Anthr.* 59, 664–87.
- MURDOCK G.P. 1959. Cross-Language Parallels in Parental Kin Terms // *Anthr. Ling.* 1–9, 1–5.
- NEEL, J. V., and F. M. SALZANO. 1967. Further studies on the Xavante Indians. X. Some hypotheses-generalizations resulting from these studies // *American Journal of Human Genetics* 19 (4): 554–574.
- NICHOLS J. 2008. N-M Pronouns // M. HASPELMATH, M.S. DRYER, D. GIL & B. COMRIE (eds.). *The World Atlas of Language Structures Online*. Munich: Max Planck Digit. Libr. (<http://wals.info/index>). Chap. 137 available online at <http://wals.info/feature/137>. Accessed on 9 Oct. 2009.
- ŌNO, Hitomi. 1996. An Ethnosemantic Analysis of Gui Relationship Terminology // *African Study Monographs, Supplementary Issue 22*: 125–144. Kyoto: Kyoto University Center for African Area Studies.
- PAGEL M. Maximum Likelihood Models for Glottochronology and for Reconstructing Linguistic Phylogenies // C. RENFREW, A. MCMAHON & L. TRASK (eds), 2000, *Time Depth in Historical Linguistics*, vol. I, 189–208. Cambridge, Eng., McDonald Inst. for Archaeol. Res.
- PAGEL M., Q. ATKINSON & A. MEADE. 2007. Frequency of Word-use Predicts Rates of Lexical Evolution throughout Indo-European History // *Nature* 449, 717–20.
- PATTERSON F. 1987. *Koko's Story*. New York, Scholastic.
- PINKER S. 1999. *Words and Rules. The Ingredients of language*. London, Weidenfeld and Nicolson.
- RASMUSSEN, Jens E. 1999. Indo-European personal pronouns // *Selected Papers on Indo-European Linguistics*. Copenhagen: Museum Tusulanum Press, 256–275; first published in *APILKU* 6, 1987, 89–112.
- RUHLEN M. 1991. *A Guide to the World's Languages*, vol. 1: *Classification*. Stanford, Stanford U. Pr.
- RUHLEN M. 1994a. *On the Origin of Languages. Studies in Linguistic Taxonomy*. Stanford, Stanford Univ. Press.
- RUHLEN M. 1994b. *The Origin of Language. Tracing the Evolution of the Mother Tongue*. New York, John Wiley.
- SAVAGE-RUMBAUGH S. & R. LEWIN. 1994. *Kanzi the Ape at the Brink of the Human Mind*. New York, John Wiley.
- SINGER R. & J. WYMER, 1982. *The Middle Stone Age at Klasies River Mouth in South Africa*. Chicago, Univ. of Chicago Pr.
- STILES, Patrick V. 1988. Gothic Nominative Singular *brōþar* 'Brother' and the Reflexes of the Indo-European Long Vowels in the Final Syllables of Germanic Polysyllables // *Transactions of the Philological Society* 86 (2): 115–143.
- TITIEV, Mischa. 1967. The Hopi Use of Kinship Terms for Expressing Sociocultural Values // *Anthropological Linguistics* 9 (5): 44–49.
- TURNER, Ralph L. 1966. *Comparative Dictionary of the Indo-Aryan Languages*. Oxford: University Press.
- WEAVER, Timothy D., and CHARLES C. Roseman. 2005. Ancient DNA, Late Neandertal Survival, and Modern-Human Neandertal Genetic Admixture // *Current Anthropology* 46 (4): 677–683.

Статья продолжает серию работ авторов, основной идеей которых является происхождение личных местоимений древнейших праязыков человечества из терминов родства. В данной публикации предлагается математическая модель, подтверждающая, по мнению авторов, возможность подобной деривации.