

Interpreting Semitic Protolanguage as a Conlag Constructed Language

Dr. Edouard Belaga¹

¹ IRMA Universit de Strasbourg

Received: 15 December 2012 Accepted: 4 January 2013 Published: 15 January 2013

Abstract

One of the most natural approaches to the problem of origins of natural languages is the study of hidden intelligent "communications" emanating from their historical forms. Semitic languages history is especially meaningful in this sense. One discovers, in particular, that Biblical Hebrew, BH, the best preserved fossil of the Semitic protolanguage, is primarily a verbal language, with an average verse of the Hebrew Bible containing no less than three verbs and with the biggest part of its vocabulary representing morphological derivations from verbal roots, almost entirely trilateral "the feature BH shares with all Semitic and a few other Afro- Asiatic languages. For classical linguists, more than hundred years ago, it was surprising to discover that verbal system of BH is, as we say today, optimal from the Information Theory's point of view and that its formal topological morphology is semantically meaningful. These and other basic features of BH reflect, in our opinion, the original design of the Semitic Protolanguage and suggest the indispensability of IIH "Inspirational Intelligence Hypothesis, our main topic, " for the understanding of origins of natural languages. Our project is of vertical nature with respect to the time, in difference with the vastly dominating today horizontal linguistic approaches.

Index terms— semitic languages, protolanguage, verbal system, origins of natural languages, artificial intelligence, intelligent communication, conlag or construc

Interpreting Semitic Protolanguage as a Conlag -Constructed Language Dr. Edouard Belaga Abstract-One of the most natural approaches to the problem of origins of natural languages is the study of hidden intelligent "communications" emanating from their historical forms. Semitic languages history is especially meaningful in this sense. One discovers, in particular, that Biblical Hebrew, BH, the best preserved fossil of the Semitic protolanguage, is primarily a verbal language, with an average verse of the Hebrew Bible containing no less than three verbs and with the biggest part of its vocabulary representing morphological derivations from verbal roots, almost entirely trilateral -the feature BH shares with all Semitic and a few other Afro-Asiatic languages. For classical linguists, more than hundred years ago, it was surprising to discover that verbal system of BH is, as we say today, optimal from the Information Theory's point of view and that its formal topological morphology is semantically meaningful. These and other basic features of BH reflect, in our opinion, the original design of the Semitic Protolanguage and suggest the indispensability of IIH -Inspirational Intelligence Hypothesis, our main topic, -for the understanding of origins of natural languages. Our project is of vertical nature with respect to the time, in difference with the vastly dominating today horizontal linguistic approaches.

1. Introduction: Biblical Hebrew perceived by classical linguists 2 2. Communicative awareness and inspirational intelligence 3 3. Verbal structure of Biblical Hebrew and of its protolanguage 5 4. Getting out of the Natural Selection Stampede to Clean up Our Epistemic Act. 7 5. Natural languages without natural selection 9

Language is one of the hallmarks of the human species -an important part of what makes us human. Yet, despite a staggering growth in our scientific knowledge about the origin of life, the universe and (almost) everything else

45 that we have seen fit to ponder, we know comparatively little about how our unique ability for language originated
46 and evolved into the complex linguistic systems we use today. Why might this be?

47 Introduction: Biblical Hebrew Perceived by Classical Linguists §1. Biblical Hebrew, BH, the best preserved
48 fossil of the Semitic protolanguage [20], could be seen as primarily a verbal language [3], with an average verse
49 of the Hebrew Bible containing no less than three verbs and with the biggest part of its vocabulary representing
50 morphological derivations from verbal roots [24], almost entirely triliteral, or triconsonantal [15], [16] -the feature
51 BH shares with all Semitic and a few other Afro-Asiatic languages [12].

52 The unique peculiarity of this triconsonantal morphological pervasiveness did not completely escape the
53 attention of previous generations of Western linguists, as shows the following "methodological" warning opening
54 a popular Hebrew grammar edited more than a century ago [8], pp. 1-2: "Hebrew, of course, has difficulties of
55 its own, which must be frankly faced.

56 ... [In particular,] the roots are almost entirely triliteral, with the result that, at first, the verbs at any rate
57 all look painfully alike -e.g., malak, zakar, lamad, harag, etc., -thus imposing upon the memory a seemingly
58 intolerable strain. Compound verbs are impossible: there is nothing in Hebrew to correspond to the great and
59 agreeable variety presented by Latin, Greek, or German in such verbs as exire, inire, abire, redire, ... ausgehen,
60 eingehen, aufgehen, untergehen, etc.

61 Every verb has to be learned separately; the verbs to go out, to go up, to go down are all dissyllables of the type
62 illustrated above, having nothing in common with one another and being quite unrelated to the verb to go." §2.
63 This amusing résumé has the merit to recognize, even if under the guise of an earnestly banal pedagogical clueing
64 in, two extraordinary fundamental linguistic phenomena common to all Semitic languages: First, the extreme
65 parsimoniousness, one could say optimality, from the point of view of Information Theory, of the triconsonantal
66 representation of verbs: with more than one and less than two thousand known BH verbs, two consonants would
67 be not enough and four would be too much: the Biblical Hebrew dictionary has about 1700 verbs among about
68 8000 words.

69 Second, the meaningful morphological topology of the body of BH verbs, a fundamental feature of the BH
70 architecture. Two triconsonantal verbs are morphologically or, equivalently, topologically neighboring if they
71 differ in just one consonant, with many pairs of topological neighbors having close, or similar, or related semantical
72 values [6].

73 Third, even more surprising and subtle: this feature of Biblical Hebrew of mixed morphologicsemantic nature
74 manifests not only the pervasiveness of the phenomenon of topologically neighboring verbs having semantically
75 meaningful correlations -such correlations are often relating to the type of the particular letters involved [6].

76 Thus, the verb to go, "he-lamed-kaph", meaning to progress step by step toward a goal, is both semantically
77 and morphologically neighboring the verb "he-lamed-qoph", meaning divide and portion, and not the verbs to
78 go out, to go up, to go down, which are neighboring the verbs to extend, to master, and to scrape or scratch,
79 respectively.

80 §3. These exquisite -combinatorial, topological, and communicative -precision, efficiency, and evocativeness
81 are the real source of the so much deplored above difficulty of mechanical memorization of BH verbs, the difficulty
82 which, according to [39], would be considerably aggravated if the quoted manual should be written somewhere in
83 between the third and second millennium BC:

84 "It has, of course, long been recognized that the ancient Hebrew vocabulary must have been markedly larger
85 than that preserved in the OT [Old Testament, alias Hebrew Bible]." II.

86 1 Communicative Awareness and

87 Inspirational Intelligence §1. Summarizing the above observations, we arrive at the following central problem of
88 our project: Main Problem. What is the meaning and what are the origins of these unique and fundamental
89 attributes of Biblical Hebrew, primarily verbal language, with most of words of its dictionary derived from verbal
90 roots? We speak here of the highly innate, morphologically most parsimonious, semantically efficiently involved
91 formal structure of its verbal system, displaying also a unique language-alphabet relationship, closely resembling
92 in particular, and yet vastly superior in its expressive power to humanly designed assembler languages.

93 Our conclusion, stipulated and developed below, cannot be formulated otherwise than Inspirational Intelligence
94 Hypothesis. IIH: the assumption that the hypothetical protolanguage preceding Biblical Hebrew and other known
95 Semitic languages, and called here Semitic protolanguage, has appeared, or emerged, spontaneously and during
96 a relatively short period of time, in and from a single person or a single family. In other words, its emergence
97 is of inspirational nature, sort of a very personal "poem", reflecting the innermost vital, moral, spiritual, and
98 intellectual "architecture" and aspirations of certain human beings.

99 The real presence of inspirational creativity related to physics or biological, linguistic, cultural, and social
100 contexts -is somehow eluding today the scientific curiosity. To confirm the reality and the validity of our intuition
101 in the linguistic and cultural context, it will suffice to mention the example of the Russian poetic genius Alexander
102 Pushkin (1799-1837) who almost singlehandedly initiated the modern culture of Russian language and literature,
103 better -the Russian modern culture tout court [4].

104 §2. The computational modeling is today the most powerful technical universe for playing in, around and out
105 different scenarios of emergence and evolution of natural languages [21]. Pre-adaptation for emergence, biological
106 and cultural apparatuses for evolution and natural selection, genetic and archaeological evidence, etc. etc. [36]:

107 those are global scientific concepts and ideological schemes dominating our linguistic field -unfortunately without
108 much success [5].

109 Our approach will be different. To simplify, if not caricature the matter, one can compare it to methods
110 of SETI, Search for Extraterrestrial Intelligence [38], without attributing to this modern field the importance
111 its protagonists aspire. More precisely, we will restrict our attention to hidden intelligent "communications"
112 emanating from evolving historical forms of Semitic protolanguage, as those forms are reflected in the structure
113 of its best preserved fossil, Biblical Hebrew. Then we will try to understand the meaning of these communications
114 and its implications for the problem of emergence of our Semitic protolanguage.

115 §3. For those of our readers who might be doubting the value of constructing a research project on emergence
116 of natural languages around such a "rare poisson" as Biblical Hebrew, let us remark that we are sharing the
117 assumption, many times and in many ways demonstrated linguistically, that its Semitic protolanguage was the
118 principal source for all modern European and many Asia-African languages [20]. III. Verbal Structure of Biblical
119 Hebrew and of its Protolanguage §1. The Hebrew verb is known for its remarkable linguistic "enigmas" [30].
120 Ours start with a trivial observation that, with the exception of several dozen double two-letter cases, all Hebrew
121 verbs are trilateral, or triconsonantal -three-letter combinations over the Hebrew alphabet of 22 letters (cf. Fig.
122 1). In other words, about 1700 of these verbs can be presented by points of the discrete cube Biblical Hebrew
123 Verbs, #BHV _22_22_22_10648.

124 There is no doubt that, taking by itself, its notoriety notwithstanding, this unique linguistic phenomenon
125 should arise today one's scientific curiosity -be it just because of the striking similitude of the abstract
126 perfection and parsimoniousness of such an alphabetical coding of verbs to the way machine codes (low level, or
127 assembly programming languages [?]) are traditionally represented -by mostly three latin letters combinations
128 (abbreviations), with a very few codes having two-and four-, or more-letter names.

129 Add to this surprising formal similarity, first, the well-known but still lacking any evolutionary explanation fact
130 that "Hebrew grammar is essentially schematic and, starting from simple primary rules, it is possible to work out,
131 almost mathematically, the main groups of wordbuilding" [26], [41] and the second, even more surprising, subtle,
132 of a mixed morphologic-semantic nature feature of Biblical Hebrew -the pervasiveness of the phenomenon of
133 topologically neighboring (for example, differing in only one letter position) verbs having semantically meaningful
134 correlations, often related to the type of the particular letters involved [6].

135 The very existence of such a semantically meaningful relationship represents a novel, and for that matter,
136 giant conceptual leap from the pure phonetical role an alphabet -interpreted by modern evolutionary theories as
137 a phonetically oriented dead end of a gradual random simplification of the hieroglyphical systems [18] -supposed
138 to play, and the change of the linguistic perspective at least as radical as the passage from a hieroglyphical coding
139 of words-notions to their phonetically meaningful alphabetic protocols.

140 §2. Let us think now back to the mentioned above classical appreciation of the difficulties of Biblical Hebrew:
141 "[Its] roots are almost entirely trilateral, with the result that, at first, the verbs at any rate all look painfully
142 alike -e.g., malak, zakar, lamad, harag, etc., -thus imposing upon the memory a seemingly intolerable strain."
143 [8] Thus, because "language is one of the hallmarks of the human species -an important part of what makes us
144 human" [5] (our epigraph), one can conclude that profound intimate linguistic preferences of English speaking
145 people yesterday and today are different from those of people who spoke the other day Biblical Hebrew and,
146 before, its protolanguage.

147 In other words, to this second category of women and men the BH verbs were not at all looking alike !

148 In particular, we observe that some points of the "verbal body" of Biblical Hebrew were connected between
149 them by the sensitive passages -change of only one consonant -to their neighbors: Organismic BH Linguistics. The
150 compact trilateral "verbal body" of BH is an extremely sensitive organic fundament of human proto-Semitic
151 linguistic ability.

152 §3. Were these properties specifically BH or were they "projected" on BH from more ancient proto-Semitic
153 languages ?

154 The modern redaction [29] of the cited above classical BH grammar [8] creates an impression that this verbal
155 BH compactness was acquired later: "The roots, whatever may have been their original form, are in the Old
156 Testament almost entirely trilateral."

157 However, all studies of Semitic languages, living and dead, demonstrate convincingly that verbal trilaterality
158 was an essential feature of Semitic protolanguage. And this feature doesn't imply either particular difficulty
159 -compared to modern English -to learn and to use this protolanguage, or poverty of its expressive power.

160 Quite to the contrary -whereas in the above English example (Section 1, §1) the verbs to go, to go out, to go
161 up, to go down achieve semantical variations by outward combinatorial means applied to the unanalyzable basic
162 word go, BH verbs are referring by their trilateral structure -which is related by vicinages to similar verbs and
163 which implies the immanence of an alphabet -to some innermost realities of the human being:

164 Verbal Body of Semitic Protolanguage.

165 2 Verbal body of Semitic protolanguage was an

166 organismic [17] linguistic system with explicit and deep links to biological, psychological, intellectual, spiritual,
167 and social aspects of human life. 2. Morphologically, this verbal body was absolutely dominant, implying an
168 extremely dynamic appeal to women and men exercising this protolanguage. 3. We cannot characterize in the

169 same way the verbal body of modern Hebrew, even if its creators were very sensible to the ancient origins of
170 that language. 4. As to the verbal systems of modern natural languages, they should be characterized as verbal
171 collections, without any substantial universal and unifying links between verbs. 5. Verbal body similar to that of
172 Biblical Hebrew cannot be expected to appear in a process of acquiring accidental improvements. Its existence
173 is the result of a linguistic construction -Semitic protolanguage was a Constructed Language -Conlag [32]. 6.
174 One can expect to partially reconstruct this system by understanding the semantical meaning and the alphabetic
175 references of verbal neighborhoods in the BH verbal body.

176 IV. Getting out of the Natural Selection Stampede to Clean up our Epistemic Act §1. The challenge of our
177 Biblical Hebrew problem has been from the very beginning complicated by a universal, unspoken, and yet not less
178 bounding methodological assumption that any evolutionary solution should be consistent with, if not inspired
179 by, the natural selection paradigm [22].

180 More generally, Charles Darwin fundamental idea -before and independently of his elaborated doctrine -that
181 the biological reality is permanently in a natural movement, in a flow of renewal, accompanied by accidental
182 mutations, with some of them leading to radical improvement of species, this idea has finally eliminated from
183 the scientific horizons all "theological" interest à la Johannes Kepler [42] in Why? Thanks to what? For what
184 purpose? and Who? [25]. Thus, for example, the only ambition of Optimality Theory [35] was, and remains,
185 to introduce and to investigate some natural constraints on the linguistic flow of languagesthe flow supposed to
186 bring our languages from speechless vocality or manual nothing to their modern splendor.

187 We believe that the truth, at least in our case, turned out to be different, and the vision elaborated in this
188 study has been won out by the author -looking since about twenty years for a meaningful interpretation of the
189 mysterious linguistic phenomena outlined aboveover the considerable psychological pressure, and at the prize of a
190 painstaking sorting out the enormous body of relevant emergence-and-evolution-by-naturalselection publications,
191 with their characteristic authoritative -because emanating from this theory of everything [27] -and yet, to our
192 great disappointment, absolutely unconvincing, even if often computeroriented and -supported, claims [23].

193 §2. A typical sample -a veritable statement of metaphysical faith, publicly and solemnly delivered by Robert
194 Dawkins [10] and having the merit to be short, clear, and uncompromising -could help an outsider to have a taste
195 of, without acquiring it for, the prevailing atmosphere:

196 "I believe, but I cannot prove, that all life, all intelligence, all creativity and all 'design' anywhere in the
197 universe, is the direct or indirect product of Darwinian natural selection. It follows that design comes late in the
198 universe, after a period of Darwinian evolution. Design cannot precede evolution and therefore cannot underlie
199 the universe." And many, many, too many have tried to be faithful to this condemnation of the Design creativity
200 to work out accidentally as it were: 1. biology [9], cosmology [37], behavioral psychology [7], linguistics [36] ,
201 2. all progress of sciences at large [40], and even more radically, 3. all intellectual endeavors and failures [11]
202 of humanity, if not 4. the very existence in, and ultimately, of the Universe [10]. §3. To begin with, let us
203 remind the reader that, historically, there is nothing new or extraordinary when a venerable (in our case, spelled
204 out by a 19-th century economist [28]) scientific concept outlives its epistemological usefulness and becomes an
205 epistemological burden for science. Two following wellknown precedents should illustrate the point.

206 Laplacian Mechanics created more than two hundred years ago and universally admired ever sincethat is,
207 until the advent of Maxwell's, Poincaré's, and Einstein's theories -has ultimately lost its epistemological value
208 for physics, to acquire instead an enormous ideological prestige as an authentic and unsurpassed in its perfection
209 instance of reductionist philosophy which, in particular, underlay the corresponding dogmatic distortions of
210 otherwise valuable scientific discoveries of, say, Charles Darwin, Karl Marx, and Sigmund Freud. This is how
211 Albert Einstein [13] has summarized the post-Laplacian epistemological crisis in physics:

212 "We must not be surprised, therefore, that, so to speak, all physicists of the last ??19-th] century saw in
213 classical mechanics a firm and final foundation for all physics, yes, indeed, for all natural science, and that they
214 never grew tired in their attempts to base Maxwell's theory of electromagnetism, which, in the meantime, was
215 slowly beginning to win out, upon mechanics as well."

216 Little has Einstein known, delivering this postmortem of a formerly omniscient theory, that he himself has
217 fallen under the spell of the commonly acceptedat least, since Isaak Newton -Classical Causality Doctrine of
218 Space and Time, the very conceptual ground on which Pierre-Simon Laplace has proudly erected his miniature
219 mechanical universe.

220 To his credit, Einstein was able to spell out himself his difficulty to understand some quantum micro-phenomena
221 incompatible with the classical causality doctrine, by inventing his now famous Gedanken-experiment exhibiting,
222 as he called it, a "spooky action on a distance".

223 We speak here about the well-known, systematically exploited, and yet as poorly understood today as in
224 Einstein's times phenomenon of quantum entanglement that, after being discovered according to the very
225 scenario advanced by Einstein and his colleagues as improbable [14], dominates the modern research in Quantum
226 Information Processing [31].

227 §4. The subtlety of this pure physical phenomenon, of its philosophical and theoretical repercussions and
228 accommodations, and of related theoretical and experimental discoveries which might one day lead to the creation
229 of presently still even theoretically unconceivable Quantum Computer, most strikingly contrasts with 19-th
230 century scientism still limiting and burdening the imagination of many cognitive scientists, -as illustrated by the

231 following recent credo [19], found in the mentioned above and otherwise very instructive compendium [1] on the
232 mirror system hypothesis on the linkage of action and language:

233 "[T]he central metaphor of cognitive science, 'The brain is a computer', gives us hope. Prior to the computer
234 metaphor, we had no idea of what could possibly be the bridge between beliefs and ion transport. Now we have
235 an idea. In the long history of inquiry into the nature of mind, the computer metaphor gives us, for the first time,
236 the promise of linking the entities and processes of intentional psychology to the underlying biological processes
237 of neurones, and hence to physical processes. We could say that the computer metaphor is the first, best hope
238 of materialism."

239 What physical processes have had the author in mind formulating this statement of scientific belief: only
240 classical, or quantum, the "spooky" ones including, or some other, now either on the stage of preliminary studies,
241 or as yet not discovered, eventually even more paradoxical ones? What sort of Materialism informs his scientific
242 vision -Laplacian, or Einsteinian, or more modern, say, Zeilingerian [43] (which would not be recognized as
243 "Materialism" neither by Laplace, nor by Marx, and probably not even by Dennett), or its futurist version, not
244 yet invented? And on what idea of Computer relies his metaphor, -the abacus, Charles Babbage's programmable
245 mechanical computer, the modern transistor-based, integrated circuit computer, the futurist quantum computer
246 project, or a future computing device based on new revolutionary philosophical, physical, chemical or other
247 scientific principles, today not even dreamt about?

248 **3 V. Natural Languages without Natural Selection**

249 In fact, transposed to such fields as the studies of the emergence and evolution of natural languages, of science
250 [2], etc., from the strictly biological scene -with its immense variety of species, genera, etc., with its times of
251 engagement ranging from at most hundred years of life expectancy for an individual organism to at least millions
252 and even billions of years for evolutionary processes to bring this or that organism to existence, and with the
253 fundamental scarcity of the material traces (fossils) of both biological organisms and their evolutionary changes
254 -natural selection conjecture becomes for the first time verifiable and, if it should be eventually the case, falsifiable
255 [34].

256 This eventuality, neither dealt here with, nor bearing directly on our proceedings or conclusions, has everything
257 to do with the three following well-known linguistic (and more general, cognitive [2]) facts of fundamental
258 epistemological importance -with particular instances of the second and the third ones providing us, as it was
259 already mentioned above (Section 1, §2), with both the object and instruments of our enquiry:

260 1. First, the number of natural languages, living or dead, does not exceed several hundreds, with the life
261 span of a typical natural language, our linguistic "organism", varying from several hundred to several thousand
262 years, compared to at most several million years of modern languages existence; respectively, the number of
263 principal natural languages families (the linguistic genera) does not exceed several dozens. 2. Second, the
264 linguistic "fossils" are relatively numerous, very well preserved, and mostly very good documented and studied
265 -to faithfully testify both to the state of particular languages at particular historical junctures and to their
266 evolutionary changes. 3. Third and last, but not least: Thesis: Higher Memory Level of Linguistic Fossils.
267 Alongside the traditionally studied first, or low, or material memory level of linguistic fossils extracted from
268 preserved (and mostly archeologically retrieved) inscriptions and texts -the level corresponding to the one and
269 only one known in the case of biological fossils -fossilized languages often possess a higher memory level: the
270 stories told by preserved texts about the (history of the) very language in which they were written.

271 As in the case of the first level memory possessing by preserved inscriptions and texts, but on a different
272 methodological basis, the stories which preserved the higher memory level need a careful and critical examination
273 before being admitted as trusted testimonies to the history of the language in question. But if ultimately admitted,
274 the extracted information, otherwise unavailable, might be of an extraordinary importance: just imagine that,
275 alongside our studies of fossils of an extinct dinosaur, we could also here from him his and his generation's story
276 ! 1 2 3

¹© 2013 Global Journals Inc. (US) © 2013 Global Journals Inc. (US)Interpreting Semitic Protolanguage as a Conlag -Constructed Language

²© 2013 Global Journals Inc. (US)

³2 35 Interpreting Semitic Protolanguage as a Conlag -Constructed Language



Figure 1: Figure 1 :

277 [Gesenius ()] *A Hebrew and English Lexicon of the Old Testament*, Heinrich Friedrich Wilhelm Gesenius . 1952.
278 USA: Oxford University Press.

279 [Weingreen ()] *A Practical Grammar for Classical Hebrew*, Jacob Weingreen . 1959. Oxford University Press.
280 (2nd ed)

281 [Arbib ()] *Action to Language via the Mirror Neuron System*, Michael A Arbib . 2007. Cambridge University
282 Press.

283 [Malthus ()] *An Essay on the Principle of Population, or, A View of its Past and Present Effects on Human
284 Happiness, with an Inquiry into our Prospects Respecting its Future Removal or Mitigation of the Evils which
285 it Occasions*, Thomas R Malthus . 1803. Johnson, London. (2nd edition)

286 [Bruce ()] *An introductory Hebrew grammar with progressive exercises in reading, writing and pointing*, Andrew
287 Bruce , Davidson . 1916. Clark, Edinburgh.

288 [Einstein] ‘Autobiographical Notes’ Albert Einstein . *Albert Einstein: Philosopher-Scientist*, Paul Arthur Schilpp
289 (ed.) (London) Cambridge University Press. p. .

290 [Bergen ()] Robert D Bergen . *Biblical Hebrew and Discourse Linguistics*. Eisenbrauns, (Winona Lake, USA)
291 1994.

292 [Dennett ()] *Breaking the Spell: Religion as a Natural Phenomenon*, Daniel Dennett . 2006. Penguin, London.

293 [Einstein et al. ()] ‘Can Quantum-Mechanical Description of Physical Reality Be Considered Complete?’ Albert
294 Einstein , Boris Podolsky , Nathan Rosen . *Phys. Rev* 1935. 47 p. 777.

295 [Popper ()] *Conjectures and Refutations: The Growth of Scientific Knowledge*, Karl R Popper . 1963. Hutchinson,
296 London.

297 [Smolin ()] ‘Cosmological Natural Selection as the Explanation for the Complexity of the Universe’ Lee Smolin
298 . *Physica A: Statistical Mechanics and its Applications* 2004. 340 (4) p. .

299 [Mauchline (ed.) ()] *Davidson’s Introductory Hebrew Grammar*, John Mauchline . T. & T. Clark (ed.) 1978.
300 Edinburgh. 26.

301 [Paty ()] *Einstein philosophe. La physique comme pratique philosophique*, Michel Paty . 1993. Paris. Presses
302 Universitaires de France

303 [Kepler (ed.) ()] *English translation: The Harmony of the World. Translated into English with an Introduction
304 and Notes by*, Johannes Kepler . E. J. Aiton, A. M. Duncan, J. V (ed.) 1997. 1619. 1997. Philadelphia:
305 American Mathematical Society. (Traduction francaise)

306 [Clark ()] *Etymological Dictionary of Biblical Hebrew. Based on the Commentaries of Samson Raphael Hirsch*,
307 Matityahu Clark . 1999. Jerusalem & New York: Feldheim Publishers.

308 [Weinberg ()] *Facing Up: Science and Its Cultural Adversaries*, Steven Weinberg . 2001. Harvard University
309 Press.

310 [Carles Crawford Krebs (ed.) ()] *Handbook of psychology: Ideas, Issues, and Applications*, B Carles, Dennis L
311 Crawford, Krebs (ed.) (Mahwah, NJ) 1998. Lawrence Erlbaum Associates.

312 [Healey ()] John F Healey . *The Early Alphabet (Reading the Past)*, (Berkeley) 1990. University of California
313 Press.

314 [Gesenius ()] ‘Hebr ‘aische Grammatik. Neudruck: Hildesheim’. Heinrich Friedrich Wilhelm Gesenius . *Gesenius’
315 Hebrew Grammar*, (Oxford) 1813. 1983. 1910. 2008. Dover Publications. (Bilingual edition)

316 [Belaga ()] ‘In the Beginning Was the Verb: The Emergence and Evolution of Language Problem in the Light of
317 the Big Bang Epistemological Paradigm’ Edouard Belaga . *Rivista di Filologia Cognitiva (Cognitive Philology)*
318 2008. 1 p. 1.

319 [Ullendorff ()] ‘Is Biblical Hebrew a Language?’ Edward Ullendorff . *Bulletin of the School of Oriental and
320 African Studies* 1971. 34 (2) p. . University of London

321 [Lambek and Yanofsky ()] Joschim Lambek , Noson S Yanofsky . <http://www.sci.brooklyn.cuny.edu/noson/hebrew1.pdf> *A Computational Approach to Biblical Hebrew Conjugation*, 2006.

322 [Christiansen and Kirby ()] ‘Language evolution: consensus and controversies’. Morten H Christiansen , Simon
324 Kirby . *TRENDS in Cognitive Sciences* 2003. 7 (7) p. . (First, the number of natural languages, living or
325 dead, does not exceed)

326 [Gray and Atkinson ()] ‘Language-Tree Divergence Times Support the Anatolian Theory of Indo-European
327 Origin’. Russel D Gray , Quentin D Atkinson . *Nature* 2003. 426 p. .

328 [Laughlin and Pines ()] Robert B Laughlin , David Pines . *Theory of Everything. Proc. Natl. Acad. Sci. USA
329 97:1*, 2000. p. .

330 [Wolfenstein ()] ‘Lessons from Kepler and the Theory of Everything’. Lincoln Wolfenstein . *Proc. Natl. Acad.
331 Sci. USA* 2003. 100 (9) p. .

332 [Nielsen and Chuang ()] Michael A Nielsen , Isaac L Chuang . *Quantum Computation and Quantum Information*,
333 (Cambridge) 2000. Cambridge University Press.

334 [Okrent ()] Arika Okrent . *the Land of Invented Languages: Esperanto Rock Stars, Klingon Poets, Loglan Lovers, and the Mad Dreamers Who Tried to Build A Perfect Language*. *Spiegel & Grau*, (New York) 2009.

335

336 [Pinker and Bloom ()] Steven Pinker , Paul Bloom . *Natural Language and Natural Selection*. *Behavioural and Brain Sciences* 13-4, 1990. p. .

337

338 [Prince and Smolensky ()] Alan Prince , Paul Smolensky . *Optimality Theory: Constraint Interaction in Generative Grammar*, 1993/2002/2004. Blackwell Publishers.

339

340 [Huehnergard ()] *Proto-Semitic Language and Culture*, *The American Heritage dictionary of the English language*, John Huehnergard . 2011. p. . (5th ed.)

341

342 [Ehret ()] *Reconstructing Proto-Afroasiatic (Proto-Afrasian): Vowels, Tone, Consonants, and Vocabulary*, Christopher Ehret . 1995. Berkeley and Los Angeles: University of California Press.

343

344 [Swift ()] *Seti Pioneers -Scientists Talk about Their Search for Extraterrestrial Intelligence*, David W Swift . 1993. Tucson: Univ. of Arizona Press.

345

346 [Jurafsky and Martin ()] *Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition*, Daniel Jurafsky , James H Martin . 2000. Upper Saddle River, NJ: Prentice Hall.

347

348

349 [Stephen and Gould ()] J Stephen , Gould . *The Structure of Evolutionary Theory*, (Cambridge (Massachusetts) and London) 2002. The Belknap Press of Harvard University Press.

350

351 [Dawkins ()] ‘The Blind Watchmaker: Why the Evidence of Evolution Reveals a Universe Without Design’. Richard Dawkins . *Adler & Adler* 1986.

352

353 [Mcfall ()] *The Enigma of the Hebrew Verbal System: Solutions from Ewald to the Present Day*, Leslie Mcfall . 1982. Cambridge: The Almond Press.

354

355 [Zeilinger ()] ‘The Message of the Quantum’. Anton Zeilinger . *Nature* 2005. 438 p. 743.

356 [Goldstein ()] *The Organism: A Holistic Approach to Biology Derived from Pathological Data in Man*, Kurt Goldstein . 1939/1995. Zone Books.

357

358 [Hobbs (ed.) ()] *The Origin and Evolution of Language: A Plausible, Strong-AI Account*, Jerry R Hobbs . Michael A. Arbib, ed. (ed.) 2007. Cambridge University Press. p. . (Action to Language via the Mirror Neuron System)

359

360 [Bethea and Dolinin ()] *The Pushkin Handbook*, David M Bethea , Alexander Dolinin . 2005. Madison: University of Wisconsin Press.

361

362 [The Verbal System of Biblical Hebrew: A New Synthesis Elaborated on The Basis of Classical Prose ()] *The Verbal System of Biblical Hebrew: A New Synthesis Elaborated on The Basis of Classical Prose*, Jan Joosten (2012. Ein Kerem, Jerusalem: Simor Ltd.

363

364

365 [L’harmonie Du Monde ()] ‘Traduction de Jean Peyroux’. L’harmonie Du Monde . *Librairie Blanchard* 1979.

366 [Dawkins (2005)] *What Do You Believe Is True Even Though You Cannot Prove It*, Richard Dawkins . 2005. January 3. New York Times.

367