

# Biblical Hebrew, Fossil of an Extinct Proto-Language

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## Abstract

Scientific enterprise is a part and parcel of the contemporaneous to it general human cultural and, even more general, existential endeavor. Thus, the fundamental for us notion of *evolution*, in the modern sense of this characteristically Occidental term, appeared in the 19-th century, with its everything pervading, irreversible cultural and technological change and the existential turmoil. Similarly, a formerly relatively recherché word *emergence*, became a widely used scientific term only in the 20-th century, with its cultural, economical, political, and national sagas of emergence and destruction played against a background of the universe emerging from the Big Bang and disappearing into its black holes, if not into its ultimate Big Collapse.

Today, the rules of engagement in scientific emergence-evolution games, steadily spreading from natural to cognitive sciences, and beyond, are dominated by the 19-th century concept of *natural selection* which has inverted the time-arrow of the classical *creationist* dogma, with its rarely spelled out pessimistic implication that the life is moving from the highest biological organization to an entropic chaos. In its turn, the natural selection's excessively contagious, "do-it-yourself" optimism might ultimately turn out to be its undoing : the natural selection conjecture, when transposed to such fields as linguistics from the strictly biological scene, with its times of engagement ranging from at most hundred years of life expectancy for an individual organism to at least millions and even billions of years for evolutionary processes to bring this or that organism to existence, becomes for the first time verifiable and even falsifiable.

The present paper studies some implications of the well-known but almost universally disregarded tight combinatorial morphological-semantic structure of the verbal system of Biblical Hebrew, to show that this linguistic fossil testifies to the existence of a now extinct Proto-Language whose extremely tight verbal organization and meaningful architecture made it both structurally strikingly similar and expressively vastly superior to humanly designed Assembler languages, – an absolutely novel, paradoxical phenomenon, never before and nowhere else observed and apparently incompatible with the basic tenets of modern linguistic natural selection theories and, at the very least, crying out for new explanatory linguistic paradigms.

# 1 Introduction

§1. In their influential paper *Language Evolution : The Hardest Problem In Science ?* [6], Morten H. Christiansen et Simon Kirby made an eloquent call to arms, characteristically blending humility, jealousy, and wistful admiration of a cognitive scientist aspiring to sometime emulate the effectiveness and precision of, and the universal respect commanded by, natural sciences in their understanding of the emergence, functioning, and evolution of (everything in) the observable universe – that is to say, outside and different from what makes us intelligent human beings :

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

This is why and how it came that, in search of new approaches to the problem of *emergence and evolution of natural languages*, natural sciences – Mathematics [54], Theoretical Computer Science [38], Neurosciences [2] and Evolutionary and Computational Molecular Biology [21] [13], to mention just a few both characteristic and important studies – represent today the fast *emerging, evolving* and, for that matter, extremely diversified and rich pool of formal concepts, structures, and methods to learn, to borrow, and to adapt.

The present study, too, is legitimately claiming natural sciences among its ancestry, building **(i)** on new experimental, computer-assisted appropriations of some classical linguistic structures, **(ii)** on their theoretical computer science interpretations related to newly established analogies between these structures and assembly programming languages, and last but not least, **(iii)** on original mathematical (combinatorial and graph-theoretical) analyses these structures revealing some novel and, for that matter, paradoxical interplay between their basic alphabetic, morphologic, and semantic aspects.

§2. A proper interpretation of these results is another matter : after several years of futile attempts to adapt to our needs some mainstream methodologies of natural sciences extraction, we have turned our attention to sources less popular, more obscure, questioned even by humanities and, according to the learned opinion of radical proponents of natural sciences [50], intellectually definitively compromised [25] and thus, absolutely worthless if not noxious.

All this makes the issue of the ancestral lineage of this study rather complicated, if not controversial. In other words, should we be uncomfortable with, or ashamed to acknowledge, or even to name the second, much less enviable ancestry of this study ? Or should we better hide and forget it altogether ?

The answer is : being particularly proud of this ancestry, our mock hesitations notwithstanding, let us first remove the main stumbling blocks to its reasonably dignified presentation.

The aforementioned remarkable phenomenological, analytical, and compu-

tational breakthroughs of our colleagues notwithstanding, it is not a secret that on the most general conceptual and methodological levels the research into the emergence and evolution of natural languages is dominated, as it is also more and more the case for cognitive sciences at large, by faithful imitations of *the biological natural selection paradigm* [44] – with a credulity, at least in some poorly thought over cases unrelated to the present study [1], bordering on the absurd.

And it happens mostly at the expense of others, innately linguistic and cognitive sources and methods of the relevant, venerable, well preserved, immensely rich – historically, culturally, esthetically – and intellectually sound written traditions, which are invariably and summarily dismissed today by the dominating school of cognitive thought as boring and unreliable fairy tales irrelevant to serious scientific research.

We speak here about the fundamental, unique, and well-documented faculty of (some) languages to provide, thanks to their rich library of texts, informal and yet insightful, in many cases factually verifiable (as, for example, in Homer’s Troy and Heinrich Schliemann’s case [46]) testimonies to ours and the languages own histories, including occasionally the histories of their emergence and evolution : cf. below *Thesis on the Higher Memory Level of Linguistic Fossils*, Section 2, §5.

It is this faculty which represents another, and for that matter, the most important and the most controversial source of inspirational insights for our study. We speak here about venerable and well documented Judaeo-Christian traditions of interpretation of Biblical Hebrew texts, including traditional Rabbinic commentaries on the verbal system of Biblical Hebrew (Sections 4 and 5), – the source to be pleaded more forcefully against the grain of the common linguistic prejudices below, Section 2.

**§3.** The Hebrew verb is known for its remarkable linguistic “enigmas” [35]. Ours start with a trivial observation that, with the exception of several dozen double two-letter cases, all Hebrew verbs are three-letter combinations over the Hebrew alphabet of 22 letters (cf. Fig. 2).

There is no doubt that, taking by itself, its notoriety notwithstanding, this unique linguistic phenomenon should arise today one’s scientific curiosity – be it just because of the striking similitude of the abstract perfection and parsimoniousness of such an alphabetical coding of verbs to the way machine codes (low level, or assembly programming languages [43]) are traditionally represented – by mostly three latin letters combinations (abbreviations), with a very few codes having two- and four-, or more-letter names. (It is obvious that two latin – respectively, Hebrew – letters would be not enough to systematically code all machine codes – respectively, Hebrew – verbs, four would be too much, and three is just enough.)

Add to this surprising formal similarity, first, the well-known but still lacking any evolutionary explanation fact that “*Hebrew grammar is essentially schematic and, starting from simple primary rules, it is possible to work out, almost mathematically, the main groups of word-building*” [51], [26] and the second, even more

surprising, subtle, of a mixed morphologic-semantic nature feature of Biblical Hebrew – the pervasiveness of the phenomenon of topologically neighboring (for example, differing in only one letter position) verbs having semantically meaningful correlations, often related to the type of the particular letters involved [7], – and we have on our hands the following

**Main Problem.** *What is the meaning and what are the origins of this unique and fundamental attribute of the verbal system of Biblical Hebrew, the primarily verbal language, with an average verse of the Hebrew Bible containing no less than three verbs and with most of its words being derived from verbal roots ? We speak here of its highly innate, morphologically most parsimonious, semantically involved formal structure displaying a unique language-alphabet relationship, closely resembling in particular, and yet vastly superior in its expressive power to humanly designed assembler languages ?*

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

After further analyses, both linguistic, mathematical, and computational, we came to interpret our observations as testifying to the existence of a now extinct Proto-Language possessing an innate Proto-Alphabet, with semitic and Hebrew alphabets being its fossils and with its letters having interwoven proto-morphological and proto-semantic attributes.

More precisely, we demonstrate, with a cogent degree of certainty which should be evaluated and, if possibly, augmented by the future research, that this Proto-Language was sort of a living reflection of a human being in a giant linguistic mirror – a linguistic live image ingeniously, faithfully, harmoniously, with an astonishing precision and parsimony of an artificially designed formal language mirroring the fundamental intellectual realm of women and men, for all purposes related to both the description of, and an idealized dialogue concerning their abilities to interrelate and to act.

These conclusions address, without fully resolving, the first part of our *Main Problem*, the *meaning* of the outlined above linguistic attribute of Biblical Hebrew. As to its second part concerning the *origins* of this attribute, i. e., its emergence and evolution, we feel that it would be preposterous on our part, at least at the current level of our knowledge, to advance any conjecture or even informal suggestions.

We only can (and should) try to throw into relief, by restating some of the above arguments, the objectively most controversial character of the emergence at some historical juncture – in the context of an ancient civilization deprived of any intellectual and material means to even adequately formulate our problem – of a comprehensive, rich, and perfectly formal linguistic structure superseding

in its expressive power all known today artificial programming languages.

We deal here with an emergence, in today's scientific terms, unquestionably "spooky" – in whatever conceptual context might one be willing to place it :

(i) either appreciating it in the light of the one-with-a-half-century-long and still ongoing and burgeoning collective human experience, scientific and later industrial, of the creation (*a. k. a. emergence*) and development (*a. k. a. evolution*) of the culture of programming languages and information processing;

(ii) or researching its apparently free from any tries-and-errors prehistory whose outcome, according to the universal presumption discussed below, Section 2, should be decided by an appropriate *survival of the fittests* protocol;

(iii) or reflecting on the unequaled revolutionary and purposeful immensity of the message named *the Hebrew Bible*, and of both its historical relevance and its accurately foretold cultural impact – of this "*devouring and consuming fire*" (Deuteronomy 9:3) which Biblical Hebrew, the perfect and perfectly adapted to such a purpose linguistic vehicle, has been destined (*a. k. a. designed ?* – cf. Section 3, §2, below) to carry.

## 2 Getting out of the Natural Selection Stampede – to Clean up Our Epistemic Act.

§1. As it was already mentioned above, the challenge represented by our Biblical Hebrew problem has been from the very beginning complicated by a universal, unspoken, and yet not less bounding methodological assumption that any potential evolutionary solution should be consistent with, if not inspired by, the natural selection paradigm.

We believe that the truth, at least in our case, turned out to be different, and the vision elaborated in this study has been won out by the author – looking since about fifteen years for a meaningful interpretation of the mysterious linguistic phenomena outlined above – over the considerable psychological pressure, and at the prize of a painstaking sorting out of the enormous body of relevant emergence-and-evolution-by-natural-selection publications, with their characteristic authoritative and yet, to our great disappointment, very approximate, even if often computer oriented and supported, claims.

A typical sample – a veritable statement of metaphysical faith publicly and solemnly delivered by Robert Dawkins [11] and having the merit to be short, clear, and uncompromising – could help an outsider to have a taste of, without acquiring it for, the prevailing atmosphere :

*"I believe, but I cannot prove, that all life, all intelligence, all creativity and all 'design' anywhere in the universe, is the direct or indirect product of Darwinian natural selection. It follows that design comes late in the universe, after a period of Darwinian evolution. Design cannot precede evolution and therefore cannot underlie the universe."*

This is how, after being stamped by the dominating mode into this most desperately arid, inhabitable intellectual desert – which the author were con-

demned to cross, as it were, on foot – they came eventually to believe that, today, the natural selection epistemological matrix, with its specific reductionist, over-reaching interpretations – **(i)** of all past, current, and future contributions to biology [10], to cosmology [47], to behavioral psychology [8], to linguistics [44], **(ii)** of all progress of sciences at large [50], and even more radically, **(iii)** of all intellectual endeavors and failures [12] of humanity, if not **(iv)** of the very existence in, and ultimately, of the Universe [11], – has become both too rarified and fanciful, too rigid and dogmatic to provide a universal explanatory basis for, and too heavily ideologically charged to serve as the main theoretical desk for the admittance into the scientific circulation of new facts, problems, conjectures, and theories – from both natural and cognitive sciences.

This is why – taking into account the widespread and apparently voluntary acceptance by the scientific community at large of the natural selection paradigm as *the ultimate theory of everything* – we have chosen to delineate our vision of the unhealthy pervasiveness and deficiencies of methodological (ab)uses of this paradigm, – and thus to prepare the ground for the detailed presentation of our controversial, to say the least, study, its inspirational sources, motivations, methods and results.

The study all the more controversial, we repeat, that it is characterized by an unusual, if not scandalous refusal either to accept any known epistemological matrix, of natural selection, design, or whatever, or to produce a new one fitting in our purposes.

**§2.** To begin with, let us remind the reader that, historically, there is nothing new or extraordinary when a venerable (in our case, spelled out by a 19-th century economist [33]) scientific concept outlives its epistemological usefulness and becomes an epistemological burden for science. Two following well-known precedents should illustrate the point.

**Laplacian Mechanics** created more than two hundred years ago and universally admired ever since – that is, until the advent of Maxwell’s, Poincaré’s, and Einstein’s theories – has ultimately lost its epistemological value for physics, to acquire instead an enormous ideological prestige as an authentic and unsurpassed in its perfection instance of *reductionist philosophy* which, in particular, underlay the corresponding dogmatic distortions of otherwise valuable scientific discoveries of, say, Charles Darwin, Karl Marx, and Sigmund Freud.

This is how Albert Einstein [14] has summarized the post-Laplacian epistemological crisis in physics :

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

Little has Einstein known, delivering this post-mortem of a formerly omniscient theory [27], that he himself has fallen under the spell of the commonly accepted – at least, since Isaak Newton – **Classical Causality Doctrine of Space and Time**, the very conceptual ground on which Pierre-Simon Laplace

has proudly erected [28] his miniature mechanical universe.

To his credit, Einstein was able to spell out himself his difficulty to understand some quantum micro-phenomena incompatible with the classical causality doctrine, by inventing his now famous *Gedankenexperiment* exhibiting, as he called it, a “*spooky action on a distance*”.

We speak here about the well-known, systematically exploited, and yet as poorly understood today as in Einstein’s times phenomenon of *quantum entanglement* that, after being discovered according to the very scenario advanced by Einstein and his colleagues as improbable [15], dominates the modern research in Quantum Information Processing [16].

**§3.** The subtlety of this *pure physical* phenomenon, of its philosophical and theoretical repercussions and accommodations, and of related theoretical and experimental discoveries which might one day lead to the creation of presently still even theoretically unconceivable Quantum Computer, most strikingly contrasts with 19-th century scientism still limiting and burdening the imagination of many cognitive scientists, – as illustrated by the following recent *credo* [18], found in the mentioned above and otherwise very instructive compendium [2] on the mirror system hypothesis on the linkage of action and language :

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

What *physical processes* have had the author in mind formulating this statement of scientific belief : only classical, or quantum, the “spooky” ones including, or some other, now either on the stage of preliminary studies, or as yet not discovered, eventually even more paradoxical ones ? What sort of *Materialism* informs his scientific vision, – Laplacian, or Einsteinian, or more modern, say, Zeilingerian [55] (which would not be recognized as “Materialism” neither by Laplace, nor by Marx, and probably not even by Dennett), or its futurist version, not yet invented ? And on what idea of *Computer* relies his metaphor, – the abacus, Charles Babbage’s programmable mechanical computer, the modern transistor-based, integrated circuit computer, the futurist quantum computer project, or a future computing device based on new revolutionary philosophical, physical, chemical or other scientific principles, today not even dreamt about ?

**§4.** Scientific enterprise is a part and parcel of the contemporaneous to it general human cultural, and even more general, existential endeavor. Thus, the fundamental for us notion of *evolution*, in the modern sense of this characteristically Occidental term, so pregnant with ideological, philosophical, and (anti-) theological implications and ambiguities, appeared in the 19-th century, with its everything pervading, irreversible cultural and technological change and the

existential turmoil. Similarly, a formerly relatively *recherché* word *emergence*, became a widely used scientific term only in the 20-th century, with its cultural, economical, political, and national sagas of emergence and destruction played against a background of the universe emerging from the Big Bang and disappearing into its black holes, if not into its ultimate Big Collapse.

Today, the rules of engagement in scientific emergence-evolution games, steadily spreading from natural sciences to humanities, and beyond, are dominated by the *neo-Darwinism* [20] – a complex of modernized versions of the 19-th century concept of *natural selection*.

To its great advantage, the natural selection doctrine inverts the time-arrow of the *creationist* dogma – which is just another, competing with the *reductionist scientism* way to get rid of the existential Mystery of the intelligibility and intellectual beauty of the Universe the humanity is slowly discovering, understanding, and learning from (cf. Conclusion, §01) – and whose important, undesirable, and mostly skipped over pessimistic implication is that we are moving from the golden age of the highest organization to an entropic chaos.

**§5.** In its turn, the *all-or-nothing* natural selection “optimism” – appropriating, on the one hand, the indubitable reality and the fundamental importance of biological evolutionary processes (whose experimental discovery, courageously emphasized and painstakingly researched by Charles Darwin, the natural selection interpretation notwithstanding, has been his greatest achievement), and on the other hand, the extraordinary successes of evolutionary and especially computer modeling – brought with him, in its quality of *the ultimate theory of everything*, at least one apparently unsought and unexpected by its partisans consequence of an unquestionably great objective importance.

In fact, transposed to such fields as the studies of the emergence and evolution of natural languages, of science [3], etc., from the strictly biological scene – with its immense variety of species, genera, etc., with its times of engagement ranging from at most hundred years of life expectancy for an individual organism to at least millions and even billions of years for evolutionary processes to bring this or that organism to existence, and with the fundamental scarcity of the material traces (fossils) of both biological organisms and their evolutionary changes – natural selection conjecture becomes for the first time verifiable and, if it should be eventually the case, falsifiable [42].

This eventuality, neither dealt here with, nor bearing directly on our proceedings or conclusions, has everything to do with the three following well-known linguistic (and more general, cognitive [3]) facts of fundamental epistemological importance – with particular instances of the second and the third ones providing us, as it was already mentioned above (Section 1, §2), with both the object and instruments of our enquiry :

(1) First, the number of natural languages, living or dead, does not exceed several hundreds, with the life span of a typical natural language, our linguistic “organism”, varying from several hundred to several thousand years, compared to at most several million years of modern languages existence; respectively, the number of principal natural languages families (the linguistic *genera*) does not

exceed several dozens.

(2) Second, the linguistic “fossils” are relatively numerous, very well preserved, and mostly very good documented and studied – to faithfully testify both to the state of particular languages at particular historical junctures and to their evolutionary changes.

(3) Third and last, but not least :

**Thesis on the Higher Memory Level of Linguistic Fossils.** Alongside the traditionally studied *first, or low, or material memory level of linguistic fossils* extracted from preserved (and mostly archeologically retrieved) inscriptions and texts – the level corresponding to the one and only one known in the case of biological fossils – fossilized languages often possess a higher memory level : the stories told by preserved texts about the (history of the) very language in which they were written .

As in the case of the first level memory possessing by preserved inscriptions and texts, but on a different methodological basis, the stories which preserved the higher memory level need a careful and critical examination before being admitted as trusted testimonies to the history of the language in question.

But if ultimately admitted, the extracted information, otherwise unavailable, might be of an extraordinary importance : just imagine that, alongside our studies of fossils of an extinct dinosaur, we could also here from him his and his generation’s story !

### 3 Acknowledgments and Cautionary Remarks.

§1. Our approach, after some unavoidable mainstream evolutionary hesitations mentioned above, has become, and remains today, both inspired and insulated from all dominating reductionist scruples by the healthy skepticism and ideological independence of modern physical sciences, which value phenomenological evidence, including the most paradoxical and “spooky” one, above all universally accepted dogmas, and which strive to be sufficiently open-minded to accept the most “crazy” explanatory paradigms [49] – on the only condition that they are reasonably efficient in accommodating new experimental evidence.

In practical terms, it means that when you strike gold – and this was the author’s feeling upon their “discovery” of the Hebrew verbal system – no theories claiming that there should not be gold there count anymore.

On a more theoretical level, one should not hesitate to pursue her and his personal authentic inspiration – whatever might be its source and whatever might one expect to be the dominant public appraisal of the nature of this source. Thus, as it will be clear from what follows, the present study has greatly benefited from some traditional Rabbinic sources, both linguistic and theological, as well as from Eastern (Orthodox) and Western (Catholic) Christian traditions of the Biblical exegesis.

Moreover, we readily confess that, starting as two curious scientific bystanders wondering what might be the meaning of the elementary combinatorial harmony of a typical Hebrew verb, the harmony known to every Hebraist

פלאות עדותיך על-כן נצרתם נפשי  
פתח דבריך יאיר מבין פתים

Figure 1: The verses 129 and 130 of the Psalm 118 (or 119, in the Hebrew Bible numeration). This Psalm is the most remarkable among *acrostic Psalms* (see below Section 4, §2). It consists of 22 groups of eight verses, every one beginning with the corresponding Hebrew letter; the above two verses start with *Pe*, the 17th letter of the Hebrew alphabet.

[35], we slowly came to perceive our scientific enquiry, as it did once a certain Johannes Kepler or a certain Albert Einstein, as an ongoing dialogue with a mysterious Author to whose exquisite Creation we were suddenly and undeservedly exposed and whose patience and generosity we gratefully acknowledge, – even as admitting that His existence, nature, and intelligence are far beyond our ability to fully comprehend or characterize, and that any reference to Him in this scientific paper should be restricted – out of respect for His, the author, and their readers intellectual privacy and integrity – to the present *Acknowledgment*.

This said, there is no doubt in our mind that it was the Psalmist, twenty five or so centuries before us, who knew better than we, or for that matter, than Kepler [52] or Einstein [41], how to tell it (see Fig. 1 for the original Hebrew verses) [22] :

*“Thy testimonies are wonderful : this is why my soul keeps them. The unfolding of your words gives light, it gives the understanding to the simple.”*

**§2.** With our subject, problem, objectives, and inspirational sources being presented, the following remarks are intended to dispel some misunderstandings which could distract our attention from the real and, for that matter, really troubling controversy indissociable from our arguments and conclusions.

Let us start by affirming that we do not use in this study any hypothesis which could be characterized or perceived as *creationist*, *by design*, or whatever.

More radically : *we do not need such hypotheses*, as Pierre-Simon Laplace has claimed before us [29] – but without his reductionist emphasis carefully designed to deprive us, at the very least, of the freedom to be challenged in the most exquisite of intellectual adventures, the scientific enquiry, by Someone to whom Einstein was respectfully referring as *“the sophisticated but not malicious Herr Gott”* [40], and to surreptitiously subject us, among other things, to the intellectual servitude to an impotent, deadly boring, and finally not even omniscient Laplacian *Intellect* [27].

Moreover, nowhere in this study are we advancing, or suggesting the truth of what might be responsibly referred to as a *hypothesis*, any hypothesis, creationist or not, – as Isaak Newton before us, with his *Hypotheses non fingo* [39], when publicly challenged to give an explanation for the commonly acceptable causes of gravity rather than just the mathematical principles of kinetics.

And as to our *proto-conjectures*, they are not more hypotheses than working assumptions – probably true, but on the other hand, quite possibly mistaken – of a paleontologist who found elephant-sized bones in Siberia and attempts to prove, without excluding other, as yet unknown options, that they are remnants of a mammoth who lived there somewhen during the Pleistocene epoch.

Similarly, our *proto-terminology* it is not here to imply – in reciprocal accordance with our insistence on the freedom of choice of explanatory paradigms – that our Proto-Language has to be construed as the source of all existing or whenever existed natural languages.

**§3.** In other words, we do not claim that our theory excludes all other possible historical mechanisms of language emergence. And as a matter of fact, we are inclined to believe, without being able as yet to prove it, that there existed several such disparate mechanisms – the problem which we hope to address in a near future.

Neither are we here – and anyway, who are we – to judge the performance, veracity, and pertinence of contemporaneous language evolution studies, of the natural selection inspiration or of any other linguistic school of thought.

Quite to the contrary, we believe that, by opening these particular new vistas in our understanding of the language emergence, our approach should valuably complements such studies.

Last but not least on our list (indubitably, incomplete) of eventual misunderstandings : the reader will not find here a new epistemological doctrine underlying, elucidating, justifying, or promoting our study. This comes at no additional cost to us : we readily confess to not possessing any such doctrine, even as vague or as emergent as Robert Laughlin’s [30].

And as to our loud protests against *the natural selection theory of everything*, they are not directed against *genuinly reductionist* uses of the natural selection, or any other scientifically customized concept and methodology : i. e., their uses in specific, clearly delineated, and experimentally accessible for verification – actually, potentially, or virtually – circumstances, in any domain of either natural or cognitive sciences.

Still, after all these *mises au point*, it remains to be seen if in the prevailing culture of preemptive pro-natural-selection analyses of new contributions, our controversial but, from the scientific point of view, certainly non-partisan approach would not spell a trouble for both the author and his work.

And if it should be the case, we are resolute to face this particular, *so naturally selective* adversity in good spirits and with the high, even if mock expectation that our contribution might ultimately unleash the coming of a renovated, neo-neo-Darwinian era of a new natural selection theory of everything, fully reconciling our discoveries, if not our conclusions, with the natural selection dogma, – as such theories typically do, – by carefully explaining them away.

**Aside.** *With the present study entering its final stage, we have been pleased to discover the recent report on the hypothetical neurological underpinnings of the “action-language” dualism [2]. Some phenomenological observations and*

*conclusions of this report shed new light on, if not directly confirm some of our experimental results and theoretical arguments concerning the verbal system of Biblical Hebrew; see more about it in Conclusion.*

## 4 Biblical Hebrew and Its Verbal System : Classical Introduction.

*The following presentation of the well-known, relevant to this study part of the history and grammar of Biblical Hebrew, of its apparently novel morphological-semantic analyses, and of the original and controversial reasoning founding the complex of our proto-conjectures are expected to be accessible to all sufficiently determined freshmen.*

§1. Excluding primarily four chapters of the Books of Ezra (*Ezra 4:8-6:18, 7:12-26*) and six chapters of the Books of Daniel (*Daniel 2:4b-7:28*), the *Hebrew Bible* – known for centuries either by its Hebrew name, *Tanakh*, or by its Christian name, *Old Testament* (in the contemporary Christian usage, *First Testament*) – is written in *Biblical*, or *Classical Hebrew*.

Israeli Hebrew, or *Ivrit*, spoken in Israel, is a relatively modern creation of mostly a single person, Eliezer Ben-Yehuda (1858 - 1922); its vocabulary, morphology, grammar, and syntax are based on, but have significantly departed in many directions from, the tight Biblical Hebrew matrix.

The knowledge we possess today about Biblical, or Classical Hebrew has been transmitted to us by people who read, contemplated, followed injunctions of, and commented on the Bible – since, as they tell it, the time immemorial, in other words – since at least three millenia.

According to historians of the Hebrew Language, Biblical Hebrew was the dominant Jewish vernacular from about 1200 to 600 BC [48], [45]. From a linguistic point of view, it went through several historic periods of evolution, including so called “Golden Age” Hebrew (before 500 BCE) and “Silver Age” Hebrew (500 BCE to 60 BCE).

Nevertheless, despite the long period covered by the books of the Hebrew Bible, “*Biblical Hebrew exhibits a surprising degree of uniformity, due to its being a literary language and to the homogeneous character of the textual tradition*” [4]. To downplay the importance of this unparalleled historical stability of Biblical Hebrew, some attribute it mistakenly to “*the amount of editorial revision of the Old Testament documents ... which has given to them a uniformity of form and usage which otherwise they would not possess*” [34].

In any case, all these historical changes did not affect the underlying alphabetic, §2, and verbal, §3, sub-structures which are the objects of our primary phenomenological interest in this study. In the parlance of *Dynamical Systems Theory*, these linguistic structures have displayed a remarkable and well-documented *structural stability* in the historically relatively fluid linguistic context.

22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01
ת	ש	ר	ק	צ	פ	ע	ס	נ	מ	ל	כ	י	ט	ח	ז	ו	ה	ד	ג	ב	א
				ץ	ף			ן	ם		ך										
t	s	r	q	t	p	a	s	n	m	l	k	y	t	h	z	w	h	d	g	b	a
a	h	e	o	z	e	i	a	u	e	a	a	o	e	e	a	a	e	a	h	e	e
v	i	s	p	a		n	m	n	m	m	p	d	t	t	i	w		l	i	t	p
	n	h	h	d	e	k	k			e	h		h	h	n		e	e	m	h	h

Figure 2: The Hebrew Alphabet.

**§2. The Hebrew Alphabet** comprises twenty two letters, Fig. 2, with five letters possessing their “soffit”, or terminal, at the end of word version.

*Here and elsewhere, when using the Latin transliteration of a Hebrew word, we mark the vowel of its accented syllable by an accent and print it in bold.*

The letters of the Hebrew Alphabet are ordered from right to left, in accordance with the distinctive Semitic right-to-left tradition of writing.

Another persistent aspect of the Semitic tradition, with its consonant-only, *abjad* scripts, is the *syllabic* nature of the Hebrew letters. Thus, the three letter word “Mem–Lamed–Kaph-soffit” (written in Hebrew letters from right to left, see Fig. 3) could be either read as *MaLaKh* and understood as “[Somebody] Ruled”, or read as *MeLeKh* and understood as *King*, depending on the context.

A unique feature of Biblical Hebrew represents the very ancient *normative ordering* of its Alphabet, the ordering documented by acrostics of at least nine Psalms (Psalms 9, 10, 25, 34, 37, 111, 112, 119, 145, according to the Hebrew tradition of the numeration of Psalms), as well as of some Lamentations and Proverbs (with a few other, more problematic Biblical acrostic excerpts suggested by modern Biblical scholars).

King David (1013-973 BC) being identified by modern Biblical studies [36] as the author of at least some of these acrostic Psalms, the emergence of the normative ordering of the Hebrew Alphabet should be probably referred to the time of Exodus (around 1300 BC), or even earlier.

Some esoteric Rabbinic commentaries view the Hebrew letters as the raw symbols of the spiritual building blocks of the Creation and interpret their normative ordering as inherent to the Divine plan of Creation [37]. We will discuss below, neither adhering to these mystical school of thought, nor providing our own explanations, the linguistic data bearing witness to the innate character of the normative ordering of the Hebrew alphabet.

**§3. The Biblical Hebrew Verb. Initiation into the Triliteral Controversy.** The Biblical Hebrew vocabulary is relatively small, representing, as some have observed, less than a quarter of Shakespeare’s vocabulary. It is little

wonder, since, as it was already mentioned above, Biblical Hebrew is primarily a verbal language, with an average verse of the Hebrew Bible containing no less than three verbs and with most of its words being derived from verbal roots.

The strangeness of this trilateral-roots morphological feature of Biblical Hebrew did not completely escape the attention of Western linguists. In what follows, we will cite the most important contributions to the topic. For starters, the following typical, amusing, and yet very instructive pedagogical warning from a popular textbook [34] throws quite perspicaciously into relief some most mysterious features of the Hebrew verbal system – unfortunately, simultaneously subtly dismissing them as a linguistic problem worthy of our scientific curiosity :

*“Hebrew ... has difficulties of its own which must be frankly acknowledged and faced ... [with probably the most conspicuous difficulty in studying Biblical Hebrew being] that the roots, whatever may have been their original form, are in the Old Testament almost entirely trilateral, ... thus imposing upon the memory a very heavy strain. Compound verbs are not found : there is nothing in Hebrew corresponding to the modifications of verbal meaning which can be made in Latin, Greek or German by prefixing prepositions ... Every verb has to be learned separately : the verbs to go out, to go up, to go down are quite different, having nothing in common with one another and being quite unrelated to the verb to go”.*

This résumé has the merit to represent, with almost photographic precision, a *negative* of our most important claims. Let us clarify, comment on, and enlarge upon its main points :

(i) the reserved, if not skeptical remark on *the original form* of the trilateral character of Hebrew roots rejoins the above opinion of the same author, §1, concerning an eventual *editorial revision of the Old Testament documents*, thus – by questioning its linguistic authenticity – stressing almost against the will of the author both the saliency and the exclusive, if not almost artificial character of this feature of the Hebrew verbal system, –

(ii) whose study *imposes upon the memory a very heavy strain* (similarly, we would add, to the difficulty of simultaneously memorizing the codes of several dozen unrelated assembler languages), because of an extreme parsimoniousness of such a trilateral representation – *every verb has to be learned separately*, – compared to a considerable morphological redundancy characteristic of other natural languages;

(iii) complement this by the “unnatural” feature of Biblical Hebrew grammar being, as stressed by another respected textbook [51] (cf. also Section 1, §3 above), *essentially schematic*, so that “*starting from simple primary rules, it is possible to work out, almost mathematically, the main groups of word-building*” (cited also in [26] where it is shown that “*the adverb ‘almost’ in the above assertion can be removed*”, with the “*mathematics involved being that of a finitely generated partially ordered semi-group, also called ‘semi-Thue system’ by mathematicians, ‘rewrite system’ by computer scientists and ‘production grammar’ – Chomsky’s Type zero – by linguists*);

(iv) finally, compared to Western languages, living and dead, the trilateral

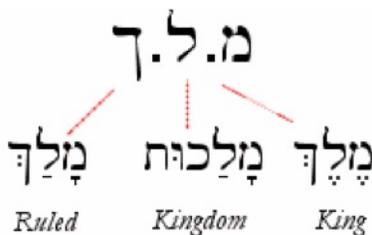


Figure 3: The Hebrew Alphabet.

“coding” of Hebrew verbs does not, according to [34], morphologically respect even the most natural and immediate logical and semantic proximity of the notions they are supposed to express, with, for example, *the verbs* to go out, to go up, to go down being *quite different, having nothing in common with one another and being quite unrelated to the verb* to go.

This berating of the logico-semantic consistency of the trilateral form of Hebrew verbs, the berating appealing to a purported reasonableness of the corresponding structures of Western languages, is especially instructive : it raises an important issue concerning both Biblical Hebrew and Western languages, touching one of the deepest mysteries of their emergence and evolution, – and it dismisses this issue in the next breath, demonstrating in passing the total ignorance of deeper layers of Biblical Hebrew’s semantic.

Anticipating our discussion of these problems below, Section 4, §01X, let us just comment here on the case of four specific English verbs chosen in [34] and their Hebrew equivalents, chosen by us as the most salient among respective Hebrew synonyms, in full conformity, as we hope, with the intended meaning of [34]. We leave it to the reader to decide whether the exposed below semantic proximity – true, unfamiliar to a Western ear – of morphologically neighboring Hebrew verbs is in any way inferior to that of the above four verbs of the “to go” family.

The verb *to go*, “he-lamed-kaph” – having actually the meaning “to walk, to progress step by step toward a goal” – is semantically and morphologically neighboring the verb “he-lamed-qoph”, with its main meaning “divide and portion”, whereas the verbs *to go out*, *to go up*, *to go down*, i. e., respectively, “iod-tzade-aleph”, “ain”-lamed-he”, “iod-resch-daleth” – translated, respectively, “exit; come out”, “rise up; develop”, “go (come) down; descend” – are semantically and morphologically neighboring the verbs (we choose just one sample, out of three to six possible for each of these verbs) “iod-tzade-ain” (extend), “aleph-lamed-he” (master), and “ghimmel-resch-daleth” (scrape; scratch), respectively [7], [5].

#### §4. The Biblical Hebrew Verb. Classical Introduction.

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