LANGUAGE AS A POTENTIAL RECONSIDERED

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Abstract. Language-as-a-potential reconsidered
The aim of the **XVth International Symposium of the I.A.P.L** (International Association of Psychomecanics of Language) held in Paris in 2018 was to discuss the theme: *Cognition, languages as dynamic systems and psychomechanics of language: theoretical aspects and applications.* This paper directly addresses this theme, especially the part I have underlined. However, a comment is in order concerning "cognition," which will be made in the first and last sections. Regrettably, lack of space does not permit a discussion of "applications."

Résumé. Le langage puissanciel reconsidéré
Le **XVe Colloque International de l'A.I.P.L** (Association Internationale de Psychomécanique du Langage) s'est realisé en 2018 autour du thème: *Cognition, fonctionnement systémique des langues et psychomécanique du langage: aspects théoriques et applications.* Ma communication s'occupe directement de ce thème, surtout de la partie soulignée. Cependant, elle ne passe pas sous silence l'aspect "cognition" qui sera abordé au tout début du texte et repris à la fin. L'espace manque pour discuter l'aspect "applications."

Key words: *noösystem, particulate principle, Humboldt systems, semiotic totipotency*

Mots clés: *noosystème, principe particulaire, systèmes Humboldtians, totipotence sémiotique*

1. Introduction

The plan of the article is as follows. Firstly, I will show that *cognition*, though very fashionable, is a fuzzy, all-encompassing concept [2], or at least a ill-defined one by the very same people who make a fuss over it. As a result, it is of little help in understanding what is language. It is rather the other way round. Secondly, I shall characterize language as a whole. We will see that language is a complex, threefold entity: language-as-a-potential, language-as-operations, language-as-actualized. Thirdly, I shall characterize language-as-a-potential, the first and crucial component of the triad. We will see why it is a unique particulate system, an *Humboldt system* unlike any other.

2. Cognition

By the end of the 18th century, philosophers seemed to accept mental phenomena, roughly grouped under the rubrics of *cognition, affection,* and *conation* (Murphy 1949).

"In this tripartite division, *cognition* referred to knowledge or knowing, *affection* to feeling and emotion or motivation, and *conation* to willing and action or response production. The early textbooks of psychology gave explicit recognition to this division (James 1890; Stout 1896; Ward

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[2] This is no better illustrated than by this definition: "The term *cognition* refers to all processes by which the sensory input is transformed, reduced, elaborated, stored, recovered, and used. It is concerned with these processes even when they operate in the absence of relevant stimulation, as in images and hallucinations…Given such a sweeping definition, it is apparent that cognition is involved in everything a human being might possibly do; **that every psychological phenomenon is a cognitive phenomenon**" (Neisser 1967:4, the emphasis is mine). This inflated view of cognition was dubbed *cognitivism.*

1918). The present-day dictionary meaning of cognition coincides with that intended in the early textbooks. According to this, all aspects of knowledge, such as sense impressions of the current environment or *perception*, acquisition of knowledge or *learning*, retention of knowledge or *memory*, selection of percepts and memories or *attention*, manipulation of knowledge or *thinking*, and individual differences in the capacity for problem solving or *intelligence*, belong to the domain of cognition. The term *cognitive* is thus an appropriate although vague adjective for referring, generally, to the knowledge aspect of things, as in "cognitive capacity," "cognitive processes," "cognitive development," "cognitive representation," and the like. It may also be used to refer to *intellectual*, as opposed to the *emotional* or *motivational*, as in "cognitive brain" (Bindra 1984:3).

In any event, psychologists and psychiatrists learned long ago that they are not the only ones interested in mental functions, even when the latter are restricted to cognition alone. Philosophers, anthropologists, linguists, ethologists, sociologists, neurologists, neurobiologists, computer scientists and AI (artificial intelligence) researchers too are interested in cognition and, more generally, in mental functions. The need for a cross-disciplinary synthesis became apparent around 1960. Eventually two quite different mergers came about, namely cognitive science, and cognitive and affective neuroscience. The former is a synthesis of psychology, philosophy of the mind, linguistics, anthropology, computer science, and AI. By contrast, cognitive and affective neuroscience (aka neuropsychology or psychobiology or biopsychology) is a synthesis of psychology, neurophysiology, neurology, ethology, linguistics, anthropology, psychiatry, endocrinology, and immunology.

Cognitive science has split in two major branches: computationism and connectionism. Each branch has its preferred metaphor for understanding the mind. For computationism, the metaphor is the mind as a digital computer. For connectionism, it is the mind as a neural network. That is, the computationist approach regards mental processes as a collection of "information-processing" programs, computations performed in accordance with precise algorithms. The connectionist approach attempts to model mental processes with computational models that use selected neurobiological findings, rather than novel psychological postulates alone. The idea is to model parts of the brain *qua* information-processors as "neural nets", networks of interconnected mock neurons, that is, hypersimplified models of neurons. No wonder, then, that a main objection to so-called cognitive science — as opposed to cognitive and affective neuroscience (or neuropsychology or psychobiology or biopsychology) — is that its practitioners, albeit paying it lipservice, overlook or neglect the central nervous system (CNS), namely the brain, the actual "wet" brain, which happens to be an indispensable organ for the emergence of mental functions, including cognitive functions. "Shorter: whereas cognitive science is brainless, its rival is brain-centred" (Bunge 2003: 191; see also Bunge 2001: chapter 19). However, the objection does not apply to enactivism (aka embodied dynamicism) which stands as a third way between cognitive science on the one hand, and cognitive and affective neuroscience on the other. The enactivist approach regards our mental "life" as involving our body (including the brain) and the world beyond the surface membrane of our organism. That is, for enactivism, the mind is an embodied dynamic system (Maturana & Varela 1980).

But what does "cognition" mean actually (Neisser notwithstanding, since his definition is useless) ? Dabril Bindra, as we have seen, tells us that the word was traditionally used to refer to the knowledge aspect of things. And that is in fact what one finds into *A Dictionary of Psychology*: "***Cognition***. A general term covering all the modes of knowing — perceiving, remembering, imagining, conceiving, judging, reasoning" (Drever 1969:42). However, not everybody agrees with this definition, with good reasons. Peter M.S. Hacker, for example, distinguishes cognitive and *cogitative* powers (or abilities or functions). *Thinking*, which is not in Drever's list of cognitive functions, is a cogitative function (/ability/power) rather than a cognitive one. Moreover, as Hacker

points out, thinking is polymorphous. It comes in many varieties: **reasoning** (thinking through; thinking up; wh-thinking); reflecting (reflecting about; deliberating; considering; ruminating); musing (day-dreaming; idle-thinking); **imagining** (thinking up possibilities; thinking falsely); **remembering** (thinking of/about the past); taking a cogitative stand (inferring, deducing; **judging**, concluding); thinking things to be thus-and-so (believing that; opining, assessing; estimating; assuming, supposing, taking for granted); thinking of (meaning in saying; thinking of A as B); acting with thought (attentively; intelligently; after deliberating; with revelant considerations in mind) (see Hacker 2013: figure 10.2).

Note that four out of the six items in Drever's list of cognitive functions (those highlighted in **bold**) overlap with some varieties of thinking in Hacker's figure, which constitute a complex network connecting a multitude of diverse cogitative processes. Imagination is a case in point. It is a cogitative function (/ability/power) rather than a cognitive one, if we adopt the view that "cognition is the acquisition of knowledge, or knowledge in the making" (Bunge 2010:201). One cannot acquire knowledge by the exercise of imagination in the manner which one can by perception and/or by reasoning. One may imagine things that do not exist (such as dragons and elves) as well as things that do (which, nevertheless, may well be not as they have been imagined to be), and imagine doing things that are never done. "But although not a cognitive faculty, imagination is, among other things, a cognition-facilitating one. Einstein held that imagination is more important than knowledge. For theoretical creativity and originality require bold leaps of imagination" (Hacker 2013: ch.11).

The difficulties of ascertaining what cognition is about — as opposed to cogitation — has been compounded by the explosive expansion of (and rivalry between) cognitive science and cognitive and affective neuroscience. In present-day usage the intended meaning of *cognitive* is usually much more specific and much more varied than that summarized by Bindra (see quotation above). According to the same author, at least five new, nondictionary, meanings could be readily identified as early as 1980: 1. An activated central knowledge state (e.g., expectancy, semantic domain); 2. Reasoning and other problem-solving abilities (e.g., inferential reasoning, hypothesis formulation); 3. Central transformations conceptualized within the "information-processing" framework (e.g., encoding, retrieval); 4. Mentalistic concepts, describing events in consciousness, viewed as explanatory entities (e.g., image, percept); 5. Self-control systems (e.g., self-monitoring, guidance by verbal rules) rather than situational determinants. Thus, the problematics of cognition in these disciplines has a considerable (though not aknowledged) overlap with that of cogitation. On the other hand, neuropsychology has shown in the course of the last thirty years that "cognition" is undetachable from "affection," including emotions and emotional feelings (e.g., Damásio 1994, 1999, 2003, 2010, 2017). In other words, it has been shown that the so-called cognitive regions of the CNS (e.g., the prefrontal cortices) are connected to the so-called emotional regions of the CNS (e.g., the amygdala, the periacqueductal gray, the enteric nervous system), and that such connection is two-way (e.g., Barbas 1995). This would explain why emotion can now energize "cognition," now block it.

The simplicity and apparent unifying power of the heuristic postulate underlying neuropsychological research (to wit: mental abilities are identical with neural states and processes) is very attractive at the first sight. But the results of this research are often ambiguous and confused (see Bennett 2007a, 2007b; Bennett & Hacker 2007a, 2007b, 2013). For one thing, they are plagued by conceptual muddles in accounting for the emergence and submergence of higher-level properties of the human organism. For another, human cognition is not a collection of neural functions of the human brain. The brain is a part of the human being. It is not, however, a feeling, perceiving, remembering, conceiving, judging, reasoning, knowing, learning part, and nor is any other part of a human being. Brains do not feel, perceive, remember, imagine, conceive, judge, reason, know, or

learn anything — for these are mental abilities of human beings (and, in some cases, of non-human animals too), not of their brains. It is the human being as a whole, not any part of its organism, that is the bearer of mental powers. But it is true that a normal functionning brain is an indispensable organ in the emergence of the mental functions/abilities/powers (cognitive, cogitative, affective, conative) of the human being.

Enterprises that are visibly well funded and highly praised attract new adherents as well as hangers-on. It is, then, no surprise that the recent ascendancy of neuroscience and its spirited marriage with cognitivism led many to accept (without cringing) such labels as *cognitive psychologists*, *cognitive linguists*, *cognitive anthropologists*, *cognitive archeologists*, *cognitive sociologists*, *cognitive economists*, *cognitive historians*, *cognitive educationists*, and *cognitive therapists*. Therefore, Bindra's verdict in his epoch-making article four decades ago rings today more true than ever:

"Nor should it be a surprise that *cognitive* has become an accepted word (a cant) and is increasingly used as a substitute for more exact and appropriate words. It is used superfluously, for example, saying "cognitive representation of spatial relations" instead of "representation of spatial relations." It is used vaguely, as in "cognitive counseling," "cognitive task," or "cognitive code." It is used sloppily, as in "cognitive-behavioral interactions" and "environmental cognition." It is used fashionably, for example, saying "cognitive effort" instead of "mental effort," or saying "cognitive deficit" instead of "amnesia" or "retardation."And it is used euphemistically, for example, saying "cognitive unsophisticates" instead of "the ignorant." Although such lax usage has greatly reduced the information value of *cognitive*, its extravagant use is a sign of the popularity of cognitivism, even if not of its success" (Bindra 1984:2-3).

So much for cognition. I shall return to this topic in the conclusion of this text.

3. Language

Language is a composite, threefold entity: (i) language-as-a-potential, (ii) language-as-operations, (iii) language-as-actualized (see Guillaume 1995: 282-285; Hirtle 2007:27-28). A simpler and shorter (though more opaque) statement is as follows:

(1)

(i) (ii) (iii)
Language ***(t)*** *= archilect —> languaging —> discourse*

where (i) *archilect* stands for language-as-a-potential, (ii) *languaging* stands for language-as-operations, (iii) *discourse* stands for language-as-actualized, and the vectors '—>' indicate the ordered sequence of transitions from one facet of language to another over a period of time ***t***. Consequently, we may rewrite (1) as follows:

(2)

(i) (ii) (iii)
Language ***(t)*** *= archilect —> languaging —> discourse*
| | |
language-as-a-potential language-as-operations language-as-actualized

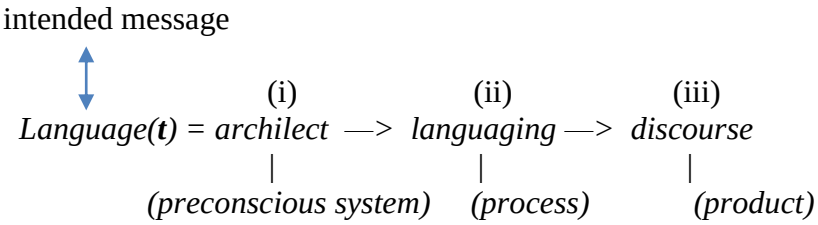
This introducing of a dynamic view of language will be shown repeatedly below. But before going on to that discussion, a brief comment on terminology will be useful.

Archilect (Port. *arquilecto*, Fr. *archilecte*) is a neologism of my own, from the Greek ἀρχή (arkhḗ), "origin, beginning, principle" + λέγω (légō), "I say, speak, converse." The advantage of this term is that it designates language-as-a-potential — lexical, grammatical and phonological (or phanological, in the gestural/sign languages of Deaf people) — as existing in its own right distinct from language-as-operations (the momentary deployment of that potential in a particular situation) and, of course, from language-as-actualized (short or long portions of discourse), and so obliges us to enlarge our concept of language beyond the common-usage, performative and resultative senses.

There is no appropriate term in common usage to designate this sense in the languages I am most familiar with: Portuguese, French, and English. For this reason, Gustave Guillaume himself was obliged to resort to the French word *langue*. But this is hardly satisfactory, if only because such a term evokes primarily the static view found in Saussure (1995:124, 149, 159, 167) and others who consider a system such as *langue* to be a set of synchronic oppositions, not the new view proposed by Guillaume (one which includes the explanation of that sort of synchronicity and much more), that is, a dynamic system of operative subsystems available at any moment to the speaker, the signer (in Deaf communities) or the writer. Walter Hirtle and John Hewson (Guillaume 1984:XX) suggested *tongue*, an extension of the sense of expressions like *the mother tongue* and *the tongues of men*. But they have also recognized that this leads to certain infelicities and that some English-speaking people have trouble accepting it in the intended, guillaumian sense. To use the term *language* itself, as it was done by Alan Gardiner (1951:88) and others, is misleading, because it is of no help in calling to mind the new view proposed by Guillaume (a centrepiece of the research program he initiated under the name of *psychosystematics/psychomecanics of language*), besides using the name of the whole for one of the components. Thus, a further advantage of *archilect*, the term adopted here, is that it allows us to avoid using twice the same word ("language") with two different senses at two different places in the diagrams (that is, using it to designate the sole member found in the left part of the equations (1) and (2), as well as the first member (i) found in their right part), as is usually the case in both ordinary and technical parlance.

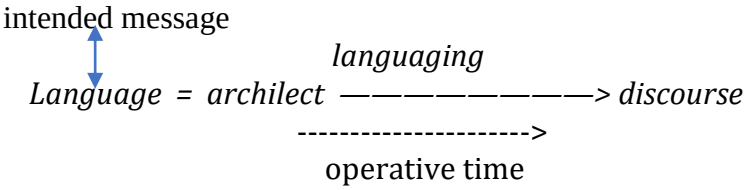
Let us go back to diagram (2). Note the following points. First, an individual *act of language* takes place whenever one uses (i) the archilect (a preconscious system of representation with peculiar emergent properties) to produce (ii) the discourse appropriate (iii) to whatever subject-matter one has in mind to talk about at that moment. Second, whenever one undertakes an act of language, (ii) languaging, language-as-operations, has its place between (i) archilect, language-as-a-potential, and (iii) discourse, language-as-actualized. Third, archilect (language-as-a-potential) enables people, while they are conscious (i.e., wakeful and alert, as opposed to being hypnotized, very drunk, in a stuporous narcotized state, asleep, fainted, anaesthetized, or comatose), to say whatever pleases them, and to communicate to one another, as the occasion arises, whatever might interest them. Fourth, what people want to say, their *intended messages*, may encompass entities and properties of all kinds: feelings (sensations, tactile perceptions, appetites, affections [agitations, emotions, moods]), motives, inclinations, perceptions other than tactile, concepts, substances, organisms, events, actions, activities, recollections, dreams, beliefs, conjectures, theories, plans, fantasies — you name it. Note also that the intended message is necessary for motivating and launching every act of language, but its content is outside language proper. Accordingly, we may rewrite (2) as follows:

(3)



or, more simply, as follows:

(4)



The French reader acquainted with the work of Gustave Guillaume should have no difficulty in substituting the terms *visée de discours*, (i) *langue* (or, equivalently, *langage puissanciel*); (ii) *effection* (that is, "langage en execution") ; (iii) *discours* (or, equivalently, *langage effectif*) for "intended message," "archilect," (/language-as-a-potential), "languaging" (/language-as-operations), and "discourse" (/language-as-actualized), respectively. "Operative time" is English for *temps opératif*, the time involved in languaging, whether via speaking, via gestural-signing (in Deaf communities), or via writing.

4. System types and language

What type of system, in an ontological sense, is language ? A short digression is in order.

The *cosmos* (or, if it is preferred, the universe or the world) is not a pile of stray things. There are no stray things. Each and every thing known to exist is either a system or an actual or potential component of a system. The cosmos is made up of interconnected complex things (systems) of several different kinds and levels of organisation. A thoughtful classing of systems is, however, too big a task to be undertaken in this article. For present purposes, I content myself with sketching a typology of systems detailed enough to answer the question raised above. Accordingly, I submit a typology of them as follows: **A)** physical systems (such as atomic nuclei, atoms, solids, liquids, gases, the weather); **B)** chemical systems (such as carbon compounds, electric batteries, flames, fermentation vats); **C)** biotic systems (such as cells, tissues, organs, organisms, biocenoses); **D)** institutional systems (such as human families, linguistic communities, business firms, labour unions, universities, nations). This typology of the main concrete systems is based upon the notions of 'matter,' 'life' (/'living matter'), 'institution' (/'institutional matter'), 'level of organisation' (/'integrative level') and 'emergence.'

Notice that the systems of higher levels are dependent upon the systems of lower ones (i.e., D level *vs* C, B, and A levels; C level *vs*. B, and A levels; B level *vs* A level), but they are not reducible to them in an ontological sense, even if the systems are shown to emerge from the interaction of their constituents. This is because each of these levels have emergent properties that the others lack.

For instance, chemical systems are made up of atoms or molecules just as physical systems are. But they belong to a level of organisation of their own, wherein chemical (or covalent) bonds change — for example, molecules of pure substances may be combined or converted to others by means of

emergent (supraphysical) processes, namely chemical reactions, as exemplified by combustion in fire, fermentation, oxidation, reduction, hydrolysis, electrolysis, and molecular synthesis (Bunge 2010: 80). Likewise, biotic systems are also capable of originating chemical reactions. However, they have in addition a number of inter-related emergent properties that abiotic systems (physical and chemical systems) lack. Here are a few of them: cellularity, metabolism, homeostasis, cell division, heredity, genic mutation, value, self-repair, sickness, death, survival, and bioevolution. Cellularity, for example, is the biotic counterpart of atomicity: it consists in the fact that the units of living matter are cells, which are biotic systems endowed with a semipermeable outer envelope or membrane. This amounts to saying that all organisms are either cellular or multicellular: there is no subcellular life (ibid.: 81). Virus are not living matter.

Institutional systems are partly composed of organisms, albeit organisms from one single kingdom of life (*Animalia*), and from one single animal species (*Homo sapiens*). However, institutional systems have no biotic properties. For one thing, they do not metabolize (except in a metaphorical sense). For another, they are hereditary (genetically speaking). But they have a number of inter-related emergent properties that biotic systems lack. Here are a few of them: language, work, politics, art, science, technology.

An institutional system is one some of whose components are *nöosystems*, and the other is people. A noösystem [3] is one that greatly enhances people's mental abilities in one or more aspects: cognitive, cogitative, affective, conative. Consequently, there are several varieties of noösystems: *technosystems* (such as laptops, smartphones, automobiles, bulldozers, aircrafts) and *sociotechnical systems* (such as naval convoys, cruise ships, the world wide web) which enhance especially the conative power of the human organism; *conceptual systems* (such as philosophical, mathematical and scientific theories) which enhance especially the intellectual (cogitative and cognitive) aspects; *artistic systems* (such as music, dancing, painting) which enhance especially the affective aspect, and *semiotic systems* (such as diagrams, musical scores, maps, paper money) which can be used to harness all other kinds of noösystems. No surprise, then, that noösystems turn out to be also the systems through which human beings institutionalize the suprabiotic bonds that hold human communities together. Without the noösystems that human beings have been creating and using from time immemorial, there would be no institutional systems, and without institutional systems there would be no human society as we know it, since the human society is the supersystem composed of all institutional systems existing on planet Earth. Without such systems, the human species would likely appear to an extraterrestrial scientist (if any) as just another, inconspicuous, social species of the animal kingdom.

5. Language as a unique semiotic system (I)

We are now ready to answer the question: what type of system, in an ontological sense, is language, in particular at its core, archilect ?

Clearly, it is neither a physical system (albeit possessing physically-based manifestations, such as sound waves and reflection of light), nor a biotic system (albeit possessing a biotic-based infrastructure, such as those neural, glial, muscular, and skeletal connections of the human body allowing deliberate planning, fine control and integration of laryngeal, orofacial, brachial, manual and respiratory movements used in vocal and gestural talk). It is rather a noösystem, and more specifically, a semiotic system, one whose use, moreover, is crucially involved in all institutional

[3] . *Noösystem* (pronounced no-osystem) is a neologism of my own, from *noüs* [νοῦς], ancient Greek for "mind," and *systēma* [σύστημα] for "system."

systems. This is because language is a semiotic system with emergent properties not found in any other noösystem. Let us see why is that.

In a remarkable paper (1989) and in its book sequel (2005), both of which have been too seldom noted, William L. Abler defined the "particulate principle of self-diversifying systems" (Abler 1989), according to which unlimited pattern diversity is generated by a system through combinations among a finite (typically small) set of particulate elements/constituents. In such systems the combining elements must be particulate (that is, discrete and non-blending) in the sense of not producing an average when combined, i.e., they must retain their individuality on combining (Figure 1.b). When that is the case, each such combination creates something new, something which is not present *per se* in any of the associated constituents, making infinite pattern variety possible (Figure 1.c). The self-diversifying systems must be based on particles, rather than on blending constituents, because blending constituents would form combinations whose properties lie between, rather than outside, the properties of the original constituents (Figure 1.a).

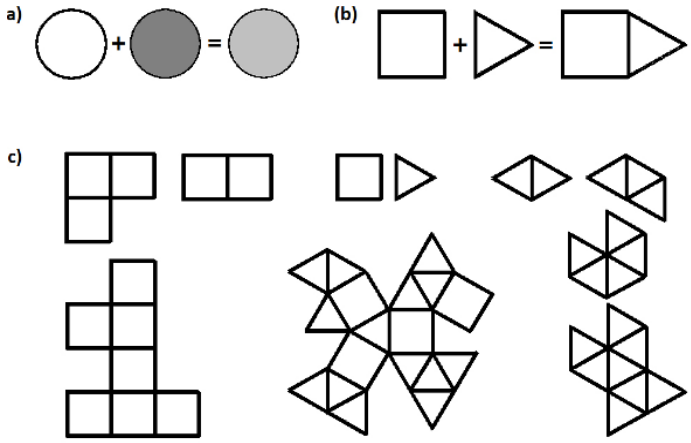


Fig. 1. "Cartoon illustration of the "particulate principle of self-diversifying systems," following Abler (1989). **(a)** A "blending system" in which combining ingredients average. Here exemplified by a drop of ink in water: the combining elements do not generate a qualitatively new entity. Other examples are most mixtures of liquids as well as gases, as in weather systems, and patterns of heat conduction. **(b)** A "particulate system," in which the combining elements generate a qualitatively new entity by retaining their individuality on combining. **(c)** A minuscule sample of the infinite generativity of a combinatorics of as few as one or two discrete non-averaging elements" (Merker 2015:196).

Thanks to Abler's sweeping insight, several spontaneously-occurring systems, which have been traditionally treated, scientifically, as totally unrelated, are now known (A) to be based on underlying particulate units. These systems include (1) chemical compounding, whose underlying particulate units are chemical elements; (2) genetic inheritance, whose underlying particulate units are genes; (3) language, whose underlying particulate units are cenemes (phonemes or phanemes) and grammatemes (lexemes and morphemes) [4]; (4) and music, whose underlying particulate units are musical notes (Merker 2002). The properties of these particle-based systems differ markedly from the properties of blending-based systems such as geosystems (e.g. volcanos, the weather), which can also make infinite use of finite media. But blending media show variability along one or a few simple dimensions (e.g., temperature, speed, humidity, direction of the wind in the weather

[4] . The terms *grammateme* and *ceneme*, as particulate units of archilect, are borrowed from Louis Hjelmslev. *Grammateme* (Fr. *grammatème*, Port. *gramatema*) stands here for the minimal significate (/unit of meaning) having its specific (explicit or implicit) expression in the sign[ifier] (see Hjelmslev 1983:53). *Ceneme* (Fr. *cénème*, Port. *cenema*) stands here for the minimal unit of the sign[ifier] with a distinctive character for the meaning (/significate) (ibid.:150-163).

system) and which, consequently, create little that is not present *per se* in the associated constituents.

Although, historically, the evidence supporting a particulate theory has been specific to each system separately, all four systems share the further common property of conforming to Wilhelm von Humboldt's (1971[1836]) characterization of language, i.e., (B) all systems "make infinite use of finite media" (1971: 70), (C) whose "synthesis creates something that is not present *per se* in any of the associated constituents" (1971: 67). Humboldt's phrase in (B) was made famous by Noam Chomsky (1991) under the term of "digital infinity", where the "digital" term stands for the discrete, non-blending aspect of particulate combinatorics. Humboldt's phrase in (C), far more important than (B), is an early mention of what we would now call *an emergent* or *emergent property/effect*, two terms introduced by George Henry Lewes (1875) in philosophical and scientific discourse. The two phrases appear a few pages apart in Humboldt's book, but he draws no obvious connection between them. This was done 153 years later by William Abler.

Abler refers to requirements (A), (B) and (C), collectively, as *Humboldt's criteria*. Likewise, systems which conform to Humboldt's criteria are called *Humboldt's systems.* All Humboldt's systems exhibit change by a process of variation and selection based on their particulate units; and, when particulate units form on the basis of intersecting dimensions, the properties of the particles conform to a periodic law (Abler 1989:4-7). When the particulate constituents of Humboldt's systems combine with one another, the constituents retain their original identities (Figures 1.b and 1.c), a property which Abler calls *retrievability*. The retrievability property of the constituents of Humboldt's systems is very important. It indicates that such systems are based on particles, because the individual identity of blending constituents would be obliterated by the process of combining and averaging. While a self-diversifying property indicates that a system is based on particles, it is the retrievability property that indicates the identity of such particles. The particulate constituents of human language (cenemes and grammatemes) are retrievable in the sense that, after forming combinations with one another (e.g., phonemes combined into syllables; grammatemes into words; words into phrases and sentences), the original constituents remain identifiable perceptually.

When Chomsky stated that "Language is, at its core, a system that is both digital and infinite. To my knowledge, there is no other biological system with these properties, apart from the number system, also a unique human possession it appears, and quite probably, derivative from the language faculty" (Chomsky 1991: 50), he was only displaying, as Bjorn Merker observed (2015), the limits of his knowledge at the time, because a total of four systems (or five, if the so-called natural numbers are enrolled independently of language) are in fact flourishing in and all around us. Two of these are natural ones, independent of humans (chemical compounding and genetic inheritance), while three are noösystems that lie at the institutional heart of human society and culture (language, music and natural numbers).

6. Language as a unique semiotic system (II)

In fact, the uniqueness of language lies elsewhere, as it was already noted above (see section 3). Let me remind it. Archilect (language-as-a-potential) enables us, human beings, to represent semiotically not only everything we may experience concretely (that is, feel in our flesh and bones, perceive through our proximal and distal senses, do with our limbs and other anatomic parts of our body, dream during our sleep, remember from our past days and years), but also everything we might want to think. Gustave Guillaume used to state this astonishing property as follows: archilect is an overall preconscious system of sayable representation englobing the entire range of what is thinkable and containing subsystems each of which covers one specific part of the thinkable (Guillaume 1984:104).

"The thinkable is the totality of potential thought, an integral of potentiality" (ibid.: 92). In practice archilect, which establishes the thinkable in systemic form, in a state of systematized sayable representation, must be able in advance to allow for the expression of any thought that a speaker (or a signer or a writer) might actually want to produce (ibid.) It is therefore necessary to explain, however briefly, how each of the morphosemantic subsystems of archilect covers one specific part of the thinkable, and what happens when one passes from the thinkable of sayable representation (archilect) to the thought of said expression (discourse).

The act of language in every vernacular known to exist consists largely in conveying from archilect to discourse the lexemes and morphemes required for the intended message to be expressed. For lexemes and morphemes to be thus conveyed they need a potential sign in archilect, that is, a phonemic representation (or a phanemic representation in the vernaculars of Deaf communities) linked to what they mean, to their significate, so that they become vocally (or gesturally) sayable. The general function of morphemes is, through diffusion, to subsume whole series of lexemes. The series thus covered vary in extent and the number of lexemes in each of the series may, if need be, be freely increased without meeting any conceptual limits. As a result, they can alternate in an open circuit. They do not constitute a closed system. Not so with morphemes. Morphemes are an integral part of closed systems. A closed system exists wherever forms alternate in a closed circuit. Before it can choose the appropriate morpheme, the sayer seeking discursive expression for an intended message must evoke the morphemes within its system, the closed system which lends the morpheme its meaning according to its position therein. This is a mental operation so rapid and deep-seated that the sayer is totally unaware of it. The system presents all its morphemes together in such a way as to allow a total, synoptic "view" of them at a single glance. From among these forms presented altogether within the system, the person, preparing to express something, chooses the one form that at the moment is judged to express most aptly what it intends to express, leaving the others aside (ibid.: 80, 105).

To clarify this important point, let us consider, for example, the forms of the verb conjugation in English. The morphemes of the verb constitute a closed system, and the speaker, instantly grasping the system as a whole, chooses from among the finite and small number of morphemes contained therein the one that best suits his/her intended message in discourse, that is, what (s)he intends to express. For instance, (s)he may choose from among the verb forms *cry*, *cri**es***, *cri**ed***, *cry**ing***. This is a closed system because the morphemes, being only four (*-ø*, *-[e]s*, *-ed*, *-ing*), alternate in a closed circuit. By contrast, the lexemes that signify the specific content of a verb can be substituted for one another without expressly closing the field of substitution: ***cry*/*mix*/*remember*/*talk*/*look***, etc.; ***cri**es*/***mix**es*/***remember**s*/***talk**s*/***look**s*, etc.; ***cri**ed*/ ***mix**ed*/***remember**ed*/***talk**ed*/***look**ed*, etc.; ***cry**ing*/***mix**ing*/***remember**ing*/***talk**ing*/***look**ing* , etc. Similar observations hold true for the compound forms of a verb, if we make room for the fact that the auxiliary verbs, too, form a closed system in that the distinction between lexemes and morphemes is blurred in them as a result of a process whose explanation would take us too far afield.

Archilect, the established part of language, is actually an overall, integrating system of sayable representation of the thinkable made up of several integrated systems linked to one another by relationships of systemic dependence and together forming a structured whole. These subsystems have a natural tendency to become individualized (as we have just seen in the case of the English verb) and to stand as wholes, integrated within the vaster overall whole, archilect. Consequently, it is not entirely exact to identify cenemes, lexemes and morphemes as the only particulate units of archilect. It is better to say that these minimal particulate units operate within the framework of vaster, integrating, particulate units: morphosemantic systems.

7. Conclusion

What I have just said about language systematization applies to all vernaculars used by people in different countries and regions of our planet. And this amounts to saying that every vernacular known to exist is, in its established part, archilect, a *totipotent* semiotic system. There is no other semiotic system that matches the formidable power of language, its efficacy of making expressible in discourse not only something perceivable but also something thinkable. Thanks to its *semiotic totipotency*, language can represent and express the content of all the major system types (physical, chemical, biotic, institutional) and the content of all the minor system types (technical, sociotechnical, conceptual, artistic), including that of the other semiotic systems.

This remark can perhaps throw light on Guillaume's comment that there are scientific questions that the human mind would never have raised if the unquestioned pre-science of sayable representation, archilect, have not already included the latent basis for them (Guillaume 1984:152).

I must add here, regarding cognition, that only humans can know things to be true or false. Non-human organisms can know things to be thus-and-so, but cannot know things to be true or false. For it is only sayables — such as propositions, statements, declarations, stories and rumours — that may be true or false. "Such bearers of truth and falsehood can be understood only by language-users, and only language-users can know whether they are true or false" (Hacker 2013: ch.4). Thus, we can see that both the historical emergence and the historical development of philosophy, mathematics and science have always depended on language. This gives linguistics a special importance, a sort of preeminence in a fully developed history of the conceptual systems (philosophy, mathematics, science). For linguistics is foremost the science of the pre-science of human lucidity, that pre-science which constitutes the established part of language (Guillaume 1984:138).

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