A NATURAL HISTORY OF LANGUAGE FOR THE 21ST CENTURY

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1. PREAMBLE

Writers of natural histories have the opportunity to explore in glorious detail the multifacetedness of living things. The very character of a natural history gives authors license to range far and wide, drawing diverse matters together under a common theme. The earliest natural history is a massive thirty-seven volume work entitled *Natural History* by the Roman writer Pliny the Elder which took as its subject, according to the author, "the nature of things—that is, life." No stone was left unturned from Pliny's omnivorous purview—geography and cosmology, minerals and precious stones, humans and animals, imaginary and fabled creatures all were duly accorded a place. His first century masterpiece was an attempt to make a record of all knowledge much in the way of a modern encyclopedia. A modern natural history typically focuses on one living thing such as a species of bird or a phenomenon such as a disease and cuts a narrative path through its evolutionary history, development, and life cycle, and details its adaptability, habitat, and role in the environment.

In addition to offering up a life story, natural histories are also reliable guides to the range of received knowledge within disciplines and, in this sense, natural histories can be seen as setting up boundaries, marking off that which is conventionally accepted and known from *terra incognita*. Although authors may disagree on the details, the issues that are treated are rarely cause for debate.

2. TRADITIONAL APPROACHES TO THE NATURAL HISTORY OF LANGUAGE

The first scientific natural history of language is Lenneberg's *Biological Foundations of Language* published in 1967. He wanted to document the biological embeddedness of language, to show the pervasive morphological, physiological, and neurological linkages that make human language possible and, therefore, how fundamentally different language is from the mainstream notion of language as being a mere quantitative extension of animal communication. Apart from firmly establishing the biological matrix of language,

Lenneberg's interest was to do away with the idea, then fashionable, that language was an accidental discovery of earlier humans who subsequently benefited from the powerful selectional advantages that it conferred on them. As a natural history, Lenneberg's book established the highest standard for the discipline of linguistics, covering, in great technical detail, topics such as the human respiratory system, the musculature and neurological correlates of speech production, and the evolution and genetics of language.

Over the past dozen years, as the study of language has taken a firmer hold on the public imagination, there have been quite a few natural histories of language published. The book to reach the widest audience is Steven's Pinker's *The Language Instinct* (1994). Much like Lenneberg before him, Pinker's book also addresses a wide range of questions that we might expect to find in a natural history: What is language? How is language acquired? How does it work? Where does language come from? How does it change? Other texts include Derek Bickerton's *Language and Species* (1990), Jean Aitchison's *The Seeds of Speech* (1996), Steven Fischer's *A History of Language* (1999), and John McWhorter's *The Power of Babel: The Natural History of Language*. The most recent, with a look back at Lenneberg's 1967 monograph, is Ray Jackendoff's *Foundations of Language: Brain, Meaning, Grammar, and Evolution* (2002).

What brings these books together is their authors' attempts to provide the reader with an all-encompassing view of language, treating it as central to the human experience, both as a biological imperative with an evolutionary past and a critical factor in human cognition and communication.

In consideration of a natural history of language, it would be useful to construct a framework through which we can evaluate the major themes addressed in the texts above and see clearly how the themes constituted at each level stand in relation to one another. We also have the opportunity to appreciate the range of issues typically undertaken in a modern natural history. I have provided such a framework in Figure 1.

The columns in Figure 1 concern the level at which the themes, in the rows, are treated. The framework can be seen as varying along the dimension of time, beginning, at the far left column, with language at the level of 'Evolution.' By time scale, I mean, in very rough terms, the range of time that the process of change engenders at a given level. The time scale for the level of 'Evolution' comprises from millions of years to hundreds of thousands of years in the past and includes evolutionary lines of hominids before the arrival of modern humans such as *Sahelanthropus tschadensis*, the Australopithecines, early *Homo* representatives, the Neanderthals, and the newly discovered *Homo floresiensis*. From the perspective of cladistics, this level could also be thought of as the 'Order' level.

Figure 1 A framework for a natural history of language.

LEVELS/ THEMES	EVOLUTION	SPECIES		
		SPEECH COMMUNITY	INDIVIDUAL	COMMUNICATION
TIME SCALE	-millions of years	-tens or hundreds of years	-a lifetime	-seconds, minutes, hours, days
LANGUAGE ENTITY	-evolving organs of speech and brain/mind -protolanguage	-a mother tongue -a dialect -pidgins and Creoles	-a language that 'grows' vs. a developing language -language competence vs. language skill	-a speech act -an adjacency pair -a conversation -a discourse
MECHANISM OF CHANGE	-natural selection vs. mutation vs. emergence	-historical events -language contact -language shift -creolization	-language acquisition device (LAD) vs. general cognition -language input as a trigger vs. language in the context of communication -critical period	-Grice's cooperative principle -politeness -context -background knowledge
INFORMATION UNIT	-genes	-words and phrases -idioms -sayings -memes	-principles and parameters (UG) vs. distributed neural net	-communicative goals and intentions

The 'Species' level is restricted to modern humans, *Homo sapiens*, and is itself divided into three levels: the 'Speech Community,' the 'Individual,' and the 'Communication' level. The level of 'Speech Community' concerns language as a historical and sociological phenomenon where the time scale is on the order of tens or hundreds of years. The 'Individual' level deals principally with language as a psychological phenomenon within the space of a human lifetime. The last level, 'Communication,' concerns language as a function of communication and considers its pragmatic and discourse analytic properties. Such things as speech acts and conversations can take place within the short space of seconds or minutes, hours or days.

Within each of these levels, several major themes in the natural history of language are considered: the language entity, the mechanism of change, and the information unit. The language entity is the manifestation of language found at a given level. Thus at the level of 'Evolution,' the entity would be the evolving organs of speech, their physiological and neurological correlates, and Protolanguage—a much reduced, grammarless, precursor of modern language postulated to have been available to *Homo erectus* and the Neanderthals (Bickerton, 1990). For the level of 'Individual' the mature language is represented as a

competence or an achieved skill. The mechanism of change refers to the operation or phenomenon that effects changes to the information unit. At the level of 'Evolution,' natural selection, a catastrophic mutation, or some non-Darwinian process such as emergence are candidates found in the literature, depending on your point of view. At the 'Individual' level, the mechanism of change would be the language acquisition device (LAD) or general operations of cognition, as factors internal to the language-acquiring individual, interacting with language input or language in the context of communication, as factors external to the individual. The information unit refers to the thing that the mechanism of change above it manipulates, influences, or alters. At the level of 'Evolution,' the units are constituted by the genes. For 'Individual' the information unit would be the principles and parameters of a universal grammar (UG) or a distributed neural net. Taking the level of the 'Speech Community' as another example, language is represented as a mother tongue or a dialect; the mechanism of change includes such historical events as migrations, the opening up of trade routes, or any situation that leads to language contact; the information unit would include words, idioms, sayings, and, more broadly, memes (Blackmore, 1999).

That there are alternative candidates in some of the table cells in Figure 1 (indicated by *vs.*) reflects the controversy underlying a theme at a given level—the updated Nature *vs.* Nurture approach to language studies. A universal grammar would be the preferred model by a nativist (such as Noam Chomsky, Steven Pinker, or Lyle Jenkins) as the information unit at the level of 'Individual,' but an interactionist (such as Jean Piaget, Jerome Bruner, or Elizabeth Bates) would instead claim the unit is best represented as a distributed neural net. In each case where there are alternative views, I have indicated the nativist position first.

As with any framework that attempts to reduce a highly complex and controversial set of ideas, there are disadvantages here: the framework is an oversimplification and it unwisely suggests clear boundaries between fields where the differences are more dimensional in nature. It may also be incomplete: the framework might include a level to describe how language is represented in the brain, but this, I believe, can be comfortably subsumed under the 'Individual' level. More favorably, the framework presents in very visual terms the relationships between the themes and the levels at which the themes are treated: from the level of language as an evolving human capability, to language as a social and historical phenomenon, a psychological phenomenon, and a function of communication. Additionally, the framework provides a map of sorts with which we can locate new developments in the study of language. One recent such development takes an ecological perspective on lan-

guage and, by so doing, comes up with very different characterizations from those we find in the framework above.

3. ECOLINGUISTICS: A NEW PERSPECTIVE ON LANGUAGE

Among other things, an examination of framework in Figure 1 reveals an interesting fact. No where is there an approach to language study linking language to the environment. This is an expectation that we have for a natural history of anything: that it would detail the thing's relationship with its environment. One might be excused for assuming such a consideration would be unnecessary because language, after all, is not a living thing in the strict sense. But what is wrong is the assumption itself and this points to a fundamental naivety. What has brought about a such a shift in the orientation to language?

In fact, linguists and others have written about the interrelationship between language and the environment ever since Edward Sapir's seminal paper *Language and Environment* was published in 1912, but these studies were more in the way of isolated instances that did not lead to a conceptual shift in the orientation to language. More recently, however, there has been renewed academic interest matched with a growing public awareness of indigenous peoples that converged in the late 1980s and early 1990s, a result of many social and political developments. The United Nations hosted the 1992 Conference on Environment and Development which focused particularly on environmental degradation and the circumstances of indigenous peoples. In the same year, Kenneth Hale (with others) and Michael Krauss published their landmark studies in the journal *Language* on endangered languages —and it is no coincidence that they reported that the languages of indigenous peoples faced the greatest risk of extinction in the coming century. The following year, 1993, was recognized as the United Nations International Year of the World's Indigenous Peoples. Also in 1993, Mark Plotkin, a Smithsonian ethnobotanist, published the best-selling *Tales of a Shaman's Apprentice*, an account detailing the northeast Amazon indigenous peoples' encyclopedic knowledge of plants and animals and their environment. These events and others have not only focused the public's attention on the past injustices by colonial powers, but more positively on political enfranchisement and the recognition of indigenous peoples' rights to their hard won ecological knowledge.

As interest in indigenous peoples grew, the focus for many turned to a consideration of their culture and language. Inquiry into the relationships between linguistic diversity, language extinction, and, latterly, biodiversity became the principal interest of many studies (see Nettle, 1999; Crystal, 2000; Nettle & Romaine, 2000; Maffi, 2001; Mufwene, 2001; Wurm & Heyward, 2001; Skutnabb-Kangas, et. al. 2003). Underlying these three

concerns are the relationships between language and the environment which particularly drew the attention of linguists David Harmon, Alwin Fill, Peter Muhlhausler, and Michael Halliday. The approach engendered through these investigations challenged fundamental assumptions of mainstream linguistics. By mainstream linguistics, I am here particularly referring to the nativist approaches which have made up the bulk of the professional literature in linguistics in the past forty years. Sociolinguistics (featured at the 'Speech Community' level in Figure 1) and pragmatics and discourse analysis (featured at the 'Communication' level) are philosophically closer to the ecolinguistic point of view because of their functionalist orientation, although the ecolinguistic perspective remains, as we will see, distinctive nonetheless.

Einar Haugen, credited with inspiring the revival of ecolinguistics, defined it as "the study of interactions between any given language and its environment" (Haugen, 2001:57: originally published in 1972). The central idea is that languages are constructed through the interactions of a people living in a particular environment. The language, over many hundreds of years, achieves a fit with the environment in much the same way that an animal or plant achieves a balance with its surroundings, eventually occupying a niche. Although languages are not living things in the same sense as plants and animals, languages nonetheless share certain properties with living things such as adaptability, variability, and a dynamism that make them an ecological phenomenon.

3.1 Natural and exotic languages

At its core, ecolinguistics make a very important distinction between natural languages and exotic languages. Natural languages are those which have developed over centuries in close association with a particular environment, whose grammar and lexis reflect an accommodation with their surroundings. Languages from this perspective are a kind of 'reading' of the environment (or a 'misreading' with its attendant consequences), a memory "in the same way that a phenomenon such as a glacier is a memory of a past climate" (Mühlhäusler, 2003:47). The few thousand (but fast disappearing) indigenous languages spoken around the world are the last surviving natural languages.

Exotic languages such as English, Mandarin Chinese, German, and Japanese are those which have had a history of human intervention largely through the agencies of written technologies and institutions that promote political centralization such as educational bureaucracies. Throughout the periods of 'discovery' and colonial expansion during the past five hundred years, exotic languages have been transplanted, to regions throughout the world, to environments they are ill suited to deal with from an ecological perspective. Such

languages are exotic in the sense that they have been introduced and are alien with respect to the local ecologies. A similar characterization was once made by Benjamin Whorf who wrote in defense of the value of studying American Indian languages: "To exclude the evidence which their languages offer as to what the human mind can do is like expecting botanists to study nothing but food plants and hothouse roses and then tell us what the plant world is like!" (1956:215).

3.2 Languages as autonomous, idealized systems

Thus foremost among the mainstream assumptions that ecolinguistics challenges is the idea that languages are independent systems with clear boundaries between a language and the outside world. Mainstream linguistics, particularly the views promoted by nativist positions, treats language as a purely psychological construct with no connection to the world outside. The focus is entirely on the structural features with little regard for the functional or meaning creation aspects of language. Meaning has always taken a back seat as can be seen through the lens of the nativist research paradigm which uses as its data set sentence fragments removed from any communicative context.

In the ecolinguist's view, languages in the natural state are constructed with contributions from the environment *and* the people who use it. Far from being a self-contained system, languages are an accommodation achieved after years of close association with a particular environment. As Tindale concluded in his 1974 study of the aboriginal tribes of Australia, "Coincidences of tribal boundaries to local ecology are not uncommon and imply that a given group of people may achieve stability by becoming the most efficient users of a given area and understanding its potentialities" (p. 133). The language is in every way implicated in the knowledge about and adaptation to the environment. Mainstream linguistics takes the view that the world is mapped directly onto languages; ecolinguistics takes the two-way view that the world constructs languages and is, at the same time, constructed by it. Not an autonomous, self-contained system, on this view a grammar of a language is a "theory of experience" (Halliday, 2001:195).

Related to the notion of language autonomy above, traditional linguistics also focuses on an idealized linguistic competence where the language is seen a static system of rules for generating an infinite set of grammatically possible sentences. On this view, language is a passive storehouse of rules, words, and phrases, instead of being actively involved in the construction of meaning. In contrast, ecolinguists focus on the dynamic and adaptive properties of language. "Language…does not describe reality," Mühlhäusler says, "but creates, shapes and perpetuates group-specific perceptions of reality" (2003:60).

3.3 Linguistic diversity and biological diversity

An ecological approach is also interested in linguistic diversity. Diversity is a measure of variation which is a chief factor in evolutionary processes. Why do we humans not all speak one language? How does linguistic diversity come about and in what ways is this diversity threatened? Facts such as the top ten most widely spoken languages (as a mother tongue) around the world are spoken by nearly 50% of the world population, and 90% of the world's languages are spoken by only 10% of the world's population are largely the products of ecolinguistic thinking. A measure of just how fragile a state the world's languages are in, and how threatened is linguistic diversity on a global scale, is another fact, that around 3400 of the world's languages have fewer than 10,000 speakers comprising some 8 million people, in other words, 0.13% of the world population (Skutnabb-Kangas et. al, 2003). Studies have estimated that 10,000 speakers comprise the lower limit in terms of numbers of speakers needed for a language to survive in the modern world (Nettle & Romaine, 2000). Such studies of linguistic diversity are commonplace considerations of language from an ecological perspective, but have little value in traditional approaches to language.

The languages spoken by individuals, known as idiolects, and linguistic diversity are both integral to the ecological perspective as they are the engines that make languages viable as ecological entities—they are the grist driving the ecological mill. The strong correlation between linguistic and cultural diversity, on the one hand, and biodiversity on the other, was first noted by early studies in ecolinguistics (e.g., Harmon, 1996) and has since generated a large amount of interest. Recent studies (see the collection in Maffi, 2001) show links between the degree of biological diversity of an area and the size of the communication communities that inhabit it. For example, Nettle's 1999 study found that the seventeen Old World countries where ecological diversity is highest (two great equatorial belts including Ghana, The Ivory Coast, Togo, Benin, Nigeria, Cameroon, Zaire, Tanzania, in Africa; and India, Vietnam, Laos, Philippines, Malaysia, Indonesia, Papua New Guinea, Vanuatu, and the Solomon Islands in the Asia-Pacific) are regions where there is also high diversity of languages. These regions contain 27% of the world's population and occupy a mere 9% of the world's land, yet they are home to around 4000 of the world's languages-some 60% of the world's total of around 6500 languages (Nettle, 1999:61-63).

Crucially, these same studies have suggested links between the decline of biodiversity and linguistic diversity. The implications are that indigenous languages, so many of which

are facing extinction, represent vital repositories of knowledge about the environment and how to take care of it. The people who speak these languages know how to talk about their surroundings in a way that no other peoples do. Linguistic diversity thus represents a vast resource of environmental knowledge that is rapidly falling from our grasp. As communication communities disappear, we lose with them the ability to talk about and care for these ecologies and they, in turn, deteriorate.

3.4 The equivalence of languages

Ecolinguistics further challenges the traditionally held notion that all languages are equally expressive. The very fact that a language is the product of centuries of accommodation with a local ecology implies that it is unique with respect to its expressive power in terms of representing the environment. Taking Whorf's analogy above a step further, claiming that languages are all equal in this sense is akin to claiming that all flowers, as flowers, are able to take root and thrive in any given environment. But take a Glacier Lilly from the Rocky Mountains of North America and plant it in a Congolese rain forest and chances are it will wither and die. Although a flower, like thousands of other flowers in the Congo, the Glacier Lilly is not equipped with an appropriate 'memory' of the Congolese ecology to thrive in a rain forest environment. On the same analogy, each language incorporates a singular view of reality as an outcome of its dynamic and interactive association with a particular environment.

When we think of the differences between languages as embodiments of culture we are tempted to limit our scope to differences in vocabulary (as in, Inuit has more single nouns referring to types of snow and ice than English) or, from a structural perspective, to differences in the word order of major sentence constituents (as in, English is a Subject-Verb-Object language, but Japanese is a Subject-Object-Verb language) and leave it at that. But as Halliday argues in a 1990 (reprinted in 2001) paper, the grammars of languages also embody constraints on how a people organize the world which in turn shapes their attitudes towards the world they inhabit. For example, English grammar, like the grammar of most European languages, makes the categorical distinction between two types of nouns: countable and mass. Countable nouns refer to entities that come in units whereas mass nouns refer to entities that are uncountable, suggesting that they are 'unbounded' and exist without limit. For mass nouns, Halliday gives as examples, *air*, *soil*, *water*, and *coal*. "We know such resources are finite," writes Halliday, "(b)ut the grammar presents them as if the only source of restriction was the way that we ourselves quantify them: a *barrel of oil*, a *seam of coal*, a *reservoir of water* and so on—as if they in themselves were inexhaustible"

(2001:194). Another constraining feature of many languages such as English is that they do not readily admit the use of non-human agents as in, "*What's the forest doing?*" (Halliday, 2001:194). Such constraints as these and many others construct our world and thus lead, according to Halliday, to sexist and growthist ideologies. The view presented in these discussions suggests not only that languages are not equivalent in their expressive power, but also that the corollary assumption, that languages are intertranslateable, is, in the strict sense, untenable as well.

3.5 One language, one people

Mainstream approaches to language have also been biased towards the mistaken notion, largely a Western construct, that we are a world of countries with peoples who speak a mother tongue in each country: Dutch is spoken in The Netherlands, French, in France, German, in Germany, each language bounded neatly by political borders. The world is, in fact, resoundingly multilingual. In this regard, the following quote, taken from a language survey conducted in Papua New Guinea, likely describes the circumstances of languages in contact when diversity was at its peak some 7000 years ago. At the time, an estimated 10,000 to 15,000 languages were spoken around the world (Nettle & Romaine, 2000).

> In a survey of 359 adult speakers in 1974, it was found that [in addition to speaking Hua] 305 were fluent in Gimi, 287 in Siane, and 103 in Chimbu. A smaller number of people spoke at least half a dozen other languages. Only two respondents claimed to be totally monolingual, and only eleven knew only one other language besides Hua. All the others spoke at least two, and many were fluent and at ease in four or five. (Haiman, 1987:36)

Instead of mother tongues, dialects, and idealized competences, ecolinguistics is more concerned with "communication communities" and the "speech repertoire" (Muhlhausler, 2001) of individuals within those communities.

To summarize, ecolinguistics is concerned principally with the interrelationships between language and the environment and the way a people can talk about the environment. The distinction between natural and exotic languages is a core notion to understanding the ecolinguistic perspective. Languages are not independent, border-bound, static systems of rules, but dynamic, interactive, and meaning-creating phenomena. Ecolinguistic thinking leads to questions about linguistic diversity and its relationship to local ecologies, questions that are of little value to traditional approaches to language study. From an

ecolinguistic perspective, it makes little sense to speak of an individual's mother tongue, but rather, more realistically, their speech repertoires. Idiolects, speech repertoires, and communication communities are all factors, distinct in their scale, involved in the dynamic adaptation to local ecologies.

4. A REVISED NATURAL HISTORY OF LANGUAGE

Because of its radical departure from mainstream linguistics and because it opens up a whole new dimension in the study of the natural history of language, we will introduce a new level to our natural history of language as in Figure 2. This new level, 'Communication Community,' we will locate between the 'Evolution' and 'Speech Community' given that the time scale, in hundreds or thousands of years, is intermediate between the two.

Figure 2 A revised framework for a natural history of language.

LEVELS/ THEMES	EVOLUTION	SPECIES			
		COMMUNICATION COMMUNITY	SPEECH COMMUNITY	INDIVIDUAL	COMMUNICATION
TIME SCALE	- millions of years	-hundreds or thousands of years	-tens or hundreds of years	-a lifetime	-seconds, minutes, hours, days
LANGUAGE ENTITY	-evolving organs of speech and brain/mind -protolanguage	-idiolect, speech repertoire, and linguistic diversity (-local ecologies)	-a mother tongue -a dialect -pidgins and Creoles	-a language that 'grows' *vs.* a developing language -language competence *vs.* language skill	-a speech act -an adjacency pair -a conversation -a discourse
MECHANISM OF CHANGE	-natural selection *vs.* mutation *vs.* emergence	-interaction between language and environment -dynamic and adaptive properties of language (and the environment)	-historical events -language contact -language shift -creolization	-language acquisition device (LAD) *vs.* general cognition -language input as a trigger *vs.* language in the context of communication -critical period	-Grice's cooperative principle -politeness -context -background knowledge
INFORMATION UNIT	-genes	-environmental contingencies and local ecologies (-idiolect, speech repertoire, and linguistic diversity)	-words and phrases -idioms -sayings -memes	-principles and parameters (UG) *vs.* distributed neural net	-communicative goals and intentions

At the level of 'Communication Community,' language is represented as the idiolect, the speech repertoire of individuals, and, more broadly, linguistic diversity, each concept essentially being a 'reading' of their environment at a different scale. The dynamic and adaptive properties of language constitute the mechanism for change. The information unit would be the local ecologies and environmental contingencies that shape the language. To

capture the interactive character of the ecolinguistic approach, I have provided in brackets the other half of the process in which the idiolects and speech repertoires (the information units) produce changes to the local ecologies (the entity) made possible through the dynamic and adaptive properties of the environment (mechanism of change).

This new level contributes to the picture of a natural history by introducing an entirely new perspective on language: it proposes a significant conceptual shift in how we think of language, its functions, and its relationship to people and the environment. Above all, the ecolinguistic perspective shows us how language, in its natural state, is integrated with the environment, playing an intermediary role, a filter of sorts, between reality and human activity and demonstrates that the human adventure is bound inexorably to the destiny of the planet. In its new formulation, the framework, by presenting language as an evolutionary, social, psychological, communicative, *and* an ecological phenomenon, fulfills its mission as a natural history.

As Mühlhäusler and others have noted, ecolinguistics has important implications for many fields including sociolinguistics, applied linguistics, environmental studies, and language planning. Ecolinguistics deserves a place in any contemporary natural history of language. Indeed, with the extinction rate for languages around the world estimated to be as high as 90% within this century, incorporating an ecolinguistic perspective into mainstream language studies would seem to be most wise.

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