A Potpourri of Chomskyan Science

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1. Introduction

This paper is an extension of a review of *Noam Chomsky: The Science of Language – Interviews with James McGilvray,* (to appear in *Philosophy in Review,* http://journals.uvic.ca/index.php/pir), providing additional textual evidence supporting my conclusion that *Noam Chomsky: The Science of Language – Interviews with James McGilvray* is not a book that illustrates *why* Noam Chomsky is considered to be a "founding genius of modern linguistics" (Stainton). I provide (i) elaborations of some of the points I made, (ii) additional passages from the text showing that the examples originally selected are representative of the quality of the volume, and (iii) a brief discussion of Chomsky's intellectual contributions. Given that Chomsky advocates "consciousness raising" (p. 119), he would recognize the Chomskyan spirit of the critique offered. People have to become aware of what is problematic in academic writing, especially when "there's been regression … and the regression has to do with quite clear and definite institutional structures, and, often, conscious propaganda" (p. 120). What is wrong in society at large surely is also wrong in linguistic work.

2. The Review

Noam Chomsky: The Science of Language – Interviews with James McGilvray

This volume is endorsed as "truly exceptional in affording an accessible and readable introduction to Chomsky's broad based and cutting edge theorizing" (Stainton, back cover). Chomsky made undeniably important contributions to modern linguistics but his Minimalist Program (Chomsky, 1995) and subsequent developments have been severely

criticized (e.g., Pullum, 1996; Johnson & Lappin, 1997; Culicover, 1999; Lappin et al., 2000; Postal, 2004; Seuren, 2004; Culicover & Jackendoff 2005; Jackendoff 2011). Hence a cutting edge account addressing these criticisms would be indeed desirable. The volume promises to cover a wide range of topics relevant to a 21st century science of language. Twenty-five interviews are grouped in two sections. Part I introduces the reader to Chomsky's thought on the design and function of human language, language evolution, representationalism, the nature of human concepts, optimality and perfection of Universal Grammar, and Chomsky's intellectual contributions. Part II includes discussions of human nature, evolutionary psychology, morality, epistemology and biological limits on human understanding. In addition McGilvray provides twelve appendices, chapter-by-chapter commentaries and a glossary.

In spite of the impressive table of contents, hope for finding cutting-edge insights and meaningful engagement with long standing criticism fades quickly. Most arguments for domain-specific innate biological endowment, saltational language evolution, semantic internalism, and computational optimality have been proposed for decades and are unsupported by evidence and/or citation of sources. Further, it will be difficult, especially for the lay reader, to follow the presentation because terms are not clearly defined, the conversation meanders through countless obscure, irrelevant digressions, and far-reaching conclusions are often drawn from meager premises.

For example, Chomsky argues that the function of human language cannot be communication because: "...probably 99.9% of its [=language] use is internal to the mind. You can't go a minute without talking to yourself. It takes an incredible act of will not to talk to yourself" (Chomsky, p. 11). No evidence supports the claim that 99.9% of

language-use is internal. It seems to be based on Chomsky's intuition. Further, showing that language is currently used mainly for internal thought does not rule out its having originally evolved for communication. Selection acts only on aspects of traits that make a difference to the trait carrier's inclusive fitness, irrespective of what other aspects these traits may have and exaptations occur (Gould & Vrba, 1982).

The Argument from Norman Conquest, defending Chomsky's dismissal of the significance of empirical data for linguistic theorizing, is equally unconvincing:

> Take the Norman Conquest. The Norman Conquest had a huge effect on what became English. But it clearly had nothing to do with the evolution of language - which was finished long before the Norman Conquest. So if you want to study distinctive properties of language - what really makes it different from the digestive system ... you're going to abstract away from the Norman Conquest. But that means abstracting away from the whole mass of data that interests the linguist who wants to work on a particular language. There is no contradiction in this; it's just a sane approach to trying to answer certain kinds of far-reaching questions about that nature of language. (Chomsky, p. 84)

If taken seriously this argument requires that, when studying L_1 one should abstract away from *the whole mass of data* of interest to the linguist about L_1. The same logic holds for L_2....L_n. So one would have to abstract away from everything of linguistic interest about all languages to uncover the nature of language and explain how it differs from digestion. Idealization and abstraction are of course part of the scientific method but given how little is currently known about the core properties of language such wholesale abstraction is hardly responsible. Even on a more charitable reading, the Argument from Norman Conquest is incompatible with Chomsky's view that "the linguist is *always* involved in the study of *both* universal and particular grammar ... his formulation of principles of universal grammar must be justified by the study of their consequences when applied in

particular grammars" (Chomsky, 1968, p. 24, emphasis added). It is astounding that the Argument from Norman Conquest, representative for the quality of many arguments, is seriously offered in support of Chomsky's position.

While *The Science of Language* cannot be recommended for the positive arguments it contains, even worse are numerous attacks on opponents, who are often not even named. None of the criticisms are supported by solid evidence. Instead one finds countless misattributions and distortions:

> … a very good English philosopher wrote a paper about [Everett's work on Piraha]. It's embarrassingly bad. He argues that this shows that it undermines Universal Grammar because it shows that language isn't based on recursion. Well if Everett were right, it would show that Piraha doesn't use the resources that Universal Grammar makes available" (Chomsky, p. 30).

The very good English philosopher expressed surprise that his 800-word book review for *The Independent* had been promoted to the status of an academic paper, albeit an 'embarrassingly bad' one (Papineau, p.c.). The review he sent me did not contain anything substantiating Chomsky's charge.

Another unnamed opponent is criticized as follows:

> Some of the stuff coming out in the literature is just mind-boggling...The last issue [of Mind and Language] has an article - I never thought I would see this - you know this crazy theory of Michael Dummett's that people don't know their language? This guy is defending it. (Chomsky, p. 57)

'This guy" was astounded that Chomsky "overlooked" that his paper (Lassiter, 2008) "was attacking Dummett's position as untenable, using arguments inspired from Chomsky (1986)" (Lassiter, p.c.). Lassiter's paper proposes a position different from Chomsky's on the internalism/externalism debate but nowhere does he defend Dummett.

Distortion is also the hallmark of Chomsky's arguments against evolutionary accounts of language development:

> There are a lot of [theories of language evolution] but *there's no justification for any of them*. So for example, a common theory is that somehow, some mutation made it possible to construct two-word sentences; and that gave a memory advantage because then you could eliminate this big number of lexical items from memory. So that had selectional advantages. And then something came along and we had three word sentences and then a series of mutations led to five...finally you get Merge, because it goes to infinity. (Chomsky, p. 15, emphasis added)

One example hardly supports the claim that there is no justification for any existing theory of language evolution. The 'common theory' is astoundingly bad but appears to be Chomsky's invention. None of the sixteen researchers I contacted had embraced such a theory, which one of them described as "truly nonsense" (Newmeyer, p.c.), and few could imagine anyone would. The consensus was: "This is a theoretical strawman if I ever saw one" (Christiansen, p.c.). Nevertheless, many similarly unsupported attacks on the language evolution community appear throughout: "We know almost nothing about the evolution of language, which is why people fill libraries with speculations about it" (p. 51) and "If you look at the literature on the evolution of language, it's *all* about how language could have evolved from gesture, or from throwing or something like chewing, or whatever. *None of which makes any sense*" (p. 49, emphasis added). Chomsky never provides evidence or detailed analysis supporting his dogmatic dismissals.

McGilvray's appendices aim to provide additional details in support of Chomsky's position. But his arguments suffer from the same lack of engagement with criticism and at times he outdoes Chomsky in distorting others' views:

> Consider, for example, Patricia Churchland's (1986, 2002) view that one must look directly at the brain to construct a theory of mind. The internalist approach to linguistic meanings cannot currently look at neurons, axons, and neural firing rates. That is because unless one has a theory in hand of what neural systems 'do' - of the computations they carry out - looking directly at neurons is as sensible as groping in the dark... Moreover, there is no guarantee at all that the current understandings of neural systems and how they operate are on the right track. (McGilvray, p. 212)

The reply from the author, perplexed by this caricature of her view, was "To say of me what McGilvray says is like saying that Darwinian evolution implies that my grandfather is a monkey" (Churchland, p.c.). Churchland explicitly argues in the works cited and elsewhere that that neuroscience needs psychology to provide a description of capacities and behaviors, that neurological and psychological theories need to co-evolve, and that no neuroscientist pursues a purely bottom-up strategy. It is mysterious how McGilvray could miss these arguments.

Finally there is a confident dismissal of work by connectionists, based on a letter by Chomsky to McGilvray (already quoted in McGilvray, 2009, p. 23):

> … take Elman's paper[s]… on learning nested dependencies. Two problems: (1) the method works just as well on crossing dependencies, so doesn't bear on why language near universally has nested but not crossing dependencies. (2) His program works up to depth two, but fails totally on depth three. (Chomsky cited by McGilvray, p. 226)

This example is particularly troubling because in an earlier review it was brought to McGilvray's attention that Chomsky's interpretation of Elman's work is incorrect (Behme, 2009) and, as his footnote 6 indicates, McGilvray is aware of the sources

provided there. Yet, he repeats the fallacious argument and draws a similarly grandiose conclusion:

> Details aside, the point is clear. Those convinced that language is a learned form of behaviour and that its rules can be thought of as learned social practices, conventions, induced habits...are out of touch with the facts… Enough then of externalist or "representationalist" and clearly non-naturalistic efforts to deal with language and its meaning (McGilvray, p. 226)

Enough indeed. There are many good publications on the market that deal with the topics discussed here. *The Science of Language* is not one of them and one can only hope in future publications both authors follow the advice Chomsky gives to others:

> So sure study [language] to the extend you can, but sensibly - knowing when you're talking and producing serious science and when you're gesturing rhetorically to a general public who you are misleading. Those are important distinctions and I think if we make those distinctions, a lot of this literature pretty much disappears. (Chomsky, p. 105)

3. Supplemental Information

One could expand on all the points made above. I restrict myself to two that are of particular importance: (i) Chomsky's "contributions" to debates on language evolution, and (ii) Chomsky's distortion of the work of others. I selected these topics because Chomsky's views about language evolution reveal the full extent of the double standards evident throughout. He ridicules the work of an entire field, without ever citing the views he considers problematic. His own view is put forward authoritatively as the only rational option, no evidence supporting it is cited, and none of his speculations are based on work

he has completed himself. The tendency to distort and denigrate the work of others is not confined to language evolution and warrants additional attention as I document directly.

3.1. Speculations about Language Evolution

For decades Chomsky has been claiming that communication is not an important function of language. This highly controversial proposal plays a crucial role supporting the equally controversial suggestion that language evolution occurred basically overnight when one mutation 'slightly rewired the brain' and 'installed Merge'. Given its central importance, one would expect the proposal to be well defended. But it turns out to be a typical 'just so story' (JSS).

> Now let's take language. What is its characteristic use? Well, probably 99.9 percent of its use is internal to the mind. You can't go a minute without talking to yourself. It takes an incredible act of will not to talk to yourself. We don't often talk to ourselves in sentences. There's obviously language going on in our heads, but in patches, in parallel, in fragmentary pieces, and so on. So if you look at language in the way biologists look at other organs of the body and their subsystems - so you take into account all its functions in talking to yourself - what do you get? What are you doing when you talk to yourself? Most of the time you're torturing yourself [laughter]. So you might think you're being conned, or asking why does this person treat me that way? Or whatever. So you could say that the function of language is to torture yourself. Now, obviously, that's not serious. (Chomsky, pp. 11/2)

Chomsky provides no evidence supporting these claims and at least some readers may have a different experience concerning their use of language. Worse, there is not even an

attempt to specify a function of language 'in the way biologists do when they look at other organs of the body'. Instead, Chomsky admits his only identifiable proposal was not serious. McGilvray fails to ask for a *serious* proposal and allows Chomsky to continue his musings: "It's perfectly true that language is used for communication. But *everything you do is used for communication* - your hairstyle, your mannerisms, your walk, and so on and so forth. So sure, language is also used for communication" (Chomsky, p. 12). Again, there is no research is cited supporting this assertion. It seems to be based on personal experience. Presumably Chomsky never walks alone, never grimaces at his mirror image, and cannot imagine a person styling her hair for her own enjoyment. Presumably he is also unaware of fellow humans who do not do *everything* for communication. His speculations continue:

> In fact, a very tiny part of language is externalized - what comes out of your mouth, or from your hands if you're using sign. But even that part is often not used for communication in any independently meaningful sense of the term "communication" … the overwhelming mass of language is internal; what's external is a tiny fraction of that [and what's used in communication in some serious sense is a smaller fraction still]. As functions are usually informally defined, then, it doesn't make much sense to say that the function of language is communication. (Chomsky, 2012, p. 12)

Overall, by stressing non-linguistic means of communication and diminishing the role of language in communication, Chomsky appears perilously close to claiming that virtually everything we do, *except language*, is used for communication.

Finally Chomsky asserts: "*Every* animal down to ants has a communication system" (p. 12, emphasis added). No citation supports this astounding claim. Undoubtedly, many animals do have communication systems. But Chomsky's claim requires that there are no

animals without communication systems. What and to whom would an endoparasite like *Taenia saginata* communicate, one wonders. Why would solitary sessile creatures like *Corella willmeriana* have a need to communicate? It is of course possible to conceive of a definition of "communication" that entails that these species communicate. But, if we invoke Chomsky's own standards: "if by "communication" you mean any form of interaction, ok, [there is] communication. However, if you want the notion of communication to *mean* something, let's say conveying information" (p. 12), then it is dubious that these or many other animals communicate with conspecifics. This example is a representative illustration of Chomsky's tendency, to try to have things both ways, or *all* ways.

Turning to language evolution, two tendencies emerge. First, Chomsky expresses contempt for and repeatedly ridicules the work of others. Second, his own accounts reveal an astounding lack of elementary-level understanding of biology, psychology, and evolutionary theory. Moreover, they violate the basic principles of scientific argumentation. Documentation of both these failures follows.

For example, as discussed in the review reproduced above, Chomsky nowhere critiques actual work on language evolution. Instead, he has invented an allegedly common account that is so bad that several scientists I consulted indicated anyone suggesting anything like it seriously 'must be losing his mind'. The comments ranged from "a caricature" (Corballis, MacWhinney), "willful ignorance" (Lieberman), "very annoying" (Jackendoff), "vaguely incoherent" (Studdert-Kennedy), "ridiculous" (Bickerton) to terms not suitable for citation.

Furthermore, Chomsky alleges that current evolutionary theorizing is too narrowly focused on natural selection: "… a pure form of selectionism that no serious biologist could pay attention to, but which is [a form of] popular biology - …It's like a sixth grade version of the theory of evolution. It can't possibly be right" (p. 67). Chomsky links this view to Skinner and Quine but gives no example of even a single evolutionary biologist who actually *holds* this view. Presumably he considers this to be unimportant because he argues that natural selection could not have played a role in language evolution:

> But what's advantageous about having a concept RIVER that has the features we seem to be sensitive to that could have no discernible bearing on survival or selection? We can make up thought experiments about RIVER which you couldn't even imagine if you're a New Guinea native. Imagine a small phase change that turns the Charles River into a hard substance, which is apparently possible. And then you paint a line on it, and you start driving trucks on both sides of the line, so it becomes a highway and not a river. You can't explain that to a New Guinea native; none of the other notions you need to entertain the thought of a river undergoing a phase change and becoming a highway are around; so how could selection have played a role in leading us to acquire the features RIVER has that come into play when we engage in thought experiments like these, ones that lead us to declare that a river has become a highway? In fact, the native has the same concept; if he or she grows up here or there, he or she's going to have the concept RIVER. So he or she's got it. But how could it possibly be selected? What function does it have in human life, for that matter? And… that's true of every elementary concept… (Chomsky, 2012, p. 47)

Chomsky provides no evidence establishing that every New Guinean native has exactly the same concept RIVER as he does and it is unclear what this argument establishes. On a charitable reading one may grant that the concepts we currently have may not have provided a selectional advantage for our distant ancestors. Whether or not they had the same concepts as we is a matter of speculation. Chomsky provides no evidence that they

did and it is difficult to imagine what such evidence could possibly consist of. Assuming for arguments sake that they did have the same concepts, it would appear that the argument mainly threatens Chomsky's controversial innatism/internalism. If having the concepts we do has no selectional advantage and if the concepts are also not reliably related to external objects, then one has to ask *why* are these concepts and not different ones encoded in our genome? Why are they invariant for all humans and do not differ like, say, eye-colour or body-height (which are also both: genetically determined and not linked to survival)? These questions seem not to arise for Chomsky and he assumes his argument has established natural selection is irrelevant for language evolution. This leads him to ridicule the proposals of others:

> …the overwhelming assumption is that language evolved slowly through natural selection. Yet that doesn't seem at all consistent with even the most basic facts. If you look at the literature on the evolution of language, it's all about how language could have evolved from gesture, or from throwing, or something like chewing, or whatever. None of which makes any sense. (Chomsky, 2012, p. 49)

Chomsky does not tell the reader who overwhelmingly assumes prolonged gradual linguistic evolution, or what 'the most basic facts' are and he provides no reference to specific accounts that don't make any sense. The continuation of his attacks - "We know almost nothing about the evolution of language, which is why people fill libraries with speculation about it" (p. 51) - is not supported by any evidence such as examples of problematic speculations. The same holds true for: "You can't just tell stories about something; you have to show that those stories have some substance. That's why so much talk about evolution is basically uninteresting; it's just stories" (p. 128). Since Chomsky

does not even provide a name of anyone who propagates ‘just stories’, it is impossible to evaluate whether his criticism is justified. The attacks continue:

> Take the evolution of language. It’s a question; and so is the evolution of bee communication a question. But just compare sometime the literature on one with the literature on the other. There are libraries of material on the evolution of human language and some scattered technical papers on the evolution of bee communication, which mostly point out that it’s too hard to study, although it’s vastly easier to study than evolution of human language. *This is just irrational* … So sure, study it [language evolution, CB] to the extend you can, but sensibly - knowing when you’re talking and producing serious science and when you’re gesturing rhetorically to a general public who you're misleading. Those are important distinctions, and I think if we make those distinctions, a lot of this literature pretty much disappears. (Chomsky, 2012, p. 105, emphasis added)

It is curious why Chomsky would think the fact that more people study language evolution than the evolution of bee communication is an indicator of irrationality. If he is right, and the study of the former is vastly more difficult, then it would seem sensible to spend more resources on that task. Obviously serious scientific work should be free of rhetorical gesturing. But Chomsky does not provide any examples of such gesturing and it is unclear anyone is producing the mass of allegedly worthless literature. In one case, Chomsky does provide a name:

> Many of these people, like Dawkins, regard themselves very plausibly as fighting a battle for scientific rationality against creationists and fanatics and so on. And yes, that’s an important social activity to be engaged in, but not by misleading people about the nature of evolution – that’s not a contribution to scientific rationality. (Chomsky, 2012, p.105)

One looks in vain for citation of any actual non-rational argument that Dawkins has offered, much less any counterevidence to Dawkins (unidentified) non-rational arguments, or any characterization of what it is that makes these (unidentified) arguments irrational. The reader is apparently supposed to walk away from this passage convinced that one of the major evolutionary theorists of the past century has made, not just incorrect arguments, but arguments which are 'not a contribution to scientific rationality' - on the basis of nothing more than Chomsky's declaration that this is so. It is astounding that Chomsky puts forward such grave allegations without providing any evidence showing that Dawkins is misleading people about the nature of evolution.

Given his harsh criticism of the work of others, one would expect that Chomsky's own contribution is 'done seriously and without pretense', and that his arguments are carefully crafted and supported by solid evidence. But this is not the case. He cites no own research and his familiarity with the work of others seems superficial at best. He argues that, obviously, we have to dismiss gradual language evolution because other animals have adaptations similar to those of humans and it is not clear that any of the language related changes in our anatomy evolved *for* language. A typical "argument" is provided here:

> There might be some adaptations for language, but not very much. Take, say, the bones of the middle ear. They happen to be beautifully designed for interpreting language, but *apparently* they got to the ear from the reptilian jaw by some mechanical process of skull expansion *that happened, say, 60 million years ago*. So that is something that just happened. The articulatory-motor apparatus is somewhat different from other primates, but most of the properties of the articulatory system are found elsewhere, and if monkeys or apes had the human capacity for language, they could have used whatever sensory-motor systems they have for externalization, much as native human signers do. Furthermore, it seems to have been available for hominids in our line for hundreds of thousands of years before it was used for

> language. *So it doesn't seem as if there were any particular innovations there*. (Chomsky, 2012, pp. 25-6, emphasis added)

First, Chomsky has not completed the research he discusses here. By omitting references he shows disrespect for the researchers and prevents the reader from accessing this work. Second, scientists do not claim that apparently something happened, say 60 million years ago, but give specific time frames for specific events. Third, this superficial survey of very few factors that need to be considered for the evolution of the multitude of capacities involved in language production and comprehension fails entirely to support the conclusion that there were not any 'particular innovations' for language. Rather this "argument" reveals that for Chomsky it is a forgone conclusion that only Merge is in need of an evolutionary explanation and everything else just happened to be in place, presumably, 'for hundreds of thousands of years'.

The sloppiness continues when Chomsky discusses the single mutation that allegedly resulted in Merge. For his hypothesis, it must be the case that modern day humans all descend from a small breeding group in Africa: "We know by now that human language does not postdate about sixty thousand years ago…when the trek from Africa started" (p. 13). Chomsky does not specify who 'we' is and neglects to mention that a competing hypothesis (e.g., Frayer et al., 1993) proposes a multiregional origin of modern humans (MOH). There is wide consensus among mainstream language evolutionists that MOH is unlikely (e.g., Lieberman, 1998). But Chomsky disagrees with virtually everything else proposed by mainstream language evolutionists and stresses repeatedly their alleged irrationality. Given that it is *necessary* for Chomsky's argument that MOH is false he would need to either provide his own arguments, refuting MOH or provide very strong

supporting evidence for the 'out of Africa' hypothesis. He does neither. And, given how important the precise dating of the 'trek from Africa' and the 'sudden leap' are, it is surprising that Chomsky offers a fairly wide variety of dates for these events: "maybe sixty thousand years ago, language was there, in its modern form" (p. 13), "effects of having a complex symbolic system are barely there before 60,000-100,000 years ago" (p. 13), "this massive cultural revolution, which is quite striking, probably about sixty or seventy thousand years ago" (p. 17), "groups that got separated about fifty thousand years ago" (p. 27), "a 'great leap forward' in human evolution in a period of roughly 50,000-100,000 years ago" (p. 70), "it couldn't have happened later than about fifty thousand years ago" (p. 71). Chomsky cites no work by other researchers so the only reason for this variety of dates seems to be inexcusable sloppiness that has not been corrected by the editor. Finally, he also claims: "You can argue fifty thousand years more or less, but that doesn't matter" (p. 51). Given the dates Chomsky offers this implies the language mutation could have happened as early as 150,000 years ago or as late as yesterday. One might think more precise timing *does* matter for his "theory".

Unsurprisingly Chomsky's "theory" of language evolution is on a similarly sloppy, unsophisticated level. I reproduce here only three of his numerous attempts to come up with an account:

> … some small genetic change led to the rewiring of the brain that made this human capacity available…Well, mutations take place in a person, not in a group. We know, incidentally, that this was a very small breeding group - some little group of hominids in some corner of Africa, apparently. Somewhere in that group, some small mutation took place, leading to the great leap forward. It had to have happened in a single person. Something happened in a person that that person transmitted to its offspring. And apparently in a very short time, it [that modification] dominated the group; so it must have had some selectional advantage. But it

> could have been a very short time in a small [breeding] group. Well, what was it? The simplest assumption - we have no reason to doubt it - is that what happened is that we got Merge. You got an operation that enables you to take mental objects [or concepts of some sort], already constructed, and make bigger mental objects out of them. That's Merge. As soon as you have that, you have an infinite variety of hierarchically structured expressions [and thoughts] available to you. (Chomsky, 2012, pp. 13-14)

This account can hardly be taken seriously. It has the hallmarks of (very superficial) backward engineering. Chomsky is convinced that Merge is the essential computational operation of language. Therefore Merge must have evolved, and this must have happened in one mutation, and this mutation immediately conveyed such a tremendous advantage to a single person that his/her descendants took over the breeding group and the world. Chomsky presents no evidence for his JSS. Furthermore, he neglects to mention that the 'great leap forward' hypothesis has been challenged (e.g., McBrearty & Brooks, 2000). It is a matter of ongoing scientific debate, whether the great leap forward occurred in all human groups. Independently, it is not entirely clear that a detectable change in technology is a reliable indicator for an increase in overall intelligence and/or the arrival of linguistic abilities. By analogy, comparing the technology of the 17th and 20th century a scientist of the 44th century might conclude that our species underwent a dramatic increase in intelligence during this time period. But we have little reason to believe that such an increase took place. Hence, Chomsky needs to establish not only that 'the great leap' took place but also *that* it would provide proof that language evolved at exactly the same time. He does neither. For readers unconvinced by the previous JSS, Chomsky offers a slightly modified version:

> … every living human being has basically the same [concepts]. So they must have been there before the separation - before the trek from Africa - which means roughly fifty thousand years. So they predate fifty thousand years. And there's no real evidence that Merge really existed before roughly that time… There's lots of interesting work showing adaptations of the sensory-motor system that appear to be language-related. So for example, the ear and articulatory muscles seem to be geared to the range of sounds that are used in language. But that doesn't tell you anything. All that that tells you is that whatever grunts hominids were using may have played a role over hundreds of thousands of years in changing the structure of the middle ear. That wouldn't be too surprising. It's like any other animal - take frogs. Take a particular species of frogs; their auditory systems will be correlated with their articulatory system. But that's precursors of language. Yes, *that's going to be true for every organism*. So everything that's found about the sensory-motor system - at most, what it's telling you is, well, these are precursors to language of the kind that you find in frogs. But there has to be that point at which you suddenly get that explosive growth - this great leap in creative activity going on. It looks as though it's roughly at the point of the separation of the breeding group all over the world. (Chomsky, 2012, p. 77-8).

One learns here that, allegedly, our very distant ancestors had concepts that are virtually identical to our own because 'every living human being has basically the same ones'. Concepts that remain the same over millennia, regardless of being used only in internal thought or in communication with other members of the species are more reminiscent of Platonic forms or the craftsman stamp of the Cartesian God than of objects of 21st century naturalistic science. The superficial discussion of precursors to language in frogs indeed 'doesn't tell us anything' and, given that *The Science of Language* is populated with remarks about pigeons, insects, nematodes and bacteria, one wonders if these groups are included in 'any other animal'. For anyone with biological training, it is impossible to take this "account" seriously, and even non-biologists ought to wonder about its plausibility.

One final passage demonstrates how little empirical foundation there is to Chomsky's evolutionary theorizing:

> Take phonology. It's generally assumed - plausibly, *but not with any direct evidence* - that the mapping from the narrow syntax to the semantic interface is uniform. There are lots of theories about it; but *everyone's theory* is that this is the way it works for every language - which is not unreasonable, *since you have only very limited evidence for it*. The narrow syntax looks uniform up to parameters. On the other hand, the mapping to the sound side varies all over the place. It is very complex; it doesn't seem to have any of the nice computational properties of the rest of the system. And the question is why. Well, again, there is a conceivable snowflake-style answer, namely, that *whatever the phonology is, it's the optimal solution to a problem that came along somewhere in the evolution of language* - how to externalize this internal system, and to externalize it through the sensory-motor apparatus. You had this internal system of thought that may have been there for thousands of years and somewhere along the line you externalize it; well, *maybe the best way to do it is a mess*. That would be the nicest answer, although it's a strange thought for me. (Chomsky, 2012, p. 40).

Here Chomsky claims that everyone believes in a theory for which we have little evidence. The argument 'my theory is reasonable *since* there is only very limited evidence for it' should have been rejected by a serious philosopher like McGilvray and how something that 'is a mess' can be the 'optimal solution' to anything would have required detailed justification. *The Science of Language* contains roughly 20 pages of evolutionary "theorizing" by Chomsky without stating a single proposal that could be tested scientifically. McGilvray's attempts to clarify notions such as 'biological function' (pp. 169-175), 'natural selection', and 'third factor' reveal that he is also confused about the intricacy of biological processes. In sum, while Chomsky requests that theorizing

about language evolution "has to be done seriously and without pretense" (p. 105) one sees that such requirements are not met in this work

3.2. Distorting the work of others

One of the most troubling aspects of *The Science of Language* is that Chomsky and McGilvray repeatedly distort the work of others even though it has to be assumed that they are aware that the accounts they give are incorrect. I defend this serious allegation by expanding on two cases briefly discussed in the review.

3.2.1. Dan Lassiter's paper on semantic externalism/internalism

Dan Lassiter published in 2008 (when he was a doctoral student at NYU) a paper in Mind and Language. He attempted to reconcile "descriptivism, mentalism, and externalism by construing community languages as a function of social identification" (Lassiter, 2008, p. 607). If Chomsky thought that this project was unsuccessful, he should have provided factual criticism. Instead, Chomsky accuses Lassiter (whom he only calls 'this guy') of defending a crazy theory of Michael Dummett. As discussed in the review, on the contrary, Lassiter does not defend but attacks Dummett. Anyone who had read the paper would have hardly missed that.

> Dummett argues that communalects must be able to [provide a guarantee of mutual understanding] because otherwise, 'for all [a speaker] knows, or can ever know, everyone else may attach to his words or to the symbols which he employs a meaning quite different from that which he attaches to them' (ibid.). This consequence is intended as a reductio, but attention to the

> empirical facts of language shows it to be a positive boon: only a theory that does not provide such a guarantee can provide a convincing account of language variation and change (Lassiter, 2008, pp. 631-2)

Chomsky could have missed this explicit point only if he did not read the entire paper. This would be certainly irresponsible. However, the situation is worse. McGilvray replies to Chomsky's enraged comment about some guy defending Dummett's crazy theory:

> Terje Lohndal [a graduate student in linguistics at the University of Maryland] - he and Hiroki Narita [a linguistics graduate student at Harvard] - wrote a response to it. I think it's good; I don't know if it will be published. I hope so. [See Lohndal & Hiroki (sic) 2009.] (McGilvray, 2012, p. 57)

Given that Lohndal & Narita (2009) is found in the bibliography (from which Lassiter (2008) is missing), it is odd that McGilvray claims he does not know if it will be published. Further, these authors acknowledge that they "are indebted to Noam Chomsky, Jim McGilvray, and Paul Pietroski for valuable comments and advise on this piece" (Lohndal & Narita, 2009, p. 231). This shows that McGilvray and Chomsky were fully aware of the paper, and at least through it of the relevant details of Lassiter's (2008) paper before *The Science of Language* went in press.

Lohndal and Narita allege "that Lassiter's arguments are flawed and based on a serious misunderstanding of the internalist approach to the study of natural language … and conclude that Lassiter's socio-linguistic approach is just another instance of externalist attempts with little hope of scientific achievement" (Lohndal & Narita, 2009, p. 321). At one point the authors acknowledge that Lassiter holds that "the philosophically dominant tradition of semantic externalism (led by people like Hilary Putnam, Tyler Burge, Michael Dummett, and David Lewis) can [not provide] … a linguistic theory that

incorporates individuals' intentional contributions to the meaning/reference of linguistic expressions" (Ibid., p. 322). However, they also frequently conflate Lassiter's view with externalism (e.g., "his alleged 'theory' is just another instantiation of externalism", p. 323; "He fails to provide convincing arguments for the feasibility or legitimacy of constructing an externalist linguistic theory of the sort he envisages", p. 329).

In 2010 Lassiter published a reply to Lohndal & Narita (2009) defending his account and specifically stateing: "I expended considerable energy to refute precisely this type of externalism, using Dummett as the prototype of an externalist whose theory is unworkable (Lassiter 2008: 611-617)" (Lassiter, 2010, p. 138). The further details of the dispute are irrelevant here. Striking is that at the time of publication of *The Science of Language* Lassiter's original paper and his reply to Lohndal & Narita (2009) had been available to Chomsky. In both, Lassiter states clear and unambiguously that he objects to Dummett-style externalism. One cannot plausibly assume that Chomsky was *unable to understand* Lassiter's arguments. He harshly attacked an author whose paper he knowingly distorted. This would be a reprehensible act no matter who commits it. But given the status and exalted influence Chomsky enjoys, it is outrageous that he would resort to such unprofessional behaviour to demean someone who disagrees with him.

Also relevant here are the grounds on which Chomsky defends semantic internalism:

> Take children stories; they're based on these [internalist, CB] principles. I read my grandchildren stories. If they like a story, they want it read ten thousand times. One story that they like is about a donkey that somebody has turned into a rock. The rest of the story is about the little donkey trying to tell its parents that it's a baby donkey, although it's obviously a rock. Something or another happens at the end, and- it's a baby donkey again. But every kid, no matter how young, knows that that rock is a donkey, that it's not a rock. It's a donkey because it's got psychic

> continuity, and so on. That can't be just developed from language, or from experience. (Chomsky, 2012, p. 27)

This argument is supposed to show that children could not have learned the concept 'psychic continuity' from experience or from instruction. Given that Chomsky derives his data from a fairytale, it is not surprising that his grandchildren could *not* have learned from experience with the actual world that donkeys who turn into rocks and back into donkeys retain their psychic continuity. It is dubious how an allegedly innate concept can account for "knowledge" that is specific to cultures who share the donkey fairytale. Even more dubious is how anyone can conclude based on such a "case study" that for "other cultures … the basic properties [of concepts] are just *identical*" (p. 27, original emphasis). Throwing in the additional example of 'river', Chomsky claims that all infants in all cultures recognize continuity of objects that change their appearance: "… these things are there. They show up in every language; whether they are there independently of language, we have no way of knowing. We don't have any way of studying them" (Ibid.). Without providing any evidence Chomsky claims that every human being shares the identity concept and that we cannot study these matters. Given that Chomsky provides exclusively arguments of this quality to support his own view it is even truly astounding that he calls the views of others 'crazy'.

Chomsky advocates superior ethical standards, writing that we need "consciousness raising: get people to recognize that there's nothing natural about domestic abuse, for example" (pp. 119-20). There is also nothing natural about distorting the view of one's opponent to achieve an advantage in academic debates or about providing poorly supported arguments. The failure of Chomsky's writings to conform to serious standards

of scientific and academic practice is in striking contrast to his pious preaching about consciousness raising.

3.2.2. Jeff Elman's early connectionist work

The misconstrual of the work of others can be based on ignorance, genuine misunderstanding, or willful distortion. Consulting the relevant literature can eliminate the first and likely the second of these reasons. In the case discussed below neither Chomsky nor McGilvray have the "excuse" of being unaware of this literature. In July 2009 it has been brought to their attention that the letter from which McGilvray cited in *Cartesian Linguistics* (2009) contained serious misinterpretations of Elman's work (Behme, 2009). The authors were provided with several papers by Elman showing clearly that his work had been misrepresented. In *The Science of Language* McGilvray cites *these* papers in a footnote, which must be taken as indication that he has read them. Astoundingly, he claims in said footnote "Chomsky was wrong to think that the view is expressed in a single paper" (p. 226) and continues to support the incorrect conclusions Chomsky draws about Elman's work. Anyone who has read the papers knows that "the view" is not expressed in them. Elman has never claimed that his method works "just as well on [nesting and] crossing dependencies" (Chomsky, p. 226). Instead, in the papers cited Elman reports that the work with SRNs has shown that they perform very similar to humans when dealing with nested and crossing dependencies. What is difficult for humans to process is difficult for SRNs and what is easy for humans is easy for SRNs. He also never reported anything supporting the claim that "his program works up to depth

two but fails totally on depth three" (Chomsky, p. 226). McGilvray does not cite Elman regarding this alleged finding but relies exclusively on Chomsky's dated letter. But adding the references may well create the entirely wrong impression that Chomsky's interpretation *is* based on Elman's work. Such deception violates generally accepted scientific conduct. It also makes one wonder about the sincerity of Chomsky's writings about morality: "If you regard yourself as a moral agent – you're trying to think about your actions, or plans, or ideas that might make human life better" (p. 101). Any moral agent has an obligation to think about the consequences of misrepresentation, especially an agent who claims in the same publication in which this misrepresentation occurs: "We apply to ourselves the same standards we apply to others – probably more rigorous standards if you're serious" (Ibid.)

4. Putting things into context

It has been suggested repeatedly that I took things out of context, selected only examples that supported my conclusion, and ignored those that would undermine it. I have two replies to this allegation. First, the examples I discussed in the review should not have appeared in *any* published academic volume called 'The *Science* of Language", far less in one by the celebrated intellectual leader of linguistics. Second, these examples are no exceptions in an otherwise flawless volume but representative of the quality of the work. Here are further examples of "arguments" offered by Chomsky and accepted by McGilvray without questioning.

Science of Language contains numerous allegations that researchers outside the Chomskyan framework are irrational (e.g., "It's a highly irrational approach to inquiry" (p. 20), "… that's not a contribution to scientific rationality" (p. 105), "… a tribute to human irrationality" (p. 116), "That's just irrational" (p. 123)) but none of these criticisms are based on analysis of specific work. Instead denigration of the work of mostly unnamed others and blanket accusations are the rule.

> If you look at the articles in the technical journals, such as, say, *Science* or *Nature,* most of them are pretty descriptive; they pick around the edges of a topic, or something like that. And if you get outside the hard-core natural sciences, the idea that you should actually construct artificial situations in an effort to understand the world - well, that is considered either exotic or crazy. Take linguistics. If you want to get a grant, what you say is "I want to do corpus linguistics" - collect a huge mass of data and throw a computer at it, and maybe something will happen. That was given up in the hard sciences centuries ago. Galileo had no doubt about the need for focus and idealization when constructing a theory. (Chomsky, p. 19)

This passage is offensive to anyone doing linguistics, and especially to researchers doing corpus linguistics. Some work might of questionable value and in some cases projects might get funded because they are data oriented. But Chomsky condemns a whole field instead of providing targeted criticism of specific problematic cases. Every linguist I consulted (e.g., Everett, Hurford, Jackendoff, Sampson, Tallerman) agreed that no one has a chance to obtain funding for proposals that contain no carefully specified theoretical questions.

In addition to unsupported accusations, Chomsky repeatedly makes assertions that are not mutually consistent. At times, the members of such incoherent sets are contained in a single answer:

> *If somebody can tell me what a general learning mechanism is*, we can discuss the question. But if you can't tell me what it is, then there's nothing to discuss. So *let's wait for a proposal*. Hilary Putnam, for example, has argued for years that you can account for cognitive growth, language growth and so on, by general learning mechanisms. Fine, let's see one.
> Actually, there is some work on this which is not uninteresting. Charles Yang's (2004) work in which he tries to combine *a rather sensible and sophisticated general learning mechanism* with the principles of Universal Grammar, meaning either the first or the third factor - we don't really know, but something other than experience - and tries to show how by integrating those two concepts you can account for some interesting aspects of language growth and development. I think that's perfectly sensible.

Here Chomsky asserts simultaneously (i) that he is unaware of *any* sensible account of general learning mechanisms *and* (ii) that Yang's work concerns a sensible and sophisticated general learning mechanism. Astoundingly McGilvray, a professional philosopher, did not question this incoherent set of assertions.

It seems the only criterion Chomsky applies consistently is claiming work that is done in his framework is superior, scientific, and rational while any other work is inferior, unscientific, and irrational. This is illustrated by the following typical dismissal:

> And connectionism seems to me about at the level of corpuscularianism in physics. Do we have any reason to believe that by taking these few things that we think - probably falsely - that we understand, and building up a complex structure from them, we're going to find anything? Well, maybe, but it's highly unlikely. Furthermore, if you take a look at the core things they're looking at, like connections between neurons, they're *far* more complex. They're abstracting radically from the physical reality, and who knows if the abstractions are going in the right direction? But, like any other proposal, you evaluate it in terms of its theoretical achievements and empirical consequences. It happens to be quite easy in this case, because they're almost nonexistent. (Chomsky, 2012, p. 67)

Again, it is astounding that McGilvray accepts this "argument" without any questioning. What are "these few things"? How does the complexity of connections between neurons differ from the models Chomsky never identifies? Why is abstracting away from physical reality problematic when done by connectionists but a hallmark of good science when done by Chomsky? Recall that he advocates: "… abstracting away from the whole mass of data that interests the linguist who wants to work on a particular language" (p. 84). This is justified because "Galileo had no doubt about the need for focus and idealization when constructing a theory" (p. 19). So one is implicitly told to accept, without any evidence, that Chomsky can know that his abstractions aim in the right directions but connectionists cannot know this.

Finally, one finds: "But, like any other proposal, you evaluate it in terms of its theoretical achievements and empirical consequences. It happens to be quite easy in this case, because they're almost nonexistent." Chomsky never tells us what *the proposal* is. Connectionism is a hugely complex field that cannot be reduced to one proposal. Claiming that an entire field lacks theoretical achievements and empirical consequences without providing a shred of evidence challenges Postal's judgment of a passage from Chomsky (2002) as "the most irresponsible passage written by a professional linguist in the history of linguistics" (Postal, 2009, p. 2009; details at Postal, 2004, chapter 11). And this is not the only contender for this dubious honour.

Similarly irresponsible remarks are scattered throughout *The Science of Language*. Here are a few examples of the many attacks on other individuals or other fields: "And if you get outside the hard-core natural sciences, the idea that you should actually construct

artificial situations in an effort to understand the world – well, that is considered either exotic or crazy" (p. 19), "modern philosophy of language and mind…is just off the wall on this matter [=externalism, CB]" (p. 26), "representational theories of mind are bound to a concept of representation that has … no particular merits as far as I know" (p. 32), "Nobody in linguistics works on the meaning of WATER, TREE, HOUSE, and so on; they work on LOAD, FlLL,- and BEGIN - mostly verbal concepts" (p. 35), "Take a look at the history of the advanced sciences. No matter how well established they are, they almost always turn out to be wrong" (p. 38), "… this crazy theory of Michael Dummett's, that people don't know their own language" (p. 57), "[connectionists] start from the simplest thing we understand – like a neural connection – and make up some story that will account for everything" (p. 67), "Behavioural science is, in principle, keeping to the data; so you just know that there's something wrong with it" (p. 67), "selectionism….which is [a form of] popular biology… is like a sixth grade version of the theory of evolution" (p. 68), "And [in contemporary neurophysiology] is nothing in the way of any depth of theory. There is a slogan – that the mind is neurophysiology at a more abstract level" (p. 74), "In fact, common sense – at least in the advanced sciences – has been completely abandoned" (p. 75), "Most linguists…are so data oriented that they find it scandalous to accept methodological principles that really ought to be obvious" (p. 84), "From the tides to the flight of birds, the goal of the scientists is to find that nature is simple; and if you fail you're wrong" (p. 88), "Mysterianism is the belief that our cognitive capacities are part of the natural world, so therefore these capacities have scope and limits" (p. 97), "Leninism… is a natural position for intellectuals, because they are going to be managers" (p. 98), "… the kind of pop biology that's common today [in

evolutionary theorizing]" (p. 104), "[Dawkins' work] is not a contribution to scientific rationality" (p. 105), "science shines often penetrating light on extremely simple questions… if the helium atom is too hard to study you give it to the chemists" (p. 106), "formal debates are based on a principle of profound irrationality, namely that you can't change your mind" (p. 116), "there are distinguished figures who…literally can't see any difference between adopting what is called 'innatism' – meaning scientific rationality – and belief in God" (p. 123), "Most scientists tend to accept the Cartesian dogma" (p. 124), "the entire discussion [about the meaning of the sentence 'water is H_2O'] on all sides is basically vacuous. And that's the primary theme in contemporary analytic philosophy. It's just not about anything" (p. 127), "You can't just tell stories about something; you have to show that those stories have some substance. That's why so much talk about evolution is basically uninteresting; it's just stories" (p. 128), "[Tyler Burge] is an intelligent person trying to engage with the issues; most philosophers don't even engage with them" (p. 131), "it's one of the joys of evolutionary psychology. You can have it any way you like it" (p. 142), "[using complicated words] tends to make economists like physicists, and then the political scientists want to look like economists" (p. 144), "[social science has] just the superficial trappings of science" (p. 144), "The kinds of questions where real progress has been made are typically very simple ones. That's part of the reason that physics has made such progress" (p. 145), "[Elman's theory] is about as interesting as a theory of arithmetical knowledge that handles the ability to add 2+2 but has to be completely revised for 2+3" (p. 226).

The key point, revealing the essential nature of this work, is that absolutely none of these statements (ranging from trivialities to harsh accusations) is supported by any evidence.

Even in cases where Chomsky names individuals allegedly holding the view he objects to, he does not provide any references to their work. Instead he "adopt[s] a god-like point of view" (p. 29) and condemns, trivializes, or ridicules the work of others. One might think grandiose accomplishments justify that Chomsky takes such an attitude. What, then, are Chomsky's contributions?

5. Chomsky's contributions

One reader of my review suggested I ought to elaborate Chomsky's contributions to linguistics, before launching into such harsh criticism of one work. As non-linguist I am hardly the person to give an objective and fair evaluation. Fortunately, there is little disagreement about the value of Chomsky's early contribution. This early work contributed to clarifying important conceptual issues and sketched the outlines of a novel scientific framework for linguistics. The great potential of this work was recognized quickly. When Morris Halle and Chomsky established a linguistics program at MIT it "immediately attracted a number of gifted scholars… All were eventually named to MIT faculty - Lees and Postal in linguistics, Fodor and Katz in philosophy (Barsky, 1997, p. 101). Some thirty years later one of these gifted scholars vividly recalled the initial appeal Chomsky's work had "I was very impressed, first with the power of his thought, but also [by Chomsky's work that]... was based on an entirely different way of thinking from anything I had come into contact with before" (Postal quoted in Harris, 1993, p. 102).

The value of Chomsky's initial contribution has been acknowledged by other linguists as well: "Chomsky's exposition of how in principle the syntax of a language can be brought within the purview of scientific linguistic description is a great positive contribution to the discipline" (Sampson, 1980, p. 134). Further, it was acknowledged that Chomsky's work had impact beyond linguistics: "[Chomsky's work can help] developing psychology to incorporate the sophisticated formal insights that generative grammar has produced" (Pullum, 1972, p. 64), and "Chomsky's influence on cognitive science was beneficial in many ways…He offered a vision of theoretical rigor that inspired linguists and non-linguists alike. And…his work encouraged others to attempt the computer modeling of mind" (Boden, 2006, p. 591). In addition it is widely recognized that Chomsky contributed greatly to overcoming the behavourist approach to linguistics (e.g., Sampson, 1980; Botha, 1989; Seuren, 1998; Boden, 2006).

However, by now linguists disagree strongly about the value of Chomsky's recent contributions. Especially for work completed since the publication of the Minimalist Program (Chomsky, 1995) evaluations of defenders and critics differ so strongly that both sides can't be correct. But certainly one would expect Chomsky himself to make a strong case *for* the value of his work. When McGilvray asked him about his intellectual contributions Chomsky provided the following reply (cited in its entirety):

> JM: Noam, let me ask about what you take to be *your most important contributions*. Do you want to say anything about that?
>
> NC: Well, I think that the idea of studying language in all its variety as a biological object ought to become a part of future science - and the recognition that something very similar has to be true of every other aspect of human capacity. The idea that - there was talk of this in Aspects, but I didn't really spell it out - the belief ...

> [Wait; I'll start over. B. F.] Skinner's observation is correct that the logic of behaviorism and the logic of evolution are very similar - that observation is correct. But I think his conclusion - and the conclusion of others - is wrong. Namely, that that shows hat they're both correct. Rather, it shows that they're both incorrect, because the logic of behaviorism doesn't work for growth and development, and for the same reason, the notion of natural selection is only going to work in a limited way for evolution. So there are other factors. As I said in Aspects, there's certainly no possibility of thinking that what a child knows is based on a general procedure applied to experience, and there's also no reason to assume that the genetic endowment is just the result of various different things that happen to have happened in evolutionary history. There must be further factors involved - the kind that Turing [in his work on morphogenesis] was looking for, and others were and are looking for. And the idea that maybe you can do something with that notion is potentially important. It's now more or less agreed that you can do something with that notion for, say, bacteria. If you can also do something with it for the most recent - and by some dimension most complex - outcomes of evolutionary history like language, that would suggest that maybe it holds all the way through. (p. 76)

First, Chomsky was asked about *his most important* contributions. He has undoubtedly talked a lot about language as biological organ but he has never done any work in biology and certainly has made no contribution to work on, say, bacteria. Second, it is misleading to imply that Chomsky has contributed to theories that could be tested by natural scientists: "… in four decades [Chomsky] has not specified *a single physical property* of any linguistic object" (Postal, 2009, p. 113, original emphasis). The language centers in the brain (Broca area, Wernicke area, etc.) and genes (FOXP2) involved in language processing were discovered prior to or independently of Chomsky's work. Third, what could possibly be *Chomsky's* intellectual contribution to the idea that: "there's also no reason to assume that the genetic endowment is just the result of various different things that happen to have happened in evolutionary history". He attributes this 'insight' (that

there must be further factors involved) to Turing; so whatever its value, it is not Chomsky's contribution. Remaining as genuinely Chomskyan contributions are some unspecified talk in *Aspects* that never got spelled out and the refutation of Skinnerian behaviourism. These contributions date back more than 45 years and are best described as contributions to psychology. This leaves Chomsky, by his own account, without any important specifically linguistic contribution. Even more startling than this admission is McGilvray's reaction. Far from expressing concern about the absence of any specific contributions he suggests Chomsky's work led to "pretty *radical progress* [because] we're actually at the stage now where we can begin to ask for language the old question, "Why are things the way they are?" (McGilvray, p. 77, emphasis added). Why McGilvray would celebrate the arrival at a stage where we can *begin to ask* an old question as radical progress is mysterious. If this is indeed all the identifiable progress, one might want to (re)consider what critics of Chomsky's work said years ago: "[Chomsky's] claims and promises made during the early years of his academic activity…have over time largely proved to be wrong or without real content and the promises unfulfilled" (Levine & Postal, 2004, p. 203). It would seem Chomsky largely agrees.

Other answers confirm the impression that Chomsky's early promises remain unfulfilled and that his contributions to linguistics are unidentifiable. When McGilvray asks about the strong minimalist thesis, currently *the* centerpiece of the biolinguistic enterprise, Chomsky's answer begins in a promising way: "Maybe it's even true" (p. 54). However, this is followed by 237 words of speculation about interfaces, the Norman Conquest,

mapping constraints, and "new questions" (but no answers), leading up to this grand finale:

> It's interesting that people have expectations for language that they never have in biology. I've been working on Universal Grammar for all these years; can anyone tell you precisely how it works [- how it develops into a specific language, not to mention how that language that develops is used]? It's hopelessly complicated. Can anyone tell you how an insect works? They've been working on a project at MIT for thirty years on nematodes. You know the very few [302] neurons; you know the wiring diagram. But how does the animal work? We don't know that. (Chomsky, 2012, p. 54)

Here Chomsky admits that 'how language develops and is used' is 'hopelessly complicated'. In other words, his work has not advanced our understanding of "the creative aspect of language use [which he had made] a central concern of linguistics" (Chomsky, 1966, p. 72). Nor has he given by now a "sharp and clear formulation of some of the central questions of psychology and [brought] a mass of evidence to bear on them" (Chomsky, 1968, p. 59) as promised decades ago. Instead of taking responsibility, he claims that no one can tell us how an insect works. Linguists are not zoologists, so what is known about insects seems irrelevant to linguistics. Further, if Chomsky considers the biology of other species so important for linguistics it is curious that he apparently does not know that nematodes are not insects but roundworms. Hence, it is not surprising that the work of his MIT colleagues (likely on the species *Caenorhabditis elegans*) does not reveal 'how insects work'. So this diversion not only fails to establish that we should not expect any results from linguistic work, it also reveals Chomsky's ignorance of basic facts of biology; a discipline he claims to have been working in for decades.

Astounding ignorance of biology is displayed throughout *The Science of Language*:

> The idea that basically there's one organism, that the difference … between an elephant and a fly is just the rearrangement of the timing of some fixed regulatory mechanisms. It looks more and more like it. There's deep conservation; you find the same thing in bacteria that you find in humans. *There's even a theory now that's taken seriously* that there's a universal genome. Around the Cambrian explosion, that one genome developed and every organism's a modification of it. (Chomsky, 2012, p. 53, emphasis added)

First, it is questionable that the difference between fly and elephant can be reduced exclusively to unidentified regulatory mechanisms. Second, given that bacteria have no language faculty, whatever similarities they share with humans is irrelevant to linguistics. Third, Chomsky never tells us what 'a theory' is or who takes it seriously. The fact that *some* theory exists and is taken seriously by *some* people does not tell us much about its credibility. For example Michael Behe proposed 'a theory' of irreducible complexity, which is taken seriously by many creationists. That does not make it a respectable scientific theory. Any biologist who wants to be taken seriously would provide detailed arguments in support of the widely rejected speculation 'that there's a universal genome'.

In some cases it is difficult to discern what could have been the motivation for Chomsky's answers. McGilvray had asked if we want to allow 'that proving useful is not a condition of a biological entity'. Chomsky replies: "Take D'Arcy Thompson. If biophysical laws determine the general shape of the properties of creatures, it doesn't say that you can't build submarines" (p. 137). I leave it to others to speculate how the building of submarines might be connected to D'Arcy Thompson's work or how either relates to linguistics. Some of the research projects Chomsky envisions seem similarly bizarre: "An interesting topic that should be addressed some day is that our internal speech is very likely fragments of re-internalized external speech, and the real 'inner

speech' is very likely inaccessible to introspection" (p. 12). Before even contemplating how this topic could be addressed, one wonders why evolution would have equipped us with such a completely unnecessary epicycle. The obscure and contentless character of such remarks is typical of many of the musings that comprise *The Science of Language*.

6. Virtues of *Noam Chomsky: The Science of Language – Interviews with James McGilvray*

I have been repeatedly asked if the volume contains anything of value. In my opinion it does. The by far most enjoyable section was a brief recollection of Chomsky's personal relationship with Nelson Goodman:

> It was a close personal relationship ... While Carol and I were students, he and his wife - by our standards, old people, like 40; and they were wealthy, and we were poor - they did what they called "slumming with the Chomskys." They picked us up when we were backpacking in Europe and drove us around. We had extremely interesting trips with them. For one thing, they happened to be on a Romanesque tour through southern France which was planned by Meyer Shapiro - who I also knew - who was a great art historian. We just sort of followed them around. She (Mrs. Goodman) was an artist; he was an art dealer and specialist on a level of insight and understanding into Romanesque art and other things that we would never have gotten to appreciate without that experience.
> Somehow we ended up in Switzerland - I don't remember how, exactly - and we were in (I guess) Basel. I remember that there was a huge Klee museum and we went in and looked at the Klee exhibit. But Goodman wasn't satisfied with that - and he was very imperious. He went to the director of the museum and asked to be shown the actual collection, which was down in some basement somewhere. And the guy very meekly led us all down to the storage room where they had the most immense collection of magnificent Klee paintings that you could ever have imagined. I don't know how many of them were ever shown. And we went

> through those with an excellent exposition from the director. And there were other things like that. (Chomsky, 2012, pp. 91-92)

The reader would have enjoyed learning about 'other things like that'. Chomsky is in his eighties. He has made undeniable contributions to linguistics but his current writings are barely a shadow of real contributions. It is not serious to claim that *Noam Chomsky: The Science of Language – Interviews with James McGilvray* is a cutting edge contribution. This is simply deceptive. But a broad audience would no doubt be interested in the personal biography of a man as well-known and influential over such a long period as Noam Chomsky.

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References

Barsky, R. (1997). *Noam Chomsky: A life of discent*. Cambridge, MA: MIT Press.
Behme, C. (2009). Review of *Cartesian Linguistics*. *Metapsychology online reviews, 3*, http://metapsychology.mentalhelp.net/poc/view_doc.php?type=book&id=5110&cn=394
Boden, M. (2006). *Mind as machine*. Oxford: Oxford University Press.
Botha, R. (1989). *Challenging Chomsky*. Oxford: Blackwell.
Chomsky, N. (1966). *Cartesian Linguistics*. New York: Haper&Row.
Chomsky, N. (1968). *Language and Mind*. New York: Hartcourt.
Chomsky, N. (1986). *Knowledge of Language*. New York: Praeger.
Chomsky, N. (1995). *The minimalist program*. Cambridge, MA: MIT Press.
Chomsky, N. (2012). *The Science of Language*. Cambridge: Cambridge University Press.
Churchland, P. (1986). *Neurophilosophy*. Cambridge, MA: MIT Press.
Churchland, P. (2002) *Brain-Wise*. Cambridge, MA: MIT Press.
Culicover, P. (1999). Minimalist architectures. (Review article on R. Jackendoff (1997) The Architecture of the language faculty. Cambridge, MA: MIT Press.) *Journal of Linguistics, 35,* 137-150.
Culicover, P. & Jackendoff, R. (2005). *Simpler Syntax*. Oxford: Oxford University Press.
Frayer, D., Wolpoff, A., Thorne, F., Smith, F., & Pope, G. (1993). Theories of modern human origins: The paleontological test. *American Anthropologist, 95*, 14-50.
Gould, S., & Vrba, E. (1982). Exaptation — a missing term in the science of form. *Paleobiology* 8, 4–15.
Harris, R. (1993). *The linguistic wars*. Oxford: Oxford University Press.
Jackendoff, R. (2011). What is the human language faculty? Two Views, *Language 87*, 586-624.
Johnson, D. & Lappin, S. (1997). A critique of the minimalist program. *Linguistics and Philosophy, 20*, 273 – 333.
Lappin, S., Levine, R., & Johnson, D. (2000). The Structure of Unscientific Revolutions. *Natural Language & Linguistic Theory, 18*, 665-671.
Lassiter, D. (2008). Semantic externalism, language variation, and sociolinguistic accommodation *Mind and Language 23*, 607–633.
Lassiter, D. (2010). Where is the Conflict between Internalism and Externalism? A Reply to Lohndal & Narita (2009) *Biolinguistics* 4, 138-148.
Lieberman, P. (1998). *Eve Spoke*. New York: Norton.
Lohndal, T. & Narita, H. (2009). Internalism as methodology. *Biolinguistics* 3, 321–331.
McBrearty, S. & Brooks, A. (2000). The revolution that wasn't: a new interpretation of the origin of modern human behavior. *Journal of Human Evolution, 39*, 453–563.
McGilvray, J. (2009). Introduction to the third edition. In: McGilvray, J. (Ed.) *Cartesian Linguistics*. (pp. 1 – 52). Cambridge: Cambridge University Press.
Papineau, D. (2008). Review of Dan Everett: *Don't sleep there are snakes*. *The Independent* Nov 2008.
Postal, P. (2004). *Skeptical Linguistic Essays*. New York: Oxford University Press.
Postal, P. (2009). The Incoherence of Chomsky's 'Biolinguistic' Ontology. *Biolinguistics 3,* 104–123.

Pullum, G. (1972). Grammars, competence and linguistic intuitions. *Linguistische Berichte, 21*, 55-64.
Pullum, G. (1996). Nostalgic views from building 20. *Journal of Linguistics, 32*, 137 – 147.
Sampson, G. (1980). *Schools of Linguistics: Competition and Evolution*. London: Hutchinson.
Seuren, P. (1998). *Western Linguistics*. Oxford: Blackwell Publishing.
Seuren, P. (2004). *Chomsky's Minimalism*. New York: Oxford University Press.