A fox knows many things but a hedgehog one big thing

Mark Aronoff

Stony Brook University

1. Introduction

Isaiah Berlin's little book, *The Hedgehog and the Fox* (1953), takes its title from a line by the Greek poet Archilochus: πόλλ' οἶδ' ἀλωπηξ ἀλλ' ἐχῖνος ἓν μέγα 'many [things] knows [a] fox but [a] hedgehog one big [thing]'. Since it is impossible to do justice in a paraphrase to Berlin's prose, I will quote the relevant passage in full:

> [T]aken figuratively, the words can be made to yield a sense in which they mark one of the deepest differences which divide writers and thinkers, and, it may be, human beings in general. For there exists a great chasm between those, on one side, who relate everything to a single central vision, one system less or more coherent or articulate, in terms of which they understand, think, and feel—a single, universal, organizing principle in terms of which alone all that they are and say has significance—and, on the other side, those who pursue many ends, often unrelated and even contradictory, connected, if at all, only in some *de facto* way, for some psychological or physiological cause, related by no moral or aesthetic principle; these last lead lives, perform acts, and entertain ideas that are centrifugal rather than centripetal, their thought is scattered or diffused, moving on many levels, seizing upon the essence of a vast variety of experiences and objects for what they are in themselves, without, consciously or unconsciously, seeking to fit them into, or exclude them from, any one unchanging, all-embracing, sometimes self-contradictory and incomplete, at times fanatical, unitary vision. The first kind of intellectual and artistic personality belongs to the hedgehogs, the second to the foxes; and without insisting on a rigid classification, we may, without too much fear of contradiction, say that, in this sense, Dante belongs to the first category, Shakespeare to the second; Plato, Lucretius, Pascal, Hegel, Dostoevsky, Nietzsche, Ibsen, Proust are, in varying degrees, hedgehogs; Herodotus, Aristotle, Montaigne, Erasmus, Molière, Goethe, Pushkin, Balzac, Joyce are foxes.

Most of us have a little of both the fox and the hedgehog in us and the two natures interact in complex ways. As Berlin shows in detail about the main subject of his essay: "Tolstoy was by nature a fox, but believed in being a hedgehog." If Berlin is right and his dichotomy applies to human beings in general, then we should find hedgehogs and foxes in any field of endeavor. In this brief article, I will show that we

can understand a great deal about the history of modern linguistic morphology in terms of the two categories of thinkers and doers.

First a confession: I am a fox. I find it hard to understand why hedgehogs make the moves that they make. It has always been especially puzzling to me why they react with such vehemence to what strikes me, a fox, as entirely reasonable or even unremarkable. I will give just one example. Together with colleagues, I spent years working on the question of why certain Classical Latin verbs were deponent (Xu, Aronoff, and Anshen 2007). This was an arduous project. We recorded all the senses of every Latin deponent verb in a large dictionary and then categorized these senses into a pre-established set of syntactico-semantic classes. We found that the great majority fell into classes in which the object was not affected, the polar opposite of a prototypical transitive verb. Additionally, we found that deponent verbs derived from nouns or adjectives (nearly half of all deponent verbs) tend to have noncausative senses, again contrary to the prototypical derived transitive. Finally, we found that most deponent verbs not derived from nouns or adjectives contained what we called *deponent roots*, roots that only occur in deponent verbs. To my mind, at least, these results were both surprising and interesting, inviting a number of interpretations, some of which we discussed in our article. In his long review of the book in which it appeared, Müller (2013) devoted one paragraph to our article, noting only that our reluctance to provide a theoretical underpinning for the work is "defeatist." In his summary he remarked on as "truly impressive" only those works that offer "new typological or theoretical ideas." He appeared to have little interest in empirical results that called for theory rather than proposing one. Clearly we are at odds, I a fox, Müller a hedgehog.

2. American Structuralists

The first notable battle between hedgehogs and foxes in linguistic morphology is nicely collected with play-by-play commentary in Martin Joos's *Readings in Linguistics* (1957), an epitome of American structuralist linguistics between 1925 and 1956. In 1947, Charles Hockett and Bernard Bloch each published an article in *Language* on morphological analysis, Hockett's a fairly general summary of how one did "morphemic analysis" and Bloch's a rigorous analysis of English verb inflection with little methodological content (Hockett 1947, Bloch 1947). The influence of Bloch's analysis can still be felt today in much work on English verbs (e.g., Huddleston & Pullum 2002). Eugene Nida responded the next year (Nida 1948). His greatest objection to both articles was that their theories had led their authors to dissatisfying conclusions. For example, Bloch had insisted on "avoiding all reference to the process by which the form is derived" and "analyzing every inflected form as a combination of morphemes in a particular order." Bloch had asserted (without actually demonstrating his claim) that the result is a

"systematization" that is "more uniform and in the long run simpler" (p. 244).[1] Thus, he famously analyzed the English verb *took* as consisting of the base verb followed by a zero past-tense suffix and a lexically conditioned morphophonemic alternation: the base has two alternants (*take* and *took*), the second of which is conditioned by the zero suffix. Nida instead posited a process morpheme in this case, one changing *take* to *took* as the expression of past tense, oblivious of the fact that what lay behind Bloch's entire unintuitive solution was specifically his desire to avoid morphological processes and to express all morphology in terms of simple concatenation. In fact, there is nothing contradictory in Bloch's treatment; it merely puts theory before the facts, a consummate hedgehog move. As Joos notes in his commentary (p. 254): "in principle, Bloch's procedure is to adopt a set of axioms and then to develop the consequences of the set à outrance." As for Nida (p. 271), Joos quipped: "If there can be any such thing as 'common sense' in descriptive linguistics, Nida's work is where we may expect to find it." In truth, hedgehogs and foxes are unlikely ever to agree on which solution is better, because they cannot agree on what is more important: the theory or the conclusion. Hedgehogs value theory above both sensibility and sensibleness. Foxes don't like theories that lead to unenlightening or odd conclusions.

As a fox, this piece of Nida's has always been one of my favorites. It reminds me of Oliver Hardy's constant refrain to Stan Laurel: "Well, here's another nice mess you've gotten me into!" But Nida paid dearly for facing down the theoretical juggernaut. As Terry Langendoen chronicles in his obituary of Nida (2013), this was the last piece that Nida published in *Language*, aside from his presidential address.[2] After 1947, he steered his course away from the community of academic linguists towards renown in the field of translation, the subject of his presidential address (Nida 1969), where he flourished for the rest of his long life. And who can blame him. His greatest legacy to linguistics, his textbook on morphology (Nida 1949), was excoriated in the pages of *Language* for its excessive reliance on semantics rather than distribution in establishing the identity of morphemes (Trager 1951). I sympathize. Having been told in print that anyone who does morphology by itself is doomed to do morphology by himself, I devoted myself to sign language research and university administration for a decade. Yes, morphologists can be crueler than presidents and provosts.

Bloch's analysis of English strong verbs as having a zero suffix accompanied by a lexically conditioned morphophonemic vowel change rule persists among hedgehog morphologists to this day. Embick and Marantz (2005) invoke it without attribution as part of their analysis of the English past tense in their response to the pack of foxes assembled in Ullman et al. (2005). What leads foxes and hedgehogs to have such opposing reactions to this particular analysis? And what irks foxes, in

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[1] Page numbers for these articles are from the Joos volume.

[2] Bloch was the Editor of the journal from late 1939 until his death in 1965.

particular, about it? Nida objected: "It appears to me as strikingly contradictory to treat overt distinctions as meaningless and covert distinctions as meaningful" (256). Certainly, *contradictory* is not the right word here, but still, there is something upside down about the analysis. It says that the readily apparent physical signal of the difference between present tense and past tense forms is a secondary by-product and that the actual linguistic signal is inaudible. The analysis hides what is apparently actually going on. There is also the matter of invoking zeroes, elements that are not just invisible for now but invisible in principle, as the heart of an explanation. For the hedgehog, though, what matters most is that the animal (or linguist) is able to solve the problem with the limited resources it has or has imposed on itself, not whether the analysis is intuitively satisfying.

To be fair, appealing to common sense is not always a reliable way of judging any analysis. Some hedgehogs instead go so far as to make a virtue of necessity by exalting the status of counterintuitiveness and downgrading common sense. After all, successful theories of physics since Newton have never borne much resemblance to the apparent physical reality of our human perceptual world, so maybe counterintuitive analyses are not so bad, maybe they are even good. Counterintuitiveness has a kind of perverse cachet: reality does not lie on the surface that the unelect naively perceive; it is hidden beneath. Robert Hoberman reminds me of the religious saying: *credo quia absurdum est* 'I believe because it is absurd'. This appeal to the occult strikes foxes as merely an excuse for refusing to use the resources at hand and for accepting odd analyses as a consequence. But hedgehogs are natural Miesians. For them, less is always more.

Not surprisingly, what hedgehogs in their turn find annoying about foxes is precisely the opposite trait from the hedgehogs' tendency to want always to make do with less: a baroque even rococo tendency to revel in the invention of all sorts of novel terms, devices, and concepts: lexemes, stems, paradigms, and morphomes, just for starters.

In the end, the lesson to be drawn from this almost seventy-year-old disagreement about which analysis of irregular past tenses in English is better is that neither side is going to convince the other of the correctness of their analysis, because the two sides have very different notions about what makes for a best analysis. The greater mystery is why some people are hedgehogs and some are foxes, but we are not trying to solve that one here.

3. Noam Chomsky: a hedgehog and a fox

James MacGregor Burns opens the preface of the second volume of his biography of Franklin Roosevelt (Burns 1970) with the following sentence:

> The proposition of this work is that Franklin D. Roosevelt as war leader was a deeply divided man – divided between the man of principle, of ideals, of faith, crusading for a distant vision on the one

> hand; and, on the other, the man of *Realpolitik*, of prudence, of narrow, manageable, short-run goals, intent always on protecting his power and authority in a world of shifting moods and capricious fortune.

In the next paragraph he notes: "This dualism between the prophet and the prince was not clear-cut." Burns apparently felt that Roosevelt should have chosen between the two sides of his nature, leading Burns to title the first volume of his biography (Burns 1956) *The Lion and the Fox* after the two natures. He may not have read Berlin or perhaps he thought *lion* was a more dignified epithet than *hedgehog*. But Berlin was not troubled by the possibility of a person being two-faced. He argued that Tolstoy was a fox who believed he was a hedgehog, and remarked that many of us probably harbor aspects of both animals. Most politicians must be foxes, at least in part. If they were pure hedgehogs they would get very little done. The greatest of politicians, like Lincoln and Roosevelt, have balanced the two personas, deploying each side of their nature as called for. The same may be true in other walks of life. Darwin was sometimes a hedgehog and sometimes a fox. Without the mass of pure description that occupied him for most of his life his great theory would have received no support. What about linguists? Are all of us either hedgehogs or foxes or are at least some of us Janus-faced?

Noam Chomsky is usually thought of as an inveterate hedgehog and the moniker is well deserved. In one of his excursions into biology, he goes so far as to make the following suggestion:

> The idea [is] 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)

Of course, these notions of a single organism and universal genome fly in the face of the basic fact of speciation that Darwin's theory of evolution was devised to address, but these are the words of an extreme hedgehog. Still, some of Chomsky's greatest achievements, and certainly his two greatest contributions to morphology, were those of a fox.

In 1957, Chomsky published one of the most important works in twentieth-century thought, *Syntactic Structures*. At this heart of this work lay a stunning piece of morphological analysis. Chomsky is known primarily as a hedgehog theoretician but most of this book is the work of a fox, a very systematic fox. The main, purely syntactic, goal of this book is to argue a need for transformations. The book is set up as a progression of decreasingly desirable and increasingly complex theoretical frameworks for describing language. The first (and best because it is simplest) purely linear Markovian framework fails quickly. Chomsky is forced to introduce a second dimension, that of phrase structure. He then shows that a two-dimensional

theory cannot express certain intuitively satisfactory analyses of simple English constructions. This forces the introduction of yet a third dimension that allows for these analyses, expressed as transforming one phrase-structure-derived string into another through movement.

What makes the entire work so powerful is the intuitive appeal of the transformations, despite their added theoretical complexity: they express clear and simple but previously unnoticed generalizations that are unstatable within a system that permits only phrase structure. While some of transformations are purely syntactic, two of the more compelling ones involve morphology: affix hopping and subject auxiliary inversion. Both are intertwined closely with Chomsky's analysis of the English verb system, certainly the most beautiful piece of linguistic analysis of the century and rivaled in the history of the field only by that of an even younger (21-year-old) Ferdinand de Saussure in his *Mémoire sur le système primitive des voyelles dans les langues indo-européennes* (1879). Like Saussure, Chomsky will always be regarded primarily as a theoretician, but this first achievement, like Saussure's, was analytical and descriptive.

From a theoretical point of view, the most troubling aspect of Chomsky's account is the affix hopping transformation, because the use of transformations greatly increases the expressive power of the grammar and, all else being equal, the best theory is the least powerful one. There have been numerous assaults on the transformation, most prominently that of Gazdar, Pullum, and Sag (1982), which explicitly sets out to demonstrate that a variety of phenomena involving English auxiliary verbs can be handled by a phrase-structure grammar. They show that the affix-hopping analysis can indeed be expressed without resort to transformations, though, at least as far as I can tell, much less perspicuously.[3]

The facts of the account of English verbs have sometimes been called into question (Chomsky ignores semi-auxiliaries like the very common *be going to* or *ought to* and double modals like *might could*, found in certain dialects), along with the need for a transformational theory. But the heart of the analysis remains intact: the marking of morphological tense (past or present) on the first member of the verbal string, the fixed sequence of auxiliary verbs, and the dependency between a particular auxiliary and the morphological form of the following word.

Ever tempted by his inner hedgehog, Chomsky finds it difficult to resist the urge to unify, even in this foxlike analysis of English verb morphology. He proposes (p. 29) the morphemes *S* and *Ø*, "where *S* is the morpheme which is singular for verbs and

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[3] In a long footnote on pages 41 – 42, Chomsky admits that it might be possible to do without transformations, but he concludes that "[t]his approach would miss the main point of level construction . . . , namely to rebuild the vast complexity of the actual language more elegantly and systematically by extracting the contribution to this complexity of several linguistic levels, each of which is simple in itself." This is a fox arguing here.

plural for nouns ("comes," "boys"), and *Ø* is the morpheme which is singular for nouns and plural for verbs." But the fox in him recoils from this solution and a sentence later he notes: "Identification of the nominal and verbal number affix is actually of questionable validity."

Curiously, Nida raised and quickly dismissed the possibility of this analysis of *S* in his 1947 article (418):

> Hockett considers that complementary distribution is all that fundamentally counts. But the implications of this method seem to be greater than he may have anticipated. For example, consider what could be done on that basis with number distinctions in English. Not only would it be possible to combine all the plural affixes of nouns in one morpheme (a step which we should all agree to), but one could say that these are in complementary distribution with the partly homophonous third-singular suffix of verbs. A single morpheme could then be set up with the meaning 'number distinctiveness' . . .

Nida concludes, "If this were done, we should only have succeeded in changing the meaning of the word *morpheme* to apply to certain distributionally related forms." I must confess that I too have claimed that this *S* is a valid entity, but that it is a *morphome* rather than a morpheme. The morphome, though, is a creature that only a fox could love, as we will see below.

A decade after *Syntactic Structures*, having conquered the field, Chomsky awoke to a rebellion among the troops, a resurgence of hedgehogs under the banner of generative semantics (Harris 1993). Though there was no organized school or single theory behind the movement, most generative semanticists sought to lump syntax and semantics together in a single system. In *Aspects of the Theory of Syntax* (1965) Chomsky had proposed that the mapping between the superficial structure of a sentence and its meaning pass through an intermediate level of deep structure. The generative semanticists sought to do away with this intermediate level in favor of a direct mapping between surface structure and meaning. Though published a few years later, a good example of this kind of thinking was Paul Postal's article, "The best theory" (Postal 1972), in which Postal argued that a direct mapping was intrinsically better than one that involved an intermediate stage. Importantly, he did not argue that the direct mapping theory was correct, only that it was better. This is sheer hedgehoggery.

Chomsky's response to the rebels was a single article on English morphology, his last major contribution on that topic (Chomksy 1970). It took a while for this subtle counterattack to take effect, but within a few years generative semantics was effectively neutralized. The article dealt with what he called "nominalization" or "derived nominals" in English, what we would now call deverbal nouns. I have discussed the article at length elsewhere (Aronoff 2013) as an example of the balance among description, analysis, and theory in accounting for a set of facts. In the context of foxes and hedgehogs, and with the hindsight of forty years, what is most striking about the article is the way in which Chomsky uses facts alone to

support his basic claim, which is that verbs and nouns with the same root cannot be related by meaning-preserving transformations. This claim is entirely empirical and independent of any theory or analysis. It has never been questioned:

> The idiosyncratic character of the relation between the derived nominal and the associated verb has been so often remarked that discussion is superfluous. Consider, for example, such nominals as *laughter, marriage, construction, actions, activities, revolution, belief, doubt, conversion, permutation, trial, residence, qualifications, specifications*, and so on, with their individual ranges of meaning and varied semantic relations to the base forms. There are a few subregularities that have frequently been noted, but the range of variation and its rather accidental character are typical of lexical structure. To accommodate these facts within the transformational approach (assuming, as above, that it is the grammatical relations in the deep structure that determine meaning), it is necessary to resort to the artifice of assigning a range of meanings to the base forms, stipulating that with certain semantic features the form must nominalize and with others it cannot. Furthermore, the appeal to this highly unsatisfactory device, which reduces the hypothesis that transformations do not have semantic content to near vacuity, would have to be quite extensive. (Remarks, p. 189)

Berlin says of foxes: "their thought is scattered or diffused, moving on many levels." With this characterization in mind, contrast the analysis of verbs in *Syntactic Structures* and the paragraph just cited. The first is purely distributional, worthy of Bloch or Hockett or Trager and almost morphomic in its disregard for semantics, which is completely absent from the entire analysis. Chomsky is concerned simply with getting the forms and their order right. The core of "Remarks," by contrast, is not an analysis at all, but a statement of facts that defy analysis. There is no consistency in method or theory between the two. As Berlin says in closing his sentence, foxes "seiz[e] upon the essence of a vast variety of experiences and objects for what they are in themselves." Of course, the ultimate goal of any science is to understand objects for what they are in themselves. The fox achieves this goal by whatever means are available. It is up to the hedgehog to try to unify this work.

4. Scylla and Charybdis

Remarks opened the door for a raft of work on morphology, both derivational and inflectional. I won't go through a history of this project, whose current state is covered in the rest of this volume, but I will discuss the division between foxes and hedgehogs that has persisted in linguistic morphology since the publication of Chomsky's article. Central to *Remarks* and everything that follows it is the tension between rules and the lexicon (Pinker 1999). The items in the lexicon, whether they are morphemes, words, phrases, sentences, or all of the above, are irregular by

definition (Bloomfield 1933; DiSciullo and Williams 1987). Morphology must negotiate between the two. In this way it is very different from syntax, where the irregular lexical content is limited to collocations, idioms, and fixed phrases, which comprise a very small part of the domain of inquiry.

Morphology is filled with small and sometimes odd regularities. What to do with them? Remember what Berlin said about foxes. They "entertain ideas that are centrifugal rather than centripetal, their thought is scattered or diffused, moving on many levels." As a result, foxes do very well in this sort of ecosystem, with all its unpredictabilities. The downside is that foxes may be satisfied with smaller pickings and less focused on or even interested in the big picture. Hedgehogs, by contrast, "relate everything to a single central vision, one system less or more coherent or articulate, in terms of which they understand, think, and feel—a single, universal, organizing principle in terms of which alone all that they are and say has significance." Hedgehogs are not so easily satisfied with a diet of many small tasty morsels, partial generalizations.

If morphological foxes are by nature willing to accept a much less unified view of language than are hedgehogs, this difference applies both within morphology itself and in how morphology relates to other aspects of language. A major tenet of Distributed Morphology, the most popular hedgehog framework, is Alec Marantz's *single engine hypothesis* (Julien 2002, Arad 2006), according to which a "single engine" is responsible for both syntactic and morphological structure. Driving this hypothesis is the exact same hedgehog impulse that lies behind Postal's Best Theory. Foxes have trouble making sense of the single engine hypothesis, because they can't fathom the unifying urge behind it. Sure, morphology and syntax share many things, say the foxes, but they are not exactly the same thing. Maybe there is a single engine driving aspects of both syntax and morphology, but there are morphological phenomena that have nothing to do with syntax, just as there are syntactic phenomena that have nothing to do with morphology. As morphologists, we are particularly interested in precisely these non-syntactic aspects of morphology. If not, we would have decided to become syntacticians.

To a fox, trying to reduce morphology to syntax is a bit like trying to reduce biology to physics and chemistry. No one would question the fact that biology depends on physics and chemistry, that they are more basic. Nothing in biology is physically or chemically impossible but that does not mean that there are no biological phenomena or even principles that are not physically or chemically necessary. The problem is that life is not necessary but contingent by its very nature, an accidental confluence of certain physical and chemical circumstances. So too with the actual evolution of any given species. Once life gets started, the principles of evolution, combined with physics and chemistry, determine very broadly what is possible, but they have no predictive power in the face of historical accident.

Hedgehogs dislike contingency, perhaps because they are so single-minded that contingencies are just an annoyance that gets in the way. Contingencies explain nothing for a hedgehog. Foxes are flexible and versatile creatures who delight in contingency, new circumstances and surprises, because novelties allow them to

show off all their tricks. Morphology, like life, is filled with contingencies, and so it is a happy hunting ground for the ever-adaptable fox.

5. The waste remains and kills

Morphological systems vary greatly in the extent and type of their complexity, making morphology a playground for foxes. For hedgehogs, this variety presents a worrisome challenge: how to reduce the riot to some semblance of generality. Both creatures search for consistencies but consistencies of very different sorts. The wiliest fox comes armed with few expectations and succeeds by observing its prey and detecting the variety of patterns that emerge from its behavior. These patterns sometimes differ greatly from one language to the next. For a hedgehog, the differences are disconcerting; for a fox, they are fun. Consider systems of grammatical gender. Fewer than half the languages in the WALS sample of 258 languages (Corbett 2013) have grammatical gender at all, though all distinguish three persons and only ten percent show no plural marking on nouns. Of the 112 languages that have grammatical gender, 50 have two genders, the rest three or more. Those with two are based on sex, humanness, or animacy, though the assignment of individual nouns to one gender or another can often be puzzling. Those with three often combine humanness, animacy and sex (again with the usual array of oddities), but once we get beyond three, it is difficult to make any predictions. Djirbal, whose gender system has been much written about (Dixon 1972, Lakoff 1987), has four genders. One contains mostly human males and other animates, another contains most human females, water, fire, and words relating to fighting, along with a few birds and animals, a third contains most non-flesh foods, and the fourth is a catch-all residual class. Most of the languages with five or more genders are members of the Niger-Congo family, where sex is absent from the gender system but a number of other factors have been added alongside humanness and animacy, including shape. A few of these, as well as the languages of Papua-New Guinea that are known to have large numbers of genders, also add phonological criteria. Apparently, as the number of genders in a language increases, so does their variety.

The hedgehog may derive some consolation from the fact that only a tenth of the world's languages have more than four genders. But the hedgehog might also deride this seeking out and flaunting of exotic gender systems on the fox's part as the work of an eighteenth-century collector looking mostly to fill his cabinet of curiosities, rarities, and monsters. This is not science! Science seeks generalizations. And when the hedgehog does find true generalization in what appears on the surface to be a hodgepodge, even the fox applauds. Bobaljik 2012 is an example of how it is possible to explain a broad diversity of morphological facts across a wide range of languages by means of a single abstract theoretical principle. The book deservedly won an award. But an at least equally frequent strategy is to simply dismiss the curiosities as just that, to deal with "the clear cases" first.

I know of no hedgehog treatments of the diversity of gender systems, but, because person systems are better behaved, there are plenty of theories about person, some of them quite "formal" (Ackema and Neeleman 2013, Harbour 2011, Harley and Ritter 2002), others more grounded in discourse (Cysouw 2003, Wechsler 2010). Number lies between gender and person in its diversity: the values for grammatical number vary more widely across languages than do those for person, but their range is implicationally predictable for the most part (trial > dual > singular & plural). There is very little work on number by either hedgehogs or foxes. It's as if the topic is neither diverse enough nor structured enough to attract much attention from either side (Kibort and Corbett 2008).

6. His vorpal sword

Lewis Carroll's *Jabberwocky* is of great value to syntacticians and morphologists for its demonstration of the power of both syntax and word coinage. As Alice herself remarked upon hearing the poem:

> "It seems very pretty," she said when she had finished it, "but it's rather hard to understand!" (You see she didn't like to confess, even to herself, that she couldn't make it out at all.) "Somehow it seems to fill my head with ideas—only I don't exactly know what they are! However, somebody killed something: that's clear, at any rate."

Charles Dodgson, who write the Alice books under a pen name, was a mathematician and logician. He spent his career as a Lecturer in mathematics at Christ Church College at Oxford and published widely, both in serious and "recreational" mathematics. The Alice books were filled with mathematical and logical allusions and, though there is no textual or other support for the idea, I like to think that the vorpal sword with which the nameless hero of the poem slew the Jabberwock was Ockham's razor and that the Jabberwock, the Jubjub bird, the frumious Bandersnatch, and all the other nonsense terms in the poem were names for nonexistent creatures, entities multiplied beyond necessity.

Ockham's razor is the weapon of choice of all hedgehogs and the multiplication of entities is their nemesis. Ockham never suggested that entities should never be multiplied, only that a solution with fewer entities is better than one with more, just so long as the two solutions cover exactly the same set of data. But because hedgehogs dislike multiplication in principle, they are always on the lookout. They keep their razors ready to hand, just in case.

Much of the history of linguistic morphology over the last forty years consists of a back-and-forth struggle between entity-multiplying foxes and razor-carrying hedgehogs. The foxes propose a new morphological concept and the hedgehogs set upon it, ready always to show how this concept can be reduced to something 'simpler'. A good example is the morphological paradigm. The last quarter century has seen a number of influential proposals that depend on paradigms, including Carstairs-McCarthy's work on allomorphy and inflectional classes (Carstairs-McCarthy 1987), an influential collection edited by Franz Plank (Plank 1991),

Gregory Stump's paradigm function morphology (Stump 2001), Albright's work on leading forms (Albright 2008), and the importance of paradigms in phonology (Downing et al. 2004), especially paradigm uniformity effects (Steriade 2000). I have cited only a single work for each of these areas, but the literature is very large.

Bobaljik (2002) sets out to demonstrate that "paradigms are epiphenomenal, derived constructs" (54). He sees getting rid of paradigms as good, because they require "extra expressive power . . . within UG" (55). The first point might be true, but that does not mean that paradigms play no role in language, as Bobaljik concedes in his first footnote, which mentions "grammatical principles which refer directly to these structures" (78). Nowhere in his article does he attempt to refute the possibility of such principles. Bobaljik seems mostly concerned that paradigm structure might be part of U(universal) G(rammar) and paradigms therefore *entia praeter necessitatem*. But most of those who think in terms of paradigms haven't thought about whether they are *entia* in the strict sense of the term: irreducible elements of a theory. Few scientific concepts qualify for this status. Species certainly cannot be *entia*. That is the whole point of Darwin's revolution. But that does not mean that species is not a useful concept for discussion evolution.

To be fair, Williams (1994), about which Bobaljik is most exercised, does call a paradigm "a real object" (22), but it is not clear that Williams meant the term *real object* to be taken quite as seriously as Bobaljik does, and even if he did, few if any other morphologists do, though they freely invoke paradigms. Why take up 30 pages of a journal arguing against this straw man? Because splitters must be stopped! Bobaljik's second claim, about expressive power, is specious, though it tells us much about a hedgehog's desire to make do with less. Bobaljik never produces any evidence for his assertion that positing paradigms as *entia* leads to run-away expressive power; in particular he does not prove that paradigms lead to expressive power beyond that of a finite-state transducer, which all theories that incorporate phonological rewrite rules have (Johnson 1972), including Distributed Morphology with or without paradigms. And even if paradigms did lead to greater expressive power, that would not make it wrong to posit paradigms as basic elements if they proved to be useful, just as Chomsky did with transformations (while acknowledging their undesirability and expressive power). It would only make the theory less desirable on some meta-level that practicing scientists rarely worry about.

Another favorite target of morphological hedgehogs is the stem. Stems are among my favorite objects, real or not. The common definition of a stem, which I take here from the OED, is simple: "the theme of a word (or of a particular group of its cases or tenses), to which the flexional suffixes are attached." Stems become interesting when we look in more detail at the particular sets of cells around which paradigms are organized. This is because, as I first argued in Aronoff (1994), not all stems can be defined cleanly in morphosyntactic terms; some stems are morphomic (Maiden 2005). Bonami and Boyé (2002) established the notion of a stem space to denote the distribution of stem types in a paradigm's cells. For French verbs, Bonami, Boyé, and Kerleroux (2009) established 13 distinct distributions (of which one is reserved

for nominal derivation), each of which is a stem type: individual verbs may have a number of stems, each of which falls into one of these distributional types. Of course, no verb has 13 stems. Regular verbs have only one and most irregular verbs have a small number, but 13 is the theoretical maximum for French. Adjectives and nouns in French, which show little inflection, have a maximum of two stems, hence two stem types. In Aronoff (2012), I discussed a number of stem types in French verbal morphology, the most interesting and best known of which is what I called the PIPS stem, after its distribution: *present plural/imperative plural/subjunctive (plural)/imperfect/present participle stem*. The most common form of the French PIPS stems contains a –*Vss*- augment descended from the Latin inchoative suffix –*sc*-. It is the normal PIPS stem form in 2nd declension verbs like *finir 'finish'.* For these 'semi-regular' –*ir* verbs and many other verbs, the stem of plural present indicative forms (*finiss-ons, finiss-ez, finiss-ent*) is identical to the stem of all imperfect verb forms (*finiss-ais* etc.), all forms of the subjunctive, and the present (active) participle (*finiss-ant)*. As the reader can see at a glance, the distribution of this stem type is not morphosyntactically simple but rather involves a disjunctive enumeration (and cannot therefore be subject to analyses involving impoverishment or underspecification that do not abuse the notion of morphosyntactic feature). This stem type is therefore *morphomic*, in the sense of Aronoff (1994) and in the spirit of Maiden (1992). It is defined purely in terms of distribution, which would have warmed the heart of Bloch and Hockett.

Embick and Halle (2005) question the need for "the move to stems" (p. 1) and try to show that the same set of phenomena that calls for morphomic stem types can be accounted for by means of readjustment rules. In fact, as I argue at length in my 2012 article, they do no such thing. Instead, they use readjustment rules to encode suppletion, in the belief that readjustment rules are formally less powerful than suppletion, a claim that they do not bother to attempt to demonstrate. More importantly, they miss the point of what stem types are about, regardless of how the relation between a root and a stem is to be stated: stem types are *distributions*. Thus, even if one uses readjustment rules, the sets of environments in which these rules operate will recur over and over again. Stem types are thus more dangerous to the hedgehog even than paradigms, because they are by definition not *entia* but rather emergent, contingent accidents of history, as Martin Maiden has shown many times over (Maiden 2005 and elsewhere). They are like Monty Python's Spanish Inquisition. No one expects them. That is why only a fox could love a morphome.

Embick (to appear) is couched as a response to Aronoff (2012). In fact, Embick does not address the central question of whether morphomic stem distributions exist. Though never offering any evidence, he suggests that they don't, or at least that they shouldn't:

> Throughout the discussion, I will put to the side the question of whether the (by definition) morphomic distributions are actually found, and illustrate the main points of the argument schematically. In my view, many of the arguments for putative morphomes advanced

in the literature are less than conclusive, but I will abstract away from this point here.

In place of evidence, Embick offers a complex technical solution for stem shapes involving diacritics. The basic idea is that, whenever a particular stem is called for in a given cell, say the French PIPS stem, the cell will bear a particular diacritic.[4] This diacritic will then call whatever morphophonological rules are needed to derive the stem. This is a fine technical solution, but it has nothing to do with the central empirical claim, which is that morphomic distributions of stems exist. All it does is substitute a morphomic distribution of diacritics for a morphomic distribution of stems. The waste remains, the waste remains and kills.

My mentor, the most formidable linguistic hedgehog I have known, used to say that when facts appear to contradict the theory one should always question the facts. This is the hedgehog's last defense against the fox: roll up into a ball and pretend that the fox is not there. This succeeds only if the fox goes away. A clever fox waits. Eventually, the hedgehog has to unroll and expose its underbelly. Then the fox will pounce.

7. Can we all get along?

Real hedgehogs fear real foxes, because hedgehogs are the foxes' prey. Whether they dislike them we will never know. But morphological hedgehogs have adopted, instead of fear, a profound disdain for us foxes, bordering on contempt. Marantz (1997), sets out to "dump lexicalism" (2) and the article has a section heading bearing the title "'Remarks on Nominalization' kills lexicalism to death." It's no small wonder that Edwin Williams, one of the main targets of Marantz's scorn, entitled his response (Williams 2007) "Dumping lexicalism." Lexicalism, as I commented above in my discussion of "Remarks," is a fox's claim: it is entirely empirical in nature, which is why Marantz cannot understand it, and why he believes that Chomsky's article was about theory. Yes, that article contained a sketch of a theory, but one that has little bearing on the central factual claim, unless one is willing to ignore the facts by denigrating those who work to show the truth rather than figs. Foxes are not sycophants.

I noted above Müller's characterization of our work on Latin deponents as "defeatist". What evoked this response in Müller was the following line of ours, which he quotes: "Can the relation between Latin deponency and physical affectedness be deduced from any theoretical framework? We leave [this question] for more ambitious folk" (143). Müller is offended by the presentation of facts outside a theory as much as by our lack of ambition. Embick's response to empirical claims about morphomic stem distribution is that "current synchronic theories of

[4] Since Embick eschews paradigms and cells, he expresses things a bit differently, but thinking in terms of cells is easier for me.

stems . . . do not hold more theoretical interest than an enumeration of the facts." Later in the same article, following in Müller's footsteps, he scolds us foxes because work on morphomic stems "does not raise any questions of theoretical significance." He contrasts this with works by other hedgehogs "that are laying the foundations for a truly integrated theoretical framework."

What raises all these hedgehogs' bristles appears to be that foxes like facts and especially factual generalizations. They do not show enough interest in theory or much respect for bristles. The hedgehogs must not have read Berlin, who reminds us that a fox's "thought is scattered or diffused, moving on many levels, seizing upon the essence of a vast variety of experiences and objects for what they are in themselves." Hedgehogs, by contrast, "consciously or unconsciously, seek to fit [experiences and objects] into, or exclude them from, . . . one unchanging, all-embracing, sometimes self-contradictory and incomplete, at times fanatical, unitary vision." Foxes don't care much for theories. What they care about are "ideas that are centrifugal rather than centripetal," things like morphomic stems. The claim that morphomes, stems and other kinds, exist has never been a theoretical claim, but rather an empirical claim and a fox delights in empirical generalizations, because, unlike the famously nearsighted hedgehog, who can find only what it is looking for, no guiding theoretical principles restrict the vulpine vision of a cunning fox.

Hedgehogs have a unitary vision. Certainly, theoretical linguistics has been dominated for over half a century by various examples of what Embick calls a truly integrated theoretical framework. Chomsky's earliest vision (Chomsky 1975)[5] was clearly of a unified linguistic theory. But that grand vision has now been whittled down to the narrow faculty of language of Hauser, Chomsky, and Fitch (2002), which encompasses only a very small aspect of syntax and nothing beyond syntax. The rest is interfaces, experience, or what Chomsky (2005) calls "third factors." On this new view, languages result from the intersection of a number of distinct factors, not necessarily integrated in the ways Embick and his fellow hedgehogs would like them to be.

Third factors are just what foxes are best at working with, precisely because a fox's thinking is more scattered and diffuse and not unitary. For example, over the past decade, our sign language research group has found that the human body plays an important role in the grammatical organization of sign languages (Aronoff et al. 2005, Meir et al. 2007), including a number of constructions that are commonly found among sign languages but peculiar to them. The human body is thus a third factor, although, unlike the ones that Chomsky enumerates, it is not a disembodied abstract principle of the sort that theoreticians prefer, but simply a fundamental biological and physical property of humans. But extra-linguistic principles of the

[5] The publication date of this work is deceptive. It was written in 1955. See the preface for historical background.

exact sort that Chomsky has mentioned have also been shown to be third factors central to the organization of language. In recent work, Mark Lindsay and I have shown that Darwinian competition, related to what Chomsky calls "principles of efficient computation," can be very fruitfully applied to longstanding problems involving what used to be termed *rival affixes* (Lindsay & Aronoff 2013). There is no reason to believe that any aspects of this competition are unique to language, or to biology for that matter. Competition is simply something that drives the emergence of stable systems of all sorts, from neuronal organization to solar systems. Another very well known factor that is independent of language but plays a role in its organization is frequency, or its Hebbian neurological correlate (Hebb 1949 and much subsequent work). I suspect that competition and frequency, together with computational efficiency, play a large role in the emergence and persistence of morphomic phenomena. If this turns out to be right, it would be of value to theoreticians, because they would no longer feel that they had to dismiss the phenomenon as improbable. The point is that any field needs hedgehogs and foxes. In the words of Rodney King, "can we all get along?"

REFERENCES

Ackema, Peter, and Ad Neeleman. 2013. Person features and syncretism. *Natural Language and Linguistic Theory* 31. 901-950.

Albright, Adam. 2008. Explaining universal tendencies and language particulars in analogical change. In J. Good (Ed.), *Language Universals and Language Change*. Oxford: Oxford University Press. 144–181.

Arad, Maya. 2005. *Roots and Patterns: Hebrew Morpho-Syntax*. Dordrecht: Springer.

Aronoff, Mark. 1994. *Morphology By Itself: Stems And Inflectional Classes.* Cambridge, MA: MIT Press.

Aronoff, Mark. 2012. Morphological stems: what William of Ockham really said. *Word Structure* 5. 28-51.

Aronoff, Mark. 2013. Face the facts. In *Foisonnements morphologiques: études en hommage à Françoise Kerleroux*. Ed. by Florence Villoing and Sophie David. Paris: PUPO. 307-324.

Aronoff, Mark, Irit Meir, and Wendy Sandler. 2005. The paradox of sign language morphology. *Language* 81.301-344.

Berlin, Isaiah. 1953. *The Hedgehog and the Fox*. London: Weidenfeld and Nicholson.

Bloch, Bernard. 1947. English verb inflection. *Language* 23.399-418.

Bloomfield, Leonard. *Language*. New York: Holt, Rinehart, and Winston.

Bobaljik, Jonathan. 2002. Syncretism without paradigms: Remarks on Williams 1981, 1984. *Yearbook of Morphology 2001.* 53-85.

Bobaljik, Jonathan. 2012. *Universals of Comparative Morphology: Suppletion, Superlatives, and the Structure of Words*. Cambridge, MA: MIT Press.

Bonami, Olivier and Gilles Boyé 2003. Supplétion et classes flexionnelles dans la conjugaison du français. *Langages* 15.102–126.

Bonami, Olivier, Gilles Boyé, and Françoise Kerleroux. 2009. L'allomorphie radicale et la relation flexion-construction. In Bernard Fradin, Françoise Kerleroux and Marc Plénat (Eds.), *Aperçus de morphologie du français*. Saint-Denis: Presses Universitaires de Vincennes. 103–125.

Burns, James McGregor. 1956. *Roosevelt: The Lion and the Fox*. New York: Harcourt Brace.

Burns, James McGregor. 1970. *Roosevelt: The Soldier of Freedom*. New York: Harcourt Brace Jovanovich.

Carstairs-McCarthy, Andrew. 1987. *Allomorphy in Inflexion.* London: Routledge.

Chomsky, Noam. 1957. *Syntactic Structures*. The Hague: Mouton.

Chomsky, Noam. 1965. *Aspects of the Theory of Syntax.* Cambridge, MA: MIT Press.

Chomsky, Noam. 1970. Remarks on nominalization. In Roderick Jacobs and Peter Rosenbaum (Eds.), *Readings in English Transformational Grammar*. Waltham, MA: Ginn and Co. 184-221.

Chomsky, Noam. 1975. *The Logical Structure of Linguistic Theory*. New York: Plenum.

Chomsky, Noam. 2005. Three factors in language design. *Linguistic Inquiry* 45.463-481.

Chomsky, Noam. 2012. *The Science of Language: Interviews with James McGilvray.* Cambridge: Cambridge University Press.

Corbett, Greville G.. 2013. Number of Genders. In: Dryer, Matthew S. & Haspelmath, Martin (eds.). *The World Atlas of Language Structures Online.* Leipzig: Max Planck Institute for Evolutionary Anthropology. (Available online at http://wals.info/chapter/30, Accessed on 2014-08-27.)

Cysouw, Michael. 2003. *The Paradigmatic Structure of Person Marking*. Oxford: Oxford University Press.

de Saussure, Ferdinand. 1879. *Mémoire sur le système primitive des voyelles dans les langues indo-européennes*. Leipzig: Teubner.

DiSciullo, Anna Maria, and Edwin Williams. 1987. *On the Definition of Word*. Cambridge, MA: MIT Press.

Dixon, R. M. W. 1972. *The Djirbal Language of North Queensland*. Cambridge: Cambridge University Press.

Downing, Laura J., T. Alan Hall, and Renate Raffelsiefen. 2004. *Paradigms in Phonological Theory*. Oxford: Oxford University Press.

Embick, David. To appear. On the distribution of stem alternants: Separation and its limits. To appear in Ricardo Bermúdez-Otero and Ana Luís (Eds.) *The Morphome Debate: Diagnosing And Analyzing Morphomic Patterns*.

Embick, David, and Morris Halle. 2005. On the status of stems in morphological theory. In Twan Geerts, Ivo van Ginneken, and Haike Jacobs (Eds.), *Romance Languages and Linguistic Theory 2003*. Amsterdam: John Benjamins. 37-62.

Embick, David, and Alec Marantz. 2005. Cognitive Neuroscience and the English Past Tense: Comments on the Paper by Ullman et al." *Brain and Language* 93.243-247.

Gazdar, Gerald, Geoffrey Pullum, and Ivan Sag. 1982. Auxiliaries and related phenomena in a restrictive theory of grammar. *Language* 58.591–638.

Harbour, Daniel. 2011. Descriptive and explanatory markedness. *Morphology* 21.223-245.

Harley, Heidi, and Elizabeth Ritter. 2002. Person and number in pronouns: A feature-geometric analysis. *Language* 78.482-526.

Harris, Randy Allan. 1993. *The Linguistics Wars.* Oxford: Oxford University Press.

Hauser, Marc, Noam Chomsky, and Tecumseh Fitch. 2002. The faculty of language: what is it, who has it, and how did it evolve. *Science* 198. 1569-79.

Hebb, Donald. 1949. *The Organization of Behavior*. New York: Wiley & Sons.

Hockett, Charles. 1947. Problems of morphemic analysis. *Language* 23.321-343.

Huddleston, Rodney, and Geoffrey Pullum (Eds.) 2002. *The Cambridge Grammar of the English Language*. Cambridge: Cambridge University Press.

Johnson, C. Douglas 1972. *Formal Aspects of Phonological Description*. The Hague: Mouton.

Joos, Martin. 1957. *Readings in Linguistics: The Development of Descriptive Linguistics in America since 1925*. Washington: ACLS.

Julien, Marit. 2002. *Syntactic Heads and Word Formation*. Oxford: Oxford University Press.

Kibort, Anna & Greville G. Corbett. "Number." Grammatical Features. 25 January 2008. http://www.grammaticalfeatures.net/features/number.html.).

Lakoff, George. 1987. *Women, Fire, and Dangerous Things: What Categories Reveal about the Mind*. Chicago: University of Chicago Press.

Langendoen, D. Terence. 2013. Eugene Nida. *Language* 89.163-169.

Lindsay, Mark, and Mark Aronoff. 2013. Natural Selection in Self-Organizing Morphological Systems. In *Morphology in Toulouse: Selected Proceedings of*

Décembrettes 7, ed. by Fabio Montermini, Gilles Boyé, and Jesse Tseng. Germany: Lincom Europa. PAGES

Maiden, Martin. 1992. Irregularity as a determinant of morphological change. *Journal of Linguistics* 28. 285-312.

Maiden, Martin. 2005. Morphological autonomy and diachrony. *Yearbook of Morphology 2004*. 137-75.

Marantz, Alec. 1997. No escape from syntax: Don't try morphological analysis in the privacy of your own Lexicon. In Alexis Dimitriadis, Laura Siegel, Clarissa Surek-Clark, and Alexander Williams (Eds.). *Proceedings of the 21st Annual Penn Linguistics Colloquium: Penn Working Papers in Linguistics 4*: 2. 201-225.

Meir, Irit, Carol Padden, Mark Aronoff, and Wendy Sandler. 2007. Body as subject. *Journal of Linguistics 43*. 531-563.

Müller, Gereon. 2013. Review of Baerman, Corbett, Brown, and Hippisley. *Word Structure* 6.100-122.

Nida, Eugene A. 1948. The identification of morphemes. *Language* 24.414-441.

Nida, Eugene A. 1949. *Morphology: The Descriptive Analysis of Words.* 2nd edn. Ann Arbor: University of Michigan Press.

Nida, Eugene A. 1969. Science of translation. *Language* 45.483-498.

Pinker, Steven. 1999. *Words and Rules: The Ingredients of Language*. New York: Basic Books.

Plank, Frans. 1991. *Paradigms: The Economy of Inflection*. Berlin: Mouton de Gruyter.

Postal, Paul M. 1972. The best theory. In S. Peters (Ed.), *Goals Of Linguistic Theory*. Englewood Cliffs, NJ: Prentice-Hall. 131-170.

Steriade, Donca. 2000. Paradigm uniformity and the phonetics-phonology boundary. In Michael Broe and Janet Pierrehumbert (Eds.). *Papers In Laboratory Phonology V. Acquisition and the Lexicon.* Cambridge: Cambridge University Press. 313-334.

Stump, Gregory. 2001. *Inflectional Morphology: A Theory of Paradigm Structure*. Cambridge; Cambridge University Press.

Trager, George L. 1951. Review of Nida 1949. *International Journal of American Linguistics* 17.126-131.

Ullman, Michael T., Roumyana Pancheva, Tracy Love, Eiling Yee, David Swinney, and Gregory Hickok. Neural correlates of lexicon and grammar: Evidence from the production, reading, and judgment of inflection in aphasia. *Brain and Language* 93.185-238.

Wechsler, Stephen 2010. 'What "You" and "I" Mean to Each Other: Person Marking, Self-Ascription, and Theory of Mind.' *Language*. 86.332-365.

Williams, Edwin S. 1994. Remarks on lexical theory. *Lingua* 92. 7-34.

Williams, Edwin. 2007. Dumping lexicalism. In Gillian Ramchand and Charles Reiss (Eds.). *The Oxford Handbook of Linguistic Interfaces*. Oxford: Oxford University Press. 353-382.

Xu, Zheng, Mark Aronoff, and Frank Anshen. 2007. Deponency in Latin. In Matthew Baerman, Greville G. Corbett, Dunstan Brown, and Andrew Hippisley (eds.) *Deponency and Morphological Mismatches*. (Proceedings of the British Academy 145.) 127-143. Oxford: Oxford University Press.