The Matter of Morphological Metaphors

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My father, Glen Acorn, is a lawyer. He still works, part time, at 83, and his specialty is legislative drafting (he was at one time the Legislative Counsel for Alberta). I am told that most other lawyers think drafting is a necessary and important "service," but also difficult and dull. Dad, on the other hand, loves it, is good at it, and never liked the courtroom—he's a solicitor at heart, not a barrister, and he loves the English language. I often speculate that my own affinity for words and writing is somehow connected to his.

I was thinking about legal drafting the other day, while working on a morphology project. I like morphology, and I was glad to have a chance to get back into it, but I realize that many biologists see morphology as a dull, arcane service as well. Many also see it as anachronistic now that the molecular era is upon us, while others (myself included) see morphology as an important reality check against molecular results in systematics. After all, morphology lays claim to a sort of basic objectivity, even if this aspect of the science is often described in derogatory terms, such as "merely" or "purely descriptive."

In the legal drafting world, the late, great American authority (and friend of my father's) Reed Dickerson famously claimed that a good legal drafter becomes an "emotional oyster" in order to do the job properly. The drafter simply takes instructions (typically from elected officials) and produces the legislation they ask for, without the addition of any art, style, or intrusion on the original intent of the law. Dickerson, who died in 1991, probably didn't know much about the biology of real oysters, but most people would agree that even if oysters have emotions, they really don't show them very well. Either way, my father never quite agreed with Dickerson on this point. But are morphologists emotional oysters too? Do we write about structure the way drafters write legislation, without art, style, or interpretation? Or can we mix the careful study of words with the careful study of animal anatomy?

Let's start with what I suspect is the strangest aspect of morphological terminology—many of our terms serve as both adjectives and as verbs. For example, we often say that a structure is rounded, when we could just as easily describe it as round. The word round is clearly an adjective, describing something that shares some aspect of its shape with a circle. But the word rounded, even when used as an adjective, implies either that the thing is, in fact, round, or that is has become rounded through some process of rounding (evoking the verb "to round"). Do you see the issue here? Structure is static (at least it is on a dead specimen), but we generally describe structure in terms that suggest modification from some previous condition. Was an elongated (or simply "elongate") beetle once more stocky? Was a curved line once straight, a straightened line once wiggly, a roughened surface once smooth, or a constricted pronotum once broad? It seems obvious to me that the structures we are describing are not actually changing at all—they are just "sitting there." Metaphor is involved here, and I am fascinated by metaphor in science.

These terms, serving as both verbs and adjectives, are called participles, and here I am specifically interested in past participles—those that suggest a prior action. My classicist friend Selina Stewart tells me that the way participles work has been a bit of a puzzle for linguists as well (although not for a while—the paper she referred me to was written by Frederick Hansen in 1889), and when she read over some of Linnaeus' original descriptions in *Systema Naturae* she confirmed that biologists have been describing things through the use of participles for as long as we have been doing taxonomy. I have also been informally polling my entomologist and paleontologist colleagues on this subject, and so far the results have been quite interesting. For one thing, I'm finding that almost no one in my circle of friends has ever thought much about it. This surprised me, since I fully expected someone to point me in the direction of some standard treatise on the subject, written by an eminent biologist from a past era.

When I explained my concerns about metaphors and participles, the first response I got from my colleagues was that we use this sort of language as an evolutionary shorthand, since we generally know something about the phylogenetic history of the organisms we describe. Of course, this implies knowledge of homologies—which features of taxon A are the equivalents of which features of taxon B—but this is true of all morphology, and doesn't necessarily require an evolutionary perspective. Moth antennae were "the same thing as" beetle antennae long before the days of Darwin. Still, if we were to say, about a particular beetle, "light areas of the color pattern expanded" and "last segment of maxillary palpus abbreviated," it sounds a heck of a lot like we are saying that the ancestor of this particular creature possessed a pattern on which the light areas were not so extensive, and a palpal segment that was full-sized.

Once you learn to read descriptions with participles in mind, other odd metaphors begin to stand out as well. For example, why do we use possessive language when describing insect structure? How can one insect "possess" a structure (a spot on a butterfly wing, for example) while another

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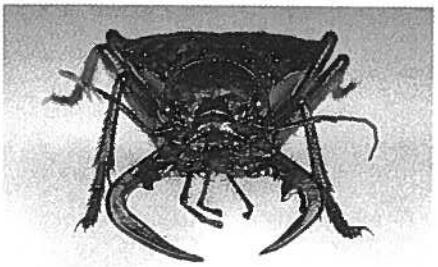
"lacks" that same feature? Surely the whole insect developed as one, and the structure in question was never an add-on, or an option. Is there a developmental metaphor at work here, in which the individual comes to possess new features as it grows? On the other hand, is it possible that we might think in terms of the mind-body dualism, the way people refer to "my mind" and "my left foot" as possessions, rather than thinking that their mind is, in fact, the central aspect of "them," and that their left foot is also part of "them," although a part that is, in some medical sense, optional. Here, the subject becomes confusingly metaphysical, overlapping with the philosophy of mind.

It gets even stranger when you encounter the occasional time-based description of a structure. For example, when segments "become shorter later on in the antenna" or "as you go down the antenna," you can't help but take a little imaginary trip along the flagellum, right? Sometimes what is being described is what artists call the eye-line—the path that your eyes follow, along, for instance, a sinuous curve. This is how things that are pointy also appear to point in particular directions, as in "a posteriorly directed spine."

Perhaps, instead of describing evolutionary or developmental change, we might be describing deviation from an idealized, central, prototypical condition. This explanation makes some sense to me, since it relies on the way people conceptualize categories, and not on any particular assumption about evolution or growth. It makes sense to think that our descriptions compare the condition in the prototypical insect to the condition in the specimen at hand, using language that encourages us to imagine one transforming to become the other. In some instances, the way an insect is described can even make it sound as if



Does the *Manticora* tiger beetle really possess elongated mandibles, reduced eyes, and a constricted prothorax?

the insect was drawn, painted, or sculpted. What are we to make of "converging lines on a yellow-green background?" The lines only converge if you think of them as paths, as in the path of a pen, and the background is only the background if it was created before, and separate from, the lines. Can structures be "outlined" without the action of an outliner? Consider as well how some descriptive terms sound as if the insect had been created by an act of sculpting. Structures can be "indented," "compressed," "bent back," "set in sockets," "deeply impressed," "pinched inward" or "finely etched." My favorite is the term "punctures," which always makes me visualize the beetle-finishing needle of the Inordinately Fond Creator.

I don't know about you, but when I read a morphological description, or when I write one, I don't feel at all like an emotional oyster. I feel humbled by the need to think as an evolutionary biologist, a developmental biologist, a cognitive scientist, and a wordsmith, carefully integrating observations, hypotheses, and language and deeply aware that what I am writing is largely metaphorical in nature. It certainly isn't purely descriptive, or objective. I'm sure you saw this coming, but that is also how my father feels about legislative drafting. It is not an artless service, or the execution of a technical formula. It really is, when you think about it, quite complicated and quite fascinating how we direct each other's thoughts and attention when we read and write morphology.

References Cited

Dickerson, Frederick Reed. 1986. The Fundamentals of Legal Drafting, 2nd edition. Little, Brown, and Co. Boston.

Hansen, Frederick. 1889. The Latin adjective. American Journal of Philology. 10: 34–44.

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