Shifts That Pass in the Night: Missed Opportunities in the Recent History of Linguistics and Biology

(*Ohio State University; **University of Kansas)

[janda.2@osu.edu, ****]

[wenzel.12@osu.edu]


I. PREAMBLE:

0. Practitioners of two disciplines which have previously borrowed from each other, sometimes quite insightfully, are understandably apt to expect that they will likewise notice — or at least hear about — subsequent innovative developments in the other field which are likely to bear productively on their own sphere of inquiry, and so one might assume this to be especially true of biology and linguistics, both of which have benefited not only from exchanging many metaphors, as in (1), but also by converging on a number of more substantive notices, as in (2):

1. Convergent (or nearly synchronous) and borrowed terminology (cf. a. below), plus the same or similar constructs and methods —
   a. morphology: phonetics/phonetics; genetic code, syntax of DNA, grammar of life (although this term is not used exclusively in biological circles);
   b. arboral (family tree) representations of relations;

2. Convergent notions
   a. both fields study objects which are in some sense maintained over time via replication (leading to the existence of diachronic correspondences between stages);
   b. both fields propose reconstructions of prehistoric entities based solely on present-day evidence;
   c. both fields seek to posit systematic relations and groupings among entities with historical validity.

3. We find it especially telling that biolinguistic parallelism was recognized relatively early on — Darwin himself in (1871 [The Descent of Man, and Selection in Relation to Sex: 59]) stated: "The formation of different languages and of distinct species, and the proofs that both have been developed through a gradual process, are curiously the same".

   a. We argue here, however, that linguists as well as biologists have recently failed to capitalize on — or even recognize — certain innovations in each other's fields which would have allowed them either to make considerable progress within their own disciplines or to avoid unproductive impasses which had been hampering scholarly advances.

   b. The present investigation is one outgrowth of a year-long study conducted by an interdisciplinary working-group at Ohio State University uniting evolutionary biologists with historical linguists, as described in (4):

4. The OSU Bio-Ling Study Group —
   • Janda's interests in biology and in (mis-)applications of "punctuated equilibrium" to historical linguistics led to much of Janda & Joseph 2003 being devoted to biological issues; a happily convergent July 2003 invitation from John Wenzel of the OSU Dept of Entomology to his friend Joseph to speak in Wenzel's Phylogenetics Discussion Group on linguistic classification (since they were reading Rezena et al. 2003 on biological-cladistic methods as applied to Indo-European classification) led to meetings between some OSU small group of evolutionary biologists (Wenzel and John Freudentstein of the OSU Dept of Evolution, Ecology, and Organisational Biology, plus students, especially Christopher Randel (now post-doc at Univ. of Kansas)) and some linguists (Joseph and Janda of the OSU Dept of Linguistics, and Jim Unger of the OSU Dept of East Asian Languages & Literatures, along with students) to explore parallels between evolutionary biology and biological cladistics on the one hand and historical linguistics and language classification on the other.

   • this developed into an interdisciplinary population of scholars forming into a joint study-group (augmented by Megan Daly, newly hired in Evolutionary Biology from Univ. of Kansas) — uniting historical linguists with evolutionary biologists with lots of other interested parties on campus, students and faculty alike — undertaking a year-long investigation of substantive parallels between the two disciplines, with numerous public events, some drawing audiences as large as 45.

5. As a result, we feel fairly certain that our conclusions, insofar as they express criticism, are fair to both sides and, insofar as they appraisal praise, are indicative of positive results that could still be gained in the future. In this paper, we focus on two representative failures of biolinguistic vision since ca. 1950.

II. TYPOLOGY IN THE TWO FIELDS

6. One missed opportunity concerns biologists' failure to discern the early breakthrough that they could have achieved by adopting a life-science analogue of linguistic typology as it has been practiced during roughly the past fifty years, starting with the work of Greenberg and widening into a broad stream of research.

   a. 19th-century linguistic typology tended to be like biological classification in focusing on a rather arbitrarily chosen group of parameters and attempting to classify languages as wholes (e.g., isolating vs. agglutinating vs. fusional), but Greenberg 1957, 1963, 1966 built on pioneering work by Sapir 1921 in general and by Trubetzkoy 1939 in phonology and began elaborating typologies for virtually every aspect of language in every linguistic subfield (e.g., semantics as well as morpho-syntax).

   b. Lacking sufficient contact with linguistic typology of the 1950s and early 1960s, however, American biologists did not begin a significant migration away from the arbitrariness of non-phylogenetic, similarity-based classification until the 1966 publication of a translation (as Phylogenetic Systematics) of Hennig's 1950 Grundzüge einer Theorie der phylogenetischen Systematik.

7. To be fully explicit, though, there was another reason why typology as practiced by linguists would not have found great acceptance by biologists even if its name had not happened to be identical to that of a concept which had fallen from favor among biologists.

   a. Namely, the biological concept that is closest to linguistic typology is phenetics (cf., e.g., Sneath & Sokal 1973).

   b. Whereas we view the biological usefulness of (a biological analog of) linguistic typology as lying in its ability to express similarities and differences without regard to classification (phylogenetic or other...
erwise), the approach called numerical phenetics was for some time seen as being a maximally objective and therefore virtually optimal basis for biological classification, superior to both phylogenetic and other classification schemes in this respect.

8. As for linguistic approaches to typology, compare the following:
   a. The Research Centre for Linguistic Typology (La Trobe University) has the mission of "putting forward inductive generalizations about human language".
   b. The Association for Linguistic Typology has the mission of promoting "the scientific study of linguistic diversity and the patterns underlying it".
   c. Wikipedia defines typology as "the classification of languages by grammatical features".

9. What "types" are interesting or important?
   a. Would dividing languages into those that have [k] as sounds together signify or signify "cat" be a useful division? How about languages with a lehial sound in their phoneme inventory?
   b. Unusual characteristics can be used to define types: e.g., languages with no nasals.
   c. Correlating/correlated characteristics are valued by researchers (as leading to the recognition of implicational universals): e.g., the relationship between OV word order and ADJ-N order (cf. Greenberg 1966, Hawkins 1983).

10. Nasal/Oral vowels and implicational scales:

<table>
<thead>
<tr>
<th>TYPE</th>
<th>NASAL VOWELS?</th>
<th>ORAL VOWELS?</th>
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<tbody>
<tr>
<td>1</td>
<td>+</td>
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   *Which types exist? 1, 2
   *Which types do not? 3, 4 (but 4 is cut, due — not to anything about nasality or orality in vowels — but due to it being defined as a language with NO vowels at all).
   *What implicational relations are there? ⊮N ⊮O.

11. Consequences/interests of typologizing for linguists:
   a. synchronically: define "possible human language";
   b. descriptively: identify range of diversity;
   c. diachronically: define possible range of movement from type to type;
   d. no genetic implications (at least none are intended by these methods, though inferences can always be drawn).

III. BIOLOGICAL MORALS FOR GRAMMATICALIZING MORPHMES (EVEN IF THEY AREN'T ORGANISMS)

12. On the other hand, historical linguistics might have avoided much of the apriorism, circularity, and sterility besetting current "grammaticalization" theory if historical linguists had paid (more) attention to evolutionary biologists' discussions of such issues as:
   a. the (ir)reversibility of particular changes,
   b. the (in)constancy of change rates, and
   c. the reshaping of ritualized behaviors under varying ecological conditions.

13. That is, help in eliciting from grammaticalizationists the more differentiated theory that their subject matter already inherently demands could have been been given via just a smattering of exposure to biological discussions — even popularizing ones like:
   a. Gould 1980 on Dool's 1905 "law of irreversibility",
   b. Dawkins 1986 on the non-noveltys of Eldredge & Gould's 1972 views as to rate, or
   c. Lorenz 1966 on Huxley's 1914 account of the courtship habits of the great crested grebe (Podiceps cristatus).

14. For example, there apparently nothing that is irreversible in biological evolution:
   a. A proposed case of irreversibility for plants had to do with the idea that, once the xylem elements called "vessels" have evolved (from tracheids), they can never be lost (with the reason for this being that tracheids are so much more efficient for moving water around within plants than are tracheids — tracheids have membranes that water has to pass through, whereas vessels are open tubes essentially without limiting membranes).
   b. But it is now believed that some plants have in fact gone from having vessels back to having tracheids,
   c. In general, anyway, aquatic plants tend to lose vessels (they can afford to, because they are bathed in water all the time, in any case).

15. Further examples await you in the [biological text]...

References


**Figure 1** The phenetic and phylogenetic principles of classification may disagree. [Ridley 1996: 373 (Fig. 14.1).]

**Figure 2** Monophyletic, paraphyletic, and polyphyletic groups. Taxonomic groups can be monophyletic, paraphyletic, or polyphyletic. Monophyletic groups, or clades, contain all the descendants of a common ancestor. Paraphyletic groups contain some, but not all, the descendants of a common ancestor. A polyphyletic grouping does not contain the most recent common ancestor of all the taxa.

In a cladistic classification, only monophyletic groups are named. In contrast, traditional taxonomic schemes occasionally assign names to polyphyletic and paraphyletic groups. [Freeman & Heron 2001: 456 (Fig. 13.10).]

**Figure 3** The chain of organismic events that extends from information to function. [Strickberger 2000: 243.]

**Figure 4** A simple relation exists between the phylogenetic (cladistic) classification of a group of species, and their phylogenetic tree. (a) The evolutionary history of seven species. (b) Their cladistic classification. (c) The formal Linnaean classification for species 5. This particular classification is only an example; depending on the detail in a particular case, different Linnaean levels might be used. [Ridley 1996: 381 (Fig. 14.5).]

<table>
<thead>
<tr>
<th>(a) Phylogeny</th>
<th>(b) Cladistic Relations</th>
<th>(c) Classification</th>
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<td>Species: Species 5</td>
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Figure G  Possible classification of the adiostola group of species of fruitflies. (Taken from the larger phylogeny of Hawaiian Drosophila) These 14 species are only a small part of the Hawaiian Drosophila, which are themselves only a (large) part of the worldwide Drosophila fauna. What we know about their phylogeny would require at least five new levels between the genus and species level. [Ridley 1996: 386 (Fig. 14.8).]

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Fig. 5  The relationships of the major groups of vertebrates, tested using six familiar animals,... Postulated relationships, based on analysis of characters,...

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Fig. 7  1 and 2, Helically thickened vessel members with scalariform perforation plates—Fig. 3 and 4. Helically thickened vessel members illustrating transitions between scalariform and porous perforation plates—Fig. 5 and 6. Helically thickened vessel members with single porous perforation plates—Fig. 7 and 8. Helically thickened vessel members with truncated ends—Fig. 9. Helically thickened tracheary element of Gastrodon, showing circular bordered pits. [Bailey 1944: 429 (Fig. 1-9).]
Fig. 8. The most parsimonious phylogenetic tree of Doyle and Endress (2000) from the combined analysis of four genes (Act + 18S rhodanese DNA + 16S, data from Soltis et al., 1999) and morphological data matrix for coniferous angiosperms. Character optimization was accomplished using Mesquite 2.2 (Maddison and Maddison, 2009).

[Fig. 8 continued]