1. Introduction. Word and Paradigm (WP) as a model of morphological description has been around at least since the fifties, when Hockett (1954) mentioned it in passing, and Robins (1959) presented its major outlines. The two terms, “word” and “paradigm,” properly understood, convey its two most distinctive characteristics. The lexicon is primarily a collection of words—the role of morphemes is secondary. Inflection is accomplished within paradigms in those languages that have inflection. But what, in more detail, is the role of paradigms within inflection, and what, if any, is the role of morphemes within the WP model? These are the questions I attempt to address in these pages.

1.1 Dealing with Whole Words. Much of linguistic analysis has to do with taking words (and larger structures) apart and developing instructions about how to put them back together so that they can be restored exactly, or converted into related structures. This seems to be based on the assumption that speakers build words up from smaller pieces. The WP model makes the opposite assumption—that speakers deal with whole words exclusively, and that they store them ready-made and refashion them as necessary, based on other words as models, but do not take them apart, or build them up from scratch.

Matthews (1991) says, “We have seen how word-forms can be built up from their roots. . . . But there is an alternative method, whose sources lie in the work of the ancient grammarians of Greek and Latin. This is simply to relate words as wholes. . . . Which method is best? . . . The modern method has already been explored, and its attractions do not need to be laboured further. But there are at least three reasons why the opposite approach should not be neglected. Firstly, it conforms very closely to the method by which languages of this kind are traditionally taught. Pupils begin by memorising paradigms. These are sets of words as wholes, arranged according to grammatical categories. . . . Secondly, it is not clear that, when native speakers learn a flectional language, they do not themselves learn words as wholes. . . . [F]inally, both Latin and Ancient Greek had native grammarians; and it is significant that, as native speakers writing for and teaching other native speakers, they too dealt with words as wholes.”
The idea of dealing with words as wholes seems to fly so much in the face of what we do in linguistics that a word or two further on the subject may be in order before we proceed to look at the paradigm side of the WP model. If we do not build words up from their roots in daily use, why is it that they come apart so easily? Why is it that we are able to analyze them to the extent we are? First of all, they do not come apart all that easily in many languages, and they do not come apart that regularly in most. Second, there is at least one seam implicit in many words that reflects what we do in modeling them on other words. So it is not as though they cannot be taken apart at all. It is just that we do the modeling—the analogizing—so smoothly that we are not conscious of having taken them apart. But the main answer to the question as to why we as linguists are able to take words apart to the extent we are is that that is how they were built up originally, when they were first formed, and what we are doing in our analysis of them is actually internal reconstruction, a type of linguistic archaeology. We are uncovering that part of their history that has not been scrambled or otherwise eroded. The pieces of this history that can be recovered—the morphemes—make it easier for us to store and remember the words as wholes, and sometimes give us clues as to their meaning and grammatical classification. For discussion and some examples of this role in lexical morphology, see section 3. In section 2., we turn to the matter of inflection, hoping to get a better idea of how it may be possible to relate whole inflectional wordforms to each other and model them on one another, especially in a language that is both highly inflected and fusional—in this instance, Latin.

2. Paradigms Tell the Story of Inflection. Inflections are the ways in which a word changes its shape as its morphosyntactic features are changed. In fusional or flectional languages, the categories of these features often intersect, and when they do, the various inflections can be displayed as wordshapes in rows and columns headed and labeled by the intersecting features. Such displays require as many dimensions as there are categories intersecting. When the categories are simply person and number, for example, two suffice. When there are more, as there are for the Latin verb, which is inflected for a total of six categories (tense, aspect, voice, mood, person, and number), six dimensions are required. In a two or three-dimensional world, other devices must be found for their display.

2.1 The Case for Paradigms. Both structural and generative linguistics, intent on analysis, have been slow to recognize the paradigmatic nature of inflection. Thus Spencer, as recently as 1991, asks, in part rhetorically, “Where does this leave the paradigm? If the lexicalist stance is taken, then the paradigm will re-
main an epiphenomenon of the morphosyntactic feature system, and therefore of no intrinsic interest” (Spencer 1991:224). Spencer goes on to review the work of Natural Morphologists such as Wurzel, and of Carstairs, in support of the paradigm as much more than an epiphenomenon. Strongest support comes from Carstairs’s Paradigm Economy Principle, which summarizes the constraints placed on inflectional systems by paradigms. According to this principle, “the number of (macro)paradigms found in the language won’t exceed the number of different affixes for the feature combination with the greatest variety of affixes. In our Hungarian example there are two combinations with maximal variation, the 1sg. and 3sg. forms, and these have two distinct affixes each. Hence, there can be only two different paradigms [rather than the four possible if unconstrained]” (Spencer 1991:229). (In the example referred to, of the four possible combinations of person-number endings [A, B, C, D] only two [A, D] are found.)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1sg</td>
<td>-ok</td>
<td>-ok</td>
<td>-om</td>
<td>-om</td>
</tr>
<tr>
<td>3sg</td>
<td>-Ø</td>
<td>-ik</td>
<td>-Ø</td>
<td>-ik</td>
</tr>
</tbody>
</table>

Matthews (1991:197) identifies the same effect of paradigms by saying simply that “one inflection tends to predict another” and goes on to exemplify it with data from Latin noun inflection. “Traditionally, it is the basis for the method of exemplary paradigms. If the alternations were independent, these would have to be numerous. One class of Nouns would have a Genitive Singular like dominus, but all its other endings like flos; another would have the endings of flos in every form except the Dative/Ablative Plural, and so on for every possible combination. But since they are interdependent, the number can be very small. In tradition there are five” [emphasis mine—bwb].

2.2 What an Inflectional Rule Looks Like. Starosta (1991) proposes, in the spirit of WP, that both derivation and inflection are accomplished on a whole-word basis by analogy, thereby obviating the agglutinative morphemes, boundaries of various types, and other mechanisms generally posited by morphologists for building up morphologically complex words in a compositional approach. The forms of the rules he uses with this approach bear some similarity to those used by Matthews (1991:193) to show how members of a paradigm may be related analogically. The example in (1), from Matthews, is a “morphological transformation” he gives for forming the genitive singular from the nominative singular of Latin masculine nouns in -os, based on Priscian.
However, whereas this rule is unidirectional, Starosta’s are bidirectional, as are those also of Ford et al. (1997). An example from the latter for French, termed a “morphological strategy,” is given in (2):²

(2) /Xal/_{N_{sg}} \leftrightarrow /Xo/_{N_{pl}}

cheval, chevaux; mal, maux

(Ford et al. 1997:11)

Could Matthews’s rule be made bidirectional by giving the arrow a double head and more fully specifying the right side, so that it would serve for forming the nominative if one knew the genitive and were starting there, as in (3), or in the format of Ford et al., (4)?

(3) 

(Masculine in -os)
Nominative \leftrightarrow Genitive
Singular \leftrightarrow Singular
X + s \leftrightarrow X + ris

As it turns out in this particular instance, the rule is not reversible unless it is somehow delimited to include nouns like flōs, flōris ‘flower’, but exclude those like victor, victōris ‘victor’, also a masculine noun of the third declension.³ This is easily done if the rule is part of a set that operates for a class of verbs of specified membership, those that follow a given paradigm. Let us consider whether, and if so how, the bidirectional rules of Starosta or the bidirectional strategies of Ford et al. might operate to specify all the members of an inflectional paradigm.⁴
2.3 Strategies within a Paradigm. In Latin verb inflection, the usual starting point is the Present Active Indicative. These inflections of a First Conjugation verb such as *amō* ‘love’ are given in a paradigmatic array according to person and number in (5).\(^5\)

\[
\begin{array}{ccc}
\text{sg} & \text{pl} \\
1 & \text{amō} & \text{amāmus} \\
2 & \text{amās} & \text{amātis} \\
3 & \text{amat} & \text{amant} \\
\end{array}
\]

Note that the six forms fall into three groups according to their treatment of the historic theme vowel: it appears long (ā) in the 1pl, 2sg, and 2pl forms, short (a) in 3sg and 3pl, and as zero in 1sg. If we wish to formulate bidirectional “strategies” for each of these six forms in relation to each other, we might decide for each pair to let X equal the maximum form they share, in which case X will have different values, depending on the pairs involved. Even when one and the same form is being related to other forms, as many as three values for X would be needed. Thus, using the format of Ford et al.,\(^6\) in the reciprocal strategies relating the second person plural with each of the singular forms, X would have three different values, as shown in (6–8).

\[
\begin{array}{ccc}
\text{sg} & \text{pl} \\
1 & \text{amō} & \text{amāmus} \\
2 & \text{amās} & \text{amātis} \\
3 & \text{amat} & \text{amant} \\
\end{array}
\]

(6) \( \text{/Xō/ 1sg} \leftrightarrow \text{/Xātis/ 2pl} \) (X = am)

(7) \( \text{/Xs/ 2sg} \leftrightarrow \text{/Xtis/ 2pl} \) (X = amā)

(8) \( \text{/Xt/ 3sg} \leftrightarrow \text{/Xat/ 2pl} \) (X = ama)

On the other hand, if we were to consider these six forms as a group, we might decide to let X equal the maximum form they all share. In this case, X would have the value it has in (6), coterminous with the lexeme root, and (7) and (8) would be modified as follows:

(7') \( \text{/Xās/ 2sg} \leftrightarrow \text{/Xātis/ 2pl} \) (X = am)

(8') \( \text{/Xat/ 3sg} \leftrightarrow \text{/Xat/ 2pl} \) (X = am)

This latter alternative simplifies strategizing by keeping the value of X constant and not solely dependent on each reciprocal strategy, and thus provides some additional justification for admitting the paradigm to theoretical status. These
forms are not just six randomly associated forms. Because the reciprocal strategies each is involved in all need to refer to the interlocking grid of grammatical categories (person and number in this instance) that unite them in a common semantic array of morphosyntactic features, when they are used to modify the form of one and the same lexeme, we are dealing with the paradigm of its inflections—“the ways in which this particular lexeme changes its shape as its morphosyntactic features are changed.”

Thus we are able to respond to the burden of proof put on us by Ford et al. (1997) (see note 4) by pointing out that paradigms exist for sets of forms like the six we are considering here most fundamentally because of the way in which the forms are inherently interrelated in semantic space. Separate reciprocal strategies written in the format of Ford et al. (1997) will acknowledge this interrelationship by citing points on the grid in each instance. The existence of paradigms on this basis makes possible more economic and efficient strategizing—the extending of a pattern of forms from one lexeme to another—in several ways. First, as shown in (6–8, 7′–8′) above, they permit more economic and efficient strategizing by providing an arena within which there can be a common value for X. Second, it may also be that they permit a reduction in the number of separate reciprocal strategies required within this arena. It is to the exploration of this possibility that we now turn.

Let us examine in greater detail the reciprocal strategies involved among the six forms of (5). Thus far we have looked at only three of the total of 15 separate strategies that would be needed to relate each of these six forms to each other bidirectionally—the number would be double that if they were unidirectional! Fifteen seems a large number for relating just six forms, but for the full Latin paradigm of 90 finite verbforms, the number becomes overwhelming: 4,005 separate reciprocal strategies are needed to relate each form to every other form within a single conjugation. One way in which these numbers might be reduced would be to stipulate that within a paradigm, individual strategies should relate only forms that differ by a single morphosyntactic feature, as for example in (2), where –plural and +plural are related. (Serial strategies would then be required for relating forms that differ by more than one feature.)

Applying this restriction to the strategies among the six members separated by features of person and number, their total is reduced from fifteen to seven (assuming for the moment that the features involved are ±speaker, ±addressee, and ±plural). Starting from 3sg (the least marked: –speaker, –addressee, –plural), three strategies relate each of these values to their + counterpart, forming respectively 1sg, 2sg, and 3pl, as in (9).
1pl and 2pl could be tied in either by strategies with 3pl, or with 1sg and 2sg, respectively, or by both, yielding the full array of seven reciprocal strategies relating the six paradigm members that differ by just one feature, as in (10).

Note that there are no reciprocal strategies relating any points in the paradigm other than the nearest neighbors in this arrangement. There are none along any of the diagonals, and there are none relating first and second person forms directly. At most, a sequence of three is necessary to relate 1sg and 2pl, or 2sg and 1pl. A “serial strategy” required to span one of these extremes may not be as complex as would appear at first glance, involving just two intermediate stages, as for example those for relating 1sg and 2pl given in (11) and (12).
Nevertheless, scenarios of this sort seem clumsy and far-fetched to those of us who have learned to recite these inflections in a different order, such as 1sg, 2sg, 3sg, 1pl, 2pl, 3pl, yet who would probably not have to run through the sequence to get from one point to another. Before we dismiss serial strategies such as (11) and (12) summarily, though, it might be a good idea to remind ourselves of the basic question we are addressing, which concerns ultimately how those who are native speakers are able to cope with the high degree of morphological complexity of inflected fusional languages such as this. We are considering here an alternative to building each form up, layer by layer, upon its root, a process that is already notorious for its complexity in this type of language. The alternative we are considering starts with a ready-made form and “bends” it by analogies with other known forms. The assumption is that the inflections of several common verbs (the “exemplary paradigms”) are already known, and that the “strategies” we are considering here are formalisms that underlie the analogizing process used to arrive at the inflections of less well-known verbs known to belong to the same paradigm—the same conjugation, in this instance. To avoid all sequences of strategies like those of (11) and (12), a total of 15 reciprocal strategies would be required to produce any of six forms from any of six starting-points. This number could be reduced to as few as five, if some sequences were tolerated, even when there is only one feature of difference.\textsuperscript{11} To avoid any sequences when a single feature is involved, a minimum of seven reciprocal strategies are required—still fewer than half of the full 15.

In considering whether certain reciprocal strategies are so rarely used that sequences might be tolerated, a practical step would be to ask what the more frequent starting places might be, as well as the more frequent ending points. The answers to these questions are to be found in discourse. What new form is one likely to want to produce or identify in comparison with a form one has just uttered or heard? No doubt one of the first things to be concluded, if such a study were undertaken, is that to have first and second persons related only via third, as (11) requires, will never do. The deictic switches between “you” and “I” are much more basic and direct. Even if the analysis with ±speaker and ±addressee should ultimately prove to have validity at some level, it is hardly adhered to while strategizing in face-to-face situations. The reciprocal strategies relating first and second person directly, in all combinations of singular and plural, need to be added to the seven already provided in (11): “You-all say this, but I say that . . .” Similarly, those relating first singular and third plural, first plural and third singular, etc.: “I did such-and-such, but they did so-and-so . . .” (cf. [12]). We would have to conclude that no economies are likely to be achieved short of the full 15 reciprocal strategies required to interrelate all the person-number combinations directly, with the persons treated equipollently rather than binarily.
To keep perspective, we should remember that we have reached this conclusion within just one small corner of Latin verbal inflection—albeit an intensive corner—the six person-number combinations of the nonperfect present active indicative, and that this is but one of 15 parallel corners for the various tense-aspect-voice-mood combinations that make up the total of 90 inflections referred to in note 8. Whether economies might be possible in the strategies that tie together these 15 corners (each with its six members) should remain an open question. For the moment, we have determined that none of the 15 reciprocal strategies required to interrelate the six members in this particular corner can clearly be dispensed with in the interests of economy, especially in view of the price that would need to be paid in serial reciprocal strategies as replacements for any single reciprocal strategies dispensed with. Before looking further to see whether we might reduce the number of reciprocal strategies required—which do not assume or depend in any way on the existence of paradigms—we should explore the question as to whether a different sort of strategy is possible within a paradigm, that is, whether conflation of reciprocal strategies might be possible.

2.4 Paradigms as Rules in Parallel. Conflation of reciprocal strategies does in fact appear possible within a paradigm. If the six forms of (5) as members of the same paradigm do share a single value for X in all their reciprocal strategies, only the variable portion of each singulary term need be given in a conflated strategy, together with the combination of morphosyntactic features that each term represents. The X-constant need be given only once to establish its position in relation the variable portions (although we repeat it in our examples for clarity of presentation). A conflated strategy, as in (13), can bear close resemblance to a traditional paradigm such as (5), with the understanding that its cells are linked together in radial fashion, as signified by the asterisk at the center of (13). The radial connection permits instantaneous switching among terms to create reciprocal strategies of all combinations as needed, accomplished by a “CPU” (central processing unit). We will call such conflated strategies paradigmatic strategies.

(13) **paradigmatic strategy**

```
conj: nonperf pres act ind

<table>
<thead>
<tr>
<th></th>
<th>sg</th>
<th>pl</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Xô</td>
<td>Xâmus</td>
</tr>
<tr>
<td>2</td>
<td>Xâs</td>
<td>* Xâtis</td>
</tr>
<tr>
<td>3</td>
<td>Xat</td>
<td>Xant</td>
</tr>
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```
This array is thus a notational variant of the fifteen reciprocal strategies discussed in the preceding section. It exists because it fits the set of verbs that are the members of its class. Similar strategies exist in each of the other 14 corners of the overall paradigm, as for example those in (14–17).

(14) **paradigmatic strategy**

```
conj 1: nonperf pres act subj
```

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<tbody>
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<tr>
<td>2</td>
<td>Xês</td>
<td>Xêtis</td>
</tr>
<tr>
<td>3</td>
<td>Xet</td>
<td>Xent</td>
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(15) **paradigmatic strategy**

```
conj 1: nonperf fut act ind
```

```
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<th>pl</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Xâbô</td>
<td>Xâbimus</td>
</tr>
<tr>
<td>2</td>
<td>Xâbis</td>
<td>Xâbitis</td>
</tr>
<tr>
<td>3</td>
<td>Xâbit</td>
<td>Xâbunt</td>
</tr>
</tbody>
</table>
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(16) **paradigmatic strategy**

```
conj 1: nonperf past act ind
```

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<th>pl</th>
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</thead>
<tbody>
<tr>
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<td>Xâbam</td>
<td>Xâbamus</td>
</tr>
<tr>
<td>2</td>
<td>Xâbâs</td>
<td>Xâbatis</td>
</tr>
<tr>
<td>3</td>
<td>Xâbat</td>
<td>Xâbant</td>
</tr>
</tbody>
</table>
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(17) **paradigmatic strategy**

```
conj 1: perf pres act ind
```

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<table>
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<th>pl</th>
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</thead>
<tbody>
<tr>
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<td>Xâvî</td>
<td>Xâvimus</td>
</tr>
<tr>
<td>2</td>
<td>Xâvistî</td>
<td>Xâvistis</td>
</tr>
<tr>
<td>3</td>
<td>Xavit</td>
<td>Xâvërunt</td>
</tr>
</tbody>
</table>
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Paradigmatic strategies (14–17) show the relations among inflections in selected corners while the features of tense, aspect, voice, and mood are being held
constant. Their counterparts, which vary the latter while holding the former constant, are illustrated in (18–20).

(18) paradigmatic strategy, first conjugation, 1sg

<table>
<thead>
<tr>
<th>conj</th>
<th>-perf</th>
<th>+perf</th>
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<tbody>
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<td>lsg</td>
<td>ind</td>
<td>subj</td>
</tr>
<tr>
<td>active</td>
<td>futuro</td>
<td>Xäbô</td>
</tr>
<tr>
<td>pres</td>
<td>Xö</td>
<td>Xem</td>
</tr>
<tr>
<td>past</td>
<td>Xäbam</td>
<td>Xärem</td>
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<tr>
<td>passive</td>
<td>futuro</td>
<td>Xäbor</td>
</tr>
<tr>
<td>pres</td>
<td>Xör</td>
<td>Xer</td>
</tr>
<tr>
<td>past</td>
<td>Xäbar</td>
<td>Xärer</td>
</tr>
</tbody>
</table>

(19) paradigmatic strategy, first conjugation, 2sg

<table>
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<th>-perf</th>
<th>+perf</th>
</tr>
</thead>
<tbody>
<tr>
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<td>subj</td>
</tr>
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<td>futuro</td>
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</tr>
<tr>
<td>pres</td>
<td>Xäs</td>
<td>Xäs</td>
</tr>
<tr>
<td>past</td>
<td>Xäbas</td>
<td>Xârês</td>
</tr>
<tr>
<td>passive</td>
<td>futuro</td>
<td>Xäberis</td>
</tr>
<tr>
<td>pres</td>
<td>Xäris</td>
<td>Xäris</td>
</tr>
<tr>
<td>past</td>
<td>Xäbäris</td>
<td>Xäreris</td>
</tr>
</tbody>
</table>

(20) paradigmatic strategy, first conjugation, 3sg

<table>
<thead>
<tr>
<th>conj</th>
<th>-perf</th>
<th>+perf</th>
</tr>
</thead>
<tbody>
<tr>
<td>3sg</td>
<td>ind</td>
<td>subj</td>
</tr>
<tr>
<td>active</td>
<td>futuro</td>
<td>Xäbit</td>
</tr>
<tr>
<td>pres</td>
<td>Xat</td>
<td>Xet</td>
</tr>
<tr>
<td>past</td>
<td>Xäbat</td>
<td>Xäret</td>
</tr>
<tr>
<td>passive</td>
<td>futuro</td>
<td>Xäbitur</td>
</tr>
<tr>
<td>pres</td>
<td>Xätur</td>
<td>Xärur</td>
</tr>
<tr>
<td>past</td>
<td>Xäbätur</td>
<td>Xärëtur</td>
</tr>
</tbody>
</table>

Three additional paradigmatic strategies like (18–20) are needed for the plural persons, and ten additional strategies like (13–17) for the other tense-aspect-voice-mood combinations. Using the analogies of “corridors” and “corners,” any
of the six corridor strategies (like 18–20) can be used to access any of the 15 corners (like 13–17). One uses corridors to switch tense-aspect-voice-mood combinations, and corners to switch person-number combinations. Although this may seem an arbitrary division of the six morphosyntactic categories into two sectors, there would seem to be some justification within discourse structure, as has already been noted with respect to the close deictic relation between first and second persons, and the many discourse-based occasions to vary person and number together. Note also in (21) that person and number are especially tightly fused in form, with the seeming plural exponent undergoing full suppletion from person to person: -us in 1st person, -ti- in second, and -n- in third.14 No other combination of morphosyntactic features is quite so tightly intertwined by their exponents in the Latin verbal paradigm. Person and number do indeed need to covary because of the way in which they are now fused within this system—that is, for internal reasons as well as the external demands of discourse. One can go a step further and say that they have probably become as tightly fused as they are because they have so often been kept together in discourse.

(21)  
<table>
<thead>
<tr>
<th></th>
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<th>pl</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>-m</td>
<td>-m-us</td>
</tr>
<tr>
<td>2</td>
<td>-s</td>
<td>-ti-s</td>
</tr>
<tr>
<td>3</td>
<td>-t</td>
<td>-nt</td>
</tr>
</tbody>
</table>

The various corridors would also seem to be fairly heavily traveled in discourse: the occasions are many, for example, to shift tense, aspect, voice, and/or mood, while holding 3sg or any of the other person-number combinations constant. To vary both, use of both corridor and corner would be required, in either order.15

2.5 Summary of the Case for Paradigms. Of the two strongest arguments for the existence of paradigms, one is semantic and the other is formal. (i) Put most simply, the semantic argument says that inflections belong inherently in a paradigmatic array when their meanings are most clearly stated with reference to an intersecting grid of morphosyntactic categories. (ii) The formal argument notes that whereas inflections could vary independently, in fact they do not. They vary interdependently in a way that adheres to the Paradigm Economy Principle (Carstairs 1987).

In sections 2.3–4, we have noted several additional arguments for the existence of paradigms. (iii) The use of reciprocal strategies (Ford et al. 1997) to relate inflections is simplified if the value of X can be held constant within a frame such as the paradigm—X being the root portion of a lexeme that does not vary from inflection to inflection—and if it is not permitted to vary according to
the two items being related. (iv) Furthermore, a constant X makes it possible for strategies to be conflated and interconnected radially, while being placed in an arrangement dictated by the morphosyntactic properties involved, thereby bearing close resemblance to traditional paradigms. This is the basis for the title of section 4, “paradigms as rules in parallel”: when paradigms are understood as conflations of multiple reciprocal strategies, they are in effect “rules in parallel”—rules of an analogizing sort. (v) Whereas over 4,000 reciprocal strategies would be required to interrelate the 90 inflections of a Latin verb, only a score of these “paradigmatic strategies” are needed to accomplish the same end if the six morphosyntactic categories involved can be separated into two sectors: those involved in the corners, and those involved in the corridors. (vi) The X in common among the members of a paradigm brings us a bonus: insight into why it is that morphological solutions prevail over phonological solutions in those situations where they can be seen as being in contention. This is the subject of the remainder of section 2.

2.6 When Morphological Classes are Created. Inflection does not necessarily require that there be different morphological classes, that is, noun declensions, verb conjugations, and so forth. In many languages, inflections fall into a single paradigm. This seems to be true especially of languages said to be agglutinative. It is only when we have determined the extent of X for each verb and we are left with differing residues for different verbs (as with our Latin verbal data), that we find it necessary to group the verbs into different conjugations according to these residues, as in (22).

(22)

<table>
<thead>
<tr>
<th>X residue</th>
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<tbody>
<tr>
<td>am ō</td>
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<tr>
<td>am ant</td>
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<td>trah unt</td>
<td>aud iunt</td>
</tr>
</tbody>
</table>

‘love’ 1st conj ‘teach’ 2d conj ‘drag’ 3d conj ‘hear’ 4th conj

There is no way we can obtain identical residues, unless we segment as far to the right as was done in obtaining the exponents for person and number given in (21), in which event the values for X are no longer constant.

Traditional grammars exemplifying the WP model of description sometimes list the forms in (22) as whole words, but use a different typeface for the residue
portions, and present them as being exemplary paradigms for their respective conjugations. This may seem contradictory: why should a whole-word approach indicate what appears to be an internal boundary using a different typeface? As noted in 1.1, this is an implicit seam that reflects what we hold constant and what we vary in modeling other words on these words. It is determined by how the whole words relate to each other, and is in no sense a determinant. Highlighting it with typefaces is evidently intended as a pedagogical aid, but is probably of dubious value that is limited to work with written materials. It is but one of a number of features in traditional grammars that go beyond the WP approach and reflect the alternative approach discussed in 1.1, that of building complex forms up from their roots. Grammars that include these non-WP bits and pieces are catering to our quite human fascination with reflective analysis.

2.7 Phonological Solutions as Alternatives. Both of the alternative models discussed by Hockett (1954) are morpheme-based, and one of these, the Item and Process (IP) model, attempts to reduce variants to more abstract basic forms that can be combined and adjusted by process rules. In early generative grammar, such solutions were viewed as being phonological, under a broadened view of phonology, and as preferred, in part because they are often able to eliminate morphological classes by building indicators of class membership into the phonetic substance of the more abstract base forms. At the same time, it has been no secret that such base forms often turn out to be closer to those reconstructed for earlier stages of a language than are the contemporary surface forms—that the establishment of well-motivated base forms constitutes an exercise in internal reconstruction.

As an example of the use of this type of analysis in order to eliminate morphological classes, Pearson (1977b:60) includes the following exercise under “Latin phonology (advanced), “Reexamine the data . . . [roughly equivalent to that of (22)—bwb]. Describe the four verb conjugations so that all can be merged into a single undifferentiated class. To do this, it will be necessary to assign the theme vowel for each conjugation to the verb stem, set up a single set of affixes for all four conjugations [identical to those in 21—bwb], and posit a series of process rules to make the necessary phonological adjustments.” The same workbook also includes an equivalent exercise for Spanish (Pearson 1977b:7), in which students are asked to “devise at least two different statements that will account for the present tense formation. . . .” The data include present indicative paradigms and infinitives for two verbs in each of the three Spanish conjugations. A conjunctional statement given in the instructor’s key requires—in addition to the stem for each verb, a knowledge of their conjugation membership and a total of 21 different suffixes, seven for each conjugation. In this solution, the infinitives end
in -ar, -er, and -ir. A phonological alternative is presented as the preferred solution because it requires only seven suffixes and four rules, with no conjugation membership. In this solution, all infinitives end in -r.

Morphological and phonological solutions have been pitted against each other in a number of other contexts. As just one example, many Oceanic languages have developed longer and shorter verb forms through loss of final consonants—longer forms in contexts in which the consonant was protected and preserved, and shorter where it was lost. A morphological solution finds that reanalysis has occurred, and that original stem-final consonants are now part of suffixes that are added. To derive longer forms, it is now necessary to group shorter verb forms into morphological classes according to the consonant in the suffix to be added. The alternative phonological solution would have for each verb a single abstract form that includes the final consonant and that underlies both longer and shorter forms, with a rule of final consonant deletion to derive the shorter ones. This is documented for Māori in Hohepa (1967) and Hale (1968, 1973), where there is increasing evidence that the morphological solution is more in accord with speakers’ intuitions and continuing developments in the language.

The same would appear to be true for Latin and the various Romance languages. Spanish infinitives, for example, are commonly viewed as ending in –Vr, reflecting a morphological analysis in which those in -ar are becoming predominant. How can one account for the staying power of morphological solutions, in spite of the seeming economy offered by phonological solutions?

2.8 Why Morphological Solutions Prevail over Phonological Solutions. The answer to this question was hinted at at the close of section 2.5. It is because, whenever possible, the whole-word analogizing of morphology uses paradigmatic strategies that presuppose a common and constant X that is defined paradigmatically. When the residue left by this X-constant varies for different groups of verbs, morphological classes exist. These classes and the X-constant depend on each other, just as both depend, in turn, on whole-word strategizing.

3. The Sign Gravitates to the Word. The title of this section comes from Aronoff (1976:14), who was the first among generative grammarians to identify the morpheme as something other than the minimal unit of meaning and to call for a word-based morphology. Much the same point had been made earlier by Robins (1959), while defending the word-based Word and Paradigm (WP) model of grammatical description, but the full force of that paper went largely unappreciated in North America. 16 Says Robins, “The salient difference between WP and both the other two models is the centrality it accords to the word as a fundamental unit in
the grammar as a whole and as the basic unit of syntactic structure. IA and IP both start from the morpheme as the minimal grammatical element and also the basic syntactic unit, passing through the word as relatively unimportant, and consequently regarding the traditional division between morphology and syntax as unnecessary or even misleading” (Robins 1959:118–119).

3.1 Morphemes as Formatives. “A formalized version of WP must recognize the morpheme as the minimal grammatical (not semantic!) unit of a language, but it makes the word the unit that carries in its paradigmatic and syntagmatic associations the main weight of grammatical description” (Robins 1959:119). The minimal grammatical unit is here differentiated from the minimal semantic unit, but also from “the unit that carries . . . the main weight of grammatical description.” What is the nature of this unit, and what is the meaning of “grammatical” when applied to it?

3.1.1 Building Blocks of the Primary Articulation. Morphemes are the building blocks of the primary articulation, recurring in various functions. To be certain of Robins’s intent, we do best to look at his examples of these “minimal grammatical units,” which he gives for Sundanese, Japanese, Latin, Greek, German, and English. To cite here just one from the last mentioned, we can note the -er suffix that functions as comparative inflection on adjectives and agentive suffix on verbs (to mention just two of its multiple functions). For Robins, one and the same -er morpheme is to be found in both poorer and doer, but with quite different functions. Recognizable elements such as this, that do not necessarily have a unitary meaning, are what others have called “formatives” (Matthews 1991:127). Thus, from a WP point of view, and to illustrate its word-centered nature, one might identify poorer and worse as the comparatives associated with poor and bad, respectively, while also recognizing that their status as comparatives is independent of whether or not they contain the -er morpheme.

I believe that when Robins refers to morphemes as “minimal grammatical units,” he is using “grammatical” to refer one of the two levels of patterning to be found in language, the primary level (sometimes also called the “primary articulation of language.” Thus, whereas phonemes can be seen as the building blocks of the secondary level, morphemes play a parallel role at the primary (grammatical) level.

3.1.2 Aids to Memory. Morphemes help us cope with the memory burden. How important is this role? Comrie (1981) has observed that a language that was completely suppletive, in which no word resembled any other word, would be impossible, especially if it were also highly synthetic (where the word approaches the sentence in size), and sentences therefore did not resemble each other either.
His reasoning is as follows, “Here, we can take agglutination as the norm: clearly segmentable and invariant morphemes, and define the index of fusion as deviation from this norm. The extreme deviation from this norm would thus be suppletion, where there is absolutely no segmentability and no invariance, as with English *went* as the past tense of *go*. Thus a language [that] represented the ideal fusional type would have all of its morphology in terms of suppletion; if it also had an ideally high index of synthesis, then each sentence would simply be totally and unsegmentably distinct from every other sentence of the language. Given that a language consists of an infinite number of sentences, this is clearly a practical impossibility, which means in practice that as the index of synthesis gets higher, the ratio of agglutination to fusion must also increase; more radically stated, there can be no such thing as an ideal fusional polysynthetic language” (Comrie 1981:45–46).

If he is right, we do need—in all but the most analytic of languages—for an appreciable number of our words to have recognizable, recurring parts. Further, our knowledge of these parts in such languages (languages with an appreciable degree of morphological complexity) would seem to be crucial, even on an everyday basis—not just for coining new words, or understanding those not part of our prior experience. To see how dependent we are on such recurring parts, it is instructive to attempt to come up with nonsense words orally, and note how the vast majority are made up of such partials recombined—or, on the other hand, to note how difficult it is to coin multi-syllabic words that do not include the same.

### 3.1.2.1 A favorite English disyllabic pattern

Even when morphemes do not help us at all with meaning, they can still be of great help in coping with and remembering the form of a word, especially longer and more complex words. It can be instructive to look at a favorite English pattern for two-syllable words, those with a stressed first syllable, and a weak, unstressed second syllable occupied by a single syllabic sonorant: /r, l, m, n, y, w/—in their usual spellings, *-er, -le, -om, -en, -y*, and *-ow*. (See Householder 1957, 1962 on *-y* as syllabic /y/, and *-ow* as syllabic /w/.) When we thought of morphemes as being necessarily units of meaning, we were not led to look at these entities as a group, except where meaning clearly intersected, as it sometimes does, especially with *-er, -en*, and *-y*.

But freed of the meaning requirement, and in quest of “favorite formatives,” new vistas open up for the study of morphology. To cite just a few, here are some verbs in *-er*: *meander, offer, pander, plunder, ponder, pucker, quiver, quaver, shudder, thunder, wander, wonder*; nouns in *-er*: *antler, bladder, boulder, brother (sister, father, mother), chowder, cider, dither, ember, finger, gander, glimmer, grocer, hammer, ladder, lather, manger, member, murder, order, paper, powder, shoulder, soccer, solidier, spider, tiger, timber, water*, etc.
Verbs in -le: bustle (cf. busy [?]), cobble, finagle, fondle (cf. fond), haggle, heckle, hustle (cf. hurry [?]), jostle (var. justle)(cf. joust), meddle, rustle (cf. roust [?]), sidle (cf. side), topple (cf. top), trundle, wrestle (cf. wrest), wriggle; nouns in -le/-el/-al: buckle, bundle (cf. bind, bound), cable, channel, cripple, cymbal, dial, duel, funnel, gaggle, handle (cf. hand), hassle, huddle, hurdle, ladle (cf. lade), people, rascal, rival, treacle, tunnel, turtle; adjectives in –le/-al: dismal, dual (trial), frugal, humble, fickle, oral, purple, supple, single (double, treble, triple, etc.), etc.

Words of various classes in –am/-om/-em/-m: anthem, atom, balsam, balsam, bottom, buxom, chasm, -cosm, custom, diem, fathom, ism, plasm (cf. plastic), poem (cf. poet), rhythm, seldom, spasm (cf. spastic), system, totem, etc.

Words in –en/-eon/-on: barren (cf. bare), bludgeon, burden, chicken, dozen, dungeon, even, falcon, garden (cf. yard), glisten, haven, heaven, kitchen, listen, mason, often, oven, person, pigeon, platen, raven, season, seven, virgin, wagon, warden (cf. ward), etc.

Words in -y: any, bevy, city, copy, cozy, curry, ditty, dizzy, duty, happy, hurry, many, party, penny, putty, tiny, worry, etc.

Words in -ow: arrow, barrow (cf. bear), burrow, fallow, fellow, follow, furrow, hallow, harrow, hollow, meadow (cf. mead), morrow, narrow (cf. near), pilow, shadow (cf. shade), shallow, sorrow, sparrow, widow, willow, window, etc.

In the preceding paragraphs, instances are given of these six morphemes (in the Robins [WP] sense) without functions—except where a related word is cited occasionally. Instances in which the same morphemes have found functions include the following: -er with agentive function: baker, *butcher, doer, lover, reader, etc.; -er with comparative function: richer, poorer, wider, narrower,18 upper, lower, etc.; -er with “article of clothing” function: blazer, bloomer(s), jumper, pullover, sweater, trouser(s), etc.; -er with “resident of” function: Hoosier, islander, Londoner, Michigander, New Yorker, etc.; -er with reiterative function: chatter, flutter, quiver, shimmer, shudder, totter, waver, etc; -le with “repetition of small movements” function: dazzle (cf. daze), dribble, drizzle, paddle, sparkle, twinkle, waddle (cf. wade), wriggle, etc.; -le with “repetitive sound” function: babble, cackle, crackle, giggle, grumble, mumble, prattle (cf. prate), rattle, tinkle, whistle, etc.; -le with diminutive function: hackle, heckle, speckle, spindle, spittle, etc.; -al with nominal function: burial, signal, rental, trial, etc.; -al with adjectival function: bridal, brutal, global, tidal, tribal, etc.; -en with participial function: broken, chosen, proven, taken, etc.; -en with “denoting material” function: earthen, golden, leaden, oaken, wooden, woolen, etc.; -en with transitive causative function: greaten, harden, lighten, tighten, etc.; -y with denominational adjectival function: bloody, cloudy, guilty, juicy, milky, nosy, risky, soapy, stormy, syr-
upy, thirsty, watery, etc.; -y with deverbal adjectival function: (un)wieldy, droopy, fidgety, floppy, shiny, squeaky, sulky, tottery, etc.; -y with distributive function: achy (headachy), angry, bluey, crispy, dusty, feathery, flowery, goody, hungry, leathery, moisty, purply, silvery, watery, etc.

Note that of the six syllabic consonants cited above, productive functions are given for all but two (-om and -ow). My attention was attracted to these particular morphemes with multiple functions initially by -er, and my exploration of that particular morpheme proved so fruitful that I decided to extend it to this particular phonotactic and prosodic type as a whole. I have included as much detail as I have hoping to make my point, which is, that in any language, words of any complexity are composed not only of recurring phonemes, but of such recurring morphemes as well. Because in the phonemicization I have been using, each morpheme consists of a single phoneme, some might ask to which of the two levels of patterning these units belong. I maintain that it is to the primary articulation. When functions can be identified, there can be no doubt; when there are no obvious semantic (or “grammatical”) functions, they are still functioning to make the words more manageable—helping us cope with the memory burden.

3.1.2.2 The -ing morpheme. Here is an example of a morpheme clearly composed of more than one phoneme, the -ing morpheme. There is general agreement as to its function in the formation of gerunds (“Parting is such sweet sorrow”) and of present participles (“A rolling stone gathers no moss”). Some would see a third function in the formation of the progressive aspect (“The stone is rolling down the hill”), while others count this as an instance of the present participle with be. There comes a point at which some present participles become lexicalized as adjectives, as attested by their use with intensifiers (“I’ve had a very trying day”) and in the comparative or superlative degree (“... but it was probably no more trying than yours”), although such tests do not always give clear-cut results (Matthews 1991:54–60). Whether we have here as few as two or as many as four separate deverbal functions for -ing, we have only begun to scratch the surface.

More are revealed when we turn to nouns, some of which are deverbal, and some of which are not. There are “products” such as clipping(s), shaving(s), paring(s), peeling(s), painting(s), building(s), writing(s), earning(s), meaning(s), spelling(s), marking(s), darning; “ingredients”: making(s), fixing(s), seasoning(s), leavening, whitening, bluing; frosting; “accommodations”: heating, lighting, seating, covering; “softer materials”: bagging, basting, batting, belting, binding, carpeting, clothing (hunting, stocking[s], legging[s], kilting, dressing), felting, lacing, netting, packing, padding, quilting, wadding; “harder materials”: boxing,
coping, curbing, enameling, fencing, flooring, glazing, moulding, piling, planking, rigging, scaffolding, siding, tooling, trussing, walling, wiring; “locations”: crossing, mooring, footing, inning; “events”: christening, gathering, happening, meeting, outing, wedding; “utter defeats”: beating, lacing, lambasting, licking, pasting, shellacking, spanking, thrashing, trouncing, walloping, whipping; “diminutives” (with -l-): (animals) chickling, duckling, weanling, (humans) seedling, sapling, rooting, (plants) foundling, earthling, sibling, weakling; “fauna”: bunting, herring, starling, lemming; “monetary units”: farthing, shilling.

While most of these nouns in -ing have recognizable word bases, those in the last two groups do not. Others may include batting (from beat?), ceiling, cunning, morning, pudding.

What is the point of all these examples? The morpheme viewed in this way, as a unit of form, typically has multiple functions. More complex words, as combinations of such familiar recurring entities, are made more manageable by employing them.

3.1.3 Subtleties of Meaning. The instances of syllabic-sonorant weak second-syllables and of the -ing morpheme listed in the preceding sections are given only as examples, and are just the beginning of what remains to be uncovered when we approach the study of “formative morphemes” as part of morphology. These examples include other enticing leads. Note the possible p/b accretions to the -le of double, triple, treble and (going beyond two syllables) multiple, leading to the -uple of quadruple, quintuple, sextuple, etc. We can pursue further the alternations of single/singular and couple/copular, not to mention table/tabular, circle/circular, vehicle/vehicular, title/titular, angle/angular, and so forth. (Although these last examples may be Latinate in origin, they are today integrated into the broader English morphology.) The -ing morpheme is not without its own accretions. Note especially the -ling morpheme of the diminutives duckling, chickling, suckling, dumpling, lordling, princeling, the plant terms seedling, sapling, rootling, and the human terms sibling, earthling, foundling, weakling, hireling. We know the meaning of each of the quantifiers such as single, double, triple, . . . multiple as words, but what help, if any, do we get from their -le/-ble/-ple parts?

This leads directly to the matter of phonesthemes and their contribution to word meaning. The instances of accretion noted in the preceding paragraph involve a certain fuzziness of segmentation. There is also a certain semantic fuzziness that attends many of the examples in which a recurring function can be identified for one part of a word, but not for the other. Thus, -le recurs in babble, cackle, giggle, etc. with a “repetitive sound” function, but the remainders of these words (babh-, cack-, and gigg-, respectively) do not—here the crack of crackle is an
exception. This is true of phonesthemes generally, that while one portion of the word recurs with semantic connotation, the other does not. This prevented earlier linguists, who were still searching for morphemes that were everywhere meaningful, from segmenting such words, and required that they coin a special term such as “phonestheme” (some term other than “morpheme”) for the single meaningful part. In this connection, please see what Bender (1994) has to say about “Paradox No. 7: Universal aspects of the arbitrary sign.”

3.1.4 Clues as to the Part of Speech. The -er morpheme is not of much help in determining part of speech in English: poorer is an adjective; doer is a noun, as are sweater and jumper; wander and meander are verbs; over and under are prepositions. But other morphemes are more helpful in this regard. The -able/-ible morpheme, for example, consistently points to adjectives, whether its bases are verbs (doable, eatable, comparable “able to be compared”), nouns (comfortable, fashionable), or something less than full words (probable, possible, comparable “equal”) (Aronoff 1976:120ff.).

3.1.5 Further Clues as to Meaning. Morphemes may sometimes go beyond phonesthemes in giving us clues as to the meaning of a word, getting us further into the ballpark semantically. English words in re-, many of which are loans from French or Latin, often include a meaning element of either “back” or “again.” Some of those with “again” may be fairly compositional, so that they can be characterized simply as “to V again,” as for example, re-cover “to cover anew” or re-count “to count again,” while others include additional connotations that make them no longer purely compositional: reconsider “to consider again, especially with intent to alter or modify a previous decision,” redistribute “to reallocate,” and so forth. Even so, the re- of these latter at least gets us into the “again” ballpark, although the situation is muddied further by the existence of a competing “back” ballpark: return, repay, refund, rejoin, and so forth. Note that each of these latter examples has a compositional “again” counterpart, at least potentially: re-turn “turn again,” re-pay “pay again,” re-fund “put up money for again,” re-join “join again”; while others like remand and remember do not.

3.2 Full Information as to Derived Meaning. Some words are compositional, at least in their outer layers. English nouns in -ness are a good example. It is an open question as to whether any of these nouns needs to be listed in the lexicon—so regular are they semantically, and so productive is the class (Aronoff 1976:40ff.). The adjectives that cannot add -ness with predictable results are extremely rare. As I have pointed out elsewhere (Bender 1994), ness-nouns are as regular, across-
the-board, and predictable as participles and gerunds, and should perhaps, to-
gether with them, be considered to be inflections of a category-changing variety.
That then would remove them from the domain of word-formation, and the ne-
cessity of appearing in the lexicon as lexemes. It is interesting to note that some
dictionaries already treat them in this manner. The *American Heritage Dictio-
nary*, for example, does not have a separate entry for *badness*, but lists it (to-
gether with “*bad* n. . . . That which is bad: *weighing the good against the bad.*”) as a noun form of “bad,” within the entry for *bad* adj.

But it may not be just those across-the-board morphemes such as -ness that
not only give us clues as to a word’s meaning, but take us unequivocally that last
compositional mile. This is true of the re- prefix (1) in its pure “to V again”
sense, as in re-cover “to cover anew” or re-count “to count again”; but not (2)
when there have been additional accretions of meaning, as in reconsider “to con-
sider again, especially with intent to alter or modify a previous decision,” or in
redistribute “to reallocate”; and certainly not (3) when it has “back” senses, as in
return, repay, refund, rejoin, or in relapse, remand, or remember. But how are we
to know which of these re- ’s we are dealing with in a given word? This brings us
full circle to the title of this article. It is the words that are the signs, and the
morphemes they contain sometimes give support and confirmation—albeit cir-
cular—to their meaning.

3.3 Summary of the Role of Morphemes within WP. Although Robins drew
attention forty years ago to the fact that individual morphemes as units of form
are to be found widely distributed across more than one major lexical category
and with a variety of functions in many languages, most linguists continue to
treat such instances as accidental identities of form (the -Z, -Z, and -Z of En-
glish, for example) and have not as yet faced up to the question as to why such
accidents should be so prevalent. In so doing, they have been depriving the field
of morphology of much of the richness that still lies in store. Both the primary
and secondary articulations of language can be profitably viewed as providing
recurring units with little or no correlation to meaning, which nevertheless per-
form a vital function by enabling our limited memories to retain and operate with
a vastly expanded inventory of signs.

4. Conclusion. The whole word approach to morphology is finally about to get a
full hearing within the discipline of Linguistics. In this view, morphology is not
so much the structure of words as it is the study of the relationships among exist-
ing words and wordforms. Each of us spends a lifetime learning the words of our
language, a task that is never completed. Those of us who happen to know inflected languages also learn the different forms that a word takes as its morphosyntactic features are modified, the various wordforms of its paradigm. We use morphological strategies to keep everything straight, and to straighten anything out when it starts to go awry for us. Strategies help us not only among the wordforms within a paradigm, but among the words of our lexicon. Here their by-products, the morphemes (a.k.a. formatives), are an indispensable aid to memory in languages of any degree of morphological complexity.

NOTES

1. This paper attempts to convey my understanding of the model of morphological description that has sometimes been proposed as an alternative to both the IA or IP models (Hockett 1954). In this context it has been referred to as “Word and Paradigm” (WP). Those to whom I am most indebted for this understanding include Robins (1959) and Matthews (1974, 1991), and less directly, Uhlenbeck (1953, 1992), Aronoff (1976), Starosta (1993), and Ford et al. (1997). I wish also to thank students in the seminars on morphological change at the University of Hawai’i in 1996 and 1997 for some stimulating discussions. Paul Lassettre deserves special acknowledgement. Others whose ideas have helped me are mentioned at particular places. Some of my sources address the WP model per se; others (who may not wish to have their names associated with that model) are guilty only of helping me understand other aspects of morphology that made it all come together. I bear sole responsibility for the interpretation given to all ideas here.

2. Say Ford et al. (1997) of their strategies, “A morphological strategy . . . captures the morphological relatedness amongst the words in the ‘lexicon’ and allows a speaker to morphologically analyze a word she may not have analyzed before or to create a new word that she may not have yet encountered or may have forgotten temporarily. The listing of the morphological strategies of a language constitutes a part of the description of that language. It is, therefore, an aspect of linguistic competence, a component of grammar” (Ford et al. 1997:2).

3. Matthews’s stipulation on the nominative “Masculine in –os” serves this
purpose in the original direction, but a similar stipulation of gender and form on the genitive—“Masculine in -oris,” perhaps—cannot serve in the opposite direction because of the coincidence of the genitive forms.

4. Neither Starosta (1991) nor Ford et al. (1997) address this matter, since the paradigm has no status as an entity within either of their theories. Ford et al. (1997) states this most explicitly: “No sub-category of strategies is exclusively identified morphologically. Hence, no ‘conjugation/declension’, or ‘intra/extra-paradigmatic’ kind of typology. . . . We claim that there is no need for the outlawed restrictions. The burden of proof is, clearly, on those who want to dispense with these constraints and introduce additional devices to account for the facts” (Ford et al. 1997: 3–4).

5. My reasons for shifting from nominal to verbal morphology at this point in the discussion are primarily two: verbal morphology is richer, and the morphosyntactic features involved are more generally agreed upon than are those operating in case systems.

6. Simplified somewhat for our purposes here. These bidirectional strategies in the spirit of Ford et al., which do not presuppose the existence of paradigms, we will be referring to as “reciprocal strategies” when necessary to distinguish them from “paradigmatic strategies.” which do.

7. The number of ordered (unidirectional) pairs is equal to n(n–1), and the unordered (bidirectional) pairs to n(n–1)/2. Thus, as the size of a paradigm expands, the number of strategies expands quadratically. (I have my University of Hawai‘i colleague Thomas Ramsey to thank for help with these statements.)

8. Indicative and subjunctive, but not including imperative, or the various forms derived on the “t-stem” (see Aronoff 1992, 1994).

9. This is the order in which I list the feature values in (9) and (10) below: speaker, addressee, plural.

10. Note that the total of seven could be reduced to five if one chose only one of the two alternatives for relating 1pl and 2pl, but at the cost of increasing the number of serial strategies required to interrelate certain combinations.

11. In a scheme that required only five reciprocal strategies, the three plural terms would not be interrelated by strategies; each would be related only to its singular counterpart. Alternatively, 1pl and 2pl would each relate to 3pl, but only the latter would relate to its singular counterpart. It should be clear that I am not seriously proposing this as a workable alternative, but only as a theoretical possibility if one wished to keep the number of reciprocal strategies as low as possible.

12. Remembering also that we have examined the inflections of a verb from
only one of the four conjugations.

13. It will be noted that I view the Latin “perfect” as an aspect, and the “imperfect” as a tense that I label here as “past.” The perfect passive quadrant in (18–20) is vacant of forms, because this combination is accomplished periphrastically, not morphologically. The asterisk, while not centrally located within the overall array, still serves as a reminder that all 15 cells are to be viewed as radially interconnected. The arrows mark instances of suppletion.

14. The exponents of person and number are even more tightly fused in the singular, usually into a single segment.

15. It is, of course, possible that language users switch directly among all combinations of features without division into subareas (our corners and corridors), even in such large paradigms. (Even more herculean tasks are sometimes imputed to speaker-hearers by those who build up complex forms from their roots.) There may also be differences among users in the pathways, and those that are especially well-trodden.

16. Aronoff does not include Robins (1959) among his references, but I would not want to imply that he failed to note a key source. Both the trans-Atlantic rift and the transformational-structural rift were wide in those days, and it is quite understandable to me that Aronoff could have been unaware of Robins’s work, just as I must confess I was then.

17. In this exercise, it matters not that the origins of these forms are often disparate, as sometimes revealed in their spelling. This should not prevent us from seeing their contemporary unity of form.

18. Note the chance sequence here of the -ow and -er morphemes. Sequences are sometimes more systematic, as for example the -ery of crockery, finery, greenery, pottery; debauchery, forgery, lechery, slavery; bakery, bindery, cannery, eatery, hatchery, printery, tannery; winery, nursery, nunner, etc. I will not explore such combinations further in this paper.

19. Examination of this function takes us beyond disyllables.

20. I wish to acknowledge my indebtedness to Marchand (1969) for many of these examples of functions.

21. There are other phonemicizations that analyze four of these morphemes as consisting of two phonemes each, by including a schwa before the final liquid and nasal elements.
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