

ARTICLES

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TELLING THE NUMBERS: A UNIFIED ACCOUNT
OF SYLLABO-TONIC ENGLISH AND SYLLABIC FRENCH
AND POLISH VERSE

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1. The fundamental problem for a theory of meter is
how to count

- (1) Tell me not, in mournful numbers,
Life is but an empty dream! –
For the soul is dead that slumbers,
And things are not what they seem.
(Longfellow 'A Psalm of Life')

The stanza quoted in (1) is an example of metrical verse, in the meter 'trochaic tetrameter'. The metricality of these lines can be found both in their regular 'binary falling' rhythm and in their regular length of eight or seven syllables to the line. Most previous accounts of English metrical verse

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(parentheses) divide up the asterisks into groups. We say that this kind of representation is the metrical scansion of the line, and must correlate in some way with the mental representation produced as part of the act of scanning the line when it is composed or heard. Our theory of meter, because it treats scansion as the construction of bracketed grids, is called Bracketed Grid Theory. This theory is based on Halle and Keyser (1966, 1971), revised using a special counting mechanism adapted from Isard: (1992) where it was used in accounts of stress and other prosodic properties on words. The theory has been discussed in Halle and Keyser (1999), Fabb (2001, 2002a, 2002b), and is the subject of Fabb and Halle (in preparation) with illustrations of meters from many of the world's poetic traditions.

Every theory of meter must assign a representation to the metrical elements – the syllables – of the line. We call this representation the scansion of the line. In some theories (e.g. Fussell 1979), this representation is a sequence of foot types (iambic, trochaic, dactylic, anapaestic, etc.) where subsequences of syllables are segmented into component feet of various kinds. In other theories (e.g. Hanson and Kirparsky 1996), this representation is a tree structure with terminal nodes which are attached to syllables. Yet other theories (e.g. Hayes 1993) have a grid with the terminal line of the grid attached to syllables, similar in some respects to the grid in (3).

Many theories of meter have assumed that the scansion of the line is a prefabricated templatic unit which is matched as a whole to the whole line. For such a theory, the trochaic tetrameter, the meter of Longfellow's poem, would consist of a specific template – a sequence of feet, or a tree, or a grid, depending on the theory – which is preconstructed and matched to each line in turn; if the template matches, then the line is metrical.

We offer a fundamentally different account of the relation between the scansion and the line. This account derives from our view that the scansion results directly from the counting operation, as outlined below. It is this fact in particular that we have in mind when we qualify our theory of meter as being generative. We propose that the scansion is built step-by-step from the verseline by a set of ordered rules, the first of which is stated in (4).

- (4) Project each syllable as an asterisk on gridline 0.

This rule applies to the line of verse and projects for each line a gridline of asterisks:

- (5) Tell me not in mournful numbers
* * * * * gridline 0

Life is but an empty dream
* * * * * gridline 0

For the soul is dead that slumbers,
* * * * * gridline 0

And things are not what they seem.
* * * * * gridline 0

The next step is to group the asterisks into pairs; these are the gridline 0 feet. The grouping is implemented by inserting parentheses into the asterisk sequence. It is assumed that a right parenthesis groups the asterisks on its left, while a left parenthesis groups the asterisks on its right, as defined by the rule in (6).

- (6) Asterisks to the left of the nearest right parenthesis or to the right of the nearest left parenthesis belong to the same metrical group.

Consider for example the representation in (7). Here the first three asterisks are in a foot, defined by the right parenthesis which follows them. The final four asterisks are also in a foot, defined by the left parenthesis which precedes them. The middle two asterisks above remain ungrouped (unfooted) as they are neither to the left of a right parenthesis or to the right of a left parenthesis.

- (7) * * * * * (* * * * *

The mechanism responsible for inserting the parentheses is a set of rules – for example those in (8) – which work their way across the asterisk sequence from one end to the other, marking one asterisk by inserting a left parenthesis before it (rule (8)i) and skipping the next (rule (8)ii). We say that the rules in (8) iteratively group the asterisks into binary feet (for ternary feet there would be a second skip rule in addition to ((8)ii)).

- (8) Moving from left to right apply the following rules iteratively
i. Insert a left parenthesis to the left of the next asterisk
ii. Skip the next asterisk

The effect of these rules is to insert parentheses into the lines as follows.

And things are not what they seem.

(*)	*	(*)	*	(*)	*	(*)	*
*		*)		*		*)	*
		*				*	

gridline 0 (feet)
 gridline 1 (metra)
 gridline 2 (cola)
 gridline 3 (line)

If a line has more than eight gridline 0 asterisks (i.e. projecting from more than eight syllables), the grid built by the rules will have more than one asterisk at gridline 3, and thus will be ill-formed. Thus we constrain the upper length of the line by the requirement that the final gridline have one asterisk. This limitation to a maximum length of eight syllables presupposes that as in (13) the counting on gridlines 0, 1, and 2 is by pairs. Longer lines can be accommodated by admitting triplets on one or more of the gridlines. The theory we have sketched here could readily be extended to admit grids with more than four gridlines. We have limited the grid to four gridlines because we have not encountered convincing examples in any metrical tradition that would justify this extension.

In sum, above we have demonstrated a way of counting up to any number of syllables by grouping syllables (and higher level groups) into pairs and triplets. This is achieved by a set of ordered rules which step-by-step build a bracketed grid, and thus count the syllables in the line. This bracketed grid is the scansion of the line. In the next section we will see that the bracketed grid also explains the rhythmic properties of English metrical verse.

3. The rhythm derives from the counting

The grid which is constructed in order to count the metrical elements of the line has a periodic structure. The periodicity of the grid reflects the rhythmic periodicities found in the meter of these lines. There are two relevant kinds of rhythmic periodicity. The first and most salient kind of rhythmic periodicity is in the overall rhythm of the lines as they are performed, based on likely stressings of the syllables, and is illustrated in (14).

(14) / x / x / x / x /
 Tell me not, in mournful numbers,
 / x x x / x /
 Life is but an empty dream! -

x x / x / x / x
 For the soul is dead that slumbers,
 x / x / x / x /
 And things are not what they seem.

Above each line, x indicates a syllable which is likely to be performed with weak stress or no stress, while a slash / indicates a syllable which is likely to be performed with strong stress, and underlining indicates obligatory stress (this is the syllable carrying strongest stress in a polysyllabic word). Other ways of stressing the monosyllabic words are possible; for example *but* and *for* could be given stress, thus making the lines more periodic in stress (but less 'natural' sounding) while the last of the four lines can also be made more periodic but at some cost to naturalness of stressing:

(15) / x / x / x / x /
 And things are not what they seem.

If we match the overall rhythms to the grid as in (16) we see that there is some relation between the rhythms and the grid structure, in that the syllables carrying stress tend to be the syllables which project to gridline 1 (here, most consistently in the first line and least in the last line).

(16) / x / x / x / x /
 Tell me not, in mournful numbers,
 (* *) (* *) (* *) (* *)
 * * * * *
 * * * * *
 * * * * *
 * * * * *

gridline 0 (feet)
 gridline 1 (metra)
 gridline 2 (cola)
 gridline 3 (line)

/ x x x / x /
 Life is but an empty dream! -
 (* *) (* *) (* *) (* *)
 * * * * *
 * * * * *
 * * * * *

gridline 0 (feet)
 gridline 1 (metra)
 gridline 2 (cola)
 gridline 3 (line)

x / x / x / x /
 For the soul is dead that slumbers,
 (* *) (* *) (* *) (* *)
 * * * * *
 * * * * *

gridline 0 (feet)
 gridline 1 (metra)
 gridline 2 (cola)
 gridline 3 (line)

x / x / x / x /
 And things are not what they seem.
 (* *) (* *) (* *) (* *)
 * * * * *
 * * * * *

gridline 0 (feet)
 gridline 1 (metra)
 gridline 2 (cola)
 gridline 3 (line)

gridline 2. The heads of the two metra are grouped into a single binary colon, which is left-headed and projects its head up to gridline 3.

(28) French 12-syllable meter (*alexandrin*)

Vous vous mêlez sur tout de dire votre avis.	
* *) *) *) *) *) *) *) *) *) *) *) *)	gridline 0 feet
* * * * * * * * * * * * * *	gridline 1 metra
* * * * * * * * * * * * * *	gridline 2 cola
* * * * * * * * * * * * * *	gridline 3 line

"You butt in everywhere with your opinion"

(Molière, *Tartuffe*)

The grid in (28) limits the length of the line to 12 footed syllables; the upper length of the line again controlled by the requirement that the final gridline contain just one asterisk (but we will shortly show that there is a 13-syllable variant). The grid also makes it easy to account for the placement of the caesura (the obligatory word boundary) after the sixth syllable of the line. We can formulate this restriction now as in (29).

(29) Caesura condition (French)

The syllable projecting to gridline 3 must be followed by a word boundary.

Note: a syllable not projecting to gridline 0 and therefore not counted for purposes of the meter may intervene between the word boundary and the syllable projecting to gridline 3.

Many discussions of the alexandrin note that the syllable preceding the caesura need not be word final, and this is expressed by our note to the rule. In the pairs of lines in (30), (31) and (32), the first line in each case has the caesura preceded by a nonfinal syllable; this is allowed because in each example the final syllable is an *e caduc* which is not projected. In contrast, the second lines in each case show that when the last syllable of the relevant word counts for the meter, it must directly precede the caesura.

- (30) Relève-toi, Rodrigue. || Il faut l'avouer, Sire,
 * * * * * Δ * * * * *
 Je vous en ai trop dit || pour m'en pouvoir dire
 * * * * * * * * * * * * * * *

"Get up Rodrigue. It must be admitted, Sire, / I have said to you too much about it to be able to retract it"

(Cornaille, *Le Cid*)

(31) Un peu trop forte en gueule || et trop impertinente:

* * * * * Δ * * * * *
 Vous vous mêlez sur tout || de dire votre avis.
 * * * * * * * * * * Δ * * *

"A face that is a bit tough and too impertinent / you butt in everywhere with your opinion"

(Molière, *Tartuffe*)

(32) Les vertus de son père, || et non point les faiblesses,

* * * * * Δ * * * * *
 D'aime, je l'avouerai cet orgueil généreux
 * * * * * * * * * *

"The virtues of his father and not his weaknesses, / I love, I admit it, this generous pride"

(Racine, *Phédre*)

Our rule (25) permits nonprojection of a syllable with *e caduc* only if that syllable is followed by a word which begins with a vowel. This means that a line-final syllable with *e caduc* is always projected (because it is not followed by another word). Thus for example the final syllable in 'Sire' is *e caduc* but because it is line final it is projected so that there are thirteen projected syllables in the first line in (30). This is a 'feminine rhyme' and we deal with it exactly as we deal with 'feminine rhymes' in English in section 4, i.e., we begin the iterative footing on line 0 with the skip rule rather than with the rule of parenthesis insertion. This is illustrated in (33).

- (33) Relève-toi, Rodrigue. || Il faut l'avouer, Sire,
 * *) * *) Δ * *) * *) * *) * *) * *) * *)
 * * * * * * * * * * * * * * *
 * * * * * * * * * * * * * * *
 * * * * * * * * * * * * * * *

In (34) we have given the formal rules that generate the metrical grid for the French alexandrin.

(34) French 12-syllable meter

- a. Project each syllable as an asterisk on gridline 0
Rider: Do not project a syllable containing word final *e caduc* if *e caduc* is followed by a vowel-initial word.
 gridline 0 (foot level)

The 10-syllable line differs from the alexandrin (cf. (34)) in lacking one binary foot on gridline 0 (i.e. a foot which projects from two syllables – hence the line is two syllables shorter). By assuming that these lines differ from the alexandrin by lacking the initial foot, we automatically also account for the fact that in the 10-syllable line the caesura comes after the fourth syllable and that the fourth and tenth syllables are occupied by maxima. We have illustrated this in (39) with the metrical grid constructed on the last line in (38).

| | | |
|------|---|------------|
| (39) | Elle était jeune et son œil plein de joie | |
| | * Δ *) * *) Δ * *) * *) * *) * | |
| | * * * * * | gridline 0 |
| | (* * * * | gridline 1 |
| | * * | gridline 2 |
| | * | gridline 3 |

The only difference between the grid of the décasyllabe in (39) and the grid of the alexandrin in (33) is that in (39) the left-most (ternary) metron on Gridline 1 has fewer than its maximum complement of three asterisks. We express this fact formally, by adding (40) to the conditions that a grid must satisfy.

(40) (Additional condition on the décasyllabe)

The left-most metron on Gridline 1 must be non-maximal (binary rather than ternary).

The fact that these two meters – that of the alexandrin and that of décasyllabe – share all but the condition (40) provides further empirical support for the formal analyses advanced here. It shows that our particular way of counting the syllables in a line has as one of its by-products a straightforward account of other relevant properties of the line.

6. Polish syllable counting meters

Like the French alexandrin, the main meters of Polish metrical verse are based on the counting of syllables (Dhuska 1978). It is generally assumed that these meters became the metrical standard for Polish poetry as a consequence of the enduring popularity of the poetry of Jan Kochanowski (1530–1584), one of the greatest poets of the language, who made extensive use of them. Kochanowski lived for a number of years in Italy and France and was in contact with contemporary poets, including Ronsard and other members of the Pleiade. In the syllabic meters most widely used not only

by Kochanowski, but also by all Polish art poetry until the middle of the nineteenth century (Preminger 1993:116), the lines are either 13 or 11 syllables long with an obligatory caesura that appears before the sixth syllable from the end of the line. Examples of the two meters from Kochanowski's poems are given in (41) and (42) respectively (quoted from Kridl 1957). Placement of the caesura is indicated by ||.

(41) Czego chcesz od nas, Panie, || za Twe hojne dary?
Czego za dobrodziejstwa, || którym nie masz miary?

'What do you demand of us, Lord, for your abundant gifts?
What – – for your benefactions that you do not count?'

(Kochanowski, 'Song 25')

(42) W Tobie ja samym, || Panie, człowiek smutny
Nadzieję kładę: | Ty racz o mnie radzić!

'In you, o Lord, I, sad man,
Place my hope: you will be pleased to guide me!'

(Kochanowski, 'Psalm 7')

We propose the following rule for gridline 0 in Polish 13-syllable lines.

(43) *Polish 13-syllable meter*

- a. Project each syllable as an asterisk on gridline 0
gridline 0 (foot level)
- b. Moving from right to left apply the following rules iteratively
 - i. Skip the next asterisk
 - ii. Insert a left parenthesis to the left of the next asterisk
 - c. The leftmost asterisk in each foot is the head of the foot and is projected up to the next gridline.

The rules in (43) when applied to the first line in (41) foot the line as in (44), and when applied to the first line in (42) foot it as in (45). (We note again that as in French, maxima are not required to project to gridline 1.)

(44) Czego chcesz od nas, Panie, || za Twe hojne dary?
* (* * * * * * * * * * *
* * * * * *

(45) W Tobie ja samym, || Panie, człowiek smutny
* (* * * * * * * * * * *
* * * * * *

We therefore add to our account of the Polish meters the definition (52) and the condition (53). Note that the situation is like French in that certain positions must be filled by maxima, and unlike English where maxima are not required but if present must be in certain positions.

(52) Definition of maximum (Polish)

The syllable bearing the stress in a polysyllabic word is a maximum.

(53) Condition (Polish)

Syllables projecting to gridline 3 must be maxima.

There is thus a fundamental contrast between the French alexandrin and the Polish 13-syllable meter. The Polish meter requires a word boundary both mid-line (after the 7th syllable) and at the end of the line, and thus in two places; but only one syllable, the twelfth syllable which is the head of the line must be a maximum. The French meter requires a word boundary only at mid-line (after the 6th syllable); in contrast two syllables, the sixth and the twelfth, must be maxima.

7. Conclusion

Our theory of meter, Bracketed Grid Theory, begins from the observation that in all metrical traditions, poets must be able to count the number of syllables in the line. We propose a set of rules by which counting is undertaken; these rules permit counting no higher than three, and build a bracketed grid as their output. This is the basis of metricality and is common to metrical traditions which on the surface are very different, such as the syllabo-tonic meters of English verse and the syllable-counting meters of French and early modern Polish verse. As no previous theory of meter has been able to provide a unified account of these different kinds of meter, we believe that we have made a significant advance in the understanding of metricality.

The parenthesis-insertion and asterisk-projection rules which build grids, and thereby count the syllables in the line, are open to variation, and by varying these iterative rules we differentiate meters within a tradition or between traditions. The iterative rules that insert parentheses into a gridline can skip one or two asterisks after each insertion, and in the groupings so generated the left-most or the right-most asterisk can be projected to the next higher gridline. The setting of these two binary variables on gridline 0 limits to four the possible foot types that may be encountered in metrical

verse. This radical claim that there are only four kinds of feet in metrical verse anywhere is sustained we believe by the several dozen kinds of widely differing metrical systems investigated in our forthcoming book (see Fabb and Halle in prep). The setting of additional parameters such as the direction of parenthesis insertion, the choice of left or right parenthesis for insertion, the starting of the iterative parenthesis insertion with a skip or with an insertion, and the possibility of the last grouping on a gridline to fall short of its full complement of two (or three) asterisks are additional parameters by means of which meters are differentiated within a tradition or in different traditions.

The most overt differences between metrical traditions usually come in the constraints which relate the verseline to the grid. While these conditions presuppose the metrical grid, they are independent of the grid. As explained above, the grid is the result of the specific way in which syllables are counted in a given meter, whereas the conditions determine where the maxima (which are particular syllables in a word) or word-boundaries occur in lines of verse. For the purpose of counting, all counted syllables are alike; but the syllables differ fundamentally in determining whether or not a sequence of n syllables is or is not a lawful instance of a particular meter. In all three languages there are constraints which involve maxima – i.e., the syllable bearing main stress in a polysyllabic word – but the precise definition of the maximum differs from language to language. In the English syllabo-tonic meters (as well as in those of German and Russian) the maxima must project to gridline 1; in the syllable-counting meters of French and Polish, syllables projecting to gridline 2 must be maxima. Moreover, in these syllable-counting meters, there must be a verse-internal caesura (word-boundary) whose location is determined in slightly different ways in French and in Polish by the syllables that project to gridlines 2 and 3. Thus, syllabo-tonic and syllable-counting meters differ in that their constraints involve different gridlines: syllabo-tonic meters involve gridline 1, syllable-counting meters, gridlines 2 and 3. Since gridlines 2 and 3 cannot be constructed without gridline 1, all three kinds of meter discussed in this paper require gridline 1. Since lines in syllabo-tonic meters commonly exceed 4 syllables in length, they require the additional two gridlines to determine line length. Hence the full structure of the grid is involved in controlling the metrical form of the line.

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