

On Meter in General and on Robert Frost's Loose Iambics in Particular

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1 The Line in Poetry

Virtually every society we know has poetry, and every poetry that we know about is composed of lines. It is this that distinguishes poetry from all other forms of literary art. There is, of course, much more to poetry than the formal organization of the running text into lines and into couplets and stanzas with or without rime. Indeed, much of our finest poetry has neither couplets, stanzas or rime. But one immutable fact remains: all poetry everywhere is made up of lines.

At first sight this seems a rather trivial, superficial distinction rightly lampooned by the English philosopher Jeremy Bentham when he wrote that poetry was nothing but prose unjustified at the right margin. Bentham's remark was not meant to be taken seriously because it glossed over the essential difference between prose and the poetry known to Bentham. In the metrical poetry familiar to Bentham and his readers the lines were subject to strict rules that determined in each case where a line must end and a new line begin. Much later when free verse became the standard for poetry in French, English, and elsewhere, the joke turned serious since in free verse there are no principles determining what a line is, yet the line remains. As Ezra Pound wrote in his 81st canto, his aim was "to break the pentameter, that was the first heave," and he succeeded in this perhaps beyond his wildest dreams. Pound, Eliot, and the majority of English poets that followed them have broken not only the pentameter, but all meter.¹ As a result the only common property

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¹ For a discussion of the breakup of metrical verse in the 20th century, see Steele 1990.

that their lines share is typographic: the lines are not right-justified, and that is what distinguishes free verse from prose.

While metrical verse also fails to be right-justified, the lines that make up metrical verse are subject to measurement just as surely as if they were made of cloth, and both poet and reader had a yardstick. The units in terms of which lines are measured are, of course, not yards and inches, but syllables and feet, where feet—as we detail below—are syllable sequences subject to special conditions.

2 Syllable-Counting Meters

The simplest kinds of meters are those that measure the lines in terms of their syllables: one counts so many syllables to a line. Such meters occur in the poetry of languages all over the world. Much of the poetic canon in Italian, Spanish and French is written in syllable-counting meters (see Halle and Keyser 1980), and so is much of the poetry of the Hebrew bible (see Halle 1997). So, too, are the *tanka* and *haiku* forms of Japanese poetry (Halle 1970).

Before illustrating how such meters work, we recall that metrical traditions differ as to how they count syllables. In some traditions, e.g., English, every syllable counts as one metrical unit. In others, e.g., Japanese (see below in (1) and (2)), syllables with short vowels count as one metrical unit, but syllables with long vowels count as two metrical units. There are, moreover, traditions where syllables following the last accent in the line do not count, whereas in still other systems a syllable ending in a vowel counts only if followed by a consonant-initial syllable, etc. Line length is therefore measured in terms of metrical units rather than syllables, and we shall take formal account of this distinction below by representing each metrical unit by an asterisk. Thus, in (1) and (2) below syllables with a long vowel, transcribed in the text by double vowels, are assigned two asterisks, while all other syllables receive only one asterisk.

reading metrical verse.

3 What is a Foot?

The most elementary part of the metrical computation was already introduced in (1) and (2). It consisted in specifying the metrical units that are counted in determining the lines of the Japanese *haiku* and *tanka* meters. We observed that for these meters we count a syllable with a long vowel as two units and one with a short vowel as one unit, and we reflected this fact formally by representing long syllables with two asterisks and short syllables with a single asterisk. As noted above the machinery employed in this (syllable-counting) verse is of a rudimentary kind. All that it requires is knowing whether for purposes of the meter a given syllable counts as one or two or is not counted at all. Once this has been determined line length is measured as in (1) and (2).

Somewhat more complex machinery is involved in meters where line length is measured in feet rather than syllables. Foot-counting meters are encountered in a wide variety of poetic traditions beginning with Homer's *Iliad* and *Odyssey*. Included here are the meters of classical Greek and Latin, the Old Norse epics, Russian poetry from the eighteenth century to the present, German poetry from Hans Sachs to Rilke, and English poetry from Chaucer to Frost.

Footed verse differs from pure syllabic verse in that its lines are measured not directly in terms of syllables—or more accurately, of metrical units—but rather in terms of sequences of such units, and these sequences are called feet. Basically there are only two kinds of feet: binary and ternary. The traditional names of the binary feet are iamb and trochee, and those of the ternary feet: anapest and dactyl. The difference between the two is the location of the most prominent element in the foot, regardless of whether it is made up of two elements (binary) or three elements (ternary). The prominent element is called the head of the foot and it is always located at an edge. Iambs and anapests are right-headed (the prominent element is at the right edge of the foot). Trochees and dactyls are left-headed. Thus, an iambic pentameter line is made up of five (binary) iambs, whereas a dactylic hexameter is composed of six (ternary) dactyls.

Consider the opening lines of Robert Louis Stevenson's *A good play* in (3).

- (3) We built a ship up on the stairs
 * * * * *
 All made of the back-bedroom chairs,
 * * * * *
 And filled it full of sofa pillows
 * * * * *
 To go a-sailing on the billows.
 * * * * *

Unlike the Japanese meters of (1) and (2), in English meters every syllable counts as one unit for measuring the length of lines. There is therefore in (3) one asterisk for each syllable. The four lines in (3) are all iambic tetrameter; yet the number of syllables in the lines varies: the first two lines have eight syllables each, while the last two have nine. This irregularity disappears once we measure line length in terms of feet. We turn therefore to foot construction.

The devices that are used for foot construction were discovered by Idsardi 1992 in the course of his study of accentual systems of different languages. The basic devices are two boundary markers. One groups into feet the metrical elements on its right; the other marker foots the elements on its left. Metrical units that are not to the right of a left boundary or to the left of a right boundary, remain unfooted. Such unfooted units play an important role in different meters. The first examples are found at the ends of the third and fourth lines of (4) below.

Below we use parentheses to represent the two boundaries: a left parenthesis "(" foots the elements on its right, a right parenthesis ")" foots the elements on its left. Feet are the result of rules inserting parentheses. For iambic feet we have a rule that inserts a right parenthesis beginning at the left edge of the line and proceeding rightwards skipping two syllables after every insertion. As shown in (4), this results in the insertion of a parenthesis after every even-numbered syllable. Crucially, in the last two lines of the stanza, the procedure causes the ninth syllable to remain unfooted.

- (1) Tanka
- | | | |
|-------------------|---|--------------------|
| haru tateba | | when spring comes |
| * * * * * | 5 | |
| kiyuru koori no | | the ice melts away |
| * * * * * | 7 | |
| nokori naku | | without trace |
| * * * * * | 5 | |
| kimi ga kokoro mo | | your heart |
| * * * * * | 7 | |
| ware ni takenamu | | melts into me |
| * * * * * | 7 | |
- (Kokinshuu)
- (2) Haiku
- | | | |
|-----------------|---|------------------------------|
| kaki kueba | | A bite of persimmon |
| * * * * * | 5 | |
| kanega narunari | | And the temple bell resounds |
| * * * * * | 7 | |
| hooryuu-ji | | Hooryuuji |
| * * * * * | 5 | |
- (Masaoka Shiki)²

Tanka and *haiku* are names for two kinds of stanza used in Japanese poetry. As shown in (1) and (2) above the *tanka* stanza is composed of five lines and that of the *haiku*, of three. In the *tanka*—illustrated in (1)—the line count is 5-7-5-7-7 metrical units, while in the *haiku*—see (2)—the line count is 5-7-5.

In spite of its apparent simplicity, the counting of syllables like that in (1) and (2) is a computation of considerable sophistication. As noted, different metrical traditions have different ways of counting syllables. Moreover, the very determination of the syllables in a word is a matter of some complexity: in fact, psychologists, phoneticians, linguists and other students of speech do not know how syllables are recognized by humans, and we have to this day no machine, no computer program that can reliably segment stretches of speech

² Horyuji is the name of a famous monastery in Japan. We thank Sige-Yuki Kuroda, Shigeru Miyagawa, and Noriko Sugimori for translation and important information about these beautiful poems.

into syllables. And what is true of determining syllables is—not surprisingly—also true of more complex linguistic functions such as identifying words in a string of speech or of extracting the meaning of such a string: all of these things are readily done innumerable times each day by ordinary humans, but, as of this writing, this task is far from fully understood.

The work of the last half century in linguistics has established that much of the machinery required for the computation of all aspects of language—syntax, morphology and phonology including the computation of syllables and metrical units—is innate, part of the genetic endowment that makes us human.³ As human beings we are equipped at birth to learn the computations involved in producing the words and sentences in our native tongue during the first years of life and are then able to perform these enormously complex computations unconsciously and with the greatest ease. Perhaps a good way of thinking about this feat is by comparing it to the way dogs compute the trajectories of balls they catch. They do not take out pad and paper to solve the differential equation that characterizes the arc of the ball and that will tell them where to stand when it comes down to earth. They don't have to: to catch balls is as natural for dogs as speaking is for children. Neither dogs nor children need to—or can—reflect on the feats they perform naturally. But the scientist or the critic who wants to understand the nature of these abilities must examine these computations in detail.

What has this got to do with meter? It is our contention that just as we go through innate computations to make and understand sentences, we also go through elaborate computations when we read or make metrical verse. In fact, there is good reason to suppose that the computations employed for metrical verse are identical with some that are involved in speaking. Because of the complex character of the computations involved in the construction of metrical verse, it will be necessary for the reader to take out paper and pencil and learn to perform the computations in order to follow the discussion below. We hasten to remark that poets and their readers need neither paper nor pencil: like dogs—and ball players—they perform these computations on the fly. Paper and pencil is, however, necessary for those who want not only to enjoy the poetry, but also to get some insight into what goes on in writing and

³ For a readable discussion see Pinker 1994.

- (4) We built a ship upon the stairs
) * *) * *)** * *)
 All made of the back-bedroom chairs,
)* *) * *) * *) * *)
 And filled it full of sofa pillows
)* *) * *) * *)* *)*
 To go a-sailing on the billows.
) * *) * *)* *) * *)*

Our procedure for foot construction accounts automatically for the extra-metrical syllable in the third and fourth lines in (4), where a ninth syllable appears after the last foot. Since parentheses are inserted only after a pair of unfooted syllables, a parenthesis cannot be inserted after the ninth syllable, which remains therefore unfooted, and these two lines have four feet, just like the first two lines in (4).

The formal procedure for constructing iambic feet therefore is that in (5).

- (5) To construct iambic feet insert right parentheses beginning at the left edge of the line and proceeding rightward skipping two syllables after every insertion.

We have already noted, moreover, that the two units constituting a foot are not equal. Iamb and anapests are right-headed, trochees and dactyls left-headed. We state these observations formally in (6).

- (6) In iambs and anapests the head of the foot is the right-most element; in trochees and dactyls the head is the left-most element.

Consider next the trochaic verses of Longfellow's *Psalm of Life* in (7).

- (7) Tell me not in mournful numbers
 (* *(* * (* * (* *
 Life is but an empty dream,
 (* *(* * (* * (* *
 And the soul is dead that slumbers,
 (* *(* * (* * (* *
 And things are not what they seem.
 (* *(* * (* * (* *

Like those in (4), the lines in (7) are also tetrameters. What distinguishes formally the trochaic lines in (7) from the iambic lines in (4) is that in (7) the feet are constructed with left, rather than right parentheses. This explains immediately the fact that the seventh syllable in the second line of (7) counts as a foot, but as shown in (8) would not constitute a foot if feet were constructed by inserting right parentheses:

- (8) Life is but an empty dream
)* *) * *) * *) *

As noted above, in addition to binary meters there are also ternary meters; i.e., anapests are the ternary counterparts of iambs, whereas dactyls are the ternary analogs of trochees. As ternary meters are beyond the purview of this paper we give the examples in (9) and (10) with only the most minimal commentary.

- (9) The Assyrian came down like the wolf on the fold,
) ** *)* * *) * * *) * * *)
 And his cohorts were gleaming in purple and gold;
)* * *)* * *) * * *) ** *)
 And the sheen of his spears was like stars on the sea
)* * *) * * *) * * *) * * *)
 When the blue wave rolls nightly on deep Galilee.
) * * *) * * *) ** *) ** *)

Byron (323)

- (10) My country, t'is of thee,
 (* * * (* * *
 Sweet land of liberty,
 (* * * (** *
 Of thee I sing;
 (* ** (*
 Land where my fathers died,
 (* * * (* * *
 Land of the pilgrims' pride,
 (* * * (* * *
 From every mountain side
 (* * * (* * *
 Let freedom ring.
 (* * * (*

Samuel Francis Smith (347)

Byron's lines are examples of anapestic tetrameters, while those of Samuel Francis Smith are dactylic dimeters. The lines in (10) end in monosyllabic feet, which parallels closely what we have seen above in the trochaic verses in (7).

We show below that in addition to type of parenthesis and to interval of parenthesis insertion there are also meters that construct feet from the end of the line, rather than from its beginning. But before examining these lines, of which Frost's loose iambs are a special instance, we must discuss how foot construction interacts with the stress contours of the individual words that make up the line.

4 Stress Maxima

It is an elementary fact of English metric verse that a given polysyllabic word cannot be replaced by a word of equal length but with main stress on a different syllable without destroying the metrical structure of the line. For example, it is obvious that something is wrong metrically with a couplet such as that in (11).

- (11) Tell me not in mournful numbers
 All made of the back-bedroom chairs

The oddness of these lines cannot be the result of the number of syllables in them since they both have the same number of syllables. What causes this couplet to appear metrically wrong is that the stressed syllables in the polysyllabic words appear in different metrical positions. In the first line of (11), the stressed syllables in the words *mournful* and *numbers* occupy odd-numbered positions; in the second line the stressed syllable of the compound *bedroom* occupies an even-numbered position. Since the first of the two lines has been taken from a poem with a trochaic meter (i.e. (7)) and the second from a poem with an iambic meter (i.e. (3)), we conclude that such mixtures of meters in a single poem are not allowed.

The conclusion is supported by the fact that the couplet can be improved metrically—if not esthetically—by modifying the lines so that the stress of polysyllabic words in both lines coincides either with an odd-numbered or an even-numbered position. This is shown in (12).

- (12) a. Téll me nóT in móurnful númbers
 (* * (* * (* * (* * (*
 Áll máde óf back-bédroom cháirs
 (* *(* * (* * (*
 b. Tell mé not in such móurnful númbers
)* *) **) * *) * *) *
 All máde of thé back-bédroom cháirs⁴
)* *) * *) * *) * *) *

The problematic lines in (11) and their improvements in (12) reflect the fact, disregarded in the discussion to this point, that polysyllabic words cannot appear freely in the line, but must be located so that the syllable with main stress in the word coincides with the head of a foot. It is this fact that forces us to scan the first line in (11) as trochaic and the second line as iambic. And it is this fact that is exploited both in (12a) where the second line is converted

⁴ It is especially instructive to write out the scansion of these lines in order to confirm the claim made here that the modifications result in exclusively trochaic feet in (12a) and exclusively iambic feet in (12b), whereas in (11) the first line is trochaic and the second, iambic.

- (18) a. Shouldered his crutch, and showed how fields were won.
)*) * *) * *) * *) * *) *
 b. Careless their merits or their faults to scan,
)*) * *) *)* *) * *) * *)

The lines in (18) have a unary foot at the beginning of the line which triggers an unintuitive scansion in (18a) and too many feet in (18b). These problems indicate that (17) is in need of some revision. In the strict iambic verse under discussion below the insertion by (14) is subject to the further condition (19).

- (19) In strict iambic verse, right parentheses are inserted after stress maxima only if they are preceded by a syllable with lesser stress.

An immediate consequence of (19) is to replace the scansions in (18) by those in (20) because the initial syllables of these lines do not qualify as stress maxima. The resulting scansions are straightforward.

- (20) a. Shouldered his crutch, and showed how fields were won
)* *) * *) * *) * *) * *)
 b. Careless their merits or their faults to scan
)* *) * *)*)* *) * *) * *)

(19) requires that stress maxima remain unmarked both when preceded by no syllable as in (20), as well as when preceded by syllables with greater or the same stress. The latter is illustrated by the W.B. Yeats line in (21).

- (21) Wherein the gazing heart doubles her might.
 * *) * *)*)* *) * *) * *)

(from *In Memory of Major Robert Gregory*, IX)

In the polysyllabic word *doubles* a right parenthesis would normally have been inserted after the first syllable were it preceded by an unstressed syllable. However, the stressed monosyllable *heart* precludes that assignment in accordance with (19). Another example of this kind of "neutralization" in Yeats is listed in (22).

- (22) Were loved by him: the old storm-broken trees
 * *) * *) **) * *)* *)

(from *In Memory of Major Robert Gregory*, VII)

The compound adjective *storm-broken* would normally trigger parenthesis insertion after the first syllable were it not preceded by the stressed monosyllable *old*.

Let us recapitulate. The theory of strict iambic meters that we have developed here includes two definitions, two rules, and two output conditions. One of the two rules inserts right parentheses to the right of stress maxima; the other inserts right parentheses iteratively from left to right. The constraints prevent insertion of parentheses after certain stress maxima and rule out certain configurations of parentheses assignments. We restate the entire complement of devices developed above in (23).

- (23) Definitions:

- i. The syllable with main stress in a polysyllabic word is called a *stress maximum*.
- ii. In iambs and anapests the right-most element of the foot is the head; in trochees and dactyls the left-most element of the foot is the head (cf. (6)).

Rules:

- iii. In left-headed (trochaic and dactylic) meters insert a left parenthesis to the left of a stress maximum; in right-headed (iambic and anapestic) meters insert a right parenthesis to the right of a stress maximum (cf. (14)).
- iv. To construct iambic feet insert right parentheses beginning at the left edge of the line and skipping two syllables after every insertion (cf. (5)).

Special Constraints:

- v. Right parentheses are inserted after stress maxima only if they are preceded by a syllable with lesser stress (cf. (19)).
- vi. In strict iambic verse, feet may not end on consecutive syllables (cf. (17)).

5 The Loose Iambics of Robert Frost

In "The Figure a Poem Makes," first published in 1939, Frost says:

All that can be done with words is soon told. So also with meters—particularly in our language where there are virtually but two, strict iambic and loose iambic.

Frost's characterization of his own metrical practice is accurate: what he calls strict and loose iambs are the two meters found in almost all of his poems. An example of Frost's strict iambs was given in (15d) above, and as shown there it fully conforms to the principles (23).

As shown in (24), the starting lines of Frost's *Birches* also conform to the principles (23).

(24) When I see birches bend to left and right
) * *) * *) * *) * *) * *) * *)

Across the lines the straighter darker trees,
)* *) * *) * *) * *) * *) * *)

The poem, however, abounds in lines like (25) and (26), which when scanned by (23), give unexpected results that are incompatible with the scansion in (24).

(25) Before them o ver their heads to dry in the sun
)* *) * *) * *) * *) * *) * *)

(26) Years afterwards, trailing their leaves on the ground
)* *) * *) * *) * *) * *) * *)

In (25) it appears that the line has six, rather than five feet like the majority of the rest. Moreover, unstressed prepositions figure as heads of feet as in *heads to dry in* contrary to the practice elsewhere as exemplified by *to left and right* in (24). Line (26) is even more unexpected in that it contains not only six feet but also a violation of the prohibition (23vi) against feet ending on consecutive syllables.

We discuss below thirteen additional lines in the poem that in various ways fail to conform to the principles in (27). The fact that in a 59 line poem 15 lines (more than one in four) do not readily conform to principles that hold elsewhere suggests that the poem was not written in conformity with these principles, but that instead it was composed in a different meter, the one Frost refers to as "loose iambic."

We propose that instead of (23) the meter of "loose iambs" is governed by the principles in (27).

(27) Definitions:

- i. The syllable with main stress in a polysyllabic word is called a *stress maximum*.
- ii. In iambs and anapests the right-most element of the foot is the head; in trochees and dactyls the left-most element of the foot is the head (cf. (6)).

Rules:

- iii. In left-headed meters (trochaic and dactylic) insert a left parenthesis to the left of a stress maximum; in right-headed meters (iambic and anapestic) insert a right parenthesis to the right of a stress maximum (cf. (14)).
- iv. Insert a right parenthesis to the right of a stressed monosyllabic word followed by two or more stressless syllables.
- v. To construct iambic feet insert left parentheses beginning at the right edge of the line and skipping two syllables after every insertion (cf. (5)).

Special Constraint:

- vi. Right parentheses are inserted after stress maxima only if they are preceded by a syllable with lesser stress (cf. (19)).

As a comparison of (27) with (23) shows, the definitions remain unchanged and so does the first rule of parenthesis insertion as well as the first of the two special constraints. The rest of (23), however, is changed. The rule of foot construction has been altered: instead of inserting right parentheses from left to right, the new rule inserts left parentheses from right to left.⁵ A new rule (27iv) has been added which inserts right parentheses after monosyllabic words followed by two or more unstressed syllables. We represent the parentheses inserted by this rule with a strikethrough ").".

To illustrate how this meter works we scan in (28) the awkward line (25) in conformity with (27).

(28) Before them over their heads to dry in the sun
 (**) (* *)* (* * (* *)* (* *)

⁵ In unpublished work (Halle 1997), it has been shown that in addition to loose iambic meters, there are also loose trochaic, loose anapestic and loose dactylic meters.

The stress maxima in *Before* and *over* receive a right parenthesis as before. In addition, a right parenthesis is inserted after *dry* as required by the new rule (27iv). Finally and most importantly, iambic feet are constructed not by inserting right parentheses from the beginning of the line, but rather (as required by (27v)) by inserting left parentheses from the end of the line. The most striking result of this procedure is the generation of a number of unfooted elements inside the line. Unfooted elements were encountered already in (4) above. However, in strict iambic meters unfooted elements are limited to line final position (feminine rimes). In "loose" iambs, by contrast, unfooted elements may occur anywhere in the line. Note that only a single metrical element can remain unfooted, because every sequence of two unfooted elements will be footed by (27v).

In (29) to (33) below we show how the remaining variant lines in *Birches* are scanned by the principles of (27).

(29) Shattering and a valanching on the snow-crust

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

The first syllable in (29) is not a stress maximum (cf. (27vi)). The word *shattering* is, moreover, scanned as a bisyllable and is footed by (27v).

(30) They are dragged to the withered bracken by the load

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

Here a parenthesis is inserted after *dragged* as required by (27iv) since the word is followed by two unstressed syllables.

(31) And they seem not to break; though once they are bowed

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

In this line rule (27iv) does not apply to *seem* because the following *not* is stressed. However, it does apply to *once*.

A line that deviates strikingly from the strict iambic mold is (26), reanalyzed here as (32).

(32) Years afterwards, trailing their leaves on the ground

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

We assume that Frost treats *afterwards* as being without stress. On this assumption *Years* is followed by two unstressed syllables and rule (27iv)

inserts a right parenthesis after it. A right parenthesis is similarly inserted by (27iv) after *leaves* because it is followed by two unstressed syllables. The remaining right parenthesis in the line (after *trail*) is inserted by (27iii).

The scansions of the rest of the variant lines of *Birches* are shown in (33).

(33) a. With all her matter-of-fact about the ice-storm

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

b. Then he flung outward, feet first, with a swish

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

c. Kicking his way down through the air to the ground.

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

d. So was I once myself a swinger of birches

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

e. And then come back to it and begin over

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

f. Toward heaven, till the tree could bear no more

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

g. That would be good both go ing and co ming back

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

h. One could do worse than be a swinger of birches

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

(33b) requires some comment. Before we discuss it, however, we need to say something about Frost's treatment of compound words. It seems to be the case that in *Birches* Frost makes a distinction between hyphenated compounds like *ice-storm(s)*, *snow-crust*, *snow-white*, and *matter-of-fact*, on the one hand, and unhyphenated compounds like *baseball*, on the other. We hypothesize that Frost's orthographic practice reflects a genuine metrical distinction. The hyphenated compounds are all treated like polysyllabic words whereas the nonhyphenated *baseball* is treated like a sequence of two monosyllabic words:

(34) Some boy too far from town to learn baseball

(* * (* * (* * (* * (* * (*

If *baseball* had been treated like the hyphenated *ice-storm* in (33a), the line

would have had only four feet and been unmetrical:

- (35) Some boy too far from town to learn baseball
 * (* * (* * (* * (* *)*)*(

Returning to (33b), we assume that the phrase *feet first* is treated as a compound with a stress maximum on the first element; i.e. as if it were *feet-first*. Were the sequence to be treated as two monosyllabic words in a row, then a right parenthesis would have been inserted by (27iv) after the second element *first*. The subsequent assignment of left parentheses from right to left would yield only four feet. (The reader with pencil and paper in hand ought to take a moment to verify this.)

The same loose iambs as in *The Birches* are also found in Frost's *Two Tramps in Mud Time*. This poem is in tetrameter; that is, its lines are composed of four feet. We scan some interesting lines in (36).

- (36) a. And you're two months back in the middle of March
 * (* * (* * *) * (* *) * (* *)
 b. A bluebird comes tenderly up t'alight⁶
 * (* * (* *) * (** (**)(
 c. But yield who will to their separation
 (* * (* *) * (* (***)*(
 d. My object in living is to unite
 (**) * (* *)* (* * (**)(

The fact that the lines in (36) are readily scanned as tetrameters of loose iambs serves as strong evidence in support of the theory of meter developed above.

6 Meter and Meaning in Frost's *Design*

Let us look at Frost's poem *Design*:

⁶ We assume elision of the vowel in *to* before the vowel initial *alight*. Otherwise the line is not readily scannable.

- (37) I found a dimpled spider, fat and white
 On a white heal-all, holding up a moth
 Like a white piece of rigid satin cloth—
 Assorted characters of death and blight
 Mixed ready to begin the morning right,
 Like the ingredients of a witches' broth—
 A snow-drop spider, a flower like a froth,
 And dead wings carried like a paper kite.

What had that flower to do with being white,
 The wayside blue and innocent heal-all?
 What brought the kindred spider to that height,
 Then steered the white moth thither in the night?
 What but design of darkness to appall?—
 If design govern in a thing so small.

The poem is obviously a sonnet. It has 14 lines and the rime scheme: ABBA ABBA ACAACC. But what is its meter? In light of Frost's statement quoted above, we have two choices. It is either written in strict iambs in accordance with (23) or loose iambs in accordance with (27). It ought to be a straightforward matter to scan the poem in term of each set of principles to see which one applies. Frost's convention about hyphenated words, however, complicates things a bit as the scansions of line 10 in (38) show.

- (38) a. The wayside blue and innocent heal-all
)* *) * *)* *) * *) * *) * by (23)
 b. The wayside blue and innocent heal-all
 (* *(* *(* *) *(* *) * by (27)

Both hypotheses yield unmetrical scansions. The culprit is the hyphenated word *heal-all*, which, following the discussion of *Birches* in (25) above we have treated as a polysyllabic word. Consequently we must assign to *heal* the status of stress maximum. If (23) is assumed to underlie the meter of this line, *heal-all* produces a violation of (23vi) (cf. (38a)). And if (27) is assumed to underlie the line's meter, then the line yields too few feet (cf. (38b)). To deal with this we suppose that Frost allowed himself some free-

dom in the treatment of compounds; in particular, in *Design* he treated *wayside* and *heal-all* alike as sequences of monosyllables.⁷ By this assumption, the line is metrically sound, but ambiguous, scannable either as a strict iambic line or as composed of loose iambs:

(39) a. The wayside blue and innocent heal-all
)* *) * *)* *) * *) * *) by (23)

b. The wayside blue and innocent heal-all
 (* *(* *(* *) (** (* *(by (27)

How then are we to determine the meter of *Design*? It is a remarkable fact that each line of the sonnet is scannable either in terms of (23) or (27), except for its last line:

(40) a. If design govern in a thing so small
)* *)*) * *) * *) * *) * *) by (23)

b. If design go vern in a thing so small
 * (**) *)(* *(* * (* * (* * by (27)

As (40) shows the line is well-formed only if scanned as loose iambs by (27). If it is scanned as a strict iambic line, then it incurs a violation of (23vi). This fact disambiguates the meter. Up to the last line the meter of the sonnet is ambiguous; it can be either of the two meters that Frost says are possible in English, strict or loose iambs. The last line tips the scale decisively toward loose.

Consider now the sense of the last line. It asks if there can be design in so small a thing as a white and blue heal-all with a white spider holding up a dead white moth: white on white on white. Frost sees the juxtaposition as a symbol of "death and blight," suggests that their coming together is the product of a dark design and then tempers the thought, wondering if one can attribute so much design to something so small in this tiny wayside passion play. He leads the reader down one path, and then changes direction at the last moment. This ambiguity is paralleled by the meter of the lines. Frost leads the reader down one metrical path, and then changes direction at the last

⁷ A study of Frost's metrical treatment of compounds would be useful. Such a study is, however, beyond the scope of the present article.

moment. The meter thus is a perfect accompaniment to the sense of the poem as well as an ironic comment on the poem's content since, from a metrical point of view, design *does* govern.

It is worth noting that in its first version, Frost titled the poem *In White* and ended it not with (40), but with (41), which, like (40) is scannable only as loose iambs.

(41) a. Design. Design! Do I use the word aright?
)**)) **) **)* *) * *)*) by (23)

b. Design. Design! Do I use the word aright?
 (**) (**) (*** (* * (**) by (27)

It is thus clear that from the very beginning of work on the poem Frost had the intention of disambiguating the meter only in the very last line, thus having the meter underline the meaning of the poem.

7 Conclusion

As the name implies, meters are measuring devices. Poetic meters measure the length of lines in verse. The basic step in defining all meters is the determination of how the syllables in a running text are counted in measuring line length; specifically, what syllables are counted as single metrical units, what syllables are counted as more than one metrical unit, and what syllables are not counted at all.

In the Japanese *haiku* and *tanka*, line length is measured in terms of metrical units directly (see sec. 2). In the more complex syllabo-tonic meters utilized in much of English poetry, line length is measured not in metrical units directly, but in feet, which are sequences of two or three metrical units.

Feet are delimited by inserting boundary marks into sequences of metrical units. Boundary markers are of two kinds, left and right, and they are represented above with the help of parentheses. A right parenthesis (=boundary) foots the metrical units on its left, whereas a left parenthesis foots the metrical units on its right.

The parentheses are inserted into a sequence of metrical units by rules of two kinds. One kind of rule inserts parentheses next to stress maxima, i.e. next to syllables bearing the main stress in a polysyllabic word (cf. (23iii) or

(27iii)). In loose iambs right parentheses are also inserted after monosyllabic words followed by two unstressed syllables (27iv). The second type of rule inserts parentheses iteratively starting at one end of the string and proceeding to its other end. In "strict" iambic meters the iterative rule constructs the feet from the beginning of the line, whereas in "loose" iambic meters they are constructed from the end of the line (cf. (23iv) vs. (27v)).⁸

Metrical lines are thus the result of a fairly elaborate computation, and the fact that metrical lines are often produced by individuals without special training and without any awareness of the computation, may raise doubts about the plausibility of the account that has been offered here. As noted above, the fact that readers and writers of metrical verse are not aware of executing any computations does not of itself undercut the analysis proposed above, since other forms of behavior—such as catching a fly ball—involve complex computations of which the individual is unconscious.

Facts of language, in particular, involve complex computations of which the speaker is quite unaware. For example, to many English speakers it comes as a distinct surprise that the assignment of stress to the words of their language is governed by strict rules, which speakers follow even though they are unaware of both the rules and their application. Thus, when some years ago the Russian words *Górbachev* and *perestróika* appeared on the news and the talk shows, no one had to be instructed that the former word was stressed on the antepenult and the latter, on the penult. They were correctly stressed by the same stress rules as those employed by English speakers innumerable times each day. When some decades earlier the Russian words *bábushka*—with stress on the antepenult—and *bolshevik*—with stress on the final syllable—entered the English language, their original stresses were readjusted, so as to conform to the rules of English stress, a clear indication that these rules are part of the linguistic competence of the ordinary speaker of English.

We conclude by remarking that the machinery in (23) and (27) is not encountered only in the computation of metrical verse. As shown in Idsardi

⁸ Although the matter is beyond the confines of this paper, it is worth noting that "loose iambs" have been widely utilized by English poets other than Frost. Moreover, "loose iambs" have enjoyed great popularity in German poetry; many famous poems—e.g., Goethe's *Der Erlkönig* and Heine's *Die zwei Grenadiere*—are written in this meter. As discussed in Halle 1997, Russian poets have used loose iambs, as well as loose trochees, loose anapests and loose dactyls.

1992 the same machinery is involved in the assignment of stress to words in a great many languages. In particular, as shown there, the rules (27) are identical with the rules assigning stresses to the words in the California Indian language Tübatulabal. The identity of the two sets of rules suggests that the same cognitive capacity is at work both in the assigning of stress to words and in the production of metrical verse.

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