KALUZA’S LAW AND SECONDARY STRESS

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ABSTRACT

Kaluza’s law is a proposed restriction in the metre of Beowulf against the resolution of light-heavy sequences: words like cyning ‘king’ can only resolve and count as the equivalent of a single heavy syllable under more restricted circumstances than can words such as wudu ‘wood’. There has been debate about how to define these ‘restricted circumstances’, with many investigators claiming that this limitation holds only under ‘secondary stress’ (sometimes broadened to include subordinated stress in general). This article reviews the operation of Kaluza’s law in Beowulf, arguing that the correct conditioning is the position immediately following a heavy syllable. The level of stress carried by the (non-)resolving sequence is irrelevant. A phonological explanation for this restriction may be that the resolution ideally produces bimoraic (light-light) units; accordingly, resolution of light-heavy sequences, which is anomalous from a typological and phonological perspective, is only permitted in word-initial position, or in metrical equivalents.

1. INTRODUCTION

Few aspects of Old English metrics have given rise to as much discussion over the past few decades as the phenomenon known as Kaluza’s law.¹ This interest stems especially from the indirect evidence that Kaluza’s law allegedly provides concerning the length of unstressed final vowels in Beowulf, which is in turn evidence concerning the date of composition of this particular poem. Here, I do not wish to engage directly with the question of dating, nor of any larger issues, but will instead focus on its exact scope of application: the contexts in which the law applies.

In particular, a central question regarding Kaluza’s law is whether it is limited to ‘secondary stress’ or not. While different views have been argued over the years, and not all investigators have taken a clear stance on this point, the influential argument of Fulk (1992: 156, n. 6) has established some form of ‘subordinated stress’ as the prime context for the operation of the law: ‘the law applies to syllables whose stress is subordinated to an immediately preceding stress’. In later writings, he more explicitly connected the law, at least in its core application, not to a general ‘subordinated stress’, but specifically to ‘secondary stress’².

¹I would like to thank Patrick Stiles, R.D. Fulk, and two anonymous reviewers for their many helpful comments on drafts of this article. I am also grateful to Donka Minkova for providing me with an advance copy of her 2021 article.

²A connection with secondary stress specifically is not always made as explicit in the earlier literature, though it plays a role as far back as Kaluza (1896: 120–1). Bliss (1962: 27), loosely following Kaluza, initially defines the context (more accurately, as I will argue) as ‘whether the sequence is preceded by a long syllable or not’, though in practice he in fact operates with a context of secondary stress.

[Correction added on XX April 2021, after first online publication: “upper-case þ” has been corrected to “lower-case þ” in all occurrences.]

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Under a variously formulated principle now referred to as Kaluza’s law, resolution under secondary stress in *Beowulf* occurs only when the second of the resolved syllables was short in early Old English... In complementary fashion... nonresolution under secondary stress is accompanied by etymologically long final syllables...’ (Fulk 2007: 317).

Fulk’s position has been taken up more recently by Neidorf & Pascual (2014: 658), in their clear, succinct, and mainstream explanation of the law for non-metricists:

In brief, Kaluza’s law refers to a linguistic regularity observed in two types of verses, wherein syllabic sequences under secondary stress are treated as resolvable or unresolvable according to whether the desinence involved was historically long or short. [Emphasis added]

On the other hand, the importance of secondary stress is explicitly denied by Suzuki (1996a: 293), and Yakovlev (2008: 76, n. 49) not only (in passing) rejects the conditioning of Kaluza’s law by secondary stress, but (as a central thesis) altogether denies the metrical relevance of secondary stress as a factor in Old English verse.

My intent here is to show that the data strongly support a view of Kaluza’s law as conditioned not by secondary stress, or even subordinated stress, but simply by the presence of a heavy or long syllable before the syllables governed by the law.³ In the following sections, I will begin by reviewing the necessary background to discuss Kaluza’s law meaningfully: the syllabification of Old English, the principle of resolution, and the etymological background of vocalic endings. I then review the evidence for Kaluza’s law, first in secondary stress environments, and then elsewhere. I present evidence that while some of these non-secondary stress contexts might be captured under the broader umbrella of ‘subordinated stress’, this is a difficult explanation for both A₂k verses and their resolved counterparts. Either ‘secondary stress’ must be redefined in such a way that the term loses any reasonable meaning, or it must be abandoned as a relevant factor in the context of Kaluza’s law.

2. OLD ENGLISH SYLLABLES

Any discussion of Kaluza’s law depends on a clear conception of syllable division and weight (length) in Old English. Like all languages, the flow of speech in Old English was divided into syllables, peaks of greater sonority around which could be distributed sounds of lesser sonority or greater obstruction (Fudge 1969; Selkirk 1982; Goldsmith 2011). In Old English, the key syllabification rules concern how, in words of more than one syllable, to assign consonants that fall between vowels. There are two basic principles, which may be slightly imprecisely stated as:⁴

1. A single consonant between two vowels belongs to the onset of the latter syllable.
2. If two or more consonants together fall between two vowels, at least one is assigned to the onset of the latter syllable, and at least one is assigned to the coda of the earlier syllable.

By rule 1, a word like *fatu* ‘vessels’ is divided into two syllables as *fa-tu*. Each vowel forms the nucleus of the syllable. The *f* can hardly go anywhere but in the onset of the first syllable,

³ This is actually already a widely accepted condition – to the point that it is the only condition given in the introductory discussion of Terasawa (2011: 56) – though the history of Kaluza’s law is made more complicated by a lack of distinction between this environment and secondary stress. See note 2 for Bliss’s explicit invocation of the long-syllable condition, but de facto use of the secondary stress condition.

while the \( t \) is assigned, by this rule, to the onset of the second syllable. Similarly \( æpele \) ‘noble’ is divided as \( æ-pe-le \).

Rule 2 concerns words like \( ylfe \) ‘elves’, \( sunne \) ‘sun’, \( hreþre \) ‘breast, heart’, or \( morþre \) ‘slaying’ (the last two are in the dative singular). In \( ylfe \), \( sunne \), and \( hreþre \), the two medial consonants are split evenly so that one goes to each of the two syllables available: \( yl-fe \), \( sun-ne \), \( hre-re \). In words with three medial consonants, such as \( morþre \), the choice is potentially less clear, since by this rule the division could be either \( morþre \) or \( morþ-re \). The assignment of the two \( r \)’s is not in doubt: the first must go in the coda of the first syllable, while the second must be in the onset of the second syllable. We do not have clear phonological or metrical evidence as to which syllable the \( p \) goes into (though on general principles I would favour the syllabification \( morþre \)),\(^5\) but this is, fortunately, not a matter of any consequence for Kaluza’s law, or any other (known) point of Old English metrics.

Where these divisions do matter is in determining syllable length or weight. A syllable which ends in a short vowel (or a short diphthong) is considered to be short or light. Thus \( fa-tu \) contains two light syllables, and \( æ-pe-le \) three: all of these syllables end (at least in late Old English) in short vowels. All other syllables are considered long or heavy. Words like \( yl-fe \), \( sun-ne \), and \( hre-re \) begin with heavy syllables: they end in consonants (\( l, n, \) or \( p \)). The first syllable of \( morþre \) is heavy, whether we assume it is \( mor- \) or \( morþ- \).

A syllable ending in a long vowel also counts as heavy. A word like \( mōras \) ‘marshes’ will be divided as \( mō-ra-s \) according to rule 1, with both syllables being heavy: \( mō- \) because it ends in a long vowel, \( -ra-s \) because it ends in a consonant. Note also that the length of a diphthong matters. The first syllable of \( ea-tol \) ‘terrible’ is light, while that of \( ēa-đe \) ‘easily’ is heavy.

Schematically, it can be useful to symbolize a light syllable as \( L \), and a heavy one as \( H \). The ‘shape’ of \( fatu \) is \( LL \), that of \( eatol \) is \( LH \), that of \( morþre \) is (in late Old English) \( HL \), and that of \( mōras \) or \( sumnan \) \( HH \). Note that all stressed monosyllables in Old English are heavy (\( H \)); words of the shape \( L \) do occur, but only as weak particles, such as the preposition \( be \) (alternating with more emphatic, stressed, and heavy \( bĕ, \) \( big \)) or the negative \( ne \). This is part of a general rule in Germanic requiring every minimal phonological word (that is, discounting clitics, weakly stressed elements that are closely dependent on a more prominent word) to be heavy (Russom 1998: 15–16; Fikkert et al. 2006: 128).\(^6\)

I have presented this system descriptively. Theoretically, it can be made coherent using the concept of the \( mora \), an abstract unit representing a measure of the weight (or length) of a syllable. In Old English, as in most languages, consonants in the onset of a syllable are not assigned any moras, and do not count towards the syllable’s weight. A short vowel (or short

\(^{5}\) In general, languages prefer to maximize onsets rather than codas, and a sequence of rising sonority – \( p, [\delta] \), is less sonorous than \( r \) (Murray & Vennemann 1983; Vennemann 1988; Seo 2011) – would be generally expected to preferentially form a single onset rather than be split across syllables. That is, the general rule is to begin an onset immediately before the point of lowest sonority between two syllables, unless some other factor intervenes (Pulgram 1970; Selkirk 1982; Clements & Keyser 1983: 37–8; Goldsmith 2011: 177–83). In words like \( hreþre \), some other factor does indeed intervene: rule 2, which forces the \( fr \)-cluster to be split between syllables, despite the rising sonority. This rule probably only applies when the preceding vowel is short, in order to achieve a better correlation between stress and syllable weight, a principle sometimes known as Prokosch’s law (Riad 2004: 188–9). This would mean that in contrast to \( hreþre \), with a split cluster, we should expect \( frōþre \), with the cluster entirely in the onset: the first syllable is already heavy, and so both Prokosch’s law and the principle of rising sonority can be satisfied. However, while there is direct metrical and phonological evidence for the syllabification \( hreþre \) (Goering 2016: 173–80, esp. 179–80), the syllabification of \( frōþre \) is more speculative; for some scribal evidence that, though hardly categorical, broadly supports this distinction, see Lutz (1986: 203).

\(^{6}\) This is sometimes held to be the result of a specific change or lengthening process in Northwest Germanic (Kuryłowicz 1949: 38, 48; 1970; Fulk 1995: 491, 64, 300; Pascual 2016: 300, n. 24), but there is no reason to think this constraint did not also hold in Gothic. It is more likely that there was a persistent requirement that independent forms must be heavy, and that clitics would simply be lengthened under stress as needed, continuously throughout the history of older Germanic rather than there being a specific ‘Northwest Germanic lengthening’ change. See Goering (2016: 281–82) and Goering (2020a).
diphthong) counts as one mora. A long vowel or long diphthong counts as two moras. Consonants in an onset are ignored entirely, but a consonant in the coda of a syllable counts as a mora (for the possibility of final consonant extrametricality – that is, certain word-final consonants not counting as a mora, see note 52 below). Applying this mechanically, syllables like *ne* or *æ* have one mora; those like *scip* ‘ship’, *æ* ‘law’, and *sun* have two moras; those like *scyld* ‘shield’ and *wif* ‘woman’ would have three moras; and those like *ãht* ‘possession’ or *brœost* ‘breast’ four. Moras translate directly into syllable weight:

Syllables with just one mora are light, while all others are heavy.

Potentially a distinction can be drawn between syllables with two moras which are simply heavy, and those with three or more which can be labelled overheavy (or superheavy); this distinction is occasionally relevant in Old English, and I will return to it below (Goering 2016: 142–3). No distinction between syllables of three and of more than three moras seems to be made in Old English, and it is essentially a question of theoretical preference whether precise mora counts continue to be applied after a syllable is already overheavy (does *brœost* ‘breast’ have four moras, or is it simply categorically overheavy?).

### 3. Etymological Vowel Length

A major complication in discussing Kaluza’s law is that the weight of a considerable number of syllables changed over the course of the Old English period. This is particularly true of final syllables. For the present discussion, it is enough to contrast the late Old English (lOE) period during which the manuscript of *Beowulf* was written, and the early Old English (eOE) period – I will leave the exact date of division between these phases undefined, though eOE should, for the current purpose, probably not be extended much later than c. 750 at the outside.

During the lOE period, there are two main types of unstressed syllable: those ending in a consonant (which are by definition heavy), and those ending in a vowel. Since by this date all unstressed vowels are short, the latter type of final syllable is by definition light, according to the phonology of lOE. Examples of consonant-final unstressed syllables are *boren* ‘carried’, *monig* ‘many’, and *cyning* ‘king’. Otherwise words could end in any of the three unstressed vowels of later Old English: -*a* (*wiga* ‘warrior’), -*u/-o*10 (*sunu* ‘son’), and -*e* (*wine* ‘friend’).

In eOE, the situation was a little different. Consonant-final words are still always heavy, but a certain number of vowel-final endings contain old long vowels (which were shortened on the way to lOE). Such endings were therefore heavy. The full details of just which lOE vowels go back to earlier long ones, and which were short even in the earlier period, are complex, and involve extensive comparisons with other Germanic (and sometimes Indo-European)
languages. Some specific points remain controversial, but the general patterns can be outlined fairly straightforwardly. I mark the relevant endings with asterisks, since even though the vowel qualities are often found as such in earlier manuscripts, both their length and their appearance in Beowulf are linguistic reconstructions.

The IOE ending -a nearly always goes back to a long eOE ending, *-ä. So wiga stands for eOE *wigâ. The only exceptions are instances where IOE has substituted the ending -a where eOE had *-u. In Beowulf, such cases seem usually most easily explained as confusion of the letters a and û, e.g. -beâla in 136a, for eOE *beâlu, *balu (Fulk et al. 2009: cxl, §19, 2b). There is also the tricky case of fela ‘many’, which is the usual late West Saxon form going back to *fela, but Anglian texts often show felu (or close variants thereof), as well as occasionally feola and the like. Since we cannot pinpoint the dialect of Beowulf very precisely, we can hardly make any firm assumptions about whether our scribes’ fela-forms stand for originals ending in heavy *-â or light *-u (see further note 34 below).

Late Old English -u/-o is similarly straightforward: except where the actual grammatical form has been scribbally or linguistically altered (Fulk et al. 2009: cxl, §19, 2–3), the ending always goes back to short *-u in eOE.

The complicated cases mostly concern IOE -e. It is clear, not only from etymology, but also from the spellings used in older manuscripts (Dahl 1938; 32, 235–9, esp. §§ 6.49 and 6.53), that IOE -e may come from either eOE *-i or *-æ. For *-i, at least, there was also a further quantitative distinction: both short *-i and long *-i could be found. For instance, singular wine ‘friend’ reflects eOE *wini (short vowel), while plural wine ‘friends’ is from eOE *wini (long vowel).

With *-æ there has been some debate about whether the ending was sometimes short, or if we should reconstruct long *-ä across the board. Is the masculine accusative demonstrative *pone from *pone or *bonæ? The details are too complicated to treat here, but two initial points are worth making. First, *-æ always comes from long vowel sources (or from diphthongs) in earlier Germanic, and there is no linguistic evidence that shortening took place here earlier than for eOE *-ä; that at least some instances of *-æ retained their length is undisputed and linguistically supported (Goering 2016a: 178–80), so the question is whether we should reconstruct an extra wave of shortenings that affected some, but not all, instances of older *-æ. It seems to me that this extra shortening requires more assumptions, and cannot be taken for granted without specific evidence. Second, the argument made by (Fulk 1992: 381–2) that *-æ was (sometimes) short in eOE rests essentially on his prior analysis of the data regarding Kaluza’s law. My analysis of Kaluza’s law yields precisely the opposite conclusion – that *-æ was always long – and in any case we should temporarily set aside such considerations.

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11 One such point is the precise date at which these long vowels were shortened. Stiles (1988: 128–35, 140–1, n. 22) assumed shortening already in West Germanic, but has since identified evidence from Old High German which would indicate some retention of vowel length in that language, after Proto-West-Germanic (Stiles, personal communication). There is furthermore evidence from syncop patterns that final vowels retained their length into late prehistoric Old English: see section 10 for a summary, and Goering (2016a) for details. Since these syncopes predate the surviving written records of Old English, their exact date cannot be determined, but their place in the relative chronology of sound changes suggests a time not long before the historical period, perhaps in the early seventh century (Ringe & Taylor 2014: 292). Shortening therefore likely took place between that point and the merger of unstressed i and æ as e, which became general around the middle of the eighth century south of the Humber (Luick 1921: 300, Dahl 1938: 186–96; Fulik 1992: 386–9) – that is, sometime between 600 and 750. It is of course probable that the exact date varies by dialect. See further Ringe & Taylor (2014: 301–302).

12 It is widely thought to be in some kind of Mercian, but the Mercian dialect area is very large and coverage of it through Old English texts is rather spotty. Especially with forms of fela, our evidence is not complete enough to draw overly firm conclusions.

13 Old Saxon corresponds particularly closely in this regard. The system usually reconstructed for eOE has four unstressed vowel qualities: *i (or *t), *æ, *o (or *s), and *u (or *i). This matches exactly the four-vowel system of Old Saxon, though the orthographic representation of these vowels is complex: see King (1965) and Klein (1977), and for a clear summary of the issue, Boutkan (1995: 152–62).
(though often of great linguistic value) while Kaluza’s law itself is under investigation. My assumption going forward is that *-â is always long, in line with the simpler account of Old English historical phonology, but I will note when this makes any important difference regarding the operation of Kaluza’s law.

So, to put the pieces together: IOE -e can come from at least three main sources: short *-i, long *-â, and long *-ô (and perhaps also short *-a). See Goering (2016: 83–105) for further discussion of some of the more problematic points and etymological byways, and Stiles (1985; 339–40) for a very clear summary of the general developments (though for the precise chronology of shortening, compare note 11). All told, eOE had either five or six distinct unstressed final vowels: high front *-i and *-I, low front *-ô and possibly *-æ low back *-â, and high back *-â. The major changes that led to the three-vowel system of IOE were first the shortening of all long unstressed vowels, followed by the merger of *-i and *-æ as -e.

As a final technical point, I should note that my discussion so far has consciously avoided use of the terms trimor(a)ic or circumflexed vowels. These are terms used in the reconstruction of Proto-Germanic vowels, a stage many hundreds of years prior to even the earliest conceivable date of composition for Beowulf. There is, as it happens, only one securely reconstructed trimoraic vowel in Proto-Germanic, *-ô (also notated *-ô, *ô), which contrasts with bimoraic *-ô and with nasalized *-ô” (Stiles 1988: 118–21, 128–35; Stiles 2017: 908–10; Ringe 2017; 91–3). For these specific vowels, the trimoraic one does remain long in eOE (becoming *-â), while the bimoraic one shortened and raised in Northwest Germanic to become *-u; nasalized *-Ô” is one of the main sources for eOE -â, and is the prime source of uncertainty about whether a short *-â existed alongside the clearer *-â (Ringe & Taylor 2014: 15–16, 58–61).

But otherwise, the question of whether a vowel ends up as long or short in eOE has less to do with ‘circumflex accent’ (not now usually thought to be an accentual property at all), and more to do with other factors. For example, the genitive singular of strong feminine nouns (ô-stems) was very likely *-ôz in Proto-Germanic (Stiles 1988: 139, n. 17), not *-ôz (though one finds this incorrect ending, which is at odds with all Germanic evidence, in many handbooks). This nonetheless likely remained long in eOE (as assumed by every investigator of Kaluza’s law), becoming *-â, because the final *-ô ‘protected’ the vowel from behaving like plain final *-ô in Northwest Germanic. Similarly, Proto-Germanic *-ê (seen in the third-person singular of the weak preterite) and *-ai (in the dative singular of a-stem nouns; the Gothic cognate ending -a shows that this is not from trimoraic *-ô’ê, but from *-âi, ultimately continuing the Indo-European locative) both become eOE *-â, with the length indicated by syncope patterns. This disconnect between vowel length in eOE and ‘circumflexion’ in Proto-Germanic should be grounds for abandoning the term altogether in relation to Kaluza’s law. Early Old English poets had no direct access to Proto-Germanic phonology, and our job is to reconstruct eOE vowel length in its own right. While ‘circumflexion’ in Proto-Germanic is one point of reference in doing so, it is not even close to the whole story, and the problem must be approached with the entire picture of Germanic historical phonology and morphology in mind.

4. Resolution

In Old English metre, the distinction between light and heavy syllables is pervasive. A basic, minimal type of verse consists of four syllables, often with two being stressed; in such basic verses, the stressed syllables (the two lifts, which are potential candidates for alliteration) must both be heavy, as in:

...
Both *lan-* and *hwī-* are heavy syllables (one ending in a consonant, the other in a long vowel).

Resolution is a principle in Old English metre that allows a word beginning with a stressed light syllable to be used in such positions – but only if a following syllable is ‘recruited’, so that the two syllables may together stand as the equivalent of a heavy one. We can see this in verses such as the following:

(1) lange hwīle
   ‘for a long time’ (*Beo* 16a)

(2) ellen *fre-me*-don
   ‘performed valour’ (*Beo* 3b)

(3) *wi-ni*-a bealdor
   ‘lord of friends’ (*Beo* 2567a)

These are both metrical equivalents of example (1), and all are metrically minimal: the removal of any syllable would render them unmetrical. Neither of the following possibilities are among the verse patterns typically employed by Old English poets:

(4) *xellen freme*\(^{15}\)
   ‘carries out valour’

(5) *xwina bealdor*
   ‘lord of friends’

*Beowulf* shows an unusual and archaic variant genitive plural of *wine* in (3) in order to avoid the linguistically more normal, but unmetrical pattern of example (5) (Fulk 1992: 243–5; Goering 2019: 124–5). In example (3) the two light syllables, *wi-ni-*-, resolve together, creating a metrical prominence equivalent to the single heavy syllable *lan-* in example (1). The shorter *xwina bealdor* would be no more metrical than something like:

(6) *xScyld Sc̄efing*
   ‘Scyld son of Sc̄ef’ (cf. *Beo* 4a)

It is not simply that *xwina* could be resolved, it would *have to* be resolved and count as the equivalent of a single heavy monosyllable. Even though *xwina bealdor* has four syllables, and might strike the modern reader as being basically ‘the same’ as the common tetrasyllabic verses such *lange hwīle*, it is demonstrably not equivalent, and since *xScyld Sc̄efing* is too short to constitute a satisfactory half-line, so is *xwina bealdor*. Only the addition of the extra syllable in *winia bealdor* allows the verse, with its resolved sequence, to become actually equivalent (within the Old English phonological system) to *lange hwīle* and be employed as a valid half-line.\(^{16}\)

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\(^{14}\) There are a very few sporadic occurrences of such patterns. In *Beowulf*, only 845a and 2430b are reasonably good examples of the type without an easy explanation as scribal alterations. Schabram (1960) gathers further examples from the wider Old English corpus; they are not very numerous, especially given the ease of constructing them in the Old English language. Such patterns appear to have been intentionally avoided (Pascual 2013).

\(^{15}\) Where *x* indicates a hypothetical form which is plausibly reconstructed on the basis of the evidence, *x* marks hypothetical constructions that can be imagined, but which do not in fact occur, or which occur with suspiciously less frequency than might be expected on general principles. Such non-occurring hypotheticals can often illustrate important linguistic or metrical factors preventing them from occurring.

\(^{16}\) The exact explanation for why *xwina bealdor* and *xScyld Sc̄efing* are unmetrical is a matter of metrical theorizing. Under the mainstream Sieversian analysis, the motivation is that every verse must have four ‘positions’, and these have three (*Scyld Sc̄efing* because it only has three syllables; *xwina bealdor* because *wina* resolves and so counts as a single metrical position). It is worth emphasizing, however, that resolution and the four-position principle are independent, as shown by the motivated acceptance of resolution within the very different word-foot framework (Russom 1987; 1995; 2002). This point is developed further in Goering (2020b).
This is all to say that resolution is not, for the most part at least, a matter of poetic licence, but a strict requirement. In most cases, two light syllables (the first of which is stressed, e.g. \textit{wi-ni-}), or a light stressed syllable followed by a heavy syllable (e.g. \textit{cyning}), automatically count as the metrical equivalent of a single stressed heavy syllable (Terasawa 2011: 30–1). There are, however, places where resolution does not take place. This is traditionally (though perhaps not entirely happily) called \textit{suspension of resolution}, and the question currently at stake is the extent to which this is a matter of poetic whim versus metrical or linguistic rule. Kaluza’s law is a proposed rule or set of rules meant to determine when resolution must be suspended, and when it must take place.

5. The basic operation of Kaluza’s law

The exact contexts under which resolution may be suspended – with a light syllable counting simply as the metrical equivalent of a heavy one, and not ‘recruiting’ a second syllable to help out – are the main topic of this investigation. A simple example of suspended resolution is:

\[(7) \text{bēag-hro-den cwēn}\]
\[\text{‘circlet- adorned queen’ (Beo 623b)}\]

The second ‘position’ of this verse begins with a light syllable, \textit{hro-}, and so is potentially resolvable – but in fact it is clearly \textit{not} resolved, and its overall metrical pattern is comparable to such verses as:

\[(8) \text{sorh-ful-ne sīð}\]
\[\text{‘sorrowful journey’ (Beo 1278a, 1429a; cf. 512a)}\]

If \textit{hroden} were instead resolved, it would instead be equivalent to a hypothetical half-line such as:

\[(9) \'sorh-ful sīð\]
\[\text{‘sorrowful journey (nominative rather than accusative)}\]

Such verses are, despite their linguistic naturalness, conspicuously absent. If we accept that Old English verse shows metrical patterning at all, then we must assume that verses such as those in example (7) are suspended, and so scan the same as (8), and are not resolved (which would result in the unmetrical pattern of (9)).

Suspension of resolution is limited to certain contexts, which I call \textit{suspension contexts}. In \textit{bēag-hro-den}, there are at least two elements which have traditionally been cited as potentially playing a role. One is the presence of an immediately preceding heavy syllable, here \textit{bēag-}, which may be called the \textit{conditioning syllable}. The other is that \textit{hroden} is the second element of a compound, and so a prototypical example of ‘secondary stress’. In many verses (as here), both conditions are met, and suspension of resolution is a clear metrical possibility.

An important aspect of suspension of resolution is that it is, at first glance, inconsistently applied. Alongside examples like (7), we find verses such as:

\[(10) \text{hrēð-si-go-ra ne gealp}\]
\[\text{‘did not rejoice in glorious victories’ (Beo 2583b)}\]

Here we again have an uncontroversial suspension context: \textit{si-} is a light syllable, and it occurs immediately after the (heavy, stressed) conditioning syllable \textit{hrēð-}, and is the second element
of a compound, under secondary stress. But this time, instead of being suspended, si-go-
seems to be resolved together. In this type of verse (E), a dip of one unstressed syllable before the final stress is the norm (as in (7), with the dip -den), two would be acceptable (as in (10), with -ra ne, if we assume resolution), but three unstressed syllables in a single dip in type E (as we would have without resolution, ²-go-ra ne) are never found in comparable verses where resolution is not at issue (Russom 1987: 24; Cable 1991: 12–15; Hutcheson 1995: 252–5).

Kaluza’s law is, in its simplest form, an explanation of why we have suspension of resolution in example (7), while resolution takes place in (10). The hypothesis is that (within a suspension context) suspension or resolution depends on the second of the potentially resolved syllables, the one following the first light syllable: if this is also a light syllable, then resolution must take place, but if it is a heavy syllable, then resolution must instead be suspended. In schematic terms, in suspension contexts, LL sequences always resolve, LH sequences always suspend.

This can be seen clearly in our two examples, even in their late Old English guise. hro-den is an LH sequence, a light syllable followed by a heavy one, and so when placed in a suspension context has no choice but to suspend. On the other hand, si-go- is an LL sequence, two light syllables in a row, and so must resolve, even in a suspension context. This sensitivity to the following syllable is Kaluza’s law.

Note that such sensitivity is entirely absent outside of suspension contexts. In examples (2) and (3) above, I illustrated resolution using LL sequences: both fre-me- and wi-ni- are LL sequences (and were so also in eOE: *fra-mi- and *wi-ni-), with both syllables being light. However, it is easy to find examples of resolution outside of suspension contexts (and so beyond the scope of Kaluza’s law) where the second syllable is heavy:

(11) hæfde ky-ning-wuldor
‘the glorious king had’ (Beo 665b)

In example (11), the first syllable is light, ky-, and so ‘recruits’ the following syllable to resolve with, in this case the (over)heavy syllable -ning.

By contrast, in suspension contexts, where Kaluza’s law is meant to apply, we find no examples of lOE LH sequences undergoing resolution. Even simply on the basis of the lOE forms in Beowulf, we can already say that resolution of LH sequences is strongly disfavoured, if not entirely prohibited, in suspension contexts.

6. Kaluza’s law and early Old English vowels

On the basis of lOE phonology, the only unstressed syllables that are still heavy are those ending in consonants, such as the second syllable of hro-den. Suspension of resolution in Beowulf, especially for second syllables ending in lOE -e, is less obviously conditioned, at least on the basis of lOE phonology. For instance, compare the two following examples (in the latter, note that gearo is not in a suspension context, and so automatically resolves; it is the behaviour of -wre-ce that is of interest):

(12) frēo-wi-ne folca
‘dear friend of peoples’ (Beo 430a)

(13) gearo gyrn-wra-ce
‘prepared for vengeance of grief’ (Beo 2118a)

17 For an introduction to Sievers’ typology of verses, which can easily appear to be a confusing and arbitrary alphanumeric soup, see Terasawa (2011). For ease of reference, I have included a short appendix of the basic types at the end of the article.
In both cases, we should have suspension contexts. Both wine and wræce are (by initial appearance) LL sequences bearing secondary stress and immediately following heavy, stressed monosyllables (frēo- and gynn-, respectively). And yet the resolution expected for a LL sequence only occurs in example (12), while we find suspension in (13).

This patterning is, however, explainable if we restore the eOE vowels in each case:

(14) *frēo-wi-ni folcā
(15) *gynn-wra-cē

The historical vowels of eOE and the suspension or resolution of sequences in suspension contexts (however defined) fit together remarkably well, though there are a smallish number of exceptional cases that remain. The exact numbers depend on the assumptions one makes about historical phonology (was there a short */-æ/ in eOE, for instance?), but under the most straightforward understanding of eOE phonology, there are only a handful of clear exceptions to Kaluza’s law, if we operate with eOE vowels. Setting aside various examples that are uncertain (either because the grammatical interpretation is not clear, there is a textual crux involved, or the historical phonology is for some reason in doubt), there are some 729 examples in Beowulf of either suspension or resolution in a plausible suspension environment, with Kaluza’s law predicting suspension or resolution around 95.2% of the time. Only about 2.9% of the time (of clear cases) does an LH sequence resolve in a suspension environment, while in around 5.1% of cases an LL sequence undergoes suspension of resolution.19 These numbers concern every verse in a possible suspension context in Beowulf, not limited by metrical type or further conditions, and show that the predictive power of Kaluza’s law is, while not flawless, far better than would be expected either if LL and LH sequences were all the same to the Beowulf poet, or if they were ignorant of the historical lengths of unstressed vowels, and that this is true before we attempt to apply any further qualifications or limitations to explain (away) exceptions.20

7. Kaluza’s law under secondary stress

The numbers just given for Kaluza’s law concern all instances of suspension of resolution in Beowulf, as well as all instances of resolution in environments where suspension sometimes occurs. They suggest the broad applicability of the law without further restrictions, but the possibility remains open that this average count conceals a stricter application of Kaluza’s law.

18 Or */gynn-wra-cē*.
19 This data, which will be discussed in more detail in the following sections, is ultimately based on Goering (2016: 105–30), which should be consulted for further details. Depending on the assumptions one makes regarding the more uncertain cases, the overall failure of Kaluza’s law could be as low as 4.2%, or as high as 8.2% (Goering 2016: 130).
20 What this means in terms of the date of Beowulf – the question most famously associated with Kaluza’s law – is not of immediate interest here. It does indeed seem difficult to maintain that Beowulf is of a really late date, but this was already unlikely given the general linguistic nature of the poem. Whether Kaluza’s law really secures a date of before 725 depends primarily on two further questions: how long after the loss of unstressed vowel length in everyday language might such distinctions have been preserved in poetic phonology; and what dialect was Beowulf composed in (since more northerly dialects seem to have lagged in reducing their unstressed vowels, the further north we place the poem, the later a date might be comfortably posited, at least as regards this particular body of evidence)? Both of these points deserve further discussion – as does the question of what the earliest bounds of the composition of Beowulf might be – but I cannot enter into them further here.
in certain contexts, and a looser one in others. As noted above, the most frequent limitation suggested is to limit the law to instances of secondary stress. The definition of ‘secondary stress’ is not always made clear in discussions of Kaluza’s law. Linguistically, the only clear context for secondary stress is in the second elements of compound words and, potentially, in certain derivational syllables: that is, within a single phonological word (Elan Dresher & Lahiri 1991: 259–61; Hutton, 1995). Sometimes elements that are considered to be metrically subordinated, but are not linguistically compounded, are included by metricists under the umbrella of ‘secondary stress’, but this is better termed ‘subordinated stress’, and can involve greater difficulties of classification. In this section I limit myself to elements that are certainly under secondary linguistic stress by virtue of being the second elements of compounds. Independent words of all types will be treated in section 8 below.

The remainder of this section will explore the operation of Kaluza’s law with regard to two kinds of compounds. Both have an initial element consisting of a single heavy syllable (the conditioning syllable for Kaluza’s law), followed by a second element beginning with a light syllable. The first type to be considered has a disyllabic second element, e.g. stān-hliðo ‘stone-cliffs’, while the second type has a trisyllabic second element, e.g. þeod-cyninga ‘people-kings’ or hrēð-sigora ‘glorious victories’ (both genitive plural).

Traditionally, the most attention has been paid to stān-hliðo-type compounds, which are relatively frequent and occur in several rhythmic types. One of these types has long been recognized as having a somewhat uncomfortable relationship with Kaluza’s law: the subclass of what Sievers (1893) labelled type C verses which end in such compounds (Sievers specifically called this subtype C3; cf. the appendix), and given the alphanumeric code of d3 in the peculiar labelling system of Bliss (1962):

(16) in gēar-da-gum
‘in ancient days’ (Beo 1b)

This type of verse does indeed have a relatively high rate of violations of Kaluza’s law, and we find some 18 clear examples (of 201 total) with suspended final LL elements, such as:21

(17) þæt hit wearð eal-gea-ro
‘that it became fully ready’ (Beo 77b)

With nearly 9% of examples clearly not conforming to Kaluza’s law, it is indeed a valid question why this type of verse should seem to hold to the law so relatively poorly (while nonetheless seeming to respect it most of the time). This fairly high rate of violation prompted Fulk (1992: 158–9) to explicitly exclude the type from the operation of Kaluza’s law, following its implicit exclusion by Bliss, though no one has yet devised a satisfactory explanation for this metrical exclusion (verse ‘types’ being purely epiphenomenal).

This exclusion of type C3/d3 may be contrasted with the general acceptance of a different type of verse, also ending in stān-hliðo-compounds. This is the subclass of type D labelled D2 by Sievers, and 1D3 by Bliss:

(18) lēof land-fru-ma
* lēof land-fru-mā
‘dear prince of the land’ (Beo 31a)

The difference from the preceding type is that where that opened with one or more unstressed syllables (in, þæt hit wearð, etc.), this type opens with a single stressed and

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21 77b, 84a, 230a, 486a, 771b, 820b, 1192b, 1253a, 1810a, 2340a, 2410a, 2438a, 2540a, 2840a, 2884a, 2884b, 2946a, 3112b. Two more verses are problematic in their interpretation, and could potentially be taken as containing final LL sequences: 851a and 3074a.
alliterating monosyllable or resolved equivalent (e.g. lēof or guma, cf. 868a). There are some 48 verses of this type, though sometimes certain verses have been disregarded or overlooked.22 Particularly important to note are two verses (1230b and 2241b) with the compound eal(l)-gearo 'completely ready', which Bliss (1962: 56) rewrote as two-word phrases, eal(l) gearo, due to his failure to distinguish poetic and non-poetic compounds, and his mistaken belief that the alliterative requirements of the former also apply to the latter (Krackow 1903; Russom 1987: 92–7). Without such (groundless) metrical considerations, eallgearo would universally be understood as a compound: this is historically how most editors of Beowulf have printed the elements (Fulk et al. 2009: 331), and how it is listed in the Dictionary of Old English. These two verses, along with the oft-cited 1409a, certainly show suspension of an LL sequence, any way we cut it:

(19) þeod eal-gea-ro
‘the people fully prepared’ (Beo 1230b)

(20) beorh eall-gea-ro
‘the barrow fully prepared’ (Beo 2241b)

(21) stēap stān-hli-ðo
‘steep stone-cliffs’ (Beo 1409a)

These three verses constitute around 6.3% of the total of this type: adhering slightly better than type C3 verses like those in example (17), but worse than any other type or metrical context. It does not seem justified to exempt C3 verses from the scope of Kaluza’s law, while including D2 verses within it. Either both are in, or both are out.

As mentioned above, no one has ever come up with a really satisfactory explanation of just why C3, and C3 verses alone, might have stānhliðo-type compounds systematically freed from obeying Kaluza’s law. Considering C3 and D2 types together, however, suggests a more promising characterization. The two types share the suspension of resolution: (1) in the final two syllables of the half-line; (2) after an immediately preceding heavy syllable; and (3) in the subordinated context of the second element of a compound. In this position there may have been increasing pressure to count every syllable on its own, due to the congruence of subordination and placement at the end of a verse. Heavy endings are still favoured, but light endings are more permissible in these two types than anywhere else that resolution is suspended.

Elsewhere, when not verse-final, stānhliðo-type compounds adhere more strictly to Kaluza’s law. Examples of this sort have already been given above:

(7) bēag-hro-den cwēn
‘circlet-adorned queen’ (Beo 623b)

(12) frēo-wi-ne folca
‘dear friend of peoples’ (Beo 430a)

22 31a, 54a, 160a, 288a, 322a, 394b, 427a, 551a, 554a, 609a, 692a, 742a, 786b, 868a, 936a, 1069a, 1230b, 1311b, 1554a, 1622a, 1641a, 1682b, 1845a, 1895a, 1919a, 1948a, 1954a, 2025a, 2042a, 2090a, 2112a, 2118a, 2226a, 2241b, 2271a, 2273a, 2315a, 2368a, 2414a, 2455a, 2476a, 2517a, 2563a, 2642a, 2827a, 2942b, 3152a.
There are perhaps six examples like (7) in *Beowulf*, and some 60 half-lines like (12). Only two verses among the latter group are reasonably likely to have resolution of historical LH sequences:

(22) móð-cea-re micle
‘great trouble of spirit’ (Beo 1778a)

(23) móð-cea-re mándon
‘proclaimed the sorrow of their spirit’ (Beo 3149a)

In both cases, the ending is historically *-æ*, from Proto-Germanic *-ōn*, the length of which in eOE has been disputed. Fulk (1992: 420) assumes that *-ōn* gives a short ending simply because the Proto-Germanic source is not trimoraic, but this is in itself not sufficient reason to suppose an earlier shortening (see the end of section 3 above). There are other ‘non-trimoraic’ sources of *-æ* in eOE, such as *-ai*, *-ōz*, and *-ē*, which are widely assumed to count as long vowels for the purposes of Kaluza’s law – there seems little reason to expect that *-ōn* alone of all the old non-high vowels would have undergone an earlier shortening, before the general shortening of final long vowels (on which see note 11). Bliss (1962: 119) recognized that these endings were problematic, and should not resolve by Kaluza’s law; he suggests, rather tentatively, that ‘possibly [næodeceare] replaces an obsolete word of a different declension’. I will return to this ending in the next section. For now, the crucial point is that of the 66 examples of *stænhdæo*-type compounds occurring not as the final element in a half-line, there are only two (under my preferred assumptions concerning historical phonology) or zero clear violations of Kaluza’s law: a failure rate of 0-3%.

Kaluza’s law also applies very strictly indeed to tetrasyllabic *þæodcyninga/hræðsigora*-type compounds, though these are somewhat rarer (presumably for the simple reason of being generated less frequently given the lexical and grammatical elements available). When suspended, such compounds fill out an entire verse on their own:

(24) þæod-cy-nin-ga
‘of people-kings’ (Beo 2a)

There are ten such verses in *Beowulf*, all of which consist of a compound word of the shape H-LHX: that is, a heavy monosyllable as the first element (here, þæod-), followed by a second element which shows a light syllable (cy-), another heavy syllable (-nin-), and a final unstressed syllable which may be freely heavy or light (-ga; the X schematically represents a syllable whose weight is irrelevant). The non-resolution of the LH sequence is, of course, expected by Kaluza’s law. *Beowulf* also contains a few compounds of the shape H-LLX, such as *hræð-sigora*, already illustrated above:

(10) hræð-si-go-ra ne gealp
‘did not rejoice in glorious victories’ (Beo 2583b)
There are four clear instances of such compounds in the poem, all resolving as expected by Kaluza’s law.\(^{26}\)

Additionally, we find six examples of resolution with pentasyllabic full-verse compounds, such as:\(^{27}\)

(25) sib-æð-e-lin-gas
‘nobles of the same family’ (Beo 2708a)

All of these show a resolved LL sequence.\(^{28}\)

The number of these longer compound types is of course rather small. Taken together with the stænhlīðo type, Kaluza’s law predicts two things very well: resolution (0-2 exceptions out of sixty-six verses; failure rate of less than 3%), and suspension in non-final compounds (0 exceptions out of six verses). In final compounds, the failure rate (in all cases unexpected suspension) is around 8.4% (21 exceptions in 249 examples).\(^{29}\)

8. Kaluza’s law outside of secondary stress

The question of whether Kaluza’s law applies outside of ‘secondary stress’ depends partly on what one considers ‘secondary stress’. Take, for example:

(26) feorh cy-nin-ges
‘the life of the king’ (Beo 1210a)

Linguistically, cyninges is clearly an independent noun, and as such would, as a preliminary assumption, be expected to carry ‘primary stress’ on its initial syllable. Traditional metrical analyses, such as that of Sievers (1893: 34), scanned such verses as having two primary stresses, each matching a metrical ictus, and this perspective is echoed in more recent scansion (Bliss 1962: 122, 147; Russom 1987: 45–6; Hutcheson 1995: 72). On the other hand, it is clear that there is a broad similarity between examples like (26) and those like (24):

(24) þeod-cy-nin-ga
‘of people-kings’ (Beo 2a)

There have been attempts to get at the affinity of these two patterns, usually considered the same metrical ‘type’, but one consisting of two words and the other of a single compound. This is done through invoking, in effect, phrasal stress patterns, and levels of stress higher than those found within the phonological word, an approached pioneered by Cable (1974: 68–73, 86–8). This has been elaborated more clearly using the linguistic model of the metrical grid (Liberman & Prince 1977: 309–34; Hayes 1983: 366–71); this was incipiently applied to Old English metre by Cable (1991: 35–7, 142–3), and more fully by Cable (1994) and Suzuki (1996b: 14–18, 184–6).

\(^{26}\) 2583b, 2650b, 2661b, 2780b. 2921b might possibly be a fifth example; 1946a is extremely doubtful. The two doubtful cases are both verse-final, and it may be that compounds of this type were not generally permitted at the end of a half-line. This could be related to the same bias against resolution in such positions – in verse-final second elements of compounds – which allows more latitude with regard to Kaluza’s law in types C3 and D2.

\(^{27}\) 468b, 744a, 1308b, 1389b, 2708a, 2908b. Most of these consist of the word unliifigende.

\(^{28}\) Note that the first syllable of this verse is heavy, historically from *sibb-, with simplification of the geminate in ‘final’ position, before the juncture with the second element of the compound. This same juncture would be expected to force a syllable boundary between the two elements. Whether the original form of the poem was *sibb-æðelingas (with the simplification to ð introduced by later scribes) or already *sib-æðelingas, the initial element should be heavy, and so should condition Kaluza’s law.

\(^{29}\) The ten whole-word compounds of the þeodcyninga type also suspend and resolve in accordance with the law in all cases. The syllables in question are not verse-final, though the compounds as a whole technically are (though they are at the same time also verse-initial). If they are counted together with the C3 and D2 types, then the failure rate for verse-final compounds drops slightly, to 7.9%, twenty one exceptions out of 265 examples.
Broadly speaking, though metricists have not always agreed in how to implement a phonological grid for Old English verse, this kind of representation allows one to capture both similarities and differences between the types represented by (26) and (24). In (26), both *feorh* and *cy-* may be syllables bearing primary stress at the word level, but *feorh*, as the head of the phrase *feorh cyninges*, bears an additional ‘unit’ of stress (represented as a mark in a metrical grid), giving it even more prominence, and creating a steadily falling contour over the whole half-line:

(27) Phrase x
   Word x x
   Foot x x x
   Syllable x x x x
       feorh cy- nin- ges

(28) Phrase x
   Word x
   Foot x x
   Syllable x x x x
       þeod- cy- nin- ga

In (28), *þeod-* may not actually be the head of a phonological phrase (syntactically, it is part of a larger noun phrase headed by *prym* in the following verse), but the crucial point is that either way, it still has greater relative prominence (at least one extra grid-mark) compared to *cy-* which is subordinated as the second element of a compound.

This kind of thinking leads Fulk (1992: 240, cf. 156, n. 6) to fairly argue:

This is to say that in type D, Kaluza’s law, which normally applies under secondary stress, may apply to *cyninge*\(^{30}\) because its stress is subordinated to that of the preceding word ...

Fulk (1996: 495–6) elaborates similar ideas, further carrying forward the idea that it is subordinated stress and not secondary stress that is the real conditioning factor for suspension of resolution.

If we extend our view to include all reasonable examples of subordinated rather than strict secondary stress, we find a fair number of verses of various types that either show suspension of resolution, or resolution in this broader suspension environment. As far as suspension goes, in addition to five verses like example (26),\(^ {31}\) there are nine verses parallel to example (18) (type D2), but ending with a two-word phrase instead of a compound word:\(^ {32}\)

(29) heard hēr cu-men
    ‘hardy, (he has) come here’ (Beo 376a)

All thirteen of these verses suspend in accordance with Kaluza’s law (all have historically heavy endings).

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\(^{30}\) Referring to *Daniel* 129b as Fulk’s type-example of the same pattern as *Beowulf* 1210b.

\(^{31}\) Beo 947a, 1210b, 1759a, 1871b, 2921b. Three of these involve restoration of a syncopated vowel in \(^{*}betistā\), written in the manuscript as *betsta*. This restoration is linguistically grounded and necessary to achieve a metrically minimal verse (Pope 1966: 319–20; Fulk 1992: 241; Ringe & Taylor 2014: 278).

\(^{32}\) 90a, 215b, 281b, 376a, 572b, 1065b, 1869b, 2551b, 3131b. Russom (1987: 77–8) disputes the scansion of 90a, and does not feel the final word is actually under subordinated stress; if so, this would belong rather with verses like example (41), discussed below. This group of three-word verses is relatively small, and conclusions about the role of subordinated stress do not depend primarily on just how they are classified.
Beyond these examples of suspension, there are perhaps 13 examples showing resolution in the same environment:\(^{33}\)

(30) **heall heo-ru-drêore**
    ‘hall (wetted) with sword-gore’ (*Beo* 487a)

Only one of these potentially violates Kaluza’s law:

(31) **fröd fe-la-geömör**
    ‘wise, very sorrowful’ (*Beo* 2950a)

This shows the ambiguous element *fela* (see section 3), with the additional complication that it occurs here as a bound element in a compound rather than an independent particle. Note that in all other instances where *fela* occurs in a Kaluza environment it is suspended, while only here is it resolved. Assuming the same form in all cases, either this instance must be a violation of Kaluza’s law, or all the others must be. The only way to allow all verses to conform is to assume (on no other evidence than Kaluza’s law itself) that the bound form was really *felu-*,

Presumably of much the same type as (30) are some one to four verses of this shape ending in a two-word phrase rather than a compound:\(^ {35}\)

(32) **gesëon su-nu Hrœdles**
    ‘to see the son of Hrœgel’ (*Beo* 1485a)

Within this small category there are no attested violations of Kaluza’s law.

The position of subordinate stress may also take in a large number of type C3 verses ending in two-word phrases:

(33) **ne wæs him ecg bo-na (*/bonâ*)**
    ‘the blade was not his killer’ (*Beo* 2506b)

Such verses are widely felt to involve a subordination of the final word (Kaluza 1911: 75–9, 93–5; Pope 1966: 41, 65–79; Cable 1974: 65–8; 1991: 143; Russom 1987: 16–23). Half-lines of this sort are very numerous, amounting to some 251 examples. Most show a final LH word,
where the suspension is in accordance with Kaluza’s law, but there are six clear examples of final LL words: 36

(34) wæs on bæl gea-ru
‘was prepared on the pyre’ (Beo 1109b)

This suggests a failure rate of around 2.4%, though if every somewhat uncertain ending were taken as unfavourably as possible for Kaluza’s law (i.e. every instance of *fela emended to fela, the preterite-present subjunctive endings taken as short, and meoto in 489b interpreted as a short ending – only this last seems to me very likely), then the failure rate could be as high as 9.6%. This type thus likely shows a very good adherence to Kaluza’s law, though uncertainties about historical forms makes any findings here less certain.

If the failure rate of 2.4% (or 2.8%, if meoto is taken at face value as a short ending) is roughly correct, then this type of C3 verse contrasts sharply with the compound-final C3 verses of the type from example (16):

(16) in gea-r-da-gum
‘in ancient days’ (Beo 1b)

These, as a reminder, had a nearly 9% failure rate. If this distinction between verses like (33) and (16) is real, it would lend support to the hypothesis that the final syllables of verse-final compounds are more prone to suspension, regardless of Kaluza’s law, while less subordinated independent elements such as bona are more likely to conform to the law. 37

Two further verses should be mentioned in this regard:

(35) hæ on weg lo-sa-de
‘he escaped away’ (Beo 2096b)

(36) þæi chær on sta-ri-e
‘which I here look upon’ (Beo 2796b)

Both of these are type C verses as well, though their scansion may call for some comment. In (35), hæ on forms an unstressed initial position, weg the alliterating lift, lo-sa- the resolved second lift, and -de the final dip. In (36), þæi chær is the initial weak run, while on, here being

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36 1109b, 1250b, 2150b, 2523b, 3000b, 3105b. There is an emendation involved with 3000b, the restoration of wën (*wœn), but this is very widely accepted (the alternative wœn is metrically equivalent). A further nine verses end in fela, on which see section 3 and the discussion immediately above: 530a, 869a, 883a, 1265b, 1373b, 2349b, 2738b, 3029b. Beyond this, nine verses end in the subjunctive of a preterite-present verb, whose ending involves some uncertainties of historical morphology (Goering 2016: 88–90): 589b, 680b, 1179b, 1367b, 2031b, 2523b, 2749b, and 3176b. Finally, 489b is of uncertain meaning, leaving the grammatical form (or textual correctness) of its final meoto in doubt. Verses with endings that are reasonably clearly heavy are: 11b, 15a, 20a, 23b, 35b, 44b, 48b, 78b, 124b, 146b, 170a, 178b, 190b, 197a, 212a, 214a, 223b, 225b, 242a, 252b, 253a, 284b, 286b, 290b, 291b, 296b, 319a, 331b, 399b, 400b, 424a, 437a, 493a, 494b, 444b, 447b, 452b, 453b, 507b, 509b, 539a, 594b, 599b, 671a, 676b, 683b, 689b, 698b, 763b, 790a, 798b, 806a, 831b, 835b, 844b, 854a, 863b, 865a, 873a, 918b, 920b, 939b, 944b, 948b, 953b, 954b, 956b, 966b, 974a, 975b, 979a, 996b, 1010a, 1024a, 1034a, 1074b, 1124b, 1144b, 1151b, 1152b, 1153b, 1174b, 1192a, 1211b, 1218b, 1225b, 1233a, 1238b, 1246b, 1292b, 1306b, 1328b, 1331b, 1339b, 1340a, 1343b, 1361b, 1366b, 1370b, 1374b, 1381b, 1382b, 1385a, 1392b, 1395b, 1430b, 1439b, 1458a, 1481b, 1485b, 1491b, 1495b, 1536b, 1546b, 1575b, 1592b, 1600a, 1601b, 1610b, 1611b, 1614b, 1647b, 1668b, 1676b, 1678b, 1688b, 1735b, 1738b, 1741b, 1745b, 1749b, 1801a, 1805b, 1808b, 1814b, 1820b, 1824b, 1846b, 1849b, 1858b, 1885b, 1891b, 1903b, 1909b, 1921b, 1923b, 1930a, 1935a, 1966b, 1989b, 2027b, 2043b, 2058b, 2069b, 2099b, 2126b, 2152a, 2180b, 2196b, 2208b, 2209b, 2252b, 2263b, 2306b, 2314b, 2343b, 2348b, 2390b, 2408b, 2446b, 2453b, 2473a, 2499b, 2506b, 2508b, 2536b, 2598b, 2646b, 2702b, 2708b, 2727b, 2737b, 2742b, 2745b, 2772b, 2775a, 2801b, 2818b, 2858a, 2864b, 2903a, 2913b, 2945b, 2957b, 2962b, 2976b, 2980b, 2981b, 2982b, 2987b, 3007b, 3014b, 3015b, 3021b, 3028a, 3070b, 3073b, 3077a, 3106b, 3114b, 3126b, 3132b, 3134b, 3159b, 3163a, 3167b, 3169a, 3172b.

37 It may perhaps be relevant that all six of the clear exceptions in non-compound C3 verses are in the off-verse, that is, doubly subordinated by being both at the end of a verse and the end of a line. This point would be more compelling if verses of this type were not usually in the off-verse anyway.
an adverb rather than a preposition, forms the alliterating first lift. Then starie scans in parallel to losade, with resolution of sta-ri-. Both -sa- (analogue for *su-) and -ri- were short in eOE (Bermúdez-Otero 2005: 25–30; Stausland Johnsen 2015: 24, 187, n. 25), so the resolved sequences in both verses are LL, in keeping with Kaluza’s law. That is to say, in the final word of a (non-compound) type C verse, we find not only suspension of resolution largely adhering to Kaluza’s law, but occasional active resolution as well – its rarity probably suggests that such contexts were not really amenable to resolution overall, but on the occasions it does occur it is in conformity with Kaluza’s law.

The verses discussed so far make it clear already that – as indeed already acknowledged by Fulk in his original study – ‘secondary stress’ cannot be the relevant conditioning factor for Kaluza’s law, as tacitly assumed by Bliss. If stress is to be invoked at all, then it is subordinated stress, understood in a phrasal context, which must be the relevant factor. There are, however, two further complementary sets of verses, neither uncommon, which show both resolution and suspension in contexts outside of traditional subordinated-stress environments.

The first of these types has received some discussion with regard to Kaluza’s law (Fulk 1992: 239, n. 4; Hutcheson 1995: 82–7; 2005: 307–9; Suzuki 1996a: 295–6; Cable 2003: 151–2). This is what Sievers called A2k:

(37) wæl-rēow wi-ga (*wi-gā)  
’slaughter-fierce warrior’ (Beo 629a)

(38) Hrunting na-ma (*na-mā)  
‘Hrunting (was the) name’ (Beo 1457b)

In such verses we are dealing with suspension in an independent word, which very often alliterates – alliteration is widely assumed to broadly correlate with phonological prominence (Russom 1987: 65; Minkova 2003: 24–8). Usually the syllable immediately beforehand (the conditioning syllable) is a typical ‘secondary stress’ element, such as -rēow, the second element of a compound, though in the off-verse a heavy derivational element (such as -ing in example (38)) may occur. Suspension of resolution is never found after a plain unstressed element, such as a case ending or a function word (even if heavy). There are some sixty clear examples of such verses, forty-eight like example (37), with the suspension following a secondary stress, and twelve like (32), following a derivational suffix. 38 Fifty-three of these certainly conform to Kaluza’s law, while six more end in the word pone: 39

(39) grund-wong po-ne  
‘that ground-plain’ (Beo 2588a)

This comes from Proto-Germanic *panōn, with the development of the ending *-o being disputed: did it undergo shortening by eOE, or did it retain its historical length? As noted above with respect to example (22), there seems to be little reason to assume shortening in this ending, and the linguistic reconstruction of Ringe & Taylor (2014: 298–303) favours retention of long *-ē across the board in eOE, rather than the more complex state of affairs (with contrasting *-ē and *-ē) assumed by Fulk (1992: 420). If this is correct, then there is just one exception among these 60 A2k verses to Kaluza’s law:

38 Verses where suspension is conditioned by a derivational suffix are marked by * in the following list: 64b, 67a, 69a, 120a, 252a, 284a, 303b*, 406a, 619b, 629a, 643a, 776a, 786a, 817a, 838b, 973a, 994b, 1015a, 1112b*, 1256a, 1287b*, 1288b, 1310b*, 1432a, 1457b*, 1510b, 1672a, 1682a, 1731b, 1807b*, 1834b, 1896b, 1914b, 1925b, 1964b, 2007b, 2060b, 2110b, 2158b*, 2191a, 2256b*, 2265b, 2334b, 2417b, 2457b*, 2460b, 2588a, 2613b*, 2754b, 2906b*, 2947a, 2959a, 2969b, 2972b, 3000a, 2019b, 3081b, 3135b*, 3172a. For 657a and 2035a, see note 43 below.

39 2007b, 2334b, 2588a, 2959a, 2969b, 3081b. Note that these are also included in the larger list in note 38.
The form geara is expected grammatically to be *gearu, presumably a simple scribal confusion of two similar letters.\textsuperscript{40} This makes for a probable failure rate of around 1.7\%, despite the suspended elements not belonging in any obvious way to a subordinated stress position.

There are an additional six A2k verses of somewhat unclear status with three words in the verse, all with clearly heavy final syllables:\textsuperscript{41}

\begin{itemize}
\item \textit{þrīto wicg sa-mod}
\item \textit{three horses together’ (Beo 2174b)}
\end{itemize}

These are superficially very similar to verses like those in example (29) above:

\begin{itemize}
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With three words, the relative stress, and which elements are subordinated, depend on how one interprets each passage and what assumptions one makes about phrasal stress assignment in Old English. In general, the six verses listed in note 41 seem to me the most likely to show suspension of resolution of a non-subordinated element, while those in note 32 are more plausibly considered to be subordinated. All the verses in both groups probably adhere to Kaluza’s law.\textsuperscript{42} The uncertainties about stress subordination make these two groups poor evidence for the current discussion, however: they are the easiest to reconcile with the assumption that subordinated stress is really what matters for Kaluza’s law.

Wherever suspension of resolution may occur is, by definition, a suspension context. This means that, in evaluating Kaluza’s law we cannot simply consider instances of suspension of resolution only (such as A2k verses), but must also evaluate positive instances of resolution in the same metrical context: that is, in A2a or A2ab verses with a resolved second lift.\textsuperscript{43} Such occur at least 20 times:\textsuperscript{44}

\begin{itemize}
\item \textit{ealdsweord eo-te-nisc}
\item \textit{giantish ancient sword’ (Beo 1558a; cf. 2616a, 2979a)}
\end{itemize}

Such verses have a subordinated conditioning syllable, here -\textit{sweord}, followed by the resolved sequence, which is without exception LL. Exceptions can be easily imagined, but are never found in \textit{Beowulf}:

\begin{itemize}
\item \textit{xcearsīð cy-nin-ges}
\item \textit{the sorrowful journey of the king’}
\end{itemize}

\begin{itemize}
\item \textit{ealdsweord eo-te-nisc}
\item \textit{giantish ancient sword’ (Beo 1558a; cf. 2616a, 2979a)}
\end{itemize}

\begin{itemize}
\item \textit{xcearsīð cy-nin-ges}
\item \textit{the sorrowful journey of the king’}
\end{itemize}

\textsuperscript{40} Unless this should be restored to *gearwa, with a weak adjectival form, archaically used without the conditioning of a determiner, meaning ‘the ready harbour-guard’. This would be an ad hoc emendation to remove an exception to Kaluza’s law, entirely metri causa, though such formations are not out of place in \textit{Beowulf} (Fulk et al. 2009: cxlix-cl).

\textsuperscript{41} 908b, 1525b(?), 2174b, 2545b, 2663b, 2956b.

\textsuperscript{42} The one potential exception is 1525b, which ends in \textit{fela}.

\textsuperscript{43} As far as I know, the only researcher to discuss such verses in the context of Kaluza’s law is Yakovlev (2008: 76, n. 49), who makes this observation in passing and provides 3041a as an example.

\textsuperscript{44} 467a, 522a, 784a, 819a, 1047a, 1198a, 1205a, 1267a, 1558a, 1607a, 1670a, 1802a, 1852a, 2043a, 2072a, 2154a, 2616a, 2979a, 3006a, 2041a. Additionally, 657a and 2035a are under suspicion of showing a more modern genitive plural \textit{Dena} as a scribal modernization of *Denia; compare 1670a (Fulk 1992: 244, n. 4). However dealt with, these two verses certainly conform to Kaluza’s law, the only question being whether they do so in correctly suspending resolution (as the scribal forms would have it) or in actively resolving (as the model of 1670a would suggest).
This strongly reinforces the idea that the ‘A2k context’ of a primary stress following a (genuine) secondary stress is governed by Kaluza’s law: in such verses, LL sequences must resolve, and LH must be suspended.

There is one three-word verse in such a context whose scansion is notoriously difficult:

(44) æscholt u-fan græg
    ‘ash-forest grey above’ (Beo 330a)

Hutcheson (1995: 167) says with reason that this verse seems to ‘defy classification’. Even if ufan is resolved (in violation of Kaluza’s law) there is only one potentially comparable example known to me in the entire Old English corpus (Andreas 1579a). Bliss (1962: 72) and Pope (1966: 262) both take the verse as a species of type A2ab, and so comparable to the following verse (where the resolution of the second lift is expected by Kaluza’s law):45

(45) grim-lic gry-re-fäh
    ‘fierce and terrible in its variegated colouring’ (Beo 3041a)

But this verse still doesn’t quite approach the massive buildup of stresses in (44), and it may be noteworthy that it has no unresolved counterparts. We never (in Beowulf, or as far as I know out of it) find a non-resolved A2ab verse ending in two distinct words:

(46) xæscholt ã göd
    ‘ash-forest eternally good’

Precisely what constraints militated against such verses – formulaic, syntactic, prosodic – is now hard to determine, but it seems likely that however we take (44), it is unusual, and probably struck the ear of the original audience as being so. Whether they understood it with resolution or suspension, the precise metrical rhythm would be unparalleled in Beowulf, and nearly so in the surviving corpus. Not knowing whether to resolve or not makes it difficult to say whether this verse conforms to Kaluza’s law or violates it. At best, this shows one further violation of Kaluza’s law in primary stress, and if taken together with suspending verses like (42), would result in a failure rate of at most 4.8% for this variety of A2a(b) verse.46

For verses in clear primary stress taken all together – that is, A2k (such as (37)) and A2a(b) verses (such as (42)) – the failure rate is perhaps (taking 330a as an exception) two forms out of 81 (2.5%), or, if three-word verses like (41) are included, two out of 87 (2.3%).47 This is the total rate for words bearing clear primary, non-subordinated stress to either resolve or suspend when following a heavy syllable bearing some degree of stress. This is much too good a rate of adherence to be chance, and strongly suggests that Kaluza’s law applies in such positions. It is not limited to ‘secondary stress’ environments, or even to ‘subordinated stress’, unless these terms are redefined beyond their normal linguistic meanings.

9. THE CONTEXT FOR KALUZA’S LAW

From the review of the data in the previous two sections,48 it seems clear that the usefulness of subordinated stress (let alone ‘secondary stress’) as a context for Kaluza’s law must be doubted. In fact, the problem of A2k verses has already given rise to such doubts: Suzuki (1996a: 292–3) explicitly denies secondary stress as a limiting factor, and Fulk (1995: 494)

45 This delightfully pedantic translation of gryre-fäh is from Fulk et al. (2009: 22, 388, s.v.).
46 4.3%, if 657a and 2035a are restored to resolving forms.
47 If 330a is set aside, the respective rates are 1.3% and 1.2%.
48 Which is not quite complete regarding Kaluza’s law, as potentially ambiguous verses that could be either D* or A2b have been left out of consideration, as have verses involving proper names, which potentially involve greater metrical liberties and provide less clear-cut evidence. See Goering (2016: 128, 134–5) for details on such verses.
himself has recognized that, if ‘secondary stress’ is to be maintained as a term, it must redefined:

Under this analysis secondary stress is defined positionally, as any full stress that immediately follows another (Fulk 1992, §§ 266, 275). Thus I would call the stress on scipes in on bearm scipes (Beowulf 35b) secondary . . .

This is certainly a not unreasonable assessment of the environment in which suspension of resolution may occur (though the conditioning stress need not itself be a ‘full stress’), but I do not see that this can be fairly labelled ‘secondary stress’. Even granting the loose use of ‘secondary stress’ to mean ‘subordinated stress’, this definition moves even further to include a fair number of examples that bear prominent word-level and phrase-level stress, sometimes more prominent than the preceding syllable.

Cable (1994: 5–6) also reconsiders the matter, and abandons any direct characterization in terms of genuine subordination. His later formulation of Kaluza’s law is highly technical:

A short syllable must have at least two levels of stress above the preceding syllable for resolution with a long syllable to occur. (Cable 2003: 152)

This statement is prompted by Cable’s consideration of A2k verses. In his grid-analysis, example (37) appears as (47):

(47) Phrase x
Word x x
Foot x x x
Syllable x x x x
  wæl- rēow wi- ga

That is, since the word-stress of wi- in example (37) is only one ‘level’ of stress (as indicated by grid-marks) above the secondary stress of -rēow, Kaluza’s law applies. Although it empirically accounts for a fair number of verses obeying Kaluza’s law, this account runs into problems with verses such as (48) (adjusted from (38)):

(48) Phrase x
Word x x
Foot x x
Syllable x x x x
  Hrun- ting na- ma

By his own analysis elsewhere such elements have ‘tertiary stress’, which Cable (1991: 139, 144–7) understands to be in effect simply a heavy unstressed syllable, and which should at any rate be a grid-mark lower than secondary stress, if the two concepts are to be distinguished at all (though I am not aware that Cable himself ever tries to represent ‘tertiary stress’ in a metrical grid). There is furthermore a methodological question to be raised: Cable’s solution has the look of a mechanism designed to broadly save a stress-level approach to Kaluza’s law, while recognizing the empirical reality that subordinated stress alone is not sufficient. This is an understandable move given the history of scholarship on this problem, but it is fair to reconsider why we should invoke levels of stress at all.

In the end, the only really robust empirical description of the environment for suspension of resolution, the environment for Kaluza’s law, is the one put forward by Bliss (1962: 27), who, as quoted in note 2 above, stated that all that matters is ‘whether the sequence is preceded by a long [i.e. heavy] syllable or not’ (though again, he did not actually put this definition into practice).
Stress matters in two ways only: the conditioning syllable must have a certain minimum prosodic salience (at least ‘tertiary stress’, whatever this means precisely), and resolution requires some degree of stress.\(^{49}\) Requiring the conditioning syllable to be stressed is what allows verses such as:

\[
\begin{align*}
(49) & \text{nō ðý ār su-na (∗su-nā) sīnum} \\
& \text{‘yet not to his son’ (Beo 2160a)}
\end{align*}
\]

This is a type C verse, where nō ðý ār form an initial run of weak syllables constituting a single metrical position. If ār (as heavy a syllable as -ing) could condition suspension of resolution, not only would the resolution of suna (an LH sequence) be unexpected, but we would expect to find actual examples of verses where such weak elements triggered suspension.

The limitation of resolution to stressed syllables explains why we find verses such as:

\[
\begin{align*}
(50) & \text{þréat-e-don þearle} \\
& \text{‘they assaulted sorely’ (Beo 560a)}
\end{align*}
\]

If such verses relied on resolution, they would involve a very significant number of exceptions to Kaluza’s law (1962: 31–4). It is now clear, however, that they do not resolve, and simply show two fully unstressed syllables, which either count as a protracted drop in the earlier part of a verse, or else obey the rule of the coda (also known as Fulk’s rule) in filling two distinct metrical positions at the end of a verse (Fulk 1992: 201, 228; Cable 1991: 19).\(^{50}\)

Kaluza’s law may then be descriptively characterized as follows:

\[
\begin{align*}
(51) & \text{Immediately after a heavy syllable bearing any stress (the conditioning syllable), a} \\
& \text{stressed light syllable (the resolving syllable) resolves with a following syllable if and} \\
& \text{only if that following syllable is also light.}
\end{align*}
\]

The primary further caveat may be that verse-final compounds show an additional pressure (somewhat akin to the rule of the coda) to count subordinated final sequences, even when -LL, as distinct units, without resolution – this might be termed the stānthlīðō-licence, and explains the majority of exceptions of Kaluza’s law. If this condition is genuine, then it means that secondary stress (when coupled with verse-final position) is actually a precondition for the less strict application of Kaluza’s law.

\(^{49}\) This restriction seems linguistically justified, but is complicated somewhat by the existence of what has now been dubbed Bliss’s rule (Pascual 2018). This rule, first identified in Bliss (1981), shows that the distribution of auxiliary verbs such as sceal and hafad is more restricted than that of those like scolde. That is, elements which, at first glance, appear to be best characterized as a heavy syllable or resolved equivalent behave one way, while elements that are heavier behave another. A full evaluation of the linguistic implications of this rule remains a desideratum, but it seems likely that this has to do with foot formation: sceal and (apparently) hafad can be accommodated within a single linguistic foot (though compare note 53), while scolde cannot. That certain elements were footed without being phonological words was already to be suspected on purely linguistic grounds: contrast the retention of the vowel quality in æt with the reduction of the a-stem genitive singular ending -es to -es. Particles such as these have more than minimal prosodic salience, but behave metrically differently from derivational syllables such as -ing and participial -end: a traditional stress-based view might take this as evidence that such particles are prosodically a ‘step down’ from heavy endings (however this should should be formalized). It may be that the positioning – before rather than after the main word-stress – is more relevant: a proposed element such as æt or æt does not affect the status of the main element as word-initial, while feet following a word-head maintain, within the verse, the compound-like cohesion that prevents following syllables from counting as ‘initial’ (see the proposal below, in section 10).

\(^{50}\) There is no justification for assuming secondary stress on either of the weak syllables in words like þréatedon. Their ambiguity in fact initially led Sievers (1885: 254–5) to hesitate over the correct stress assignment and consider the pattern þréatedon. Linguistically, the medial syllable seems to have been shortened and reduced earlier than the final (Dresher 1985: 47, 83), so the common assumption that these map most naturally onto a falling stress pattern is probably the less likely option, if one were to insist on assigning meaningful ‘stress’ to either non-root syllable. The argument of Cable (2016) that these sequences could be syllabified in different ways to give different stress patterns is both ad hoc and unnecessary. It is also worth noting that the word-foot theory of alliterative metre deals with such sequences very simply, without recourse to any ‘rule of the coda’: it simply posits a Sx̅x foot, which can be employed in various combinations (Russom 1987: 13).
10. EXPLAINING KALUZA’S LAW

I have been concerned strictly with a descriptive, empirical account of the suspension of resolution, since it is only with a clear and accurate understanding of the facts that an adequate explanation of the phenomenon can be developed. It is, I suspect, precisely the commitment to ‘secondary’ or subordinated stress that has led to the verses such as those in example (38) being considered in some way doubtful or marginal, and those such as (45) being entirely disregarded.

A full metrical-phonological account of Kaluza’s law could easily fill an article on its own, but I do not want to leave this aspect of the problem entirely neglected. This is in part because what I believe are the proper questions to ask are nearly the reverse of those that have featured in this more empirical investigation: not ‘under what conditions does Kaluza’s law apply’, but rather ‘why does Kaluza’s law not apply to all potentially resolvable sequences’?

From a phonological perspective, the strangest thing about resolution in Beowulf is not that LH sequences are sometimes suspended, but rather that words such as *su-na, *wra-ca, and cy-ning are ever resolved (Minkova 2021: 122-8). Prosodically, Old English, like other Germanic languages, clearly shows a preference for moraic trochees, that is, prosodic units with exactly two moras, the first of which is stronger than the second (Kiparsky 1998; Goering 2016a; 2016b: 280–9). As a cross-linguistic unit, the bimoraic trochee is very well established (Kager 2007: 203–204), and in cognate systems which feature resolution, such as Latin or Greek, the phenomenon is strictly limited to LL sequences. Accounts of Kaluza’s law based around subordinated stress, even if they were empirically adequate, would not explain this fundamental peculiarity in Old English resolution.

Phonologically, I provisionally suggest that the resolution of LH sequences at all, under any circumstances, is due to a special prosodic allowance, which I call the overheavy licence. The first syllable of a prosodic word in Old English must always be part of a (minimally) bimoraic foot, and carries primary stress – this requirement allows the creation of exceptional feet, which can have more than two moras. This licence may be at play in monosyllables, such as beorht and brœost, which far exceed the two-mora preference, as well as in the resolution

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52 It is of course possible that final consonant extrametricality could be invoked, in this case of the final two consonants -ht, though it is noteworthy that the final consonant does not appear to be extrametrical in the genitive singular *hēafudes or dative plural *hēafudum, where the ending counts as heavy and conditions medial syncope: any extrametricality is either optional or restricted in some way (Goering 2016a: 179–80).
of words like *cyning*. However, outside of the initial foot of a word, this licence does not normally apply, and foot formation follows a pattern of strict bimoraism. This is seen linguistically in the syncopes within the paradigm of *hēafod* ‘head’. Here, the oldest nominative plural, *hēafudu* shows the pattern HLL, with the two later LL syllables ‘resolved’ into a single (phonological) foot. This contrasts with other case forms, such as the dative plural */hēafudum* or singular */hēafudē*, both of which historically had the shape HLB: the middle L syllable could not be accommodated with in a precisely bimoraic second foot (the final LH sequence could not ‘resolve’), and so the medial */u* was deleted, giving attested *hēafdom, hēafele*, etc. (Goering 2016a: 177–180).

If this view is correct, and LH feet are formed only as an exceptional phonological licence, then Kaluza’s law takes on a slightly different theoretical aspect, being seen in part simply as the non-application of a licence. Within compound words such as *bēag-hroden*, Kaluza’s law likely simply reflects the normal phonological structure, where non-word-initial LH feet are prohibited. There is, however, an apparently strictly metrical component to Kaluza’s law when it applies across word boundaries, as in the phrase *Hrunting nama*. Something about this context must block the application of the overheavy licence to *nama*. It is hardly likely to be subordination of stress, since -*ting* is a derivational syllable while *na-* is the head of an independent word, but the presence of the immediately preceding -*ting* is nonetheless crucial. By way of contrast, compare a verse like:

(52) syðdan Gēata *cyning*
‘after the king of the Geats’ (*Beo* 2356a)

Here, the overheavy LH sequence *cyning*, an independent and fully stressed word, resolves.

My provisional suggestion is that sequences of footed syllables in poetry are treated as more closely adjoined than they would be in ordinary speech, meaning that later feet within this run of feet are no longer ‘initial’ and so no longer eligible for the overheavy licence. In *Hrunting nama*, the syllable *na-* immediately follows -*ting*, which is plausibly footed (Goering 2016b: 142–3): (*Hrūn*)/*(ting)*/(nā)mā. For metrical purposes, *na-* is not treated as ‘domain initial’, and so not granted the overheavy licence. Without this licence, resolution of an LH sequence is impossible. On the other hand, in (*Gēa*)*tā* (*cy-ning*), the inflectional syllable is defooted (Goering 2016a: 179–80), meaning that *cyning* is initial to a new sequence of feet, and so resolves with the overheavy licence.

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53 I do not mean to suggest that the tolerance of LH feet is an inevitable solution to the prosodic pressures at work, merely that it is the solution that Old English happened to adopt. An instructive contrast to the Old English system is provided by Cahuilla, which shows a prosodic system very similar in its outlines – bimoraic trochees, a requirement to foot and stress a word-initial syllable (disregarding prefixes) – but which deals with LH sequences very differently. Compare the Cahuilla forms *tāxmuʔat* ‘song’ and *sükāʔtī* ‘the deer (objective case)’ (Hayes 1995: 133–36). The acute marks primary stress, the grave secondary. In Cahuilla, the only consonant to contribute a mora to syllable weight is /t/, so *táx-muʔat* has the shape LLL (with non-moraic x), while *sū-kāʔ-tī* is LHL. The first may be parsed using a normal moraic trochee: representing the foot boundaries with brackets, this is *(tāx-mu)*/(ʔat)*, with the final syllable either forming a degenerate, monomoraic foot (Mamet 2011: 264), or else being unfooted, *(tāx-mu)at*, with final lengthening giving it a phonetic prominence mistranscribed as secondary stress (Hayes 1995: 137). The initial foot bears primary stress, any non-initial feet secondary stress. If LH feet were tolerated, then *sükāʔtī* ought to show the same stress pattern, *sükāʔtī*, but it doesn’t. Instead, it appears that there is an initial degenerate foot, followed by a normal heavy (bimoraic) foot, followed by a final syllable that is, as before, either a degenerate foot or unfooted: *(sū)*/(kāʔ)/(/tī)* or *(sū)*/(kāʔ)/ti* (Blumenfeld 2011: 228–30). In other words, the presence of secondary stress on the medial syllable shows that the initial LH sequence is split into two distinct feet, each with its own stress, rather than combining into a single LH foot. Such a system (or some other means of avoiding LH feet) would be perfectly imaginable for Old English, but is not in the event employed, except in Kaluza’s law contexts. It is tempting to suggest that this distinction arises because in Old English overheavy monosyllables are very frequent, while in Cahuilla they are at best rare, meaning that a general overheavy licence is more useful beyond LH sequences in the one language compared to the other.
This line of explanation depends on a type of metrical coherence, a widely attested phenomenon in poetry where elements are treated as more closely bound than they might be in non-poetic speech (Kuryłłowicz 1970: 7). I suggest that this coherence leads, in effect, to sequences of footed syllables being treated as pseudo-compounds for the purposes of prosodic-word boundaries.

This theoretical proposal, which may well benefit from further refinement, is only an illustration of what I think a full metrical-phonological account of Kaluza’s law might look like, armed with a revised understanding of the empirical workings of resolution and its suspension in Beowulf. It seems clear that resolution, so closely related to phonological foot structure, should be explained in relation to foot formation and set within the context of linguistic typology and phonological theory. Subordinated stress explanations are inadequate empirically, and fail to provide a theoretical explanation for the most striking and distinctive aspects of resolution. The over-heavy licence appears to provide a means of accounting for the full range of facts regarding Kaluza’s law, and allows a motivation of the descriptive definition of the law given in (51) above.

11. Conclusion

As a linguistic and metrical phenomenon, Kaluza’s law holds a great deal of interest from a variety of perspectives. The goal of this survey has not been to exhaustively treat all aspects related to resolution and its suspension, but to identify the correct descriptive context for the application of Kaluza’s law, and suggest directions for further theoretical work. The rule given in (51) has long been suspected in the literature, but the idea that ‘secondary stress’ is a prototypical condition that is somehow essentially bound up with Kaluza’s law has also had a long and persistent history. The data and contexts reviewed here strongly suggest that the factors of ‘secondary’ and ‘subordinated’ stress may be set aside as conditions for Kaluza’s law.

APPENDIX

Sievers’ Types

The following is a simplified overview of the basic labels of different verse ‘types’, adjusted from the classification of Sievers (1893). S represents a stressed syllable (or resolved equivalent), s a secondarily stressed syllable (or resolved equivalent), and x a weak syllable. A breve marks a syllable that must be light and unresolved. Parentheticals show optional elements, and (x...) in particular indicates an unspecified number (in practice usually zero to three) of optional unstressed syllables. I only include subtypes that are specifically discussed in this article. Note that this is a practical summary of the traditional classification, not a theoretical endorsement of the scheme, and the ‘types’ in general are now widely seen as epiphenomenal; for a critical discussion with full references, see Goering (2020b).

54 This is not to be confused with the principle of metrical coherence proposed by Dresher & Lahiri (1991: 251), which holds that various prosodic and metrical processes in a language, both phonologically and in verse, will follow the same general system. Dresher & Lahiri’s principle is a fundamental background principle of this entire discussion, but in the immediate context I mean to invoke Kuryłłowicz’s very different principle of the same name.

55 The stāhlīðo-licence might also have a foot-based explanation, though the issue is not entirely clear. In Goering (2016a: 146–51), I suggested that we might be dealing with a special kind of defooting, where a doubly subordinated foot (both linguistically, within a compound, and metrically as the final element in a verse) might trigger a demotion of final foot, -hlīð in our example. Minkova (2021: §4.2) suggests that this as an example of the phonetic lengthening of a phrase-final syllable: an intriguing line of explanation, though more powerful in accounting for suspension in later Old English poetry (which it explains very well) than in Beowulf, where such lengthening would have to be relatively sporadic. Further consideration of the question is very much in order. On the possible relevance of final defooting to Terasawa’s law, see Goering (2016b: 151–2).
REFERENCES

56 The ‘k’ stands for kurz ‘short’, referring to the light second lift.