



BRILL

MNEMOSYNE 73 (2020) 577-608

MNEMOSYNE
A Journal
of
Classical Studies
brill.com/mnem

‘Irrational Lengthening’ in Virgil

Rupert Thompson

Selwyn College, Cambridge

rjet1@cam.ac.uk

Nicholas Zair

Peterhouse, Cambridge

naz21@cam.ac.uk

Received January 2019 | Accepted May 2019

Abstract

Word-final syllables consisting of a short vowel or a short vowel followed by a single consonant sometimes scan as heavy in Latin hexameter poetry, a feature known as ‘irrational lengthening’, lengthening in arsis, *diastole* etc. We examine the contexts in which this occurs in the poetry of Virgil. It is widely acknowledged that this phenomenon is based on a similar licence in earlier Greek and Roman models for Virgil, but it has also been argued that other, metrical or phonological, aspects may have been relevant to the use of lengthening. We examine these environments, and, where possible, carry out statistical analysis. We conclude that, while some of these are descriptively true, the position of lengthened words is primarily due to the constraints that Virgil applied to the construction of his hexameter rather than any other explanation.

Keywords

Virgil – lengthening – diastole – hexameter – poetry

1 Introduction

Word-final syllables consisting of a short vowel or a short vowel followed by a single consonant sometimes scan as heavy in Latin hexameter poetry, as in these examples from the *Eclogues*:¹

1. Tityrus hinc aberat. ipsae te, Tityre, pinus (Verg. *Ecl.* 1.38)
2. terrasque tractusque maris caelumque profundum (*Ecl.* 4.51)

This phenomenon is known by a number of names, including ‘irrational lengthening’, ‘lengthening in arsis’ and *diastole*.² The use of the term ‘lengthening’ is to some extent a misnomer, insofar as the vowel in question is phonologically short, and merely scans heavy (‘long’) in these instances (although when reading aloud, there may of course have been some lengthening of the vowel or some other means of marking that the syllable counted as heavy). Nonetheless, we will refer to it as ‘lengthening’ in what follows (henceforth without inverted commas). There have been few systematic investigations of lengthening, with most discussions to be found *ad loc.* in commentaries (for an unusually thorough example see Fordyce 1977, 96–97 on *Aeneid* 7.174, with 100–101 and 135–136). A convenient summary can, however, be found in *EV* 2.43–44, s.v. *diastole*.

In this article, we focus on the phenomenon in Virgil for a number of reasons. Firstly, because he is the first Latin poet whose remaining works provide enough evidence to allow the possibility of testing the various suggested explanations of lengthening in hexameters in a systematic fashion;³ secondly, because these explanations have often been based primarily on evidence from Virgil; thirdly, because thorough collections of examples of lengthening in

1 Unless otherwise stated, all lines of Virgil are taken from the *OCT* edition (Mynors 1969). We have marked these heavy syllables with italics.

2 The use of ‘arsis’ to refer to the first part of the foot is common in modern discussion of Latin metre, along with terms such as ‘rise’ and ‘*princeps*’. On the use of the terms arsis and thesis in Greek and Roman sources see Lynch 2016. The term ‘in arsis’ is used because all widely acknowledged examples take place there (but see Section 3).

3 All cases of lengthening in Virgil can be found in the Appendix from Johnston 1898, 19–24; Kent 1948. Ennius’ use of lengthening will be discussed at length below. There are three examples in Lucilius (Breed, Keitel and Wallace 2018, 26 n. 100), no instances in Cicero’s *Phaenomena* and *Prognostica*, and only three each in Lucretius (2.27, 5.396, 5.1049) and in Catullus (see Section 6). There are three in the hexameter lines of Tibullus, perhaps as many as four in the hexameter lines of the elegiacs of Propertius, and another two in the pentameter (Platnauer 1951, 59–61).

other poets writing in hexameters seem not to have been made;⁴ and fourthly because the environments in which lengthening takes place in other poets who write in hexameters appear to be somewhat different from those of Virgilian lengthening.⁵

Leaving aside two controversial cases (on which see Section 3 below),⁶ there are 72 examples of lengthening in Virgil (i.e. in the *Eclogues*, *Georgics*, and *Aeneid*; all examples can be found in the Appendix). Of these, 17 involve lengthening of a syllable ending in a vowel, and 55 lengthening of a syllable ending in a consonant (the reason for this distinction will be clarified directly below and in Section 3). It has long been acknowledged that this lengthening

4 Unfortunately, searching for 'lengthening in arsis before a caesura' (on the use of which terms see below) on the *Pede Certo* website (www.pedecerto.eu, accessed 24/05/2018) does not provide all examples of lengthening. It is based on the *Musisque deoque* corpus, which does not include all parts of all works of some authors (the contents of the corpus can be found at www.mqdq.it/public/indici/autori/tipo/alfa, accessed 24/05/2018), but *Pede Certo* appears not to provide all examples even from works included in the corpus. Thus, for example, it finds 18 examples in hexameter lines of Ovid, omitting (at least) *Met.* 6.658, 7.61, 7.365, 12.392. Likewise, it gives 4 examples in Horace's *Satires*, lacking (at least) 1.9.21, 2.2.47, 2.3.1 (although both books of the *Satires* are in the corpus).

5 According to Kiessling and Heinze 1895, XIX-XX; 1901, 12, lengthening in Horace is found only in arsis, in the third and fourth foot in hexameter, and except in *Satires* 1.7.7, only in the third singular of verbs. The examples of which we are aware in the *Satires* bear out this pattern, which is quite different from that of Virgil. At least in the *Metamorphoses*, Ovid's usage is similar to Virgil's in the case of words ending in a consonant. According to Haupt *et al.* 1903, 127 (on *Met.* 3.184), Ovid uses lengthening in the *Metamorphoses* before a Greek word and before a fourth-foot caesura which is also before *et* or *aut*, but this is not quite accurate, and anyway is subject to the same likely explanations as for Virgil discussed in Section 5. Out of 11 instances of lengthening where the word ends in a consonant known to us, 7 are before *et* (1.660, 3.224, 7.61, 7.365, 8.283, 10.98, 12.392), 1 is before *at* (7.644), none before *aut*. All those before *et* are in the third foot, 7.644 is in the fourth. There is lengthening before a Greek word in a spondaic fifth foot at 2.247 (*Taenarius Eurotas*), and in the second foot at 6.658 (*prosiluit Ityosque*). At 5.640 we find *petit aptum* (fourth foot). Lengthening in hexameter lines also occurs at *Tristia* 5.14.41 and *Ex Ponto* 3.1.113, which begin identically with *morte nihil opus est* (second foot). The remaining examples on *Pede Certo* involve lengthening of *-que* (*Her.* 9.133, *Met.* 1.193, 4.10, 5.484, 7.225, 10.262, 10.308, 11.36, 11.290), which takes place in the second foot except for a single example in the fourth foot (which is strikingly similar to the distribution in Virgil). As with Virgil, in all instances there is another *-que* in the line, although, unlike Virgil, it (only) takes place before a word beginning with a single consonant, almost none of which permit lengthening of τϵ in Homer (see below). According to Platnauer 1951, 60-61 twenty-two of the twenty-six examples in Ovid's elegiacs (both hexameter and pentameter) consist of the sequence *-iit*, of which all but one are compounds of *eo*. For lengthening in Plautus' metres see Fortson 2008, 76-97.

6 The lines, unemended, are *dona dehinc auro grauia sectoque elephanto* (*A.* 3.464) and *sancta ad uos anima atque istius inscia culpae* (*A.* 12.648).

is a poetic feature which is carried over from or derived from Virgil's Greek and Roman predecessors.⁷ We can see an example of this at *A.* 7.398,

sustinet ac natae Turnique canit hymenaeos (*A.* 7.398)

on which Fordyce observes that "the lengthening of a short syllable before a Greek quadrisyllable at the end of the line is an echo of Greek rhythm (in such line-endings as *Od.* vii. 475 πλεῖον ἐλέλειπτο ...) which Catullus had already used ... and which Virgil repeats four times elsewhere ...".⁸ In general Virgil and other Latin poets avoid a fifth and sixth foot where the final four syllables consist of a single word, or a line-end of the shape – – x consisting of a single word. Where this occurs, it seems to have been felt as a particularly 'Greek' convention and the final word is often Greek,⁹ as in all three examples in Catullus with lengthening:¹⁰

1. iam ueniet uirgo, iam dicetur hymenaeus (*Cat.* 62.4)
2. tum Thetis humanos non despexit hymenaeos (*Cat.* 64.20)
3. qua rex tempestate nouo auctus hymenaeo (*Cat.* 66.11)

and in the following lines of Virgil (in which lengthening is not always before the final Greek word):

1. ille latus niueum molli fultus hyacintho (*Ecl.* 6.53)
2. ille comam mollis iam tondebat hyacinthi (*G.* 4.137)
3. Pergama cum peteret inconcessosque hymenaeos (*A.* 1.651)
4. sustinet ac natae Turnique canit hymenaeos (*A.* 7.398)
5. scepra Palatini sedemque petit Euandri (*A.* 9.9)
6. Graius homo, infectos linquens profugus hymenaeos (*A.* 10.720)
7. seu mollis uiolae seu languentis hyacinthi (*A.* 11.69)

7 E.g. Norden 1957, 450-452, and other commentaries.

8 Fordyce 1977, 135-136.

9 Dainotti 2015, 192-197.

10 Norden 1957, 437-449. It may be noted that the Greek line-ending word in all these cases (directly before the lengthened syllable in all but one case) begins with *h-*. More on this in Section 6.

Many other lines with lengthening in Virgil include Greek names or other words, or are clearly based on lines of Homer or other Greek poets.¹¹ The 17 examples in Virgil of lengthening in words ending in a vowel are particularly associated with ‘Greekness’,¹² in the following ways:

- (a) the lengthened syllable is always the enclitic conjunction *-que* followed later in the line by (at least) another *-que* in the meaning ‘both ... and’ (the use of which is generally agreed to be heavily influenced by Homeric τε ... τε);¹³
- (b) almost all examples appear before *x-*, *z-*, *st-*, *mn-* or *muta cum liquida* sequences (*tr-*, *pl-*, *dr-*, *cl-*, and, by extension *fl-*),¹⁴ all of which represent word-initial clusters which must or may cause a vowel at the end of the preceding word to scan heavy in Homer.¹⁵

Many of the lines including lengthened *-que* have other Greek features. Thus, of the three following lines, no. 1, in addition to being a translation of a Homeric line, contains the Greek accusative singular *-a*, no. 2 is a half-translation of a Hesiodic line and contains a Greek accusative of respect, and no. 3 contains three Greek names,¹⁶ and all three end with a Greek tri- or quadrisyllable.

11 For example, *Pleiadas, Hyadas, claramque Lycaonis Arcton* (*G.* 1.138), where the first half of the line is taken from Homer (Πληιάδας θ' Ὑάδας τε, *Il.* 18.486), and part of the second line from Callimachus (Λυκαονίης Ἀρκτοιο, *Hymns* 1.41); see Thomas 1988, 91 on this line. Note that the lengthening in Virgil keeps the rhythm of the Homeric line, where the heavy syllable of the second dactyl is provided by the following elided θ' which closes the syllable. Horsfall 2006, 184 (on *A.* 3. 211, which does not have lengthening) notes the “typical accumulation of metrical anomalies and extravagances ... in the presence of Greek names and themes ...”, and see also Raven 1965, 15, 101.

12 Dainotti 2015, 193 n. 589.

13 This double use of *-que* is not found in prose, and it is used by Plautus only seldom and largely in high-register contexts. Fraenkel 1922, 209–211 = 2007, 142–144 considers it a calque on the Homeric usage, but Skutsch 1985 (on *Annales* 170) is probably right to consider it native but largely obsolete, with Ennius having revived and extended it on the basis of Homeric usage. Norden 1957, 228 (on *A.* 6.336) argues that its use was felt to be a Hellenism by both Virgil and Ovid. See Section 3 for the single possible instance of lengthening of a vowel-final syllable other than *-que*.

14 The two exceptions are in *A.* 3.91 and 12.363, where lengthening takes place before *l-* and *s-* (which also has Homeric precedent; see n. 26).

15 Ennius allows lengthening of vowels other than in *-que* before sequences of *s-* followed by a consonant, e.g. *auspicio regni stabilita scamna solumque* (*Ann.* 91). So does Catullus, e.g. *nulla fugae ratio, nulla spes: omnia muta* (64.186) see Skutsch 1985, 57–58.

16 On further Greek context for *Aeneid* 4.146, and a connection between metrical licences, including lengthening, and Dionysiac and dithyrambic contexts see Weber 2002, 326–328.

1. Alcandrumque Haliumque Noemonaque Prytanimque (*A.* 9.767)
 Ἄλκανδρόν τε Ἄλιόν τε Νόημονά τε Πρυτανὶν τε (*Hom. Il.* 5.678)
2. Brontesque Steropesque et nudus membra Pyragmon (*A.* 8.425)
 Βρόντην τε Στερόπην τε καὶ Ἄργην ὀβριμόθυμον (*Hes. Th.* 140)
3. Cretesque Dryopesque fremunt pictique Agathyrsi (*A.* 4.146)

It is widely acknowledged, therefore, that lengthening is a licence based on Greek models, and, especially in the case of the *-que* type, one which apparently often seems to cluster with other poetic features in Virgil's works which are also in some sense 'Greek'. Moreover, it is a licence for which there were also Roman models for Virgil to follow, as already mentioned (n. 3), in particular that of Ennius, to be discussed in Section 3.

The question that we wish to discuss here is whether there are other factors which also interact with and/or are necessary for lengthening to take place, of which a large number have in fact been suggested. This is a question of serious import both for literary appreciation of Virgil—for example, as to the intended effect of a particular use of lengthening—and for questions of text criticism. For an example of both of these see the discussion of *Aeneid* 12.363 in Section 3.

With regard to the other factors perhaps involved in lengthening, we can compare the statement of Fordyce that “[i]t is impossible to find any dramatic purpose in Virgil's practice (there is none discernible in Homer's) and unnecessary to look for technical explanations ... Virgil's purpose is literary, not dramatic, suggestion: he is recalling Ennian effects and, like Ennius, echoing Homeric rhythms”¹⁷ with that of Austin (on *A.* 4.64), who, in addition to commenting that “Virgil appears to have used such lengthenings for the sake of variety, either because he wished to recall Ennius and other early poets, or to echo a Greek rhythm from Homer or Alexandrian epic, or simply for a special artistic effect (sometimes there is more than one such motive) ... In his handling of metre Virgil listened to the voice of imagination as well as to that of rule” also notes that “the syllable so treated [i.e. lengthened] is always in ‘arsis’, i.e. it bears the metrical ictus, and is generally before the main caesura in the line where a pause is either marked or felt. A number of examples reflect an original prosody preserved by Virgil as an echo from early Latin”.¹⁸ Certain of

17 Fordyce 1977, 97. Likewise Dainotti 2015, 159–160: “These prosodic singularities are ‘literary’ rather than expressive, constituting an elegant echo of Homer (in whom the phenomenon is frequent), and presumably also of Ennius. It is therefore unproductive to attempt to isolate a stylistic effect.”

18 Austin 1960, 43–44. A similar emphasis on the range of contexts of lengthenings is found in Crusius and Rubenbauer 1955, 28.

these features, or a combination of them, are highlighted by a number of other scholars, as we shall see in what follows.

Now, descriptively, the correlations observed by Austin are correct: all examples of lengthening are in the arsis (although we make the case in Section 3 for an instance of lengthening in thesis); most examples are before a main caesura (but not all of them); many examples are in syllables that originally contained a long vowel (but these are in the minority).

Such a descriptive approach, in referring to lengthening, for example 'in arsis', may not seek to imply that lengthening could not, in principle, take place in the thesis. Indeed, it is relatively difficult to find explicit statements that lengthening may only occur in arsis or that there is something special about arsis (such as the verse ictus),¹⁹ which causes lengthening. Nonetheless, there are examples of such statements (in fact Austin, on A. 4.146, speaking of lengthening of *-que*, states that "Virgil can only treat the syllable this way because it bears the ictus"²⁰), and commentators sometimes make arguments for particular readings or scansion based on assumptions of such restrictions.²¹ Moreover, names have power: even if a particular scholar does not intend the observation that lengthening takes place in arsis or in caesura to be anything other than descriptive, others may well assume it to have explanatory or restrictive force. Even more so, a description of lengthening as 'before caesura' may be taken in two ways: either that word-final lengthening only takes place in a syllable in arsis (which, is, as we shall see, vacuously true); or that lengthening only takes place before a major caesura (penthemimeral, hephthemimeral), which is untrue.

In our view, we should strive to avoid using labels such as these,²² since they may imply in general usage a more prescriptive, or even explanatory, force than careful scholars have intended. Moreover, we should, where possible, prefer a single explanation—if there is one—that satisfactorily explains all the data, to a number of explanations which individually explain only part of the data. Of course, it is possible that several effects and developments could have

19 The existence of the ictus, i.e. a stress on the first part of each foot rather than on the syllable of the expected word-stress, is nowadays controversial; see Fortson 2011, 99–104 for a sceptical discussion. Since we will argue against the arsis as a favoured site for lengthening, which may be seen as the result of the ictus, this article may provide a minor point against the existence of the ictus.

20 Austin 1960, 146–147.

21 For example Williams 1996, 481–482 and Tarrant 2012, 254 on A. 12.648, discussed in Section 3.

22 E.g. "Lengthening *in arsi*" in the index of Dainotti 2015; section heading "syllabes allongées à la coupe" (Nougaret 1963, 49); 'lengthening in arsis before a caesura' as a searchable feature at www.pedecerto.eu (31/05/2018).

come together to produce the situation we find in Virgil's poetry. But it is good practice to at least start by testing explanations for lengthening individually, to see if a single satisfactory factor will suffice. We can do this partly by checking whether possible explanations/restrictions fit all the data, and if they do, whether they can be shown to have a relationship with the data which is statistically significant.

Our argument will be that restrictions to the position of lengthened syllables consist largely of the prosodic shape of the word in which they appear, the consonants at the start of the following word (especially in the case of lengthened *-que*), and the (rather severe) constraints Virgil set himself in composing his hexameters. In addition, he may have considered lengthening to be particularly appropriate to lines with Greek content of one sort or another, or as a way of echoing earlier Roman poets. Features like an original long vowel, position in arsis, position before a caesura etc. cannot be shown to be either sufficient, or necessary, environments for lengthening to take place, and they are in fact epiphenomenal, arising from the restrictions just mentioned, instead of being causative.

In Section 2 of this article we will show that Virgil does not restrict himself to lengthening syllables which were long in earlier stages of Latin. In Section 3 we will address lengthening in arsis, in Section 4 lengthening at caesura, in Section 5 lengthening before a syntactic pause, and in Section 6 lengthening before *h*-. In Section 7 we will provide conclusions.

2 Lengthening of Etymological Long Vowels

It is often observed that some final syllables that undergo lengthening in Virgil originally had long vowels. Postgate claims that lengthening “happens especially if the short vowel had once been Long [*sic*] and some sense of this remained”.²³ It is of course possible that Virgil could identify (some of) these words on the basis of their length in e.g. Plautus and Ennius, and the example of Ennius in particular was doubtless strong (see Section 3). But, as Kent points out, the majority of words showing lengthening in Virgil did not have etymological long vowels: he counts 22 original long and 1 uncertain vowel out of 55 examples of lengthening.²⁴ So it seems that Virgil's practice in this regard was not driven by historical linguistic factors.

²³ Postgate 1923, 28.

²⁴ Kent 1948, 305. Kent recognises 54 rather than 55 examples, since he omits *A.* 3.504 (Kent 1948, 30 n. 3), which contains an etymologically short vowel.

3 Lengthening in Arsis

It is undoubtedly true that all 72 good examples of lengthening in Virgil occur in arsis. One possible way to explain this would be if he followed the practice of his Greek and Roman poetic forebears. In the case of Greek poetry, Homeric usage is obviously of great importance, since he was considered by the ancients the earliest writer of, and privileged model for, epic hexameter, although the usage of subsequent Hellenistic poets is also relevant. In the case of Latin poetry, of greatest importance is no doubt Ennius, as the first writer of epic hexameter in Latin.²⁵ In fact, however, neither poet provides a clear model for lengthening being restricted to the first part of the foot.

Cases of what would be, from the point of view of later readers or hearers, apparent lengthening, are not infrequent in Homer. Norden 1957, 450-452, West 1982, 15-18, 38-39; 1988, 157-158, Nünlist 2009, 112, 114, and Chantraine 2013, 117-154 identify a number of types of lengthening which are relevant for the present discussion (the conditioning factors may overlap and may themselves be open to debate):

- (a) those resulting from a preceding original digamma, e.g. (f)εἶπες (f)έπος (*Il.* 1.108);
- (b) those resulting from a preceding original ^(*)h- < *s- or *y-, e.g. θεός ὦς (*Il.* 3.230) < *yōs, βέλος ἐχευευκέες (*Il.* 1.51) < *seg^{he}-;
- (c) those consisting of a short vowel + -ν, -ρ, -ς before a word beginning with a vowel, e.g. δμῶες ἐνὶ οἴκῳ (*Od.* 11.190) (analogical on a and b);
- (d) those containing vowels whose original long vowels were shortened due to analogy in the subsequent history of Greek, such that instances of long vowels in Homer could be seen as lengthening, e.g. ἡ πλῆθὺς ἐπὶ (*Il.* 15.305), Τρωσὶν ὄδ’ ὄρνις ἦλθε (*Il.* 12.218);
- (e) those before a caesura or before punctuation, e.g. εἴατ’ ἀκούοντες ὁ δ’ Ἀχαιῶν νόστον αἶειδε (*Od.* 1.326);
- (f) those resulting from alterations to formulae, e.g. μέροπες ἄνθρωποι (*Il.* 18.288) after μερόπων ἀνθρώπων (*Il.* 1.250 etc.).²⁶

In Homer, most of these instances of lengthening are to be found in arsis, but there are occasional instances in thesis, such as:

- 25 Light syllables at word-end can also take the place of heavy in some parts of the Plautine senarius and septenarius (‘Jacobsohn’s Law’; Fortson 2008, 76-97).
- 26 Included here are only examples of lengthening in words ending in a consonant. Final short vowels could also be lengthened before a word beginning with *f-, λ-, μ-, ν-, ρ-, σ-, a stop + liquid sequence, a σ + stop sequence, ζ-, and sometimes for no clear reason, e.g. μήτε σύ γ’ Ἀρηα τό γε δείδιθι (*Od.* 10.141).

1. πληθύν, ὥς ὁπότε ... (*Il.* 11.305)
2. Αἶαν' Ἰδομενεὺ τε ... (*Il.* 23.493)
3. Ἕκτορ εἶδος ἄριστε ... (*Il.* 17.142)
4. εὖ μὲν τόξον οἶδα ... (*Od.* 8.215)

Ennius also shows quite frequent instances of lengthening, at least from the point of view of an author of the first century BC like Virgil.²⁷ Skutsch draws a distinction between 'lengthening' of a final syllable containing an etymological short vowel,²⁸ and 'shortening' of etymological long vowels in words like *urserāt* < *urserāt* (*Ann.* 217), and asserts that this 'lengthening' takes place only in the rise. But this is probably a false distinction; as Skutsch acknowledges, how words with an original long vowel scan is partly driven by the metre (as in the case of *ursērāt* which otherwise would not scan in hexameter), and otherwise varies: *tenēt* (*Ann.* 159) but *decēt* (*Ann.* 458).

This is to be explained as the result of a sound change which was in progress around the start of the second century BC. In Plautus etymological long vowels in final syllables mostly (or always?) scan long. Ennius, a generation or so after Plautus, shows the variation in long vowels just described, with vowel length being largely determined by metre. A reasonable explanation for this is that he has undergone, or is undergoing, the sound change that will produce the situation in Classical Latin, in which vowels in final syllables of polysyllabic words are always short when the word ends in a consonant, except before -s.²⁹ This being so, it is not clear whether it is a coincidence that most of the lengthened syllables in Ennius were etymologically long, or whether he knew which words could have long vowels in final syllables, either from the example of older poets such as Plautus, or by having access to speakers who had not yet undergone the change (e.g. those in earlier generations or different social class).

In any case, Virgil is likely to have seen Ennius' long scansion of final syllables as being an instance of 'lengthening' relative to the short vowels found in his own time. Altogether, there are 29 instances of lengthening in words ending in a consonant in Ennius' *Annales*, including both varieties mentioned by

27 All lines of Ennius are taken from Skutsch 1985.

28 Skutsch 1985, 58-59. The examples of words ending in a consonant are: *sic expectabat populus atque ore timebat* (*Ann.* 82), *quom nihil horridius unquam lex ulla iuberet* (*Ann.* 158), *si quid me fuerit humanitus, ut teneatis* (*Ann.* 119). *fuerit* is future perfect, not perfect subjunctive. It is not included as an example of lengthening by Skutsch, because he considers the long vowel analogical on perfect subjunctive *fuerit*.

29 Weiss 2009, 128.

Skutsch.³⁰ Of these, at least 4 have the lengthened syllable in thesis (note that the Ennian hexameter is much less constraining compared to the Classical poets):³¹

1. omnibus cura uiris uter esset induperator (*Ann.* 78)
2. noenum rumores ponebat ante salutem (*Ann.* 364)
3. *infit*: 'o ciues, quae me fortuna fero sic' (*Ann.* 385)
4. clamor ad caelum uoluendus per aethera uagit (*Ann.* 545)

Having looked at the practice of both Homer and Ennius, it is possible to see, therefore, that neither of them need provide a model for Virgil to avoid lengthening in the thesis of a foot. Even if we observe that lengthening in thesis is much rarer in Homer than in Ennius (as far as we can tell, given our fragmentary evidence for Ennius), we have no way of knowing whether Virgil aimed to follow Homer or Ennius in this regard.

Let us, therefore, take another, statistical approach to Virgil's use of lengthening. On the face of it, the restriction to arsis is well supported, since all 72 examples of lengthening appear there, and it hardly seems probable that with such a large number, examples in thesis could be lacking, if the position of lengthening were simply determined by chance. Such a common-sense view, however, fails to take into account the crucial fact that the position of a long word-final syllable in dactylic hexameter is strongly dependent on the quantity of the previous syllable in the word. Since it is not possible for a dactylic foot to begin with a light syllable,³² any word whose final two syllables form an iamb can perforce only have its final syllable in arsis (remarkably, this point has not been made by any of those discussing lengthening of whom we are aware). Consequently, if we wish to test whether the position in arsis is important for allowing lengthening, we must examine only those words in which it takes place and whose penultimate syllable is heavy, since these are the only words whose final syllable could in principle appear in thesis.

30 There are also two examples of lengthening in words ending in vowels: *et densis aquila pennis obnixa uolat* (*Ann.* 139), *pastores a Pergamide Maledoue potis sint* (*Ann.* 342).

31 Skutsch 1985, 47–51. All examples have etymologically long vowels, but, as already stated, would be seen as 'lengthened' from the point of view of Virgil, who had short vowels in this position. Another possible example is *puluis fulua uolat* (*Ann.* 315), which depends on whether -s is allowed to make position in the second part of the foot. Skutsch 1971, 1985, 56 claims not, and argues—highly implausibly—that *puluis* had etymologically long *i* in the final syllable. See also n. 33.

32 In Virgil; for resolution of a first longum in Ennius, see Skutsch 1985, 52.

Removing words ending in an iamb has a significant effect on the numbers of words to be taken into account. Of the words ending in a consonant,³³ only 12 have two final heavy syllables (i.e. end in a spondee) and there are also 12 words of this shape ending in a vowel.³⁴ We can investigate whether there is a significant link between lengthening and arsis by testing the null hypothesis that there is no such link, but that words ending in lengthened spondees are distributed in the same way as words in un-lengthened spondees.

We do this by calculating the probability that the null hypothesis would generate the distribution observed (i.e. that the observed distribution differs from that expected on the null hypothesis purely by chance). If that probability is sufficiently low, then the null hypothesis, that there is no link between arsis and lengthening, falls, and we are left with the alternative hypothesis, that there is some link (whose origin would remain to be investigated); otherwise, no such link can be demonstrated. The conventional threshold for statistical significance in a test of this sort is 5%, i.e. a less than 5% probability of the observed distribution of lengthenings differing from that of all spondaic words by chance is taken to be meaningful. The null hypothesis will then be disproved, and it is reasonably plausible that Virgil intentionally placed lengthened final syllables only in arsis (for whatever reason).

The next step is to work out the probability of the distribution occurring due to the null hypothesis. At this point problems arise. If words ending in a lengthened syllable were scattered randomly in Virgil's verse, it would not be a terribly difficult task to work out what the probability of the final syllable ending in arsis would be—and indeed, this is what we are about to do. However, we already know that words with lengthening are not scattered randomly: at least, in the case of the *-que* words, it is not possible to assess them as though arsis was the only conditioning feature of their position in the line, since we

33 We include in this number *sanguis* (A. 10.487). Although, as an anonymous reviewer points out to us, the nom. sg. may have an etymologically long vowel in the final syllable (< **-in-s*; Balles 1999, 6), which scans heavy twice in Lucretius, it scans light in its other instances in Virgil (G. 3.508, A. 2.639, A. 5.396), and then overwhelmingly in later poets (although Balles 1999, 6 n. 10 gives a couple of instances of heavy scansion, only one in hexameter). We therefore assume that the vowel had been shortened at least by the time of Virgil (presumably by analogy with the nom. sg. of *i*-stems, in the same way as **neptis* became *neptis* 'niece' and **socrūs* became a *u*-stem *socrus* 'mother-in-law'; Nussbaum 1973, 208). We also include *puluis* (A. 1.478), which shows the same pattern, scanning light at A. 11.877, and subsequently in Latin hexameter. In fact we doubt that it was ever **puluis* (although Balles 1999, 3 n. 1 provides a more plausible explanation for it than Skutsch 1971; see also n. 31). Note that, if *sanguis* and *puluis* were not counted, this would make the relationship between arsis and lengthening discussed directly below even less significant.

34 Although G. 4.222 is repeated from *Ecl.* 4.51, so is not really independent evidence.

know that *-que* lengthening is sensitive to presence of another *-que* in the same line, and takes place only when directly followed by a word with a restricted number of consonantal onsets (not to mention the fact they are rather frequently close translations of Greek verses). Moreover, the *-que* type is almost entirely restricted, not only to arsis, but to the arsis of the second foot (or, to put it another way, after the first word).³⁵ So, even once we have worked out the expected distribution of any spondee-final word having its final syllable in the arsis, there does not seem any way to compare this with the distribution of the *-que* words, since these other constraints cannot be included.

Even if this were possible, the expected distribution that results will certainly not be the same as for words which end in a consonant, where the environmental restrictions are much looser: we have observed a tendency to co-occur with other features which can be seen as Greek-ish, but otherwise there is no other condition that has to be filled. It is therefore on the 12 consonant-final words which we have, perforce, to focus. In the next few paragraphs, we propose to establish whether the appearance of 12 words ending in a spondee in arsis is improbable enough to require an explanation different from the null hypothesis (which is that the distribution is the result of Virgil's constraints in composing his verses rather than being intentional).

In order to work out whether the relationship between lengthening in spondaic word-end and arsis is significant, we need to know what proportion of final syllables of any words of this shape we would expect to appear in arsis in the normal run of things. This is relatively easily done using the search function of *Pede Certo* to establish how many polysyllabic words ending in a spondee have their final syllable a) in arsis and b) in thesis.³⁶ The results are a) 11,005 and b) 2,091 out of a total number of spondees of 13,096. On the basis of this, we would

35 As can be seen from all the examples, collected in Section A of the Appendix. The sole example breaking this rule is *Alcandrumque Haliumque Noemonaque Prytanimque* (A. 9.767), which is, as already noted, a translation of Homer.

36 We used the advanced search function at www.pedecerto.eu/ricerca/avanzata (accessed 25/05/2018) to find all examples in Virgil of spondees with a bridge between the two syllables at foot end and after the arsis. The numbers of word-final spondees at foot end are first foot: 418; second foot: 17; third foot 2; fourth foot 1,654; fifth foot 0. At arsis: first foot: 0; second foot: 2,423; third foot: 4,798; fourth foot: 3,762; fifth foot: 20; sixth foot: 2.

expect the final syllable of any given word ending in two heavy syllables to end up in arsis 11,005/13,096 times,³⁷ which is to say 84.0% of the time.³⁸

We can now compare the expected distribution of the position of the final syllable of words ending in a spondee with the observed distribution of our 12 words which have undergone lengthening, as in Table 1.³⁹

The binomial test⁴⁰ gives us a measure of the likelihood that the observed distribution could arise if the probability of a lengthened syllable being in arsis

37 This proportion arises from the constraints which apply to the position of words of this shape in the Virgilian hexameter, which can allow us to understand why there are so many more spondaic word-ends with word-final syllables in arsis than thesis. If we imagine a hexametric line, this will contain 6 arses and 6 theses. How many of these positions can the word-final syllable of a spondee fill? The number of theses will be highly limited. The final thesis of the sixth foot may be heavy or light, so lengthening is unnecessary; Virgil disfavours a spondaic word-end at the end of the first foot (Winbolt 1903, 107; only 418 hexameters out of 12,854 = 3.25% on *Pede Certo*), and word-end corresponding with foot-end in second and third feet (17% and 15.6% respectively; Sturtevant 1921, 293-294, based on the first 500 verses of the *Aeneid*); in the fourth foot, a word-end corresponds with foot-end 52.4% of the time according to Sturtevant, but only 12.9% of Virgilian fourth feet have a spondaic word-end at foot-end (1,654 hexameters out of 12,854 on *Pede Certo*). The fifth foot is of course almost never a spondee anyway, and there are no examples in Virgil where it is a polysyllable whose end is also the end of the foot. In short, Virgil's poetic practice simply disfavoured a match between the end of a spondee-final word and the end of a foot.

There are also some positions where a spondee-final word is unlikely to have its final syllable in arsis. A heavy final syllable obviously cannot go in the arsis of the first foot unless it is a monosyllable (which none of our words are). Moreover, Virgil avoids monosyllabic theses in the final foot, so the arsis of the sixth foot is not available (Skutsch 1985, 50-51, 58-59; 94 out of 12,854 hexameters on *Pede Certo* = 0.731%), and also avoids word-end in the arsis of the fifth foot (only 2% according to Sturtevant 1921, 293-294, and 214 out of 12,854 hexameters on *Pede Certo* = 1.66%). Nonetheless, the way Virgil constructed his lines clearly gives far more opportunities for a spondee-final word to have its final syllable in arsis than thesis.

38 As a test we scanned all of Book 1 of the *Aeneid* and counted the number of heavy final syllables belonging to words ending in a spondee in arsis (622) and in thesis (99). On the basis of this, we would expect the final syllable of any given word ending in two heavy syllables to end up in the arsis 622/721 times, which is to say 86.3% of the time (to three significant figures). The similarity to the 84% derived from *Pede Certo* is reassuring; the slight difference may be due to the fact that we omitted lines which contained a word with lengthening and did not take into account words whose final syllable was lost by elision, or that *Aeneid* 1 does not give as representative picture as all the data, or be due to human error.

39 The expected distribution is achieved by multiplying 12 (instances of lengthening) by 0.84 (the proportion of long vowels in arsis) and by 0.16 (the proportion of long vowels in thesis).

40 Hollander and Wolfe 1973, 15-22.

TABLE 1 Expected and observed distributions of long final syllables in spondee-final words

| | Arsis | Thesis |
|----------|-------|--------|
| Expected | 10.08 | 1.92 |
| Observed | 12 | 0 |

is the same as that for other heavy syllables, viz. 0.84. If this likelihood, p , is lower than 0.05, we consider it statistically unlikely, in which case we would be able to conclude that the apparent restriction to arsis was significant. As it happens, we calculate a value of p of 0.235; that is to say, it is not unlikely that the underlying distributions of lengthened and non-lengthened final spondees are the same. In other words, the null hypothesis stands and it cannot be shown that the position of the final lengthened vowel in the 12 spondee-final examples is due to something other than chance, given the constraints under which Virgil composed his hexameters.⁴¹

This discovery can have important results for literary and textual criticism. For example, let us consider A. 12.648, which is transmitted in earlier manuscripts as *sancta ad uos anima atque istius inscia culpae*. This contains one of the tendentious examples of lengthening in a vowel-final word which is not *-que* mentioned in Section 1. Both Williams and Tarrant, in discussing the line, prefer to analyse it as showing lengthening and hiatus of the final vowel of *anima*, noting, among other reasons, that the alternative scansion, with lengthening of the final syllable in *istius*, would provide an unparalleled lengthening in thesis.⁴² Housman goes so far as to emend the line, since he does not believe in the possibility of the lengthened final vowel of *anima* (and,

41 The position of heavy final syllables by lengthening can be compared with the case of final long vowels in hiatus. The distribution of these long vowels in Virgil in words with a heavy penultimate syllable is almost the same as that of lengthened syllables, with 12 in the arsis and 1 in thesis (figures from Kent 1948). The p -value of this distribution between arsis and thesis is 0.7064.

42 Tarrant 2012, 254: “[E]ither *anima* has to be scanned with a final long syllable and in hiatus with *atque*, or *istius* has to be scanned as three long syllables even though it does not have the metrical ictus [i.e. is in thesis]. Of these choices the first seems preferable: a) if the metrical oddity is meant for emphasis, a pause after *sancta ad uos anima* is much more effective than a stressed *istius*; b) the position of *anima*, before the third-foot caesura, is one where ‘irrational’ lengthening of short syllables is not uncommon, accounting for more than half of the instances in V...”; very similarly in Williams 1996, 482.

although he does not explicitly say so, is presumably not prepared to accept lengthening in thesis in *istūs* either).⁴³

But in the absence of a statistically significant relationship between arsis and long final syllables, we cannot say that Virgil avoided lengthening in thesis; nor is there any reason to think it any more of a metrical oddity than lengthening in arsis. Its rareness can be satisfactorily explained by the fact that he used lengthening relatively seldom in words whose penultimate syllable was heavy, and there were very few theses in a line which were available for the final syllable of a word ending in a spondee. Conversely, lengthening of a word-final vowel other than in *-que* is otherwise non-existent. Hence, there is no reason for us to avoid an analysis of *Aeneid* 12.648 that involves lengthening in thesis.⁴⁴ Conversely, we might prefer not to posit lengthening of a word ending in a final vowel, which was presumably deprecated by Virgil, since there are no other examples in a word other than *-que*.⁴⁵

4 Lengthening before a Caesura

Apart from Austin, quoted in Section 1, other references to a caesura as the context for lengthening include Nougaret who, in a section called “syllabes allongées à la coupe” observes lengthening in Virgil at the trihemimeral, penthemimeral, hephthemimeral caesuras, and in the fifth foot (i.e. at all possible caesuras other than in the first and sixth feet, both of which are almost impossible places for lengthening to take place, as noted in the previous section).⁴⁶

43 Housman 1927, 10–11. The only other possible example of lengthening of a final vowel other than in *-que* is in *dona dehinc auro grauia sectoque elephanto* (*A.* 3.464), which is printed as *dona dehinc auro grauia ac secto elephanto* in most modern editions, following an emendation of Schaper accepted by Housman 1927, 10.

44 An anonymous reviewer comments: “It may be true that, statistically, we expect lengthening in thesis to be possible, but that statistical possibility doesn’t mean that the poet would have been happy with doing it. I just don’t think we know.” It is true that we cannot, in the final analysis, know whether or not Virgil would have been unhappy to do this, but our view is that entities should not be maximised beyond necessity. That is, the null hypothesis is that Virgil operated with lengthening which was not restricted by foot position; the actual distribution is not out of line with this hypothesis. This means that, even though it may appear only once, we should not go beyond the null hypothesis and suppose that Virgil was unhappy with lengthening in thesis. To do otherwise is unfounded speculation. Of course, the line might still be criticised on other grounds.

45 Although the reviewer points out that there are instances of lengthening of a short final vowel in Homer, as well as Ennius.

46 Nougaret 1963, 49–50.

Califf comments that “typically vowels are only lengthened at a *main caesura*”; but he does note lengthening in Verg. *Ecl.* 6.53 at the fifth foot caesura.⁴⁷ Crusius and Rubenbauer state that above all, lengthening occurs “in den männlichen Hauptcäsuren des Hexameters, aber auch in anderen Hebungen”.⁴⁸

Looking at the data, it is true that all examples of lengthening occur before a caesura, but this is essentially the same as the observation that lengthening occurs only in arsis, for which see Section 3. As the scholars quoted above suggest, many examples of lengthening indeed do fall before a main, i.e. a penthemimeral or hephthemimeral caesura (marked here with a vertical line),⁴⁹ but 14 of the 55 examples of lengthening in words ending in a consonant in Virgil appear in a line which has a strong caesura in the third and/or fourth foot but occur elsewhere.⁵⁰ Caesura, in the strong sense, is clearly not necessary for lengthening to take place:⁵¹

1. ille latus niueum | molli | fultus hyacintho (*Ecl.* 6.53)
2. Pleiadas, Hyadas, | claramque Lycaonis Arcton (*G.* 1.138)
3. muneribus, tibi pampineo | grauidus autumnno (*G.* 2.5)
4. inualidus etiamque tremens, | etiam inscius aevi (*G.* 3.189)
5. ille comam mollis | iam tondebat hyacinthi (*G.* 4.137)
6. pectoribus inhians | spirantia consulit exta (*A.* 4.64)
7. pingue super oleum | fundens | ardentibus extis (*A.* 6.254)
8. sustinet ac natae | Turnique canit hymenaeos (*A.* 7.398)
9. sceptrum Palatini | sedemque petit Euandri (*A.* 9.9)
10. Graius homo, infectos | linquens | profugus hymenaeos (*A.* 10.720)
11. seu mollis uiolae | seu languentis hyacinthi (*A.* 11.69)
12. oratis? equidem et | uiuis | concedere uellem (*A.* 11.111)
13. si quis *ebur*, aut mixta rubent | ubi lilia multa (*A.* 12.68)
14. quippe *dolor*, omnis | stetit imo uulnere sanguis (*A.* 12.422)

47 Califf 2002, 20 (emphasis in the original).

48 Crusius and Rubenbauer 1955, 28.

49 Note again that as all instances of lengthening appear at word-end and in arsis they by definition occur before a caesura (since a caesura is caused precisely by a break in words within the foot). Consequently, all instances of lengthening in the third and fourth foot will fall before a main caesura: but they create the caesura rather than vice versa.

50 On the placement of caesura see Raven 1965, 95–98.

51 For a—rather obscure—argument against lengthening at caesura, not just in Virgil, see Suarez-Martinez 2014.

A search on *Pede Certo* allows us to ascertain that in the whole Virgilian corpus there are 18,809 instances of word-end in arsis in the third and fourth feet ('main' caesurae) and 7,960 in the second and fifth ('other' caesurae). If our 55 examples of lengthening were distributed in the same proportion, we should expect 38.65 examples in the third and fourth feet and 16.35 in the second and fifth. In fact we find 41 and 14 respectively, i.e. the lengthened and non-lengthened syllables are distributed amongst the available arses in the same proportion within the bounds of random variation (from the binomial test, $p = 0.557$, i.e. 55.7%): we cannot say that lengthening is more likely to take place at 'main' caesurae.

If, however, we look at the distribution across the caesurae at which lengthening is found (i.e. at strong caesura in feet 2-5), we do observe a large divergence between the expected distribution of long word-final vowels in this position and the instances of vowels arising from lengthening in the fifth foot. If we separate the figures quoted above into separate feet, we arrive at the distribution given in Table 2, which shows a very large discrepancy between the expected number of word-ends at the strong caesura in the fifth foot per 55 words (0.44) and the actual number (7). By comparison, the second to fourth feet caesura word-ends are much closer to the expected distribution. So, when looked at in terms of expected distribution rather than raw numbers, the observations of Califf and Crusius and Rubenbauer are reversed: in fact lengthening happens much more *than expected* at the fifth-foot caesura, given how unlikely Virgil is to place a word-end there.

There are 7 instances of a lengthened final before the fifth foot caesura and 48 before the other caesurae. If words in lengthened finals were distributed in the same way as other words ending at caesurae, the probability of ending at the fifth foot caesura would be $214/26,769 = 0.008$. A binomial test shows that the likelihood that this probability would result in the observed distribution is vanishingly small ($p < 3.04 \times 10^{-7}$). Lengthened finals are therefore statistically significantly more likely to appear at the fifth foot caesura than elsewhere. This seems to us to require an explanation.

We would see the relative abundance of lengthening here as connected both with the association between lengthening (in general) and 'Greekness', and with the practicalities of constructing the Virgilian hexameter. As can be seen below, all instances of lengthening in the fifth foot co-occur with a verse-ending with a three or four-syllable word, a type of ending which was seen as particularly Greek, and often correlates with other Greek features.⁵² Indeed,

52 Fordyce 1977, 135-136.

TABLE 2 Total numbers, expected and observed distributions of word-end at the strong caesura in the 2nd-5th feet

| | Strong caesura, 2nd foot | 3rd foot | 4th foot | 5th foot |
|------------------------------------|-----------------------------|----------|----------|----------|
| Total word-ends | 7,746 | 1,0341 | 8,468 | 214 |
| Expected distribution ^a | 15.915 | 21.247 | 17.398 | 0.44 |
| Observed distribution | 7 | 29 | 12 | 7 |

a Calculated by dividing the total for each foot by 26,769 and then multiplying by 55.

in six out of seven instances, the final word is itself Greek. In a line ending in a word of this shape, it is a requirement that the syllable preceding it must be at word-end and must be heavy (since it has to be in arsis in the fifth foot). The only way to do this when the final word began with a vowel or *h*- and the syllable before it was naturally light was by lengthening (or by hiatus, in words ending with a long vowel). So, the Greek line-ending brings lengthening along for the ride, as it were, and the ‘Greekness’ of the line gives a particular licence for the lengthening. So, we would suggest, lengthening at the fifth foot caesura is particularly common proportionally, because it was one of the features, which tend to cluster together, that Virgil used when he wanted to give a line a particularly Greek air.⁵³

1. ille latus niueum molli fultus hyacintho (*Ecl.* 6.53)
2. muneribus, tibi pampineo grauidus autumnno (*G.* 2.5)
3. ille comam mollis iam tondebat hyacinthi (*G.* 4.137)
4. sustinet ac natae Turnique canit hymenaeos (*A.* 7.398)
5. sceptrā Palatini sedemque petit Euandri (*A.* 9.9)
6. Graius homo, infectos linquens profugus hymenaeos (*A.* 10.720)
7. seu mollis uiolae seu languentis hyacinthi (*A.* 11.69)

53 As an anonymous reviewer points out, example 2 (*G.* 2.5) also contains a spondaic fifth foot, which perhaps makes the lengthening yet more striking.

5 Lengthening before a Pause

Not entirely to be distinguished from the identification of caesura as the cause of lengthening is the claim made, apparently independently, by Shipley 1924 and Kent 1948 that lengthening takes place only before a pause. Shipley's discussion takes into account only a small selection of the Virgilian data, so we will concentrate on the argument of Kent. Kent focusses on lengthening in words ending in a consonant and observes that generally speaking, word-ends are not observed in poetry for the purpose of scansion, such that a sequence -VC V- (i.e. a word ending in a vowel followed by a consonant and then a word beginning with a vowel) is treated as though it were a single sequence -V.CV-, with the consonant at the end of the first word treated as though it belonged at the beginning of the following word, i.e. that it is in the onset of the second syllable (the syllable boundary is marked with a full stop). Lengthening can then be seen as the observation of the word-end as a syllable end, giving the sequence -VC.V-. The consonant will now be treated as being part of the coda of the first syllable, causing it to scan as heavy.⁵⁴ According to Kent, this second treatment may be caused by a syntactic pause, presumably because the pause acts as the end of the phrase, and prevents the resyllabification across words.

Kent identifies lengthening as taking place (and hence identifies a pause) at "a caesura of some nature, either by a break in the phrasing or by the use of an additive or alternative conjunction, or else in the fifth foot before one word ending the line".⁵⁵ But why, apart from the circular argument from lengthening there, should there be a pause in the fifth foot before a single word? In fact, we find quite the opposite: in none of the following lines in which lengthening occurs is there a clause which ends at the fifth foot, and in the case of *A.* 11.69 in particular the agreement is evidence of a close syntactic connection between *languentis* and *hyacinthi*.

54 Postgate 1923, 28-29 similarly explains lengthening as due to treatment of the consonant as though in the syllable coda, but does not mention a pause as a reason for this. He claims that lengthening of vowels which were not etymologically long occurs only before continuants (*l, r, s, n, m*) and erroneously claims that there is only a solitary exception (*caput* in *A.* 10.394). He mistakenly includes another (*agit* in *Hor. Odes* 1.3.36) as a case of an etymologically long vowel. In fact, lengthening of etymologically short vowels before -*t* occurs several times in Virgil (e.g. *erit Ecl.* 3.97, *facit Ecl.* 7.23, *canit A.* 7.398, *sinit A.* 10.433).

55 Kent 1948, 307.

1. ille latus niueum molli fultus hyacintho (*Ecl.* 6.53)
2. muneribus, tibi pampineo grauidus autumno (*G.* 2.5)
3. ille comam mollis iam tondebat hyacinthi (*G.* 4.137)
4. sustinet ac natae Turnique canit hymenaeos (*A.* 7.398)
5. sceptrā Palatini sedemque petit Euandri (*A.* 9.9)
6. Graius homo, infectos linquens profugus hymenaeos (*A.* 10.720)
7. seu mollis uiolae seu languentis hyacinthi (*A.* 11.69)

Likewise, in very few of the remaining Virgilian lines ending in a single word after the arsis of the fifth foot is there a clause break at that point; we give below only those that provide particular evidence of close syntactic relations by means of agreement between the penultimate and final word:

1. Amphion Dircaeus in Actaeo Aracyntho (*Ecl.* 2.24)
2. munera sunt, lauri et suaue rubens hyacinthus (*Ecl.* 3.63)
3. aut Tmaros aut Rhodope aut extremi Garamantes (*Ecl.* 8.44)
4. pro molli uiola, pro purpureo narcisso (*Ecl.* 5.38)
5. stant et iuniperi et castaneae hirsutae (*Ecl.* 7.53)
6. ulla moram fecere, neque Aonie Aganippe (*Ecl.* 10.12)
7. nec salici lotoque neque Idaeis cyparissis (*G.* 2.84)
8. saxa per et scopulos et depressas conuallis (*G.* 3.276)
9. et pinguem tiliam et ferrugineos hyacinthos (*G.* 4.183)
10. Lyctius Idomeneus; hic illa ducis Meliboei (*A.* 3.401)
11. Caulonisque arces et nauifragum Scylaceum (*A.* 3.553)
12. aëriae quercus aut coniferae cyparissi (*A.* 3.680)
13. et nunc ille Paris cum semiuiro comitatu (*A.* 4.215)
14. per conubia nostra, per inceptos hymenaeos (*A.* 4.316)
15. lamentis gemituque et femineo ululatu (*A.* 4.667)
16. tris Antenoridas Cererique sacrum Polyboeten (*A.* 6.484)
17. Ardea Crustumerique et turrigeræ Antemnae (*A.* 7.631)
18. euolat infelix et femineo ululatu (*A.* 9.477)
19. seruabat senior, qui Parrhasio Euandro (*A.* 11.31)
20. ambrosiae sucos et odoriferam panaceam (*A.* 12.419)
21. quae quondam in bustis aut culminibus desertis (*A.* 12.863)

In fact, as pointed out in Section 4, the association between lengthening and a single-word last foot-and-a-half is again just a reflection of the rules of the hexameter: if the final word begins with a vowel (or *h-*, since it does not make position), a word whose final syllable is naturally light can appear before it

5. totae adeo conversae acies omnesque Latini,
omnes Dardanidae, Mnestheus acerque Serestus
et Messapus equum domitor et fortis Asilas
Tuscorumque phalanx Euandrique Arcades alae (A. 12.548-551)
6. aestuat ingens
uno in corde pudor mixtoque insania luctu
et furiis agitatus *amor* et conscia uirtus (A. 12.666-668)

So, what might explain what appears at first sight to be a relatively large number of cases of lengthening before a conjunction (23 out of 55)? In addition to our doubts that one can automatically assume a pause before a conjunction, we would suggest that the reason for a particular tendency to lengthening in this context has, as with lengthening in the fifth foot, more to do with the practicalities of the hexameter than anything else. All of the conjunctions found directly after a lengthened syllable begin with a vowel (*et*, *ac*, *aut*, *etiamque*). This distribution is therefore unsurprising, because the only way to use a word whose last two syllables form a pyrrhic, which ends in a consonant, and is in arsis before a word starting with a vowel, is by lengthening.⁵⁹ Given the frequency of conjunctions and the convenience for structuring verses of the monosyllables *et*, *aut*, *ac*, it is not surprising that we find lengthening tending to cluster before them.

Only *-que* or *-ue*, which will close the preceding syllable, are usable without lengthening. But this will require the following word (or words, if monosyllables) to start with an iamb (in order to form the pyrrhic required for the second half of the dactyl, followed by the heavy arsis of the following foot), or to be vowel-initial with the first two syllables forming a spondee or a pyrrhic (or for *-que* to be lengthened itself). For words ending in a consonant whose last two syllables form an original pyrrhic, therefore, which conjunction is used, and whether lengthening is required, is essentially dependent on the metre rather than any other factor. Only for lengthening prior to words followed by *-que* is there greater freedom.

The final locus for a pause, and hence lengthening, identified by Kent we take to be only at any caesura in the first four feet which marks some kind

59 Note that all the examples of lengthening before a conjunction do have iambic final syllables, i.e. the final syllables form a pyrrhic before lengthening (as can be seen by looking in Section B of the Appendix). In fact consonant-final words whose last two syllables form an original trochee also cannot appear before a vowel-initial word beginning with a heavy syllable without lengthening (so before *aut*, or *ac* and *et* followed by a consonant-initial word).

of syntactic break (he is a little unclear on this). Once again, we stress that all words ending in an iamb will automatically appear before a caesura in the sense of a word-break inside a foot, and no explanation other than the rules of Virgilian hexameter composition is necessary for all the spondaic words to do so. Breaks in syntax also align with caesuras; so the possibility of lengthening aligning with a syntactic break ought to be fairly high.

Given the difficulties outlined above in identifying pauses, in a principled way, with either fifth-foot caesura or conjunctions, it can be seen that Kent's apparently unitary explanation for lengthening is really a combination of three proposed sites for lengthening, and therefore disobeys Occam's razor in the way we were keen to avoid doing in Section 1. Even so, Kent describes 4 out of 55 (54 for him) examples as 'unclassified', i.e. that they do not fit into his—already loose—explanatory framework.⁶⁰ Consequently, the evidence does not support a following pause as a plausible reason for lengthening.⁶¹ In particular, we believe that the tendency for Virgil to use lengthening before conjunctions is because the metrical shape of many of these conjunctions makes lengthening particularly convenient in this environment.

6 Initial *h*-

The final explanation for lengthening is that proposed by Goold, who, observing that all three examples of lengthening in Catullus occur before words beginning with *h*-, states that "we are to regard the letter *h* as being here

60 It is also worth pointing out that Kent's proposal of lengthening before pause is also significantly more unconstrained than, say, lengthening in arsis, or before a caesura. In the latter cases, the claim is not only that all instances of lengthening take place in arsis, but that all short final syllables in arsis or caesura are lengthened. Kent's proposal is only that all instances of lengthening are in pause, not that all instances of pause cause lengthening, as shown by e.g. *Aeole, namque tibi diuum pater atque hominum rex* (A. 1.65), where the final syllable of *pater* scans light despite being before *atque* or *frangitur inque sinus scindit sese unda reductos* (A. 1.161), where the final syllable of *frangitur* scans light despite being followed by a word followed by *-que*.

61 This conclusion is, of course, only necessarily true for Virgil. For example, Fortson 2008, 76-97 suggests that lengthening in Plautus (aka 'Jacobsohn's Law') occurs only before a prosodic break, and that this may cause word-final consonants to be counted as syllable codas, not onsets of the following word, an explanation that is similar to that of Kent. We do not claim that this is incorrect on the basis of the Virgilian evidence—although we do find his conclusion peculiar, since, as Fortson acknowledges, this form of lengthening includes words ending in a vowel, as well as words ending in a consonant, and in these cases lengthening cannot be attributed to the resyllabification of a word-final consonant, since no consonant is present.

endowed with consonantal force. Certainly the *h* seems to be a significant factor in the following passages of Virgil, who, when indulging in unusual lengthenings and cases of hiatus within the verse—probably suggesting an archaizing effect—is nevertheless eager to grasp at a possible justification for the licence”.⁶²

The examples in Catullus are:

1. iam ueniet uirgo, iam dicetur hymenaeus (Cat. 62.4)
2. tum Thetis humanos non despexit hymenaeos (Cat. 64.20)
3. qua rex tempestate nouo auctus hymenaeo (Cat. 66.11)

Those in Virgil are:

1. ille latus niueum molli fultus hyacintho (*Ecl.* 6.53)
2. Pleiadas, Hyadas, claramque Lycaonis Arcton (*G.* 1.138)
3. ille comam mollis iam tondebat hyacinthi (*G.* 4.137)
4. qui teneant (nam inculta uidet), hominesne feraene (*A.* 1.308)
5. Idaeumque *nemus*, hinc fida silentia sacris (*A.* 3.112)
6. regibus omen erat; hoc illis curia templum (*A.* 7.174)
7. sustinet ac natae Turnique canit hymenaeos (*A.* 7.398)
8. Alcides subiit, haec illum regia cepit (*A.* 8.363)
9. terga fatigamus hasta, nec tarda senectus (*A.* 9.610)
10. per medium qua spina dabat, hastamque recepat (*A.* 10.383)
11. tela manusque *sinit*. hinc Pallas instat et urget (*A.* 10.433)
12. Graius homo, infectos linquens profugus hymenaeos (*A.* 10.720)
13. seu mollis uiolae seu languentis hyacinthi (*A.* 11.69)
14. hic hasta Aeneae stabat, huc impetus illam (*A.* 12.772)

On the face of it, this restriction to position before *h*- is highly unlikely, both because it leaves other instances of lengthening unaccounted for, and because *h* is extremely weak in Latin, since it does not normally count as a consonant for the purposes of ‘making position’, nor does it prevent elision. However, lengthening before *h*- surprisingly does prove to be statistically significant.

In order to establish the expected incidence of lengthening before *h*- we counted the words beginning with a vowel and *h*- in Book 1 of the *Aeneid*.⁶³ Altogether, there were 1281 instances of words beginning with a vowel, and 119 instances of words beginning with *h*-. We would therefore expect a heavy

62 Goold 1969, 190.

63 Once again, we omitted lines which contained a word with lengthening.

final syllable to appear before *h*- 119/1400 times, which is to say 8.5% of the time. In fact 14/55 instances of lengthening occur before *h*-, which is 25.5%. Using the binomial test, the probability of this distribution arising by chance is $0.000156 = 0.0156\%$, well below our threshold of 5%. It looks as though the presence of *h*- is extremely statistically significant for lengthening.

A possible explanation for this is that it is a reflection of the sociolinguistic status of *h*- in Latin at the time of Virgil. It is very likely indeed that *h*- had been lost at the start of words in Latin in some sociolects by the time of the first century BC.⁶⁴ The ignoring of *h*- in verse dating back to the earliest Latin poetry presumably reflects the widespread absence of *h*- even in educated speech styles, but it is possible that Virgil is using the socially-driven variation between *h*-full and *h*-less pronunciation to provide a convenient metrical licence. A similar effect is that of synizesis, where *i* and *u* after a consonant can be treated as consonants rather than vowels, as in trisyllabic *arīete* for unmetrical *āriētē* (A. 12.706). This matches up with the inscriptional and other evidence for desyllabification of *i* and *u* in this context from the first century AD onwards.⁶⁵ The extension of this licence in the other direction, such that consonantal *i* and *u* were treated as vocalic (e.g. *sūadent* = *sɹadent* in Luc. 4.1157), demonstrates that a presumably 'real' linguistic variable could be taken up by poetry and used as an artificial licence. One can also compare the occasional retention of vowels in hiatus and non-elision of final *-m* in poetry as presumably being originally variants reflecting careful speech. On the other hand, synizesis of this type had previously been used by both Homer and Ennius (as well as Plautus and Lucretius), whereas the usage of *h*- in this way has not been previously identified before Catullus and Virgil.⁶⁶

However, this is not the only possible explanation. In the first place, of the examples of lengthening before (Greek) *h*-, one is in G. 1.138, which is, as already noted (n. 11), a translation of two half-lines of Greek poets, where the prosodic pattern of the Greek is being maintained by lengthening, rather than any other factor. As regards the 5 instances of lengthening before the caesura of the fifth foot, this is connected with the 'Greekness' of lengthening in this position discussed in Section 4. The fact that 5 of the 7 instances in the fifth foot in

64 Weiss 2009, 153-154; Adams 2013, 125-127.

65 Väänänen 1981, 45-46; Adams 2013, 104-110.

66 Although a number of instances of lengthening in Homer do occur before words beginning with a rough breathing (largely coming from original **w*-, **s*- and **y*-), as mentioned in Section 3, and it is possible that Virgil (and Catullus) consequently made a particular connection between *h*- and lengthening.

Virgil (and 3 out of 3 in Catullus) appear before a Greek word beginning with *h-* is very striking, but it is hard to test whether it is more than a coincidence.⁶⁷

It is probably the nexus of the fifth foot caesura lengthening with the Greek words *hymenaeus* and *hyacinthus* that is responsible for the statistical significance of lengthening before *h-* in general. Our suspicion is that in other positions in the line and before non-Greek words starting with *h-*, lengthening does not appear more commonly than before words starting with vowels.

7 Conclusion

The phenomenon of 'irrational lengthening' in Virgil has historically been connected with a number of metrical and phonological phenomena whose explanatory—as opposed to descriptive—status for lengthening has remained fuzzy. These are lengthening of final syllables in words which contained long vowels in Old Latin; lengthening in arsis; lengthening before a caesura; lengthening before a pause; and lengthening before *h-*. None of these on their own are sufficient to define the contexts in which lengthening happens; the only one which descriptively covers every instance of lengthening is the correlation with arsis. But, at least as regards words ending in a consonant, the position in arsis of lengthened syllables is not statistically significant.

Instead, in seeking to understand the phenomenon of lengthening, it is important to take into account the effects that the structure of Virgil's hexameter had on his use of lengthening, a 'licence' that he had inherited from his predecessors in both Greek and Latin poetry. In the case of neither Homer nor Ennius was this lengthening restricted to arsis, although in both cases it was no doubt much more common there than in thesis, due to the requirements of the dactylic hexameter verse. On the one hand, the rules and tendencies Virgil adopted made it highly probable that lengthened vowels would end up in arsis; lengthening was particularly useful, and therefore tended to cluster, in particular parts of the line: in the arsis of the fifth foot before a word beginning with a vowel or *h*, before conjunctions beginning with a vowel. On the other hand, as a relatively rare occurrence, lengthening must have been highly noticeable to Virgil's original listeners and readers. Especially in the case of *-que*, but also in some other instances, it flags up close relationships with particular Greek poetic works, and it may have been seen as a particularly 'Greek' poetical feature, appropriate for use in passages that are otherwise characterised by other

67 It is also striking, of course, that only two lexical items are involved: *hymenaeos* (twice), *hyacinthi* (twice), *hyacintho*; likewise Catullus with *hymenaeus*, *-os*, *-o*.

'Greek' features (whether metrical, lexical, morphological etc.).⁶⁸ But it may have been multivalent, imparting a more general tone, reminiscent of Homer or the Hellenistic poets or Ennius, archaic or solemn, or just adding variety to poetic language. Ultimately, these are effects which are to be judged on literary rather than linguistic or metrical criteria.⁶⁹

Appendix

A. Verses with lengthened *-que*

1. *terrasque tractusque maris caelumque profundum* (*Ecl.* 4. 51)
2. *lappaeque tribolique, interque nitentia culta* (*G.* 1.153)
3. *tribulaque traheaeque et iniquo pondere rastris* (*G.* 1.164)
4. *aestusque pluuiasque et agentis frigora uentos* (*G.* 1.352)
5. *Eurique Zephyrique tonat domus, omnia plenis* (*G.* 1.371)
6. *lappaeque tribolique absint; fuge pabula laeta* (*G.* 3.385)
7. *terrasque tractusque maris caelumque profundum* (*G.* 4.222 = *Ecl.* 4. 51)
8. *Drymoque Xanthoque Ligeaque Phyllodoceque* (*G.* 4.336)
9. *liminaque laurusque dei, totusque moueri* (*A.* 3.91)
10. *Cretesque Dryopesque fremunt pictique Agathyrsi* (*A.* 4.146)
11. *spiculaque clipeique ereptaque rostra carinis* (*A.* 7.186)
12. *Brontesque Steropesque et nudus membra Pyragmon* (*A.* 8.425)
13. *Alcandrumque Haliumque Noemonaque Prytanimque* (*A.* 9.767)
14. *ensemque clipeumque et rubrae cornua cristae* (*A.* 12.89)
15. *fontisque fluuiosque uoco, quaeque aetheris alti* (*A.* 12.181)
16. *Chloreaque Sybarimque Daretaque Thersilochumque* (*A.* 12.363)
17. *Antheusque Mnestheusque ruunt, omnisque relictis* (*A.* 12.443)

68 For some more examples see Norden 1957, 451-452, and note the usage of lengthening in Greek contexts claimed for Ovid (see footnote 5).

69 We are delighted to acknowledge the help of many people in writing this article. We are grateful to the members of the E Caucus in the Cambridge Classics Faculty for questions and comments on an early version; David Butterfield for discussion and useful pointers; Ingo Gildenhard, Angelo Mercado and Barbara McGillivray for reading whole drafts and providing us with many insights. John H. McDonald generously gave advice on statistics. The comments of the anonymous reviewers improved the article significantly. All faults and omissions are of course the authors' own. The article was completed while Nicholas Zair was a Pro Futura Scientia Fellow based at the Swedish Collegium for Advanced Study in Uppsala and the Centre for Research in the Arts, Social Sciences and Humanities in Cambridge, funded by the Stiftelsen Riksbankens Jubileumsfond.

B. Verses with lengthening ending in an iamb

1. Tityrus hinc abērat. ipsae te, Tityre, pinus (*Ecl.* 1.38)
2. ipse, ubi tempus ērit, omnis in fonte lauabo (*Ecl.* 3.97)
3. uersibus ille fācit) aut, si non possumus omnes (*Ecl.* 7.23)
4. desine plura, pŭer, et quod nunc instat agamus (*Ecl.* 9.66)
5. omnia uincit Āmor: et nos cedamus Amori (*Ecl.* 10.69)
6. Pleiādas, Hyadas, claramque Lycaonis Arcton (*G.* 1.138)
7. muneribus, tibi pampineo grauīdus autumnno (*G.* 2.5)
8. at rudis enitūt impulso uomere campus (*G.* 2.211)
9. altius ingreditur et mollia crura reponit (*G.* 3.76)
10. aequus uterque lābor, aequae iuuenemque magistri (*G.* 3.118)
11. inualīdus etiamque tremens, etiam inscius aeuī (*G.* 3.189)
12. sicubi magna Iōuīs antiquo robore quercus (*G.* 3.332)
13. nam duo sunt genera: hic melīor insignis et ore (*G.* 4.92)
14. qui teneant (nam inculta uidet), hominesne feraene (*A.* 1.308)
15. Pergama cum petēret inconcessosque hymenaeos (*A.* 1.651)
16. luctus, ubique pāuor et plurima mortis imago (*A.* 2.369)
17. nostrorum obruimur oriturque miserrima caedes (*A.* 2.411)
18. et direpta dōmus et parui casus Iuli (*A.* 2.563)
19. Idaeumque nēmus, hinc fida silentia sacris (*A.* 3.112)
20. pectorībus inhians spirantia consulit exta (*A.* 4.64)
21. tum sic Mercurium adloquītur ac talia mandat (*A.* 4.222)
22. olli serua dātur operum haud ignara Mineruae (*A.* 5.284)
23. emicat Euryālus et munere uictor amici (*A.* 5.337)
24. ostentans artemque pāter arcumque sonantem (*A.* 5.521)
25. pingue sūper oleum fundens ardentibus extis (*A.* 6.254)
26. et Capys et Numītor et qui te nomine reddet (*A.* 6.768)
27. regibus omen ērat; hoc illis curia templum (*A.* 7.174)
28. sustinet ac natae Turnique cānit hymenaeos (*A.* 7.398)
29. cum muros arcemque prōcul ac rara domorum (*A.* 8.98)
30. Alcides subiit, haec illum regia cepit (*A.* 8.363)
31. sceptrā Palatini sedemque pētit Euandri (*A.* 9.9)
32. per medium qua spina dābat, hastamque receptat (*A.* 10.383)
33. nam tibi, Thymbre, cāput Euandrius abstulit ensis (*A.* 10.394)
34. tela manusque sinit. hinc Pallas instat et urget (*A.* 10.433)
35. Graius homo, infectos linquens profūgus hymenaeos (*A.* 10.720)
36. considant, si tantus āmor, et moenia condant (*A.* 11.323)
37. concilium ipse pāter et magna incepta Latinus (*A.* 11.469)
38. congregior. fer sacra, pāter, et concipe foedus (*A.* 12.13)

39. si quis *ēbur*, aut mixta rubent ubi lilia multa (A. 12.68)
40. quippe *dōlor*, omnis stetit imo uulnere sanguis (A. 12.422)
41. et Messapus equum domitor et fortis Asilas (A. 12.550)
42. et furiis agitatus *āmor* et conscia uirtus (A. 12.668)
43. te sine, frater, *ērit*? o quae satis ima dehiscat (A. 12.883)

C. Verses with lengthening of words ending in a spondee

1. ille latus niueum molli *fultus* hyacintho (Ecl. 6.53)
2. ille comam mollis iam *tondēbat* hyacinthi (G. 4.137)
3. non te nullius exercent numinis irae (G. 4.453)
4. per terram, et uersa *puluis* inscribitur hasta (A. 1.478), cf. n. 31 and n. 33
5. litora *iactētur* odiis Iunonis acerbae (A. 1.668)
6. atque idem *cāsus*), unam faciemus utramque (A. 3.504)
7. nusquam *amittēbat* oculosque sub astra tenebat (A. 5.853)
8. terga *fatigāmus* hasta, nec tarda senectus (A. 9.610)
9. una eademque uia *sanguis* animusque sequuntur (A. 10.487), cf. n. 33
10. seu mollis uiolae seu *languentis* hyacinthi (A. 11.69)
11. *orātis*? equidem et uiuis concedere uellem (A. 11.111)
12. hic hasta Aeneae *stābat*, huc impetus illam (A. 12.772)

Bibliography

- Adams, J.N. (2013). *Social Variation and the Latin Language*. Cambridge.
- Austin, R.G. (1960). *P. Vergili Maronis Aeneidos Liber Quartus*. Oxford.
- Balles, I. (1999). Lateinisch *sanguis* “Blut”. In: H. Eichner and H.C. Luschützky, eds., *Compositiones Indogermanicae in Memoriam Jochem Schindler*, Prague, pp. 3-17.
- Breed, B.W., Keitel, E., and Wallace, R. (2018). Introduction. Lucilius and Second-Century Rome. In: B.W. Breed, E. Keitel, and R. Wallace, eds., *Lucilius and Satire in Second-Century BC Rome*, Cambridge, pp. 1-35.
- Califf, D.J. (2002). *A Guide to Latin Meter and Verse Composition*. London.
- Chantraine, P. (2013). *Grammaire homérique, Vol. 1: Phonétique et morphologie*. Paris [New edition, revised and corrected by Michel Casevitz].
- Crusius, F., and Rubenbauer, H. (1955). *Römische Metrik. Eine Einführung*. 2nd ed. Munich.
- Dainotti, P. (2015). *Word Order and Expressiveness in the Aeneid*. Berlin/Boston.
- EV = della Corte, F., ed. (1984-). *Enciclopedia Virgiliana*. Rome.
- Fordyce, C.J. (1977). *P. Vergili Maronis Aeneidos Libri VII-VIII*. Oxford.
- Fortson, B.W. (2008). *Language and Rhythm in Plautus. Synchronic and Diachronic Studies*. Berlin/New York.

- Fortson, B.W. (2011). Latin Prosody and Metrics. In: J. Clackson, ed., *A Companion to the Latin Language*, Malden, MA/Oxford/Chichester, pp. 92-104.
- Fraenkel, E. (1922). *Plautinisches im Plautus*. Berlin.
- Fraenkel, E. (2007). *Plautine Elements in Plautus*. Oxford. [Translated by Thomas Drevikovsky and Frances Muecke.]
- Goold, G.P. (1969). Catullus 3.16. *Phoenix* 23, pp. 186-203.
- Haupt, M., Korn, O., Müller, H.J., and Ehwald, R., eds. (1903). *Die Metamorphosen des P. Ovidius Naso*. 8th edition. Berlin.
- Hollander, M., and Wolfe, D.A. (1973). *Nonparametric Statistical Methods*. New York.
- Horsfall, N. (2006). *Virgil, Aeneid 3. A Commentary*. Leiden/Boston.
- Housman, A.E. (1927). Prosody and Method. *CQ* 21, pp. 1-12.
- Johnston, H.W. (1898). *A Collection of Examples Illustrating the Metrical Licences of Vergil*. Chicago.
- Kent, R.G. (1948). A Problem of Latin Prosody. In: AA.VV., *Mélanges de philologie, de littérature et d'histoire anciennes offerts à J. Marouzeau par ses collègues et élèves étrangers*, Paris, pp. 303-308.
- Kießling, A., and Heinze, R., eds. (1895). *Quintus Horatius Flaccus. Zweiter Teil. Satiren*. Berlin.
- Kießling, A., and Heinze, R., eds. (1901). *Quintus Horatius Flaccus. Erster Teil. Oden und Epoden*. Fourth Edition. Berlin.
- Lynch, T. (2016). *Arsis and thesis in ancient Rhythmics and Metrics. A New Approach*. *CQ* 66, pp. 491-513.
- Mynors, R.A.B., ed. (1969). *P. Vergili Maronis Opera*. Oxford.
- Norden, E. (1957). *P. Vergilius Maro. Aeneid Buch VI*. 4th edition. Stuttgart.
- Nougaret, L. (1963). *Traité de métrique latine classique*. Paris.
- Nünlist, R. (2009). Homerische Metrik. In: J. Latacz, ed., *Homers Ilias. Gesamtkommentar. Prolegomena*, 3rd edition, Berlin/New York, pp. 109-114.
- Nussbaum, A.J. (1973). Ennian *Laurentis terra*. *HSPH* 77, pp. 207-215.
- Platnauer, M. (1951). *Latin Elegiac Verse. A Study of the Metrical Usages of Tibullus, Propertius and Ovid*. Cambridge.
- Postgate, J.P. (1923). *Prosodia Latina. An Introduction to Classical Latin Verse*. Oxford.
- Raven, D.S. (1965). *Latin Metre. An Introduction*. London.
- Shipley, F.W. (1924). Hiatus, Elision, Caesura, in Virgil's Hexameter. *TAPhA* 55, pp. 137-158.
- Skutsch, O. (1971). The Prosody of *puluis*. *Glotta* 49, pp. 142-143.
- Skutsch, O. (1985). *The Annals of Quintus Ennius*. Oxford.
- Sturtevant, E.H. (1921). Word-Ends and Pauses in the Hexameter. *AJPh* 42, pp. 289-308.
- Suarez-Martinez, P.M. (2014). Caesura and Syllable Lengthening in Latin Hexameter. In: C. Cabrilla and C. Lehmann, eds., *Acta XIV Colloquii Internationalis Linguisticae Latinae*, Madrid, pp. 173-180.
- Tarrant, R.J. (2012). *Virgil, Aeneid Book XII*. Cambridge.

- Thomas, R.F. (1988). *Virgil, Georgics, Vol. 1: Books I-II*. Cambridge.
- Väänänen, V. (1981). *Introduction au latin vulgaire*. 3rd edition. Paris.
- Weber, C. (2002). The Dionysus in Aeneas. *CPh* 97, pp. 322-343.
- Weiss, M. (2009). *Outline of the Historical and Comparative Grammar of Latin*. Ann Arbor/New York.
- West, M.L. (1982). *Greek Metre*. Oxford.
- West, M.L. (1988). The Rise of the Greek Epic. *JHS* 108, pp. 151-172.
- Williams, R.D. (1996). *Virgil Aeneid VII-XII. Edited with introduction and notes*. London. [Reprint, 1973.]
- Winbolt, S.E. (1903). *Latin Hexameter Verse. An Aid to Composition*. London.