Dactylic words and initial vowels in latin·hexameter

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We have always known that there are significant formal constraints placed upon the Latin hexameter buth the full depth of the effects of those constraints remains to be plumbed. In the following paper, we consider the distribution of initial vowels in Latin hexameter verse and an unsuspected relationship of that distribution with the positioning of dactylic words in the verse[1]. It is particularly striking that constraints at the end of the verse have their effect near the beginning of the verse. We use *Aeneid* 12 as a paradigm case, but much of what is seen here is true of the Latin hexameter verse in general.

The text of *Aeneid* 12, as analyzed by Ott, consists of 949 complete hexameter verses[2] Ott (p. 66) also lists the number of junctures and elisions occurring at the sixteen possible positions within the verse. To his listing we add the number and percentage of words beginning at these positions with a vowel or with the letter *'h'*. (For completeness, we also add a Position 0 to indicate the beginning of the verse).

It has been long observed that the frequency of junctures varies widely within the Latin hexameter, in this case from 82.02% at Position 7 (after the first syllable in Foot 3) to 0.74% at Position 16 (after the first syllable in Foot 6). Our central concern, however, is with vocalic initials. Of the 6151 words in *Aeneid* 12, 2010 (or 32.68%) begin with a vowel or with the letter *'h'*. There are, of course, constraints upon the deployment of initials in the hexameter line. It is, therefore, interesting to note that at the beginnings of verses, where there are no constraints of position, the percentage of vocalic initials (henceforth to be understood as including initial *'h'*) is 38.25%. Soubiran has a good discussion of disparities of this sort. His conclusion is that, since the normal rate of incidence of initial vowels is about 35%, the lower rate of incidence within the verse is due to a general avoidance of elision, which includes both a general avoidance of words with vocalic initials and some displacement of such words to the beginning of the verse[3]. There are three positions within the verse, Positions 3, 6, 9 (following the final syllables of Feet 1, 2, 3 respectively), where the percentage of vocalic initials is significantly higher than that found at the beginning of the verse. In particular, over 60% of the junctures at Positions 3 and 6 have vocalic initials. Further, Position 3 has the largest number (let alone percentage) of vocalic initials. The question we wish to explore is : what is so peculiar about Position 3 that vocalic initials tend to cluster there to such a degree ? Further, since Positions 3, 6, 9, 12 all occur at the ends of metrical feet, variations in quantity come into consideration. When Foot 1 is a dactyl rather than a spondee, Position 3 occurs at the end of a short syllable. In such a case, either the previous word ends with a single consonant and the following word has a vocalic initial or the previous word ends with a short vowel and the following word begins with a consonant. (The remaining possibilities are elision and hiatus which we are eliminating from this consideration). It is obvious, then, that vocalic initials are necessarily present in one of the two ways in which juncture may occur at the end of a dactyl. By the same token, vocalic initials cannot be present when the other mode of juncture occurs. Since the same constraints do not apply to junctures occurring at the ends of spondaic feet, it has seemed desirable to us to separate the data for dactylic and spondaic feet. This is done in Table I.

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In Table I, data are listed for Positions *d3* (occurring at the end of a Foot 1 dactyl) and *s3* (occurring at the end of a Foot 1 spondee), and so on for Positions 6, 9 and 12. (It has not seemed necessary to subdivide the observations for Position 15, at the end of Foot 5, since the book contains only two spondaic verses). Thus, we see in Column (a) of Table I that of the 397 junctures at Position 3, 269 occur after a dactyl in Foot 1 and 128 after a spondee in that foot. The disparity is not unexpected since there are in general more dactylic than spondaic first feet.

It is much more startling to note, by a comparison of Columns (c) and (e) in Table I, that of the 63 vocalic initials occurring after a spondee in Foot 1 no less than 56 are involved in elision. Just so, 41 out of 48 at Position *s6* (after a spondaic Foot 2) are involved in elision, and so also 30 out of 37 vocalic initials at Position *s9* (after a spondaic Foot 3)[3]. When the effects of elisions are removed, as in Columns (g) and (h) of Table I, it is seen that very small numbers and percentages of vocalic initials remain at Positions *s3, s6, s9* and *s12*. By contrast, it is clearer than ever from Column (h) in Table I that significantly large percentages of vocalic initials occur at Positions *d3, d6, d9* and *d12* even when junctures with elision are eliminated. The percentages range from 75.86% at *d9* (after a dactylic Foot 3) to 60.94% at *d12* (after a dactylic Foot 4).

We might simply accept these high percentages as characteristic of those words in the language which satisfy the constraints present at junctures following a dactylic foot, were it not for the strongly contrasting data at Position 15 (at the end of Foot 5, the foot which is more dactylic than any other). Here we find a surprising 39.53%, much lower than the percentages we have seen at the ends of the other dactylic feet.

In order to examine more closely how this disparity comes about, we have taken a census of the metrical word-types ending at Positions *d3, d6, d9, d12* and 15. (It is, after all, the metrical shape of the preceding word that is affected by a vocalic initial). In Tables II and III, we list the number of each word-type and the number and percentage of these ending in a consonant. The number and percentage of following vocalic initials will, of course, be the same. Table II presents the census by positions, Table III by word-types.

From Table II, it can be seen that we are dealing with a very limited number of word-types at Positions *d3, d6* and *d9*. Indeed, Positions *d6* and *d9* (not very numerous in any case) are preceded only by monosyllables and pyrrhics (uu), and we deal with these word-types first.

Monosyllables play no role in the differentiation we seek. Aside from the single occurrence before Position *d6*, monosyllables constitute about one tenth of the total occurrences at each position, and almost all of them end with a consonant[5].

Pyrrhics (uu) constitute the overwhelming majority of the words ending at Positions *d6* and *d9*. They also constitute about 65% of the words ending at Position *d12*. In general, as we see from Table

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III, about 64% of these words end in a consonant, and this is true of their occurrences in all the first four feet. They are largely responsible for the preponderance of vocalic initials at Positions *d6*, *d9* and even *d12*, and they make an important contribution to Position *d3*. More noteworthy is their virtual absence from Foot 5, where there are only ten out of a total of 548 junctures. As it happens, only one of the ten ends in a consonant, but it makes little difference statistically whether all or none of them do so. It is more important to note that by their absence from Foot 5 (assuming that as elsewhere about 65% of such words would end in a consonant), they allow the foot to have a larger proportion of final vowels than it might otherwise have. At the same time, we do not believe that this is why such words are avoided in Foot 5. Rather, as we see from Ott (p. 120), such words occur in Foot 5 only when preceded by a monosyllable. For example,

> semianimi lapsoque supervenit, et pede collo
> (*Aeneid* 12.356)

Monosyllables at this position in the verse are very rare[6]. One may surmise that a monosyllable is required in such a case in order to preserve the consonance of ictus and accent in Foot 5, but the use of a following pyrrhic must of necessity set up a strongly competing accent in the second syllable of the foot. It is hard to believe that the accent on *et* in the above example can compete with the stress laid upon the first syllable of *pede.*

Most interesting are the differences seen in the distribution of dactylic words. As we see from Table III, these occur in significant numbers only in Feet 1 and 5, where they constitute well over half the occurrences of words ending at those positions. About 73% of the dactylic words in Foot 1 end in a consonant, thereby requiring a vocalic initial in the following word. In very strong contrast, only 32% of the dactylic words in Foot 5 end in a consonant, and so only that percentage of the following words have vocalic initials. We believe that the key to our question lies in this last clause. Well over half the verses of *Aeneid* 12 (about 58%) end in bisyllabic words. These final words constitute one of the very noticeable recurring features of the verse. It would be, we believe, at the very least inconvenient and perhaps aesthetically jarring, if this large class of words were to have a noticeably larger proportion of vocalic initials than the language as a whole. We have already noted above that about 33% of the words in *Aeneid* 12 have vocalic initials. We now add the observation that about 52% of all the words in *Aeneid* 12 end with a vowel or with the letter '*m*'[7]. As we see from Table III, of the 482 dactylic words in *Aeneid* 12 about 57% end with a vowel, not a very great disparity. In order to bring about a pleasing proportion of initials for the large set of final bisyllabic words, Vergil places in Foot 5 a rather larger proportion of dactylic words with vocalic finals than would be expected. In turn, a larger proportion than would be expected of dactylic words with consonantal finals is displaced to the only place where they can go in sizable numbers, i.e., to the first foot. These must be followed by vocalic initials and this largely accounts for the unusually large number and percentage of vocalic initials at Position *d3*.

There remains one more word-type, the Ionic a majore (--uu), which terminates in significant numbers at Position 15. The word-type is rare elsewhere, so there can be no conjectures about displacements.

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One can only say that Vergil's choice of these words has been such as to result in only 34% of consonantal finals, very close to the desired proportion.

Our discussion above has dealt with only one of the peculiar facets that emerge when one deals with texts in machine-readable form. We have no reason to suspect that the ancients were aware of this tendency toward initial vowels at Position 3 or of the accompanying segregation of dactylic words, but they would surely have taken it in stride. What emerges is that there are aspects of the Latin hexameter which behave remarkably like a closed system analogous, perhaps, to the construction of a clock. If it is to tell time, deviations in one part of the system must be compensated for elsewhere. Just so with the hexameter verse, at least to some degree. As always in contemplating linguistic phenomena, we are faced by a fascinating combination of freedom and constraint.

NOTES

(1)　We comment here on the wider implications of a study with different goals and additional data published in R. Grotjahn, ed., *Hexameter Studies* (Quantitative Linguistics, Vol. 11; Bochum 1981), pp. 151-167.

(2)　Wilhelm Ott, *Metrische Analysen zu Vergil : Aeneis Buch XII* (Tuebingen : Max Niemeyer Verlag, 1973). This work is hereafter referred to simply as Ott. Ott's observations are based upon the *Oxford Classical Text* of Mynors, 1969. The last verse is numbered 952, but 631 is a short verse, and there are no verses numbered 612 or 613. Ott's scheme for numbering positions is :

　　　___1u2u3___4u5u6___7u8u9___10u11u12___13u14u15___16u

(3)　J. Soubiran, *L'élision dans la poésie latine* (Paris : Librairie C. Klincksieck, 1966), p. 590 ff.

(4)　So far as we can tell, Soubiran (above, note 3) nowhere notes this disparity between the numbers of elisions occurring at the end of spondees as opposed to dactyls.

(5)　Monosyllables of this sort are discussed by J. Hellegouarc'h, *Le monosyllabe dans l'hexamètre latin* (Paris : Librairie C. Klincksieck, 1964), pp. 208 ff. E. g., " . . . de plus ces mots doivent obligatoirement se trouver devant une initiale vocalique" (p. 208).

(6)　See the discussion of such monosyllables in Hellegouarc'h (above, note 5), pp. 167 ff.

(7)　See comparable data in Soubiran (above, note 3), p. 592.

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Table I

Aeneid 12: Frequencies and Percentages of
Junctures, Elisions, and Vocalic Initials with
Differentiation at Positions 3, 6, 9, 12

Position	(a) All Inits.	(b) (a)/949	(c) Elisions	(d) (c)/(a)	(e) Vocalic Inits.	(f) (e)/(a)	(g) (e)-(c)	(h) (g)/(a)-(c)
0	949	1.0000			363	0.3825	363	0.3825
1	321	0.3383	61	0.1900	99	0.3084	38	0.1462
2	155	0.1633	5	0.0323	52	0.3355	47	0.3133
d3	269	0.2835	42	0.1561	206	0.7658	164	0.7225
s3	128	0.1349	56	0.4375	63	0.4922	7	0.0972
4	631	0.6649	31	0.0491	98	0.1553	67	0.1117
5	129	0.1359	2	0.0155	25	0.1938	23	0.1811
d6	62	0.0653	25	0.4032	51	0.8226	26	0.7027
s6	94	0.0991	41	0.4362	48	0.5106	7	0.1321
7	780	0.8219	62	0.0795	177	0.2269	115	0.1602
8	149	0.1570	1	0.0067	23	0.1544	22	0.1486
d9	50	0.0527	21	0.4200	43	0.8600	22	0.7586
s9	127	0.1338	30	0.2362	37	0.2913	7	0.0722
10	724	0.7629	103	0.1423	225	0.3108	122	0.1965
11	36	0.0379	1	0.0278	14	0.3889	13	0.3714
d12	134	0.1412	6	0.0448	84	0.6269	78	0.6094
s12	388	0.4089	31	0.0799	66	0.1701	35	0.0980
13	19	0.0200	3	0.1579	4	0.2105	1	0.0625
14	449	0.4731	6	0.0134	114	0.2539	108	0.2438
15	550	0.5796	1	0.0018	218	0.3964	217	0.3953
16	7	0.0074	0	0.0000	0	0.0000	0	0.0000
Totals	6153		528	0.0858	2010	0.3268	1482	0.2635

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Table II

Aeneid 12: Metrical word-types ending unelided at
Positions d3, d6, d9, d12, and 15
by position.

Ending at Position	Word-type	(a) Number	(b) Number with final consonant	(c) (b)/(a)
d3	u	22	19	0.8636
	uu	78	52	0.6667
	-uu	127	93	0.7323
	Total	227	164	0.7225
d6	u	1	1	1.0000
	uu	36	25	0.6944
	Total	37	26	0.7027
d9	u	3	3	1.0000
	uu	26	19	0.7308
	Total	29	22	0.7586
d12	u	12	12	1.0000
	uu	84	52	0.6190
	-uu	18	8	0.4444
	u-uu	3	2	0.6667
	uu-uu	3	2	0.6667
	--uu	8	2	0.2500
	Total	128	78	0.6093
15	u	57	57	1.0000
	uu	10	1	0.1000
	-uu	337	108	0.3205
	u-uu	13	5	0.3846
	uu-uu	7	3	0.4286
	--uu	120	41	0.3417
	---uu	3	1	0.3333
	-uu-uu	1	0	0.0000
	Total	548	216	0.3942

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Table III

Aeneid 12: Metrical word-types ending unelided at
Positions d3, d6, d9, d12, and 15
by word-type.

Word-type	Ending at Position	(a) Number	(b) Number with final consonant	(c) (b)/(a)
u	d3	22	19	0.8636
	d6	1	1	1.0000
	d9	3	3	1.0000
	d12	12	12	1.0000
	15	57	57	1.0000
	Total	95	92	0.9684
uu	d3	78	52	0.6667
	d6	36	25	0.6944
	d9	26	19	0.7308
	d12	84	52	0.6190
	15	10	1	0.1000
	Total	234	149	0.6367
—uu	d3	127	93	0.7323
	d12	18	8	0.4444
	15	337	108	0.3205
	Total	482	209	0.4336
u—uu	d12	3	2	0.6667
	15	13	5	0.3846
	Total	16	7	0.4375
uu—uu	d12	3	2	0.6667
	15	7	3	0.4286
	Total	10	5	0.5000
⊸—uu	d12	8	2	0.2500
	15	120	41	0.3417
	Total	128	43	0.3359

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