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ON THE DEVELOPMENT OF THE TRIṢṬUBH

I have been long seeking to find new means of disentangling the chronology of the development of Indian culture. Verse scansion should be informative, though it will cease to give chronological information on its full development. I began on the anuṣṭubh in Ślokas and Vipulas (Indo-Iranian Journal 1961), but did not deal with the RgVeda. For the development of the *triṣṭubh* one must begin there. I have therefore scanned over 6000 lines, excluding repetitions (but including jagatī), to get what should be a representative sample. The hymns used were:

RV	I	32-5	51	58-9	61-4	71-3	76	85	91-2	117-8	
		121	140-1	143-8	163-7	189					lines 1702
RV	II	2	4	12-3	27-8						lines 306
RV	III	1-2	15	17-20	22	31	33-4	60-1			lines 508
RV	IV	2-3	25-6	36	42-4	50-1	53				lines 446
RV	V	11-2	29-31	44-5	54-5	81	85				lines 488
RV	VI	8-9	18-9	21	31-4	49-50	67-8				lines 506
RV	VII	4-5	18	21	25	33	60-1	75	82-3	88	lines 504
RV	VIII	48	57-9	86	96	100					lines 250
RV	IX	68-9	74	93-4	96						lines 252
RV	X	13-5	30-1	34	39-40	42	67-8	73	88	91-2	94-5
		98	108	110	121	124-5	129-30	138	169		lines 1232
Total lines 6194											

We must now say how we scanned. Since a final consonant at the end of a line must make a closed syllable, I have counted such long (-). Only a final short vowel should make a short (·). Thus I find:

RV	I	∪ final	348	- final	1354		
RV	II	∪ final	58	- final	248		
RV	III	∪ final	83	- final	425		
RV	IV	∪ final	94	- final	344		
RV	V	∪ final	93	- final	395		
RV	VI	∪ final	97	- final	409		
RV	VII	∪ final	133	- final	375		
RV	VIII	∪ final	57	- final	193		
RV	IX	∪ final	45	- final	207		
RV	X	∪ final	274	- final	959		
			Total	∪ final	1281	- final	4913

The long final seems to be 4 (\pm) times commoner than the short (total ratio 1 : 3·835), though the short final seems to be rarer in *jagatī*, just as ∪∪ is not favoured at the caesura. Noting that if we include -e and -o from -as, half the hiatus is found at the caesura, e.g. from the figures of my sample:

RV	I	H	145	+	HC	142
RV	II	H	23	+	HC	23
RV	III	H	29	+	HC	26
RV	IV	H	24	+	HC	50
RV	V	H	44	+	HC	46
RV	VI	H	45	+	HC	49
RV	VII	H	48	+	HC	42
RV	VIII	H	15	+	HC	20
RV	IX	H	13	+	HC	15
RV	X	H	93	+	HC	105

Total H 479 + HC 518

I conclude that the caesura involved a pause, sufficient to change a closed syllable into a long, or to break a hiatus. The ratio of ∪ : - before caesura varies from 1 : 3·03 to 4·17, i.e. less than the finals, and not parallel, but the overall ratio of 1300 : 4867 is 1 : 3·74.

I have scanned the first part of the *trīṣṭubh/jagatī* on these principles in RV and AV (*AtharvaVeda*), but have not recognized the caesura as a break in the *Upaniṣad* or Epic owing to the progressive weakening of the caesura as shown by the increase of 6th and 7th syllable caesura, and the tendency to run pairs of lines into one, most obvious in the *anuṣṭubh*. Retaining as long syllables that would be short without a break, as against final shorts that would be long without a break (i.e. before initial two consonants) I found in

RV I	214 - against	69 √
RV II	39 - against	12 √
RV III	63 - against	4 √
RV IV	69 - against	10 √
RV V	68 - against	12 √
RV VI	73 - against	9 √
RV VII	73 - against	12 √
RV VIII	33 - against	5 √
RV VIII	33 - against	9 √
RV IX	31 - against	5 √
RV X	180 - against	29 √

Total 843 - against 171 √

With these the ratio of final √ to - at caesura and end of line is almost identical, 1 : 3·74 and 1 : 3·83.

It is certainly true that a short before the caesura is commoner in the 5th syllable than at the 4th: thus I find

- √ at 5th syllable at caesura 849, - 2220: ratio 1 : 2·615.
- √ at 4th syllable at caesura 451, - 2647: ratio 1 : 5·87

This accounts for 6167 lines; the remaining 27 have caesura at 6th or 7th, (often 3+4) or do not scan at all. Some irregular lines can be made regular by transpositions, and I would not be surprised if they were composed regular but transposed to baffle the demons (always ubiquitous). For caesuras in compounds, excluding dual *dvandvas* like *MitrāVaruṇā*, *Dyāvārthivī*, I found only 25, 7 being in RV 1/61 (which has also 3 bad caesuras), and 3 in 1/62 with 5 bad caesuras. The regularity of Vedic scansion was somewhat surprising; also in the matter of 4/6 and 5/7 *triṣṭubhs* (4/7 & 5/8 *jagatī*). Of the former I find 64 (13 in 1/61), and of 5/7(8) 23. I find 28 at 5/5.

Caesura at the 5th is commoner in *jagatī*: thus

	<i>Jagatī</i> caesura 4th	caesura 5th	<i>Triṣṭubh</i> caesura 4th	caesura 5th
RV I	190	290	692	528
RV II	52	45	108	101
RV III	38	51	224	195
RV IV	34	31	206	172
RV V	83	97	172	135
RV VI	12	21	224	247
RV VII	19	57	202	222
RV VIII	12	26	107	105
RV IX	46	54	69	82
RV X	136	206	468	421
Total	622	878	2472	2208

The ratio of 4th to 5th caesura is: *jagatī*: 1 : 1·41, *triṣṭubh* 1 : 0·89.

I have not found myself keen to accept metrical lengthening. The reason is that the avoided scansion too often occurs inevitable in the same verse or hymn. I have accepted phonetic lengthenings, e.g. *vāvrdhāna* for *Padapatha vāvrdhāna*, but I feel the other is as likely to be a musical as a linguistic phenomenon, especially because on its alleged occurrence it has *no* relation to accent. There are doubtful cases; is the lengthening philological or metrical? e.g. *atha* could be Gk. *enθa* or *athā*, parallel to *tathā*; *atrā* could be compared to Lat. *intrā* or *ultrō*, but the shortening of Skt. final *ā* is not a normal development. Some lines could be divided at the 4th or 5th; phrasing may guide to probability, and if the 6th & 7th are ∪, division should be taken at the 5th. There is therefore some ambiguity in our figures, but not significant.

As a result of our scansion we think we understand the nature of the *triṣṭubh* and its general development, but have been quite unable to find chronological strata in RV on purely metrical grounds: concomitances are not consistent. *A priori*, verse should go from rough to polished; but in fact the *triṣṭubh* seems to go back to Indo-European times, as suggested by the Greek lyric metres, and the iambic trimetre making a good *jagatī*. Primitive stages are therefore likely to have been long passed. The tendency of post-RV verse is to weaken the caesura, hence I do not feel that a caesura in a compound must be a sign of early date.

Our theory therefore is: the original metre was 4 + 4; if the 4s are not separated, we have the *gāyatrī* line; if they are, we have the *triṣṭubh* (*jagatī* is just *triṣṭubh* + 1 syllable). The 4s tend to contrast metrically, as in the classical *śloka*, and can carry one or two syllables before or after, or even, in the case of the second expected 4, three before (between). Thus 6/4, 6/5 can exist, and I found 7 (3 in 1/61); so can 7/4, of which I found 8. Since the 4s are significant, one will not normally want heavy syllables in the copula, the middle. It is therefore significant that after the 5th caesura ∪∪ is the overwhelming favourite, and even after the 4th caesura, a triad beginning with ∪∪ is much commoner; thus:

	RV	I	II	III	IV	V	VI	VII	VIII	IX	X=	1:lines
∪∪	699	122	201	188	212	228	218	110	120	576=	2674	1: 1· 154
-∪	107	14	41	11	17	30	44	18	15	51=	348	1: 8· 868
∪∪-	425	69	149	128	162	103	97	54	64	306=	1557	1: 1· 987
∪∪∪	139	35	24	43	30	47	31	20	9	105=	483	1: 6· 406
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∪∪-+∪∪∪	564	104	173	171	192	150	128	74	73	411=	2040	1: 1·5166
-∪-	185	29	66	41	37	38	52	22	23	115=	608	1: 5· 89
-∪∪	70	13	12	14	14	25	20	10	12	51=	241	1: 12· 838
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-∪-+--∪∪	255	42	78	55	51	63	72	32	35	166=	849	1: 3· 644

---	11	5	6	1	4	7	4	—	1	8=	47	1: 65·	83
---	16	2	4	5	3	7	19	2	3	6=	67	1: 46·	18
---	1	7	1	2	2	1	—	2	—	3=	19	1:162·	84
---	11	—	—	3	1	—	1	—	1	2=	19	1:162·	84

It will be seen that --- after the 4th caesura is commoner than all the rest combined (1557:1484) one should also note that --- is only half as common as ---, and less than half ---; by the time of *MBh.* --- is rare, though --- still comes third in non-*Upajati* lines (here called not-Regular). The remaining post-5th caesura two syllables show:

	RV I	II	III	IV	V	VI	VII	VIII	IX	X=	1:lines		
--	12	1	2	1	1	6	2	4	1	3=	33	1: 93·	51
---	15	5	2	1	2	6	2	2	1	1=	37	1: 83·	405

It is clear that the heaviest copulas are the least popular, presumably deemphasizing the main 4s.

We may now look at the pre-caesura syllables of 4th caesura. Thus:

	RV I	II	III	IV	V	VI	VII	VIII	IX	X =
-----	128	35	43	33	31	40	42	21	13	102 = 488
-----	32	5	7	12	8	5	11	2	8	29 = 119
-----	54	11	9	10	17	13	18	5	3	39 = 179
-----	13	2	3	2	6	5	—	4	—	8 = 43
-----	152	30	47	43	38	34	43	19	20	89 = 515
-----	23	2	5	4	3	7	8	4	4	9 = 69
-----	107	14	32	33	43	40	26	24	15	87 = 421
-----	27	7	11	5	5	13	7	5	4	17 = 101
-----	213	23	66	67	66	53	45	21	34	141 = 729
-----	20	1	10	4	7	3	1	4	2	13 = 65
-----	22	6	—	7	8	3	4	2	—	13 = 65
-----	2	1	—	1	—	—	—	—	—	— = 4
-----	25	4	8	6	7	5	5	1	2	19 = 82
-----	4	2	2	1	—	1	—	—	—	7 = 17
-----	54	15	19	13	13	11	7	5	7	24 = 168
-----	6	1	2	1	3	3	4	2	3	8 = 33

Let us look at the order of popularity:

- - - - 729	- - - - 488	- - - - 179	- - - - 119
- - - - 515	- - - - 421	- - - - 168	- - - - 101
1244	909	347	220
- - - - 82	- - - - 69	- - - - 43	- - - - 17
- - - - 65	- - - - 65	- - - - 33	- - - - 4
147	134	76	21

The discrepancy of 69 after 65 is negligible, especially as 8 of the 69 - - - - are in the badly scanning RV 1/61. Note how the variations go in pairs, the long initial being preferred, except in - - - - and possibly - - - -. Pairing by the last syllable does not give any similarly patterned and so significant progression.

If we now look at the pre-caesura syllables of the 5th caesura, we find, again taking the 5th rather than the 1st syllable as having been added, a remarkable parallelism between the 4s and the 5s in popularity, which is disturbed by the dislike of 2 short, - -, immediately preceding the Caesura: thus:

	RV I	II	III	IV	V	VI	VII	VIII	IX	X =
- - - - -	80	22	22	16	14	26	34	14	11	76 = 315
- - - - -	42	13	19	10	16	11	19	10	1	24 = 165
- - - - -	80	18	24	18	12	28	25	11	10	72 = 298
- - - - -	34	10	8	9	13	14	23	5	7	26 = 149
- - - - -	158	20	47	36	51	34	35	23	30	113 = 547
- - - - -	51	15	17	15	18	19	13	6	9	35 = 198
- - - - -	142	19	63	44	47	50	53	21	31	112 = 582
- - - - -	43	7	16	16	11	24	18	9	5	39 = 188
- - - - -	12	2	1	1	4	3	2	2	3	10 = 40
- - - - -	1	—	1	1	1	—	—	—	—	— = 5
- - - - -	14	2	2	3	3	4	3	1	1	11 = 44
- - - - -	—	—	1	—	2	—	1	—	—	— = 4
- - - - -	23	2	6	5	4	6	2	4	1	17 = 70
- - - - -	16	3	1	—	5	8	4	2	3	3 = 45
- - - - -	15	2	3	7	5	8	8	4	2	17 = 71
- - - - -	11	3	—	2	3	9	2	1	5	9 = 45
- - - - -	11	2	2	3	1	3	6	2	—	3 = 33
- - - - -	—	—	—	—	—	—	—	—	—	— = 0
- - - - -	7	—	1	2	1	2	2	3	4	6 = 28
- - - - -	—	—	—	—	—	—	—	—	—	— = 0
- - - - -	17	1	5	2	4	7	12	6	5	8 = 67

— — — — —	3	—	—	—	—	—	—	—	—	2 =	5
— — — — —	11	1	2	1	4	4	3	1	2	11 =	40
— — — — —	—	1	—	—	1	1	—	—	1	2 =	6
— — — — —	2	1	2	—	1	—	—	2	—	— =	8
— — — — —	—	—	—	—	—	1	—	—	—	1 =	2
— — — — —	2	1	—	—	1	1	2	—	—	— =	7
— — — — —	—	—	—	—	—	—	—	—	—	— =	0
— — — — —	11	1	1	5	4	1	6	2	1	8 =	40
— — — — —	9	—	—	2	4	—	1	1	1	5 =	23
— — — — —	13	—	1	4	—	3	2	1	2	10 =	36
— — — — —	2	—	—	1	1	1	3	—	—	4 =	12

Let us now look at the order of popularity:

— — — — — 582	— — — — — 188 = 770	— — — — — 729
— — — — — 547	— — — — — 198 = 745	— — — — — 515
— — — — — 315	— — — — — 165 = 480	— — — — — 488
— — — — — 298	— — — — — 149 = 447	— — — — — 421
— — — — — 70	— — — — — 45 = 115	— — — — — 179
— — — — — 71	— — — — — 45 = 116	— — — — — 168
— — — — — 40	— — — — — 5 = 45	— — — — — 119
— — — — — 54	— — — — — 4 = 48	— — — — — 101
— — — — — 40	— — — — — 23 = 63	— — — — — 82
— — — — — 36	— — — — — 12 = 48	— — — — — 65
— — — — — 67	— — — — — 5 = 72	— — — — — 69
— — — — — 40	— — — — — 6 = 46	— — — — — 65
— — — — — 33	— — — — — 0 = 33	— — — — — 43
— — — — — 28	— — — — — 0 = 28	— — — — — 32
— — — — — 8	— — — — — 2 = 10	— — — — — 17
— — — — — 7	— — — — — 0 = 7	— — — — — 4

The only figures really out of place there is 67 for — — — — —, which might take — — — — — with it; but while the distortion caused by dislike of final — — — — — pre-caesura is plain, the discrepancies of the other figures with final — — — — — is not great enough to be significant, all being within 10 per cent of 40. Taking the 1st rather than the 5th as the added syllable, there is no correspondence whatsoever between the pre-4th caesura scansion; e.g.

— — — — — 1129	— — — — — 179
— — — — — 613	— — — — — 488
— — — — — 385	— — — — — 43
— — — — — 514	— — — — — 119
— — — — — 141	— — — — — 421
— — — — — 83	— — — — — 515
— — — — — 61	— — — — — 729

Obviously no correlation. The above should substantiate our analysis of the *triṣṭubh/jagatī*, but we repeat that within RV, we can not find chronology on purely metrical grounds. Nor do ratios of resolutions, hiatus and crasis seem to shed any light without much more individual treatment than I have been able to give.

We may now turn to the AV. The verses I used are not found elsewhere, as far as I saw indicated. The hymns taken were (Šaunaka numbering)

AV	I	9 12 25 30	+ Paippalāda only, Orissa text 45-6, 74-5, 101
AV	II	2 28-9	+ Šaunaka only 1, 12
AV	III	4 8	+ Šaunaka only 1
AV	IV	2 22 27	+ Paippalāda only 3, 11, 14
AV	V	28	+ —
AV	VI		+ Šaunaka only 117-21
AV	VIII	9	+ —
AV	XI	1	+ —
AV	XII	3	+ —
AV	XVIII	2	+ Šaunaka only 3
AV	XIX	3	+ —

Lines: Šaunaka 942 Paippalāda 804

One development has been the increased number of 10 or 12 syllable lines (4/6 & 5/5/*triṣṭubhs* [4/7 & 5/6 *jagatī*], and 5/7 *triṣṭubhs* [5/8 *jagatī*]). Thus

in the Šaunaka hymns I find 4/6 (4/7) 32, 5/7 35, 5/5 10, other 6
in the Paippalāda hymns I find 4/6 (4/7) 30, 5/7 26, 5/5 11, other 6

I would attribute this to the habit of reusing with appropriate or necessary alteration RV lines in new contexts, for new purposes. This continues in the religious verse of the Upaniṣads, but the secular (epic) returns to the proper number of syllables.

Another development is in the use of the *avagraha*, eliding a-initial metrically; In our RV selection I found 18, of which 8 were augments; in the AV selection, counting only hymns in both recensions, I find 11 Š and 13 P, of which only 1 and 2 respectively are augments. The ratio of hiatus to lines I find at 1:8.17, 8.22, in AV, and 1:7.97 in RV; clearly this cannot be called a significant decline. On the other hand, resolution within words occur 1:12.73 lines in AV (Paip. selection, Š & P hymns, but 1:12.72 including Paip. only hymns), against 1:5.84 in RV; the words resolved also seem more stereotyped in AV.

Coming to scansion, I find that the preferences of scansion in our sample for the pre-5th caesura closely parallel the pre-4th caesura in RV when taken in pairs; again the 5th, not the 1st syllable is added. Thus:

	s total	SP hymns	s total	Total SP	s total	Total SP	P total	SP hymns	P total	Total SP	P total	Total SP
- - - - -	84	67	113	85			72	64	90	79		
- - - - -	29	18			208	150	18	15			157	138
∪ - - - -	72	49	95	65			52	45	67	59		
∪ - - - -	23	16					15	14				
- - - - -	63	48	89	68			61	46	87	66		
- - - - -	26	20			158	124	26	20			155	119
∪ - - - -	55	42	69	56			52	39	68	53		
∪ - - - -	14	14					16	14				
- - - - -	23	18	29	21			24	18	27	20		
- - - - -	6	3			56	41	3	2			49	40
∪ - - - -	18	12	27	20			14	12	22	20		
∪ - - - -	9	8					8	8				
- - - - -	9	9	13	11			10	8	14	10		
- - - - -	4	2			28	21	4	2			24	20
∪ - - - -	12	10	15	10			10	10	10	10		
∪ - - - -	3	—					—	—				
- - - - -	9	5	12	7			6	5	8	7		
- - - - -	3	2			15	10	2	2			11	9
∪ - - - -	2	2	3	3			2	2	3	2		
∪ - - - -	1	1					1	—				
- - - - -	6	4	8	4			5	4	5	4		
- - - - -	2	—			13	8	—	—			9	8
∪ - - - -	5	4	5	4			4	4	4	4		
∪ - - - -	—	—					—	—				
- - - - -	5	4	7	4			3	3	3	3		
- - - - -	2	—			12	7	—	—			6	6
∪ - - - -	5	3	5	3			3	3	3	3		
∪ - - - -	—	—					—	—				
- - - - -	1	1	1	1			1	1	1	1		
- - - - -	—	—			1	1	—	—			1	1
∪ - - - -	—	—	0	0			—	—	0	0		
∪ - - - -	—	—					—	—				

----- has advanced in popularity compared with - - - - just as - - - - over - - - - before the 4th caesura, perhaps because of its influence.

Let us now look at the pre-4th caesura figures:

	§ total	§P hymns	§ only			P total	§P hymns	P only				
- - - -	117	94	23	183	141	42	114	91	23	169	136	33
- - - -	66	47	19				55	45	10			
- - - -	70	48	22	132	92	40	66	52	14	111	90	21
- - - -	62	44	18				45	38	7			
- - - -	49	40	9	63	59	14	44	36	8	59	51	8
- - - -	24	19	5				15	15	—			
- - - -	12	10	2	24	17	7	15	12	3	27	20	7
- - - -	12	7	5				12	8	4			
- - - -	11	9	2	16	11	5	7	6	1	9	8	1
- - - -	5	2	3				2	2	—			
- - - -	10	3	7	11	3	8	6	4	2	6	4	2
- - - -	1	0	1				—	—	—			
- - - -	8	7	1	10	7	3	10	7	3	10	7	3
- - - -	2	—	2				—	—	—			
- - - -	2	1	1	2	1	1	1	1	—	1	1	—
- - - -	—	—	—				—	—	—			

The order of the first four pairs and the last is as for RV. pairs 5-7 go in all permutations. - - - - and - - - - have advanced in relative popularity. I would however, have liked a much bigger sample than our 800-900 lines. The popularity of - - - - over - - - - continues in the Epic in non-R lines, i.e. when not followed by - - - -; - - - - disappears in the Epic. The ratio of final - to - at caesura in RV was 1:7.195; in § total, 1:7.67, §P hymns 1:7.34. That is, final - is slightly, but not significantly rarer in AV. Before 5th syllable caesura, - is nearer being significantly rarer in AV; thus 1:2.614 in RV, in § total 1:3.024, in §P hymns 1:3.31; in P total 1:3.43, §P hymns 1:3.428. The ratio of 4th to 5th caesura is virtually the same; 1:0.989 RV, 1.088 § total, 1.09 §P hymns; P total 1.05, §P hymns 1.09. AV does not show any great attempt to regularize the scansion; the 20 least popular openings of 5th caesura provide 0.127 of the verses of 5th caesura in RV, 0.129 in §P hymns of both § and P (0.14 total §, 0.123 total P). There seems to be no progress in the stereotyping of the regular *Upajati*; the ratio of - - - - - - - - - - (-) to 5th caesura lines and total lines is

in RV 1 : 3·004 and 1 : 6·03 respectively;
 in AV Š total 1 : 3·748 & 1 : 7·190, ŠP hymns 3·85 & 7·37;
 in AV P total 1 : 4·16 & 1 : 8·12, ŠP hymns 3·92 & 7·56.

That is, AV is metrically more vulgar than RV.

I have not unfortunately had time to deal with the *Brahmanas*, partly because I would want verses not elsewhere, and partly that owing to the long chronological period of these works, there could be small satisfactory results. However by the 5th century BC the *triṣṭubh* tradition seems to have split into religious and secular, the former being more conservative (also owing to the reuse of older verses), but following the secular with a time lag.

The *Upaniṣads* used are *Kaṭha* 1-3 & 4-6, *Muṇḍaka* 1-2 & 3, *Śvetāśvatarā* 1-2 (Minus 1·1-3), 3, 4, 1·1-3 & 5-6, which last is practically as Epic. Also BAU 3-4 and *Praśna*. (For *Śvet.* & *Muṇḍaka*, I take the text as in my articles in JOIB XXIV 1975 and VVRI XIV 1976).

The first thing that is obvious is the growth of regular R lines, including R6 (6th caesura), which was practically unknown in AV. The ratio of our AV R-lines (all R4 & R5, 4th & 5th caesuras, overwhelmingly 5th) to total lines is 1 : 6·777; in our *Upaniṣads*, 1 : 3·46. Moreover R5 is no longer preponderant; In AV Š (ŠP hymns) we found 4 R4: 94 R5, and in AV P (ŠP hymns) 6 : 87. In our *Upaniṣads* we find 45 R4, 94 R5, 25 R6, & 4 R6+.

Final ∪ pre-caesura is rarer:

RV 1 : 6·869 4th, 1 : 3·628 5th
 (Ratio to total 4th & 5th caesuras respectively).
 AV 1 : 9·19 4th, 1 : 4·31 5th
 (Ratio to total 4th & 5th caesuras respectively).
 AV 1 : 9·17 4th, 1 : 4·43 5th
 (Ratio to total 4th & 5th caesuras respectively).
 (ŠP hymns only, first Š figures, then P).

Beginnings also get stereotyped, and bad ones disappear. Thus in RV
 Up 1 : 10·5 4th, 1 : 5·13 5th
 (Ratio to total 4th & 5th caesuras respectively).

Beginnings also get stereotyped, and bad ones disappear. Thus in RV these were less respectable: - ∪ ∪ ∪ -, ∪ ∪ ∪ ∪ - 82 & 65, - ∪ ∪ ∪ ∪, ∪ ∪ ∪ ∪ ∪ 69 & 65, - ∪ ∪ ∪ ∪, ∪ ∪ ∪ ∪ ∪ 43 & 33, - ∪ ∪ ∪ ∪ ∪, ∪ ∪ ∪ ∪ ∪ ∪ 17 & 4. The ratio of these to total 4th caesura in RV is 1 : 8·196, in AV (ŠP hymns) 1 : 15·04 Š, 1 : 15·85 P; in Up 1 : 21. ∪ ∪ ∪ ∪ seem to be preserved by the prevalence of ∪ ∪ ∪ ∪; so - ∪ ∪ ∪ ∪ & - ∪ ∪ ∪ ∪ survive in a way through - ∪ ∪ ∪ ∪ & - ∪ ∪ ∪ ∪. The same sort of thing happens with 5th caesura; in RV, 6 combinations could be said to be favoured, namely ∪ ∪ ∪ ∪ ∪, ∪ ∪ ∪ ∪ ∪ ∪, and in intermediate place, ∪ ∪ ∪ ∪ ∪. In RV the ratio of all others to these favourites is 1 : 7·818; in AV. ŠP hymns, 7·702 Š, 7·75 P. In the Up. our ratio is 1 : 11 excluding all R verses (as we did also for the 4th caesura); the

— — — —	2	—	—	—	2	—	—	—	1	—	5
— — — —	1	13	5	12	4	4	1	3	6	2	51
— — — —	—	2	—	1	—	—	—	—	1	—	4
— — — —	2	15	1	13	9	2	1	7	3	1	54
— — — —	—	4	—	—	—	—	1	1	1	—	7
— — — —	6	17	2	5	7	3	—	1	—	2	43
— — — —	—	—	—	—	—	—	—	—	1	—	1
— — — —	—	—	—	—	—	—	—	—	—	—	—
— — — —	—	—	—	—	—	—	—	—	—	—	—
— — — —	1	1	—	—	1	—	—	—	—	—	1
— — — —	—	—	—	—	—	—	—	—	—	—	—
— — — —	—	3	1	—	—	—	—	—	—	1	5
— — — —	—	1	—	—	—	—	—	—	—	—	1
R4	1	7	3	5	3	1	2	7	22	1	52

R4 is only half as common as R5.

	BAU 3-4	K 1-3	4-6	M 1-2	3	Š 1-2	3	4	5-6	Praš	Total
R6	1	5	—	2	5	—	—	1	9	2	25
R6+	1	1	—	—	—	1	—	1	—	1	5

R4 and R6 equal R5 in the Epic.

— — — — has supplanted — — — — as the favourite 4-opening, and similarly — — — — is preferred to — — — —; both of these continuing the trend of AV. The ratio of R to non-R lines is interesting; if we except BAU, which must be of the 6th century BC, the ratio of R to non-R lines in the others could suggest an acceptable chronological order; thus R: non-R, M 1-2 1:6·92, 3, 1:6·44; *Švet.* 1-2 (—1·1-3) 1:5·4; *Praš* 1:4·2; K 1-3 1:3·472, 4-6 1:2·9; *Švet.* 3 1:2·375, 4 1:1·71, 5-6 (+1·1-3) 1:0·534 (BAU 1:2·33). K 1-3 might here appear later than it is because of literary pretension, but I do not know a compelling reason why it must precede *Mund.*; *Švet.* 5-6 is clearly late. This order may be supported by the ratio of 5/7 lines: M 1-2 1:2·288, M 3 1:3·35; Š 1-2 1:5·33, 3 1:4·5 (1 less here, or 1 more in 1-2 would invert the ratios); *Praš* 1:4·33; Š 4 1:6·33, K 4-6 1:8·8, K 1-3 1:10·73, Š 5-6 1:14. K and *Švet.* 3-4 have become inverted in the 5/7 list; the apparent lateness of K 1-3 can again be explained by literary ambition.

Crisis at caesura might be expected to indicate chronology; Here again we have M 1-2 1:51 lines, K 1-3 1:40, Š 5-6 1:10·18; the other passages have 1 each (*Praš* 2 for 1:3). Caesura at compound I have not counted, though it should show something in theory.

We may now turn to the secular Epic; the passages chosen are 5/170-93 (Amba), *Dyutaparvana* 2/51-63, 5/22-32 (*Sañjayayāna*), 3/111-4 (*Rṣyaśrṅga*), 132-4 (*Aṣṭāvakra*), 278-82 (*Sāvitrī*), 1/65 (*Šakuntala* C author),

plus BhG, 2531 lines in all. The verse has been regularized; bad openings, and even more copulae are eliminated, and the interchange of *triṣṭubh/jagatī* becomes prohibited. 5/7 lines are not uncommon, but decline, but I have hardly found 5 at 4/6. Some 5/7 can be accounted for by resolution $\text{---} \text{---} \text{---}$, which occurs sporadically in the copula. We give the figures, non-R lines only for openings: $\text{---} \text{---} \text{---}$, $\text{---} \text{---} \text{---}$, $\text{---} \text{---} \text{---}$, $\text{---} \text{---} \text{---}$, $\text{---} \text{---} \text{---}$ do not occur:

	Sañj	Aṣṭā	Dy 51-63	(- 60 · 22-47)	Ambā	Rṣya	Sāv	Sak	C BhG 1-9	11	15	Total
---	8	5	5	—	1	—	—	—	—	—	—	19
---	2	2	1	—	—	—	—	—	—	—	—	5
---	5	1	4	—	—	1	—	—	1	—	—	12
---	—	—	5	—	—	—	—	—	—	—	—	5
---	28	8	16	—	1	—	—	—	—	—	—	53
---	3	2	1	—	1	—	—	—	1	—	—	8
---	21	8	9	—	1	—	1	—	—	—	—	40
---	1	1	1	—	—	—	—	—	—	—	—	3
---	—	—	1	—	—	—	—	—	—	—	—	1
---	—	—	1	—	—	—	—	—	—	—	—	1
---	2	2	—	—	—	—	—	—	—	—	—	4
---	—	1	1	—	—	—	—	—	—	—	—	2
---	2	—	1	—	—	—	—	—	—	—	—	3
---	2	—	—	—	—	—	—	—	—	—	—	2
R5	100	24	48	47	11	49	35	3	10	30	13	370
R6	42	15	34	23	12	47	21	2	13	34	2	235
---	256	78	97	—	28	12	5	3	10	17	—	506
---	16	2	1	—	—	—	—	—	—	—	—	19
---	34	3	9	—	1	—	—	—	—	—	—	47
---	128	26	42	2	4	17	2	2	2	7	1	233
---	1	—	—	—	—	—	—	—	—	—	—	1
---	141	34	66	1	24	12	3	1	2	8	1	293
---	5	2	1	—	—	—	—	—	—	—	—	8
---	117	23	45	1	14	18	1	2	3	9	—	233
---	14	1	2	—	—	—	—	—	—	—	—	17
---	1	—	—	—	—	—	—	—	—	—	—	1
R4	114	41	48	22	6	60	31	1	5	32	3	363

Four totalling under 40 only occur in our first three columns; works which are then early or unambitious. The Vision of BhG is ambitious, and Dyuta 60·22-47, Rṣyaśrīga and Sāvitrī look late. One may note the preference for $\text{---} \text{---} \text{---}$ in non-R verses is accentuated, but not $\text{---} \text{---} \text{---}$.

It might be worth looking at the copulae; thus: $\cup\cup$ seems to be universal in the Epic; $\cup\cup$; $\cup\cup$; $\cup\cup$ - I have not met in my selections. In the *Upaniṣads*, $\cup\cup$ is favoured (non-R) at 53 : 7. There are

--	4 (Kath 1-3 2, M 3 1, Švet 3 1)	Pali 1 (J 542 1)
$\cup\cup$	2 (M 1-2 1, Praš 1)	Pali 3 (J 542 1, J 522 1, Th 1)
$\cup\cup$	1 (Švet 5-6)	Pali 4 (J 542 3, J 543 1)

Bad trisyllabic copulae are almost eliminated in the Epic (— — 1 [Aṣṭā] and $\cup\cup\cup$ 1 [BhG 11]). They survive better in the *Upaniṣads*; thus:

$\cup\cup\cup$	5 (K 1-3 3, M 1-2 1, Praš 1)	Pali —
$\cup\cup\cup$	3 (M 1-2 1, Praš 1, Švet 5-6 1)	Pali 2 (J 522, 543)
$\cup\cup\cup$	3 (M 1-2 1, M 3 1, Praš 1)	Pali —
$\cup\cup\cup$	1 (Švet 1-2 1)	Pali 8 (Th 2, J 522 2, 542 3, 543 1)

Total 12; $\cup\cup\cup$ 400.

	Sañj	Aṣṭā	Dyut	(— 60 · 22-47)	Ambā	Rṣya	Sāv	Šak	C BhG 1-9	11	15	Total
$\cup\cup\cup$	235	88	138	1	24	27	2	3	4	18	2	566
$\cup\cup\cup$	7	2	10	—	—	—	—	—	—	—	—	19
$\cup\cup\cup$	430	82	123	2	41	29	9	7	11	16	—	748
$\cup\cup\cup$	110	20	38	1	10	6	2	—	3	6	—	196

It will be seen that $\cup\cup\cup$ disappears after the early period. $\cup\cup\cup$ becomes preferred to the earlier favourite, $\cup\cup\cup$ - (R-lines omitted in $\cup\cup\cup$). The same general pattern holds for the *Upaniṣad*; thus:

	BAU 3-4	K 1-3	4-6	M 1-2	3	Š 1-2	3	4	5-6	Praš	Total
$\cup\cup\cup$	10	39	8	41	28	2	4	8	11	11	162
$\cup\cup\cup$	1	6	—	4	2	—	—	—	2	2	17
$\cup\cup\cup$	5	42	11	30	19	22	4	12	18	5	168
$\cup\cup\cup$	3	12	6	19	4	1	4	1	5	—	55

We might add here the Pali:

	Th	J 522	J 542	J 543	Total
$\cup\cup\cup$	7	11	8	13	39
$\cup\cup\cup$	2	5	1	3	11
$\cup\cup\cup$	6	11	6	19	42
$\cup\cup\cup$	4	1	2	8	15

With the bad copulae (including $\cup \cup \cup$) and the high ratio of R-lines, the suggestion would be that the Pali verses were not on the whole written by professional poets (as one would expect of the *Theragāthā*). The Upaniṣads retain the effects of the sacred tradition, the Vedic verses being still valid examples at least of licence. No single criterion seems to give a chronological sequence; one would have to combine many ratios; e.g. R; non-R lines, to total lines; R6: lines, crasis and compound at caesura to lines, the ratio of bad to good openings and so too copulae.

I have also looked at Pali triṣṭubhs, *Theragāthā & Jātakas* 522, 532-3. While the anuṣṭubhs seemed to scan in a very archaic way, compared with the contemporary Epic Sanskrit, the *triṣṭubh/jagatī* keeps pace in the scansion, though they may mix a little more, and there are more bad openings and copulae, But the R: non-R ratios are not very different; e.g.

Th. 1 : 0·074	J 522 1 : 0·27
Dy 60·22-47 1 : 0·04	Rṣya 1 : 0·37
J 542 1 : 0·301	J 543 1 : 0·255
BhG 11 1 : 0·398	Sāv 1 : 0·496

These are the late bits of the Epic; the main Dyuta ratio is 1 : 2·496. Our total, omitting repetitions was 891 lines. R-line openings are again omitted in the table:

	Th	J 522	J 542	J 543	Total
-----	—	1	—	—	1
-----	—	—	—	1	1
-----	2	1	9	4	16
-----	—	—	—	2	2
-----	1	1	—	2	4
-----	—	—	—	1	1
-----	1	—	—	—	1
-----	1	—	—	—	1
-----	—	—	1	—	1
R5	121	52	38	76	287
R6&+	111	21	28	59	219
-----	1	5	1	3	10
-----	—	—	—	1	1
-----	—	1	1	—	2
-----	11	7	14	16	48
-----	2	—	—	1	3
-----	1	1	4	1	7
-----	4	11	—	9	24
-----	1	—	—	3	4
-----	1	—	—	—	1
-----	1	—	—	3	4
-----	—	—	—	1	1
R4	141	31	27	53	252

From the ratio of R: non-R lines, I would suspect the *Theragāthā* is later than the Jataka verses; the figures are (in the order above) 1 : 13 · 8, 1 : 3 · 714, 1 : 3 · 1, 1 : 3 · 916. This lateness might also be suggested by the prevalence of R4 over R5 in Th., but R5 over R4 in the *Jatakas*.

I would have liked more time for the Pali figures; but the above should not be generally misleading. There are ambiguities, e.g. the status of anusvara; there are many traces of underlying Sanskrit quantity, as -aṁ from -ām is long, but from -am short. Some verses scan better as Sanskrit. The surprising figure is the weakness of ----, even in resolved forms too.

Summing up; for the Epic triṣṭubh the rule has come that the place of the caesura is irrelevant in an R line; for non-R lines, it must be at the 4th syllable; a crasis going over into the 5th syllable is counted as post-caesura. This applies to the Pali also. The non-R line has caesura at the 5th only if a 12-syllable *triṣṭubh* (13 *jagatī*). While 5/7 lines continue with decreasing frequency, 4/6 are almost quite eliminated. In 'late *adhyāyas* of the Epic non-R lines virtually disappear.

ABBREVIATIONS

AV	<i>AtharvaVeda</i>	P	Paippalāda recension	
		Ś	Śaunaka recension	
C	caesura	HC	hiatus at caesura	
H	hiatus	scans	x - - - - - x	
R-line	regular	or	x - - - - - x	
non-R line	all other scansion.			
MBh	<i>MahāBhārata</i>	BhG	<i>BhagavadGīta</i>	
		Aṣṭā	<i>Aṣṭāvakraīya</i>	MBh 3/132-4
		Ambā	<i>Ambopakhyaṇa</i>	MBh 5/170-93
		Dy/Dyuta	<i>Dyutaparvan</i>	MBh 2/51-63
		Rṣya	<i>Rṣyaśrṅga</i>	MBh 3/111-4
		Sañj	<i>Sañjayayāna</i>	MBh 3/22-32
		Śak	<i>Sakuntala</i>	MBh 1/65
		Sāv	<i>Sāvitrī</i>	MBh 3/278-82
Th	<i>Theragāthā</i>			
J	<i>Jātaka</i>			
Up	<i>Upaniṣad</i>	K	<i>Kaṭha</i>	
		M/Muṇḍ	<i>Muṇḍaka</i>	
		Praś	<i>Praśna</i>	
		Ś/Śvet	<i>Svetāśvatara</i>	
		BAU	<i>BrhadAranyaka</i>	
JOIB	Journal of the Oriental Institute of Baroda			
VVRI	Journal of the Vishveshvaranand Vedic Research Institute			