

Vedic Sanskrit Vocatives in *-an*: The Case for Restoring Two Endings

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1 Introduction

This article provides new distributional evidence for a split in Vedic vocatives in *-an*, such that some (e.g., *maghavan*) were heavy-final at composition, while others (e.g., *somapāvan*) were not. Our evidence largely agrees with the scheme of Arnold (1905), though we suggest minor revisions, and largely opposes the schemes of Oldenberg (1888, 1908).

Word-final *-Vn* (where *V* is a short vowel) is found in three contexts in the Saṃhitā text of the Ṛgveda (RV), namely (a) verbs and participles in *-an*, (b) locatives in *-an* and *-in*, and (c) vocatives in *-an* and *-in*, to cite the endings as they appear in the Padapāṭha, which is not necessarily how they are to be restored.¹ Examples of these three contexts are given in (1). Other short vowels (i.e., *u* and *ṛ*) do not occur in this frame in the RV, except due to the nasal assimilation of a final obstruent (e.g., *ún mā* for */út mā/*).

- (1) a. *áhan* ‘you smashed’, *janáyan* ‘begetting’, *ágman* ‘they have come’
b. *yáman* ‘on the course’, *tásmīn* ‘in that’, *váriman* ‘upon the expanse’
c. *pūṣan* ‘o Pūṣan’, *somapāvan* ‘o soma drinker’, *śiprin* ‘o (lovely) lipped’

In the Saṃhitāpāṭha, the nasal in *-Vn* is always doubled before a vowel, such that the word-final syllable is heavy, often including cases where such doubling is unjustified etymologically.² In (2), for instance, *vajrinn* is transmitted as doubled, and yet both its etymology (**-in*) and the location of its ultima in a metrical position that is normally light suggest that the doubling is unjustified. Indeed, examining the other prevocalic instances of *vajrin* (and *-in* vocatives more generally) makes it clear that *vajrinn* should be restored to *vajrin* without doubling in every case. Translations in this article are from Jamison and Brereton 2014 unless otherwise stated; G&R marks our own translations.

- (2) *áganma vajrinn āśásah*
“we have arrived at our hopes, possessor of the mace.” (8.92.13c)

1 We assume a basic familiarity with Ṛgvedic philology and metrics, for which see Oldenberg 1888, Arnold 1905, Jamison and Witzel 1992: 2–27, Witzel and Gotō 2007: 427ff., and Jamison and Brereton 2014: 3ff.

2 The velar nasal *ñ* is also encountered occasionally as part of a *VC* ending, in which case it is also transmitted as doubled before a vowel (e.g., *sadṛñi ási* “you are of the same aspect” 8.11.8a) and can unproblematically be restored as such.

In other cases, the doubling is justified, as with the $-Vn$ verb in (3). Both meter and etymology ($*ns$) agree that *áhann* is heavy-final. In short, some prevocalic $-Vn$ forms are to be restored as undoubled, being light-final, while others are to remain doubled (or $-nC$), being heavy-final.³

- (3) *t_nvám síndhūṁr ávāsṛjo*
adharáco áhann áhim
 “You sent the rivers surging downwards; you smashed the serpent.” (10.133.2ab)

The consensus holds that doubling in the Saṃhitā is unreliable. Furthermore, everyone agrees that doubling applies to at least some $-Vn$ words. The question is then where doubling should and should not be restored. We consider three schemes. All three agree that verbal forms are doubled, locatives are undoubled, and $-in$ vocatives are undoubled. This is consistent with the etymologies of these categories: the verbs and participles reflect $*-ant$, $*-ans$, or $*-an(t)s$, whereas the $-in$ locatives and $-in$ vocatives reflect $*-in$.

The schemes differ in their treatment of $-an$ vocatives. On the first scheme, $-an$ vocatives are uniformly undoubled, like $-in$ vocatives, reflecting their etymology in $*-an$ (Oldenberg 1888: 424). The second scheme, after Arnold (1905: 142), maintains that $-an$ vocatives are normally undoubled, but with five lexical exceptions: “the final syllable of *maghavann* is always long by position, and *púṣann*, *rájann*, *vṛṣann*, and *sahasāvann* usually.” We refer to these five forms as Arnoldi- $-an$ vocatives. Finally, Oldenberg (1908: 486–93), responding to Arnold (*ibid.*), suggests that all $-an$ vocatives might behave alike in exhibiting a kind of middle quantity, such that they can scan as variably heavy- or light-final. The three schemes are summarized in Table 1. Checkmarks indicate that the ending is restored as heavy prevocalically (i.e., as $-Vnn$ or $-VnC$). Checkmarks in parentheses indicate that the forms “usually” pattern as doubled (Arnold 1905) or vary (Oldenberg 1908).

Table 1: Three schemes for restoring $-Vn$ endings

	Scheme I: Oldenberg 1888	Scheme II: Arnold 1905	Scheme III: Oldenberg 1908
Verbal forms in $-an$	✓	✓	✓
Locatives in $-an$ and $-in$			
Vocatives in $-in$			
Vocatives in $-an$ (Arnoldian)		(✓)	(✓)
Vocative in $-an$ (non-Arnoldian)			(✓)

In their metrically restored text, van Nooten and Holland (1994) restore $-Vn$ haphazardly. Compare, for instance, 1.80.1c, where *vajrin* starts in the fourth position of the dimeter and is undoubled prevocalically, to 8.92.13c, where it remains doubled in

³ We put aside the question of whether nn was pronounced as such at composition (as opposed to nt , nd , etc.). This article concerns itself only with whether the word was heavy-final at composition.

precisely the same context.⁴ The relevant pādas are given in (4) as per van Nooten and Holland (1994).

- (4) a. *śaviṣṭa vajrin ójasā* (1.80.1c)
 b. *áganma vajrinn āśásaḥ* (8.92.13c)

This is not an isolated case. For instance, of 12 prevocalic tokens of *vajrin*, they leave it doubled in six, whereas most schemes (Table 1) would restore it as uniformly undoubled.

This article presents new distributional arguments in support of Arnold’s position, in that Arnoldian vocatives pattern as heavy-final while non-Arnoldian *-an* vocatives do not. Moreover, we find no compelling evidence for optionality or middle quantity: Arnoldian vocatives are distributed well within the range of invariably heavy-final words, and non-Arnoldian vocatives are no more variable than other, securely light-final words.

2 Metrical localization

To investigate whether different types of *-Vn* pattern as heavy (*-VnC#*) or light (*-Vn#*), we employ localization vectors specifying the number of times that a word occurs in each metrical position. As an example, consider once again *vajrin*, and for the sake of illustration in this section, take the REGULAR DIMETER, that is, all eight-syllable pādas except the so-called trochaic gāyatrī, epic anuṣṭubh, uneven lyric, and any other pāda with a marked cadence of other than light-heavy-light-X.⁵ Furthermore, we exclude the Vālahilya, being late, and all repeated pādas after the first instance.

In this regular dimeter subcorpus of 10,286 pādas, *vajrin* occurs five times prevocalically, always starting in the fourth position, as in 1.80.1c and 8.92.13c above. Its prevocalic localization vector in this meter is therefore $\langle 0, 0, 0, 5, 0, 0, \text{NA}, \text{NA} \rangle$. The seventh and eighth positions are NA (not applicable) rather than zero because *vajrin*, being disyllabic, could not possibly begin in one of these positions and also precede a vowel within the pāda. The distinction between zero and NA matters for the statistics: the former is an informative absence, the latter an uninformative absence. The prevocalic distribution is used because it is more informative than the preconsonantal distribution about whether *vajrin* ends with *-nC#* or *-n#*, since this difference manifests in a heavy vs. light distinction only prevocalically.

The next step is to consider comparanda. If *vajrin* is light-final prevocalically, it is expected to be distributed metrically like other prevocalically light-final words, such as those in *-VC*, where *C* is taken here to be any consonant other than *n* or *ñ*. If *vajrin* is heavy-final, it is expected to behave more like *VVC*-final words, where *VV* includes a long vowel, *e*, or *o*.⁶ Moreover, we consider only comparanda that have the

⁴ The same holds for the online second edition, <http://linguistics.berkeley.edu/~gholland/rigveda/rvprt/> (retrieved October 19, 2020).

⁵ In assessing cadential filters, we ignore the weight of *Vn(n)#V*.

⁶ The originally trimoraic diphthongs *ai* and *au* are excluded because the *VC* ending would then be superheavy prevocalically, which might behave distinctly from a heavy ending (Hoenigswald 1990, Kobayashi 2001, Ryan 2021). Furthermore, *VCC* endings are not considered as comparanda

same metrical shape as the word in question, in this case, a disyllable with a heavy initial syllable, notated HX (H = heavy, L = light, X = either). This ensures that the comparanda are otherwise eligible for the same metrical positions as the critical item, modulo the ending.

Table 2 gives the localization of *vajrin* alongside its comparanda, all words in HX-*VC* and HX-*VVC*, that is, HX-shaped words that end in *VC* or *VVC*. Counts reflect only prevocalic tokens in the regular dimeter as just defined. While it is obvious that *vajrin* aligns better with its light comparanda, for other, less obvious cases, and for purposes of aggregation, it will be useful to quantify the likelihood that a word such as *vajrin* ends with a heavy vs. light syllable given the comparanda. To do so, we use a Bayesian approach,⁷ taking as priors the two comparand distributions, smoothed slightly by adding 0.01 to all non-NA cells.⁸ The present example illustrates the method.

Table 2: Prevocalic localization vectors for a critical item and two comparand sets.

		1	2	3	4	5	6	7	8
Critical item:	<i>vajrin</i>	0	0	0	5	0	0	NA	NA
Light comparanda:	HX- <i>VC</i>	251	89	200	392	0	26	NA	NA
Heavy comparanda:	HX- <i>VVC</i>	165	26	197	10	0	0	NA	NA

First, 0.01 is added to each position of the comparanda, yielding 251.01, 89.01, etc. for lights. Then, each position of the comparanda is divided by the sum of all positions in its row, yielding a probability distribution (0.26, 0.09, etc.). We then compute the likelihood that the critical item, *vajrin*, was derived from each comparand distribution. For lights, position 4 has a probability of 0.41. Drawing five tokens from position 4 thus has a probability of $0.41^5 = 0.011$. This is $p(\textit{vajrin}|\textit{light})$, the probability of observing *vajrin* distributed as such under the assumption that *vajrin* ends with a light. Doing the same for heavies reveals $p(\textit{vajrin}|\textit{heavy})$ to be 1.0×10^{-8} . The final step is to compute $p(\textit{heavy}|\textit{vajrin})$, the probability that *vajrin* ends with a heavy, using Bayes' theorem.⁹ We conclude that *vajrin* has a probability of 8.8×10^{-7} , or virtually zero, of ending with a heavy.

Going forward, our metrical corpus includes not just regular dimeter, but also REGULAR TRIMETER, that is, pādas of 11 or 12 syllables excluding repeated pādas after the first instance, the Vālahhilya, and unusual/irregular meters (viz. bhārgavī, gautamī, virāṣṭhānā, uneven lyric, 8+3, 8+4, and any 11 without an HLHX cadence or 12 without an LHLX cadence). After these exclusions, 20,585 pādas of regular

because once one puts aside doubled nasals, only a handful of *VCC* endings occur prevocalically in the RV (e.g., through sandhi in *urv iva*).

⁷ While Fisher's exact test (Gunkel 2010, Sandell 2016) would also work here in principle, in practice, it was intractable (without simulation) for some tables of the size considered below. Moreover, the present method slightly outperformed Fisher's in benchmark tests.

⁸ This addition obviates zeros, which have the potential to break this method. For example, $p(\textit{item}|\textit{heavy})$ and $p(\textit{item}|\textit{light})$ could both be zero, resulting in $p(\textit{heavy}|\textit{item})$ being undefined.

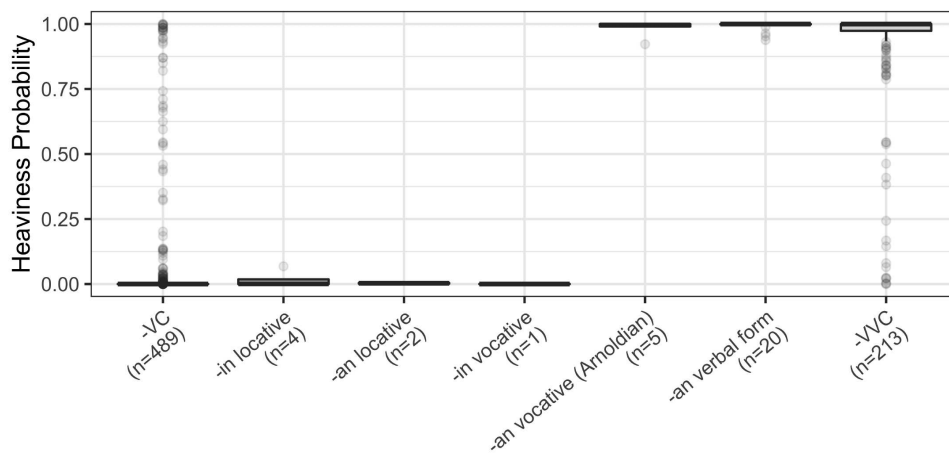
⁹ Per Bayes' theorem, $p(\textit{heavy}|\textit{vajrin}) = p(\textit{vajrin}|\textit{heavy}) \times p(\textit{heavy}) / p(\textit{vajrin})$. We assume the uninformative prior, $p(\textit{heavy}) = 0.5$. (Although heavy endings are more frequent in Sanskrit in general, we do not want to favor either outcome *a priori*.) The denominator, $p(\textit{vajrin})$, is $0.5 \times p(\textit{vajrin}|\textit{heavy}) + 0.5 \times p(\textit{vajrin}|\textit{light})$, or 0.006. Thus, $p(\textit{heavy}|\textit{vajrin})$ is 8.8×10^{-7} .

trimeter remain. Added to the regular dimeter, the full regular meter corpus comprises 30,871 pādas. Each localization vector now contains 31 positions, that is, 8 for dimeter, 11 for 11-syllable trimeter, and 12 for 12-syllable trimeter. Finally, we split each position into two cells, one pre-heavy and one pre-light (e.g., 8–1–H, 8–1–L). For example, pre-vocalic *vajrin* in regular dimeter always precedes a heavy. Thus, 8–4–H is 5 while 8–4–L is 0. Adding the weight of the following syllable improved classification accuracy under benchmarking.¹⁰

3 The weight of final - Vn

We now turn to the question of the weight of vocative ultimas more generally. Aggregate heaviness probabilities of five types of $-Vn$ words are shown in Figure 1, along with light ($-VC$) and heavy ($-VVC$) comparanda in the leftmost and rightmost columns, respectively. Each column depicts the distribution of words in its category. Each box (often flat enough to resemble a line) represents the interquartile range (25%–75%). Points are outliers. The total number of words in each category is given in its label. Only frequent words, those with sample frequencies $n \geq 4$, are included, as those are classified the most reliably. All five Arnoldian vocatives make the cutoff, but no non-Arnoldian $-an$ vocatives do. We return to the latter below.

Figure 1: Box plot for frequent (sample $n \geq 4$) words, arranged by ending type. The label of each box indicates the number of words in the category



Recall from Table 1 that several aspects of the treatment of (prevocalic) $-Vn$ are matters of consensus, namely that $-Vn$ verbal forms are heavy-final, that $-Vn$ locatives

¹⁰ Because only pre-vocalic tokens are considered, all items precede a syllable. Splitting counts into pre-heavy and pre-light improves accuracy because some metrical tendencies are syntagmatic. Imagine, for instance, that an HX word occurs once, in 8–1. Ignoring the following position (8–3), HX in 8–1 has a 77% chance of being heavy-final. But taking into account the fact that 8–3 is, say, light, HX in 8–1 has a 90% chance of being heavy-final.

are light-final, and that *-in* vocatives are light-final. All three conclusions are reinforced by Figure 1. But Figure 1 also reveals that the five Arnoldian vocatives pattern clearly as heavy-final. Thus, one of the positions in Table 1 can be rejected at this point: contra Oldenberg (1888), some *-an* vocatives—at least the Arnoldians—should be restored as heavy-final. Moreover, certain possible explanations for the heaviness of Arnoldian vocatives can already be ruled out based on Figure 1. First, their heaviness cannot be due to some aspect of the behavior of vocatives in general, given their departure from *-in* vocatives (and from certain other *-an* vocatives, as shown below). Second, their heaviness cannot be ascribed to the general phonology of final *-an*, as *-an* locatives (and certain other *-an* vocatives) are squarely light-final.

The heaviness probabilities of all *-an* vocatives attested prevocally in the regular meter subcorpus are given in Table 3. All five Arnoldian vocatives are classified as heavy-final, to which we add a sixth, *viśvakarman*. Two forms, *satrādāvan* and *śatāvan* (and less likely *ahihan*), may also be heavy-final, though their single tokens do not occupy positions that are strongly diagnostic one way or the other. Given this split between heavy- and light-final *-an* vocatives, we turn to consider what, if anything, motivates the membership in each class. Two possible factors can be set aside immediately, namely, word shape and frequency, both shown in the table. As for word shape, the same shapes can be found on both sides of the divide: LLHX, HLHX, LHX, and LLX. As for frequency, it is true that most of the heavy *-an* vocatives are frequent, while most of the light *-an* vocatives are infrequent. But there are exceptions in both directions. Note that the Bayesian method employed here is not generally biased towards light-finality for infrequent items.

Table 3: *-an* vocatives arranged from highest to lowest heaviness probability based on prevocalic tokens in regular meters. Shaded rows are indeterminate. Asterisks indicate the five vocatives singled out by Arnold (1905).

Word	Shape	Sample freq.	RV freq.	Heaviness probability
maghavan*	LLX	32	132	1.000
sahasāvan*	LLHX	5	13	1.000
viśvakarman	HLHX	1	2	1.000
rājan*	HX	10	46	0.996
vṛṣan*	LX	8	25	0.990
pūṣan*	HX	15	30	0.922
satrādāvan	HHHX	1	1	0.635
śatāvan	LHX	1	1	0.632
ahihan	LLX	1	1	0.173
aśvadāvan	HLHX	1	1	0.002
viśvasāman	HLHX	1	1	0.002
vṛtrahan	HLX	1	39	0.001
ariṣṭabharman	LHLHX	1	1	0.001
somapāvan	HLHX	1	1	0.001
vṛṣakarman	LLHX	2	2	0.000
parijman	LHX	1	1	0.000
puruhanman	LLHX	1	1	0.000

4 An account of final weight

We now turn to an account of final weight in the *-an* vocatives. First, we ask whether Brugmann’s Law could be responsible for heavy-final forms. After rejecting that possibility, we consider whether there is evidence for the analogical extension of *n*-doubling along word-formational lines. We find that it may have been extended to animate *-ān*-stems of the type *rājan*, *vṛṣan*, *pūṣan*, and perhaps also to compounds of the type *viśvākarman* and *satrādāvan*. We then suggest that *-nt*-stems are the source of the heavy-final forms. Finally, we identify several source candidates, including /maghavant/ and /rājant/, and suggest how *-ann* was extended analogically. They include relatively general extensions as well as more local ones, e.g., *maghavann indra* » *vṛṣann indra*.

Where relevant, we reference the stratum according to Arnold’s *Vedic Meter* (1905), on the one hand, and Oldenberg’s *Prolegomena* (1888) and *Noten* (1909–1912), on the other. From oldest to youngest, Arnold’s strata are Archaic (A), Strophic (S), Normal (N), Cretic (C), and Popular (P); lower case indicates that Arnold assigned the stratum based on metrical evidence alone. Oldenberg’s six strata follow his reconstruction of the *assembly* of the Saṃhitā text.¹¹ This is related to but distinct from a linguistic stratification.¹² In what follows, the notation “[P, 5]” shows that Arnold assigned the passage to the Popular stratum, and Oldenberg assigned it to the fifth Saṃhitā assembly stratum.

4.1 Brugmann’s Law as a source of weight?

A number of the heavy-final vocatives continue former *o*-grade **-on*. Specifically, *viśvākarman* and *rājan* continue **-mon* and **-on*, respectively; it is conceivable (if unlikely) that *pūṣan* continues **-on*,¹³ and it is likewise possible, at least, that *maghavan*, *sahasāvan* and *śatāvan* continue **-uon*. This obligates us to consider whether some heavy-final vocatives arose via Brugmann’s Law, which lengthened inherited **o* in open syllables in Indo-Iranian, e.g., **h₃rē.ġo.nm̄* > *rājāna[m]*, and might have originally applied across word boundaries such that **h₃rē.ġo.n#V* > *rājān#V* (versus **h₃rē.ġon.#C* > *rājan#C*). One could imagine the following sort of scenario (which we will eventually reject). By the time of the composition of the Ṛgveda, the alternation *-ān#V* ~ *-an#C* was morphologically restricted, as with other reflexes of Brugmann’s Law (e.g., perfect *cakār-a* ~ *cakār-tha*), and perhaps also lexically restricted (see below on *ha*). The poets knew and produced prevocalic vocatives in *-ān*, i.e., Arnoldian vocatives such as *rājān*. During the post-compositional transmission of the text, morphologically irregular vocatives (e.g., **rājān*) were replaced with mor-

11 See Oldenberg 1888: 191–270; see also Witzel 1995: 308–11 and Jamison and Brereton 2014: 10–13.

12 For a rough linguistic stratification, Oldenberg suggests collapsing the strata as follows: 1–4 (books 1–9 minus late additions/Anhänge); 5 (book 10 minus additions); 6 (additions to all books).

13 See the etymological treatments of Oettinger 2000: 393 and Malzahn 2014: 163, which implicitly allow for the possibility that the vocative continues **-on*, while the accusative singular and nominative plural were analogically remodeled to *pūṣānam* and *pūṣānaḥ*, respectively, versus the **pūṣānam* and **pūṣānaḥ* that would regularly continue **puh₂sh_xónm̄* and **puh₂sh_xónes*.

phonologically regular ones (e.g., *rājan*).¹⁴ Like all forms in $-Vn$, they were subject to the post-compositional n -doubling process, yielding $rājann\#V$ and the like.

On closer consideration, however, Brugmann’s Law proves to be an unlikely source of final weight in $-an$ vocatives. The only well-studied R̥gvedic reflex of the application of Brugmann’s Law across word boundary,¹⁵ namely the lengthening of $*g^h o\#CV > ghā\#CV$ (Hale 1999), is different in at least one crucial respect. Hale provides independent evidence “that monosyllables regularly form a close prosodic unit with the lexical items to which they are adjacent” (p. 148), and concludes that “the same close juncture over which the RUKI rule operates also licenses Brugmann’s Law effects” (p. 150). Hale has treated the close junctures in question in several publications. In addition to the juncture between a monosyllable and an adjacent word, they include junctures between a postposition and a non-branching N complement,¹⁶ genitive and noun,¹⁷ preverb and verb,¹⁸ and host and clitic.¹⁹

We never find those relationships between the heavy-final vocatives and the following lexical item. Instead, we typically find very loose junctures. To get a sense of this, we can briefly survey the juncture between our five potential $*-on$ vocatives (*viśvakarman*, *rājan*, *pūṣan*, *sahasāvan*, *śatāvan*) and the following vowel-initial word. In 55 of the 71 instances, the vocative phrase ends after the Arnoldian vocative, such that the juncture is equivalent to an intonational phrase boundary (*vel sim.*), e.g.,

yé tvāhīhātye maghavann āvardhan
 “Those who strengthened you at the serpent-smashing, bounteous one” (3.47.4a)

māhām rājann anyākr̥tena bhojam
 “Let me not suffer for what was done by another, o king.” (2.28.9b)

In the remaining 16 instances, the following word does belong to the vocative phrase. We find adjective-noun, adjective-adjective, and noun-adjective junctures, but never any of the close junctures listed above: *maghavann indra (girvanah)* “bounteous Indra (longing for song)” (10x), *maghavann ṛjīṣin* “bounteous possessor of the silvery drink” (3x), *pūṣann āghṛṇe* “glowing Pūṣan” (2x), and *sahasāvann amartīya* “overpowering immortal.”

Finally, it is worth noting that there is an additional reason why Brugmann’s Law would not have applied to a subset of the junctures in question: a word-initial laryngeal would have closed the syllable at the relevant time, e.g., $*-uon. h_2r.ḡi- > -van ṛjī-$.²⁰

14 Cf. replacements such as $*yásmi \gg yásmīn$ (Arnold 1905: 144); $*kriṇā-$, $*druṇā-$, $*priṇā-$, etc. $\gg kriṇā-$, $druṇā-$, $priṇā-$, etc. (Oldenberg 1888: 477–8 with references, Arnold 1905: 131); $*mimi-$ $\gg mīmī-$ (Gunkel 2018).

15 It is unclear whether Brugmann’s Law is ultimately responsible for 1pl. perfect forms in $-mā$ (e.g., *cakṛmā*). For discussion, see Kümmel 2000: 42, Jasanoff 2003: 32, and Krisch 1996: 262.

16 Hale 1990: 83, 90; 1996: 190–1; 1998: 215, 220–1; 2007: 206.

17 Hale 1990: 83–4, 90; 1998: 220.

18 Hale 1990: 86, 90; 1998: 215–20; 1999: 148.

19 Hale 1990: 87, 90; 1999: 148, 149.

20 Since word-initial $*h_2$ is apparently continued by h and x in Southwestern varieties of Iranian (Kümmel 2018: 166), it must have still been present at the time that Brugmann’s Law applied.

4.2 Analogical extension by word-formation type?

By classical Sanskrit, the prevocalic n -doubling sandhi process applied to $-Vn$ regardless of whether it was etymologically justified $< *-Vnt$, $*-Vn(t)s$ or not $< *-Vn$. The Arnoldian vocatives show that by the time the Ṛgveda was composed, prevocalic $-ann$ had already been extended beyond its original bounds. It is thinkable that n -doubling was extended by the sort of analogy that is sensitive to word-formation type. If we had a much larger corpus of Ṛgvedic Sanskrit that was all composed at roughly the same time by a single poet, that would be easy to recognize. Word-formation types would all be situated on one side of the heaviness divide or the other. Classes as yet unaffected by the extension would be on the light-final side, and classes affected by the extension would be on the heavy-final side, with the exception of lexicalized items (relics). Given the size and nature of the text, the actual picture is less clear.

There is a trio and a duo situated on the heavy side of the divide that could in theory represent morphological classes. Given their size, that is far from certain. The trio *rājan*, *pūṣan*, and *vṛṣan* could represent a class of animate $-ān$ -stems.²¹ The duo *sahasāvan* and *śatāvan* could represent the class of possessive adjectives in $-vān-$ \sim $-v(a)n-$. The morphological analysis of those two forms is disputed, though, and we argue below that they are more likely possessive adjectives in $-vant-$ \sim $-vat-$.

There is one word-formation type that clearly straddles the heaviness divide, namely possessive compounds with second compound members in $-mān-$ \sim $-m(a)n-$ ($< *-mon-$ \sim $-mn-$), which are also used as personal names. On the one hand, we find a heavy-final prevocalic vocative to

viśvā-karman- ‘possessing/accomplishing all that’s made
→ (god) Viśvakarman’

in an 11-syllable verse in 10.81, a hymn that Arnold assigned to the popular stratum:

yā madhyamā viśvakarman utémā
“and these [domains, –G&R] that are your midmost, Viśvakarman”
(10.81.5b [P, 5])

On the other hand, we find light-final prevocalic vocatives to the remaining members of that word-formation type, all of which occur in hymns assigned to earlier strata, i.e.,

viśva-sāman- ‘p/a all songs → (poet) Viśvasāman’ (5.22.1a [A, 1])
ariṣṭa-bharman- ‘p/a an unharmed burden’ (8.18.4b [A, 2])
puru-hanman- ‘p/a many blows → (poet) Puruhanman’ (8.70.2a [A, 3])
vṛṣa-karman- ‘p/a bullish deeds’ (1.63.4b [A, 2], 1.130.10a [s, 2])

²¹ Their morphological homogeneity is somewhat compromised by differences in synchronic accent and ablaut characteristics. To focus on suffix ablaut, *rājan* has $-ān-$ \sim $-n-$ (e.g., sg. acc. *rājānam*, dat. *rājñe*), *pūṣan* has $-an-$ \sim $-n-$ (e.g., sg. acc. *pūṣānam*, dat. *pūṣñe*), and *vṛṣan* exhibits variation that reflects a transfer from the former to the latter (e.g., sg. acc. *vṛṣanam* and *vṛṣānam*, dat. *vṛṣñe*). On the transfer of *vṛṣanam* to *vṛṣānam*, see Peters 1993 and Vine 2005.

There may be a second word-formation type that straddles the heaviness divide, i.e., compound verbal adjectives with a second member in $-v\check{a}n-$ $\sim -v(a)n-$ ($< *-\underline{u}on-$ $\sim -\underline{u}n-$). On the one hand, there is a chance that we have a heavy-final vocative to

satrā-dāvan- ‘giving completely’ (1.7.6b [s, 3])

in the following gāyatrī (8-syllable) stanza. Note that *vṛṣann*, a securely Arnoldian *n*-stem vocative, occupies the same metrical position as *-dāvann* in the preceding pāda, and that *vṛṣann* and *sātrādāvann* both refer to Indra.

sá no vṛṣann amúṃ carúṃ
sātrādāvann ápā vṛdhi
asmábhyam ápratiṣkutaḥ
 “You bull who give in every way, uncover yonder pot for us, since you are one
 who cannot be repulsed.” (1.7.6)

On the other hand, we find light-final prevocalic vocatives to the two other members of the type, i.e.,

aśva-dāvan- ‘horse-giving’ (5.18.3d [A, 1])
soma-pāvan- ‘soma-drinking’ (1.55.7a [S, 2])

In sum, it is possible but far from certain that *n*-doubling has been extended to the class of animate $-\check{a}n$ -stems. It is likewise possible that doubling is in the process of being extended to compounds of the type *viśvākarman-* and perhaps also compounds of the type *satrādāvan-*. But where did the weight originate?

4.3 *nt*-stems as a source for weight

The surprising feature of Arnoldian vocatives, i.e., a final syllable that is heavy in prevocalic position, would be normal, of course, if they originally ended in *-ant* (rather than *-an*). This turns out to be a plausible source of weight for a number of them.

Before we embark on a discussion of individual forms, we should recall some basic facts about the singular vocative to adjectives in $-v\check{a}n-$ $\sim -v(a)n-$, on the one hand, and $-vant-$ $\sim -vat-$, on the other (cf. Lanman 1880: 519–20, 536). The singular vocative to the $-v\check{a}n$ -stems is *-van*, e.g., *somapāvan* (: *somapāvan-* ‘soma-drinking’). In the Ṛgveda, the singular vocative to the $-vant$ -stems is usually *-vaḥ*, e.g., *harivaḥ* (: *hārivant-* ‘possessing fallow bays’); from a synchronic standpoint, *-vaḥ* is suppletive. By the Atharvaveda already, *-vaḥ* has been replaced with synchronically regular *-van*, which was doubtless generated on the familiar model of stem plus zero ending. In the Ṛgveda already, beside *-vaḥ* there are a number of plausible, if not certain, examples of *-van*. To judge by Lanman’s list (p. 520), which includes *sahasāvan*, they make up 18% by lexeme, 7% by token.

sahasāvan, śatāvan

sahasāvan is only attested in the singular vocative, and could therefore belong to a stem *sahasāvant-* or *sahasāvan-*. It is difficult to decide, because we need to consider not only the Ṛgvedic rarity of vocatives in *-van* to stems in $-vant-$, but also

the productivity of *-vant-* vs. *-van-* as a formant of possessive adjectives,²² the likelihood of finding an instrumental case form as a derivational base to *-vant-* vs. *-van-*,²³ etc. Consequently, *sahasāvan* is variously analyzed in the handbooks. For example, in AiGr2.2 it is once analyzed as *-vant-* (885), later as *-van-* (902), and in between as *possibly* belonging to a *-vant-* stem (893).²⁴ In our view, the strong evidence for prevocalic *sahasāvann*, which could not have been taken into account before Arnold 1905, points decidedly in favor of *sahasāvant-*. The following two examples are representative: the poets usually locate *sahasāvan* immediately after the early caesura in trimeter verse; we also find it twice pāda-initially in 8-syllable verse. Note that the final heavy syllable realizes the beginning of the cadence $_ \cup _ \times$.

t_uvám agne vanuṣyató ní pāhi
t_uvám u naḥ sahasāvann avadyāt
 “You, Agni—protect (us) from the rapacious one, and you, mighty one—
 (protect) us from reproach.” (6.15.12ab [A, 1] = 7.4.9ab [S, 1])
úrjo napāt sahasāvann iti tvā
o_upastutásya vandate vṛṣā vāk
 “‘O child of nourishment, mighty one’—so does the bullish speech of Upastuta
 extol you.” (10.115.8ab [A, 5])

śatāvan is likewise only attested in the singular vocative and could therefore belong to *śatāvant-* or *śatāvan-*. It is also treated variously in the handbooks.²⁵ It is only attested once, however, and its heavy-final status is indeterminate.

maghavan

The paradigm of *maghāvan-* ‘bounteous’ is irregular in a number of ways.²⁶ Consider pl. nom. *maghāvān-aḥ*, acc. *maghón-aḥ*, instr. *maghāvad-bhiḥ*. The strong stem allomorph is regular in *-van-* stems, and the preconsonantal weak stem allomorph is regular in *-vant-* stems; the combination of the two in the same paradigm is irregular. The prevocalic weak stem allomorph *maghón-* is likewise synchronically irregular. Internal reconstruction and comparison with Avestan **magauuan-* ~ *magaon-V/magauua-C* suggests that the *-vant-* stem morphology is an Indic innovation. Given the presence of *-van-* and *-vant-* stem morphology in the paradigm, the vocative *maghavan* may be interpreted as /maghavan/ or /maghavant/. The strong evidence for prevocalic *maghavann* points to the latter. The following examples are typical; the poets usually place *maghavan* after the early or late caesura in trimeter verse.²⁷

enā mandānó jahí śūra śátrūñ
jāmím ajāmím maghavann amītrāñ

22 On the productivity of *-vant-*, see Sandell 2015: 184 and 2016: 143 n. 2, 156.

23 See AiGr2.2 885 on *sahasāvan* and *śavasāvan* as de-instrumental *-vant-* stems.

24 PW takes it as *-vant-*, PW as *-van-*, Grassmann as *-van-*, Lanman as *-vant-* (1880: 520).

25 PW and PW as *-vant-*, Grassmann against the padapāṭha “aus śata-avat zusammengezogen, *hundertfach helfend* [ávat Part. von av],” Lanman as *-vant-*, AiGr3 258 as not *-vant-*.

26 See Meißner 1993 with references.

27 The ratio of post-early to post-late is ca. 2:1.

“Becoming exhilarated by it, o champion, smash your rivals and your foes,
both kin and nonkin, o bounteous one.” (6.44.17 [A, 1])

*vīśvét tā te sāvaneṣu pravācīyā
yā cakārtha maghavann indra sunvaté*

“All these (deeds) of yours are to be proclaimed at the pressings, those which
you did, bounteous Indra, for the presser” (8.100.6ab [P, 3])

rājan

The etymologically “correct” prevocalic vocative to *rājān-* is of course *rājan*, but there is also a thematic present *rājati* ‘rules’, whose active participle is *rājant-* ‘ruling’, whose proper prevocalic vocative would be *rājann* ← /rājant/. Quirkily, in the sense ‘rule over’, *rājati* takes a genitive object, e.g., *yá éko vásvo váruṇo ná rājati* “(Agni,) who alone rules over the good, like Varuṇa” (1.143.4d, G&R). Thanks to those facts and the diaskeuasts’ over-application of *n*-doubling, prevocalic *rājann* as transmitted in the Saṃhitā text is ambiguous between the noun and the participle, at least at first glance. In the following example from the first of the Śunaḥśepa hymns, where *rājann* refers to Varuṇa, the participle *kṣáyann* ‘holding sway’ at the beginning of the preceding pāda invites us to consider taking *rājann*, which is roughly synonymous with it and occupies the same metrical position, as a participle as well.

*kṣáyann asmábhyam asura pracetā
rājann énāṃsi śísraṭhaḥ kṛtāni*

“Holding sway, attentive lord, you will let loose for us, o ruling one, the sins
committed.” (1.24.14cd [P, 3], G&R)

It is true that vocatives to participles are relatively rare with the exception of certain lexical items such as *dīdivaḥ* ‘shining’ (6x), *cikitvaḥ* ‘attentive’ (11x), and above all *pavamāna* ‘self-purifying’ (64x). Nevertheless, they are attested, and there is a relatively secure example of a singular vocative to an *-ant*-participle earlier in the same hymn,²⁸ namely *sádāvan*, which the Padapāṭha interprets as /sádā avant/ “ever helping” (1.24.3c).²⁹

*abhí tvā deva savitar
īśānaṃ vārīyāṇāām
sádāvan bhāgām imahe*

“We beg you, god Savitar, as the master of desirable things, for a portion, o
ever helping one.” (1.24.3, G&R)

If we follow the Padapāṭha, *sádā_avan* “ever helping” and *táva_avasā* “through your help” form a ring that connects the initial and final stanza of the section of 1.24 that is dedicated to Savitar.

28 Despite the different meters, we are dealing with one and the same composition, which has a section to Agni (triṣṭubh), Savitar (gāyatrī), and Varuṇa (triṣṭubh); see Oldenberg 1888: 126 and Jamison and Brereton 2014: *ad loc.*

29 For other possibilities, including voc. to *sa-dā-van-* (cf. *sa-jūt-van-*, *sa-yúg-van-*), and older references, see Oldenberg *Noten* *ad loc.* and AiGr2.2 895.

*bhágabhaktasya te vayám
úd aśema távāvasā
mūrdhānaṃ rāyá ārabhe*

“We would reach upwards to (a portion) of that apportioned by Fortune through your help, in order to take hold of the head of wealth.” (1.24.5)

Returning to *rājant-*, in non-vocative singular case forms, the participle regularly refers to or describes Agni.

rājantam adhvarāṇāām
“ruling over rites” (1.1.8a = 1.45.4c, G&R)

agnīṃ rājantaṃ diviyéna śociśā
“Agni ruling with his heavenly flame” (3.2.4d, G&R)

rājantam agnīṃ yajatám rayīṇām
“worship-worthy Agni, ruling over riches” (6.1.8d, G&R)

*tigmājambhāya tārūṇāya rājate
prāyo gāyas;y agnāye*
“To the sharp-fanged one, the ruler of tender age—to Agni do you sing delight.”
(8.19.22ab)

This makes it particularly plausible that prevocalic *rājann* can be understood as the vocative to *rājant-* where it refers to or describes Agni.³⁰ For instance, in 1.79.4–6, after Agni is described with another semi-synonymous participle that takes genitive objects, namely *īśāna-* ‘being lord’,

*agne vājasya gómata
īśānaḥ sahaso yaho*
“O Agni, being lord of the bovine prize, o youthful (son) of strength”
(4ab, G&R)

it seems perfectly possible to take *rājann* as a participle, e.g.,

*kṣapó rājann utá tmánāā
agne vāstor utóśásaḥ
sá tigmajambha rakṣáso daha práti*
“Through the nights, o ruling one, and by yourself at the dawning of dawn, o Agni, burn away the demons, o sharp-fanged one.” (1.79.6 [a, 2], G&R)

In sum, we suggest that prevocalic *-ann* < **-ant* is plausible for a subset of the Arnoldian vocatives, i.e., *maghavan*, *sahasāvan*, and *śatāvan*, as well as some instances of *rājan*.

³⁰ The participle *rājant-* is used of other deities as well: *rājantī* of the World-Halves at 6.70.2, and *rājantau* of the Aśvins at 8.8.18. This allows for the possibility that prevocalic *rājann* can be understood as a vocative to *rājant-* where it refers to or describes deities other than Agni, too.

4.4 Analogical extension

While some examples of prevocalic *rājann* may actually be vocatives to the participle *rājant-*, it is unlikely that there were enough to result in a heaviness-probability of 0.996. We may have to do with a type of metrical lengthening involving “the extension of a length alternation from one set of morphological forms to another, related, set for metrical convenience—a type of morphological analogy restricted in this case to the poetic grammar” (Hale 1999: 146). To express it in terms of a four part analogy (which he did not), Hale’s example was

$$gha \text{ CC} : ghā \text{ CV} :: ha \text{ CC} : x \text{ CV}, x = hā.$$

In our case, it would be

$$\text{participial } rājan \text{ C} : rājann \text{ V} :: \text{substantival } rājan \text{ C} : x \text{ V}, x = rājann.$$

Given the possibility that all animate *-ān-*stems are Arnoldian, the analogy may have (eventually) been more general than that, i.e.,

$$\text{participial } -an \text{ C} : -ann \text{ V} :: \text{substantival animate } -an \text{ C} : x \text{ V}, x = -ann,$$

and it may not have been restricted to the poetic grammar. In other words, it is possible that the alternation was extended from *-ant-*stems to *-ān-*stems at one point in time. That more general analogy would have produced prevocalic *rājann*, *pūṣann*, and *vṛṣann*.

$$maghavann \text{ indra}, vṛṣann \text{ indra}, vṛṣann \text{ indo}$$

We now turn to alternative (not mutually exclusive) possibilities involving less general, more local, analogy. *maghavan* is by far the most frequent Arnoldian vocative, and prevocalic *maghavann* from /maghavant/ may have been established as early as the earliest Ṛgvedic compositions, since the introduction of *-vant-*stem morphology to its paradigm predates the Ṛgveda. Prevocalic *maghavann* participates in two recurring vocative phrases. The one is *maghavann indra* “bounteous Indra” (8x), which is invariably located after an early caesura in trimeter verse, e.g.,

$$māndantu \text{ tvā } maghavann \text{ indr}_a \text{ é}_i \text{ndavo}$$

$$rādhodéyāya \text{ sunvaté}$$

“Let the drops exhilarate you, bounteous Indra, to give largesse to the presser.”
(8.4.4.ab [S, 2])

The poets sometimes extend the phrase to *maghavann indra girvaṇaḥ* “bounteous Indra longing for songs” (2x),³¹ where it stretches from the early caesura to the end of the 12-syllable pāda, e.g.,

$$sá \text{ tvám } no \text{ maghavann } indra \text{ girvaṇo}$$

$$venó \text{ ná } śṛṇudhī \text{ hávam}$$

³¹ The extended phrase is also found four times in the Vālakhilya.

“You, o bounteous Indra longing for songs—like a tracker listen to our call.”
(8.3.18cd [S, 2])

The vocative phrase *vṛṣann indra* is attested three times. This raises the possibility that *maghavann indra* inspired *vṛṣann indra* in contexts where the god is presented more as the bullish soma drinker than as the bounteous distributor of wealth, e.g.,³²

vṛṣann indra vṛṣapāṇāsa índava
imé sutá ádriṣutāsa udbhidas
túbhyaṃ sutāsa udbhidaḥ

“O bull Indra—these pressed drops, the drink of a bull, pressed by the stones, are bursting out—for you are the pressed (drops) bursting out.”
(1.139.6abc [N, 6?])

á yāh_iy ádribhiḥ sutáṃ
sómaṃ somapate piba
vṛṣann indra vṛṣabhir vṛtrahantama

“Drive hither. Drink the soma pressed with stones, you lord of soma—bullish Indra, with your bulls, best smasher of obstacles.” (5.40.1c = 2c = 3c [A, 6?])

It is furthermore thinkable that once established, *vṛṣann indra* could have facilitated the creation of *vṛṣann indo* “o bull drop,” whose referent is Soma.

punāná índav á bhara
sóma dvibárhasaṃ rayím
vṛṣann indo na ukth_iyám

“Being purified, o drop, bring hither double-lofty wealth—o Soma, bullish drop—bring us wealth worthy of hymns.” (9.40.6 [N, 4])

maghavann ṛjīṣin, vṛṣann ṛjīpin

The other recurring vocative phrase with prevocalic *maghavann* is *maghavann ṛjīṣin* (3x),³³ whose referent is likewise Indra, e.g.,

asmé prá yandhi maghavann ṛjīṣinⁿ
índra rāyó viśvāvārasya bhūreḥ

“Offer us (a portion) of abundant, all-desirable wealth, o bounteous Indra of the silvery drink.” (3.36.10ab [c, 1])

It is also thinkable that the existence of *maghavann indra*, *vṛṣann indra*, and especially *maghavann ṛjīṣin* could have facilitated the coinage of a coreferential, phonologically similar *vṛṣann ṛjīpin* in the following, very bullish stanza about Indra and Soma.

vṛṣā sótā sunotu te
vṛṣann ṛjīpinⁿ á bhara

32 Note that in 12-syllable pādas with an early caesura, an opening rhythm ◡_◡_◡ is 4.5x as frequent as ◡_◡_◡.

33 The meaning of *ṛjīṣin-* is difficult to establish. See EWAia s.v. *ṛjīṣá-*.

vṛṣā dadhanve vṛṣaṇam nadīśuv ā
túbhyaṃ sthātar harṇāām

“Let the bullish presser press for you; o bull, flying straight—bring (prizes) here. The bull has run to the bull in the waters. It [=soma] is for you, o mounter of the fallow bays.” (8.33.12 [S, 2])

In this connection, it is worth noting that Werba suggested that *ṛjīśín-* arose by contamination of *ṛjīpyá-* and *ṛjīpín-* (p.c. apud EWAia s.v. *ṛjīpín-*).

pūṣan

The only recurring vocative phrase that *pūṣan* participates in is *pūṣann āghrṇe* “o glowing Pūṣan” or “o Pūṣan, glowing one” (2x). There are no obvious points of contact between that phrase and the others mentioned above. We are left with the fact that *pūṣán-* is an animate *-ān-*stem with a divine referent. In addition to the general extension from participles, extension from a particular lexical item is thinkable, e.g., *rājan C : rājann V :: pūṣan C : x V, x = pūṣann*.

5 Conclusion

Arnold (1905) posits a lexically conditioned split in *-an* vocatives in the RV such that five items are to be restored as heavy-final (*-ann*) prevocalically, namely, *maghavan* (always) and *pūṣan*, *rājan*, *vṛṣan*, and *sahasāvan* (usually); all others are to be restored as light-final (*-an*) prevocalically. Oldenberg, by contrast, rejects a lexically conditioned split, favoring uniformly light *-an* (1888) or free variation across all *-an* vocatives (1908).

Based on new distributional and poetic evidence, we find strong support for Arnold’s position over Oldenberg’s. Further, we propose two refinements to Arnold’s classification. First, we find no support for his distinction between “always” and “usually.” The Arnoldian vocatives, we maintain, can be restored uniformly as heavy. Second, we expand Arnold’s list of heavy-final *-an* vocatives to eight in total, namely, *maghavan*, *pūṣan*, *rājan*, *vṛṣan*, *sahasāvan*, *viśvakarman*, *satrādāvan*, and (most likely) *śatāvan*.

The second half of the article considers the historical motivation for the observed split in *-an* vocatives. We favor an account by which some *-an* vocatives were in fact vocatives to stems in *-ant-* originally, explaining their weight. The remaining Arnoldian tokens can be ascribed to analogical extension from the *-ant-*stem forms, as we support by adducing morphological and poetic parallels between the unextended and extended forms. To be sure, extension is needed under any scenario, as the heavy-final forms are eventually (post-RV) fully generalized. The bifurcation in *-an* vocatives in the RV demonstrates that the extension of heavy-finality was underway but incomplete at the time when that corpus was composed.

Abbreviations

- AiGr2.2 Wackernagel, Jacob and Albert Debrunner. 1954. *Altindische Grammatik*. Bd. 2,2: *Die Nominalsuffixe*. Göttingen: Vandenhoeck & Ruprecht.
- EWAia Mayrhofer, Manfred. 1986–2000. *Etymologisches Wörterbuch des Altindischen*. 3 Bde. Heidelberg: Winter.
- PW Böhrtlingk, Otto and Rudolph Roth. 1855–1875. *Sanskrit-Wörterbuch, herausgegeben von der kaiserlichen Akademie der Wissenschaften*. 7 Bde. St. Petersburg: Eggers. <http://www.sanskrit-lexicon.uni-koeln.de/scans/PWGScan/2013/web/index.php>.
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