

THE PERFORMANCE PRACTICE OF THE RIG-VEDA: A MUSICAL EXPRESSION OF EXCITED SPEECH

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The Veda, as is well-known, is the religious lore of ancient India, crystallized during ten centuries, from about the fifteenth to the fifth century B.C.E., and compiled in four collections: The Rig-Veda (collections of hymns), the Sāma-Veda (hymns with notated melodies), the Yajur-Veda (verses and prose formulae, with or without meaning used during sacrificial rites) and the Atharva-Veda (magical formulae and spells). For the participants, the actual performance is of supreme importance and not to be separated from the text. The musician, observing the Vedic cantillation especially that of the Rig-Veda assigns it a special place among the various kinds of musical expression of the world, and it has been the object of much research. However, although much has been published in this field on a descriptive level, with some attempts at a deeper analysis, little has been done to reveal the basic principles which govern the Vedic cantillation. In this study I shall try to summarize the characteristics of the Rig-Veda cantillation and discuss certain problems which arise from these characteristics as well as the implications for more general musical issues. I will also present an analysis of one specimen of chant practice (Rig-Veda 1.12) performed by the Nambudiris, a Brahmin sect in the state of Kerala in Southwest India, which may perhaps serve as a starting point for a more comprehensive study.¹

- 1 The first Western investigator in this field was M. Haug (1863), who concentrated mainly on the meaning of the accents. Since then many other scholars have approached this study from many different points of view. Of these, one is a comprehensive work on the reading variants in the repeated mantras of the Veda (Bloomfield 1930); other studies include the research of A. A. Baskin (1935, 1957) who was one of the first scholars to record and analyze Vedic chants in India, and many recordings in various institutes in India (see the list in Staal 1971: 87-97). In recent years all the Nambudiri traditions, which might otherwise have been lost, were recorded (see Howard 1977: 200); two albums of records with an accompanying explanation appeared on the Western market (Stall 1969; Danielou I); and most comprehensive work on the Sāma-Veda was carried out by Howard (1977). This also contains many musical examples (covering more than 200 pages) of various performances transcribed from recorded tapes. Specific research on the performance of the Rig-Veda was undertaken in the very detailed studies of Grey (two articles in 1959) and by Staal (1961, 1969) which are the main sources for this paper.

The main characteristics of the Rig-Veda may be summarized as follows:

Close relation to the domain of speech, as shown by 1) the prime importance attached to the human voice as the source of both music and language; 2) the acoustic presentation; a form of expression lying between speech and music, which can be described as 'musical speech' or 'spoken music'; 3) the direct contribution to the formation of the melodic line provided by the particular organization of the spoken raw material, namely the words, syllables and phonemes.

Close relation to the extra-musical environment. 1) Relation to rites and ceremonies (different hymns are performed on different occasions, and are considered an integral part of the ritual),² and relation to religious and social rules which determine who performs the various parts. 2) Extra-musical significance of the actual performance. Every deviation from the "correct" performance becomes a potential catastrophe which, in the view of the performers and the "participating" listeners, may disturb the harmony of the cosmos. The singing is therefore saturated with excitement and tension.

Ideal of adherence to exact performance in a tradition which is both oral and highly complex. The whole Veda is an outstanding example of oral tradition.³ There is some theory of performance and even some sort of notation; however these serve only as the crudest guides.⁴ Not only is the style of performance learnt orally but so is the text itself. It is taught through special discipline and training involving rigorous and continuous repetition even at a stage where the meaning of the text is not understood; though this comes at a later stage.⁵

- 2 The Vedas in general are performed either as part of the sacrifice in the rite, or separately (Howard 1977: 14).
- 3 The subject of Veda notation is still obscure. There is as yet no concrete evidence for the existence of a notation to the text before the 11th century A.D. (Howard 1977: 5).
- 4 A much more elaborate system for learning the rules of performance has been developed through the movements of the hands (*kaikatuka*) and the fingers (*mudra*). For a detailed description with many photographs of the *kaikatuka* and the *mudra* of the Sāma-Veda of the Nambudiri and other traditions in Southern and Northern India see Howard 1977: 220-248, 78-92. In the Nambudiri tradition the learning of the Rig-Veda is accompanied also by head movement (Staal 1969: 14).
- 5 Learning by rote is deeply rooted in India. Even the scriptures of the classical grammarian Pānini (dated between 400 to 250 B.C.) are first learned by memorizing the text without understanding it; they are comprehended only later. Many researchers have remarked on the role of oral transmission in India in contrast to the role of written transmission of the Holy scriptures in the cultures associated with monotheistic religions: Staal 1961:12; Howard, 1977:2-6; Prof. L. Rocher, from the University of Pennsylvania, in private conversation with me. I have also had the unique experience in India of hearing examples of the rendering of texts learnt by rote.

Some of the important parameters of the musical style are not easily notated: timbre (including certain speech-sounds), changes in the dynamics, subtle changes in pitch (including glissando, vibrato, etc.). These latter parameters are mainly important in momentary emphasis and generally play a less prominent part in the long-range musical organization.

Ancient tradition. The Vedic tradition has been jealously preserved, in secrecy, among groups isolated from each other and from the society around them. This, together with the relatively ancient origin of the Vedic chants, particularly of the Rig-Veda itself, suggests that the Rig-Veda cantillation is one of the oldest living musical traditions.⁶

The characteristics listed above are very general. We find them in various social traditions in different parts of the world. However, the unique combination of all of the above, or even excluding the last one (ancient origin), characterizes the Vedic cantillation alone. Interestingly, the greatest similarity to the Veda is found in the recitation of the Samaritans. It is remarkable to note that J. Xenakis's *Nshima* (composed for the "Testimonium," Jerusalem, 1974), which is based on abstract and complicated rules for combining musical parameters, shows a resemblance to some sections of the Rig-Veda, although the composer, in answer to my question, affirmed that he had never heard the music of the Veda, and did not in fact know of its existence.

A closer examination of the characteristics of the Rig-Veda cantillation shows that theory, practice and their interrelation differ from school to school and according to geographical location. One even finds some differences in performance within a single group. There seems to be a degree of correlation between the "severity" of the theoretical laws and their enforcement in practice, and the "severity" of the social rules which determine who performs what, and when; though this matter, and many others, have yet to be examined comprehensively.

The chants of the Rig-Veda can be analyzed according to two kinds of components, one kind belonging to the domain of speech and the other to the domain of music. But there is a very close interaction between them, unique to the Rig-Veda.

In the following I shall briefly describe the "rules of choice" applying respectively to the phonetic components, the musical components and their inter-relationship. Because of their intrinsic complexity and the occurrence of many

6 One should remember that in discussing ancient Indian tradition an error in dating any historical event may involve more than several hundred years. Thus, as an extreme example, the famous Bharata's *Nāṭya-sāstra* (the oldest Indian book to contain music theory) was written "sometime" between the second century B.C. and the sixth century A.D. (see Wade 1979:14). The Rig-Veda itself was probably composed during hundreds of years and several scholars (e.g., Arnold 1905) have attempted to reconstruct the internal chronology of this collection of texts.

kinds of deviations, many of these rules have not yet been clearly formulated.⁷

I shall give a very general description of the extra-musical framework of the Vedic rite, although this will not enter into my theoretical discussion. However, one should know the extra-musical framework and, in a more comprehensive study, take it into account. My description is based on an account given to me by Mr. K. R. Venkatesan a most learned priest and a master of vedic ceremony in Madras, to whom I am deeply indebted. I hope his contribution of evidence to the discussion of a living tradition will prove useful to others as well.

I. COMPONENTS OF THE RIG-VEDA

The Extra-musical Framework

The recitations and chantings of the various Vedas are set into a framework determined partly by set dates (of the lunar calendar), and partly by various national or personal events, such as weddings, funerals, etc. The performers of the rites must undergo a most intensive and lengthy period of study. For ten years (from the age of eight to 18), the priestly candidates pursue their studies in small groups of four or five pupils. For many hours each day they study the Veda – the philosophical, mythological and cosmological aspects, and the textual details of the actual performance (each student usually specializes in only one of the four Vedas), as well as the practical aspects of the ritual, such as ritual offerings. After passing his examinations, the future priest must get married before he is allowed to perform ritual offerings accompanied by recitations and chantings of the Vedas. Here are a few details of the framework defined by the calendar. Every morning and evening, the priest spends one hour bringing milk offering and accompanying the ritual with hymns from the Rig-Veda. Every fortnight, at the beginning and in the middle of the month (when the moon is full), a group of priests performs an offering of cakes and various plants, which lasts for two hours in the morning; once a year, during five days in spring, groups of priests perform the most complex of the rituals which reaches its climax with the offering of the *Soma* juice. This ritual also includes the sacrifice of a goat and chantings

7 The flexibility in the rules of Indian music in general has been emphasised by many scholars. It was emphasised in an extreme fashion by Wade, who wrote (1979:52) "no generalization about Indian classical music is possible." To this I would like to remark that freedom in performance is also a characteristic of other musical cultures but that it always remains within the bounds of certain rules which can be defined. Moreover it is important to include the limits imposed on freedom in performance among the characteristic rules of the style examined.

from all four Vedas, and especially the three most important ones, Rig-Veda, Sāma-Veda and Yajur-Veda.

The rituals take place in the open, with almost no specific physical context (i.e. they are not bound to any particular temple, statue, etc.). The various tasks involved in the performance of the rituals are well-defined and bear special names.

This general scheme is followed in different places with varying degrees of strictness and of extraneous influence. There are also certain differences in the manner of performance. But these differences are yet to be thoroughly studied, and their dependence on the framework itself or on extraneous factors established.

The Components of Speech

The phonetic material which is part of the musical organization can be classified into the following groups: phonemes, syllables, accents, artificial combinations of words (*vikriti*; or simply “c.w.” – combinations of words), and meter. Most of these categories belong to the domain of language, but I shall describe them briefly here.⁸

Speech-Sounds (Phonemes and Allophones) – In the Vedic language there are more than 40 phonemes, and even some well-defined allophones, which are different realizations of the phonemes. The speech-sounds are divided into vowels – long (8) and short (5) – consonants, and consonants which are considered semi-vowels (y,r,l,v). The main phonetic distinctions which play a part in the musical organization are: i) nasal, 5 different kinds of ‘m’ and ‘n’, which have a special role; ii) aspirate as compared to non-aspirate: 10 consonants appear both with and without aspiration; iii) voiced as opposed to non-voiced; iv) palatal as opposed to non-palatal. There are differences between North and South India in the pronunciation of certain phonemes.

Syllables – These are classified within the context of the musical organization as follows: i) open or closed; ii) the length of the vowel; iii) the type of consonant which closes the syllable; iv) the type of phoneme, or phonemes, which open the following syllable; and v) type of accent.

Accents – Three main accents may be distinguished (this was already pointed out by the classical grammarian Pānini): *udātta*, *anudātta*, and *svarita*. The *udātta* (called “high” by Pānini) is the important fixed accent – a kind of stress. In general, there is one *udātta* in each word, but there are words without *udātta*, e.g.

8 Thanks are due to Prof. L. Rocher from the University of Pennsylvania for his enlightening comments on this matter. For a general discussion of the linguistic phonetic aspect of the Veda language see Ivanov and Toporov 1968:27-45, 108-113.

verbs, and there are words with more than one *udātta*. The *anudātta* is an accent which generally appears immediately before the *udātta* (called “low” by Pānini). The *svarita* is an accent which follows the *udātta*. In the case of a syllable placed between two *udātta* accents, the relation to the second takes precedence, and it becomes *anudātta*. For musical purposes, the *pracaya* is also used. This accent is not mentioned by Pānini and is now known to the philologists. The *pracaya* is the accent on a syllable appearing after the *svarita*. Any of the above accents can occur in both short and long syllables.

The Notation of the Accents – In the vedic scriptures only the *anudātta* and the *svarita* on both sides of the *udātta* are indicated; the *anudātta* is notated by a horizontal line under the syllable, and the *svarita* by a vertical line above the syllable. The *udātta* is not notated in the scriptures, but musicologists usually indicate its presence by a sign above the syllable. In the following I shall indicate the presence of *udātta* by the sign $\acute{}$ above the letter. The *pracaya* is not notated; in a series of successive *anudātta*, only the one before the *udātta* is notated, e.g. $x \acute{x} x \acute{x}$, where x = syllable, \acute{x} = *udātta*, $\underset{\sim}{x}$ = *anudātta* and $\overset{\cdot}{x}$ = *svarita*. Among the Nambudiris the three accents are learned through movements of the head.

Artificial Combinations of Words and Syllables (vikriti) – This is a phenomenon unique to the Rig-Veda. It is not known exactly when the style finally took form. Not only are syllables of a certain timbre and even meaningless words or “nonsense” syllables added,⁹ but one finds complicated and predetermined kinds of artificial combinations of words from the Rig-Veda itself. For example, if we represent the successive words in a text by the ordinal numbers 1,2,3, etc., then in one system, the simplest (called *pada*), each word is a unit, 1/2/3/4. In *krama*, however, the system is 1,2/2,3/3,4/... In *jata*, the pattern is 1,2,2,1,1,2/2,3,3,2,2,3/3,4,4,3,3,4/... These combinations have consequences in determining the *svarita* and *anudātta* accents, since each combination is considered as a new kind of “word unit” (termed here “c.w. unit”), which defines what comes before and after it with respect to the *udātta* which, as stated above, is a fixed accent, apart from a few exceptional cases. It is possible therefore that the accent in /1,2/ will be different from that in /1/2/. Thus for example, if the syllables in /1/ are $\acute{x}\acute{x}\acute{x}$ and the syllable in /2/ is \acute{x} , the accents in the combination /1,2/ will be $\acute{x}\acute{x}\acute{x}\acute{x}$, while in /1/ /2/ the accents will be $\underset{\sim}{x}\underset{\sim}{x}\underset{\sim}{x}\overset{\cdot}{x}$.

The accents and kinds of syllables determine the melodic line. The main arguments between scholars revolve around the actual rendition (performance) of the accents, their grammatical and musical origin and role in the Rig-Veda. (See Grey 1959:512-14.)

9 See Staal 1967:17. This phenomenon is also found in other cultures; the case of Samaritan music is especially noteworthy (Katz 1974).

Meter – Most of the hymns of the Rig-Veda are written in syllabic meter. That is to say, there is a periodicity in the number of syllables, irrespective of their accent or length. Rules decide combinations of words and how they are to be rendered. Altogether, about 20 poetical meters are known in the Rig-Veda. Because of the artificial combinations of words mentioned above, and for other reasons which will be discussed later, the contribution of meter to the musical organization is small.¹⁰

The Musical Components

In learning the Rig-Veda neither teacher nor pupil breaks up the material into components; however, on various levels, theoreticians speak of durations, of “pitch levels” (my term) and indirectly even of timbre (through the various kinds of phonemes).

Pitch Levels – Generally both theoretician and researcher distinguish between three pitch levels that are attached to the three main accents: the *udātta* is sung on the middle level, the *anudātta* on the lower level, and the *svarita* on the higher level or linking the upper level to the middle one. This differentiation is very rough, and a more complete description will be given later. Researchers such as Staal (1961: 62-2) and Grey (1959: 514-20) have attempted to determine whether at the time of Pānini the “raised” *udātta* accent was performed on the upper level.

Intervals – The intervals between the pitch-levels are relatively quite constant in each performance and even in each style (Grey 1959:499), but they differ very much among the various styles characteristic of different places. The following are pairs of intervals between the pitch levels as found by various researchers.¹¹ The intervals are represented here by the number of tones which they contain, the signs + or – indicate that the intervals are slightly greater or slightly less.

Cases:	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>
High level							
Middle level	½	1	½	1–	1–	1+	1
Low level	1	1½	1½	1½	1+	2½	2

We see that, despite the differences, all the styles (apart from some exceptions) have something in common – the lower interval is always longer than the upper

10 The poetic meter, according to Arnold (1905), if taken together with other evidence, can be used to estimate the chronology of the Rig-Veda. Grey has declared (1959:507) that meter is not relevant to the musical organization. To my mind, it does play a limited role.

11 Example *a* is taken from Staal 1961:27, and Weber 1873:52; example *b* from the record by Danielou, and Grey 1959a:52; examples *d*, *e*, *f*, and *g* from Grey 1959a:522.

interval. I have named such relationships, which are not represented by exact numerical ratios but by the concepts bigger, smaller or equal, as “types of intonation” (Cohen 1969:74), and to my mind they play an important role in intervallic organization in many non-European musical cultures. For the sake of comparison, let me mention some other types of intonation which exist in other musical cultures similarly governed by three basic pitch levels – the Samaritan style and the *No* recitation. In the former the relation between the intervals is the inverse of that obtaining in the Rig-Veda: the lower is shorter than the upper interval (Cohen and Katz 1960). In the case of the *No* the intervals are approximately equal (Malm 1959). The three pitch levels in the Rig-Veda represent a basic adumbration. A simple western notation of the Rig-Veda (as three different pitches in four possible deviations) reflects very little of the true content of the music and may even be misleading. The reality is much more complicated.

In all the styles, even the most simple, we find other components, such as various kinds of glissandi, tremolo, etc. which play an important role in establishing the style. Moreover, there is no direct correspondence between the accents and the pitch levels. In some cases (depending on the phonetic material) the accents may appear on more than one pitch level and with various kinds of glissandi. Sometimes the glissandi may introduce secondary pitch levels, such as the starting points of the glissandi. This complication caused Grey (1959^a:519) to challenge the identification of accents with pitch levels. He notates the Rig-Veda recitation by using a certain number of predetermined small curves, which are meant to represent roughly the pitch changes (Grey 1959:87-8, 91-4; 1959^a:501-3). Each style contains a different repertoire of curves. This system is successful but is limited in use to a predetermined number of theoretical possibilities. Apart from this it does not take into account the actual size of the intervals. The system thus serves only as a partial model. One must use melographic analysis in order to reveal the minute but important changes occurring in actual performance which “disappear” in conventional transcription.

Duration – Duration is related mainly to the kinds of syllables but also to other factors. The durational unit (*mātra*) is the duration of the short syllable, and the other durations derive from this basis. The long syllable is generally made up of two units, and one finds various shortenings or lengthenings of these two basic units. Theoretically, there are nine different durations: $\frac{1}{4}$, $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, $3\frac{1}{2}$, 4. In practice, however, these durations are not exactly maintained.¹² The Nambudiri, who preserve the rhythm (i.e. the ratio between the durations) with the

12 The traditional theoretical description of the duration is far from clear. This is also Howard's impression 1977:44.

greatest exactitude, theoretically have 6 different durations (1,2,3,4,6,8). These are determined by the kind of syllable, the accent, various combinations of these two factors and the position in the c.w. unit; the value 8, for example, may appear only at the end of the c.w. unit.

Micromotives – Each style of Rig-Veda recitation can be characterized by events which we shall call micromotives. A micromotive may be a single note at a certain pitch level, for a certain duration, with or without additions, e.g. vibrato, with or without glissandi, ascending or descending, before or after the note; a change in any of these possibilities denotes a change in the micromotive. The micromotive may consist of two or even three notes, with the possibility of the above-mentioned combinations.

The micromotive is determined by the accents, durations, kinds of phonemes and syllables, and their position in the phonetic unit. Despite the interrelationship between the micromotive and the accent there is no directly proportional correspondence between them. The micromotive can be considered as one of the more important components determining the Rig-Vedic cantillation style. This idea was suggested by Grey (1959). Although not ascribing a special name to the micromotives he described them in a general manner together with a very detailed account of the accents.¹³

In the Nambudiri style of the Rig-Vedic cantillation, which is the most complicated, Grey (1959^a : 501-3) defined about 20 micromotives varying between the three main pitch levels, with the addition of a secondary level, and the six different possibilities of durations mentioned above. It is interesting to note that among the 20 micromotives only two end in descent, while all the rest end in ascent. In other styles of Rig-Vedic cantillation, the number of micromotives is much smaller, generally not more than ten.

I have further developed Grey's idea, in order to investigate the nature of the micromotive and other components as they appear in the actual performance, and to understand the interrelationship between the various components. Stated briefly the Rig-Veda cantillation is governed by certain rules determined by the following factors: the occasion of the performance and the roles of the performers; the choice of the "phonemic" components; the choice of the musical components; coordination between phonic and musical components.

13 Grey has already remarked on the absurdity of identifying the accents with stable pitches since the latter are not the only components which determine the accents (Grey, 1959:519). Moreover, he indicated that the accents may appear in various ways, according to their position in the verse and the kind of phonemes in their syllables, and the same pitch can be attained by using different accents.

We may now turn to the analysis of a performance in one particular style, that of Nambudiri, where I shall concentrate mainly on the choice of the musical components.

II. ANALYSIS OF A SPECIMEN

*The Specimen*¹⁴

The choice of the specimen for analysis was made after listening to many renditions of the Rig-Veda in different styles. And it seemed to me that in the Nambudiric style, and in this particular hymn, we might perhaps find some essential characteristics of Vedic cantillation in general. In comparison with other groups, the Nambudiri have the greatest complexity of musical components and of rules of combining the musical components with the phonetic material.¹⁵ The rules are most exactly followed and the Nambudiri keep to a complicated hierarchy with regard to the performers. Their traditions are more strictly observed than those of other groups and are considered to be older. To western ears their rendering sounds tense and more excited.

The traditional performance of this particular hymn is handed down within a few families (Staal 1969:14). Its subject is praise of the god Agni, fire personified.¹⁶ For the sake of clarity I have separated the syllables by dashes and indicated the *udātta* by [˘]. The text of the first verse is as follows:

a - gñim / dū tām / vṛ - ñī - ma - he / hō - tā - raṃ
 vi - śvā - ve - da - sam /
 a - syā / ya - jñā - sya - / su - kṛā - tum //

[Agni we choose as a messenger, as invoker, the omniscient, the expert of this sacrifice.]¹⁷

Poetic Meter (Gāyatrī) - Each verse contains 24 syllables divided into two unequal lines. The first line includes 2 × 8 syllables and the second one 8 syllables.

The system of combining words (vikṛiti) is *Krama* 1,2/2,3/3,4/ ... every word except the first is repeated. The last word of each line is repeated twice with the addition of the syllable *iti* before the last repetition. The first line is performed as follows:

/agnim dūtaṃ / dūtaṃ vṛiṇīmahe / vṛiṇīmahe hotāraṃ / hotāraṃ
 viśvavedasam/ viśvavedasam iti viśvavedasam/

14 The specimen chosen is from the recording made by Staal (1969), Record 2, side 1, band 7.

15 The main research on the Nambudiri's tradition was carried out by Grey and Staal (see n. 1). Grey concentrated mainly on the performance of the Rig-Veda while Staal dealt with the performance of all four Vedas.

16 The *Agni* ceremony still requires elucidation. See Staal 1961:34.

17 *Ibid.*, p. 14.

Analysis – All the material was first notated in the conventional way (with the text indicated beneath the notes) and also as two simultaneous graphs obtained with the aid of the melograph, one representing the pitch as a function of time and the other the intensity as a function of time. Detailed information concerning the durations was obtained by analyzing these two graphs. These two kinds of notation, the conventional and that involving the melograph, served as the raw material for the subsequent analysis. The purpose of the analysis was to uncover the principal rules governing the performance with respect to the text, the various component units, the accents, the pitch system, the durations, the relationships between the various parameters, the combination of the parameters into micromotives, and the sense of directionality, elements which contribute to the speech characteristics and particularly those of “excited speech.”¹⁸

III. FINDINGS

Text Performance – The poetic meter almost disappears in performance. What remains is only the line unit (identified by repetition of the last word) and the verse unit (there are some significant differences between the lines). The blurring of the meter occurs not only because of the play of word combinations but also because of the blurring of the syllable units. This can be the result both of breaking up syllables or of merging them. Splitting syllables into smaller units is quite frequent. In this case even single speech-sound phonemes and allophones (which may also be consonants) serve as independent units, and each of these small units appears as a kind of musical micromotive. Moreover, many phonemes are emphasized even though they do not play a strictly independent role. Thus, for example, the syllable *ram* may be performed as two micromotives *ra – m*, while in the first of these, because of the emphasis on *r*, one can even talk about splitting the micromotive into *r-a*.

This kind of emphasis on the phoneme may occur with a stop phoneme such as ‘d’ in *d̄ – a*. The prominence of the consonants produces a blurring of the syllable boundaries, i.e. their beginning and end, and may also connect the syllables. Thus, for example, in the performance of the two syllables *vi – šva* (the *š* sounds ‘sh’), because of the continued emphasis on *š* and on *v*, one can divide these two syllables into *viš – va* or *višv – a*, or even *vi – š – v – a*, or *višva*. Certain vowels and nasals are particularly stressed, especially when they close the syllable and are repeated (with a special micromotive, as we shall see below) once or twice at the end of word units. In the following analysis, the whole verse is first divided into

18 Characterizing “excited speech” by musical parameters appeals to musicians because of the interrelationship of the two media, speech and music (cf. e.g. List 1963), and also because of the possible existence of basic factors determining excitement in both media (cf. e.g. Cohen 1971).

the eight c.w. units; the intermissions between these are indicated by =; an intermission also occurs once in the middle of c.w. unit 5; the splitting of a micromotive is indicated by -.

First line

1. ag nim m d-v tam m m =
2. du-u tam m vr n-i i ma he e e =
3. vr ni ma h-e ho o ta a r-am m m =
4. ho o ta a r-am m viś(ś) va ve e d-a sam m m =
5. viś-ś va ve e d-a sa-mi ti viśv a = ve e d-a sam m m =

Second line

6. aś-s ya a ya-j-ñyas ya a =
7. yaj ñ-yas ya a su kra tum m =
8. su kra tu mi ti su kra tum m m =

The Various Units – We can distinguish the following units, in order of length: the unit of verse, which in theory is the repeated pattern in the poetic meter; unit of the line; the unit of word combination (c.w. unit); the group of syllables between one *anudātta* and the next; the syllable unit; the sub-unit of the syllable. The musical details related to all these units will be described later. Here however I would like to give a general description of the smallest unit, the micromotive, which is also basic to the larger units.

The pitch curve of the micromotive may be described as a continuous one, generally lower in pitch at the beginning than at the end; in most cases the curve has only one peak which is nearer to its end; however, certain cases exist where the curve has two and even three peaks. These curves can be classified according to their duration, the pitch at the peak, the number of pitches they contain and so on.

Accents – From the musical aspect the distinction between the various accents is a complex and subtle matter. In general each accent is accompanied by at least one micromotive. In performance one does not find an invariable correspondence between the accents and the micromotives, yet the accents are an important factor in the formation of the melodic line.

The best-defined accent is the *anudātta* (before the *udātta*). For all of the micromotives of the *anudātta*, the peaks of the pitch curves are on the lower pitch level and they end on an emphasized consonant, either that of the same syllable or the first of the next syllable. In certain cases the *anudātta* includes, in addition to a low-peaked curve, an ascending glissando which reaches a note on the middle pitch level; the two notes, the low one and the middle one with the glissando, can appear as two separate micromotives or as one. On the other hand,

almost all the prominent low notes are sung on the *anudātta*. Low notes may also appear on emphasized consonants in syllables which are not *anudātta* but in this case their duration is much shorter. Thus there is almost a one-to-one correspondence between the *anudātta* and the low-pitched micromotive. The *anudātta* constitute a kind of punctuation which determines a clear unit, stretching from one *anudātta* to the next. This unit does not always coincide with the c.w. unit

The *udātta* is less clearly defined. Generally it is expressed through a certain micromotive on the whole syllable followed by a characteristic micromotive or the repeated last phoneme of the syllable, i.e. *tam* → *tam m*. However, these micromotives, repeating the last phoneme of the syllable, appear on all the last syllables in the c.w. unit as well (without being affected by the accent of the syllable) and also with slight possible changes on the long syllables which are not *udātta*, as for example in the word without accents (*vr̥ṇīmahe*), in c.w. unit 2, on the syllable *ta* which is *svarita* in the word *hôtāram* (the first word in c.w. unit 4). Another characteristic of the *udātta* can be discerned from the melograph curves. It seems that the pitches of all the peaks of the *udātta*'s micromotives are higher than those of other peaks. The differences are not great, yet they are quite distinguishable (above one-third of a tone). It would be interesting to analyze other hymns in the same way in order to see whether this slight, but decided differentiation is ubiquitous.¹⁹ An exceptional instance where the *udātta* is moved to another syllable is in the word *viśvavedasam* (c.w. unit 4 and 5); instead of appearing on the syllable *va* the *udātta* was performed on the syllable *ve*. Such rare cases occur in other places in the Veda (Staal 1961:41). The *svarita* accent (post-*udātta*) was sung roughly like the *udātta* in the first line, but did not reach the full peaks characteristic of the *udātta*. The *svarita* is especially prominent in the second line where the repetitions of the last phoneme appears only on the accent, and moreover, these micromotives conclude an ascending deep vibrato.

The Pitch System – In establishing the pitch system one should be aware that the pitches are of differing degrees of definition and stability. In addition to the more or less stable pitches we find two main kinds of pitch instability: the one occurs within the micromotive as in the case of glissando, vibrato, etc.; the other kind of instability reflects the intrinsic scatter in the pitches as they recur within the larger unit. I shall characterize the scatter either by its maximum value or by the standard deviation (S.D.). In what follows I shall describe various collections of pitches with their appropriate scatter and their function in the various units described above. The pitch curves of the micromotives may be described as a

19 The exceptional concurrence in the use of the Nambudiri of a peak in the pitch-curve with the *udātta* (instead of the *svarita*) agrees with Pāṇini's description. This is taken by Staal (1961:43) as evidence that the Nambudiri tradition is the closest to the original sources.

combination of glissandi and a number of notes of quite well-defined pitch. The number of notes per micromotive is relatively large. It varies between 2 and 7 (with an average of 4.2 notes; S.D. = 1.7).

The Pitch Collection – The collection of all the pitches is found to be within an ambitus of a minor seventh (five whole tones). In this collection we can distinguish 4-5 groups of pitches which we shall call “pitch levels” (see Fig. 1). Their degree of definition (inversely proportional to the degree of scattering), increases with pitch, and the intervals between the successive levels decrease with pitch. The lowest level, with the smallest degree of definition, is scattered within a range somewhat greater than a minor third; the next lowest pitch level (we shall call it the intermediate) is scattered within a tone (S.D. 0.3 tone) and the interval between its average pitch and the lowest pitch of the lowest level is about a fourth. The next pitch level (we shall call it the middle) is scattered within less than one tone and the interval between its average and the average of the former level is less than a minor third. The upper level is scattered within about half a tone (S.D. 0.2. tone) and the interval between its average and the average of the middle level is less than one tone. Later on we shall discuss the function of the various levels.

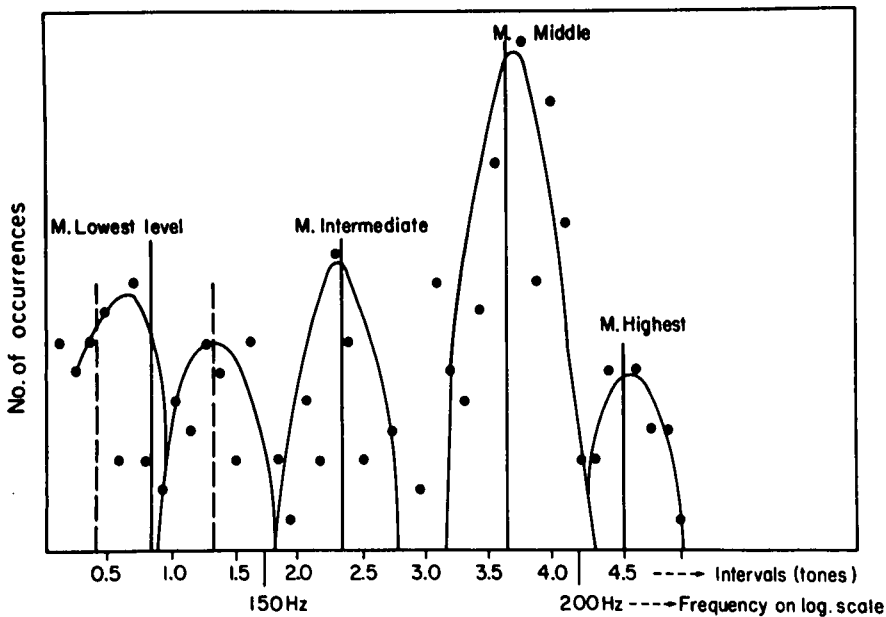


Fig. 1. The pitch collection concentrated in 4 – 5 groups (pitch levels). m represents the average pitch of each level.

Micromotive Peak Pitches – This collection reveals three main pitch levels (see Fig. 2). The lowest is scattered within about half a tone (S.D. 0.2.tone), the middle

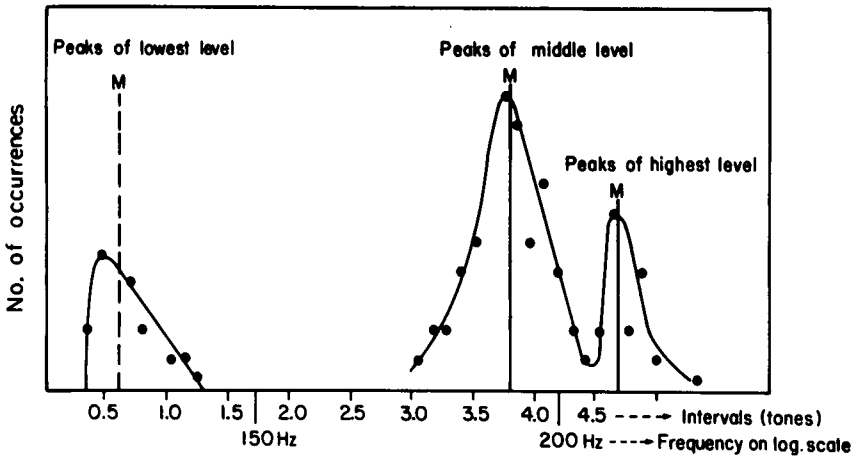


Fig. 2. The collection of peak-pitches of the micromotives reveals three groups. *m* represents the average pitch of the group.

level is scattered within about one tone (S.D. 0.5 tone) and the interval between its average and the average of the low level is more than a tritone; the upper level is scattered within less than half a tone (S.D. 0.16 tone) and the interval between its average and that of the middle level is less than a tone. The collection of all the notes which serve as starting points for the micromotive curve offers a scatter much wider than a major third (Fig. 3).

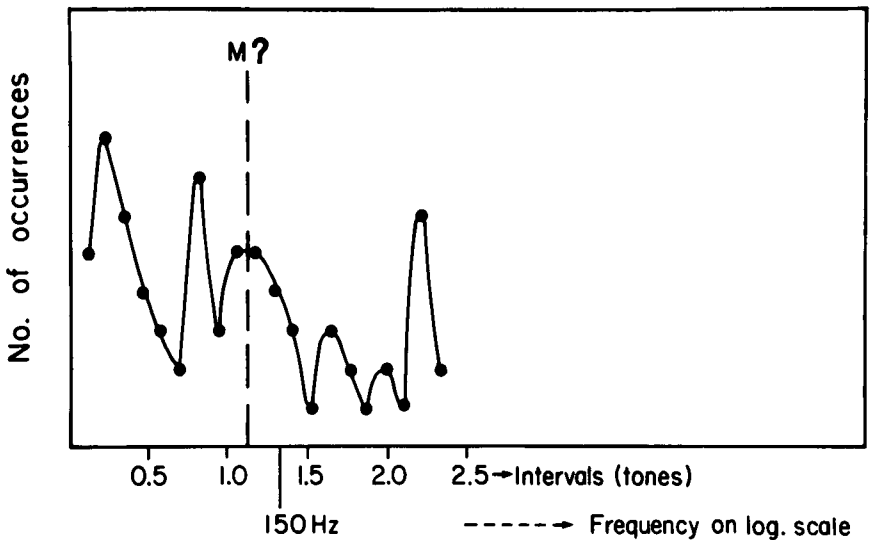


Fig. 3. The collection of pitches on which the micromotives begin.

The conventional Western notation which acts as a filter, when applied to the Rig-Veda, consists of three notes representing the three main pitch levels. The

occurrence of the middle note, which is the most frequent, is about 60%; of the upper, about 30%; and of the lowest, about 10%.

The Roles of the Various Notes. – 1) The lowest note (its pitches are among the collection of the lowest level) opens the *anudatta* unit and in most cases the c.w. unit. It is of a relatively extended duration and is sometimes followed by an intermission. Its pitch is not well-defined within each micromotive; however, the degree of scatter in the peaks of the micromotives is quite small.

2) The middle note (its pitches are among the collection of the middle level) appears in many different forms and performs different functions: i) Terminating the c.w. unit in a particular micromotive which occurs on the last phoneme of the syllable (see Fig. 4). In this case the middle note is reached after a relatively long and steep glissando (of an ambitus up to a tritone) and it ends in a vibrato of three vibrations in a crescendo. In the unit of the first line, the glissando is relatively slow and gradual and the vibrations are within a range of less than half a tone. In the second line the glissando is steeper and the vibrations increase during the micromotive (they reach at least the value of $3/4$ of a tone and can even reach $1\frac{1}{2}$ tone).

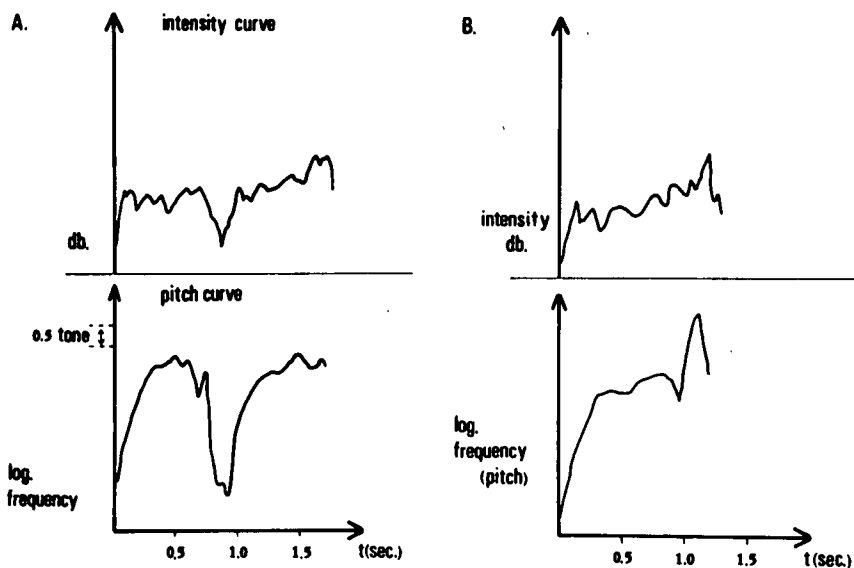


Fig. 4. Typical curves of the micromotives ending the c.w. units: a) in the first line of the stanza; b) in the second line.

In the first line this micromotive appears also in the middle of the c.w. unit (at the end of the *udatta* and on other occasions) but it is not repeated; however, at the end of the c.w. unit it is repeated several times. In the second line it appears on each *svarita*. ii) Contained in a micromotive which includes the upper note. The

middle note generally lies on both sides of the upper note. iii) Occuring after the low note, either in separate micromotives or in a micromotive common to the low note. iv) As a kind of passing note. Generally reached after some kind of glissando.

3) The upper note appears mainly as a peak in an internal micromotive (i.e. one that does not open or end the c.w. unit), characteristic of the *udātta*, and also of other syllables. This note is generally ornamented with a kind of vibrato and is accompanied by the middle note, before, or after, or both. When the upper note opens a micromotive (this is very rare) it is preceded by a steep rising glissando and is followed by the middle note.

The three notes described above are those usually notated in the conventional notation and they do not include passing notes on the pitch curve, and pitches which serve as starting points for the glissandi. These un-notated notes constitute most of the two pitch collections, belonging to the two lowest levels.

The Role of Un-notated Notes in the Lowest Level – There are three main functions: as a peak serving as a starting point for large units such as the *anudātta* unit; as a starting point for many of the micromotives; in this case, they are scattered in pitch by as much as a major third; and as passing notes.

The Role of Un-notated Notes in the Intermediate Level – As momentary resting points on the curve; as a decoration of the middle note; as the starting point for some micromotives (parallel to the role of the lowest notes). To sum up: the middle note serves as a tonic or point of reference for the other note. One can compare it to the middle tone in the main three tones of Samaritan music, but there it is sung without vibrato and without changes in pitch, in contrast to the other two tones which are sung with a characteristic vibrato. (See Cohen and Katz 1960.) Here, however, the middle note is most vital and renews itself within each new momentary event.

The upper level is a kind of extension of the middle level, and the lower level announces and prepares the appearance of the middle one. Each level shares a range with the level immediately preceding or following it. This gives rise to a vital quality immanent in each moment. Thus it seems that despite the apparent lack of definiton of pitch it is useful to talk about pitch levels as long as we are aware of their true meaning in actual practice.

Intervals – An examination of the collection of the intervals as they are actually performed reveals the frequency of their occurrence and their sizes. Theoretically, these sizes are not necessarily identical to those measured between the averages of the pitch levels. Among the six theoretical possibilities of intervals (between the four pitch levels) only three were found (with some exceptions); of these only one moved in both directions (up and down) and two in ascent only.

The intervals reflect the functions of the various pitch levels as stated above. The ascending intervals are between the two lowest levels and the middle one; the interval which "goes" in both directions is that between the middle and the upper levels. The sizes of the intervals are as follows: between the lowest to the middle level: 5.7 tones (S.D. 1 tone); between the intermediate to the middle level: 1.5 tone; between the middle to upper level: 0.95 tone (S.D. $\sim\frac{1}{4}$ tone). In comparison with the intervals measured between the averages of the pitch levels, the actual intervals are roughly the same size but they are better defined, with smaller S.D.

Durations – By the term "duration" I refer to the interval of time between the beginning of an event (unit) and the beginning of the next event. This definition is important since the successive durations determine the feel of the rhythm. (See Cohen 1978:102-4.) In the case under discussion the sense of duration of the small units (the micromotives) is not so sharp since there is no concurrence between the various parameters. The beginning of each unit is marked mainly by the starting of a new timbre phoneme while the pitch and the intensity generally begin on their lowest points. The peaks in pitch and intensity generally come towards the end of the unit, and in many cases at the very end of the unit, so that most units give a sense of syncopation and sometimes seem to begin at the peak.²⁰ A further blurring of the border-lines of the durations is caused by the lengthening of the consonants especially when the micromotives are made up of more than one phoneme. However, one can feel a special kind of rhythmic quality deriving from the various durations in the Rig-Veda recitation.

The Duration of the C.W. units – These differ to a large extent from unit to unit (see Table I) and especially as regards the two lines, while the average duration of the micromotives composing the various c.w. units is quite constant. The average for the syllable unit is less constant. These findings suggest the following conclusions: 1) a strong sense of "density tempo" in the performance. This term may be defined as the number of events per unit of time (Cohen 1978:109-10), while the average of the smaller units, the micromotive, is the fixed event; 2) the independence of the c.w. units, each one constituting a world in itself (not taking into account the increasing durations within each line, which may have some significance); 3) the significant difference between the two lines (the second line is shorter both because it contains only half the number of syllables, as dictated by the meter organization, and therefore fewer c.w. units, and also because in

20 In this connection I would like to mention my experiment (1978:104-108) which shows that, at least in the case of metric recitation, the duration which determines the rhythm according to our perception starts at the beginning of the vowels not at the beginning of the syllables. The consonants opening the syllables would thus serve as the up-beat.

performance there are fewer micromotives per syllable) shows that one can attribute structure to the larger unit – the verse.

Table I:
Measured durations of the various units – syllables, micromotives and c.w. – in the two lines.

C.W. Unit	Duration (in seconds)	No. of Micromotives	Average Duration	No. of Syllables	Average Duration
<i>First line:</i>					
1	6.8	7	0.97	4	1.7
2	8.5	11	0.77	6	1.4
3	9.12	11	0.82	7	1.3
4	11.4	15	0.76	8	1.4
5	14.5	16	0.9	11	1.3
<i>Second line:</i>					
6	4.8	6	0.8	5	0.9
7	7.2	7	1.03	6	1.2

Syllable Duration – In examining the durations of all the syllables we find a large number of sizes that are not characterized by any specific regularities. However, we also find that the durations of the syllables terminating the c.w. units are very nearly equal and that they are much longer than the other syllables. The durations of the five last syllables of the first line are (in seconds) 2.8, 2.7, 2.8, 2.7, 2.8. The other syllable durations vary between 0.2 to 2 seconds; while the longest syllables in each c.w. unit (except for the last syllable) are the *udātta*-syllables or syllables with long vowels.

Micromotive – This is the major factor determining the sense of rhythm. The collection of all the durations has a large scatter. But in the distribution of durations one can distinguish five clusters as shown in Table II.

Table II:
Measured durations of the main five micromotives

Range of duration in seconds	Average duration	Number of cases
i. 0.2. – 0.4	0.33	9
ii. 0.45 – 0.64	0.56	19
iii. 0.65 – 0.8	0.74	12
iv. 0.84 – 1	0.92	21
v. 1.1 – 1.24	1.72	8

The most frequent kinds of durations are ii and iv; iv is almost twice the duration of ii. Duration iv is the best defined and characterizes the most important micromotives, so that it can be considered as the basic unit of duration, a recurring, relatively slow beat, while the other durations perturb the regularity and introduce a speech-quality into the music. To some extent we can compare the dominant duration unit iv to the dominant pitch level, the middle one, for both are penultimate on their respective scales.

Sequences of Durations in the C.W. unit – These are restricted (in addition to grammatical considerations) by the following limitations:

- 1) The “density tempo” as discussed in the previous paragraph.
- 2) The termination of the c.w. units of the first line in three identical repetitions of type iv duration. These contribute to the exact equality of the end-syllable duration, each being composed of three micromotives.
- 3) Among any three successive durations there is at least one which is relatively long (duration iv or v) so that we do not find a merging of short durations forming a long duration.
- 4) The opening durations are all large: iv or v.
- 5) The durations of the silences which occur between the different c.w. units are relatively long and well-defined. They vary between 1 to 1.4 seconds.

Relation Between Duration and Pitch – Except for the *anudātta* micromotives, we generally find a certain concurrence between the durational units and pitch, in that the highest peaks are found in the pitch curve of the longest durations but the peak itself never occurs at the beginning of the duration.

Relation Between Intensity and Pitch – A marked concurrence can be found between intensity and pitch within the smaller unit – the micromotive; ascending pitch is accompanied by ascending intensity, and vice-versa. Non-concurrence is found in the overall curves of the c.w. units. While c.w. units conclude in a crescendo, the pitch usually remains constant or may even drop toward the end.

Relation Between Intensity and Duration – This resembles the relationship between pitch and duration. The sensation of syncopation in each micromotive created by the pitch curve is further reinforced by the increase in intensity (crescendo) in the concluding units.

Speech-Sound Timbre – In contrast to the “common” style of singing in the West, where the consonants serve to separate the notes while the vowels (as in melisma) smooth the transitions between them,²¹ in the Rig-Veda recitation the

21 The melismatic qualities as opposed to the syllabic qualities are treated by Dalia Cohen and Ruth Katz in their article on “The Melisma as a Musical Parameter,” in *Studies in Eastern Chant*, vol. 5 (in the press).

consonants sometimes serve to connect the micromotive units (as we saw earlier) and a distinct, separate, micromotive may occur in the middle of the vowel. This separation may also occur even within an open syllable, between the consonant and the following vowel (thus *da* is sung *d - a*). The various kinds of phonemes play an important role in characterizing the micromotives.

Combination of Parameters in the Micromotive Units - The micromotives represent a selection of predetermined combinations of the basic parameters (pitch, duration, intensity and timbre). The following are the main types of micromotives.

A) A note in the lower pitch level which always begins at the start of the syllable and always includes one or more emphasized consonants (when the syllable is an open one this micromotive note may sometimes end on the consonant of the following syllable); the duration is relatively long (greater than the duration of type ii); it occurs on the *anudātta*.

A') A note in one of the two lowest pitch levels which begins at the beginning of the syllable and includes certain emphasized consonants; the duration is relatively short (duration of type i); it occurs in the middle of the c.w. unit.

B) A note in the middle pitch level which always follows the micromotive A' and sometimes follows A. In the former case the two micromotives almost merge into one, while in the latter case they remain separated and the micromotive B has two peaks in the pitch curve.

C) A combination of notes from the middle and the upper pitch levels quite symmetrically organized: middle-high-middle. The highest note is ornamented and longer than both its neighbours. The micromotive generally begins with a glissando. In the conventional notation it can be written as:

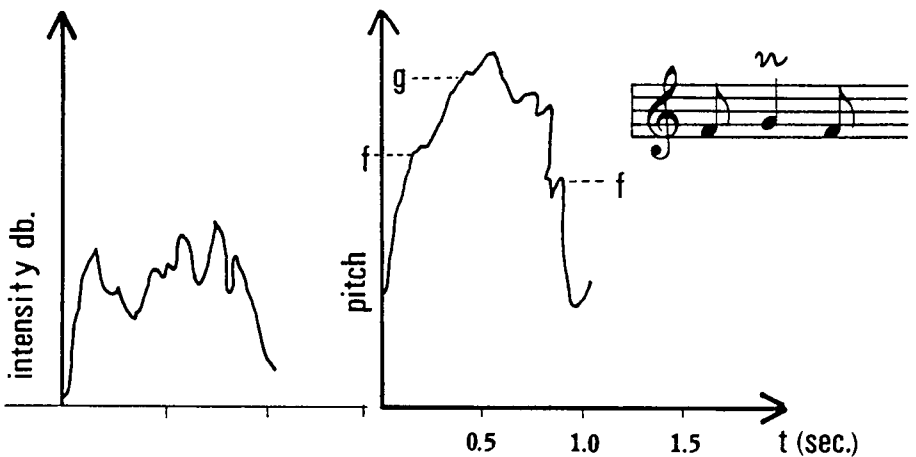


Fig. 5. Typical curve of micromotive D.

The pitch curve is given in Fig. 5. The duration is of type iv and is very well-defined. This micromotive starts with the beginning of a syllable and with the emphasis on the vowel. It comes on *udātta* syllables and also before the end of a c.w. unit. *D*) The essential pitch is in the middle. It comes on a single phoneme – nasal or vowel – the last in a syllable. The pitch curve (see Fig. 4) opens with a relatively long glissando ascending to the note in the middle level; a vibrato follows, with a depth of up to half a tone, accompanied by an abruptly terminating crescendo. This micromotive generally comes immediately after micromotive *C*. It always appears at the end of a c.w. unit but sometimes also in the middle. In the former case it is repeated three times, with precise execution of the duration (average of 0.94 sec. S.D. 0.07 sec.), which is the duration of type iv (the “beat-unit”). When it comes in the middle of the c.w. unit, it is of shorter duration: type ii or iii. In some cases we find that micromotive *B* shows some resemblance to *D*. I should emphasize that the above description of the micromotives refers to the first line. Analysis of the second line gives similar results but with some differences. A comparison of the micromotives of the second line with those of the first line shows: *A* – a *A* in the first line; *B* – does not exist; *C* – a variation of the first line; less symmetrical, steeper curve, the notes on the middle pitch level less well-defined, the highest note also the clearest in the curve, shorter than the corresponding one in the first line; *D* – not repeated, and contains a deeper vibrato, on the *svarita* only. There are a few additional micromotives which appear infrequently beyond those mentioned above, though they usually bear some resemblance to the main micromotives.

Directionality – Directionality is the term I shall use to indicate the attitude towards the time axis and the organization of the material along it, or in other words, the rules which determine the order of events as they succeed each other. Styles differ in principles of organization, giving rise to differences in the feeling of direction.

In our case this may be achieved through the organization of the various units: the micromotive, the syllable, the *anudātta* unit, the c.w. unit, the line and the verse. Emphasis on the smallest unit, the micromotive, tends to interfere with and even diminish the longer-term directionality. This momentary emphasis is produced, as described in detail above, mainly by emphasizing the consonants in micromotive *A*; the syncopation in *C* and *D*; the conclusion of *D* in ascending pitch, crescendo and with vibrato; the glissando in most of the micromotives. On the other hand some of the micromotives are connected in a special way which emphasizes the larger unit – the syllable (*A+B*; *C+D*). The relationship between the syllables and their combination, which forms the next unit, the c.w. unit, is quite complicated. It depends partly on the structure of the words and syllables and this introduces a certain random quality into the c.w. unit; However, there are

some characteristics common to all the c.w. units such as ending on the micromotives *C, D, D*; a continuous crescendo from the beginning to the end; the unit opens on *A* except in the case of the *udātta*. In addition, it seems that there are some purely musical relations between the micromotives; but this relationship should be examined and analyzed on the basis of a larger amount of material.

No regularity is displayed in the order of the c.w. units combining to form the line. All these units differ from each other but all of them keep to the same density tempo, ending in the same way, having the same collection of pitches and the same collection of durations.

The two lines of the verse differ significantly. In the second, we find an amplification or intensification of the tension-producing characteristics, such as sudden changes, vibrato, etc. We may consider this as an example of the principle of intensification which is found in the organization of various units, from the smallest to the largest:

1) An increase in intensity and pitch in most of the micromotives and especially in micromotive *D*. 2) In the c.w. unit: opening with the low micromotive, *A*, and ending with the tensest micromotive, *D*; especially the final exact repetition of the duration unit iv.²² 3) The increase in tension of the second line as compared with the first line of the verse unit.

Another characteristic example of this principle of intensification is present in the Nambudiris' recitation of the "Black" Yajuz-Veda, though not necessarily in that of the Rig-Veda.²³ In this recitation, which basically includes one motive only, we find a gradual and simultaneous increase in the intensity, the absolute pitch and the tempo; such a gradual increase is also found in the recitation of the Samaritans on certain days.

The multiplicity of the units and the lack of directionality which prevails in some of them contributes an additional tension. This kind of tension, produced by a continuous uncertainty, has a limit which is on the threshold of boredom. However, in our case, the tension which accompanies each micromotive prevents this boredom.

The Quality of Speech – The speech characteristic expresses itself both through the lack of well-defined intervals and through the lack of well-defined rhythm. Moreover, the emphasis on the phonemes (which serve as the main raw material for speech) contributes to the sense of recitation.

The "recitative quality," as opposed both to "lyric" and "rhythmic" qualities, is of course a well-known stylistic characteristic. It also may serve as an important component in a composition. Without going into detail, I would like to

22 The idea that exact repetition creates tensions is discussed in Cohen 1971: 102-104.

23 A striking example can be found in the records edited by Staal (1969, Record II, side I, band 10).

suggest that the speech quality may be divided into two main categories: calm and excited speech. Elsewhere I have tried to consider Palestrina's counterpoint as a musical expression of unexcited speech (Cohen 1969). The rules of this counterpoint are related to much more abstract parameters than those dealt with in this article. Its speech quality is determined mainly by the rhythm while the tranquillity is achieved by the avoidance of events causing excitement and lack of directionality, within the unit of the musical phrase. This system of rules is inspired in quite a sophisticated way by the ideal of "calm speech." The qualities ruled out in Palestrina's counterpoint are precisely those found in excited speech (Cohen 1960:104-8). Here, in contrast, the rules governing the manner of performance are guided both consciously and unconsciously by the ideal of excited speech.

IV. CONCLUSION

To sum up, we have seen that the recitation of the Rig-Veda is governed by special rules referring to unconventional musical parameters. These rules, which concern a performance practice in an oral tradition, were discovered after a detailed and careful examination of parameters that cannot be simply notated. The rules provide for directivity within musical units not longer than the verse unit. The absence of directivity in units larger than the verse is due to the following: The range of variation of the various parameters is very small; the chosen parameter does not include a system of well-defined intervals, or a well-defined beat; there are predetermined combinations between the musical parameters and the textual material.

At the same time the rules provide for complexity and tension during most of the musical units and even within the smallest unit – the micromotive. Moreover, the rules have qualities in common with rules associated with excited speech in general and exhibit universal qualities in relation to the basic notions of "directivity," "complexity," and tension.

The various traditions of the Rig-Veda differ in the details of their basic rules of choice. In this article I have not dealt with the interference of extra-musical factors and I have analyzed only one hymn. A comprehensive comparison among the various traditions of the Vedic cantillation as well as a comparison with other musics may tell us something about the nature of rules governing actual practice, the possibilities of creating directivity, complexity and tension in a microcosmic musical world, and the connection between music and external ideals in general.

Selected References

Abbreviations

BSOAS *Bulletin of the School of Oriental and African Studies*

JMT *Journal of Music Theory*

ZDMG *Zeitschrift der Deutschen Morgenländischen Gesellschaft*

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YUVAL

STUDIES OF
THE JEWISH MUSIC RESEARCH CENTRE
Volume V

THE ABRAHAM ZVI IDELSOHN
MEMORIAL VOLUME

Edited by

ISRAEL ADLER, BATHJA BAYER and ELIYAHU SCHLEIFER
in collaboration with Lea Shalem

JERUSALEM, 1986
THE MAGNES PRESS, THE HEBREW UNIVERSITY