

**Wesleyan University**

**“as time is stretched...”**

**Theoretical and Compositional Investigations of Rhythm and Form in  
Javanese *Gamelan* Music**

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## Contents

<b>Preface</b>	iv
<b>Notational Conventions</b>	viii
Overview of the <i>Kepatihan</i> System	ix
End-Weighted Metric Organization	xi
Variability of Temporal Scale	xv
<b>Acknowledgements</b>	xix

## Part One – Theoretical Investigations

<b>Introduction Javanese Rhythm as Articulated Flow</b>	2
<b>Chapter 1 Fundamentals of <i>Irama</i> and Formal Structure</b>	
<i>Irama</i> – General and Specific Senses	7
<i>Irama</i> , Formal Structure and Stratification	10
Stratification and Relative Levels of Density	13
Designations of Formal Structures	19
<b>Chapter 2 Javanese Terminology for Rhythm and Form</b>	
Where is the beat? (and what is a beat?)	23
The Hazards of Terminology	26
Notions of Meter	29
Javanese Terminology for Structural/Melodic Units	32
<i>Padhang-ulihan</i> and Notions of Hypermeter	36
<b>Chapter 3 Form and Structure in Context</b>	
Fundamental Principles of Temporal Perception	44
<i>Gendhing Monggang</i>	49
<i>Gendhing Gambirsawit</i>	62
<i>Gendhing Talu – Ayak-ayakan, Srepegan, Sampak</i>	74

## **Part Two – Compositional Investigations**

### **Chapter 4 *as time is stretched...***

#### **A Performance/Installation for Javanese *Gamelan* Instruments**

Background	95
Stretching Continuity	98
Considerations of Setting	103
Other Themes	109
<b>Appendices</b>	<b>117</b>
<b>References</b>	<b>156</b>

## Preface

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*Music is a natural science; it is the study of the essential non-reducible; music is a means of engagement with things that cannot be simplified without distortion.*

– Chris Jonas

*Writing about music is like dancing about architecture.*

– Frank Zappa

Much of what is contained in the pages that follow is an attempt to articulate and further an understanding of the way in which *karawitan* – the music of Javanese *gamelan* – shapes the experience of time. A number of strategies are employed, among them description. At times this description is fairly thick, and contrasted with less thick, more abstract accounts. But at other times the approach taken is equally or even more abstract, involving the isolation of certain rhythmic and formal aspects from the musical whole. Such activities unavoidably distort, but they can also illuminate, focusing attention on certain aspects that might not at first be so apparent. Analysis typically involves simplification, but when this is recognized – when the simplification is not taken as the same as its object, as long as the finger pointing is not equated with the moon it points to – simplification and distortion need not be entirely detrimental, and can in fact be useful. It is a delicate dance to maintain a balance between on the one hand remembering that musical experience is on some level irreducible and on the other recognizing that one's experience of music involves not only sound, but the concepts through which musical sound is organized and understood. Writing – or talking – about music is in a way absurd, especially when

the writing (or other approaches to analysis) takes over. But on another level it is indispensable.

The problem of representing one thing with another is, of course, nothing new. Within the field of ethnomusicology, the issue has been considered both as it relates to transcription and notation and to ethnography.<sup>1</sup> The former, of more direct relevance to the theoretical/musicological focus of this thesis, is discussed both in respect to my use of the Javanese *Kepatihan* system of number notation – now standard in Javanese *gamelan* scholarship – and my use of less conventional graphic representation. The advantages and limitations of *Kepatihan* notation are taken up in the section which follows, while the particulars of the specific graphic representations and the implications of their use are discussed as they occur in the body of the text.

The opening epigraphs are intended not only to raise issues of representation relevant to music scholarship, but also – especially in the case of Jonas – to present a perspective on a potential function of music. This perspective is that of a composer/performer, and a composer/performer working in a particular tradition with particular assumptions on how music is usually presented and experienced. The concert setting – whether a formal concert hall or a less formal improvised music club – is largely set up to allow the audience to engage in music as an aesthetic experience. There are, to be sure, social and cultural dimensions to the experience, but there is some idea among the audience for creative/new/experimental music (or whatever label is used) that a primary reason one attends a performance – or listens to a recording – is for the music itself. This notion of “the music itself,” of music as autonomous from the context in which it takes place and the lives of those who make it and experience it, is problematic and has quite rightly been challenged by ethnomusicologists and other music scholars. Nonetheless, it is a notion which maintains a certain currency – and not just among more conservative music scholars, but also among musicians and their audiences.

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<sup>1</sup> See A. Seeger (1992) for an overview of approaches to the ethnography of music.

Commenting on the “theoretical bias against any consideration of ‘music sound’ outside of its cultural context” held by certain ethnomusicologists, Harold Powers suggests that

It is of course true that ... no music can exist without people who make it. It is also true that ... some music may sometimes be more efficiently interpreted by discussing it as though it did have a life of its own. (1980, 8)

Besides the matter of efficiency, there is also the question of suitability. Certain musics such as experimental music – and also, I would argue, *karawitan* – are better suited than others to an approach which focuses on musical features apart from their cultural context. It is true that *karawitan* and other Javanese performing arts tend to be much more embedded in social contexts than their Western counterparts. There is no tradition in Java of concert performances as such. Though student recitals at performing arts academies have adopted this model, most often, *gamelan* music is presented in conjunction with social occasions, or as a social occasion in its own right.<sup>2</sup> But while at times it attracts the active attention of those attending the event, at other times it functions more as background. Because of this, it can be considered to some extent to be a musician’s music – a music where the musicians are free to do whatever they like, within reason. This was (and to a more limited extent still is) especially the case in the courts, where musicians were obligated to play on a regular basis, not for anyone, but simply for the music to be present.<sup>3</sup> It is quite reasonable to imagine that it was precisely this environment which allowed for the court repertoire to develop in the way it did – extensively, both in terms of the number of pieces, and the scope of the largest *gendhing*. It might even be reasonable to consider the process of development itself as a means of engagement with things not entirely unlike the sort of things that certain new music composers have engaged in – in particular, an engagement with the experience of time.

This idea of music as a means of engaging with certain fundamental aspects of experience, such as the experience of time – music as a “natural science” or “the

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<sup>2</sup> For a concise summary of the musical scene in Surakarta, a center of *karawitan*, see Benamou (1-61).

<sup>3</sup> According to Sumarsam, the term for this is *seba*, a term which also refers to the obligation of *abdi dalem*, palace servants, to stand guard (Sumarsam, personal communication, 7 February 2001).

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study of the essential non-reducible” – relates also to the second part of this thesis, which documents what I have characterized as compositional investigations of rhythm and form in Javanese *gamelan* music. The form these investigations have taken is the development of a large-scale piece for *gamelan* instruments and other sound sources. Although carried out in parallel to the theoretical investigations which have resulted in the first part of this thesis, the two are not equatable. My purpose was not to attempt to arrive at an understanding of *karawitan* through composing in a traditional style or by using traditional models. Neither was the project intended to demonstrate how rhythm and form function in *karawitan*. At the same time, the process of developing did involve a conscious reflection on the relationship between my compositional decisions and my understanding of *karawitan*. Though this was more the case with this project than with my previous works for *gamelan*, the most important relationship between the activities remains indirect, with each informing the other.

## Notational Conventions

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Charles Seeger opens his seminal “Prescriptive and Descriptive Music-Writing” by identifying the hazard in the “assumption that the full auditory parameter of music is or can be represented by a partial visual parameter, i.e., by one with only two dimensions, as upon a flat surface.” The focus of the article, however, is on the failure to distinguish between prescriptive and descriptive uses of music-writing, between “a blue-print of how a specific piece of music shall be made to sound and a report of how a specific performance of it actually did sound,” and on the advantages of graphic representation for accurate description (1958, 26). Ter Ellingson, expanding on the prescriptive/descriptive dichotomy notes a trend in ethnomusicology towards a third type of transcription, “neither strictly prescriptive nor descriptive, but rather cognitive or conceptual, as it seeks to portray musical sound as an embodiment of musical concepts held by members of a culture” (1992, 110). One of the ways of doing so is to make use of the notation of the musical tradition being studied. Among other examples, Ellingson points to the “quiet revolution in transcription”(Ibid. 138) among specialists in Javanese music, where the *Kepatihan* number notation gradually replaced Western staff notation as the standard system for presenting transcriptions. My use of the *Kepatihan* system is thus in keeping with the now well-established convention. The following serves both as an overview of the system for the benefit of those not familiar with it, and also a consideration of the implications of its use.<sup>4</sup>

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<sup>4</sup> More information on notation is provided in reference to specific examples in the text. A general introduction to the gamelan and its music is not included here, as such introductions are readily

### Overview of the *Kepatihan* System

The basic elements of the notation are numbers, which indicate pitch. Dots placed above or below numbers indicate pitches in higher or lower registers – numbers without dots are in the middle register. Symbols placed above or around the numbers indicate the placement of structure-marking instruments (all various sizes of hanging and cradled *gongs*).

**Figure 0.1: *Ladrang Mugi rahayu, Sléndro manyura* (after Gitosaprodjo 1992, 89)**

- + -	- + - ^	- + - ~	- + - ^
3 6̣ 1 .	3 6̣ 1 2	3 6̣ 1 .	3 6̣ 1 2
- + - ~	- + - ^	- + - ~	- + - ^
3 5 2 3	6 1̣ 6 5	1̣ 6 5 3	6̣ 1 3 (2)

**Figure 0.2: Symbols for Structure-Marking Instruments**

- = *kempyang*, + = *kethuk*, ~ = *kempul*, ^ = *kenong*, ( ) = *gong*

Further information is provided in the title of the piece. The first word indicates the piece's formal structure (in this case *ladrang*), followed by the title proper (*Mugi rahayu*) and then the scale and *pathet*, or mode (*Sléndro manyura*).

Rhythmic values are not indicated symbolically, as they are by various noteheads and flags in staff notation. Rhythmically, the part notated – the melodic line played by *slenthem*, *saron demung* and *saron panerus*, known as *balungan* is by and large uniform, consisting of a steady stream of pulses of equal duration. Durations longer than a pulse are indicated by a dot in place of a number. These are not rests, as such, as the note previously played is not damped, but sounds until the next note.

The *Kepatihan* system is, in terms of Seeger's dichotomy, more prescriptive than descriptive. This dichotomy is not, however, entirely adequate in this case. *Kepatihan* notation is both less descriptive and less prescriptive than staff notation, at least as

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available. A concise sketch may be found in Brinner (Brinner 1995, xvii-xxiv), while a more thorough basic introduction may be found in Sorrell (1990). Sutton (1993) offers more detailed discussion of instrumental idioms. My own overview may be found (as of this writing) at <cjmiller.web.wesleyan.edu/gamelan>.

staff notation is used in European Classical and related traditions. Notation of a *gendhing* (a *gamelan* composition) is less a “blue-print of how a specific piece should be made to sound” than a rough outline allowing for a range of possible realizations with differing instrumentations and idiomatic treatments. In the case of the above example, it is understood that the piece may be repeated several times. The actual number is typically not predetermined, but the result of interaction between different players.

One argument for using *Kepatihan* notation in transcriptions of *karawitan* focuses on the representation of pitch. This argument centers on the fact that neither of the two Javanese tuning systems correspond to the twelve-tone chromatic scale, or any subsets thereof. Furthermore, each *gamelan* is tuned slightly differently. Ellingson notes of the use of cipher notation that it has the advantage of “not suggesting fixed, rigid pitch and interval relationships, so that readers could ‘hear’ the transcriptions in terms of whatever unique *gamelan* tunings they knew”(Ibid. 138).<sup>5</sup> However, it has a distinct disadvantage when used in contexts where an ability to readily translate numbers into appropriate pitches cannot be assumed – which is whenever there is some aspiration to reach an audience larger than that of Javanese music specialists. When this is the case, it is next to useless for facilitating an immediate grasp of melodic content, especially as there is not even an approximate graphic representation of contour.<sup>6</sup>

The non-equivalence of Javanese and Western tuning systems is by no means the most significant factor, either generally or specifically in terms of the current study. As my primary concern is with the rhythmic and formal aspects of *karawitan*, clearly conveying pitch information is less crucial than it would be to a study of melodic

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<sup>5</sup> The point that *gamelan* tunings are unique is, I believe, frequently overstated. While variability in tuning of instruments – and also of individual musicians – is recognized and valued, Javanese still have fairly clear ideas of what a *pélog* or *sléndro* tuning should be, and variation beyond certain acceptable ranges is criticized. The variability between *gamelan* tunings may be somewhat greater in degree than that which would have been found in European music before the widespread adoption of the equal-tempered scale, but I would suggest that it is not so different in kind.

<sup>6</sup> Herbst (1997) arrived at an elegant compromise by using a staff of non-equidistantly spaced lines, thus clearly representing contour without implying equivalence to diatonic or other scales.

patterning or mode. Indeed, many of my figures do not indicate pitch at all. The distortion through simplification is more complete, which in certain respects is advantageous. One of the pitfalls of much *gamelan* scholarship has been an over-reliance on notation as the basis for analysis. This could also be said of much Western analytical music theory, but with Javanese music the problem is made much more acute by the fact that notation typically indicates only one out of a dozen or more melodic lines in the whole musical texture. Again, for Javanese or Javanese music specialists who have developed the ability to interpret such notation, and who are able from the *balungan* alone to imagine the sound of the whole ensemble, such notation suffices. Javanese notation is neither prescriptive nor descriptive, but rather a sort of musical shorthand, an object to be interpreted.<sup>7</sup>

### End-Weighted Metric Organization

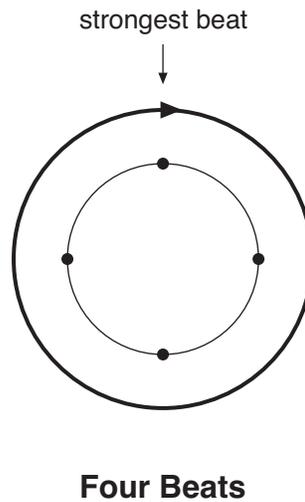
There are two more specifically rhythmic factors concerning the difference between *Kepatihan* notation and staff notation. The first is a fairly simple matter of a specific notational convention – that rhythmic organization is end-weighted. It is the last beat rather than the first in groupings of beats that has the most metric weight. The difficulty posed by this convention is not unlike that posed by the representation of pitch by number. For those familiar with the convention it is second nature, but for those less familiar it requires continual readjustment. For the benefit of those not familiar with this convention I offer the following explanation.

Consider first the following diagram:

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<sup>7</sup> Except for those musicians who simply play the *balungan*, but even they at times are called upon to play figuration which is neither prescribed nor described in the notation itself.

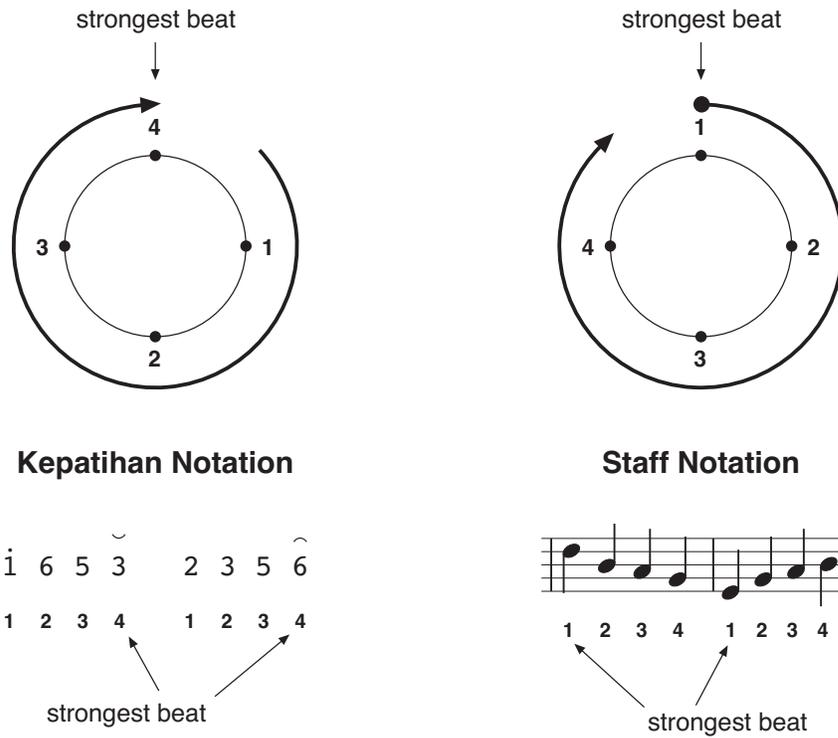
Figure 0.3a



The inner circle and four dots represent a metric unit of four beats. The strongest beat is the dot at the top. The thicker line with the arrowhead forming the outer circle represents the passage through time, following the familiar convention of clockwise movement. In contrast to the diagrams below, where this line is broken, here it is continuous. This represents the idea that the strongest beat is simultaneously the beginning and the end of the cycle. In other words, there need not be a distinction between end and beginning.

The following diagrams compare the metric organization of staff and *Kepatihan* notation.

Figure 0.3b: Metric organization of *Kepatihan* and Staff Notation



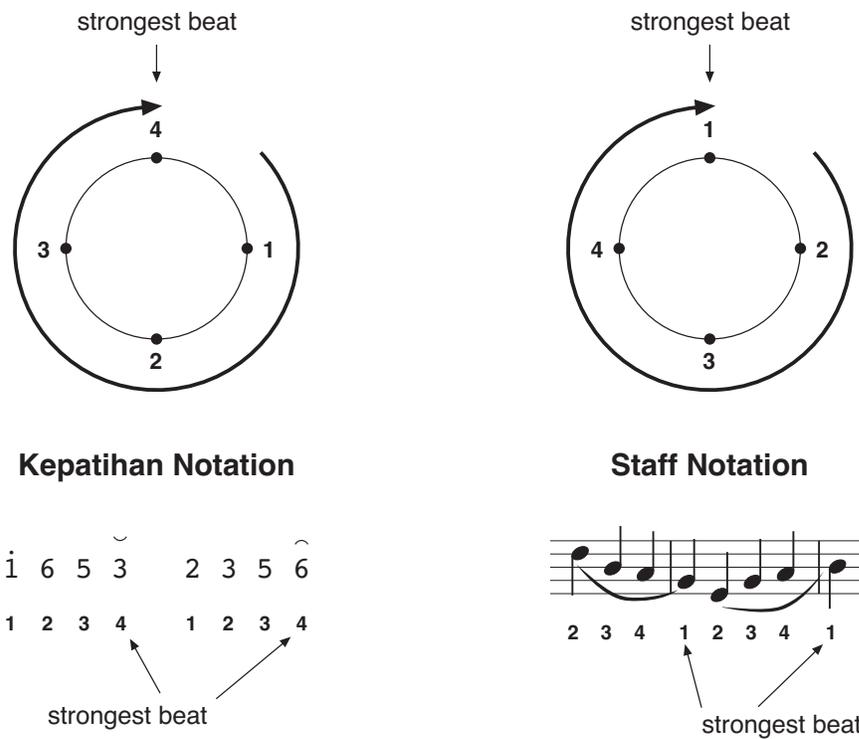
The break in the line indicating movement through the cycle shows the underlying organization of beats implied by each system. In the *Kepatihan* notation example *gatra* – groups of four beats, roughly analogous to measures – are separated by spaces following the strongest beat. The organization of beats reflects the underlying sense of movement in Javanese *gamelan*: leading up to a point. This is represented by the alignment of the arrowhead with the strongest beat.

The break in the example of staff notation corresponds to the barline, which precedes the strongest beat. The organization of beats corresponds to what might be considered the default sense of movement in much Western music: starting from a point. This is represented by the alignment of the start of the thick line with the strongest beat. The same general sequence of eight tones is used in both examples to underline this basic difference between the two systems. The sequence is reproduced visually – the eight

tones are divided into the same two groupings of four tones, without regard for the resulting difference in metric sense.

In different forms of Western music, the grouping of notes into phrases does not necessarily correspond to metric organization. Phrase marks are frequently used, and are especially useful when phrasing cuts across barlines.

Figure 0.3c: Implied and Specified Phrasing



In the above example of staff notation, the sequence of tones has been realigned in relation to the downbeat to conform with the metric alignment of the same sequence of tones in the *Kepatihan* example. Phrasing marks have been added to show that the phrases start on the second beat and lead to the first. Phrasing marks are not used in *Kepatihan*. They are generally not needed, as phrasing in *karawitan* is almost entirely uniform. The sense of phrasing is consistently oriented towards the last tone of each *gatra*, or four-beat grouping, and at larger levels, towards the point marked by *kenong*

and *gong* – which are also shown at the end of lines. Where in staff notation phrasing is shown explicitly, in *Kepatihan* notation it is implied and assumed.

### Variability of Temporal Scale

Another potentially confusing aspect of *Kepatihan* notation relates more directly to an aspect of rhythm and form in Javanese music even more central to this thesis. This is the very wide range of temporal scale in which melodic material can be set. Consider the following two examples:

**Figure 0.4a: *Lancaran Gambirsawit, sléndro sanga* (after Mloyowidodo 1976, 1:199)**

+	+	^	+	^	+	^	+	^	+	^						
.	6	.	5	.	1	.	6	.	1	.	6	.	2	.	1	
+		+	^	+	^	+	^	+	^	+	^	+	^	+	^	
.	2	.	1	.	2	.	6	.	1	.	6	.	2	.	1	
+	+	^	+	^	+	^	+	^	+	^	+	^	+	^	+	^
.	2	.	1	.	6	.	5	.	1	.	6	.	3	.	2	
+	+	^	+	^	+	^	+	^	+	^	+	^	+	^	+	^
.	3	.	5	.	2	.	1	.	2	.	1	.	6	.	5	

**Figure 0.4b: *Gendhing Gambirsawit, inggah, sléndro sanga* (after Gitosaprodjo 1993, 32)**

-	+	-	-	-	+	-	-	-	+	-	-	-	-	+	-	^
.	6	.	5	.	1	.	6	.	1	.	6	.	2	.	1	
.	2	.	1	.	2	.	6	.	1	.	6	.	2	.	1	^
.	2	.	1	.	6	.	5	.	1	.	6	.	3	.	2	^
.	3	.	5	.	2	.	1	.	2	.	1	.	6	.	5	^

The *balungan* in both cases is very nearly identical.<sup>8</sup> The primary difference between the two examples is formal structure, the first being *lancaran* and the second *inggah*. This is indicated in the title, and can also be deduced from the pattern of the structure-marking instruments. (It should be noted that the symbols for *kethuk* and *kempul* have

<sup>8</sup> The one minor melodic difference is in register, in the third line. In the third *gatra* of the *Lancaran*, 1 is middle and 6 is low; in the *Gendhing*, 1 is high and 6 is middle.

been added to the *balungan* in figure 0.4a. Mloyowidodo only indicates the placement of *kempul* and *gong*, as the use of other structure-marking instruments is implied by the designation of formal structure – another example of how notation is more a sketch than a detailed blueprint). At least as significant as the pattern of the structure-marking instruments is the difference in temporal scale. A complete cycle of the *lancaran* – that is, all four lines – would typically take around 26 seconds. A complete cycle of the *inggah* could take around 2 minutes and 20 seconds, 4 minutes, or longer. *Gendhing* and the cyclical formal structures on which they are based are expandable, so that one *gatra* in *inggah*, for example, can last around 23 seconds – nearly as long as a complete cycle of the *lancaran*. There is in the notation no direct indication of temporal scale. Even for a given piece it is variable – variability of temporal scale is an essential aspect of formal structure in *karawitan*. Again, for those fully familiar with the performance practice of *karawitan*, the indication of formal structure – in the title and through symbols indicating the structure-marking instruments (if they are indicated) – is sufficient.

It is with a view to representing this central aspect to rhythm and form in Javanese *karawitan* – variability of temporal scale – that I have introduced one significant notational innovation. This is the use of the proportional representation of time. This shares with *Kepatihan* (and staff notation) the basic convention of events being laid out linearly, with movement from left to right corresponding to movement through time. But there is a precise correspondence between the amount of time passed and horizontal distance along the line. The notation also retains an end-weighted organization, although this is only really apparent at the beginnings and ends of lines, as metric divisions finer than that are represented only by the placement of structure-marking instruments. In most of the examples, there are other forms of graphic representation of various elements. These will be introduced in connection with the particular examples concerned.

The process of transcribing the examples using proportional notation took advantage of the facility of digital sound-editing software (in particular, SoundEdit 16) to locate with some degree of precision the temporal location of beats, and to accurately time the intervals between them. The process also revealed that in some cases determining

where precisely the beat falls is not as simple an issue as it might seem. However, for the purpose of representing transformation of temporal scale, only a certain degree of precision was required; less than would be required, for example, in an analysis of micro-rhythmic detail. *Karawitan* offers equally rich possibilities in this regard.

While proportional representation may help to convey a sense of temporal flexibility and processes of expansion and contraction, it is not unproblematic. Kant's objection to the representation of time as a line presents a key issue clearly. Kant, writes Turetzky, "tends to resist this analogy, preferring descriptions of time as having the form of an arithmetic series, because time orders appearances successively while the parts of a line exist simultaneously" (1998, 88). The problem with static visual representations of music – whether conventional notation or unconventional graphic depictions – is directly related to their usefulness. They allow the whole of a piece, or a segment, to be displayed all at once. This facilitates identifying larger patterns, and pointing out certain features. But there is the danger of forgetting that they are representations, and that music is not experienced all at once, but over time.

Kramer brings up this danger in his chapter on the perception of musical time: "I fully realize... that music theory and analysis have their own methodological shortcomings and blind spots, not the least of which is their failure to differentiate between structures as they appear in a score, as they are performed, as they are perceived, and as they are remembered" (1988, 324). Further, he acknowledges that this issue and related questions potentially undermine a significant focus of his examination of the time of music: large-scale proportions, such as those based on the Fibonacci series in the music of Bartók and others. This focus is quite different than mine – as manifest in both the theoretical and compositional investigations documented in this thesis – which is more concerned with how music can alter the sense of how quickly time passes than with the perception of large-scale form.

Depending on the particular musical tradition – how invested it is in notation – it may well be that static representations have much to do with how music is understood. But in all cases, music as it is experienced is inescapably temporal. Representing music through static visual forms is not merely a matter of distortion through simplification – though that occurs as well – but a fundamental displacement in the mode of

apprehension. It may be more commonplace and accepted than dancing about architecture, but on some level it is no less absurd a proposition.

## Acknowledgements

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This thesis and the compositional project documented in its second half are the culmination of much more than just two years of graduate study. The theoretical investigations involved a significant amount of discovery, but in large part they represent an effort to articulate a curiosity and an intuitive understanding developed over a decade of involvement in *karawitan* as a player. In light of this, my debts are many and extensive. I would like to thank my first Javanese teachers, Blacius Subono, Hardja Susilo and Rusdiyantoro, whose instruction provided me with a solid foundation for the time I spent in Java. My principal teachers among the many musicians I had the pleasure of learning from, playing beside or listening to in the year and a half I spent in Solo are Supardi, Darsono “*vokal*,” and a now good friend, Wakidi. A more recent visit provided an opportunity to study with Darsono “*luar*.” Besides individual lessons, I learned much through attending rehearsals. I would particularly like to thank the people at Danar Hadi and those who met weekly at the house of Mulyadi Lojiwetan for allowing me to fumble along. Equally valuable to such hands on learning was listening and absorbing, and for this I am especially grateful to the musicians of the Mangkunegaran. I would also like to thank Midiyanto and Sutrisno Hartana, and of course, my most recent teachers, Sumarsam and I.M. Harjito.

What understanding I have managed to gain of *karawitan* has been fundamentally grounded in direct involvement with the music. At the same time, in my practical studies I have benefited greatly from insights gained from the works of Judith Becker, R. Anderson Sutton, Benjamin Brinner Martopangrawit, Marc Perlman, Sumarsam and others. The healthy state of *gamelan* performance study in North America has

much to do with their efforts, as well as those focused more on performance. More directly, I am grateful to fellow members of Gamelan Madu Sari in Vancouver, whose collective enthusiasm for the music when I was first starting out is largely to blame for my continuing involvement. In particular, I would like to thank my dear friends Kenneth Newby and Lorraine Thomson. In more recent years I have been very fortunate to play regularly with some of the most dedicated foreign students of *gamelan*, among them Kitsie Emerson, Greg McCourt, Kaoru Ijima, Barry Drummond, Marc Perlman, Anne Stebinger, Jesse Snyder and Rainer Schuetz.

While one foot has been solidly planted in the soil of traditional *karawitan*, the other has explored the possibilities of creating new music for *gamelan* instruments. Again, fellow members of Gamelan Madu Sari must be mentioned, both for their willingness to support my own compositional efforts, and for allowing me to take part in supporting theirs. I am especially grateful for the formative experience of working with Al Suwardi in 1991, and also for the opportunity to work with Johannes, Mohammed and I Wayan Sadra. For particular opportunities to create and perform my own pieces I would like to thank Adrian Lee and choreographer/dancer Bambang Mbesur.

While a great debt is owed to the fellow musicians, teachers, artists and friends noted above, I have also benefited greatly in undertaking this thesis from my academic experience. I would like to thank my earlier teachers for feeding my intellectual curiosity and stimulating an interest in scholarship. In particular, I am grateful to Donna Zapf, Martin Bartlett and George Lewis for the models they have provided, and for asking questions that matter. More recently, I would like to thank Jon Barlow for the time we shared talking about time and music, and Eric Charry for the solid introduction to the field of ethnomusicology. The seminar with Sumarsam was a fantastic opportunity to develop and discuss ideas about *karawitan*. I also have to thank Scott Wilson, Molly Sturges and Mel Mercier for making our first year at Wesleyan so memorable. Thanks to Andrew McGraw and Kelly Boyle for indulging my showing off my latest diagram, for *The Simpsons*, and just generally thanks.

More directly related to this thesis and my compositional project, I must again express my appreciation for the generosity and enthusiasm of all those who took part

in the development and performance of *as time is stretched...* I would like to thank Michael Peluse for his thorough proofreading, my committee members Peter Hoyt and Sumarsam, and especially my advisor, Ron Kuivila, both for his patience and support, and for generally having such interesting things to say. Finally, thanks to my family – my brothers Mike and Greg, and especially my parents, who have always been supportive despite even if they do not entirely fathom my fascination with *gamelan* and new music.

## **Part One – Theoretical Investigations**

## Introduction

### Javanese Rhythm as Articulated Flow

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Justin London opens his article on rhythm for the New Grove Dictionary of Music by noting: “In etymological discussions of the term there is a tension between rhythm as continuously ‘flowing’ and rhythm as periodically punctuated movement” (London 2000). A similar discrepancy is found in writings on rhythm and form in Javanese *gamelan* music, though not so directly as two sides of a theoretical dispute. Here, it is simply a gap between general descriptions and theoretical accounts. In general terms, the music has been characterized as “a richly heterophonic flow” (Brinner 1995, xxi). Even *gamelan gadhon*, a small ensemble involving less than ten musicians, can produce “an exquisite richness of sound, thick enough to feel” (Ibid. 13). More impressionistically, *gamelan* has been called “pure and mysterious, like moonlight, and always changing, like flowing water” (Leonard Huizinga, quoted in Vetter 1994, 74). In stark contrast, theoretical accounts – especially those concerned with rhythmic and structural principles such as those of Becker (1980b, 105-147) or Sutton (1993, 207-231) – make little or no attempt to describe the musical texture as an integrated whole. Instead, they isolate and focus on those parts whose primary function is to delineate form (the various sizes of hanging and cradled gongs) and on the rhythmic aspects of other parts – in particular, the articulation of levels of pulsation which subdivide the spans of time between the strokes of the structure-marking instruments.

A more direct expression of the contrast between flow and periodic punctuation is found in Stanley Hoffman’s proposal that *gamelan* music is the combination of

disparate elements representing two distinct epistemologies. One of these, embodied in the purely instrumental archaic forms of *gamelan*, consists of little more than periodic punctuation. The other, sung poetry (the most common form of which is *macapat*), is a smooth melodic line. In *gendhing* – pieces for full *gamelan* ensemble – both elements are present. The sinuous melodic lines of the *rebab* and *pesindhen* flow like *macapat*, while the structure-marking instruments play patterns which are closely related to those found in *gamelan Monggang*, *Kodhok Ngorek* and *Carabalen*. The other parts “fall somewhere along an epistemological continuum” (Hoffman 1975, 62) combining the flowing and the punctuated in varying proportions.<sup>9</sup> The *gendèr*, *gambang* and other *panerusan* with their ceaseless figuration are at the “flow” end of the spectrum, while the *balungan* marks out time with its regular and stately pace.<sup>10</sup>

The flowing melodic and the rhythmically punctuating correspond to the broadest divisions in several categorizations of instruments according to function. Brinner offers a concise summary and comparison of these (1995, 210-221) which he characterizes as “relatively brief and simplistic.” Indeed, they are typically presented as the basis for a more nuanced and detailed treatment, which acknowledges that functional roles are not always so rigid as categorizations might suggest. Functional categories can be thought of as a useful tool for understanding a complex musical texture. This is precisely how Kunst presents his account, one of the earliest examples of categorization in Western scholarship:

Such a great princely gamelan is apt to confound the listener who hears and sees it for the first time: the grouping of the orchestra and the manner of playing the instruments appear completely arbitrary, and only gradually does one become aware that each instrument actually performs its own fixed task within the ensemble. (1973, 1:247)

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<sup>9</sup> The commentary on how the concept of multiple epistemologies applies to the musical texture of the full *gamelan* in Hoffman’s thesis (1975) was not included in his subsequent article (1978).

<sup>10</sup> Briefly, *panerusan* are the instruments which fill out the texture with continuous, fast figuration. *Balungan* is the melodic line played in unison by *slenthem*, *saron demung* and *saron barung*. See p. 16 for a discussion of the term *panerusan*. The concept of *balungan*, and in particular the distinction between the line actually played within the limited register of the *balungan* instruments and a melodic line with a larger ambitus has received considerable attention in *gamelan* scholarship. Key writings include Sumarsam (1984b; 1995, 161-237), Supanggah (1988) and Perlman (1993).

Kunst would have assumed total unfamiliarity on the part of the listener. Martopangrawit presents a categorization of instruments near the beginning of a document intended for students at the arts academy where he taught (1984). In his case, he would have expected his audience to have at least a general familiarity with *gamelan*, if not considerable first-hand playing experience. Categorization in this case is less a way of presenting new information as it is a way of organizing knowledge presumed to be already held. Nevertheless, the prominence of place given to the description of instruments according to musical function is an indication of its effectiveness in approaching the musical texture of *gamelan*, even for those who already have a general familiarity with it.

Though breaking down the ensemble into functional groups is a useful analytic strategy for Javanese and non-Javanese alike, it cannot be assumed that the music is understood primarily in this way, as distinct functional streams. There is in fact evidence to suggest that for those familiar with the music the opposite is the case – that the musical texture is heard and imagined not as distinct strata of melody (or melodies) and rhythmic punctuation, but more as an integrated whole. Sumarsam describes a situation where a group had difficulty remembering a *gendhing* they had not played for a long time. He describes his *bonang* teacher's method for teasing his recollection of the piece out of his memory:

Sitting down in a corner of the building, he tried to remember the piece by humming a melody. The melody he hummed was not the *bonang* melody, nor was it the melody of any other part; rather, it flowed in the manner of all Javanese vocal music. (1984b, 262-263)

Perlman discusses the use of humming as a mnemonic technique, both for recall and for learning, in more detail. He cites Martopangrawit's description:

Humming unites *rebaban*, *balungan*, and *kendhangan*. The melody would be hummed using the drum syllables as words. Even humming a *gendhing bonang* would incorporate *rebaban*, moving smoothly, never intermittently [*putus-putus*]. (Martopangrawit, quoted in Perlman 1993, 233)

He also describes Mitropradangga's demonstration of a similar technique.

Mitropradangga hummed a version of *Gendhing Gambirsawit sléndro sanga* that was almost entirely *rebaban* and *gerongan*, with brief flashes of (multi-octave) *balungan*, *saron*, *bonang*, and *sindhenan*. (Perlman 1993, 232)

A similar approach to listening to *gamelan* is described by Sindoesawarno.

Although many notes are heard together, it is as if these other notes are pressed into the background by the melodic phrase we are paying attention to. At times we pay attention to the *sindhen* phrase, at times to the *gerong* phrase, or that of the *gendèr*, *rebab*, drum, *suling*, etc. What we are paying attention to is always changing as is the particular way in which we focus our attention. That is the way we listen to our music; the skilled ear is able to follow two or three lines at the same time. (Sindoesawarno, quoted in Hoffman 1975, 62)

Sumarsam's account of his teacher humming was presented in support of his theory of "inner melody," which he defines as the "melody that is sung by musicians in their hearts" and the "essence of melody in Javanese gamelan." The formulation "inner melody" suggests a definable melodic line, and this is the form that the "hypothetical version of the inner melody" given by Sumarsam for one example takes (Ibid. 265). However, Sumarsam also comments that "the concept of melody in Javanese gamelan encompasses the relationships between the musicians' conception of the melodic motion of the *gendhing* and the melodic patterns of each of the instruments" (Ibid. 250). In other words, it includes in some measure the totality of the musical texture, or at the very least, some overall idea of melodic motion to which their own part relates. This is suggested in a second example, where he contrasts the disjunct melodic contour of the *saron* with a "generalized melodic contour of the *rebab*, *gendèr*, and *bonang*." At the end of the segment, what started out as a single line – essentially the same as the *balungan*, but with disjunct leaps replaced by conjunct steps – breaks into two separate lines which converge on the final pitch. He notes these as two alternatives for "what Javanese musicians actually feel as the *balungan*" (Ibid. 253-254). The split could also be taken to suggest the possibility that the awareness of melodic flow encompasses several parts, and cannot be reduced to a single line.

Martopangrawit's response to Sumarsam's idea was to redefine "'inner melody' to encompass the entirety of the sound-image in the composer's mind" (Perlman 1993, 529). Supanggah proposed a theory of an "essential *balungan*", an idea parallel to

Sumarsam's and to some extent based on it. As a definable melodic line which may be written down, it is the result of an analytical process, a "boiling down" of the imagined sound of the *gendhing*. The "essential *balungan*" does not sound like any one instrument, "but like a fusion of many" (521-522).

The initial impetus for Sumarsam's theory of inner melody was in large part his conviction that existing theories of melody with their emphasis or even exclusive focus on the *balungan* were inadequate, and did not represent how Javanese musicians understand melody. Perlman's examination of the background to the implicit-melody concepts of Sumarsam, Suhardi and Supanggih examines the strategies used by musicians in performance, strategies which draw heavily on understanding the relationships between different parts in the ensemble. In short, a full understanding of the melodic aspects of *gamelan* must take into account the entirety of the musical texture.

Similarly, a full understanding of the rhythmic and formal aspects of *gamelan* must consider more than simply the delineation of form by the structure-marking instruments, and the articulation of different levels of pulsation by other instruments. These are important aspects of rhythm and form, and much of chapter 1 will be taken up with a review of these. But rhythmic aspects cannot be isolated from melodic structure. Cyclicity is not just a matter of a span of time being divided up by the strokes of *gong*, *kenong*, and *kethuk*, but also involves the structure of melodic phrasing. A detailed examination of melodic phrasing would involve an examination of instrumental idioms well beyond the scope of this thesis. Brief descriptions of some of the basic principles of patterning in melodic parts will be discussed in connection with analysis of musical examples in chapter 3. The analyses in this chapter will also draw upon fundamental principles of temporal perception. Another approach to the consideration of the interaction between melodic structure, rhythm, and form, based on the consideration of the terms used to describe melodic phrasing, will be the focus of chapter 2.

## Chapter 1

### Fundamentals of *Irama* and Formal Structure

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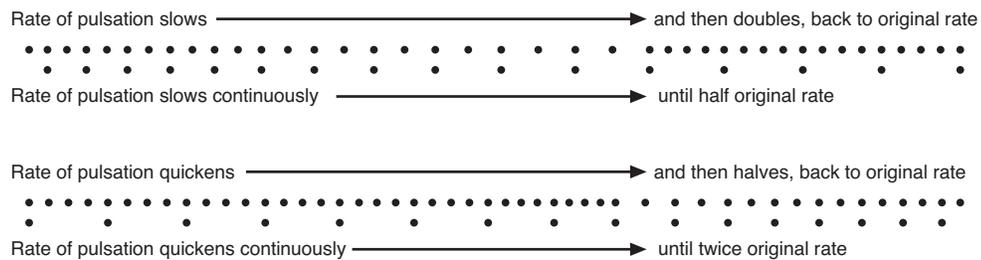
#### ***Irama* – General and Specific Senses**

Like many terms in *karawitan*, *irama* has a range of usages, some general and some specific. In its most general sense, it encompasses all temporal aspects of the music. In casual usage it can mean tempo – as in expressions such as “*iramanya terlalu cepat*” – the *irama* is too fast – or his *irama* is too fast, perhaps in reference to a drummer who tends to push tempos. It was used in an especially general and all-encompassing way by *dhalang* (shadow puppet master) Ki Tristuti when he attended a rehearsal of the Wesleyan *gamelan* group in preparation for a *wayang* performance in April of 2001. Responding to the problems the group was having following cues to start, stop or change tempo from the drummer Blacius Subono (who did tend to take tempos on the fast side, and with whom the Wesleyan group had not previously played) and also generally with staying together, Ki Tristuti stated simply “*iramanya belum pas*” – roughly translated, “the rhythm isn’t yet right.”

More specifically, *irama* is the relationship between tempo and the ratio between different levels of pulsation, through varying levels of subdivision of certain parts by other parts. It is this meaning that now predominates, especially in the more theoretically oriented discourse that has emerged through both Indonesian educational institutions and ethnomusicology. Martopangrawit, a key figure in the development of *karawitan* theory, conceptualized the distinction between this specific meaning and

simple variance of tempo terminologically, borrowing the Sanskrit *laya* to refer to the latter (1984, 10-11). In a sense, though, the distinction is automatic, in that changes of tempo beyond a certain point invariably involve shifts in rhythmic density. In these changes certain parts – the various sizes of hanging and cradled gongs which mark out cyclical structures, and usually also the single octave metallophones which play the relatively abstract melodic line referred to as *balungan* – slow or quicken continuously, while other parts – those instruments which play simple elaborations of the *balungan*, and the *panerusan*, the instruments which contribute to the melodic flow through a continuous stream of patterns – slow or quicken to a certain point and then double or halve. These basic mechanics of *irama* change are illustrated in the following figure:

**Figure 1.1: Basic Mechanics of *Irama* Change**

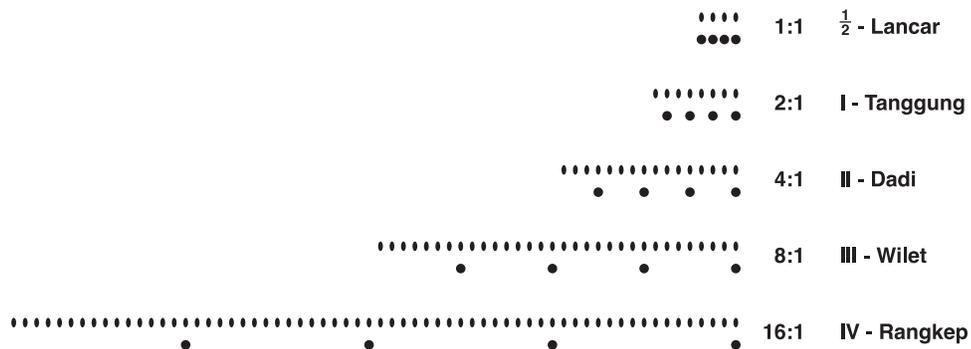


A degree of consistency in the surface level of density is thus maintained, while the overall cycle and underlying melodic sequence expands or contracts.

The most common example given to illustrate *irama* is also the most straightforward – the subdivision by the *saron panerusan* of the pulse of the *balungan* as played by *slenthem*, *demung* and *saron*. In different *irama*, or *irama* levels, the *saron panerusan* plays one, two, four, eight or sixteen strokes for every beat of the *balungan*. This beat may or may not be directly articulated by *slenthem*, *demung* and *saron*. They may play half as fast, or twice as fast, which has led Western scholars to propose the notion of an underlying conceptual *balungan* beat. In what sense the different idioms of *balungan* are understood in this way will be taken up below, but for the present explanation the concept will stand. There are two common systems of naming these

levels. One of these uses numbers, while the other uses terms. The following figure represents the five commonly recognized *irama*, with the top row of narrow dots representing the strokes of *saron panerus*, and the bottom row of dots representing the beat of the *balungan*.

Figure 1.2: *Irama* Levels



This aspect of *irama* is indeed central to, and a distinguishing feature of, temporal organization of Javanese *gamelan* music. But *irama* is more than the simple mechanics of how many strokes of the *saron panerus* (the smallest of the thick-keyed metallophones) fall between each stroke of the *balungan*. Shifts in *irama* also involve the transformation of melodic substance, with a general tendency towards elongation. There are many pieces where the *balungan* starts out as a fluid melodic line, immediately slows to a more stately measured pace, and then later is stretched even further to the point that it becomes more structural, marking important points in the overall melodic flow of the piece. At the same time as the *balungan* is stretched and transformed, cyclical structures are expanded, becoming less immediately apparent. These changes affect the overall musical texture, and are frequently enforced by shifts in instrumentation or playing style, such as the switch from the sparse strokes of *kendhang ageng* (the largest drum) to the dense rippling patterns of *kendhang ciblon*.

That changes in *irama* are gradual is also significant, distinguishing it from otherwise similar processes of expansion such as *thaw* in Thai music.<sup>11</sup> The transformation of the *balungan* from melodic line to structure is seamless, and is itself a feature of the music as much as melody or rhythmic pattern. The gradual nature of changes in *irama* – which can last over half a minute – gives rise to large temporal shapes, contributing as much to the extended sense of time as the large cyclical structures for which Javanese *gamelan* is renowned.

These other aspects of *irama* and form will be considered in subsequent chapters. The remainder of this chapter will provide an overview of fundamental principles rhythm and form.

### ***Irama*, Formal Structure and Stratification**

*Irama* as a system of relative levels of rhythmic density depends on the presence of at least two levels of pulsation. In *karawitan*, there are many levels, corresponding to different layers in what is often characterized as a stratified musical texture.

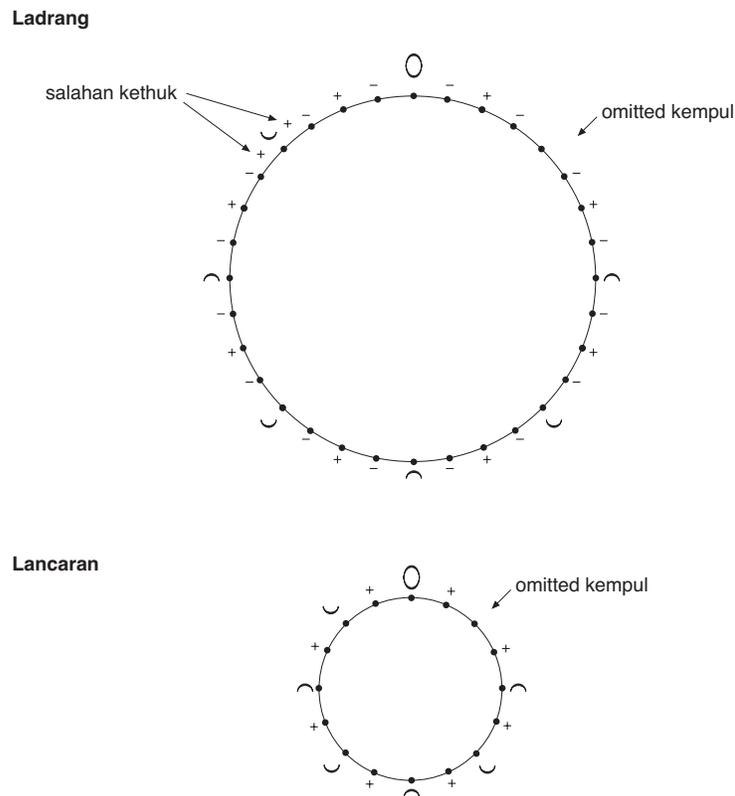
*Karawitan* is by no means unique in this regard – there are a great number of ensemble musics which in various ways involve different instruments, often in different registers, performing distinct musical roles, resulting in distinct layers. What is exceptional about *karawitan* (along with other forms of *gamelan* music from other regions of Indonesia) is the extent to which stratification pervades the musical texture, and the thoroughness of the principles it follows. This is a direct result of the almost complete regularity of nearly all levels of rhythm and structure. Essential to the rhythmic character of several parts, including *gambang*, *celempung*, *gendèr panerus* and *saron panerus*, is the sounding of a steady and continuous stream of pulsation. Other parts are less thoroughly or consistently regular, but are still grounded in and project an underlying basis in pulse. In certain pieces, the *balungan* is unflinchingly regular. In others, it sometimes leaves out strokes, or plays extra strokes, but in specific ways that are governed by rigorous idiomatic constraints that are often more melodically than rhythmically motivated. Instances where the *balungan* expresses a

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<sup>11</sup> Becker (1980a) argues that Thai *thaw* and Javanese *irama* are fundamentally similar. Surprisingly, no mention is made of this very significant difference.

clear rhythmic motif, while not rare, are exceptional, and depart from the more usual measured and steady sequence of strokes. The *bonang*, *bonang panerus* and *gendèr* incorporate some degree of rhythmic variety in their usual idioms, but with great consistency, so that an underlying steady sense of pulse is clearly implied. The various sizes of hanging and cradled *gongs* very rarely sound other than when filling their primary function of marking the regular subdivisions of the cyclical formal structures which form the basis of almost the entire repertoire.

The most basic principle which links all of these levels together is simple and remarkably consistent. Every level of regular articulation is related to every other level by some power of two. This is seen clearly in the relationship between *saron panerus* and *balungan* through the various levels of *irama*. It is equally fundamental to formal structure. All cyclical formal structures are related, with the different structure-marking parts performing the same basic roles. The *gong* marks the end of the cycle. The *kenong* sounds at regular intervals twice or four times in the cycle, once together with *gong*, dividing it into halves or quarters. The remaining instruments mark finer subdivisions of the cycle, falling on the points in between those marked (or sometimes unmarked) by other instruments. There are deviations from this simple pattern, though in most cases these serve to support regularity on a larger level, reinforcing rather than working against the sense of cyclicity. The forms *ladrang* and *lancaran* are shown here as examples.

Figure 1.3: The Formal Structures of *ladrang* and *lancaran*

The two deviations are in the parts of *kempul* and *kethuk*. In standard Solonese practice the *kempul* is omitted at the stroke that would fall after *gong*. In both *ladrang* and *lancaran*, this serves to distinguish the first half of the cycle from the second half. In the more compressed form *lancaran*, the composite pattern formed by *kempul* and *gong* becomes rhythmically prominent, especially when *lancaran* is played in the more compressed *irama lancar*. The *salahan kethuk* in *ladrang* – *salahan* meaning mistake, or deviation – similarly distinguishes the point in the cycle at which it occurs, breaking up the otherwise regular pattern of alternation between *kethuk* and *kempyang*, and reinforcing the sense of approaching the end of the cycle and the sounding of *gong*.

The difference between *lancaran* and *ladrang* – and between all forms – is essentially similar to the difference between levels of *irama*. Put in the terms used above to define *irama*, this difference consists of the level of subdivision by certain parts of the

periods marked by other parts. In both *ladrang* and *lancaran*, the *gongan* – the period between strokes of the *gong* – is divided into four *kenongan* by the strokes of the *kenong*. Each *kenongan* is subdivided by a stroke of *kempul* (except at the point after *gong*). The next level of subdivision is marked by *kethuk*. In *lancaran*, there is no further subdivision by structure-marking instruments. In *ladrang*, the *kempyang* marks one further level of subdivision. In more expansive *irama* - *irama wilet* and *rangkep* – the *kempyang* can be replaced by *engkok* and *kemong*, playing an alternating pattern basically similar to that of *kethuk* and *kempyang*, introducing yet one more level.

### Stratification and Relative Levels of Density

*Irama* and formal structure are two of three primary factors determining the relationships between different levels of regular rhythmic articulation within the stratified texture of *gamelan*. The third is instrumental idiom. Of particular interest are the idioms of the *balungan*. There are three basic idioms, differing primarily in rhythmic density. These are *balungan mlaku*, *balungan rangkep* and *balungan nibani*, examples of which are given in the following figure:

Figure 1.4: *Balungan* Idioms<sup>12</sup>

<i>Balungan rangkep</i> :	326̣5̣3̣5̣6̣1	326̣5̣3̣5̣6̣1	23..336̣1	22.3.1.2
<i>Balungan mlaku</i> :	. 5̣ 5̣ 5̣	2̣ 2̣ 3̣ 5̣	. . 5̣ 6̣	1 2 3 2
<i>Balungan nibani</i> :	. 2 . 1	. 2 . 1	. 3 . 2	. 1 . 6̣

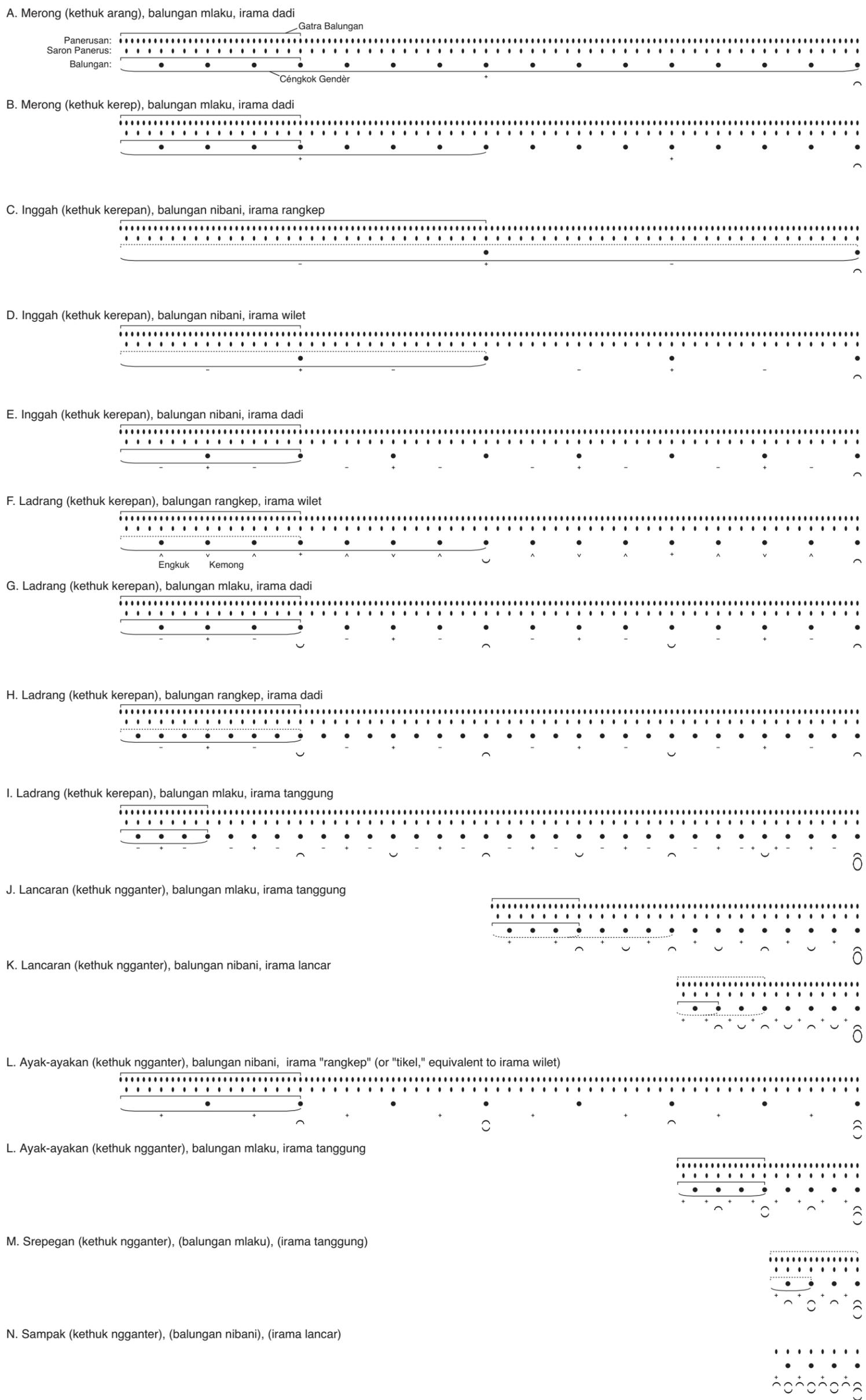
Figure 1.5 shows the relationships between levels of regular rhythmic articulation as they are affected by *irama*, formal structure and idiom of *balungan*. These three parameters are identified in the label for each example as follows: formal structure (with the *kethuk* noted in parentheses) then the *balungan* idiom, and finally the *irama* level. The different levels of articulation are represented by five layers, which in the commentary that follows form three groups. The first group – the “elaborate melodic”

<sup>12</sup> Figure taken from Perlman (1993, 152). He identifies the examples as *ladrang Lipursari sléndro manyura* for *balungan rangkep*, *Gendhing Kocak sléndro nem, mérong* for *balungan mlaku* and *Gendhing Montro sléndro manyura, inggah* for *balungan nibani*. Perlman’s source was in turn Mloyowidodo (1976).

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– comprises the first two layers, which use narrow ovals to represent the levels of pulsation articulated by the *panerusan*, *bonang panerus*, *saron panerus* and *bonang barung*. The second group consists solely of the *balungan*, with round dots of the third layer representing the strokes of *demung*, *saron* and *slenthem*. It is assumed here that these instruments simply play the *balungan* rather than other types of figuration such as *imbal*, or *pinjalan*. Rhythmic variety in *balungan mlaku* and *balungan rangkep* is also ignored – these idioms are treated here as if they were as completely regular as *balungan nibani*. The third group – the “structural” – consists of the final two layers, using standard notational symbols (except for the *engukuk* and *kemong* in example F, which are almost never indicated in notation) to represent the structure-marking instruments. The organization of these into two layers reflects a distinction I will make between the *kenong*, *kempul* and *gong* as the primary structure-marking instruments, and the *kethuk*, *kempyang*, *engukuk* and *kemong* as the secondary structure-marking instruments.

Figure 1.5: Relative Density of Levels as a Function of Formal Structure, Balungan Idiom and Irama Level



The basis for the grouping of layers is the degree of rhythmic consistency. The “elaborate melodic” and the “structural” groups are the most consistent, both in terms of regularity of articulation, and of what they do through changes of *irama*. The parts in the “elaborate melodic” group always halve or double, thus maintaining a more or less constant rate of pulsation.<sup>13</sup> The parts in the “structural” layer very strictly expand or contract. The middle layer – the *balungan* – is the least consistent. While generally projecting a sense of rhythmic regularity, it is much less regular compared to the absolute regularity of *gong* and *kenong*, or of *gambang*, *celempung*, *gendèr panerus*, *saron panerus* or *bonang panerus*. Through most changes of *irama*, it expands and contracts along with the “structural” layer, but it can also double or halve along with “elaborate melodic” layer.

While the *saron panerus*, *bonang barung* and *bonang panerus* are melodically usually associated with the *balungan*, they behave rhythmically more like the *panerusan*, maintaining the same rate of pulsation through changes in *irama* by doubling or halving. The word *panerusan* is from the root *terus* meaning “right away, right after that” or “straight (on, as before). With the suffix “an” it becomes *terusan* means “continuing in the same way; a continuation” as in *udan terusan*, “a long rain” (Horne 1974, 612). The prefix “pe” or “pa” indicates something or someone that exhibits a characteristic, or performs a function. A *pesindhen* is a woman who sings *sindhen*, a *pengeron* a man who sings *gerong*. *Sindhenan* and *gerongan* are what they sing. *Panerusan* are those instruments which play continuously, and more specifically, those instruments which consistently articulate faster levels of pulsation, playing at more or less the same density whenever they play. In observing this, Mantle Hood proposed the concept of the “density referent.” This concept recognizes those instruments which articulate the fastest level of pulsation, which is “within the rather narrow limits of the fastest possible, but physically comfortable, density” (Hood 1971, 115). The principle applies also to *saron panerus* and *bonang panerus*, as their names imply. Something similar to the concept of “density referent” is expressed by Martopangrawit with respect to the *saron panerus*, which he explains

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<sup>13</sup> The one exception is *bonang barung*, which in certain contexts can expand along with the *balungan* rather than double.

“provides a pulse which may be used as a guide to the various levels of *irama*” (1984, 13).

The designation “elaborate melodic” relates to a categorization proposed by Sumarsam, who divides melodic instruments into three groups by function. Elaboration encompasses *rebab* and vocalists as well as *panerusan*. Abstraction consists solely of *balungan* instruments. Mediation is the function of *saron panerus*, *bonang barung* and *bonang panerus*. Sumarsam does not expand on how these parts “melodically mediate” between the elaborate and the abstract. I would suggest that it is primarily through basing their figuration, as much as possible, on the melodic material of the *balungan* (rather than following the *garap*), but playing at the rate of pulsation equal to or half the rate of pulsation of the *panerusan* – those instruments which realize *garap*.

In contrast to the *panerusan*, which always play at roughly the same rate, the range of regular intervals articulated by the structure-marking parts is huge. The *gong* sounds 256 times as frequently (in terms of *balungan* beats) in the smallest, *sampak* (example N) as it does in the largest structure, *mérong kethuk 4 arang* (example A). In terms of actual time passed, the range is even more extreme. The interval between strokes of *kempul* and/or *gong* in *sampak* is 1.2 seconds, while a *gongan* of *mérong kethuk 4 arang* in *irama dadi* lasts nearly 10 minutes. Yet in the sense that they sound with nearly absolute regularity, the structure-marking instruments can, like those of the *panerusan*, be considered continuous. This is clear enough in the case of the smallest forms. In *sampak* the *kenong* articulates the fastest level of pulse – the “density referent” – along with *saron panerus*. But in larger forms, the sense of continuity is well beyond immediate apprehension.

The range of regular intervals of the structure-marking parts in a given formal structure at various levels of expansion through *irama* is much smaller, but still considerable. Pieces in *ladrang* form are commonly played in four out of the five levels of *irama*. Successively expansive levels differ by a factor of two – in the change from one level of *irama* to the next most expansive level, the interval between events doubles. Through three changes of *irama* between four levels, the interval is expanded by a factor of eight. This can be seen in a comparison of examples I, E, D

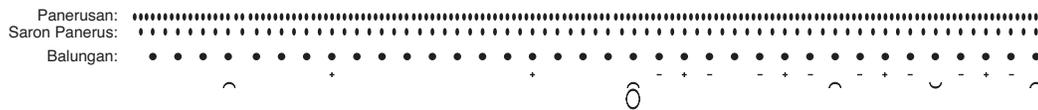
and C. (C, D and E are of *inggah* rather than *ladrang*, but the two structures share the same *kethuk* density.) Throughout changes of *irama*, however, the relationship of the structure-marking instruments to each other is consistent, and the integrity of the formal structure is maintained. The entire formal structure simply expands and contracts. (The one exception, noted above in reference to figure 1.3 is the substitution of *engkuk-kemong* for *kempyang*, but even in this case, the relationship between the other parts is not affected.)

It was stated above that the difference between formal structures is essentially similar to the difference between levels of *irama*, in that both are defined by the level of subdivision of certain parts by other parts. An important distinction is found in the usual method of change between levels of *irama* and between formal structures. Pieces of different formal structures are frequently joined together into suites. In these suites, larger structures are almost always followed by smaller structures. This results in a general tendency towards contraction, in contrast to the general tendency towards expansion through changes of *irama* within formal structures. The rates of pulsation of the “elaborate melodic” layer and the *balungan* usually remain constant through transitions from one structure to another, neither doubling nor halving. Depending on what these formal structures are, different structure-marking instruments double, or, less often, increase their level of articulation by some other factor of two. The major exception to this pattern is with the transitions from *ayak-ayakan* to *srepegan*, and from *srepegan* to *sampak*, in which the tempo increases steadily, but the *balungan* and other instruments halve their rate of pulsation. In these forms, the mechanics of the transition are basically the same as changes of *irama*, the difference being one of which parts simply change tempo – changing their density gradually - and which halve, changing their density abruptly. The *kenong* and *gong* (or in its place *kempul*) simply accelerate, while the *kethuk*, *balungan* and other instruments halve – changing density relative to the *kenong* and *gong*, in order to maintain the same basic density as before the increase in tempo. This will be seen more clearly, and discussed further, in the consideration of the *Talu* suite below, but the basic distinctions between types of change are illustrated in the figure below. The first example shows the change from *mérong kethuk 2 kerep* to *ladrang*, in which all the structure-marking parts sounding in *mérong* sound twice as frequently in *ladrang*. Additionally, the *kempyang* is used,

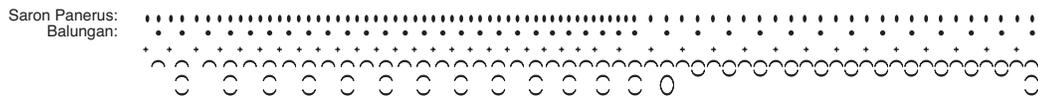
marking one more level of subdivision. *Irama tanggung* is maintained through the change of structure. The second example shows the change from *srepegan* to *sampak*.

**Figure 1.6: Changes in Formal Structure**

Change of formal structure while irama level is constant (merong kethuk 2 kerep to ladrang)



Change of formal structure and change in irama level (srepegan to sampak)



Although the mechanics of changes from one structure to another (other than those between *ayak-ayakan*, *srepegan* and *sampak*) differ from changes of *irama*, there is the basic similarity, noted above, of differences consisting of the level of subdivision by certain parts of the periods marked by other parts. As noted above in reference to the difference between *ladrang* and *lancaran*, the *gong* marks the end of the cycle, the *kenong* marks divisions of this cycle into four, sometimes two, or in a few exceptional cases some other number. *Gong* and *kenong* mark the most important structural points, and they do so for all forms. It is for this reason that I suggested they (along with *kempul*) be considered the primary structure-marking instruments. The secondary structure-marking instruments, *kethuk*, *kempyang*, *engkuk* and *kemong*, distinguish structures from each other by how they subdivide *kenongan*. To draw the analogy with *irama* more directly, *kethuk* is to *gong* and *kenong* in respect to formal structure as *saron panerus* is to *balungan* in respect to levels of *irama*.

### Designations of Formal Structures

In most cases, the particulars of formal structure are indicated only by the name of the form. In the smallest forms – *ayak-ayakan*, *srepegan* and *sampak* – there are invariably two strokes of *kenong* for every one of *gong*, or in its place, *kempul*. In

larger formal structures it is assumed that there are four *kenongan* in a *gongan* unless otherwise noted, either by the term *ketawang – gendhing* (pieces consisting of two sections, the first with the formal structure *mérong* and the second in the formal structure *inggah*) with *mérong* with two rather than four *kenongan* are called *ketawang gendhing* – or for exceptional cases by more direct explanation. *Ladrang*, *lancaran* and *inggah* almost invariably consist of four *kenongan*. Further particulars of formal structure are indicated in reference to the *kethuk*, by specifying how many *kethuk* strokes there are in each *kenongan*, and in the case of *mérong*, whether the strokes are frequent (*kerep*) or infrequent (*arang*). In *inggah* and *ladrang*, it is understood that the *kethuk* is *kethuk kerepan*, even more frequent than *kethuk kerep*. It is also understood that *kempyang* is used. In *lancaran*, it is understood that the *kethuk* is *kethuk ngganter*. For this reason, *kethuk* may be considered the most important of the secondary structure-marking instruments.

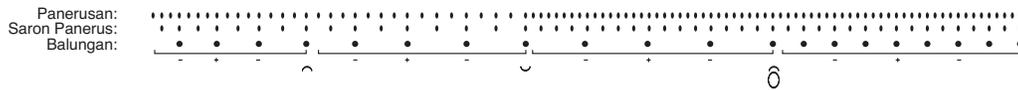
The terms *ngganter*, *kerepan*, *kerep* and *arang* indicate the relative frequency of *kethuk*. They do not specify by what measure strokes of the *kethuk* fall more or less frequently. In a certain sense, the frequencies of the different *kethuk* techniques are relative to each other, but even this is not entirely consistent due to the factor of *irama*. This can be seen in comparing examples A and C in figure 1.5. The *kethuk* in A is *kethuk arang* – nominally the least frequent – and in C *kethuk kerepan* – nominally the second most frequent, after *ngganter*, which means “to beat steadily” (Poerbapangrawit 1984, 432). Yet in both examples the *kethuk* sounds at the same frequency, relative to other levels of pulsation (the “elaborate melodic” layer providing the most stable reference). In terms of clock time, the *kethuk* is only slightly more frequent in C than in A, as tempos in *irama rangkep* tend to be somewhat faster than those in *irama dadi*, but it is still more frequent than *kethuk kerep* in *irama dadi*, as in B.

It is tempting to simply state that the point of reference is the *balungan* beat. A complication in doing so is that the density of *balungan* is variable, according to its idiom. In the formal structures *inggah* and *ladrang*, where the *kethuk* is *kethuk kerepan*, the ratio of strokes of the *kethuk* to actual strokes of *balungan* can be either 1:2 if the *balungan* is *balungan nibani* (examples C, D and E) 1:4 (examples G and I)

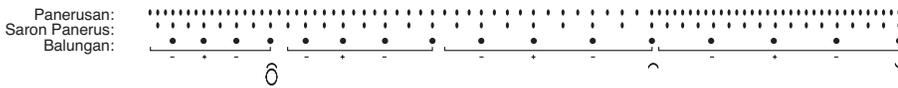
or 1:8 (examples F and H). Differences in *balungan* idiom also complicate the simple determination of *irama* level through the ratio of strokes of the *saron panerus* to strokes of the *balungan*. The difference in ratios between actual strokes of *saron panerus* and *balungan* can be the same between different *irama* if the density of the *balungan* doubles or halves along with the *saron panerus* and other parts in the “elaborate melodic” layer – if it goes along with the “elaborate melodic” layer rather than expanding or contracting along with the “structural” layer. This is not uncommon in *ladrang*. *Kembang Katès* and *Tedhak Saking* are two popular and frequently played *ladrang* in which the *balungan* is *balungan rangkep* in *irama dadi*, doubling at or shortly after the *irama* slows from *irama tanggung*. Figure 1.7 shows two examples, one where the *balungan* changes idiom, and one where it maintains its idiom.

**Figure 1.7: Change of *Balungan* Idiom in conjunction with *Irama* Change**

Change of *irama* level (from *tanggung* to *dadi*) and change in idiom of *balungan*



Change of *irama* (from *tanggung* to *dadi*), *balungan* maintains idiom



In *ladrang* such as *Asmaradana*, *Pangkur* and *Ayun-ayun* the *balungan* is *mlaku* in *irama tanggung* and *dadi*, but *rangkep* in *irama wilet*. It was presumably pieces such as these – likely these very ones – that were the source of confusion for a less experienced American *gamelan* student. Her confusion led her to send a query via e-mail to the *Indonesian Performing Arts* discussion group, with the subject “Irama and peking– the truth?” (Walker 2000).<sup>14</sup> She noticed a discrepancy between her understanding from playing of the ratio of strokes of *saron panerus* to the *balungan* beat in different *irama*, and standard accounts of these ratios, such as that in the

<sup>14</sup> *Peking* is an alternate name for *saron panerus*.

introductory text of Neil Sorrell (1990). As far as she understood, *saron panerus* plays four strokes for every *balungan* beat in *irama wilet* rather than the eight strokes per *balungan* beat usually cited. In *ladrang* where the *balungan* in *irama wilet* is *balungan rangkep*, the ratio of strokes of *saron panerus* to strokes of *balungan* is in fact 4:1, the same as the ratio of strokes with *balungan mlaku* in *irama dadi*. This can be seen by comparing examples F and G in figure 1.5. From the vantage point of *saron panerus* alone – without taking into consideration the larger context – the same *balungan* would be played exactly the same way.

One way around the complicating factor of variability in density of the actual pulse articulated by *balungan* in its different idioms – and the problems this complication poses to tidy formulations of *irama* levels and formal structures which would take the *balungan* as a stable referent – is to posit the existence of an underlying conceptual beat, either related to the pulse of *balungan mlaku* or to some other level of pulsation in the stratified texture. This is the approach taken by a number of Western scholars. While such an approach is theoretically sound, and convenient, it relies on a distinction – between actual and conceptual pulse – which is not made, at least not explicitly, by either Javanese formal terminology, or in accounts of form and rhythm by Javanese. The next section will take up a consideration of this discrepancy, and the subtle distinctions in rhythmic and formal conception it and other discrepancies suggest.

## Chapter 2

### Javanese Terminology for Rhythm and Form

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#### Where is the beat? (and what is a beat?)

The variety of relationships between different levels of regular rhythmic articulation within the stratified texture of *gamelan* is considerable, as the representative rather than exhaustive examples of figure 1.5 demonstrate. These relationships involve three principle factors – formal structure, *irama* level and the idiom of *balungan*. These factors determine very specifically all levels of rhythmic articulation, from the strokes of *gong* and *kenong* through the other structure-marking instruments, the *balungan*, the *saron panerus*, *bonang barung* and *bonang panerus*, and the *panerusan*, all according to a simple binary principle. Yet the only explicit references in Javanese rhythmic and formal terminology to ratios of one part to another part are in the designations of different *mérong* and *inggah* formal structures. These are defined by the number of *kethuk* strokes per *kenongan*, and in the case of *mérong*, by the relative frequency of *kethuk* strokes. In no case does formal terminology designate the length of structural units explicitly in terms of beats of the *balungan*, or any other level of pulsation.

Consistent with the relative nature of formal terminology, the accounts of form by Martopangrawit (1984) and Sumarsam (1984b) do not emphasize the number of *balungan* strokes in defining different forms. Both authors represent forms diagrammatically. Martopangrawit gives the *balungan* of specific pieces in various

forms, starting with the smallest, *sampak*, which shows clearly the relationship between the structure-marking parts and the *balungan*. In reference to *lancaran* he notes that “each *gongan* has a specific number of *balungan* pulses and *kenongan*” but does not spell out what this number is. It is only in discussing *mérong* that he makes specific reference to the number of *balungan* strokes, where he explains that “‘Kerep’ [‘frequent’] means that the first kethuk stroke and the second are close together (8 intervening *balungan* pulses) as distinguished from ‘kethuk arang’ [‘infrequent’] in which there are 16 *balungan* pulses between kethuk strokes” (1984, 19-20). Sumarsam simply states that “‘Kerep’ or ‘arang’ indicates the length of the interval between two kethuk strokes” without indicating how the length of the interval is measured (1984b, 291).

Contrasting with the relative nature of formal terminology and of accounts of Javanese scholars such as Martopangrawit and Sumarsam is the explicit and prominent reference to the concept of *balungan* pulse, or some other basic pulse, by non-Javanese *gamelan* scholars. Vetter begins his explanation of the role of colotomic instruments by stating “These instruments punctuate the *balungan*-pulse in patterns of varying designs, to be called ‘colotomic patterns’ and are fundamentally important to the delineation of structure in *gamelan* music.” He continues:

Structure, in gamelan music, can be conceived of as the product of the interaction of two musical variables:

- 1) repeating musical patterns formed by the composite activities of the colotomic instruments, to be called ‘colotomic patterns,’ and
- 2) the number of *balungan*-pulses in a colotomic pattern. (Vetter 1977, 6)

Becker similarly uses the concept of a beat in her theory of the derivation of different structures. She begins abstractly, noting that “Javanese gamelan compositions consist of a sequence of temporal/melodic units of 2 beats, or multiples of 2 beats whose final beat is marked by a gong” (Becker 1980b, 105). She then adopts a number of Javanese terms to designate core concepts: *dhing-dhong* to refer to the alternation of strong and weak beats, and *keteg* as “basic pulse,” and with these concepts outlines the core of her theory:

Inseparable from the *dhing-dhong* concept, that is, secondary-primary stress unit, is the concept of *keteg*, or basic pulse. *Keteg*, literally “heartbeat,” always falls on

a *dhong*. ... It is the ratio of *keteg* per *gong*, *keteg* per *kenong*, and *keteg* per *kethuk* that determines form. (Ibid. 109)

*Keteg* is not defined in reference to the *balungan* pulse – “*Keteg*... is not strictly equitable with the saron part *balungan*” – but rather as “the *dhong* of the level of subdivision played by the bonang barung.” The theory continues by defining “*kenong unit*” as “the sequence of *keteg-kethuk* patterns that is marked at the end by *kenong*” (Ibid) and by identifying the two functions that “yield forms”: the “*Irama function*” and the “*Kethuk function*” (Ibid. 112-114). The remainder of the theory is a comprehensive demonstration of how any one form can be derived from any other through these two functions.

Sutton’s exposition of formal structure follows similar lines to Becker’s theory, but without the rather elaborate, if impressively rigorous, apparatus. His “explanation of the rhythmic component of the different layers and their combinations” focuses more on general principles, as befits an appendix also intended to provide “background for readers not familiar with gamelan musical structures.” While his account is not quite as theoretically exacting as Becker’s, it is considerably more transparent, and conveys most of the same basic concepts. Again, the concept of a pulse as a basic reference is central.

The relationship between the parts played on gong, kenong, kempul, and kethuk, and the relation of the resultant pattern to a regular conceptualized pulse determines formal structure. This conceptualized pulse, often sounded by saron demung, saron barung, and slenthem, is called *thuthukan balungan* (balungan beat), the beat of the skeletal melody known as *balungan*. (1993, 210)

By comparing the accounts of Vetter, Becker and Sutton with those of Martopangrawit and Sumarsam, I do not mean to question their theoretical validity. Unlike the Beckers’ grammar of *srepegan* (Becker and Becker 1979), which as Perlman has pointed out fails “to rule out certain ‘impossible’ *srepegans*” and also rules out “certain actual *srepegans*” (1983, 19), Becker’s theory of the derivation of *gongan* accurately and thoroughly accounts for all possible formal structures.<sup>15</sup> All

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<sup>15</sup> Though one might think, in working through Becker’s theory, of Harold Powers’ comment in reference to the grammar of *srepegan* – that the “machinery ... seems rather big for the job at hand”

three authors explain clearly a number of fundamental principles of structure in Javanese music. Rather, my purpose is to draw attention to a small but significant difference: that central to each of their accounts is the notion of a basic pulse, or even a conceptualized pulse, while in the accounts of Martopangrawit and Sumarsam the reference to an actual *balungan* pulse is peripheral. I believe this difference reflects a subtle yet important difference in rhythmic conception.

### The Hazards of Terminology

While their theories are accurate and sound, the equation made by Becker and Sutton of terms such as *keteg* or *thuthukan balungan* with the concept of a basic pulse may be criticized on the basis that no indication is given of how or by whom these terms are used. By the way the terms are presented, one might think they were part of a common technical vocabulary. My sense is that they are not. The problem is in part – though not entirely – one of translation. Perlman’s comments on the difficulties inherent in translation are very much applicable.

Translation is rarely a matter of simply replacing one word with another; often much more is needed to “contextualiz[e] conceptually distant texts” (A.L. Becker 1979, 212). There is always the problem of the conflict between the demands of absorbing foreign speech into native idiom – to make it seem natural in English – and preserving its foreignness, emphasizing its difference, its resistance to assimilation by our habitual thought patterns...

It is not simply a question of the puns or verbal play that cause problems for all translations. There is also a danger of seizing on a casual turn of phrase or flight of fancy, and turning it into a technical term. The danger is all the greater when the term in question has no convenient English equivalent. Then the temptation is strong to leave it in the original language, which reifies it all the more for the monolingual English reader. (1993, xviii)

With this danger in mind, Perlman approaches the use of terminology cautiously, as befitting the ethnotheoretical focus of his study. His examination of implicit-melody concepts deals not only with explicitly theoretical formulations of such concepts by Sumarsam, Supanggah, but also the practical application of a similar concept Suhardi,

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(Powers 1980, 39). Judith Becker came to agree with this criticism in respect to the grammar of *srepegan* (1983, 11).

and more generally with how such concepts relate to the strategies used by practicing musicians in representing their music to themselves and to others. An example of Perlman's more cautious approach to terminology is evident in his treatment of how Javanese musicians "distinguish the crucial melodic content of certain parts from the 'irrelevant' features introduced by various disguising influences." (Ibid. 447-448)

I need to name this strategy so as to conveniently refer to it, since it is important to my account of implicit-melody concepts. Yet I want to take especial care not to reify this strategy, not to suggest, through technical jargon, that it represents a settled, established theoretical construct. For it was reflected in the most varied and unpretentious vocabulary. ... I want to stay especially close to my teacher's words here, and to underscore the informality of this vocabulary. So I will refer to this strategy as that of the "really" and the "merely." (Ibid. 449)

The situation with terms such as *keteg* and *thuthukan-balungan* is slightly different. These terms are not "casual turns of phrase." Nor are they idiosyncratic – as are (or were) terms such as *padhang-ulihan*, a concept roughly equivalent to that of antecedent-consequent phrase structure, which will prove important to my present consideration of rhythm and form. *Padhang-ulihan* is an important concept in Sindoesawarno's discussion of form and melody (1987, 366-377). It is similarly presented as a key concept by Martopangrawit (1984, 66-82), and after him Sumarsam (1984b, 299-302). Perlman's comments regarding Martopangrawit's use of terminology are applicable.

...some of his terms – however well founded they may be in habits of perception and feeling widespread among performers – are probably original coinages; some may be quite idiosyncratic. We can call them traditional, as long as we understand that they were mediated by his particular sensibility and range of experiences. (1993, 79)

In my own experience studying in Java, I did not encounter the terms *padhang-ulihan* in interactions with my teachers – some of whom have a more analytical bent than the average musician (whether Javanese or not), and a greater tendency to express this bent verbally. Long-time student and *gamelan* enthusiast Barry Drummond has the similar impression that the use of these terms is restricted to those musicians

associated with the performing arts academy<sup>16</sup> (personal communication, March 2001). Within that context, however, it has become prominent in theory classes, no doubt as part of Martopangrawit's legacy as one of its first teachers. Another student and *gamelan* enthusiast, Rainer Schuetz, reports that "Every [S.T.S.I.] student knows about it and somehow everybody interested in theory believes it touches upon something very important," but at the same time, it has not quite made it into day to day talk, even among instructors (Schuetz 2001).

Again, the terms *keteg* and *thuthukan-balungan* are of a different sort than terms such as *padhang-ulihan*, or the similarly idiosyncratic *nunggal-misah*. This pair of terms is reportedly the invention of Suhardi, and its use is limited to him and his circle. Yet in adopting the term, Sutton states "the interplay of convergence and independence is referred to in Javanese as *nunggal-misah*," (1993, 110) which Perlman cautions "should not be taken to mean that these terms are in general use" (1993, 110).

Similarly, one might get the impression with the way that Becker and Sutton present the terms *keteg* and *thuthukan-balungan* that they are used frequently. The issue with these terms is not that they are idiosyncratic, nor that they suggest the existence of a commonly held theoretical construct which in fact is not commonly held. They are unexceptional terms. The issue is more simply that they are not used very frequently. *Thuthukan-balungan* refers to the actual strokes of *slenthem*, *saron demung* and *saron barung* rather than an abstract, regular beat. *Keteg* translates as "heartbeat" (Horne 1974, 281), which makes it a more likely candidate for the idea of an abstract pulse. However, more common is the perhaps related onomatopoeic *ket*, which refers to a quiet tap on *kendhang* played in between primary strokes of the pattern. *Keteg* is not a commonly used term. Nor is there any other term used as consistently or as commonly as the term beat or pulse is in Western music. Martopangrawit borrows the Dutch term *slag* (1984, 9). A more recent publication from S.T.S.I. on the performance practice of *palaran* – the one metrical form without *balungan* – uses the terms *hitungan* (counting) and *sabetan* interchangeably (Rabimin et al. 1993, 147). The root of *sabetan*, sometimes used to refer to "the four individual *balungan* beats of

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<sup>16</sup> *Sekolah Tinggi Seni Indonesia* "Higher School of Indonesian Arts," formerly ASKI, *Akademi Seni Karawitan Indonesia*, "Academy of Karawitan Indonesia".

a *gatra*” (Becker and Feinstein 1988, 37) is *sabet*, “a whip, a lash” (Horne 1974, 515); *sabetan* also means “manipulation of shadow-play puppets,” and *kendhang sabetan* is one name for the drum which accompanies *wayang*. A recently published Indonesian hymnal (1984) uses the term *ketuk* to specify meter, as in 3 *ketuk* for a measure of 3/4. *Ketuk* in Indonesian means “knock, tap” (Echols and Shadily 1998) – as does *kethuk* in Javanese. *Kethuk* is also, of course, the name of the structure-marking instrument which comes the closest to simply marking out a regular pulse.

### Notions of Meter

There is less a need to explain the lack of a single Javanese term equivalent to a concept so fundamental to contemporary Western conceptions of rhythm and structure than there is a need to identify that which is central to Javanese conceptions of rhythm and structure. Still, the fact that there is no frequently used term which corresponds simply to “beat” or “pulse” is striking, given the ubiquity of pulsation in the musical texture of *karawitan*. Perhaps the concept of an underlying beat simply is not important precisely because pulsation is so ubiquitous. Regularity on all levels is so pervasive, it is a given. For the same reason, there is no commonly used term parallel to “meter.” The closest analogue is *gatra* – a unit of four *balungan* beats. Only a handful of deliberately innovative compositions from the past three decades use a metric organization which is not thoroughly binary, thus there is no need to specify how many beats are contained within metric units – it is always two, four, eight or sixteen.

Sumarsam discusses the term *gatra* along with the parallel term *cèngkok* – now used primarily to refer to the melodic patterns of instruments such as *gendèr* and *gambang*, but still retaining a broader sense of melodic unit. He notes that *gatra* has only recently appeared in the literature on *gamelan*, and suggests that its origins are connected with the introduction of notation and interactions between Javanese and European intellectuals. Sumarsam comments on the intellectual climate of the time.

This was the period when Javanese increasingly describe *gamelan* as having a closer analogy with Western music. In particular, the Dutch term *maat* (meter) became the closest analogy to *gamelan gatra*. In fact, these early *gamelan* theorists designated the meter 4/4 for writing *gendhing* notation, illustrating their

explanation with the hand gestures and fractional duration of notes appropriate to this meter. (1995, 230)

The theorists Sumarsam refers to are Dewantara and Wirawiyaga, whose use of barlines in their notations represents further evidence of the influence of Western rhythmic conceptions. Most early *gamelan* notation employed neither bar lines nor the spaces between *gatra* (placed after rather than before the beat with the most metric weight) which became the standard convention sometime around the middle of the twentieth century. Instead, these early examples simply noted the position of “the main markers of musical phrases... *kenong* and *gong*, abbreviated N or Kn, and G” (Ibid. 113).

Sumarsam, commenting further on connections made between *gatra* and meter, notes that “In the widest sense, the analogy has its merit: like meter, *gatra* is a function of the organization of pitch and duration” (Ibid. 230). There is, however, a fundamental difference between *gatra* and meter, at least as far as the mainstream conception of meter in analytical music theory is concerned. *Gatra* is as much a melodic unit as a rhythmic unit. It does refer to rhythmic organization, but very specifically to the rhythmic organization of *balungan*. By contrast, meter is usually defined in purely rhythmic terms. Analytical music theorists – that is, theorists who deal with the canon of European art music and its extensions (music earlier than 1600 and continuations of the European art music tradition to the present) – not only frequently focus on pitch aspects rather independently of rhythm, but also make a conceptual distinction between rhythm and meter. London’s formulation is representative – “Broadly stated, rhythm involves the pattern of durations that is phenomenally present in the music, while metre involves our perception and anticipation of such patterns.” London notes that “while the majority of contemporary music theorists embrace a ‘strong separation’ of rhythm and metre into separate ontological and analytical domains, not all do so” (London 2000, I.1) An especially thorough critique of this separation is made by Hasty, who strongly objects to the idea that meter exists independently of and as a basis for rhythmic perception – the idea, as he puts it, of “meter as habit.” Hasty rejects the commonly held idea that “the repetition of pulse, once established, will persist or perpetuate itself in spite of rhythmic irregularities.” He instead argues that meter is simply a type of rhythm, and that the perception of rhythm, whether

regular or irregular, is “not achieved passively as habit but actively in the self-creation of the new event” (1997, 169).

The idea that meter exists independently from rhythm – that is, as a regular continuous grid against which particular durations are understood – may be inaccurate in terms of the psychology of temporal perception. However, from an ethnographic perspective it cannot be denied that in the context of Western music – and especially in Western music theory – meter, in this or some similar sense, exists as a concept. It has been fundamental to the representation of rhythm in notation since the evolution of the musical measure, time signatures and bar lines out of sixteenth-century mensural notation and the concept of *tactus*.<sup>17</sup> In the context of *karawitan*, by contrast, rhythmic organization has tended to be conceived not abstractly, but with reference to more concrete specifics such as form, melodic units, or instrumental technique. *Gendhing Jawa* (Javanese Gamelan Music) by Poerbapangrawit is of interest as an example of the writing of a court musician presumably less influenced by Western musical concepts than was Martopangrawit.<sup>18</sup> Poerbapangrawit does not present a taxonomy of formal structures (such as those of Martopangrawit and Sumarsam discussed above) through which the patterns of structure-marking instruments are outlined. Instead, he discusses the various techniques for playing *kenong*, *kethuk* and *kempul*, noting which techniques are used in which pieces, and in the case of *kethuk* that the placement of its strokes “can be a means of classifying different types of *gendhing*” (1984, 433).

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<sup>17</sup> See Houle, particularly chapter 1, “The Origins of the Measure in the Seventeenth Century” (1987, 1-34).

<sup>18</sup> Poerbapangrawit was head of the musicians at the palace of Surakarta (Becker and Feinstein 1988, 433). Martopangrawit’s background and training was as a musician in the same court, but he became a civil servant, teaching at the Konservatori Karawitan (KOKAR) from its founding in 1951, and then later at Akademi Seni Karawitan Indonesia (ASKI, now S.T.S.I.), founded in 1964 (Ibid. 432). While at KOKAR he became familiar with the ideas of Sindoesawarno, who was not a traditionally trained musician but an intellectual and pedagogue previously involved with the Taman Siswa school system founded by Dewantara. It was Sindoesawarno who taught theory courses at KOKAR (Perlman 1993, 72-73). The discussion of Sindoesawarno is part of a chapter on “Historical Trends in the Discourse of Karawitan” (Ibid. 55-88). A discussion along similar lines is found in chapter 3 of Sumarsam (1995, 102-160).

### Javanese Terminology for Structural/Melodic Units

Poerbangrawit's discussion of *kethuk* techniques is also of interest for its use of a more obscure term for a melodic unit. He defines those *kethuk* techniques distinguished simply by frequency – *ngganter*, *kerepan*, *kerep* and *arang* – in reference to the *balungan*. He does not, however, use *gatra* in specifying the relationship between *kethuk* and *balungan*, but rather *eluk*, a not so commonly used term for a unit of eight *balungan* beats, or a unit twice as long as *gatra*. *Eluk*, or *luk*, more commonly refers to “a vocal ornament” (Becker and Feinstein 1988, 11) or to a “sequence of notes and intervals used to expand a long note in vocal music” (Sindoesawarno 1984, 395). A similar range of meaning is evident in different uses of the word *cèngkok*. As noted above, *cèngkok* is now used primarily to refer to the melodic patterns of instruments such as *gendèr* and *gambang*. These patterns are typically of uniform length, and so *cèngkok* in this usage carries some degree of metric significance, not unlike *gatra*. The difference is the degree of invariability. *Gatra* always (in reference to *balungan*) means four *balungan* beats. There is usually a one-to-one metric correspondence between *cèngkok* and *gatra*. The major exception are patterns regarded as double length *cèngkok*, equivalent in length to two *gatra*, in another instance of the binary organization. *Cèngkok* can also refer to other melodic units, such as a “melodically distinct phrase between gong-strokes” (Perlman 1993, 570). It is used this way by Poerbapangrawit. “A single gongan of a *gendhing* is referred to as ‘one *cèngkok*.’ Even though this gongan may be repeated numerous times, the *gendhing* is said to have but one *cèngkok*. If there are two separate melodies, then the *gendhing* is said to have two *cèngkok*, etc.” (Poerbapangrawit 1984, 427-428). Within a *gendhing* or a section of *gendhing*, *gongan* are of uniform length, and therefore *cèngkok* are of uniform length. But as the length of *gongan* is dependent on the formal structure, so is there variability in the length of *cèngkok*. *Cèngkok* and *gatra* are also used in different contexts. Perlman mentions the use of the term *cèngkok* by the vocalist Suwarto to refer to *luk*, as defined by Sindoesawarno. For *luk* in the sense of a vocal ornament – that is a short turn or quiver, as opposed to a longer melisma, Suwarto uses the term *gregel*. *Gatra* is used in connection with vocal music, as the term for individual lines of *macapat* (Gitosaprodjo 1987, 212; Kartomi 1973, 40).

Of these various terms for melodic units, the two most commonly used – particularly in theoretically oriented discourse – are *gatra* and *cèngkok*. Somewhat parallel to the positing of a basic pulse in explanations of form is the positing of *gatra* as fundamental melodic units, as formula to be combined in various ways to form *gendhing*. Sumarsam discusses this idea.

In earlier writings, it has been assumed that *gatra* patterns are extant musical materials that are ready to be drawn on and recombined when creating a *gendhing*. ...I have suggested that *gatra* patterns, except in instrumentally-inspired passages involving repetition of *gatra*, are not directly considered by the composer when creating a *gendhing*. Although *gatra* patterns are the means of expressing melody, in the mind of the composer they are not kernal melodic units on which a *gendhing* is based.

I should point out that in playing a *gendhing* the *gatra* patterns are useful guides for creating melody. This is because these *gatra* patterns are important to the players in performance, as they work to realize the *gendhing* in their various instrumental idioms. When we consider the underlying flow of the musical sentence, however, the function of *gatra* as compositional material becomes less significant. (1995, 229)

Sumarsam presents an alternative theory which emphasizes vocal melodies as the melodic precedents for *gendhing*. The process of composition involves shaping melodic material to fit the strictly binary framework of the formal structures of *gendhing*. Sumarsam's analysis of the transformation of *sekar macapat Pangkur Paripurna*<sup>19</sup> in the composition of *ladrang Pangkur* notes how each *kenongan* in *irama wilet* corresponds to two lines of the verse-melody, except for the third, which contains only one. The form of the *macapat* is altered "to fulfill the requirement of the melodic structure of *ladrang*, i.e., four *kenongan* per *gongan*" (Ibid. 206). A more particularly "intricate process of recombination of a melody" is found in the transformation of *pathetan pélog lima wantah* in the composition of *gendhing Kombang Mara*.<sup>20</sup> This process involves repetition, recombination, restatement and expansion of melodic material derived from the *pathetan* (Ibid. 170-171).

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<sup>19</sup> *Sekar macapat* is a category of unaccompanied sung poetry.

<sup>20</sup> *Pathetan* is one of three types of *sulukan*, melodies sung by the *dhalang* (puppet master) accompanied by *rebab*, *gendèr*, *gambang* and *suling*, in loosely rather than metrically coordinated

With the total absence in manuscripts from before the introduction of notation of detailed technical descriptions of the process of composition, there is no way of reconstructing how exactly *gendhing* were composed. It is clear, however, that it did not involve writing out a *balungan*, as *karawitan* used to be an entirely oral tradition. It is equally clear, however, that the numerous *balungan* instruments – the *slenthem*, *demung* and *saron* – play a fixed melodic line, now referred to as *balungan*. In contemporary practice, this line is written out, and from it musicians derive their parts. The process of doing so, especially as far as the players of *panerusan* are concerned, is what is known as *garap*. This is what Sumarsam refers to in the quote above when he notes that “*gatra* patterns are useful guides for creating melody.” But as Perlman states “it is important to realize that the relationship between *balungan* and *garap* is a two-way street: musicians use it to get from *balungan* to *garap*, but also to get from *garap* to *balungan*. The latter skill may be less frequently demonstrated, but it is attested both by performance practice and by musicians’ ways of talking.” Perlman gives the following as an example of the derivation of *balungan* from *garap*.

At a *klenengan* at Wesleyan University, [I.M.] Harjito was asked to write out *balungan* notation for *Ayak-ayakan Mijil Larasati sléndro manyura*. He later told me that he had never played *balungan* for this piece, so he wrote out a *balungan* following the vocal part and gave it to the *slenthem* player. He added that he wanted to ask for the notation back; he could write it out again, but it would be different. (1993, 417)

Both the practice of deriving *balungan* from *garap* and deriving *garap* from *balungan* provide clues as to the process of creating *gendhing*. They suggest that neither *balungan* nor *garap* takes priority in this process, but both must be considered.

Sumarsam’s critique (1984b) of theories of *karawitan* that emphasize the *balungan* as the primary melodic line is well founded. Expanding on this critique he points out the shortcomings of a perspective which emphasizes formulaic organization, and in particular those that stress the importance of *gatra* (1995, 161-164). In particular he

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fashion. For a concise description of the use of *pathetan* in *wayang*, see Sumarsam (1984a). *Pathetan* are also used in the context of *klenengan*, usually as an instrumental prelude or postlude. See Brinner (1989) for a discussion of their function and significance.

discusses Becker's analysis of *pathet* (1980b) and Sutton's discussion of the idea of variation (1993). The idea of formulaic organization is not, however, simply the invention of Western scholars. Nor are Western scholars alone in identifying formulas and abstracting them from the broader musical context of particular pieces. There are several volumes by Javanese scholars which document the performance techniques of various instruments through identifying basic patterns, or *cèngkok*, a prime example being Martopangrawit's compendium of *gendèr cèngkok* (1973). *Cèngkok* – like *gatra* – are indeed useful in the process of *garap*. The process of deriving a *gendèr* part for a given piece can follow *gatra*, with particular *gatra* suggesting the use of particular *cèngkok*. There is not, however, always a simple one-to-one match, and generally the importance of *cèngkok* in the performance practice of *gendèr* is limited. As Perlman notes, “there is general agreement that many passages in various *gendhing* cannot be played using the melodic building-block approach” (1993, 417), and also that “using *gendèr* patterns as melodic patchwork squares is widely regarded as immature or formulaic” (1993, 244).<sup>21</sup>

The building-block approach is based on the understanding of *cèngkok* as the means of getting smoothly from one tone to the next. This tone, which metrically coincides and usually corresponds pitch-wise to the final tone of each *balungan gatra*, is called *sèlèh*. But more refined playing must take into account both what happens melodically between *sèlèh* – in the *balungan* and in other parts – as well as keeping in mind the larger melodic context – the “underlying flow of the musical sentence” which Sumarsam points to as limiting the significance of the function of *gatra*.

As was made clear in the discussion in the second chapter, Javanese formal terminology recognizes a wide range of structural/melodic units, not just *cèngkok* and *gatra*. It was also noted that *cèngkok* can refer not only to the melodic patterns of *gendèr* and other *panerusan*, but also to *gongan* as melodic unit. The use of the same term suggests a certain degree of equivalence between the two. In a broad sense,

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<sup>21</sup> Sarah Weiss relates I.M. Harjito's response to her attempt to piece together a part to *Gendhing Larawudhu* using Martopangrawit's compendium: “When I played my interpretation... his eyes smiled and then he had to chuckle out loud. He promptly offered to make a recording for me to learn from and nothing more was said” (1998, 104-105).

*gendèr cèngkok* and *gongan* – and all other structural/melodic units can be considered functionally equivalent. They are the melodic substance in the spaces between structurally significant points.

The primary difference from this perspective is one of scale. But as the discussion of *irama* and formal structure made clear, scale is not fixed. *Gongan* range from 1 to 256 *balungan* beats in length. The range in scale is even greater when the effect of *irama* is considered. A *gongan* of one beat – a single stroke of *kempul* in *sampak* – is not generally regarded as a melodic unit. But a *gongan* of *lancaran* in *irama tanggung* is. The range in scale of *cèngkok* is less, but they are similarly expandable and contractible. *Cèngkok* in *irama dadi* or *irama wilet*<sup>22</sup> are regarded as standard length. Those in *irama tanggung* are half as long, and those in *irama rangkep* twice as long. As can be seen in figure 1.5, a standard length *gendèr cèngkok* in *irama dadi* or *irama wilet* (examples A, B, D, E, F, G or H) are the same length as a *gongan* of *lancaran* in *irama tanggung* (example K). A *cèngkok* in *irama rangkep* (example C) is the same length – in terms of number of pulses – as a *kenongan* of *ladrang* or *ketawang* in *irama dadi* (examples G and H).

### ***Padhang-ulihan* and Notions of Hypermeter**

The wide range of scale of structural/melodic units and their functional equivalence relates to the notion that *karawitan* exemplifies the concept of hypermeter – the idea of a regular structuring of durations on a higher hierarchic level than that of the measure. On this issue, it may be noted that *karawitan* satisfies all of the conditions suggested by theorist Justin London (2000, III.1). Hypermeter is not only commonplace in *karawitan*, but ubiquitous, and is as robust as foreground meter. The same basic syntactic constraint of binary organization applies to all levels of structure, linking more extensive structural levels not only with smaller scale levels, but with the surface levels. This is most obvious in the smallest formal structures, *srepegan* and *sampak*, where *kempul* and *kenong* are a prominent part of the rhythmic surface. In a certain sense, all *gongan* can be understood as pulse on different scales,

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<sup>22</sup> Between these two *irama*, it is the number rather than the length of *cèngkok* that varies, as will be discussed in reference to *Gendhing Gambirsawit* in chapter 3.

the largest structures representing a radical extension of pulse – a pulse that has been stretched to reveal all the detail it contains.

The binary nature of organization on multiple levels has been recognized by Javanese theorists through the principle of *padhang-ulihan*. The rather limited use of this pair of terms to more theoretically oriented discourse was noted above. As initially used by Sindoesawarno, the terms themselves and the explanation he gives of them reflect the influence of Western conceptions of phrasing.

Often, a language phrase is not complete in meaning and awaits further clarification. For example, the phrase “When I see your face...,” waits for something more. It can be continued, “When I see your face, I remember my deceased mother,” or, “When I see your face, I moo a thousand times.” Whatever the content of the concluding phrase, amusing or saddening, at the end the emotion is finished – anticipation in the first part has been fulfilled. In *karawitan*, the same kind of thing happens. Melodic phrases do not necessarily end with the emotion completed...

Phrases that need a sequel are called *padhang* (from *adhang* ‘that which awaits or desires’). The phrase that follows, as if to fulfill the expectation, is called *ulihan* (from *mulih* ‘to return’). *Padhang* always “ask for” *ulihan*. *Ulihan* is able to fulfill its function only if there is *padhang*. *Padhang-ulihan* “need” each other. *Padhang-ulihan* also are called question-answer, taut-slack, or climax-anticlimax. (1987, 375)

The terms were adopted by Martopangrawit, who uses them quite extensively in reference both to *cèngkok* (in the sense of melodic patterns of *gendèr* and other *panerusan*) and *gendhing*. He provides many more concrete examples than does Sindoesawarno, relating the concept more directly to performance practice, and demonstrating how it applies to different pieces with different formal structures. He also gives a different meaning of the word *padhang*. This and other differences in his explanation of the terms deserve comment.

*Padhang-ulihan* is found in many disciplines – dance, carving, discourse, behavior, etc. In short, everything has *padhang-ulihan*. “*Padhang* [‘bright’, ‘light’, ‘clear’] is something that is clear, but whose ultimate purpose is still unknown. That which clarifies the final purpose is “*ulihan*” [‘return’, ‘coming home’]. For example, let us imagine that we see a man walking to the bath, and we are unaware of his intentions. Will he take a bath, or wash his face, or merely

inspect the condition of the bathwater? In other words, we know the *padhang*, but not the *ulihan*.

It is clear that each *padhang* may have 1,001 different *ulihan*. But it is necessary that there be a harmonious match between *padhang* and *ulihan*. If saw a man enter the bath and straightaway lie down to take a nap, we would certainly laugh, since his intentions are not in agreement with the original appearance of his actions.

It is necessary to keep in mind that there are different levels of *padhang-ulihan*. For example, if a man goes to the bath with the intention of washing his face, this set of *padhang-ulihan* [i.e., action, final intention] can itself become *padhang* [which will then be balanced by a larger *ulihan*]. (Martopangrawit 1984, 66)

To be sure, the differences are subtle, and the basic tactic of using analogies (and rather quirky ones at that) is common to both. At the risk of perhaps making too much of explanations that are probably more idiosyncratic than reflective of more generally held aesthetics, I make the following observations. Sindoesawarno's analogy clearly draws upon an idea that a phrase communicates something, and in particular, something which has emotional import. The kind of anticipation and expectation that *padhang* set up – in the provocative statement that begs a question – is dramatic. Emotional content is certainly recognized<sup>23</sup> but it does not take the sort of dramatic form that Sindoesawarno's analogy suggests.

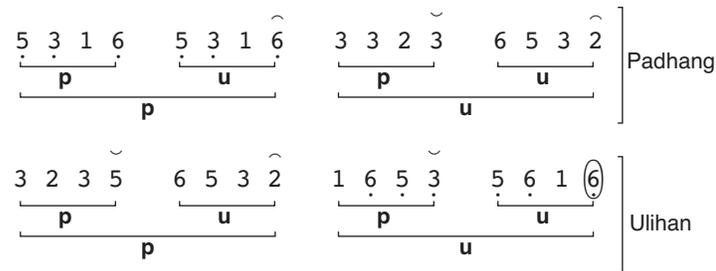
Martopangrawit – whether deliberately or not – gives a different meaning of the word *padhang*. The idea of something being clear is different than the idea of a question. In the example Martopangrawit gives, there is no deliberate dramatic intent on the part of the man who enters the bath. There is no attempt by this man to initiate conversation. The scenario where the man lies down and takes a nap is as bizarre as the idea of mooing a thousand times at the sight of somebody's face. But the point Martopangrawit means to illustrate is simply that certain actions imply certain other actions – some actions are more likely to follow after certain actions than others. The intentions Martopangrawit describes are not communicative. The example Sindoesawarno gives – of someone saying to someone else “When I see your face” – very clearly is.

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<sup>23</sup> Emotional meaning is considered by Benamou in his study of Javanese musical aesthetics (1998).

Both Sindoesawarno and Martopangrawit conceive of *padhang-ulihan* as operating on multiple levels, up to and including entire *gongan*. This is clear in the following diagram from Martopangrawit.

Figure 2.1: *Padhang-ulihan* in the formal structure *ladrang* (1984, 75)



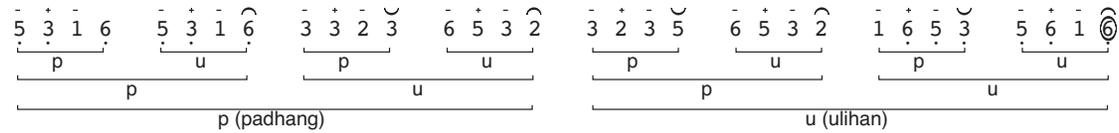
Similar representations are given for melodic phrasing in other formal structures. Excerpts of these have been reproduced, along with a reconfiguration of the above, in figure 2.2. In these, it can be seen that in the larger *mérong* formal structures, the basic phrases which constitute *padhang* and *ulihan* are not single *gatra*, but units of two, four, or in exceptional cases, eight *gatra*. There is also a relationship between melodic phrasing and the strokes of *kethuk*, as the following comment explains.

The designation of the number of *kethuk* beats in a *kenongan* (i.e., “*kethuk 2*,” etc.) serves also to indicate the number of melodic phrases in a *kenongan*. Thus, *kethuk 2 kerep* and *kethuk 2 arang* both have two phrases in one *kenongan*, the difference lying in the number of *gatra* [in a phrase] and the placement of the *kethuk* strokes. (Ibid. 77)

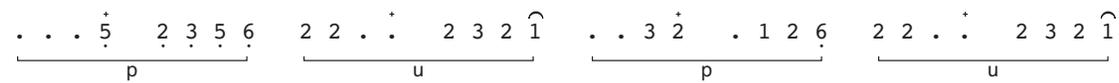
Of example E, Martopangrawit further comments “this example demonstrates that there is a certain latitude in the composition of *kethuk arang* melodies [i.e., that *padhang* and *ulihan* phrases are not necessarily of equal length]” (Ibid.). He suggests that the placement of *kethuk* is significant, but does not explicitly point to what can clearly be seen in the examples in figure 2.2 – that in all but the exceptional case of E, *kethuk* falls at the midpoint of each phrase. In this sense, *kethuk* can be understood as supporting formal structure as it is manifested in melodic phrasing, rather than being the simple determining factor in distinguishing *mérong kethuk arang* from *mérong kethuk kerep*.

**Figure 2.2: Padhang-Ulihan Melodic Phrasing and Formal Structure, from Martopangrawit (1984, 69-80)**

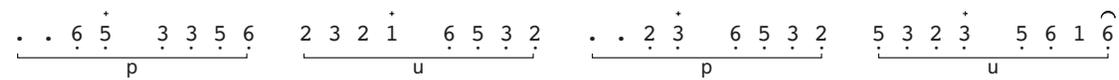
A. Ladrang (Moncer, slendro manyura)



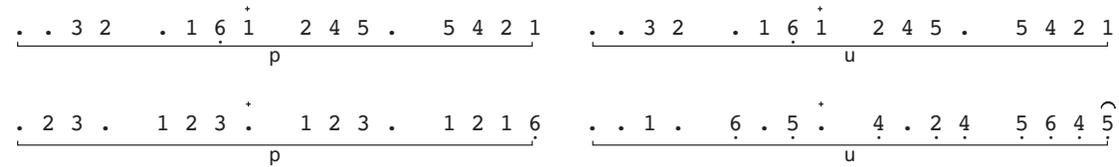
B. Merong kethuk 2 kerep (gendhing Gambirsawit, slendro sanga, first and second kenongan)



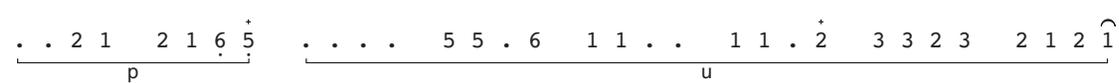
C. Merong kethuk 4 kerep (gendhing Damar Keli, slendro manyura, first kenongan)



D. Merong kethuk 4 arang (gendhing Klentung, pelog lima, first kenongan)



E. Merong kethuk 2 arang (gendhing Laranjala, pelog lima, first kenongan)



It is interesting to note a parallel between the recursiveness of *padhang-ulihan* as theorized by Sindoesawarno and Martopangrawit, and the recursiveness of a similar binary principle theorized by Becker. The pair of terms used by Becker is not *padhang-ulihan*, but *dhing-dhong*. In giving “question-answer,” “taut-slack,” and “climax-anticlimax” as equivalents to *padhang-ulihan*, Sindoesawarno also notes the usage of “*dhing-dhong*” by his colleague Wirawiyaga (1987, 375). Becker follows Gitosaprodjo’s use of the terms, not to refer to pairs of phrases but rather to the alternation between weak and strong beats. Gitosaprodjo notes the alternation between strong and weak in the four strokes of *balungan* in a *gatra*. He also identifies a second level of metric hierarchy, distinguishing between small (*alit*) *dhing* and *dhong* and large (*ageng*) *dhing* and *dhong*. The following figure shows a single *gatra*.

**Figure 2.3a: Alternation of strong and weak beats (from Gitosaprodjo 1984, 361)**

6	5	3	2
small dhing	small dhong	large dhing	large dhong

Incidentally, it is interesting to note that Martopangrawit, in expressing the same idea, refers to the standard bowing pattern of *rebab* – an alternation between forward (*maju*) and back (*mundur*) – and the concept of cadential tone, or *sèlèh*. In his figure he does not give an example of *balungan*, but simply numbers the beats from one to four.

**Figure 2.3b: Alternation of strong and weak beats (from Martopangrawit 1984, 85)**

1	2	3	4
maju	mundur	maju	sèlèh

The use of *rebab* as a model is noteworthy given how frequently it is characterized as rhythmically free.<sup>24</sup>

<sup>24</sup> See, for example, Sutton (1993, 226-231).

Becker, in her theory of formal structures (1980b, 105-141) generalizes the concept of *dhing-dhong*, and applies it to various levels. She also relates it to the basic principle of subdivision. The following figure illustrates the operation of three levels of subdivision, presumably (though it is not entirely clear)<sup>25</sup> of a *gatra* of *balungan* in *irama tanggung*, as it relates to the part of *bonang barung*. Upper-case “D” represents *dhong*, while lower-case “d” represents *dhing*.

**Figure 2.4a: *Dhing-dhong* at the level of *Gatra* (from Becker 1980a, 109)**

first level of subdivision			d				D							
second level of subdivision			d		D		d		D					
third level of subdivision			d		D		d		D		d		D	(bonang barung)
			.		.		.		.		.		.	KETEG

Becker uses essentially the same figure in outlining subdivision as the fundamental principle of formal-structure.

**Figure 2.4b: *Dhing-dhong* at the level of *Gongan* (Ibid. 108)**

gongan							G							
first level of subdivision						d	D							
second level of subdivision					d		D		d		D			
third level of subdivision					d		D		d		D		d	D

This basic pattern is common to all formal structures, from *sampak* (except that in *sampak* there are only two levels of subdivision) through to *mérong kethuk 4 arang*.<sup>26</sup>

<sup>25</sup> It is probably intentionally unspecified. Her purpose is defining *keteg* as basic pulse, equating it with *dhong* – the stronger, even-beat stroke – of the part of *bonang barung*, which may or may not coincide with the stroke of *saron*, or even the hypothetical beat of *saron*, depending on the level of *irama*.

<sup>26</sup> In Becker’s theory, the first level of subdivision is always marked by *kenong*. *Gongan* comprising four *kenongan* are defined as “repeated *gongan* with the middle gong deleted.” She justifies this definition as serving “the criterion of simplicity” despite four-*kenongan* structures being more common, and two-*kenongan* structures being distinguished by the designation *ketawang* (except for the smaller structures *ayak-ayakan*, *srepegan* and *sampak*, whose structures invariably consist of two-*kenongan*). Different formal structures are distinguished by “the number of beats per *gongan*” and “which subdivision of the *gongan* is marked by the instrument *kethuk*.” (1980b, 108).

While Becker's theory uses the concept of *dhing-dhong* abstractly, strictly in rhythmic terms, the concept of *padhang-ulihan* is used by Sindoesawarno and Martopangrawit in reference to melody. Martopangrawit in fact introduces the concept as one of several issues related to *pathet* (1984, 66), the Javanese system of modal classification. This again underlines the difference between Javanese conceptions of rhythmic organization – which do not separate it from melodic issues – and the approach of mainstream Western music theory, which not only separates rhythm and pitch, but also frequently insists on a distinction between rhythm, meter and form. To some extent, this is related to differences between the musical systems in question. Rhythm is unquestionably important to the functioning of tonality in European art music, and certain theorists pay considerable attention to the interaction between tonal and rhythmic processes. But phrase structure in this music is nowhere near as consistently regular as it is in *karawitan*, or other musics – traditional Irish music being another example – and thus the objections to generalizing a theory of hypermeter.<sup>27</sup> In *karawitan*, melodic units very nearly always correspond to structural divisions. Indeed, melodic phrasing and formal structure are fundamentally related. The initial impetus for describing phrase structure as *padhang-ulihan* may well have been Sindoesawarno's familiarity with Western conceptions of musical phrasing, but the application of the concept clearly reflects the melodic structure of *gendhing*.

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<sup>27</sup> London gives a summary of the variety of positions to the concept of hypermeter, as well as discussing generally work that relates tonal and rhythmic processes, such as that of Schachter, and Lerdahl and Jackendoff, (2000, III.1 and III.3).

## Chapter 3

### Form and Structure in Context

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#### Fundamental Principles of Temporal Perception

Isolating pitch or rhythm is convenient when discussing the basic mechanics of *irama*, or presenting a taxonomy of formal structures – indeed, most of my first chapter and the figures it discusses does exactly that, for the simple reason of clarity. But any attempt to go beyond basic principles or to describe more fully Javanese conceptions of rhythm and form must recognize that such a separation is ultimately artificial. Melodic phrasing in *karawitan* is fundamentally structural, and structural divisions are fundamentally melodic. *Gong*, *kenong* and *kethuk* are the most obvious markers of structure, but all of the instruments of the *gamelan* contribute to the articulation of the pervasive regularity central to the rhythmic and structural character of *karawitan*.

The previous chapter has noted that the terms used to describe formal aspects – whether the indication of density of *kethuk* strokes or terms such as *cèngkok*, *gatra*, *kenongan* and *gongan* – also describe melodic structure. It also noted that there are no clear equivalents to the Western concept of beat – in the sense of one level of pulse, explicit or implicit, which serves as a primary reference for smaller and larger levels of rhythmic organization – or meter. Rhythmic regularity is so pervasive on all levels, and explicitly pervasive through multiple levels of pulsation and multiple levels of phrasing, that there is no need to conceptualize and underlying metric grid. The

metric grid is present, on the surface and throughout the musical texture. Rhythm is by and large metrical, and so is formal and melodic organization. The recursiveness of the basic binary principle of organization has been recognized in the theory of *padhang-ulihan*, which reads like an idealized textbook case of hypermeter.

While the separation between rhythm and meter as conceived by analytical music theorists is largely conceptual, and somewhat contentious in terms of how it relates temporal perception – in the sense of the perception of events in time – the separation between rhythm and form has a firmer grounding in psychophysiological principles.

The principle factor is one of temporal scale. London argues that:

For a temporal pattern to be a ‘regular rhythm’ its recurrent features have to be intelligible to the human listener, and this suggests that both ‘rhythm’ and ‘rhythmic’ refer to the smaller-scale features of musical experience. There may be a deep-seated psychological reason for this, in that ‘rhythm’ may be a quality of musical figures and movement that is apprehended within the span of the perceptual present, whereas ‘form’ requires an understanding of structural relationships either wholly or partly outside the perceptual present (and thus engages one’s long-term memory of the piece at hand as well as one’s musical background and knowledge). (2000, I.1)

London thus distinguishes between two types of intelligibility, that which is grasped immediately, and that which is understood less immediately, either retroactively or in reference to expectations linked to prior experience.

While larger patterns and symmetries may occur over entire movements, days or weeks, we do not apprehend or understand these ‘rhythms’ in the way that we have a sensible, toe-tapping grasp of the periodicities present at the beginning of, for example, the finale of Haydn’s ‘London’ Symphony or the Major-General’s Song by Gilbert and Sullivan. (Ibid.)

Accordingly, London argues that “The application of the terms ‘rhythm’ and ‘rhythmic’ to larger musical structures and temporal processes represents a metaphorical extension of rhythm’s proper meaning” (Ibid.).

As the previous two chapters have demonstrated, it is difficult and counterproductive to make a clear distinction between surface and structure in *karawitan*. Structure can be present at a surface level in forms such as *sampak* and *srepegan*, and the *balungan*, usually understood as part of the surface, or at least as a middle layer, can in *inggah*

in *irama wilet* and *irama rangkep* take on a more structural function. And as the discussion of Javanese formal terminology pointed out, terms like *gongan* and *kenongan* refer to the melodies which are punctuated by strokes of *gong* and *kenong*, not simply to the abstract idea of a span of time as a container for melody. The term *cèngkok* is used to refer to both small and large-scale melodic units – the patterns of *gendèr* and other *panerusan* instruments, as well as entire *gongan*. And even more generally, melody in *karawitan* must be understood at least in part as the articulation of structure.

At the same time, the difference that London points out between how small-scale and large-scale features are understood is significant. An entire *gongan* of *mèrong kethuk 2 kerep* (not to mention one of *kethuk 4 arang*) is not experienced in the same way as a *gendèr cèngkok* in *irama dadi*. And as London rightly points out, the reasons for this largely have to do with “deep-seated psychological reason[s].”

To start with a simple example, one might consider steady, even pulsation. When pulses are fast enough, they are no longer perceived as individual pulses, but fuse, and are perceived as pitch. The boundary between pitch and pulse has to do with psycho-physical limits on temporal perception. Similar limits are operative further along the spectrum of regular pulsation. It is generally acknowledged that “the maximum interval for reliable estimates of the length of single durations, as well as for the connection of successive articulations, is usually 1.5–2.0 seconds” (Ibid.). In other words, regular articulations of periods longer than 1.5–2.0 seconds – which corresponds to a frequency of 40 to 30 articulations per minute – are not perceived as a steady pulse, but as distinct events. Fraisse discusses this point in his article “Rhythm and Tempo”:

...let us take the example of the tick-tock of a clock. The sounds are linked together in groups of two. Let us suppose that one can slow down this tick-tock indefinitely. There comes a moment when the tick and the tock are no longer linked perceptually. They appear as independent events. This upper limit is also that where all melody disappears, and is substituted by isolated notes. (1982, 156)

It is significant, however, that this psycho-physical limit is considerably less clearly defined than the boundary between pulse and pitch. It is perhaps because of the fuzziness of this psycho-physical boundary that there is a lack of vocabulary to

distinguish between regular pulsation at a frequency where it is immediately apprehended as regular, and that at which it is not. What is the word for pulses so slow they cannot really be called pulses? Articulation does not imply regularity. The word periodic means “appearing or occurring at regular intervals,” but does not imply the frequency of repetition. The revolution of the earth around the sun is periodic, but so is a light-wave. In both of these instances, periods are regular, though of vastly different temporal scales in reference to human experience.

Fraisse uses the example of the ticking of a clock in connection with the phenomenon termed “subjective rhythmization.”

If one listens to identical sounds that follow each other at equal intervals, that is to say, a cadence, these sounds seem to be grouped by twos or threes. Since nothing objectively suggests this grouping, this phenomenon has been termed *subjective rhythmization*.” (Ibid. 155-156)<sup>28</sup>

Subjective rhythmization is one of a number of concepts Fraisse discusses as important to the perception of rhythm. Most relevant to the present consideration of temporal scale are the limits he recognizes for various psycho-physical phenomena. He explains that the upper and lower limits for subjective rhythmization, noted in a “pioneering study by [T.L.] Bolton” from 1894, as 115 msec and 1580 msec have a more general significance:

These limits should command our attention, since they are approximately those of the durations on which all of our perceptions of rhythm are based. The lower limit (about 120 msec) corresponds to the psycho-physiological conditions of the distinction between two successive stimuli... The upper limit has a very important perceptual significance, revealed at the phenomenological level. It corresponds to

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<sup>28</sup> Fraisse makes further comments which could be taken to support Hasty’s contention that meter is simply a species of rhythm: “This expression, which appeared at the end of the nineteenth century ... must today be considered inadequate, because all perceived rhythm is the result of an activity by the subject since, physically, there are only successions” (1982, 156). It is interesting to note Sindoewarno’s observation of subjective rhythmization, which he points to as a basis for meter at the most fundamental level of groupings of strong and weak beats. His account attributes intention on the part of the subject. “Raindrops falling continually from the edge of a roof, drop by drop, if listened to calmly, produce after a period of time the illusion that the drops fall in alternating patterns, loud then soft. This is very strange but true. It occurs because human beings have an innate tendency to order and classify that which is perceived by their five senses” (1987, 347).

the value at which two stimuli (or two groups of stimuli) are no longer perceptually linked. (Ibid. 156)

Fraisse suggests 1800 msec as the duration beyond which “subjective rhythmization becomes impossible.” This corresponds to a pulse at a tempo of 33 beats per minute. This is also the limit for accurate synchronization with or maintenance of pulse. Beyond this, the ability to accurately gauge duration is exceeded. Fraisse makes the important point that rhythmic synchronization

constitutes an exception in the field of our behaviors. As a general rule, our reactions succeed the stimuli. In synchronization the response is produced at the same time as the appearance of the stimulus. A similar behavior is possible only if the motor command is anticipated in regard to the moment when the stimulus is produced. More precisely, the signal for the response is not the sound stimulus but the temporal interval between successive signals. Synchronization is only possible when there is anticipation – that is, when the succession of signals is periodic. (Ibid. 154)

Within the range of accurate perception, synchronization and subjective rhythmization (the upper limit of which is 200 msec), 600 msec (a pulse at a tempo of 100) is noted as the “length which is perceived with the greatest precision” (Ibid.).

Perhaps the most significant as far as the temporal scale of musical units is concerned is the upper limit for the perception of groups. He notes:

One can come to perceive about 25 sounds as a unity ... if they form five subgroups of five sounds following each other at rapid frequency (180 msec). However, the total length of the groups, in this extreme case, cannot be more than 5 sec. (Ibid. 157)

This limit of 5 seconds corresponds to what is called the “*psychological present*.” As examples of series of successive events which “we can perceive, relatively simultaneously” Fraisse gives “a telephone number or the elements of a sentence” (Ibid. 158). He also makes the important point that the unity such grouping produces “introduces a perceptual discontinuity in the physical continuum” and warns against repeating the mistake that William James made in 1891

when he thought that there was a continuous sliding of the present into the past. He cited as an example the recitation of the alphabet. If one’s present is at moment  $t$ : C D E F G, at moment  $t + 1$  it will be D E F G H, C having disappeared

and having been replaced by H. This analysis is inexact. Language, as well as rhythm, shows that one group of stimuli succeeds another group. (Ibid. 158)

These various limits, durations and concepts – in particular 1.8 seconds as the upper limit at which successive stimuli are perceptually linked, 5 seconds as the duration of the perceptual present, and the concept of grouping – are crucial to structural/melodic organization. There has been mention of the effects on structural/melodic organization that expansion and contraction through different levels of *irama* and different formal structures have, but these effects have been considered rather abstractly. Differences in the relative rhythmic density of different layers in the stratified texture within particular formal structures, with particular *balungan* idiom and particular levels of *irama* are shown clearly in figure 1.5. The range of temporal scale of structural/melodic units, both between different units and of individual units has been noted. The following examples examine these aspects of structural/melodic organization in context, as they shift through changes of *irama* and formal structure.

### ***Gendhing Monggang***

*Gendhing Monggang* is generally regarded as one of the oldest pieces in the repertoire of *karawitan*. It is the sole surviving piece in the repertoire of *Gamelan Monggang*, one of a handful of archaic *gamelan*. Others are *Gamelan Kodhok Ngorek* – on which similarly only one eponymously titled piece is played – and *Gamelan Carabalèn*. These archaic pieces are still played, with *gendhing Monggang* and *gendhing Kodhok Ngorek* being used mainly in the context of wedding ceremonies.

*Gendhing Monggang* is striking in its austere simplicity. The piece uses only three pitches, and consists of a single *gongan* which is repeated without any melodic variation. For such a simple piece, it has received considerable scholarly attention. It has been used as a core example in two related articles by Judith Becker, one co-authored with Alton Becker, as well as an article by Becker's student Stanley Hoffman, based on his MA thesis. All three articles point to *gendhing Monggang* as an archetypical example of cyclicity, and are largely concerned with the piece's symbolic, or iconic, significance. They point to the similarity between the nested cycles that make up formal structures – a large cycle marked by *gong* coinciding with smaller cycles marked by *kenong* – and Javanese calendrical systems, which likewise

consist of concurrent cycles. J. Becker and Hoffman point out that the melodic pattern of *gendhing Monggang* functions to mark the different levels of subdivision.

**Figure 3.1: *Gendhing Monggang* – Basic Pattern**

<i>klenang</i>	5	{	1	6	1	5	1	6	1	5	}
<i>kenong</i>	$\hat{5}$	{		$\hat{5}$		$\hat{5}$		$\hat{5}$		}	
<i>gong</i>	$\odot$	{						$\odot$		}	

Pitch 6 subdivides the stroke of *kenong*, resulting in a simple alternation between 6 and 5, articulating with pitch the alternation between *dhing* and *dhong*, between strong and weak positions. Pitch 1 adds a further level of subdivision. On the basis of this observation, that pitch functions to delineate structure, Becker suggests that “in the *gamelan* tradition, melody or tune was originally the result of a process of subdivision applied to a concept of cyclical time” (1979, 210). In the subsequent article co-authored with Alton Becker, the claim is made that “the most prominent feature of iconic power in Javanese or Balinese music is coincidence – small coincidence and large coincidence – small coincidings and large coincidings of cycling sounds, all iconic with the cycles of calendars and cosmos and thus, for the Javanese, completely ‘natural’” (Becker and Becker 1981, 207). In *gendhing Monggang*, a piece without the elaborate melodies and melodic figuration of non-archaic *gendhing*, the multiple levels of cyclicity are particularly prominent. Hoffman, who in the context of his study of epistemology and music in Java described *gendhing Monggang* as “perhaps the clearest example of time as music” (1975, 8), poses the issue rhetorically and in reference to the piece’s performance context:

A piece that has no beginning or end except that imposed upon it by the requirements of human musicians who must start and stop sometime, that exhibits no melodic, rhythmic, or timbral variation during the course of its performance, that is played continuously for long periods of time on ceremonial occasions, often without audience and frequently while other ensembles are playing other music within hearing range cannot be devoid of meaning. (1978, 78)

The point that the Beckers and Hoffman make is powerful – that *gamelan* is on some level a musical manifestation of the same cyclical conception of time reflected also by calendrical systems, and notions of larger historical cycles. At the same time, the meaning of *gendhing Monggang*, or of *gamelan* in general, cannot be reduced to its symbolic value, any more than it can be reduced to purely formalistic aspects. The Beckers and Hoffman do not quite do this, but they do overlook certain details of performance which are crucial to understanding the piece from a more experiential perspective. This perspective does not in any way refute the central idea that cyclical forms are iconic, but rather enriches it.

Hoffman's statement that *gendhing Monggang* "exhibits no melodic, rhythmic, or timbral variation during the course of its performance" is not strictly true. It is true as far as the parts he discusses – the parts represented in figure 3.1 above. But it is not true of the parts he omits – those of *kendhang* and *rojèh*, a set of suspended round bronze disks played with a hard mallet. He does in fact acknowledge the omission of *rojèh* (but not of *kendhang*), but justifies it by noting that "their presence or absence does not affect the observations or conclusions presented here" (1975, 73). Their absence would, however, make it nearly impossible to perform the piece in the usual manner. The *buka* (introduction) is given by *kendhang*, and it is the *kendhang* which directs the changes in tempo. The *rojèh* reinforces tempo, and through its finer subdivisions enables the *klenang* to maintain their slow pulse – a pulse which, at 32, or 1.86 seconds per stroke, is right at the upper limit identified by Fraisse for accurate synchronization. Without the presence of the subdivision of *rojèh*, it would not be possible to accurately maintain such a slow tempo.

In the course of leading the ensemble through the changes of tempo at the beginning and end of a performance of *gendhing Monggang*, the *kendhang* and *rojèh* do vary their patterns. These variations, though not entirely insignificant musically, are largely incidental to the function of directing changes of tempo. These changes of tempo, however, are a crucial part of the temporal experience of the piece, and are not merely "imposed upon it by the requirements of human musicians who must start and stop sometime." Though in the rest of the ensemble there is no variation in rhythmic

or melodic pattern, there is a very substantial transformation of the pattern's rhythmic sense as it is expanded by a factor of eight.

Over the course of the beginning of *gendhing Monggang*, the tempo slows, doubling three times through fourteen repetitions of the cycle, taking nearly one-and-a-half minutes. Change of tempo on this scale resembles that of changes of *irama*. In fact, it is greater than the scale of most continuous *irama* changes – changes where the tempo shifts continuously, rather than shifting to a certain level and then staying there for all or part of a cycle before shifting again. In most contexts, change of *irama* moves from one level to an adjacent level. In the case of *mérong* (as the example of *Gambirsawit* will illustrate), the opening cycle moves through two levels. Only certain *ayak-ayakan* – *ayak-ayakan sléndro sanga* being one example – involve comparably large changes.

**Figure 3.2: Gendhing Monggang – Transcription and Shifts in Saliency of Pulse, Cycle and Pattern**

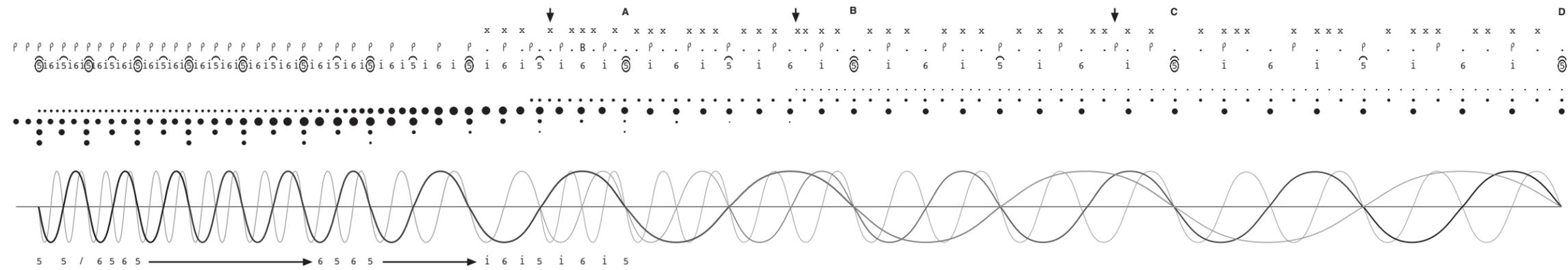
Transcription of field recording by Joseph Getter (Istana Mangkunegaran 1998).

**Beginning**

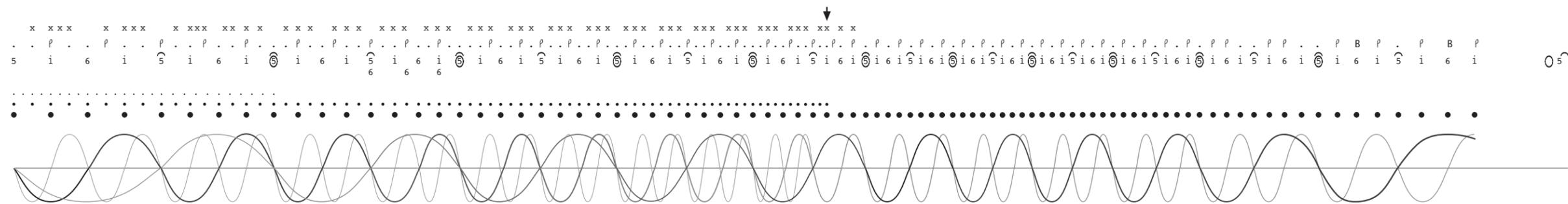
Rojèh:

Kendhang:

Klenang:



**Ending**



The scale of change is all the more apparent than in standard contexts due to the austerity of the musical texture. In full *gamelan*, there are roughly as many parts which double through changes of *irama* as there are ones that simply slow down, resulting in a consistency of surface density. In *gamelan Monggang*, it is only the *rojèh* that doubles. The result is that it is the change in tempo which is emphasized – that very aspect of *irama* which is often de-emphasized in explanations of *irama* as a system of relative density levels.

Figure 3.2 shows the expansion and contraction of cycle and the transformation of rhythmic sense over the beginning and the ending of the piece. There are three parallel elements. The first is a fairly straightforward transcription, which shows the variation in the patterns of *kendhang* and *rojèh* as they direct and adjust to the changes in tempo. The other two elements attempt to represent graphically the shifts in salience of different levels of pulse and of cycle. Each line of dots corresponds to a level of pulsation – from top to bottom at the initial *gong*, that articulated by *klenang*, by *kendhang* (and in *klenang* the alternation between 6 and 5), by *kenong* and by *gong*. Further levels of pulsation are introduced with the entrance of *rojèh*, before the *gong* marked A, and by the doubling of *rojèh* leading to the *gong* marked B. Similarly, the superimposed wave forms represent the various levels of cycle. At the opening *gong*, two are identified – that marked by the stroke of *gong*, and that marked by the stroke of *kenong*. The entrance of *rojèh* at A introduces another level.

Size of dot is intended to represent the salience of pulse, while the shift in salience of cycle is suggested by the changing proportion of the waveform as it is stretched – its width relative to its height. The waveform representing *gong* is isolated so that overall expansion and contraction can be seen more clearly. Taken together, the dots and the waves suggest a general shift in the beginning from the predominance of the sense of pulse to the emergence of the sense of cycle. This relates to the principles of temporal perception noted above, in particular the upper limit of 1.8 second limit for accurate synchronization, for perceptual linking. A pulse is a pulse when successive articulations are linked. For the purpose of this analysis, I will refer to the 1.8 second limit as the threshold of pulse. The notion of salience of pulse is meant to recognize that rather than there being a definite moment as a pulse is slowed when it ceases to

be perceived as pulse – as is suggested by Fraisse’s example of the tick-tock of a clock – there is instead a more gradual attenuation in the strength of the sense of pulse. The sense of pulse may be extend beyond the limit of 1.8 seconds if other factors – such as the presence of a subdividing pulse – contribute to a sense of continuity.

The notion of salience of cycle is more complicated. It is not as simple to link this sense to a perceptual limit, though the 5 second limit of the psychological present is probably significant. A sense of cyclicity – an awareness of a period of time as a cycle – relies on there being some sense of the unity of the period. If a period is 5 seconds or shorter – that is, if it occurs within the psychological present – this sense of unity is immediate. If it is longer than 5 seconds, one has more the sense of immersion – the bounds of the period are not contained by the perceptual present. There is more of a sense of moving through a cycle – or, moving through subdivisions of a cycle, keeping in mind the principle that in the perception of groups of stimuli, one group succeeds the previous group. There is a distinction, then, between cycles that are shorter and those that are longer than 5 seconds. The distinction is perhaps captured by the notion of *ostinato*. The pattern of the structure-marking instruments – particularly the pattern of *kempul* and *gong* – in a *gongan* of a small form like *lancaran* (which when played at a fast *irama lancar* lasts just under 5 seconds) has a quality of *ostinato* – as a directly apprehendable pattern which repeats. The same pattern is found in *ladrang* (as was shown in figure 1.3), but has quite a different quality, especially in the more expanded *irama dadi* or *wilet*. The sense of cyclicity – assuming the cycle repeats – is stronger. One moves through the same time frame in successive cycles, rather than that time frame providing a unit by which linear movement through time may be measured.

I should clarify that my intention with these representations is simply to suggest through a static visual form what is perceived aurally, and dynamically, in time. There is no pretense here of graphing objectively definable parameters. I should also

clarify that the commentary that follows is based on one particular performance and does not consider alternatives in performance practice.<sup>29</sup>

At the opening of *gendhing Monggang*, the sense of pulse predominates. The *buka kendhang* consists of three strokes on *ketipung*, the smaller of the two *kendhang* used in this piece. The last stroke coincides with *gong*, and the entrance of the other instruments, *kenong* and *klenang*. At 130, the regularity of this pulse is visceral, and that of *kenong* clear and steady. Even the *gong* may be perceived as pulse. Its period is 1.85 seconds – almost exactly the same as the very slow pulse articulated by *klenang* once the piece has slowed, and the 1.8 second threshold of pulse. After the first few cycles, the *kendhang* initiates a slowing of tempo. By the end of the seventh cycle, and the eighth stroke of the *gong*, the tempo has halved to 65. It is in this cycle that the *rojèh* enters, and the *kendhang* breaks out of its steady pulse into a more asymmetrical pattern. Examining the *kendhang* more closely, the shift occurs after the first stroke, together with 6. The next two strokes imply a grouping of three faster pulses,<sup>30</sup> superimposed on the otherwise thoroughly binary rhythmic organization of the other parts. There is then a stroke of *kendhang ageng* – one of a mere three in the whole piece, the other two occurring just before the final *gong*. These strokes mark the *gong* that follows as significant – relating to the not uncommon practice of cueing, or signaling *gong* with a stroke of *kendhang ageng* in situation where otherwise *kendhang ciblon* or *kendhang wayangan* are used.

As the tempo slows over these first eight cycles, the changing salience of different levels of pulse results in a shift in which level is perceived as a primary beat, and also a shift in perception of the pattern of *klenang*. At the outset, the three levels of pulse articulated by *gong*, *kenong* and *kendhang* are shown as being equal in salience. The level of pulse articulated by 1 in the *klenang* part is less salient, and is initially

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<sup>29</sup> The transcription is of a recording made by Joseph Getter, (Istana Mangkunegaran 1998). The performance on a commercially available recording, (n.d.) one of a series of three cassettes of common wedding repertoire, follows the same basic shape of expansion at the beginning and contraction at the ending, but the cycle does not expand to the same extent.

<sup>30</sup> To put it in Western rhythmic terminology, if the pulse of *kendhang* through the first seven cycles is quarter note, these strokes are dotted quarters.

perceived more as subdivision, as a separate stream. Gradually, the alternation between 6 and 5 gains prominence, with the 1s retaining a sense of off-beatness. Over the two cycles leading to A, there is a more rapid shift, as the composite 1 6 1 5 pattern coalesces. When the *kendhang* abandons its steady beat and shifts to its asymmetrical pattern, this level of pulse – equivalent to that of the alternation between 6 and 5 – effectively ceases to be distinctly articulated, and is subsumed within the level of pulse of 1 6 1 5 as a hierarchical distinction of metric weight.

The cycle leading up to A is also the first to exceed the 5 second threshold of the psychological present, leading to the emergence of the sense of cycle. Graphically, this is represented by the horizontal stretching of the wave form. At the outset, the peaks of each wave are most visually pronounced. As it stretches, the slope becomes more apparent, and the point of the peak less distinct as the curve increases. Note that the points where the wave crosses the 0 axis (the horizontal line), not the peaks, correspond with the strokes of *gong* and *kenong*. At the stroke of *kenong*, the waves representing *kenong* and *gong* cross in opposite directions. At the stroke of *gong*, both waves cross in the same direction, corresponding to this point's greater structural importance.

The lengthening of the period marked by *gong* is not the only factor which leads to the emergence of a sense of cycle. The patterns of *kendhang* and *rojèh* are also significant. In reference to itself, the *kendhang* pattern (after A) does, for the most part, articulate regular durations. But these durations cut across the otherwise binary organization of the rest of the ensemble. There is no correspondence between periodicity within the *kendhang* pattern and periodicity within the patterns of *klenang*, only the larger level correspondence between the entire *kendhang* pattern and the *gongan*. Functionally, this emphasizes the structural significance of *gong*.<sup>31</sup> The basis for the *rojèh* pattern is essentially similar to the composite pattern of *kethuk* and

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<sup>31</sup> In a limited sense, patterns such as this – which are not uncommon in *karawitan* – resemble *tehai* in Hindustani music, or *mora* in Carnatic music. There are also, to be sure, important differences, among them the fact that *kendhang* patterns are typically set, whereas *tehai* and *mora* are optional, improvisatory, and bound up in interaction between soloist and accompanist. There is also a difference in that many *salahan* type *kendhang* patterns do not lead right up to *gong*, but to a structural point preceding it, such as *kempul* in the case of *kendhang kali* for *ladrang*, *irama dadi*.

*kempyang* in *inggah*, *ladrang* and *ketawang*, with a stroke on every pulse of the level of pulse articulated except for the metrically strongest. In the cycle where it enters, leading up to A, it plays this pattern at the same level of pulse as *klenang*, before playing a related transitional pattern in which it begins to subdivide this pulse. Once the tempo has slowed further, approaching the stable goal tempo of this opening transition, the *rojèh* inserts an extra stroke, articulating one further level of subdivision. This pattern articulates a sub-cycle, as a sort of expansion of the simple marking of the weakest pulse in the part of *klenang* by the pitch 1. The pattern is repeated for the first three 1s of each cycle, but then altered for the last to mark the approach of *gong*, in manner similar to the *salahan kethuk* in *ladrang* (see Figure 1.3).

Once the stable goal tempo has been reached, the cycle is repeated for an indefinite number of times. In this particular performance – actually a rehearsal at the *Pura Mangkunegaran*, the minor court in the city of Surakarta – it was repeated twenty-three times. There were no variations except those introduced by minor inconsistencies – the odd mistimed stroke, slight deviations in the volume of other strokes – inconsistencies that can become a point of focus if one actually does listen. As Hoffman notes, it is played “on ceremonial occasions, often without audience and frequently while other ensembles are playing other music within hearing range” (Hoffman 1978, 78).<sup>32</sup> If the point of the rehearsal was purely mechanical – to remember how the piece goes, including how it begins and ends – it would be unnecessary to repeat it as many times as they did. It would seem that as important as a review of the technical details of starting and stopping was the engagement in the cyclical time sense – a sense that only numerous repetitions of the cycle at a slow tempo can elicit. One quickly loses track of how many times the cycle has repeated, and it can start to seem like time is simply going around in circles. It is this state which is central to the identity of *gendhing Monggang*. The opening transition, described above, is exactly that – a transition. The same is true for the ending, which

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<sup>32</sup> For a more ethnographic perspective on the role of music at ceremonial events such as weddings, see Pemberton (1987).

involves two large scale changes in tempo. The tempo increases to a point just short of the opening tempo before slowing to end.

The overall shape of *gendhing Monggang* is shared by nearly every piece in the repertoire of *karawitan*. Beginnings involve a slowing of tempo and usually at least one shift in *irama* level. Endings (and other transitions) involve an increase in tempo before slowing (or in rare cases continuing to speed up) to the final *gong*. Sutton relates a Javanese analogy for this shape.

Javanese liken the flow of a *gendhing* in performance to the blooming of a flower. From a bud (the *buka*) the *gendhing* unfolds, spreading out (*gumelar*) in all its fullness through an expansion of the *gongan* units. For transition to another section or another piece, and occasionally for ending, the unit often contracts, like a flower that, though not returning to the stage of a bud, may close its petals as night approaches. One hears not just the results of expansion and contraction in the music – the augmentation and diminution – but one experiences the gradual development from one level to another. (139)

If beginnings and endings may be likened to transitions, it might be asked what they are transitions to or from. There is no physical reason why in *gendhing Monggang* the beginning and ending involve changes in tempos. There could be some other introduction used to start at the slow tempo at which the piece is repeated, and it could end by simply slowing down slightly more. The answer I propose is that the beginning and ending serve as transitions from a regular sense of time to an extended cyclical sense of time, and then back. The repetition of the cycle becomes, to some extent, a measure for time, which is then stretched. One is led through the process of time being stretched, until one loses track of linear time as one is immersed in cyclical time. Through the ending, this cyclical time compresses, until the cycle once again is contained within the psychological present, and one returns to a regular time – though perhaps with a slightly altered perspective.

**Figure 3.3: Gending Gambirsawit**

Transcription of recording by Pagayuban Sekar Arum (Kembang Tanjung).

**Beginning (Mérong)**

Saron  
Panerus:  
Balungan:

Irama Lancar                      Irama Tanggung                      Irama Dadi

5 . 3 5 2 . 3 5 6 2 2 2 2 2 2 3 3 2 2 1 1 2 2 1 1 3 3 2 2 2 2 1 1 2 2 6 6 1 1 2 2 3 3 2 2 3 3 2 2 2 2 3 3 2 2 3 3 2 2 1 1 2 2 1 1 2 2 1 1 2 2 1 1 3 3 2 2 3 3 2 2 6 6 1 1 2 2 1 1 6 6 5 5 6 6 5 5 6 6 5 5 6 6 5 5 6 6 5 5 6 6 5 5 6 6 i i 6 6 i i 6 6 5 5 3 3 5 5 3

5 . 3 5 2 . 3 5 6 2 2 . 2 3 2 1 . . 3 2 . 1 2 6 2 2 . . 2 3 2 1 . . 3 2 . 1 6 5 . . 5 6 i 6 5 3

1 1 2 2 3 3 2 2 2 2 3 3 2 2 3 3 5 5 3 3 5 5 3 3 2 2 1 1 2 2 1 1 3 3 5 5 3 3 5 5 3 3 2 2 3 3 2 2 6 6 1 1 2 2 1 1 6 6 5 5 6 6

2 2 . 3 5 3 2 1 3 5 3 2 . 1 6

**Gending Gambirsawit, kethuk 2 kerep, inggah 4, sléndro sanga (after Gitosaprodjo 1993).**

**Buka (rebab)**  
5 . 6 1 2 . 2 . 2 . 1 2 1 . 3 . 2 . 1 6 5

**Merong**  
[ . 3 5 2 . 3 5 6  
+  
: . . . 5 2 3 5 6 2 2 . . 2 3 2 1  
. . 3 2 . 1 2 6 2 2 . . 2 3 2 1  
. . 3 2 . 1 6 5 . . 5 6 i 6 5 3  
2 2 . 3 5 3 2 1 3 5 3 2 . 1 6 5 ]

**Umpak**  
[ . 2 . 1 . 6 . 5 . 6 . 5 . 3 . 2  
. 3 . 5 . 2 . 1 . 2 . 1 . 6 . 5 ]

**Inggah**  
[ . 6 . 5 . 1 . 6 . 1 . 6 . 2 . 1  
+ + + +  
- - - -  
. 2 . 1 . 2 . 6 . 1 . 6 . 2 . 1  
. 2 . 1 . 6 . 5 . 6 . 5 . 3 . 2  
. 3 . 5 . 2 . 1 . 2 . 1 . 6 . 5 ]



### ***Gendhing Gambirsawit***

The rather minimal texture of *gendhing Monggang* allowed for a relatively thick description of rhythmic detail. To take the same approach to the musical texture of a full modern *gamelan*, where the number of distinct parts and the amount of rhythmic detail is many times greater, would not only be rather unwieldy, but in some sense would be misrepresentative of the more significant cumulative effect. The method of representation of *gendhing Gambirsawit* in figure 3.3 is a compromise between the detail of the representation of *gendhing Monggang* in figure 3.2 and the abstraction of the comparison of relative density levels in figure 1.5. Only a small portion of the ensemble is included in the transcription – the structure-marking instruments, the *balungan* and *saron panerus*. The dots do not represent salience of pulse, as they did with *gendhing Monggang*, but are intended as a simplified representation of the rhythmic density of the “elaborate melodic” layer – the two levels of pulsation articulated by the *panerusan*, *bonang panerus*, *bonang barung* and *saron panerus* – and the *balungan*, as they do in figure 1.5. One small difference is that the line of dots corresponding to the *balungan* reflects the actual strokes sounded, rather than an abstracted underlying pulse or a hypothetical rhythmically uniform *balungan*.

The absence of any indication of shifting salience of pulse is due to the greater complexity of the situation in *gendhing Gambirsawit*. The number of factors affecting salience of different pulses is much greater than in *gendhing Monggang*. Indeed, it is difficult to single out any one level of pulsation as primary. Different parts will stand out in the texture at different points, but on the whole the general character is one of an even flow articulated by pulsation on several levels. An equally important aspect of flow as its articulation by different levels of pulse is the way in which it is structured and shaped by melodic patterning. While in *gendhing Monggang* patterning and periodicity is relatively transparent, the different levels of patterning in the full *gamelan* ensemble are very complex. In the example of *Gambirsawit*, periodicity is represented in only the most general way by the waveforms indicating different levels of periodicity, and horizontal brackets indicating the division of parts into commonly recognized structural/melodic units such as *gatra* and *cèngkok*. The

simplification introduced by showing periodicity as uniform is even greater than the reduction of the “elaborate melodic” parts to two lines of dots. The patterns of *kendhang gendhing* in *mérong* and *kendhang ciblon* in *inggah* are not represented at all – though the latter may be subsumed in the two levels of dots representing the *saron panerus* and *panerusan*. Also omitted are *rebab*, *pesindhen* and *suling*. The opposition of the rhythmic flexibility in these parts to the regimented character of the rest of the ensemble is an oversimplification on several levels. This opposition tends to overlook rhythmic flexibility in the other parts. Delayed strokes are an important part of the idiom of *gong*, *kenong* and *kendhang*, those parts that are most central to marking structure and directing tempo. At a larger-scale level, even the *pesindhen* and *suling* contribute to the marking of time through the placement of their phrases.

Despite what is left out and what is overly simplified, the diagrammatic representation of *Gambirsawit* suffices to illustrate in context those aspects of rhythmic and formal organization discussed in the first two chapters – those aspects having to do mostly with relative levels of density and length of structural/melodic units – and how these are affected by changes in *irama* and formal structure. *Gendhing Gambirsawit* is a typical example of a piece in *gendhing* form – a form consisting of two formal structures in sequence, *mérong* and *inggah*.<sup>33</sup> More specifically, it is typical of a large number of *gendhing* where the *inggah* is *kethuk 4*, uses *balungan nibani*, and is normally played in *irama wilet* and *irama rangkep* using *kendhang ciblon*. In these *gendhing* the general contrast in character between *mérong* and *inggah* is emphasized. Sumarsam summarizes the contrast, noting that *mérong* “has a solemn, peaceful, or stately mood” while *inggah* “has a lively mood” (1984b, 293). Martopangrawit explains the distinction with reference to playing style. *Mérong* “provides an opportunity for a refined and calm playing style” while *inggah* “is used as a place for elaboration, ornamentation, and variation” (Martopangrawit 1984, 24-25). This distinction applies most directly to the *panerusan*. The *gendèr* in particular, with its wider range of idiom, is able to make this distinction quite clearly.<sup>34</sup> It is even

<sup>33</sup> *Gendhing* refers both generically to any metered composition for *gamelan*, as well as specifically to pieces in two sections, *mérong* and *inggah*.

<sup>34</sup> For a discussion of different *gendèr* idioms, see Sumarsam (1975).

more pronounced in *kendhang*, in the contrast between the sparse patterns of *kendhang gendhing* and the rippling patterns of *kendhang ciblon*. The *balungan*, on the other hand, contributes to the greater liveliness of *inggah* indirectly rather than directly. It does not play with more “elaboration, ornamentation and variation” but less. Through the combination of a shift in idiom from *balungan mlaku* to *balungan nibani* and the change of *irama* from *dadi* to *wilet*, the rhythmic density of the *balungan* is reduced by a factor of four. The significance of this shift in density is that the *balungan*’s own sense of melodic continuity is almost entirely lost, and its function becomes more one of structure, sounding the most significant points metrically and (for the most part) pitch-wise in the overall melodic flow. It ceases to exert the constraints on the elaboration of melodic flow by the other parts which it does in *mérong*.

The constraint of *balungan* on melody is most strong at the very beginning of *mérong*. It is only at this point that there is a very clear sense of a particular level of pulsation representing the beat, as there is only one. All of the melodic instruments play in rhythmic unison with the *balungan* – they *mbalung* (the prefix “*m*,” “*n*,” or “*ng*” changes a noun into a verb). The initial tempo of this pulse is 124. But by the second stroke of *kenong*, the *irama* has shifted twice (the points of these shifts are indicated in figure 3.3) and the tempo is approximately a quarter as fast as it was at the outset. At a tempo of 28 – the stable tempo in the particular recording on which the transcription is based – the interval between each stroke of the *balungan* is around 2.2 seconds – beyond the threshold of pulse. The salience of pulse of the *balungan* has dissipated, and no other part or level of pulse has taken on the role of primary pulse. In large part, parts are prevented by doing so by the constraints imposed upon them by the *balungan*. The *balungan* is partially responsible for setting the general pace of melodic flow. The other part to do so is *rebab*. The basic bowing pattern of *rebab* – as shown in Martopangrawit’s diagram of the strength of tones (see figure 2.3b) – is at the same pace of the *balungan* – though it departs from this basic pattern as often as not. The melodic line it plays is somewhat more elaborate, and its tendency to anticipate melodic direction while also frequently delaying bow articulations serves to obscure a simple sense of pulse. It pulls and pushes flow, in

contrast to the more steadfast pace of the *balungan*, but overall, its pace is no more than double that of the *balungan*.<sup>35</sup>

The further weakening of the sense of pulse in the *balungan* in the transition from *mérong* to *inggah* is not through a direct slowing of tempo, but involves first increasing tempo, and for a short while regaining a more immediate sense of melodic continuity. After several cycles through the *mérong*, the *kendhang* initiates an acceleration. The *irama* shifts back to *irama tanggung* by the first *kenong* (A). After the second *kenong* (B), the *balungan* changes idiom, from *balungan mlaku* to *balungan nibani*, signaling the shift to a transitional section called *umpak*. Melodically, *umpak* is often the same as the corresponding portion of *mérong*, distinguished primarily by the change in idiom of *balungan*. This change can be thought of as a delayed shift in *irama* – the *balungan* halves its density in response to a quickening of tempo, resuming the pace at which it moved before the change in tempo. It is simply that this change does not happen at the same time as the other parts which similarly halve their rate of pulsation. This staggering of shifts in density around changes in *irama* occurs in other parts as well. For example, the *bonang barung* and *bonang panerus* play with the *pipilan* technique (a technique involving alternation between pairs of pitches derived from the *balungan*, explained in conjunction with figure 3.4 below) through the first *kenongan* of *inggah*, only shifting to the technique of *imbal* and *sekarang* (the alternation between fast interlocking figuration and florid melodic patterns leading to important tones in the other melodic parts) after the first *kenong*.<sup>36</sup>

Approaching the next *kenong* (C) the tempo begins to slow, and by halfway through the last *kenongan*, the *irama* shifts back to *irama dadi* (D). At this point the *kendhang* switches to the denser style of *kendhang ciblon*. The tempo continues to slow, and shifts to *irama wilet* around *gong* – quite literally. Not all of the parts that double shift at the same point. The *saron panerus* shifts halfway between 6 and 5 (E), while the *celempung* doubles halfway between the point where the *saron panerus* doubles and

<sup>35</sup> A description of different bowing techniques may be found in Sumarsam (1984b, 267-268).

<sup>36</sup> See Lysloff (1985) for descriptions of different playing techniques of *bonang*.

*gong*. The shifts in *kendhang* and *gendèr* are more subtle in terms of density, as their parts do not simply articulate one single level of pulsation, but rather move back and forth between the fastest and the next fastest levels.

Looking beyond shifts in density of pulsation, there are also important shifts in levels of organization, and in the relationship between different levels of organization and levels of regular rhythmic articulation. The shifts in this relationship will now be examined, starting again with the *mérong*.

The constraint on melodic flow imposed by the *balungan* is most obvious in the parts of the “mediating” instruments – the *saron panerus*, *bonang barung* and *bonang panerus*. In the *mérong*, these parts relate very closely to the *balungan*. At the beginning of the *mérong*, as noted above, all instruments *mbalung*. There is no elaboration or mediation through the first *gatra*. Elaboration is introduced by the *panerusan* in the second *gatra*, starting with the *celempung* doubling the number of plucks. In the terms of the analogy related by Sutton, the flower begins to bloom. As the tempo slows, the other parts double as well. The *saron panerus* at first simply plays each tone of the *balungan* twice – the simplest possible form of elaboration. Approaching the second stroke of *kethuk* (A), the *saron panerus* doubles again, and by *kethuk* all parts have doubled, and the *irama* is *dadi*. In the *gatra* leading up to the first *kenong*, the “mediating” instruments have assumed their basic techniques of figuration – *nacah rangkep* in the case of *saron panerus* and *pipilan* in the case of the two *bonang*.<sup>37</sup> An example of these techniques is shown in the following figure.

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<sup>37</sup> Sumarsam gives definitions of these and other techniques of *saron panerus*, *bonang barung* and *bonang panerus* (1984b, 279-287).

Figure 3.4: Patterns of *Bonang* and *Saron Panerus*

Bonang Panerus:	232.232.232.232.212.212.212.212.
Bonang Barung:	2 3 2 . . 3 2 . 2 1 2 . . 1 2 .
Saron Panerus:	2 2 3 3 2 2 3 3 2 2 1 1 2 2 1 1
Balungan:	2                    3                    2                    1

The basic procedure in all three parts is to divide the *balungan* into pairs of tones, to repeat this pair a certain number of times (two, four or eight) and to this alternation between tones apply a simple rhythmic process. The *saron panerus* simply repeats each tone. The two *bonang* omit certain strokes, most notably that with the strongest metric weight – the stroke which would coincide with the stroke of the *balungan*.

This is yet another example of a common tendency in subdividing parts to leave out the strongest beat, noted above in reference to the composite pattern of *kethuk* and *kempyang* in *inggah*, *ladrang* and *ketawang*, and of *rojèh* in *gendhing Monggang*. The *bonang barung* typically omits another stroke to further shape the rhythmic pattern and to emphasize the division of the *gatra* into two halves.

The patterns of *saron panerus*, *bonang barung* and *bonang panerus* anticipate the *balungan*, and are a particularly clear example of end-weighted phrasing. Indeed, it is through this anticipation that *bonang barung* functions as a leading melodic instrument, especially in contexts where the *rebab* does not play. The *rebab* – the instrument considered to be the primary melodic leader - also frequently anticipates melodic direction, but in a less consistent fashion. There is a geometric character to the composite effect of the parts of the “mediating” instruments which is highlighted in the following figure. Both the underlying alternation of tones, and the actual patterns played are shown. In the parts of the two *bonang*, the grayed-out notes represent omitted strokes, while in the *saron panerus* they represent repeated tones.



The geometric arrangement of these parts and the connections made with diagonal lines draws attention to the recursiveness of pattern between levels – note that the same pattern of diagonal lines repeats within squares of different size on different levels. These lines are intended to represent the particular character of anticipation of the “mediating” instruments, one which gives rise to a sort of temporal perspective. This patterning introduces a sense of continuity between successive *balungan* tones which is otherwise compromised by the *balungan*’s slow pace, beyond the threshold of pulse. It also provides a strong sense of grouping, so that each pair of tones and the patterning around it can function as unities which can then be paired. This is significant for the perception of the *gatra* as a structural/melodic unit. In *irama dadi*, a *gatra* lasts around 8.7 seconds – longer than the time frame of the psychological present. Each half-*gatra*, or pair of tones, is thus 4.35 seconds, just within the range of the psychological present. In the same way that *gatra* (or units of two *gatra*) form pairs of *padhang-ulihan* phrases, pairs of *balungan* tones function as *padhang-ulihan* on a smaller-scale level.

Something like *padhang-ulihan* is also found in the internal structure of *panerusan cèngkok*. *Gendèr* will serve as an example. As noted in chapter 2, *cèngkok* can be understood as the means of getting smoothly from one *sèlèh* tone – the tone corresponding to the last tone of each *gatra* – to the next. At each *sèlèh*, the two lines of the *gendèr* form one of two intervals – *gembyang*, an interval in which there are four intervening keys between the two keys struck, equivalent to an octave, or *kempyung*, an interval with two intervening keys which in *sléndro* is approximately equivalent to a fifth. Which interval is used is largely a matter of where the *sèlèh* tone falls in the range of the instrument – tones at the higher end are played as *kempyung*. The use of *kempyung* or *gembyang* is also considered an important factor in distinguishing a *cèngkok* as being in one *pathet* or another, though it is only tone 1 where this difference can be used to distinguish between *pathet sanga* (in which 1 is played as *kempyung*) and *pathet manyura* (in which 1 is played as *gembyang*) [see, for example, Martopangrawit]. All other tones are usually played in the same way in

all *pathet*. A more consistent distinction is found in the way *sèlèh* are approached.<sup>38</sup> *Sèlèh* may be characterized as a point of repose. This is reflected rhythmically in the left hand of *gendèr*, which typically rests very briefly after *sèlèh* before resuming movement. A second point of repose is found at the half-way point of the *cèngkok*, and is marked both rhythmically by a brief pause in the left hand and pitch-wise by the use of either *gembyang*, *kempyung*, or “large” *kempyung* (an interval where there are seven intervening keys, as if one of the two tones in a *kempyung* were displaced by a *gembyang* – in other words, roughly equivalent in *sléndro* to an octave and a fifth) or a single tone. In some *cèngkok*, there is another point of repose halfway between the midpoint and the *sèlèh*, where one of these intervals is used. The relationship between this interval and that of *sèlèh* is an important determinant of the *pathet* of a *cèngkok*. In *sléndro sanga*, focusing on the tone played by the left hand, 5 and 6 are typically approached by way of 2; 1 and 2 are typically approached by way of 5. In *sléndro manyura*, the same pattern is found up one step: 6 and 1 are approached by way of 3; 2 and 3 are approached by way of 6. Pitches 3 and 5 are considered outside of *pathet sanga* and *pathet manyura*, respectively, and *cèngkok* leading to these *sèlèh* often borrow from another *pathet*.

Put in terms of *padhang-ulihan*, the movement to a particular interval at the mid-point and/or three-quarter point of a *cèngkok* sets up an expectation as to what *sèlèh* tone will follow. This interval thus anticipates the *sèlèh*, not by directly sounding the *sèlèh* tone, but implying movement to it. This *padhang-ulihan* within the *cèngkok* corresponds to the *padhang-ulihan* of the pairing of *balungan* tones by the figuration of the “mediating” instruments. A *cèngkok* in *irama dadi* corresponds in length to a *gatra* – 8.7 seconds – and is thus, like the *gatra*, longer than the time frame of the psychological present. The half-*cèngkok*, at 4.35 seconds, like the pairs of *balungan* tones, fit within the frame of the psychological present. The continuity produced

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<sup>38</sup> Forrest draws this conclusion from his analysis of “modal gestures” in *gendèr* and *gambang cèngkok* (1980, 94-119). Perlman comments on the fact that while Martopangrawit never discussed this aspect of *cèngkok* in his considerations of *pathet*, his playing did exhibit the regularities noted by Forrest, and that he was sensitive to violations of these regularities (1993, 81).

through the implication of *sèlèh* tone by the midpoint interval of a *cèngkok* is even stronger than the general tendency of units to form pairs.

Through the transition from *mérong* to *inggah* via *umpak*, there is a shift in the relationship of the levels of patterning in *panerusan cèngkok* and the “mediating” to the regular rhythmic articulation of the *balungan*. This can be seen in figure 3.3 in the part of the *saron panerus*. In the shift from *irama dadi* to *irama tanggung* at the first *kenong* (A) the *saron panerus* shifts from the *nacah rangkep* technique to *nacah lamba*, from “double chopping” to “single chopping.”<sup>39</sup> Tones in the *balungan* are simply repeated, collapsing this one level of elaboration. The *bonang barung* and *bonang panerus* continue to play *pipilan*, but the number of repetitions of pairs of tones is reduced, and temporal perspective is foreshortened, as is shown in figure 3.5a above. The change of *balungan* idiom at the transit to *umpak* after the second *kenong* (B) results in the *saron panerus* changing back to *nacah rangkep*, and the *bonang* also doubling. As far as the “mediating” instruments are concerned, *balungan nibani* in *irama tanggung* is treated in exactly the same way as *balungan mlaku* in *irama dadi*. The *panerusan*, however, play compressed half-length *cèngkok*, which in most cases are distinct from regular full-length *cèngkok* in *irama dadi*. When the *irama* shifts back to *irama dadi* at D, the “mediating” instruments begin to use tones not played by the *balungan*. The procedure for determining these tones is often explained as deducing a hypothetical *balungan mlaku* on the basis of the given *balungan nibani* (Sumarsam 1984a, 281). In other words, the *balungan* constrains the “mediating” parts less directly. Similarly, *balungan nibani* allows for more latitude in the parts of *rebab* and *panerusan* than does *balungan mlaku*.<sup>40</sup> This becomes even more pronounced after the shift to *irama wilet*. The *saron panerus* bases its part on *gatra* of a hypothetical *balungan mlaku*, where each hypothetical *gatra* corresponds (for the most part) to each single tone played of the *balungan*. This hypothetical *balungan* is shown above the actual *saron panerus* part for *inggah* in figure 3.3.

<sup>39</sup> A description of basic techniques of *saron panerus* and *bonang* may be found in Sumarsam (1984 279-280)

<sup>40</sup> See Perlman (1993, 150-154) for a summary of the relationship between interpretive latitude of *garap* and the density of *balungan*. Other examples appear in other parts of his text.

Similarly, each *panerusan cèngkok* corresponds to each single tone of *balungan*. The melodic particularity of each *cèngkok* is no longer informed by the *balungan*, but rather is led by *garap*, and most directly by the part of *rebab*.

The relationship of *balungan* to melodic flow as expressed by the other melodic parts undergoes a radical shift. At the outset of *mérong*, melodic flow is equivalent to the *balungan*. The *balungan* is the melody. Once the *irama* is *dadi*, the *balungan* maintains a fairly direct connection to melodic flow, and constrains many of the parts. It maintains a steadfast pulse, which represents, to use Perlman's conception, one of two melodic focal points, the other being manifest most directly in the push and pull of the *rebab* (1993, 127-162). Through the transition from *mérong* to *inggah* with the several changes of *irama*, the *balungan* gradually becomes more and more abstract from melodic flow and more structural. It shifts from a one-to-one correspondence between *gatra* and *cèngkok*, where in *balungan mlaku* there are four *balungan* tones per *panerusan cèngkok*. In the switch to *balungan nibani*, this is reduced to two tones per *cèngkok*, but at first the tones are at the same density as *balungan mlaku* in *irama dadi*, and the *cèngkok* are compressed. The *cèngkok* expand back to the normal length with slowing of tempo and the change back to *irama dadi*. With the next shift of *irama*, the *cèngkok* do not expand, but rather double in number, with the result that there is now one complete *cèngkok* – one melodic unit – for each single *balungan* tone. The *balungan*'s function as a melodic guide has been reduced to marking important metric and melodic points; to punctuating the melodic flow, like “the small grunts of agreement (‘yes, ‘uh-huh’) with which a person will punctuate [*ngedhongi*] the other speaker's remarks.” (Suhardi paraphrased by Perlman 1993, 287)<sup>41</sup> The *balungan* has been seamlessly transformed from melody to structure. If in the *mérong* the *balungan* serves as a melodic anchor, grounding melodic flow with its steady but slow pulse, thus constraining the other parts to a refined and calm playing style, in the *inggah* the faster levels of pulse predominate. The melodic variations and

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<sup>41</sup> Though due to the strict constraint in the idiom of *balungan nibani* that tones cannot be immediately repeated, there are points where the tone played by the *balungan* does not correspond to the *sèlèh* as played by *rebab* and the *panerusan*. Most often these occur on the “odd-numbered” strokes, thus contributing to a sense of metric hierarchy on a larger level.

elaborations flow more freely. The more lively character of the *inggah* is thus largely a result of the texture being more diffuse.

The connection between diffusion in melodic texture and liveliness is even more evident in *irama rangkep*. Here, the successive tones of the *balungan* become even more isolated, and the interval between them is equivalent – in terms of the number of subdividing pulses – to one whole *kenongan* of *mérong* in *irama dadi* (compare the second line in example C with the second or third line in example A or the first line in example B). In *irama rangkep*, *cèngkok* are expanded, for the most part through the repetition of small segments of the sub-phrases leading from *sèlèh* to mid-point to *sèlèh*. In the regular length *cèngkok* used in *irama dadi* and *irama wilet*, the interval between *sèlèh* and mid-point is, as noted above, around 4.35 seconds (in *irama wilet*, where the tempo is a little faster, it is usually more like 3.75 seconds) – within the time-frame of the psychological present. In *irama rangkep*, this interval is stretched to 5.7 seconds (again, the tempo is somewhat faster, so it is less than double the length in *irama wilet*) – just beyond the threshold of the psychological present. The number of *gambang* strokes (which provides a clearer reference in terms of the fastest level of pulsation than does the *gendèr*) in a half-*cèngkok* is 32. Smaller-scale patterning groups these strokes into 4 groups of 8, each group lasting 1.53 seconds.

Corresponding to this are four groups of four strokes of the *saron panerus*. As cited above, Fraisse suggests 25 sounds – organized in five groups of five – and lasting no more than 5 seconds as an extreme case and the upper limit at which several sounds may be perceived as a unity. It would be interesting to test if this limit is in some way extended by the combination of patterning of *saron panerus* and the *panerusan*. On some level, it seems that part of the aesthetic of *irama rangkep* is to test this limit of perception. Of course, there are more obvious reasons for why it is regarded as the liveliest *irama*. Among these are the faster tempo, and the even greater freedom for melodic variation, which includes the insertion of short vocal melodies called *senggakan*, or the imitation of these in instrumental parts. There is, however, other evidence that the effect on temporal perception that extreme stretching has is somehow key to Javanese musical aesthetics. In discussing *gendhing Monggang* with Sumarsam, he recalled an occasion where he heard musicians at the *Kraton*, the major court in Surakarta, rehearsing the piece. They halved the tempo one more time than

the usual, with the *rojèh* doubling its subdivision of the interval between strokes of the *klenang* (personal communication, February 2001). It would seem, at least from my own experience, that such musical stretching of time indeed has some effect on temporal perception. When playing *balungan* for a piece like *gendhing Gambirsawit*, and returning to *irama wilet* after several *kenongan* in *irama rangkep*, the successive strokes seem to come quickly, despite seeming very slow and detached after initially shifting to *irama wilet* in the transition from *mérong*.

#### ***Gendhing Talu – Ayak-ayakan, Srepegan, Sampak***

It has been noted briefly that in changes of *irama* between *irama dadi* and *irama wilet*, *cèngkok* do not expand in length but rather double in number. In other changes, between *irama tanggung* and *irama dadi*, or between *irama wilet* and *irama rangkep*, they either expand or contract. These two ways of adjusting to temporal expansion or contraction relate in a fundamental way to the mechanics of *irama*. Through a change of *irama*, any given level of pulsation either slows (or quickens) continuously, or slows (or quickens) to a certain point and then doubles (or halves). Another way of stating this is that pulses either double (or halve) in length, or in frequency. That *cèngkok* can act in precisely the same way suggests a fundamental similarity between pulse and melodic unit. This similarity was hinted at above in the suggestion that on some level even an entire *gongan* can be understood as a radically extended pulse – stretched to reveal all the detail it contains. This is only a more extreme version of the analogy of a flower blooming related by Sutton, and demonstrated through the example of *gendhing Gambirsawit*. From this perspective, temporal organization in *karawitan* can be viewed not only as exemplifying the concept of hypermeter, but an even more radical notion of hyperpulse.

While instances in *karawitan* of pulse being expanded to become phrase are fairly common – *gendhing Monggang* and *gendhing Gambirsawit* provide two examples – there are no instances of pieces where a whole cycle emerges from pulse. There is, however, a very common example of the opposite process, of a cycle being compressed to the point that it becomes pulse. This occurs in the sequence of *ayak-ayakan*, *srepegan* and *sampak*, a sequence found in several contexts, but perhaps

most closely associated with *Talu*, the sequence of pieces which precedes every performance of *wayang*.

A complete *Talu* starts with a piece in *gendhing* form, continuing to *ladrang* and then *ketawang* before entering the obligatory core of the suite – the sequence of *ayak-ayakan*, *srepegan* and *sampak*, *sléndro manyura*. The most common *Talu* used for *wayang purwa* – *wayang* that relate episodes from the two Hindu epics *Mahabharata* and *Ramayana* – is *gendhing Cucurbawuk kethuk 2 kerep, inggah Paréanom, kethuk 4*, continuing to *ladrang Sri Katon* and then *ketawang Sukma Ilang*. The overall pattern in the sequence – a pattern which is shared by the great majority of suites – is a movement from larger to smaller forms. While within pieces the general tendency is towards expansion through changes of *irama*, the tendency in suites is contraction through the sequence of successively shorter formal structures. The formal structures used in *Talu* are shown in figure 3.6. Unlike figure 1.5 which also shows the effect of *irama* on the scale of formal structures (as well as showing the effect of *balungan* idiom on relative levels of density), figure 3.6 simply compares the length of structures in terms of *balungan* beats per cycle. *Mérong*, *inggah*, *ladrang* and *ketawang* are typically played in *irama dadi*. The application of terms for *irama* level to the smaller structures *ayak-ayakan*, *srepegan* and *sampak* is inexact and inconsistent, and is complicated by the fact that transitions from one to the next, as mentioned in chapter 1, resemble changes of *irama*. Still, at most times the ratio of strokes of *saron panerus* to those of *balungan* is two to one, as in *irama tanggung*, meaning that the difference in scale between the larger structures and *ayak-ayakan*, *srepegan* and *sampak* is actually twice that indicated in figure 3.6.

Figure 3.6: Gendhing Talu – Contraction Through Sequence of Formal Structures

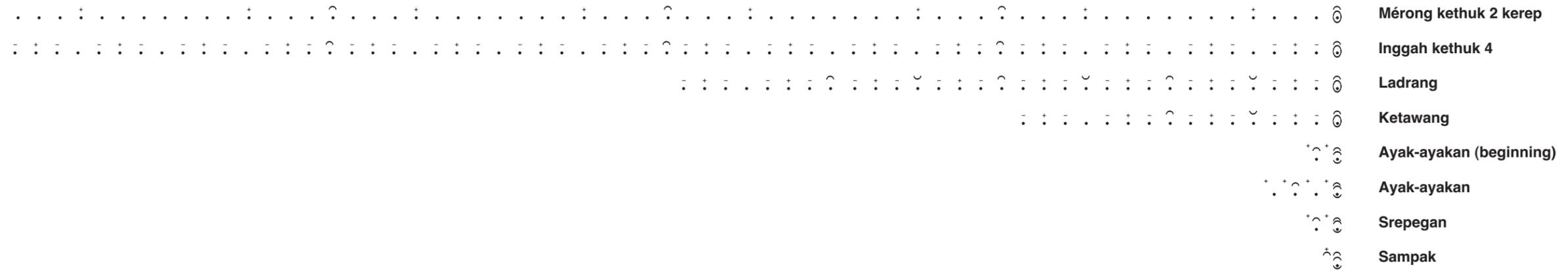


Figure 3.7a: Gendhing Talu –Interaction of Pitch Sequence and Formal Structure

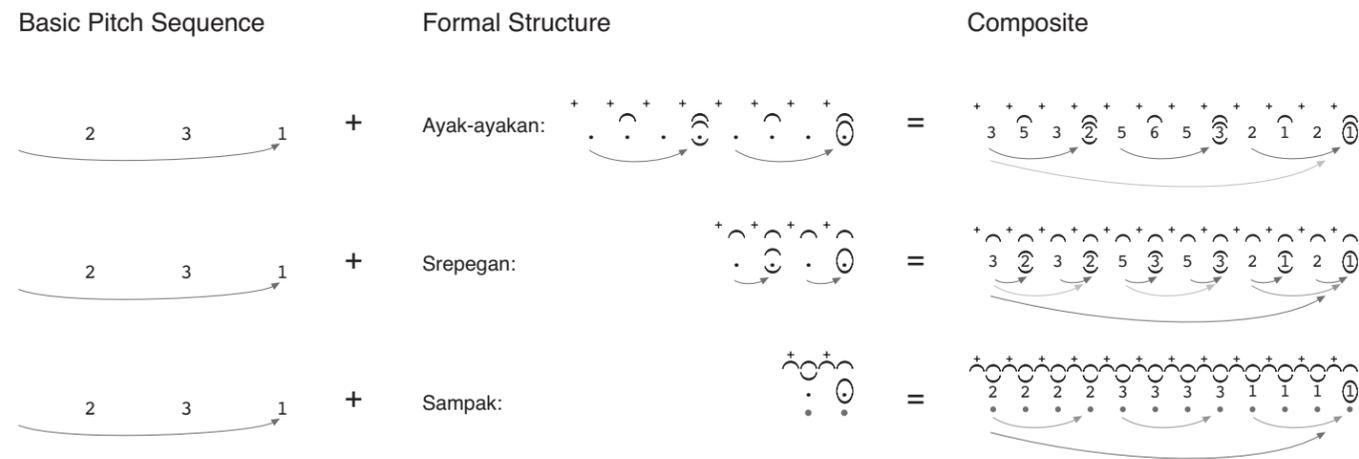
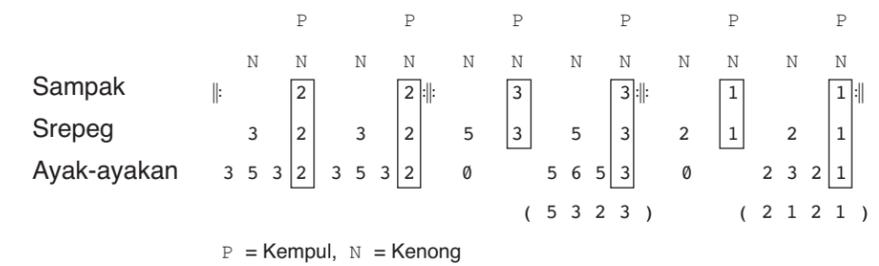


Figure 3.7b: "Relation between deep melody and colotomy" (Hughes 1988, 71)



The small scale of formal structure and the resulting density is the most significant feature distinguishing *ayak-ayakan*, *srepegan* and *sampak* from other pieces. Yet those articles in the ethnomusicological literature which examine these pieces do so from a primarily melodic perspective, in keeping with the general emphasis in *karawitan* scholarship on pitch aspects. Most notable of these are two attempts to formulate a melodic grammar based on the part of the *balungan*. Perlman notes in his critique of the Beckers' "A Grammar of the Musical Genre *Srepegan*" that they do not even mention formal structure (1983, 24). Instead, they point to the predominance of a single contour in the part of the *balungan* as the answer to the question "what makes a *srepegan* a *srepegan*?" (Becker and Becker 1979, 4) Hughes, who expanded upon the Beckers' effort by examining *ayak-ayakan* and *sampak* as well as *srepegan*, draws a similar conclusion, noting that each of these pieces is characterized by the use of a particular *gatra* contour. He does note "an important structural relationship between the gong pattern and the melodic pattern for each subgenre" (1988, 25), but the discussion of this relationship is relegated to an appendix. The core exposition of Hughes' article defines a set of rules to generate a deep melodic structure – a series of *gong* tones which also constitute the final tones of each *gatra* – and from this deep structure to produce surface melody – the *balungan*, as a series of *gatra* contours. Hughes generally succeeds in his aim "to describe the melodic features of the genre *gendhing lampah* [an obsolete collective designation for *ayak-ayakan*, *srepegan* and *sampak*] with maximum completeness and elegance" (Ibid.),<sup>42</sup> and his article provides an interesting model for the analysis of how melodic patterns are generated, whether they are generated in the process of composition, or in the process of *garap*.<sup>43</sup> It is unfortunate, though, that Hughes did not more fully integrate into his argument the observations on the relationship between melody and formal structure, as these

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<sup>42</sup> Hughes in this sense had more success than the Beckers. Perlman's criticism that their grammar fails "to rule out certain 'impossible' *srepegans*" and also rules out "certain actual *srepegans*" (1983, 19) was noted in the previous chapter.

<sup>43</sup> Hughes' model suggests a more useful approach to a particular type of musical creativity than the imprecise question of whether or not *gamelan* musicians improvise, and the attempt to answer this question simply by examining the degree of variation between performances of the same piece or the same pattern – the approach taken, for example, by Sutton (1998).

observations, I believe, more accurately describe the interaction between structure and melody.

The biggest problem in both of these articles is the idea that *gatra* represents a fundamental structural/melodic unit. In proposing a grammar whereby *gatra* contours are generated, Hughes gets past the tendency, noted by Sumarsam, to view *gatra* patterns as “extant musical materials that are ready to be drawn on and recombined when creating a *gendhing*” (1995, 229). At the same time, he maintains the assumption that the *balungan* is invariably organized into *gatra*. It has not always been so. The relatively recent appearance of *gatra* as a term to describe four-beat units of *balungan*, and the likely connection of the emergence of this term to the introduction of notation was discussed in the previous chapter. Nor need *gatra* be singled out as the most significant level of organization. The discussion of *padhang-ulihan* as found in different formal structures pointed to the conception of phrase units longer than a single *gatra*. My analysis of the structure of patterning of the *saron panerus*, *bonang barung* and *bonang panerus* points to the organization of *balungan* tones into pairs as significant level of metric organization. Just as the “the function of *gatra* as compositional material becomes less significant” when “the underlying flow of the musical sentence” (Ibid.) is considered, so does its function as a metric unit become less important when other levels of organization are considered. Metric organization exists on multiple levels, and the significance of *gatra* varies according to context. A *gatra* of *balungan mlaku* in *irama dadi* is not the same thing, in terms of the level on which it functions metrically, as a *gatra* of *balungan nibani* in *irama wilet* or *irama rangkep*. A large part of the difference is how the *balungan* relates to metric organization in the other parts, most notably the *panerusan*. In *irama dadi*, there is a one-to-one metric correspondence between *gatra* and *cèngkok*, while with *balungan nibani* in *irama wilet*, each *cèngkok* corresponds to a single stroke of the *balungan*. As *gatra*, the *balungan* organizes *cèngkok* into pairs. The *gatra* in this case corresponds to a larger-level melodic unit than the one with which it is usually associated, and it is not by itself – as merely two tones of *balungan* which are spaced too far apart to be perceived as melodically continuous – but rather in combination with other parts that it takes on structural significance.

Even the conception of how the *balungan* is organized into *gatra* can vary according to context, as the following example will illustrate. Along with *inggah*, the other formal structure which is commonly played in *irama wilet* and *irama rangkep* is *ladrang*. Indeed, *ladrang* is considered to be the smallest species of *inggah*, and certain *ladrang* can function as *inggah*. This is true of *ladrang Sri Karongron*, the *ladrang* considered here, which can be used as the *inggah* in *gendhing Mèsem*, *sléndro sanga*. Like *Asmaradana*, *Pangkur* and *Ayun-ayun* – the *ladrang* mentioned in connection with the confusion of an American *gamelan* student regarding the ratio of strokes of *saron panerus* to the *balungan* beat in different *irama* levels – the *balungan* is generally twice as dense (relative to the formal structure) in *irama wilet* and *rangkep* as it is in *irama dadi* and *tanggung*. The explanation given for this was that through the change of *irama* the *balungan* doubles along with the “elaborate melodic” layer, rather than expanding along with the structure-marking parts. This can be understood as a shift in the idiom of the *balungan* from *balungan mlaku* to *balungan rangkep*. Alternatively, it can be understood as *gatra* changing *irama* – that is, rather than the length of *gatra* changing, the number of *gatra* changes. In other words, the organization of *balungan* into *gatra* follows what happens in the parts of the *panerusan*, where in changes from *irama dadi* to *irama wilet cèngkok* are doubled in number rather than expanded in length. The following figure shows two examples of how the same (more or less) *balungan* may be notated, reflecting one understanding or the other.

Figure 3.8a: *Ladrang Sri Karongron* (after Gitosaprodjo 1992, 89)

Ir. II

- + -	- + - ^	- + - ^	- + - ^
2 1 2 6	2 1 6 5	6 i 6 5	2 3 2 i
5 5 . .	6 i 6 5	3 2 1 6	2 1 6 (5)

Ir. III/Cbl.

. 2 . 1	. 2 . 6	. 2 . 1	. 6 . 5
6 6 . .	2 i 6 5	i 6 5 6	5 3 2 i
5 5 . .	6 i 6 5	256i256i	256i2i65
2 2 5 3	2 1 2 6	. 2 . 1	. 6 . (5)

Figure 3.8b: *Ladrang Sri Karongron* (after Mloyowidodo 1976, 1:162)*Lancar*

2 1 2 6	2 1 6 5	6 i 6 5	2 3 2 i
5 2 3 5	6 i 6 5	3 2 1 6	2 1 6 (5)

*Ciblon*

2 1 2 6	2 1 6 5 6	6 .2 i6 5i	65 65 32 i 5
5 .6 i6 5256	i256 i256 i2i6	5 2 25 32 12 6	2 1 6 (5)

(Note: Ir. II is *irama dadi*, Ir. III *irama wilet*. Sections of certain *ladrang* in *irama wilet* are sometimes called *ciblon*, after the use of *kendhang ciblon*. Mloyowidodo's use of *lancar* is anomalous in terms of standard labels for *irama* levels – by it he probably means *irama tanggung*.)

The first example – the more common form of notation – assumes an understanding that the pulse of the *balungan* doubles when shifting to *irama wilet*, and along with it

the number of *gatra* per *kenong*. The second example shows more clearly that the first *kenongan*, and the last *gatra* of the last *kenongan*, are the same in both *irama*. In terms of readability, the second example is considerably less clear. The phrasing of the *balungan* is shown far more clearly by its reorganization in the first example into twice as many *gatra* per *kenongan*. As well, it is in some sense more accurate to understand the *balungan* in the second *kenongan* as *balungan mlaku* – its actual density, relative to the “density referent” of the “elaborate melodic” layer is in fact the same as *balungan mlaku* in *irama dadi*. It only really feels like *balungan rangkep* – double *balungan*, meaning twice as fast as normal - in the last two *gatra* of the third *kenongan*. Otherwise, the *balungan* “walks” – the literal meaning of *mlaku*. These considerations are beyond the basic point that in the first example, the reorganization of the *balungan* into twice as many *gatra* per *kenongan* reflects the doubling in the number of *cèngkok* per *kenong* in the *panerusan*.

Returning to the example of *ayak-ayakan*, *srepegan* and *sampak*, the question of how the *balungan* is organized is best approached, I suggest, by way of the structure-marking parts. Hughes hints at but does not quite adopt this perspective when he notes that “within each *gatra* the *gatra*-final pitch – the deep-structural melody pitch – occurs always and only on those beats marked by a hanging *gong* (the *kempul*, *gong ageng*, or *gong suwukan*)” (1988, 61). Rather than conceiving of the structure-marking parts as accompanying the *balungan* – as does Hughes – it is more appropriate in these pieces to conceive of the relationship the other way around. That is, to understand the *balungan* as an elaboration of the basic pitch sequence – or as Hughes puts it the “deep structural melody” – common to all three pieces as it is sounded by the pulses of *gong/kempul* and *kenong*.

How the *balungan* elaborates is dependent on the density of these pulses – that is, it is dependent on the formal structure. This is shown in figure 3.7 (see p. **Error!**

**Bookmark not defined.**), which compares Hughes’ schematic representation of the relation between what he calls “deep melody and colotomy” (Ibid. 71) and my own of what I call the basic pitch sequence and formal structure. A significant difference between the two is that Hughes makes no attempt to represent the differences in the density of the structure-marking parts between *sampak*, *srepegan* and *ayak-ayakan*.

In *srepegan*, the basic form of elaboration is the simplest possible – the alternation between a tone and another tone. In *sampak*, the rate of pulsation of *kenong* and *kempul* is too fast to allow the *saron* and *demung* to do anything other than simply reinforce the pulse of *kempul*. However, the *slenthem* and *saron panerus* continue the basic form of elaboration from *srepegan* into *sampak*. The *saron panerus* does not simply play the same tone twice as many times as *saron* and *demung*, but rather alternates between this tone and (usually) one tone above. The *slenthem* plays the upper-neighbour to the tone played by *demung* and *saron* on the off-beat, interlocking with them. This is shown as part of figure 3.13 (which also shows in detail the shifts in relative density levels through transitions between individual pieces in the sequence). From this perspective, the *balungan* is not organized into *gatra* at all, but rather consists simply of a single pulse in *sampak*, and a unit of two pulses in *srepegan*. It is only in *ayak-ayakan* that the formal structure is large enough to be subdivided by four strokes of the *balungan*. But even here, *gatra* do not function in exactly the same way as in larger formal structures. They are still basically elaborations of the sequence of *gong* tones. The basic contour identified by Hughes can be understood as the next simplest form of elaboration – the movement away from and back to a tone. It is in describing the deviations from this basic contour that Hughes' grammar is the most instructive. This makes sense, as the *balungan* has twice as much leeway with four tones between successive iterations of *gong/kempul* than with only two, and thus more complex melodic considerations come into play.

Stating that *gatra* does not constitute the fundamental organizational principle in *srepegan* and *sampak* should not be taken to suggest that there is not some other similar organizational principle at work. Like all formal structures, these forms are essentially binary, so it should not be surprising that organization into groups of two or four elements occurs. The point is that this is a more general organizing principle, and not one tied to *balungan*.

The question of organization also arises in the question of what in these pieces constitutes a *gongan*. There are two views. The common Javanese conception is that a *gongan* is the period between strokes of *gong ageng* or *gong suwukan*. In most forms, this period is divided evenly into either two or four strokes of the *kenong*. By

contrast, in *srepegan* and *sampak* the number of *kenong* strokes in between strokes of *gong suwukan* is variable – it is different between successive strokes of *gong*, leading to the characterization of these forms as irregular. This can be seen in the examples of *srepegan sléndro nem* and *srepegan sléndro sanga*.

Figure 3.9: *Srepegan* and *Sampak*

*Srepegan Sléndro Nem* (after Gitosaprodjo 1992, 4)

$$\begin{array}{l} \text{[ : } \overset{\wedge}{6} \overset{\times}{5} \overset{\wedge}{6} \overset{\times}{5} \overset{\wedge}{2} \overset{\times}{3} \overset{\wedge}{5} \overset{\wedge}{3} \\ \overset{\wedge}{5} \overset{\times}{3} \overset{\wedge}{5} \overset{\times}{3} \overset{\wedge}{5} \overset{\times}{2} \overset{\wedge}{3} \overset{\times}{5} \overset{\wedge}{1} \overset{\times}{6} \overset{\wedge}{5} \overset{\times}{3} \overset{\wedge}{6} \overset{\times}{5} \overset{\wedge}{3} \overset{\wedge}{2} \\ \overset{\wedge}{3} \overset{\times}{2} \overset{\wedge}{3} \overset{\times}{2} \overset{\wedge}{3} \overset{\times}{5} \overset{\wedge}{6} \overset{\wedge}{5} \text{ : ]} \end{array}$$

*Sampak Sléndro Nem* (after Gitosaprodjo 1992, 4)

$$\begin{array}{l} \text{[ : } \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{3} \overset{\wedge}{3} \overset{\wedge}{3} \overset{\wedge}{3} \\ \overset{\wedge}{3} \overset{\wedge}{3} \overset{\wedge}{3} \overset{\wedge}{3} \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{2} \overset{\wedge}{2} \overset{\wedge}{2} \overset{\wedge}{2} \\ \overset{\wedge}{6} \overset{\wedge}{6} \overset{\wedge}{6} \overset{\wedge}{6} \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{5} \text{ : ]} \end{array}$$

*Srepegan Sléndro Sanga* (after Gitosaprodjo 1992, 7)

$$\begin{array}{l} \text{[ : } \overset{\wedge}{6} \overset{\times}{5} \overset{\wedge}{6} \overset{\times}{5} \overset{\wedge}{2} \overset{\times}{3} \overset{\wedge}{2} \overset{\wedge}{1} \\ \overset{\wedge}{2} \overset{\times}{1} \overset{\wedge}{2} \overset{\times}{1} \overset{\wedge}{3} \overset{\times}{2} \overset{\wedge}{3} \overset{\times}{2} \overset{\wedge}{5} \overset{\times}{6} \overset{\wedge}{1} \overset{\wedge}{6} \\ \overset{\wedge}{1} \overset{\times}{6} \overset{\wedge}{1} \overset{\times}{6} \overset{\wedge}{2} \overset{\times}{1} \overset{\wedge}{2} \overset{\times}{1} \overset{\wedge}{3} \overset{\times}{5} \overset{\wedge}{6} \overset{\wedge}{5} \\ \overset{\wedge}{6} \overset{\times}{5} \overset{\wedge}{6} \overset{\times}{5} \overset{\wedge}{3} \overset{\times}{2} \overset{\wedge}{1} \overset{\wedge}{2} \\ \overset{\wedge}{3} \overset{\times}{2} \overset{\wedge}{3} \overset{\times}{2} \overset{\wedge}{3} \overset{\times}{5} \overset{\wedge}{6} \overset{\wedge}{5} \text{ : ]} \end{array}$$

*Sampak Sléndro Sanga* (after Gitosaprodjo 1992, 7)

$$\begin{array}{l} \text{[ : } \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{1} \overset{\wedge}{1} \overset{\wedge}{1} \overset{\wedge}{1} \\ \overset{\wedge}{1} \overset{\wedge}{1} \overset{\wedge}{1} \overset{\wedge}{1} \overset{\wedge}{2} \overset{\wedge}{2} \overset{\wedge}{2} \overset{\wedge}{2} \overset{\wedge}{6} \overset{\wedge}{6} \overset{\wedge}{6} \overset{\wedge}{6} \\ \overset{\wedge}{6} \overset{\wedge}{6} \overset{\wedge}{6} \overset{\wedge}{6} \overset{\wedge}{1} \overset{\wedge}{1} \overset{\wedge}{1} \overset{\wedge}{1} \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{5} \\ \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{2} \overset{\wedge}{2} \overset{\wedge}{2} \overset{\wedge}{2} \\ \overset{\wedge}{2} \overset{\wedge}{2} \overset{\wedge}{2} \overset{\wedge}{2} \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{5} \overset{\wedge}{5} \text{ : ]} \end{array}$$

(Note: *kenong* always sounds the same pitch as the *kempul* tone it precedes, rather than playing the tone sounded by the *balungan*.)

As laid out here, each line represents one *gongan*. The notation for *srepegan* also clearly groups *balungan* tones – or more to the point, strokes of *kenong* – into pairs, and every second stroke of *kenong* is marked by *kempul*. It thus is *kempul*, not *kenong* – as in all other regular forms – which marks the first level of subdivision of *gong*. Because of this, Sumarsam calls the position of the *kenong* and *kempul* “idiosyncratic” (1984b, 291).

The other idea of what constitutes a *gongan*, which has a certain theoretical consistency, views *kempul* is a substitute for *gong*, and a *gongan* as the period marked by a stroke of either *gong* or *kempul*. In each *gongan*, there are thus two strokes of *kenong*, rather than a variable number. This is the view put forward by Becker in her theory of the derivation of formal structures (1980b, 108). It is also the explanation given by Poerbapangrawit (1984, 434).

There is no reason to insist on one conception to the exclusion of the other. It is probably more accurate, both in terms of performance practice and of rhythmic perception, to conceive of both senses coexisting in a relationship of dynamic tension. Considering this point further, it is interesting to note discrepancies in descriptions of the ambiguous case of *ayak-ayakan*. Martopangrawit notes several peculiarities of *ayak-ayakan*, the first of which is that “It does not use the *gong gedhé* except for the final *gong*.” The implication is that *gong suwukan*, which is smaller and higher pitched, is used instead. This is true of various *ayak-ayakan* in *sléndro manyura*, but not of those in *sléndro nem* or *sléndro sanga* (*ayak-ayakan* in *pélog* are not discussed) in which “all nonfinal *gong* are replaced by *kempul*” (1984, 18). Sumarsam puts it the other way around, stating that “in *Ayak-ayakan, laras sléndro pathet manyura*, the *gong suwukan* takes the place of *kempul*” (Sumarsam 1984b, 293). *Ayak-ayakan* which use *kempul* are taken as the norm, and *ayak-ayakan sléndro manyura* the exception. To further confuse the situation, however, it might be noted that in the context of *Talu*, *gong suwukan* is used throughout *srepegan* as well as *ayak-ayakan*. *Kempul* is used only in *sampak*.

There is a clear acoustical reason why *kempul* would be used as substitute for *gong suwukan* – and for that matter, why *gong suwukan* is used in place of *gong ageng*. This is the simple principle that the greater the mass of a vibrating body, the more

energy is required to set the body sounding, and to stop it sounding. *Gong suwukan* is simply too sluggish in its attack, and would be too murky, to sound as frequently as required by the formal structure of *sampak*. Acoustic clarity is not, however, the only reason why *kempul* is used instead of *gong suwukan*, or why *gong suwukan* is used instead of *gong ageng*. The other reason is to organize successive *gongan* – in the sense of the period marked by either *gong* or *kempul* – into larger groups. The more significant issue in terms of the question of what constitutes a *gongan* is that in most forms a *gongan* is not merely a structural unit, but also a melodic unit. It was mentioned in passing that a *gongan* of one beat – a single stroke of *kempul* or *gong* in *sampak* – is not generally regarded as a melodic unit. It is simply too short. It is merely a pulse. The same is true of *srepegan*. *Ayak-ayakan*, however, is a borderline case. The period between strokes of *gong* or *kempul* in *ayak-ayakan* is long enough to accommodate four *balungan* tones – a *gatra* – which does constitute a melodic unit. But according to the concept of *padhang-ulihan*, melodic phrases do not typically consist of only one melodic unit, but two. The other consideration was raised in connection with *gendhing Monggang*, and that is the relationship between the sense of cyclicity and the time frame of the psychological present. The sense of cycle differs if it occurs within this frame – in which case it may be immediately grasped as a unity – than if it is longer – in which case the sense is one of being immersed in a cycle. Only when *ayak-ayakan* is played in a more expanded *irama* does a *gongan* really feel like a *gongan*. This is common in *ayak-ayakan sléndro sanga* as commonly performed in *klenèngan* (in *irama rangkep* or *tikel*), and also of the various *ayak-ayakan* which are used to conclude *klenèngan* such as *Umbul Donga*, *Kaloran*, *Mijil Larasati* and *Pamungkas*. Here a *gongan* typically lasts 12 or more seconds, about half the length of a *gongan* of *ketawang* in *irama dadi*.

In the context of *Talu*, *ayak-ayakan* is usually played in *irama tanggung*, but can also go into *irama dadi*. In *irama tanggung*, at the somewhat faster than medium tempo typical of *wayang*, each *gongan* lasts around 2.4 seconds – meaning that two *gongan* fit within the frame of the psychological present. In *irama dadi*, it lasts 5.5 seconds, significantly, just outside this time frame.

Performances of *srepegan* – and also *sampak* – whether as part of a sequence such as *Talu* or on their own, typically involve two clearly differentiated tempos. The following chart lists the rate of the pulse articulated by *kempul* in *srepegan* and *sampak* at both a medium tempo (*sedheng*) and a fast tempo (*seseg*). It also lists the interval between strokes of *kempul* at this pulse, as well as the intervals of the different length *gongan* (in the sense of the period between strokes of *gong suwukan*) in the two forms. In *srepegan*, *gongan* comprise either 4, 6 or 8 strokes of *kempul/gong* (only 4 and 6 are shown); those of *sampak*, 8 or 12 strokes. The length of the period corresponding to 2 *kempul* in *srepegan* or 4 in *sampak* is also shown, as this is the number of strokes in which a pitch is repeated.

**Figure 3.10: Tempos and Durations of Structural Units**

Form		Duration of unit (in seconds)			
Tempo	<i>kempul pulse</i>				
<b>Srepegan</b>		1 <i>kempul</i>	2 <i>kempul</i> (1 <i>gatra</i> )	4 <i>kempul</i> ( <i>gongan</i> )	6 <i>kempul</i> ( <i>gongan</i> )
Medium	47	1.275	2.550	5.100	10.200
Fast	69	0.875	1.750	3.500	7.000
<b>Sampak</b>		1 <i>kempul</i>	4 <i>kempul</i> (1 <i>gatra</i> )	8 <i>kempul</i> ( <i>gongan</i> )	12 <i>kempul</i> ( <i>gongan</i> )
Medium	80	0.748	2.992	5.984	11.968
Fast	150	0.400	1.600	3.200	6.400

What can be seen in this chart is that the longer *gongan* in all cases is longer than the psychological present, while shorter *gongan* are longer at the medium tempo but shorter at the fast tempo. In all cases, the rate of pulsation articulated by *kempul* is within the realm of readily apprehendable pulse.

It is clear from the three examples of *srepegan* and *sampak* that there is a preference not only for grouping by pairs, but also grouping by fours. There is, however, a particular aspect of performance practice which suggests that this is a preference, rather than a more strict rule. When *srepegan* or *sampak* are used to accompany dance, the number of repetitions of each *kempul* unit (in the case of *srepegan*) or pair

of *kempul* units (in the case of *sampak*) within each *gongan* is variable, the placement of *gong* functioning to accentuate movement. The result is often that a unit or pair of units is either added or subtracted in order to line up with *gong*. In this situation, the ensemble follows cues from the *kendhang*. Though the name of this technique, *salahan* (mistake or deviation) implies that there is a usual form from which one deviates, the existence of this technique demonstrates that the fundamental unit does not correspond to *gatra*, but rather to pairs of tones at the level of pulse articulated by *balungan*. Along with the similar functioning of flexibility in the related form *palaran* (consisting of rhythmically flexible sung poetry accompanied by the formal structure of *srepegan* – the one metered form without *balungan*) suggests the possibility that *srepegan* and *sampak* were not always so fixed.

What should also be clear from the three examples of *srepegan* and *sampak* and the chart summarizing the different lengths of units in each is a clear rhythmic relationship between the two. There are twice as many strokes of *kempul* for each pitch and for each *gongan* in *sampak* as there are in *srepegan*, but the overall duration of larger units – of repeated pitches, or of whole *gongan* – is approximately the same. In other words, the formal structure contracts, continuing the overall trajectory of formal contraction of the *Talu* suite, but the phrase structure does not. This can be seen more clearly when the forms are considered in the context of this sequence, along with the transitions between them.

There are four figures which represent the sequence. The first, 3.11a, shows both the basic sequence of tones, how this sequence fits into – or flows through – the different formal structures, and the different possibilities for moving between different pieces, and in the case of *ayak-ayakan*, between the regular pitch sequence and the alternate pitch sequence of *ngelik*. *Ngelik*, from the root *cilik* literally means “to get smaller” and indicates melodic movement to a higher register (size, rather than relative vertical position, i.e. high or low, being how difference in pitch is expressed in Javanese). Many pieces have an alternate section in a higher register, which may or may not be related to the melodic content of the rest of the piece. In the case of *ayak-ayakan sléndro manyura*, there is a resemblance. The second, 3.11b, is a transcription of the *balungan* of an actual performance. In both of these figures, the effect of tempo and

*irama* is not indicated. It should be understood that the movement through the sequence is continuous, as suggested by the arrows. The gaps are intended only to clarify the relationship between the realization and the underlying basic pitch sequence.

These two figures are provided mostly as background and support for the third figure, 3.12, which most clearly and completely shows the relationship between the expansion and contraction of formal structure – with its general tendency towards contraction – and the expansion and contraction of phrasing through the sequence, where the overall proportions are roughly maintained. This figure uses the same proportional representation of time used in the representations of *gendhing Monggang* and *gendhing Gambirsawit* (figures 3.2 and 3.3). The figure does not show the sequence in its entirety, but rather representative portions of the sequence, with the letters along the right indicating their correspondence to lines in the complete representation of the sequence in figure 3.11.

Finally, figure 3.13 shows in greater detail the shifts in relative density that occur through the transitions from one piece to the next, starting with *ketawang* (which is not represented in the other figures). This figure also illustrates clearly the point made in chapter 1 – that the mechanics of the shifts between *ayak-ayakan* and *srepegan*, and *srepegan* and *sampak* are basically the same as those of changes in *irama*.

The dotted lines in figure 3.12 indicate how the different segments of the pitch sequence are expanded and contracted through a number of factors – the number of times a *gong* tone is repeated, the omission of part of the sequence (in the case of *ngelik* in *ayak-ayakan*), changes in tempo, as well as shifts in formal structure.

In *ayak-ayakan*, each tone of the basic pitch sequence is repeated either once or twice. There is one point where the number is not actually set – this is at the point of transition to *ngelik*, which follows a cue not from the *rebab* (as do most changes of register) but from the *kendhang*. This can occur after one or two repetitions of the pattern leading to 6 (note the two lines in figure 3.11a marked “to *ngelik*.” In line E of figure 3.11b 5356 is repeated only once. Elsewhere it is repeated twice.) The *ngelik* of *ayak-ayakan* also has an interesting effect on compression. It happens to be melodically similar to the basic sequence, except that in the patterns to 1 and 2 in the

first segment (1 2 6) are played only once rather than twice, as they are in the middle register. As well, there is an elision between the first segment and the pattern to 1 in the last segment. Again, the *kendhang* indicates whether to repeat the *ngelik* sequence, or to return to the regular sequence. The returns to the regular sequence occur in conjunction with the shifts of *irama* in lines D and G (only G is shown in figure 3.12).

In line J, the tempo accelerates and as a result formal structure contracts. Just before the final *gong* of *ayak-ayakan*, the *balungan* halves its density, and assumes the simple elaboration of the underlying pitch sequence of *srepegan*. The detail of this transition is shown in figure 3.13. At this point, the number of iterations of each tone in the basic sequence becomes regular – each tone is played twice. The limit to the degree of contraction of phrasing through the number of repetitions has been reached.

Another contraction occurs in line K with an increase in tempo. Changes in tempo in *srepegan* and *sampak* are typically much more abrupt, due both to the dramatic function of these pieces in the context of accompanying *wayang* or dance, and to the condensed formal structure. Another increase in tempo at the beginning of the next line, L, pushes into *sampak*, and the phrase length snaps back to its previous length. There is one more acceleration in M, leading to an abrupt cue to switch to *suwuk*, or ending sequence. Pairs of *kempul* strokes on 6 are repeated until the *kendhang* gives the cue to play the final 532. Note that the number of pairs of *kempul* strokes is not even – there are five pairs, or ten strokes, leading up to the final stroke of *gong*.

Figure 3.11a: *Gendhing Talu* – Possible Paths through *Ayak-ayakan*, *Srepegan*, *Sampak*

**Basic Sequence of Tones**

<i>Ayak-ayakan, Srepegan, Sampak:</i>	1	2	6̇		6̇	3	2		2	3	1
<i>Ayak-ayakan (ngelik):</i>		ī	2̇	6		6					ī
<i>Ayak-ayakan (exit ngelik):</i>						6	1	2			

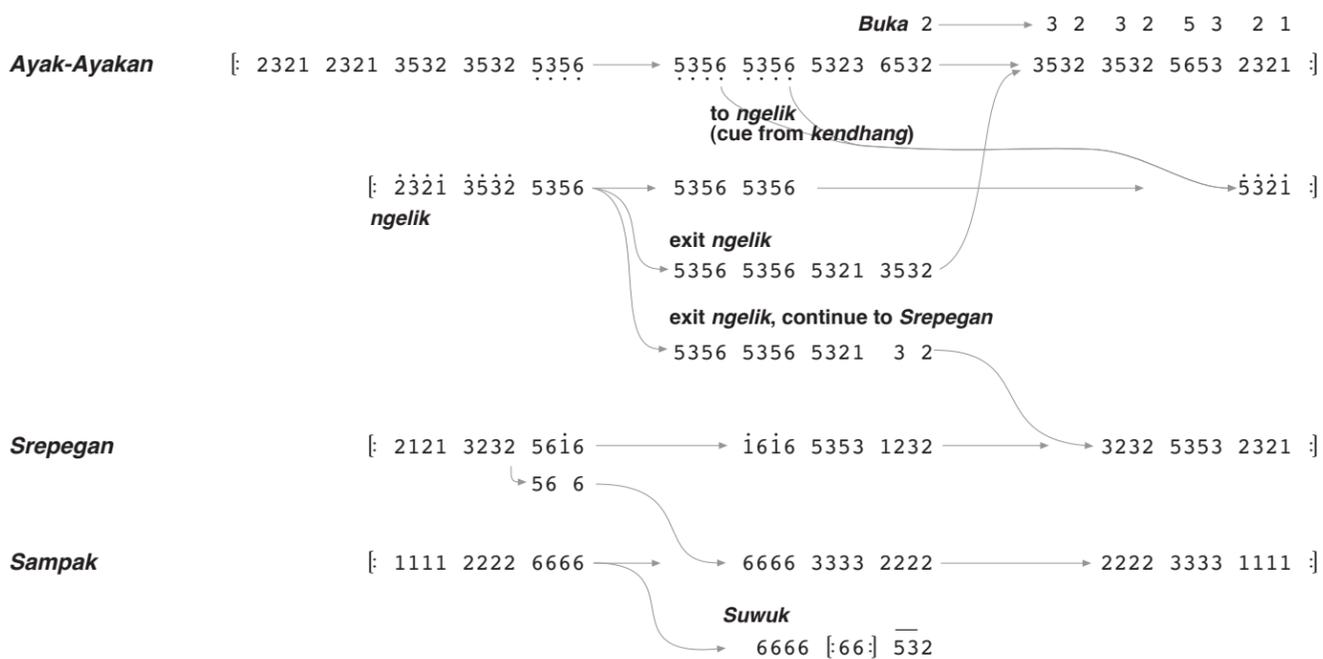
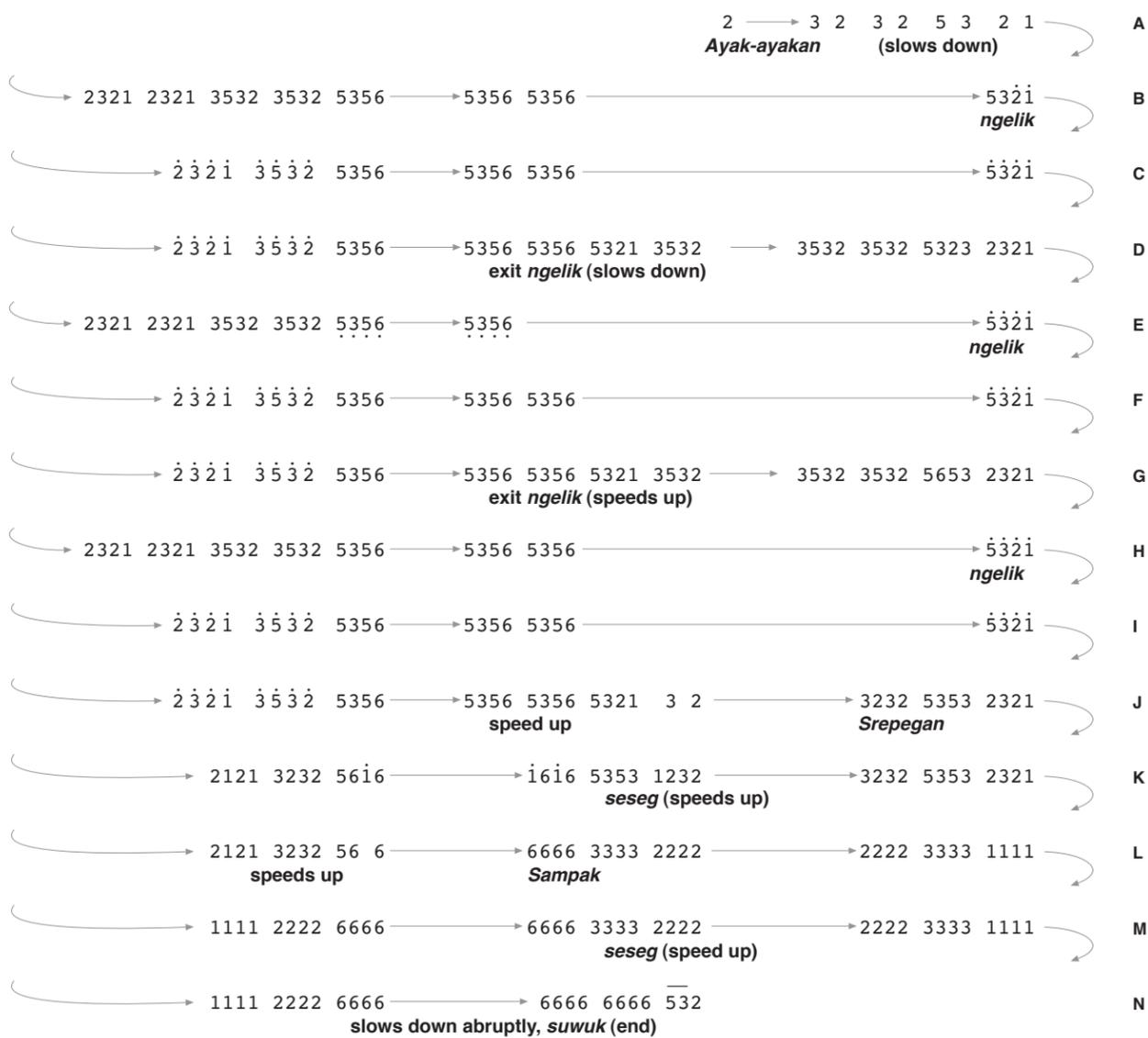


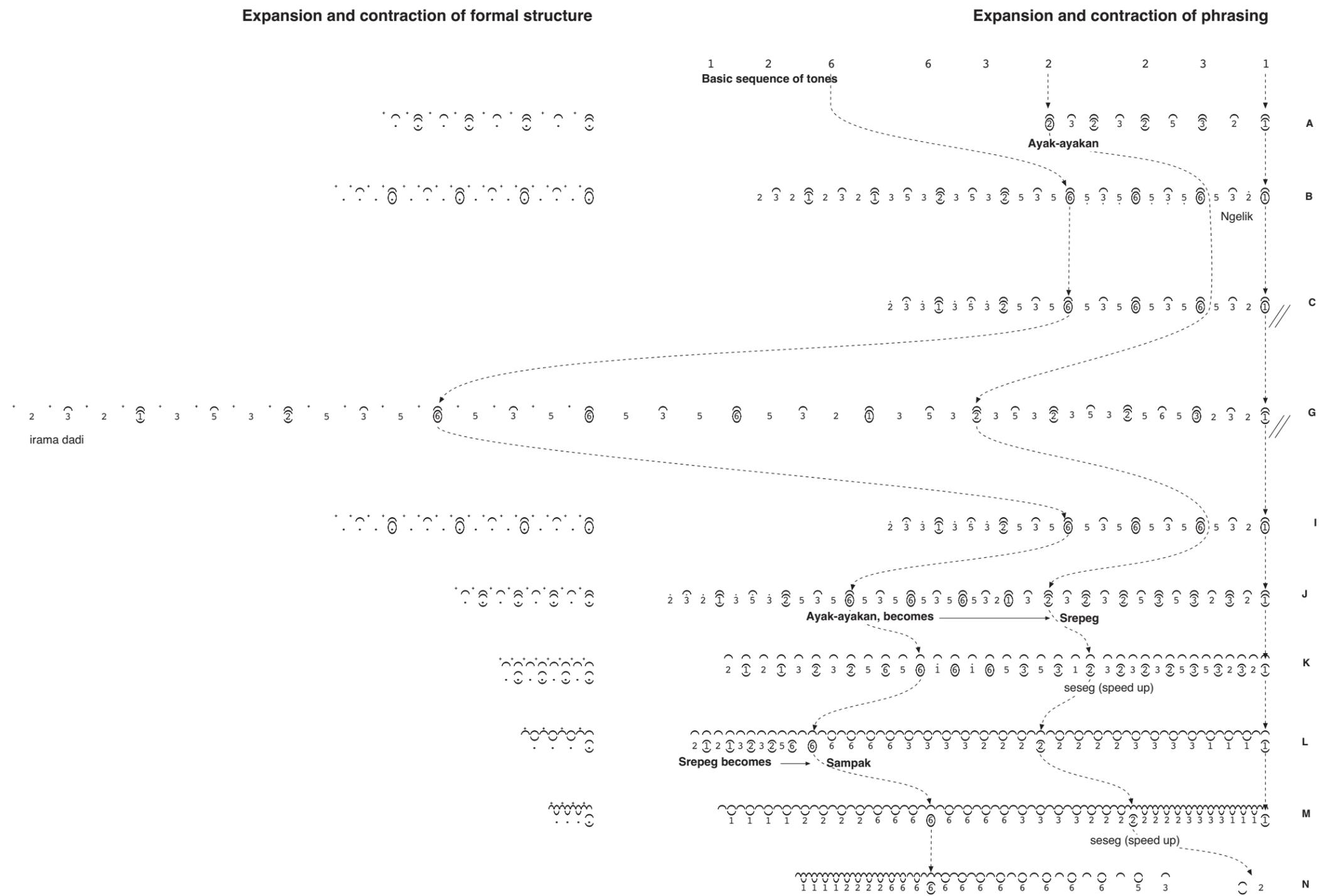
Figure 3.11b: *Gendhing Talu* – Actual Path of Recorded Example

Transcription of recording by Pagayuban Sekar Surakarta (1999).



**Figure 3.12: Gendhing Talu – Expansion and Contraction of Formal Structure and of Phrasing**

Transcription of recording by Pagayuban Sekar Surakarta (1999).



**Figure 3.13: Gendhing Talu – Detail of Transitions**

Transcription of recording by Pagayuban Sekar Surakarta (1999).

Saron Panerus: ⑤ 2 2 3 1 2 3 2 6 1 2 3 6 5 3 ② 3 ② 3 ② 5 ③ 2 ① 2 3 2 ① 2 3 2 ①  
 Balungan: .....  
 Kenong: .....  
 Gong: .....

Ketawang → Ayak-ayakan

5 3 5 ⑥ 5 3 5 ⑥ 5 3 5 ⑥ 5 3 2 ① 3 ② 3 ② 3 ②  
 .....  
 .....  
 .....

Ayak-ayakan → Srepegan

5 ③ 5 ③ 1 ② 3 ② 3 ② 3 ② 5 ③ 5 ③ 2 ③ 2 ①  
 .....  
 .....  
 .....

Srepegan (seseg)

② ① 2 ① 3 ② 3 ② 5 ⑥ ⑥ 6 6 6 6  
 .....  
 .....  
 .....

Srepegan → Sampak

② ② ② ② ② ② ② ③ ③ ③ ③ ① ① ①  
 .....  
 .....  
 .....

Sampak (seseg)

Demung & Saron: ② ① 2 ① 3 ② 3 ② 5 ⑥ ⑥ 6 6 6 6  
 Saron Panerus: 22112211332233225 6 i 6 i 6 i 6 i 6  
 Slenthem: 2 1 2 1 3 2 3 2 5 6 i i i i i

## **Part Two – Compositional Investigations**

## Chapter 4

### *as time is stretched...*

#### A Performance/Installation for Javanese *Gamelan* Instruments

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##### Background

*as time is stretched...* is a performance/installation for Javanese *gamelan* instruments and other sound sources: amplified bottles and assemblages of recorded material collected in Indonesia, diffused over four channels. The work consists of a number of pieces played as a long suite, and explores various means by which a sense of time may be stretched – means which resemble but are also distinct from a similar sense brought about by traditional *karawitan*. The composition and development of *as time is stretched...* took place in parallel to the theoretical reflections in the first part of this thesis. But while they are parallel, they are not equatable. The compositional project was not intended simply as a demonstration of principles identified in the theoretical investigations, but rather a creative application of the insights gained. At the same time, the compositional explorations helped to inform the theoretical investigations, grounding these efforts in actual musical activity.

The work represents a more conscious reflection on the relationship between my compositional thinking and the understanding of *karawitan* I have developed over a decade of involvement as a student and player. In some sense it is a working through of the small tensions between, on the one hand, my background as a composer partially indoctrinated into the experimental tradition of Western art music, and on

the other my attraction to a music more rooted in idiomatic performance practice. The work continues a softening of an attitude adopted when I first started composing for *gamelan* instruments – that I was not interested in imitating traditional repertoire, and felt dissatisfied with works by other composers that did. In particular, I was, and still am, critical of work that is simultaneously too much like *karawitan*, but not enough like *karawitan*. This tendency is quite strong in the work of many North American *gamelan* composers, due in large part to the influence of Lou Harrison. Such work tends to imitate the surface features of the music by utilizing basic formal, rhythmic and melodic techniques without reflecting a deeper understanding of *pathet* or formal structure. I do not take the position that one should refrain from writing for *gamelan* before acquiring at least a reasonable working knowledge of traditional performance practice. But I am of the opinion that if one has not developed such a knowledge, an experimental approach is preferable and honest – that it is more appropriate and productive to imagine the possibilities suggested by the instruments, and to bring whatever compatible musical experience one has to creating music for these instruments and those that play them. For myself, this meant applying the interest I had developed in chromatic harmony, developed as a composer exposed to the harmonic theory of the Czech theorist Karl Janacek through my teacher Rudolf Komorous, and as a pianist with a rather eclectic training in improvisation. The particularities of the tuning system, especially when the pitches available in both tunings, *sléndro* and *pélog* are combined to produce a found microtonal pitch set, offered rich possibilities in creating vertical sonorities – an approach to material which has nothing to do with models from *karawitan*.

My initial training in improvisation (which was largely free of any externally or self-imposed imperative to assimilate a modernist or postmodernist aesthetic<sup>44</sup>) was a strong factor in my attraction to *gamelan*. I was very much drawn towards the oral/aural nature of transmission of knowledge and to the grounding of music making in performance more than theory. The social conditions under which such music

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<sup>44</sup> See Born (1995, particularly 123-132 and 279-307) for reflections on the dynamics of acquisition and development of such aesthetic positions.

making took place were also appealing. While the aesthetic approach of my early efforts in composing for *gamelan* were largely determined by my compositional studies, the working out of the resulting pieces was geared towards engaging the knowledge and abilities of the group with which I worked – Gamelan Madu Sari, in Vancouver – and our collective experience as students of *karawitan*. Hearing the work of Indonesian composers associated with S.T.S.I. Surakarta in the 1991 *New Music Indonesia* tour and participating in the collaborative creation of a work led by Al Suwardi reinforced this interest in collective process. The development of *as time is stretched...* and the extensive use it made of workshopping material is thus based in these formative experiences.

As my knowledge of *karawitan* has increased, I have grown more open to reflecting this knowledge in composing for *gamelan*, and more appreciative of the broader influence my involvement as a player has had on my compositional aesthetic. *as time is stretched...* more comfortably integrates traditional techniques and references than my previous work. This is most apparent in the sections *circular* and *Monggang Manisan*, with their explicit incorporation of traditional material. The bulk of the work retains a less direct relationship to traditional models, and is more about exploring the extended time sense of *karawitan*. Again, fortuitously, this is an aspect of musical experience which predates my involvement with *gamelan*. The core of the piece is the recurring section *stretch*, which contrasts quite markedly with the lush, full texture of traditional *gendhing* for full *gamelan*, or even the more austere texture of *gendhing bonang*. But even here, there are aspects of traditional repertoire which are utilized: the strictly defined functional roles played by *kenong*, *kempul* and *gong*, the modal sense of the melodic material, and the simple processes of elaboration of this material. It is as if aspects of traditional performance practice have been put underneath a temporal microscope and slowed down many more times than they are in traditional *gendhing*; or as if the extreme expansion of the formal structure and *balungan* found in a piece like *gendhing Gambirsawit* was applied to the melodic figuration of *gendèr* or *gambang*, and reset among several players on the *balungan* instruments. Alternately, it can be thought of as the stretching of a pitch sequence not unlike that which is the basis for the *ayak-ayakan*, *srepegan* and *sampak* sequence in

*gendhing Talu*, but to an extent which resembles the radical transformation of *balungan* in *inggah*.

### Stretching Continuity

The genesis of *stretch* was in fact the idea of setting a simple pitch sequence in various different figurative textures. Specifically, these were canons played by spatially distributed *saron*, as shown in figure 4.1 The model was that of generative principles involved in creating a part on *saron panerus*, *bonang barung* or *bonang panerus* on the basis of a given *balungan*. With this idea in mind, I recorded myself improvising a short sequence on *saron*, with the intention of superimposing the recording on itself offset by a beat to simulate the effect of the canon. I quickly realized when working with the recording using digital sound editing software that rhythmic irregularities resulted in a shifting of the rhythmic relationship between offset parts. As an alternate strategy, I created studies for the canons using recordings of single strokes – essentially similar to a process of sampling and sequencing. What I soon discovered in working with the material was that in my initial efforts the sense of continuity was too strong, and did not produce the sense of stretched time I was after. The sequence held together too much as a continuous line.

I then recomposed several versions, maintaining the underlying pitch sequence but altering the rhythm. In *slow canon* I experimented with stretching the sequence, increasing the number of iterations of each pitch in successive repetitions of the entire sequence. With *fast canon* there were more parameters which could be adjusted. Different divisions of the sequence could be implied by shifting where longer and shorter pauses occurred. The length of these pauses generally could be lengthened, and the overall sequence expanded. Single notes could be repeated, or two- or three-note segments. The definition of structurally important points in the sequence was reinforced through simple orchestration, adding a stroke of *kempul* or *gong suwukan* to certain notes, and a stroke of *kenong* followed by a roll on *bonang* to other notes. Bowed *gendèr* was added as a largely independent element, not unlike the *pesindhèn* projecting her more extended and flexible phrasing over the very regular texture of stratified levels of pulse and regular phrasing in traditional *gendhing*. Figure 4.2

compares the original improvised pitch sequence with preliminary and final realizations of this sequence.

Figure 4.1: Realization of Notation for *stretch (slow canon)* and *stretch (fast canon)*

Figure 4.2: *stretch* – Comparison of Original Sequence, Composition in Progress, and Successive Iterations in Final Version

It was only after arriving at the sense of timing in the slow and fast canons that I became aware through my theoretical research of the principles of temporal perception discussed at the beginning of chapter 3. The combination of these efforts resulted in the more conscious awareness of an already held intuitive sense: that central to the effect of stretched time in *karawitan* was the extension of a sense of continuity beyond normal psychoperceptual limits. I remembered a tactic I used in teaching one of the other pieces from the *Talu* suite, *ladrang Sri Katon*, at a *gamelan* workshop in Seattle several years before. This was to teach the *balungan* of this piece by rote, without using notation, but by playing it eight times faster than normal. Once the *balungan* had been memorized, it was then slowed down until the correct tempo was reached. In this way, a solid sense of continuity was established which could then be radically extended. I have used a similar approach in learning the very slow and sparse parts for *kendhang ageng*, which strike me as basically similar syntactically as the faster parts for *kendhang kali* and *kendhang ciblon*.

In traditional *gendhing*, the maintenance of some sense of continuity through even the most extreme expansions of form through formal structure and *irama* has much to do with the integrity of formal structures and the principle of binary subdivision operating at all levels of rhythm and form. For various reasons, including an aversion to remaining too close to traditional models, I was more interested with *stretch* in exploring other means of maintaining a sense of continuity. More practically, the desire to suggest an even more extended time scale pointed to the use of a radically reduced musical texture. By removing the surface layer of density that is such a strong characteristic of traditional *karawitan*, the focus was shifted to the underlying extended melodic basis. The melodic material as first presented in the initial iteration of *stretch* is already extended, only to become even more extended. This can be seen in figure 4.2.

*stretch (diffuse canon)* takes the same basic pitch sequence used in *stretch (slow canon)* and *stretch (fast canon)* and sets it in a more diffuse musical texture (as the title indicates). It is diffuse in the sense that the different *balungan* instruments are more loosely coordinated than in the mostly through-composed earlier sections of *stretch*, where they closely follow the lead of the first *demung*. In *stretch (diffuse*

*canon*), each *saron* imitates the composite four-stroke repetition of *stretch (fast canon)*, playing four consecutive strokes with two mallets. What was a spatially defined figure becomes spatially and temporally distributed. The first *demung* retains its leading role, but the other *saron* are free to play their strokes within a quite narrow range of time following first *demung*. This balance between specified outline and individual realization is analogous to the narrow range of variability in *wiletan* (small scale melodic variation) in the realization of *cèngkok* on *gendèr*, *gambang* and other *panerusan*. The coordination of the different parts through *stretch (diffuse canon)* resembles in a very general way the loose coordination of *rebab*, *gendèr*, *gambang* and *suling* in *pathetan*.

While *stretch (slow canon)* and *stretch (fast canon)* were composed outside of and prior to their rehearsal (following the more conventional model of Western art music), the development of *stretch (diffuse canon II)* made greater use of the workshopping process, as did the other ensemble sections *Monggang Manisan* and *why birds*. The participation of the performers in this process was thus critical. It is not so much that the work was created collaboratively, but more that it was shaped through trial and error over consecutive rehearsals. I believe, however, that earlier work in rehearsing *stretch (slow canon)* and *stretch (fast canon)* was critical in establishing a collectively held sense within the ensemble of the extended temporality I was interested in achieving. As the rehearsal process continued, this sense became easier to produce.

#### **Considerations of Setting**

Another important way in which *as time is stretched...* relates to traditional models is in its overall presentation. The extended time scale of the piece as a whole relates in part to *wayang*, but more directly to *klenèngan*, and particularly *klenèngan* which feature a series of extended suites. One of my most memorable experiences of this was at a daytime *klenèngan* in a small village in Central Java, about an hour east of Surakarta on the slopes of the dormant volcano Gunung Lawu. At this daytime *klenèngan*, there were several consecutive long suites, all following a similar outline to that of *gendhing Talu*, but moving from *srepegan* to a series of *palaran*. Each suite lasted around an hour. Time would get stretched in the expansiveness of the large

formal structures of the first few sections of the suite, and then would contract in the transit to shorter forms, and the shift to a more bustling texture. The effect of this happening several times in succession was quite remarkable.

I found this particular *klenengan* interesting and enjoyable for another reason: its setting. It differed from other events I had attended, which were more obviously tied to a wedding or other rite of passage ceremony. It may have been part of a ritual cleansing of the village (*bersih desa*), or of some community event, but if it was, there were no obviously ritualistic aspects. There was nothing like the receiving line at a wedding, no speeches, no obvious presence of the hosts. Nor was it as festive as *klenengan* which follow such events, in which providing entertainment for the guests is the focus. Instead, the main purpose of the music was to provide a non-intrusive backdrop as the (mostly male) guests, presumably members of the community, socialized while playing cards over small tables set up throughout several rooms. The gamelan was set up in part of one of these rooms, rather than under a canopy set up in front of the house as is typical of events where the intent is to announce to the community that a wedding or other occasion is taking place.

The lack of direct attention to the music paid by the men playing cards became especially apparent when no notice at all was taken at the fact that a foreigner was sitting and playing with a group of Javanese musicians – not even when I sang (rather unconvincingly) a *bawa*, a long solo vocal introduction to a *gendhing*. Foreign students of *gamelan* have had such a continuous presence in Central Java that their presence at such events is largely unexceptional. Still, it is not unheard of for hosts to explicitly request when hiring a group of musicians that they bring along a foreigner – ideally a young woman studying *sindhenan* (singing) – and typically the presence of a foreigner attracts at least some attention. What I found striking and inspiring in this was that there was no tension between the informality or even indifference of the guests and the exquisite expansiveness of the music. I imagine the guests were more involved in the moment by moment changes of fortune in their card games than the music. But at the same time the requirements of providing a setting for socializing did not preclude the possibility of the musicians engaging quite deeply in the music – whether this meant focusing on the details of *garap* of a particular *gendhing*,

embodying its *rasa*, interacting with other performers, or experiencing a heightened sense of the passage of time.

There are other contexts where the last of these aspects of experiencing *karawitan* – the aspect of time – is more pronounced. Among these are *klenèngan* at the courts, which now occur mostly in the form of *siaran* (live radio broadcasts). During my period of study of *karawitan* in Surakarta for a year and a half in 1993-95, I regularly attended several of these. My favorite was the evening *siaran* at the *Istana Mangkunegaran*, held every 35 days on the *wetonan* of Prince Mangkunegara.<sup>45</sup> The *gendhing* played at these had a somewhat different quality of expansiveness than that of the long suites played at *klenèngan* outside the courts, resulting more from the large scale formal structures of the court repertoire and the exquisitely refined and understated performance style than the rambling sequence through multiple shorter forms. The resonance of the *pendapa* – the large, marble-floored open-walled pavilion in which the *gamelan* was housed – enhanced the diffuse yet detailed musical texture. The atmosphere was calm, relaxed, yet more focused than that of village *klenèngan*, or the daytime events, where the music competed with the crowds of tourists and young and hopeful would-be tour guides – and also the more welcome birds that flew in and around the high ceiling of the *pendapa*.

I was interested in recreating something of the feeling of attending these sorts of events with *as time is stretched...* It is for this reason that the model of presentation I used was that of a performance installation.<sup>46</sup> The primary sense in which it functions

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<sup>45</sup> *Wetonan* is a type of birthday – the particular combination of days from the seven day week and the Javanese five day *pasaran* cycle on which someone, in this case Prince Mangkunegara, was born. This is one application of the calendrical system related to *gong* cycles by the Beckers and Hoffman (J. Becker 1979) (Becker and Becker 1981) (Hoffman 1975) (Hoffman 1978). A very general and concise explanation of the Javanese calendrical systems is offered by Perlman and Suyenaga (1994).

<sup>46</sup> One of my previous works for *gamelan* instruments, *hanging from branches: an environmental installation work for trees, gongs and eight or more performers*, was more like an installation in the usual sense of the term. It consisted of kempul and gong suwukan suspended from tree branches throughout a small park in Vancouver, with the very simple instructions for players to choose a number between 3 and 11 and count that number of breaths in between successive strokes of the instrument they played. I believe I came by the term performance installation independently, but I was certainly influenced and inspired by Matt Rogalsky's presentation of a work of this type at the Western Front, Vancouver, in the spring of 1996, based on his 1995 thesis project at Wesleyan.

according to this model is not so much the formal structure, which with its clearly defined sections and overall design is more like a concert work, but instead the distribution of instruments throughout the performance space. Figure 4.3 shows the arrangement of instruments, which was intended to achieve several objectives. The arrangement reduced the division between performer and audience. Signs at the entrance to the performance space (replicated in figure 4.4) invited audience members to sit anywhere, to move around freely, or to come and go. The signs also requested the audience to remove their shoes, in part for the practical reason of softening the sound of their footsteps should they choose to walk around, but also because *gamelan* musicians always remove their shoes as a gesture of respect to the instruments. A carpet was placed in the middle of the floor, and cushions distributed among the instruments as further encouragement to the audience to sit anywhere. The arrangement was also intended to allow for a more environmental experience of the piece, an immersion in the musical space. Wherever one sat there would be instruments on several sides, so that the experience was more one of being within an environment than observing a performance 'object.' Finally, the spatial distribution of instruments served to enhance the temporal spaciousness of the music.

Figure 4.3: Arrangement of Instruments

**Figure 4.4: Sign at Entrance to Performance Space**

The choice to hold the performance during the day was largely due to availability of the World Music Hall, but was in retrospect fortuitous. The performance was long enough – three and a half hours – that the passage of time was also marked by the shifting angle of light through the large windows and the skylight. As well, the ability to see clearly what was going on outside provided an appropriate level of distraction, without interfering acoustically with the generally subdued character of most of the music. I believe the openness of *karawitan* to the context in which it is traditionally presented, whether at a village *klenengan* or in a court *pendapa*, is key to its aesthetic appreciation. I am interested in the model it provides of a more relaxed and receptive form of aesthetic experience. Rapt attention of the sort usually assumed in a concert setting (especially a concert of “serious” music) for the duration of several hours would be thoroughly exhausting, and counterproductive to the experience of extended time. Eric Rosenzweig, an artist working mostly with audio/video installations,<sup>47</sup> made an interesting point when I discussed with him strategies for encouraging a more relaxed and receptive (but still engaged) relationship to the experience of art. He observed that in the visual art world, there was an expectation both among artists and viewers; that when viewing work the idea was to “get it.” What he hopes for with much of his installation work and what I hoped to achieve with *as time is stretched...* was not for the audience to “get it,” but to “get into it.”

#### Other Themes

All the same, I cannot claim to be entirely uninterested in providing things for an audience to “get.” The tendency Rosenzweig describes in visual art relates to the increased importance of an exegesis, often in written form, accompanying the work and explaining the concept or idea behind it. The program notes which accompanied *as time is stretched...* (and which owing to the daylight setting and expansive time scale had a better chance of actually being read than those for the average concert) reflect the influence of this tendency on my own work. Picking up the references in *as time is stretched...* is certainly not essential to the aesthetic experience, but it can enhance it.

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<sup>47</sup> See <[www.appearancemachine.com](http://www.appearancemachine.com)> for an example of one of these.

*as time is stretched...* makes use of several forms of referential material. These complement the primary focus of the work on the experience of time in bringing up a number of themes. Recorded elements evoke the soundscape of Java, both acoustic and electroacoustic: *goods and edibles* is a collage built from a recording of street vendors in Bandung, while *tweet* combines two sources of birdsong, a field recording from the *Mangkunegaran* and commercial Indonesian cassettes. Another recorded element drawn from attending *siaran* at the *Mangkunegaran* is *Rayuan Pulau Kelapa*, a song by the Indonesian composer Ismail Marzuki which is played before the national news on Radio Republik Indonesia. Halfway through the *siaran*, after the close of a long, classical *gendhing*, this tune would emanate from the mobile van unit and waft through the resonance of the *pendapa*. I obtained a copy of the rendition of this tune used by RRI from the station in Surakarta, with the intent of finding some way to integrate it into a piece. In creating the assemblage *The Isle of Coconuts Beckons* (an approximate translation of Marzuki's title), the only processing used was time stretching. The delicious tension between the sweetness of the tune and its horrendously distorted realization is straight from the original.

The pairing of the somewhat sentimental *Rayuan Pulau Kelapa* with the austere *gendhing Monggang* may seem somewhat bizarre and irreverent, and is intended as a reference to the rather jarring presence of the tune in the context of a court *klenengan*. However, such pairings are not without precedent. Another archaic *gamelan* piece, *Kodhok Ngorek*, is typically paired with other pieces played on either *gendèr* or *balungan*. At royal weddings, it is often played simultaneously with other music, such as the wedding march from Wagner's *Lohengrin* played on a small European style marching band. Pak Sumarsam arranged to have the two pieces played together in a more coordinated fashion at his daughter's wedding reception. In *Monggang Manisan*, the coordination is melodic rather than rhythmic, with the basic contour of *gendhing Monggang* set to pitches matching the tonality of *Rayuan Pulau Kelapa*. The *Manisan* in the title is a qualifier, playing on the use of *manis* (sweet) in titles of traditional *gendhing* (as in *Gandrung Manis*, as distinct from *Gandrung Mangun Kung* or *Gandrung Mangu*). The suffix *-an* changes the word into sweets, i.e. candy, in reference to the piece's somewhat saccharin quality.

*Monggang Manisan* and *why birds* (an arrangement of Burt Bacharach's *Close to You*) constitute an ironic commentary on the growing trend in *klenengan* to focus on lighter repertoire, and specifically repertoire which imitates other musical styles. This tendency is most evident in the rise of *Campursari*, a genre which mixes *gamelan* instruments with Western instruments, most notably electric keyboard. Original pieces in this and related genres frequently treat *pélog* as a substitute for a diatonic scale. In the performance of traditional *gendhing*, the equal-tempered tuning of the keyboard is imposed onto *pélog*, an imposition which has begun to influence the intonation of vocalists. *why birds* both replicates and inverts the situation. A diatonic pop tune is played in *pélog*, but subjected to the same radical rhythmic transformation through formal expansion characteristic of classical repertoire, and that explored in other sections of *as time is stretched...* As the tune is unrecognizable in the radically expanded state in which it is first presented, attention may be given to the particular qualities of intervals in *pélog*, in contrast to the tendency for such qualities to be erased when the focus is on the tune itself.

The other referential piece in *as time is stretched...* is *circular*. This piece extracts the instrumentation used as accompaniment to the long vocal lines of *gendhing kemanak* and the court dance genre *srimpi*. It is the only piece in *as time is stretched...* which makes use of the most characteristic and recognizable feature of *irama* change: the doubling of pulse in certain parts as the tempo slows and the formal structure expands. The pattern of *kethuk* and *kenong* is the same as that common to nearly all formal structures in *karawitan*. Two, rather than one, *kethuk* are used, so that the cycle travels throughout the space. Four, rather than the usual two, *kemanak* are used, and the players walk slowly around the space as they play. The introduction, much like that of *gendhing Monggang*, consists simply of two strokes – but played on *kemanak* rather than *kendhang* – to set up the basic pulse. A binary organization of parts predominates at first through the alternation between two identically pitched *kemanak*. An asymmetrical element is present in the part of one of the *kemanak*, which superimposes its own regular pulse based on three of the pulses of the other two *kemanak*, again similar to the *kendhang* pattern in *gendhing Monggang*. The tempo slows immediately from the outset, and after several cycles the fourth *kemanak* enters, introducing a further level of subdivision. This provides a reference for the

shift in the level of pulsation of all but one of the *kemanak*, which reorganize to sound a repeating six-beat pattern that phases against the eight-beat cycle of *kenong* and *kethuk*. The other *kemanak* plays a stroke on every fifth pulse, adding another level of phasing. As the tempo continues to slow, the six-beat pattern of the three *kemanak* is altered by the omission of strokes. As the tempo slows even more, and it become more difficult to maintain rhythmic coordination, the *kemanak* break into their own cycles of different lengths. No attempt is made to maintain coordination, and the relationship between parts is irrational rather than a simple ratio, due to differences between the pulse counted by each individual player.

In all three of these referential sections there is a pairing of an instrumental piece with a recorded element: *circular* with *goods and edibles*, *Monggang Manisan* with *The Isle of Coconuts Beckons* and *why birds* with *tweet*. The significance of the pairing of *Monggang Manisan* with *The Isle of Coconuts Beckons* was discussed above. In the other two pairings the recorded elements function more to enhance the environmental sense of presentation. The reference to a court genre in *circular* is placed in the more quotidian context of the calls of street vendors. *tweet* starts out with the ambience of the more sequestered court setting, presented through a field recording of the birds that fly around inside the *pendapa* of the *Mangkunegaran*.<sup>48</sup> Gradually this is taken over by a assemblage of clips from commercial Indonesian cassettes of birdsong.<sup>49</sup> There are whole cassettes dedicated to single types of birds, often pointing out on the cover that the bird in question is a prizewinner at competitions. As well as a reference to the presence of birds in the ambient and electroacoustic soundscape of Java, *tweet* plays on the first line of *Close to You* (from which the title *why birds* is derived) which poses the question “Why do birds suddenly appear every time you are near?”

Recorded sound is used extensively through *as time is stretched...* In other sections, in addition to enhancing the sense of environmentality it forms more specific parallels with acoustic elements. The overlapping downward glissandi played by three *rebab* in

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<sup>48</sup> This is taken from the recording made by Joseph Getter from which the transcription of *gendhing Monggang* was made (Istana Mangkunegaran 1998). I am grateful to Joseph for keeping the tape running even when the *gamelan* musicians were not playing.

<sup>49</sup> I am grateful to I.M Harjito (who has real birds too) for lending me several tapes from his collection.

*slide* resemble the extended gesture of two amplified glass bottles of different sizes being filled with water in *dribble*. These sections function as interludes between full ensemble sections, and explore a particular aspect of *irama* and form – that of the sense of long extended gesture or shape through gradual shifts in *irama*, or the even larger pattern of contraction of formal structures in successive pieces in *gendhing Talu*. The second iteration of *dribble* represents an especially extreme extension of gesture, using a large bottle which takes 20 minutes to fill. The only other parts sounding at this point are isolated strokes of *kendhang*. The extreme length of the second *dribble* section alters the temporal perspective with which the following sections are experienced. In particular, the next *dribble* section, which still constitutes an extended gesture, seems very fast in comparison. This is not unlike the shift in perception that occurs when returning to *irama wilet* after *irama rangkep* in *balungan nibani*, discussed in connection with *gendhing Gambirsawit*.

A different manner of marking time is found in the isolated strokes played on various *kendhang* by two players, and the collage of a dripping faucet in *drip*. These set up a contrast between punctuated time and more smoothly flowing time. This is especially the case with the variety of water sounds used throughout the piece: the continuous and steady-state texture of the recording *trickle* paired with the first section of *slide*; the continuous but shifting *dribble* interludes, and the punctuation of time by the recording *drip*. In a sense, the difference between these water sounds is like the difference in formal structure – it is mostly one of density. The continuity of *dribble* and *trickle* corresponds to the presence of the structure-marking parts in the rhythmic surface in *sampak* and *srepegan*, while the isolated *drips* correspond to the isolated strokes of *kenong* and *kethuk* in *mérong*.

In a subtle way, the parallels between recorded and acoustic sound draw attention to the schizophrenic status of the former (Murray Schafer 1980, 90-91). It is notable that the only presence of voices in the piece is through recordings, most obviously in *goods and edibles*. In both this collage, and *tweet*, there is much repetition of short segments of sound – not so frequently that they are obviously the same, but frequently enough that one gradually becomes aware that the sound is repeated – and thus, more aware of the sound's separation from its source. It is not only individual

segments which repeat, but whole sequences. These sequences do not repeat exactly, and gradually what repeats shifts. This reinforces but also complicates the sense that sounds are repeated.

The pairing of recorded and acoustic is most complete with *Monggang Manisan* and *The Isle of Coconuts Beckons*. It is only in this section that there is direct interaction between the instrumental and recorded parts. As the score for *Monggang Manisan* indicates, the ensemble takes its cues from the recording. As mentioned above, the only processing involved in *The Isle of Coconuts Beckons* was time-stretching. The extent of this is sufficient, however, to go beyond a simple slowing down of the tune and to instead focus attention on the glorious details of the distortion in the original source recording of *Rayuan Pulau Kelapa*. There is both a sense of the initial state of the tune being altered and an emergence of detail not unlike that which occurs in *gendhing Gambirsawit*. In *gendhing Gambirsawit* – and, for that matter, *gendhing Monggang* – it is the extended sense of time which is most fundamental to the identity of the piece, rather than the more direct statement of melodic material in more compressed levels of *irama*. However, as I suggest in the discussion of *gendhing Monggang*, it is important that the temporal quality of this state be approached via transitions from and back to a more quotidian sense of time. This pattern is followed through the five iterations of the tune *Rayuan Pulau Kelapa*, which are directly parallel to the expansion and compression which takes place in the instrumental parts of *Monggang Manisan*.

The last iteration of the tune *Rayuan Pulau Kelapa* starts out expanded, and then gradually compresses until returning to the original speed. This is the pattern followed by the arrangement of *Close to You* in *why birds*. The function of both of these sections in terms of the overall form of *as time is stretched...* is the return to a regular sense of time out of the extended sense of time. There is, then, an overall relationship between the ordering of sections and traditional models. On another level, the placement of the more referential sections corresponds to the placement of lighter and more melodically based pieces in both long suites and the overall sequence of pieces in *wayang* and *klenengan*. The position of *circular* is parallel to that of the lighter but still traditional pieces such as *Jineman* (one of the few

traditional forms in which the *pesindhen* could be thought of as a soloist) played halfway through a *klenèngan* in *sléndro sanga*. It is also parallel to the *Limbukan* scene in the first large section of *wayang*. This scene features the antics of two clownish characters, the maid-servant Cangkik and her daughter Limbuk, who can be likened to female equivalents of Laurel and Hardy (Cangkik being very thin and Limbuk being quite fat). The *gendhing* which typically accompany this scene, such as *ladrang Asmaradana*, *sléndro manyura*, are similarly lighter but still classical pieces. It is not (or did not used to be)<sup>50</sup> until *gara-gara* and the appearance of the *punakawan* – the four male clown characters – or the last section of a *klenèngan*, with pieces in *sléndro manyura* and *pélog barang* – that all the stops are pulled out, and the most ridiculous musical pieces are played. In *as time is stretched...* these most ridiculous pieces are *Monggang Manisan* and *why birds*.

There is also a parallel to formal aspects of the ordering of pieces in a *klenèngan*, both within sections and overall. The tendency between the various sections of *stretch* is a movement from defined to diffuse, and thus resembles the contrast between the constrained melodic nature of *mérong* and the diffuse figuration which characterizes *inggah*. Such movement also occurs within other sections, such as *circular*, where the coordinated pattern at the outset dissolves into loosely coordinated independent patterns. The process is repeated in a more directly apprehendable way in *Monggang Manisan*, until the last iteration of the tune in which it inverts and the diffuse again become defined. Movement from diffuse to defined occurs two more times in a shorter durational frame over the course of *stretch (diffuse canon II)* and *why birds*.

There is, then, a balance struck between the referential and experiential. These aspects need not conflict, but can coexist and reinforce and enhance one another. The

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<sup>50</sup> In contemporary *wayang* practice there is a strong tendency for *Limbukan* to last longer and resemble *gara-gara*. For a description of this scene and a commentary on the significance of the shift in aesthetic related to its increased importance, see Weiss (1998, 319-325).

experience of extended time does not necessitate the exclusion of other experiences, even if it is to be foregrounded. Both my theoretical and compositional investigations of the temporal experience brought about by rhythm and form in Javanese *gamelan* music focus on this particular aspect, but as in *karawitan*, much can take place *as time is stretched...*

## Appendices

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### Appendix 1 – Performance Materials

The notation for *as time is stretched...* consists of performance scores for each section; all players involved in a given section use the same score, rather than individual parts. A “map” indicates the sequence in which pieces, sections of pieces, or combinations of pieces are played.

Though the scores are more detailed than traditional notation of *balungan*, they are not as self-sufficient as a typical Western art-music score. Notation functioned mostly to facilitate the process of transmission and creation over an extensive workshopping process. The material in this appendix represents the end result of the refinement of the notational strategies used in this process.

stretch (slow canon)	118
stretch (fast canon)	125
circular	134
phrase and echo	135
stretch (diffuse canon)	136
Monggang Manisan	139
why birds	144
“Map” indicating sequence of sections	149
Part for CDs and Amplified Bottles	150

<b>Appendix 2 – Performance Program</b>	<b>153</b>
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Slow Canon, p. 3

C1  $\underline{3} \dots \underline{6} \dots \underline{\cdot} \dots \underline{5} \dots \underline{\cdot} \dots \underline{\cdot} \dots \underline{2} \dots \underline{\overset{i}{\cdot}} \dots \underline{\cdot} \dots$   
 \_\_\_\_\_ 5 \_\_\_\_\_  
 $\overset{6}{\frown}$   $\textcircled{2}$   $\overset{i}{\frown}$

C2  $(\underline{\cdot} \dots \underline{\cdot} \dots \underline{\cdot} \dots) \underline{\overset{i}{\cdot}} \dots \underline{\cdot} \dots \underline{\cdot} \dots (\underline{\cdot} \dots \underline{\cdot} \dots \underline{\cdot} \dots)$   
 \_\_\_\_\_ i \_\_\_\_\_ 5 \_\_\_\_\_  
 $\textcircled{2}$   $\overset{i}{\frown}$

C3  $\underline{5} \dots \underline{\cdot} \dots \underline{6} \dots \underline{3} \dots \underline{\cdot} \dots \underline{\cdot} \dots \underline{2} \dots \underline{\overset{i}{\cdot}} \dots \underline{\cdot} \dots (\underline{\cdot} \dots)$   
 \_\_\_\_\_ 3 \_\_\_\_\_ i \_\_\_\_\_  
 $\overset{3}{\frown}$   $\textcircled{2}$   $\overset{i}{\frown}$

C4  $\underline{5} \dots \underline{\cdot} \dots (\underline{\cdot} \dots) \underline{5} \dots (\underline{\cdot} \dots) \underline{5} \dots \underline{3} \dots$   
 \_\_\_\_\_ 5 \_\_\_\_\_ 1 \_\_\_\_\_

C5  $\underline{1} \dots \underline{\cdot} \dots \underline{\cdot} \dots \underline{6} \dots \underline{\cdot} \dots \underline{\cdot} \dots \underline{5} \dots \underline{\cdot} \dots \underline{\cdot} \dots$   
 \_\_\_\_\_ 6 \_\_\_\_\_ 5 \_\_\_\_\_  
 $\textcircled{1}$   $\overset{6}{\frown}$





Slow Canon, p. 6

**Timing for Gong/Kempul and Kenong, Sections F, G, H and i**

Gong/kempul plays; kenong counts 2 to 5 pulses, at same rate as saron canon, then plays; If kenong counts 2 or 3 pulses, gong/kempul counts 7 to 9 pulses then plays next stroke. If kenong counts 4 or 5 pulses, gong/kempul counts 7 pulses, then plays next stroke.

The desired effect is an alternation between gong/kempul and kenong, with a tendency for more space following kenong, but occasionally gong/kempul coming shortly after kenong if the space between kenong and kempul is longer. Once this general pattern and pacing is established, counting is optional.

**Timing Between Groups, Sections F, G, H and i**

Groups are rhythmically independent within sections, but movement from one section to the next is roughly coordinated, with saron group leading. Saron group continues directly from measured pause (rests) at end of section to next section.

**F**

(see explanation of timing)

Lead Demung/Saron - count after last kenong stroke

( . . . . . : . . . . . : . . . . . : . . . . . )

**G**

Saron, Demung, Slenthem

5 . . . . . 3 . . . . . 6 . . . . . 5 . . . . . 3 . . . . . 6 . . . . .

4:3

5 . . . . . 3 . . . . . 6 . . . . . 5 . . . . .

( . . . . . : . . . . . : . . . . . : . . . . . )

**Bowed Gender**

[ : 3 ——— 6 ——— 5 ——— : ] 5 ———

**Gong/Kempul, Kenong & Bonang**

(bonang: vary the interval between the kenong stroke and beginning of roll)

(timing as in F)

6

Slow Canon, p. 7

**H**

**Saron, Demung, Slenthem**

2 . 1 . . . 2 . . 1 . . . . . 5 . . . . . . . . . .

2 . 1 . . . 5 . . . . . 2 . 1 . . . . .

( . . . . . . . . . . . . . . . )

**Bowed Gender**

{ 2 ——— 1 ——— 5 ——— } 5 ———

**Gong/Kempul & Kenong**

(2) (1) <sup>i</sup> ~~~~~ (2) (1) <sup>i</sup> ~~~~~ (2) (1) <sup>i</sup> ~~~~~ (2) (1)

**i**

**Saron, Demung, Slenthem**

6 . . 3 . . . . 5 . . . . . 6 . 3 . . . . . . . . . .

5 . . . . . . . . . . 6 . . . . . . . . . .

( . . . . . . . . . . . . . . . )

**Bowed Gender**

{ 6 ——— 3 ——— 5 ——— } 5 ———

**Gong/Kempul & Kenong**

(6) (3) <sup>3</sup> ~~~~~ (5) (6) <sup>6</sup> ~~~~~ (3) (5) <sup>5</sup> ~~~~~ (6) (3) <sup>3</sup> ~~~~~ (5) (5)

End

## Fast Canon

. = 40

Slow Canon . = repeated tone ( . ) = rest

Intro 5 . . . . . . . . . . . . . . ( . )  
 A  
 B  
 )  
 5

. = 60

Fast Canon . = rest

A1 5 . . . . . 3 . . . . 6 . . . . . 5 .  
 A A  
 5 \_\_\_\_\_  
 )  
 5

A2 2 . i . . . . . . . . . . 5 . . . . . . . . . . . . . . . 6 . . . . 3 . . . . . . . . . .  
 B B A A  
 6 \_\_\_\_\_  
 ( 2 ) i

A3 2 . i . . . . . . . . . . 5 . . . . . . . . . . . . . . . 6 . . . . . 3 . . . . .  
 B B A A  
 6 \_\_\_\_\_  
 ( 2 ) i

A4 1 . . . . . . . . . . . . . . . 6 . . . . 5 . . . . . . . . . . . . . . .  
 B  
 1 \_\_\_\_\_ 5 \_\_\_\_\_

Fast Canon, p. 2

A5  $\underline{\cdot \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot}$   $\underline{\cdot \cdot}$   $\underline{\cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot}$   
 $\underbrace{\hspace{1.5em}}_5$   $\underbrace{\hspace{1.5em}}_5$   $\underbrace{\hspace{1.5em}}_5$   $\underbrace{\hspace{1.5em}}_5$   $\underbrace{\hspace{1.5em}}_5$   $\underbrace{\hspace{1.5em}}_5$

B1  $\underline{5 \cdot \cdot \cdot}$   $\underline{3 \cdot \cdot}$   $\underline{6 \cdot \cdot \cdot}$   $\underline{\cdot \cdot}$   $\underline{5 \cdot \cdot \cdot}$   $\underline{3 \cdot}$   $\underline{6 \cdot \cdot \cdot}$   $\underline{5 \cdot \cdot \cdot}$   
 A A B B  
 $\underbrace{\hspace{2.5em}}_6$   $\underbrace{\hspace{2.5em}}_6$   $\underbrace{\hspace{2.5em}}_6$   $\underbrace{\hspace{2.5em}}_6$   $\underbrace{\hspace{2.5em}}_6$   $\underbrace{\hspace{2.5em}}_6$   $\underbrace{\hspace{2.5em}}_6$   $\underbrace{\hspace{2.5em}}_6$   
 $\underbrace{\hspace{2.5em}}_5$

B2  $\underline{5 \cdot \cdot \cdot}$   $\underline{\cdot \cdot}$   $\underline{5 \cdot \cdot \cdot}$   $\underline{2 \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot}$   $\underline{2 \cdot \cdot \cdot}$   $\underline{1 \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot}$   $\underline{2 \cdot \cdot \cdot}$   $\underline{1 \cdot \cdot \cdot \cdot}$   
 A A B  
 $\underbrace{\hspace{2.5em}}_5$   
 $\underbrace{\hspace{2.5em}}_2$   $\underbrace{\hspace{2.5em}}_1$

B3  $\underline{5 \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot \cdot}$   $\underline{5 \cdot \cdot \cdot}$   $\underline{6 \cdot \cdot \cdot}$   $\underline{3 \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot}$   $\underline{5 \cdot \cdot \cdot}$   $\underline{6 \cdot \cdot \cdot}$   $\underline{3 \cdot \cdot \cdot}$   $\underline{\cdot \cdot}$   
 A A B B  
 $\underbrace{\hspace{2.5em}}_5$   
 $\underbrace{\hspace{2.5em}}_3$

B4  $\underline{2 \cdot \cdot \cdot \cdot}$   $\underline{2 \cdot}$   $\underline{1 \cdot \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot \cdot}$   $\underline{2 \cdot}$   $\underline{1 \cdot \cdot \cdot \cdot}$   $\underline{5 \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot \cdot}$   $\underline{\cdot \cdot}$   
 A A B B  
 $\underbrace{\hspace{2.5em}}_2$   $\underbrace{\hspace{2.5em}}_1$   $\underbrace{\hspace{2.5em}}_2$   $\underbrace{\hspace{2.5em}}_1$   $\underbrace{\hspace{2.5em}}_5$   $\underbrace{\hspace{2.5em}}_5$   $\underbrace{\hspace{2.5em}}_5$   $\underbrace{\hspace{2.5em}}_5$   $\underbrace{\hspace{2.5em}}_5$







Fast Canon, p. 6

C11  $\underline{\cdot \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot \cdot}$   $\underline{\cdot \cdot}$   $\underline{\cdot \cdot \cdot \cdot \cdot \cdot}$   
 (5) (5) (5) (5)

C12  $\underline{\cdot \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot \cdot}$   
 (5 5)

D1  $\underline{5 \cdot \cdot \cdot \cdot}$   $\underline{3 \cdot \cdot \cdot}$   $\underline{6 \cdot \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot}$   $\underline{5 \cdot \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot \cdot}$   $\underline{\cdot}$   $\underline{3}$   $\underline{6 \cdot \cdot \cdot \cdot}$   
 B B A A  
 6 ~~~~~  
 5 \_\_\_\_\_  
 (6)

D2  $\underline{5 \cdot \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot \cdot \cdot \cdot}$   $\underline{3 \cdot \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot \cdot}$   $\underline{6 \cdot \cdot}$   $\underline{5 \cdot \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot}$   
 B B  
 5 \_\_\_\_\_

D3  $\underline{3}$   $\underline{6}$   $\underline{5 \cdot \cdot \cdot \cdot}$   $\underline{\cdot \cdot \cdot \cdot \cdot \cdot}$   $\underline{3 \cdot \cdot}$   $\underline{6 \cdot \cdot \cdot \cdot}$   
 A A  
 6 ~~~~~  
 5 \_\_\_\_\_  
 (6)

Fast Canon, p. 7

D4  $\frac{5}{B}$  . . . . .

D5  $\frac{5}{A}$  . . . . .  $\frac{5}{A}$  . . . . .  $\frac{5}{A}$  . . . . .  $\frac{2}{A}$  . . . . .  $\frac{5}{B}$   $\frac{2}{B}$  . . . . .  $\frac{2}{B}$  . . . . .

D6  $\frac{5}{2}$  . . . . .  $\frac{2}{2}$  . . . . .  $\frac{2}{2}$  . . . . .  $\frac{2}{2}$  . . . . .

D7  $\frac{2}{A}$   $\frac{i}{A}$  . . . . .  $\frac{5}{2}$   $\frac{2}{i}$  . . . . .  $\frac{2}{B}$   $\frac{i}{B}$  . . . . .

$\textcircled{2}$   $\hat{i}$

D8  $\frac{2}{2}$  . . . . .  $\frac{i}{2}$  . . . . .  $\frac{2}{A}$   $\frac{i}{A}$  . . . . .  $\frac{2}{i}$  . . . . .



Fast Canon, p. 9

D14  $\frac{2}{A} \dots \frac{i}{A} \dots \dots \frac{2}{B} \frac{i}{B} \dots \dots \dots$   
 $\textcircled{2}$   $\overset{i}{\frown}$

D15  $\dots \dots \dots \dots \dots \overset{5}{\text{---}} \dots \overset{3}{\text{---}} \dots \overset{1}{\text{---}} \dots \dots \dots$   
 $\textcircled{2} \overset{i}{\frown}$   $5 \text{---}$   $1 \text{---}$

D16  $\dots \dots \dots \frac{1}{A} \dots \frac{1}{B} \dots \dots \dots \dots \dots \dots \frac{1}{\text{---}}$   
 $\text{---}$   $6 \text{---}$

D17  $\frac{1}{A} \frac{6}{A} \dots \dots \dots \frac{1}{\text{---}} \frac{6}{\text{---}} \dots \dots \frac{1}{B} \frac{6}{B} \dots \dots \dots$   
 $\overset{6}{\text{---}}$   $\overset{6}{\text{---}}$   $5 \text{---}$   
 $\overset{6}{\frown}$   $\overset{6}{\frown}$

D18  $\frac{1}{\text{---}} \frac{6}{\text{---}} \frac{5}{\text{---}} \dots \dots \dots \frac{5}{A} \dots \dots \dots \frac{5}{B} \dots \dots \dots \frac{5}{\text{---}}$   
 $\text{---}$   $\text{---}$  **End**

circular

Transition from Slow Canon

• = 168

slowing...

• = 120 (doubled pulse)

• = 60

continue slowing...

do not attempt to maintain common pulse – count at own rate

**Kenong & Kethuk**

**Kemanak**  
 med.<sub>1</sub>  
 high  
 med.<sub>2</sub>  
 low

**Kenong & Kethuk**

**Kemanak**  
 med.<sub>1</sub>  
 high  
 med.<sub>2</sub>  
 low

## phrase and echo

**Overall Sequence:** Pitch cells are played in order, but with different instrumentation in different iterations of the piece.

### First Time, following Slow Canon

**A – D:** Bowed Gender alone;  
**A, B:** Panembung and Bowed Gender;  
**C – F:** All instruments;  
**A – F:** All instruments.

### Second Time, following Why Birds

**A, B:** Bowed Gender alone;  
**C – F:** All instruments;  
 Then carry on to ending sequence - this is the end of the performance.

**Panembung:** Play each pitch cell, pausing in between. Most times play with an even tempo, every other pulse at a pulse of 72. Occasionally, speed up from basic tempo (from 72 to 96), or slow down to basic tempo (from 88 to 72).

Pauses between cells are variable. Occasionally, begin next cell shortly after last 'echo' part (bowed gender, bonang or gambang) has stopped. Most times, wait for two or three strokes of other instruments playing pieces combined with this piece: either Kenong/Kethuk/Kemanak Cycle, in which case use strokes of the kenong as a reference, or Sparse Kendhang, in which case use individual kendhang strokes or flourishes (several strokes between the two kendhang in quick succession) as a reference.

**Bowed Gender:** Play pitch cells after Panembung, or alone before Panembung starts. When playing alone, follow the guidelines of Panembung for lengths of pauses between cells, but always pause.

**Bonang & Gambang:** play rolls (with two mallets) on pitches in each four-note cell played by Panembung. Rolls should be 6 to 10 pairs of strokes long. Play 3 to 5 rolls per cell. Bonang starts with first pitch in cell, starting after Panembung sounds that pitch. There should be a sense of alternation, both pitch-wise and rhythmically. Do not immediately repeat a pitch played by either yourself or the other player.

### Pitch Cells:

<b>A</b>	<b>B</b>	<b>C</b>
1 <sub>p</sub> 5 <sub>s</sub> 5 <sub>p</sub> 6	7 2 <sub>p</sub> 1 <sub>p</sub> 6	5 <sub>p</sub> 2 <sub>s</sub> 7 3 <sub>s</sub>
<b>D</b>	<b>E</b>	<b>F</b>
5 <sub>p</sub> 2 <sub>p</sub> 1 <sub>p</sub> 6	5 <sub>s</sub> 1 <sub>p</sub> 7 3 <sub>p</sub>	2 <sub>p</sub> 5 <sub>p</sub> 6 7

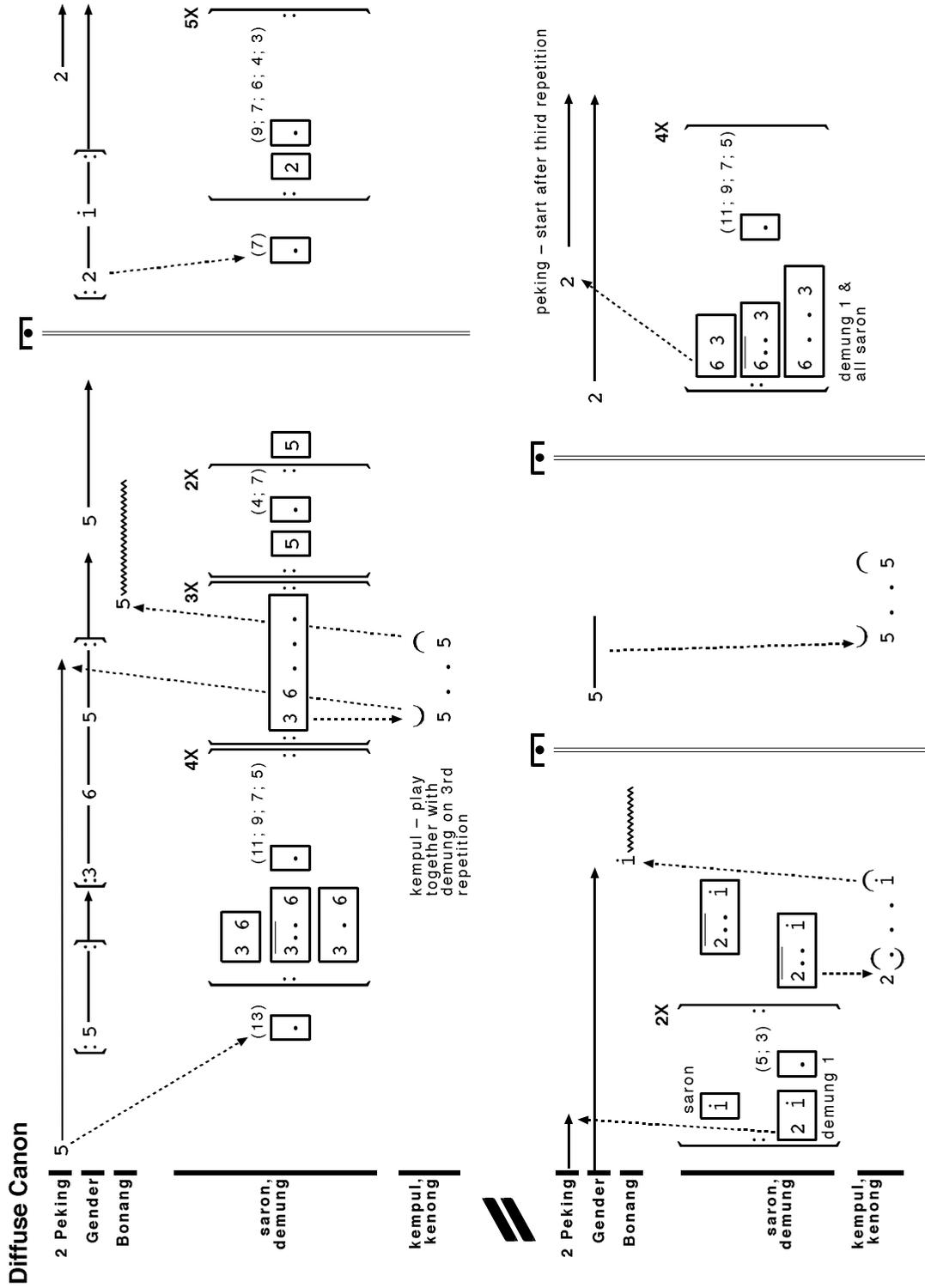
**Ending Sequence:** Bonang and Gambang play rolls on 7. Bowed Gender plays 7.

7  
7  
7  
7

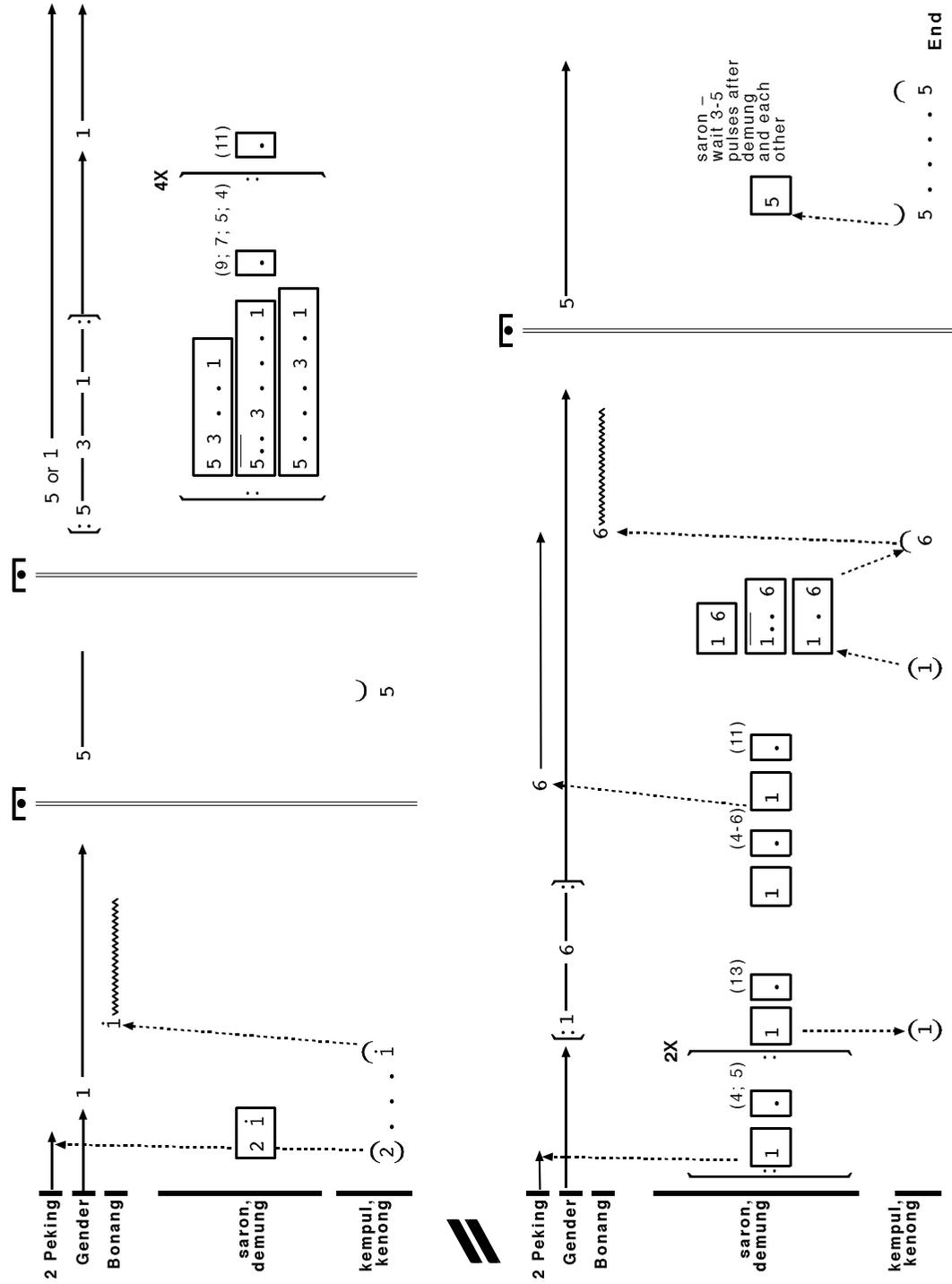
7  
7  
7  
7

7  
Bowed Gender



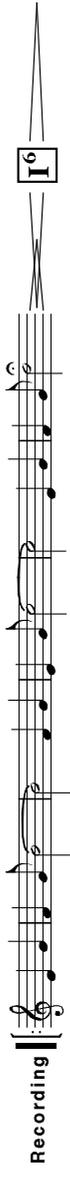


Diffuse Canon, p. 2





Monggang Manisan, p.2

**Recording**  **I<sup>6</sup>**  
 first time . = 120, second time . = 96

**Kendhang**  Ketipung 1 ρ . ρ . ρ { . ρ . ρ . ρ . ρ . ρ }

**Bonang**  
**Panerus**  3 { i 5 i 3 i 5 i 3 }

**Barung**  *f* 3 { i 5 i 3 i 5 i 3 }

**Panembung**  3 { i 5 i 3 i 5 i 3 }

**Slenthem 1**  Slow gradually and steadily; all parts decrease in volume except kendhang and kempul

**Slenthem 2** 

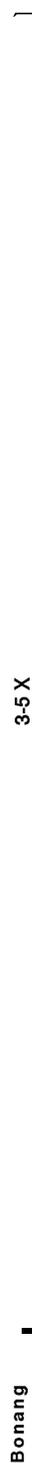
**Kenong**  5 { . . . . . 5 }

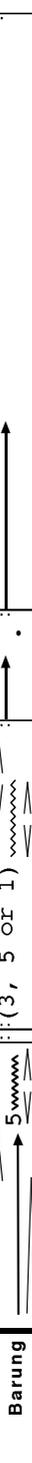
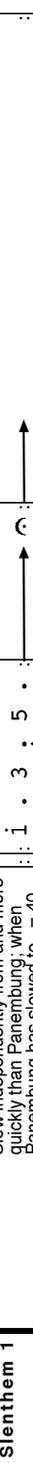
**Kempul**  3 { . . . . . 3 }

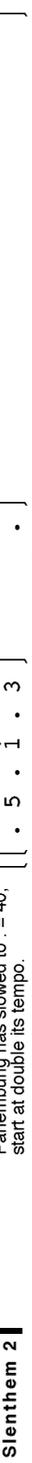
**2X**

**Recording**  **I<sup>6</sup>** 'flourish'

**Kendhang**  Switch when tempo has halved . . . . ρ . . . ρ . B . ρ . . . Continue with sparse kendhang

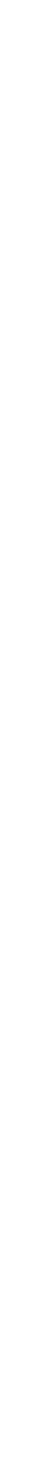
**Bonang**  
**Panerus**  i 

**Barung**  5  3-5 X  ( ( 3, 5 or i )  )

**Panembung**  i 5 i 3 i 5 i 3  4X 

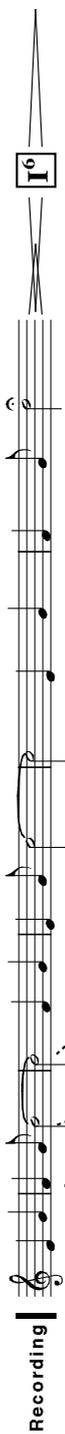
**Slenthem 1**  Slow independently from and more quickly than Panembung; when Panembung has slowed to . = 40, start at double its tempo. i . 3 : 5 .

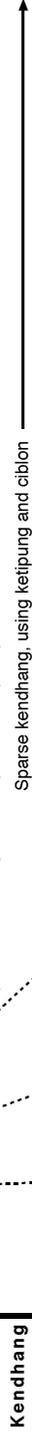
**Slenthem 2**  . . 5 : i . 3

**Kenong**  Kenong is last to play (continue until everyone else has faded out) . . . . . 3 )

**Kempul**  . . . . . 3 )

Monggang Manisan, p.3

**Recording** 

**Kendhang** 

**Bonang**  
**Panerus**  $3 \{ 1 \cdot 5 \cdot 1 \cdot 3 \cdot 1 \cdot 5 \cdot 1 \cdot 3 \}$   
**Barung**  $3 \{ 1 \cdot 5 \cdot 1 \cdot 3 \cdot 1 \cdot 5 \cdot 1 \cdot 3 \}$   
**Panembung**  $3 \{ 1 \cdot 5 \cdot 1 \cdot 3 \cdot 1 \cdot 5 \cdot 1 \cdot 3 \}$

(arrows indicate general alignment of parts)

Slow gradually and steadily; all parts decrease in volume except kenong and Kempul

**Slenthem 1**  
**Slenthem 2**

**Kenong**  $5 \{ \dots \dots \dots 5 \}$

**Kempul**  $3 \{ \dots \dots \dots 3 \}$



**Recording** 

**Kendhang**  $\dots \rho \dots \rho \dots \rho \cdot B \cdot \rho \dots$  Continue with sparse kendhang

**Bonang**  
**Panerus**  $1$   
**Barung**  $5$   
**Panembung**  $( 1 \cdot 5 \cdot 1 \cdot 3 \cdot 1 \cdot 5 \cdot 1 \cdot 3 )$

Switch when tempo has halved

Slow independently from and more quickly than Panembung; when Panembung has slowed to = 40, start at double its tempo.

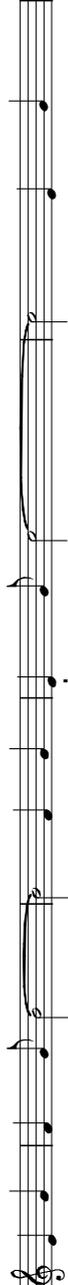
**Slenthem 1**  $( : 3, 5 \text{ or } 1 )$   
**Slenthem 2**  $( : 1 \cdot 3 \cdot 5 : : 5 \cdot 1 \cdot 3 )$

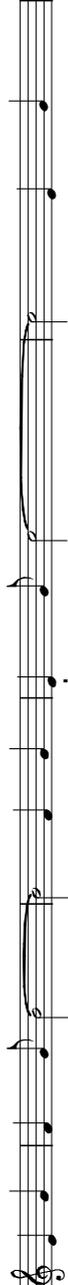
**Kenong**  $( \dots \dots \dots 3 )$

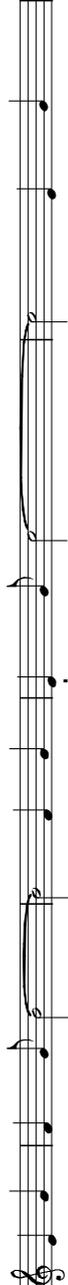
**Kempul**  $( \dots \dots \dots 3 )$

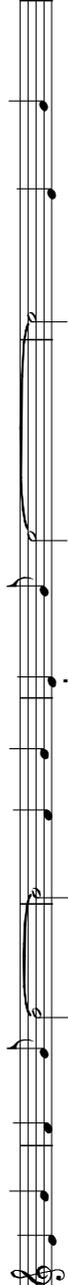
Kenong is last to play (continue until everyone else has faded out)

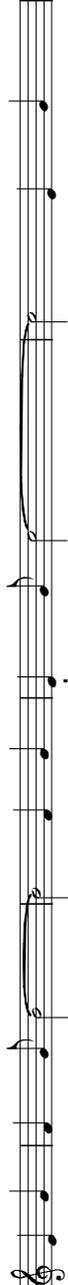
Monggang Manisan, p.4

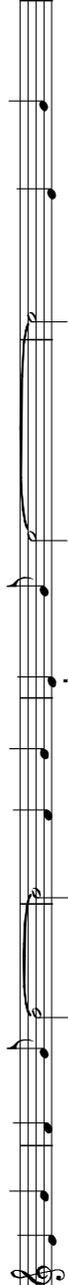
**Recording** 

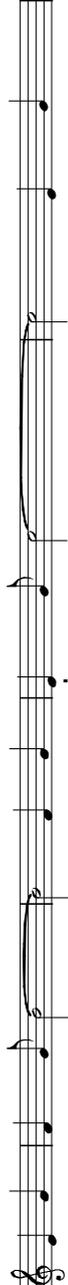
**Kendhang** 

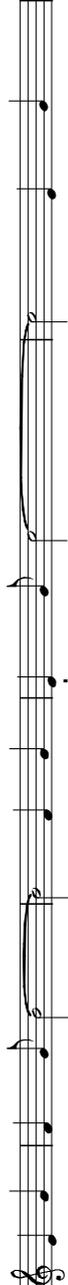
**Panerus Barung** 

**Panembung** 

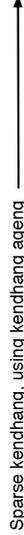
**Slenthem 1** 

**Slenthem 2** 

**Kenong** 

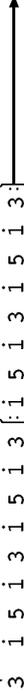
**Kempul** 

Tune slows more extremely... 

Sparse kendhang, using kendhang ageng 

{ (3, 5 or i) } / 3 i 

Start more slowly; do not attempt to coordinate with recording 

3 i 5 i 3 i 5 i 3 { i 5 i 3 i 5 i 3 } 

{ i . 3 : 5 : } { Always start at . = 76 } 

{ . 5 . i . 3 } 

5 { . . . . . 5 } 

3 { . . . . . 3 } 



**Recording** 

**Kendhang** 

**Panerus Barung** 

**Panembung** 

**Slenthem 1** 

**Slenthem 2** 

**Kenong** 

**Kempul** 

















Slow gradually and steadily; all parts decrease in volume except kenong and kempul 

Monggang Manisan, p.5

Recording

Kendhang

Bonang

Panerus Barung

Panembung

Slenthem 1

Slenthem 2

Kenong

Kempul

'flourish' (stretched)

Tune starts extremely slowly



Recording

Kendhang

Bonang

Panerus Barung

Panembung

Slenthem 1

Slenthem 2

Kenong

Kempul

End

fade out completely by this point

accelerates back to original tempo

sparse kendhang continues

Gradually speeding up to . = 60

continue to . = 96



why birds p. 2

Bonang 1  
Bonang 2

**NOTE:**  
remainder of  
this piece is in  
pelog

demung 2,  
saron

demung 1

gender  $\left[ : 1 \text{---} 3 \text{---} 7 \text{---} : \right]^{3x}$

kempul,  
kenong



Bonang 1  
Bonang 2

demung 2,  
saron

demung 1

gender  $5 \text{---} 7 \text{---} 2 \text{---} 2 \text{---}$

kempul,  
kenong

why birds p. 3

<b>Bonang 1</b>			
<b>Bonang 2</b>			
<b>demung 2, saron</b>			
<b>demung 1</b>			
<b>gender</b>			
<b>kempul, kenong</b>			



<b>Bonang 1</b>			
<b>Bonang 2</b>			
<b>demung 2, saron</b>			
<b>demung 1</b>			
<b>gender</b>			
<b>kempul, kenong</b>			

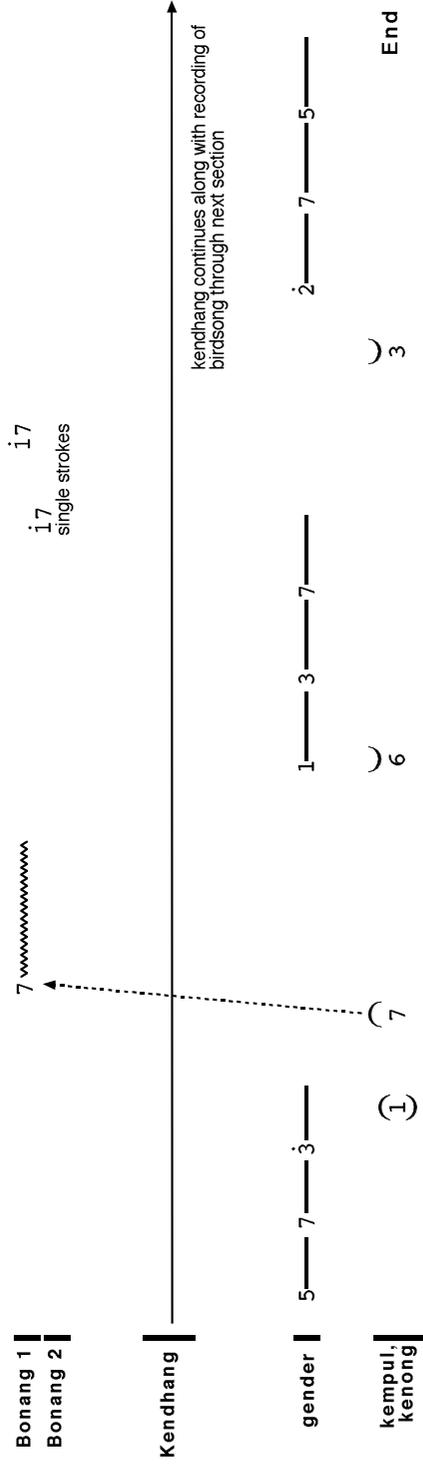
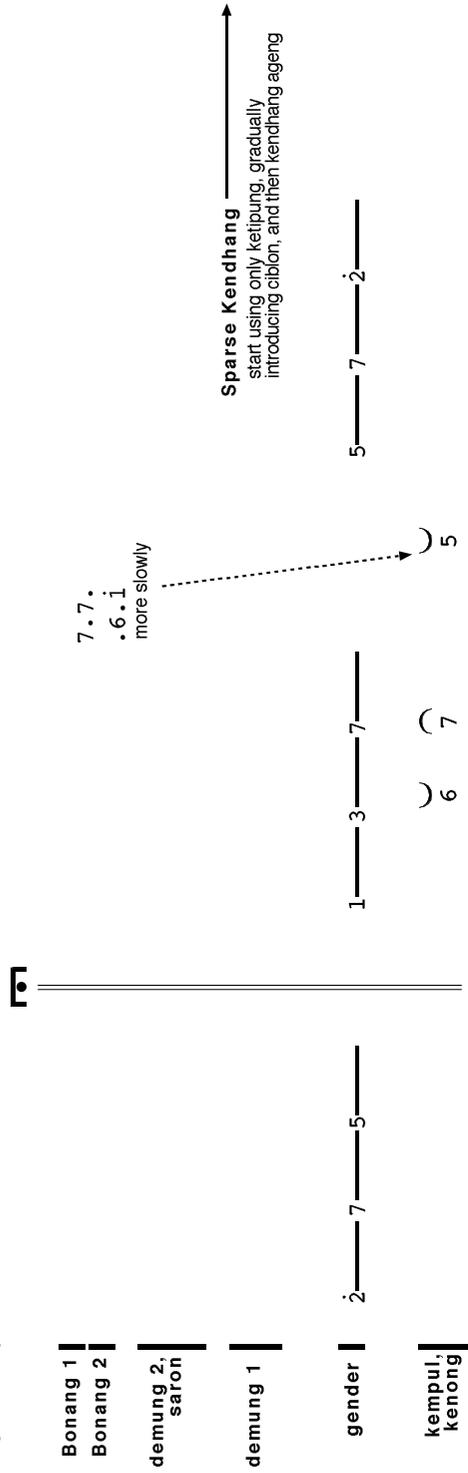
why birds p. 4

<b>Bonang 1</b>			
<b>Bonang 2</b>			
<b>demung 2, saron</b>			
<b>demung 1</b>			
<b>gender</b>			
<b>kempul, kenong</b>			



<b>Bonang 1</b>			
<b>Bonang 2</b>			
<b>demung 2, saron</b>			
<b>demung 1</b>			
<b>gender</b>			
<b>kempul, kenong</b>			

why birds p. 5



End



*as time is stretched...*

**Part for CDs and Amplified Bottles**

**A – Slow Canon (complete, ≈ 20')**

**Bottles**

start med. large first, while instruments are still ringing at end of Slow Canon (see score for cue)

start small ≈ 30" later.

**B – Fast Canon (complete, ≈ 20')**

**set CDs**

1: trickle1, level:

2: trickle2, level:

**start CDs at cue point (see last page of score)**

*rehab play along with CD*

*CD tracks fade on their own*

**C – Slow Canon (partial, ≈ 6')**

**set CDs**

1: Vendors Mix 1, level:

2: Vendors Mix 2, level:

**D – circular**

*starts immediately after Slow Canon (via transition on score of circular)*

**Start CDs at cue from kemanak (see score)**

*Phrase and Echo starts part way through circular.*

**Bottles**

large bottle starts after a 15" pause after last phrase of Phrase and Echo (circular continues)

**Fade CDs (slowly) after large bottle starts**

start medium bottle 2-3' after start of large bottle

**E – Fast Canon (partial, ≈ 13’)**

**Set CDs**

- 1: drip1, level:
- 2: drip2, level:
- 3: The Isle of Coconuts Beckons, level:

**Start CDs 1 and 2 after a short pause after end of Fast Canon**

*rehab play along with CDs*  
*CDs continue through:*

**F – Diffuse Canon (≈ 10’)**

**Bottles**

- start med. small first, while instruments are still ringing at end of Diffuse Canon (see score for cue)
- start small ≈ 30” later.

**Start CD 3 (The Isle of Coconuts Beckons aka RRI) after med. small bottle ends**

**Stop CDs 1 and 2 (after one final drip)**

**G – Monggang Manisan**

*Ensemble takes cues from CD.*

*Monggan Manisan ends at end of CD track.*

**Bottles**

med. large starts immediately following end of CD track (see score for cue)

med. small starts 15” after.

**Set CD**

(Have other bottle operator take over both bottles)

3: tweet background, level:

**Start CD 3 immediately after last bottle has stopped.**

**H – why birds**

**set CDs**

1: tweet1, level:

2: tweet2, level:

**Start CDs 1 and 2 (see score of why birds, p. 2, first system, for cue)**

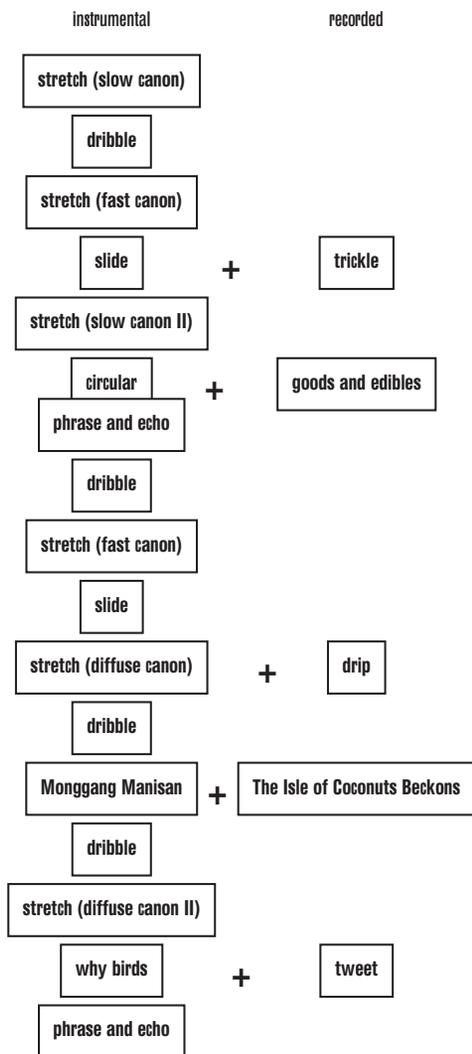
**Fade out CDs 1 and 2 (follow score)**

*CD 3 continues*

**i – Phrase and Echo**

**Fade out CD 3 during ending sequence (see score)**

**(End)**



## as time is stretched...

consists of a number of pieces played as a long suite. It is based loosely on Javanese models – both *wayang kulit* (shadow puppet theatre, in which gamelan plays an integral part) and *klenengan* (gamelan music played for enjoyment, either in conjunction with a social event or as a social event in itself). Like these forms of performance, as time is stretched... includes both serious and whimsical elements. The sequence in which these elements are presented resembles both the course of *klenengan* as a whole – with more contemplative pieces first, and lighter pieces later – and the course of the long extended suites within *klenengan* which may last as long as an hour. It also attempts to strike a balance between being open to the larger environment in which it takes place and creating a sense of environment which you the audience are invited to enter. My interest in this idea derives equally from experimental music, and the ideas of John Cage in particular, and Javanese performance situations. The use of pre-recorded elements, the interplay between these and instrumental elements, and the setting of instruments throughout the space – the primary sense in which the piece is an installation – are all intended to encourage a different relationship to the presentation than would a more conventional concert format. I encourage you to move throughout the space, and if you like, to come and go. The piece may be experienced either as a whole, or in part.

### Irama – Stretching Time

*as time is stretched...* is in large part an exploration of ideas deriving from several years of involvement with *karawitan* – the music of Javanese gamelan. I have been particularly interested in how this music can shape one's experience of time. Questions of time in *karawitan* inevitably bring up the concept of *irama*. *Irama* is usually understood as the relationship between tempo and the ratio between different levels of pulsation within the stratified texture of gamelan. Changes of tempo involve certain parts – the various sizes of hanging and cradled gongs which mark out cyclical structures and the single octave metallophones which play the relatively abstract melodic line referred to as *balungan* – slowing or quickening continuously, while other parts – those instruments which play simple elaborations of the *balungan*, and the *panerusan*, the instruments which contribute to the melodic flow through a continuous stream of patterns – slow or quicken to a certain point and then double or halve. A certain degree of consistency in the surface level of density is thus maintained, while the overall cycle and underlying melodic sequence expands or contracts.

This aspect of *irama* is indeed central, and is a distinguishing feature of Javanese gamelan music. But *irama* is more than the simple mechanics of how many strokes of the *peking* (the smallest of the thick-keyed metallophones) fall between each stroke of the *balungan*. Shifts in *irama* also involve the transformation of melodic substance, with a general tendency towards elongation. There are many pieces where the *balungan* starts out as a fluid melodic line, immediately slows to a more stately measured pace, and then later is stretched even further to the point that it becomes more structural,

marking important points in the overall melodic flow of the piece like the small grunts of agreement that punctuate conversation\*. At the same time as the *balungan* is stretched and transformed, cyclical structures are expanded, becoming less readily apparent. These changes affect the overall musical texture, and are frequently enforced by shifts in instrumentation or playing style, such as the switch from the sparse strokes of *kendhang ageng* (the largest drum) to the dense rippling patterns of *kendhang ciblon*.

That changes in *irama* are gradual is also significant, distinguishing it from otherwise similar processes of expansion such as *thaw* in Thai music. The transformation of the *balungan* from melodic line to structure is seamless, and is itself a feature of the music as much as melody or rhythmic pattern. The gradual nature of changes in *irama* – which can last over half a minute – gives rise to large temporal shapes, contributing as much to the extended sense of time as the large cyclical structures for which Javanese gamelan is renowned.

*as time is stretched...* focuses on these other aspects of *irama*. There is only one section – **circular** – where a typical change of *irama* occurs – a basic cycle articulated by *kethuk* and *kenong* is subdivided and filled in by *kemanak* (four rather than the usual pair). The tempo slows at the outset (as is typical of most gamelan pieces), and the *kemanak* double their subdivision. After that, however, only the *kenong/kethuk* cycle remains constant, while the *kemanak* devolve into individual cycles of varying length. A similar process occurs in **Monggang Manisan** – based in part on the sole surviving piece in the

repertoire of the archaic *gamelan Monggang*. But again, what starts out as a cohesive structure becomes more diffuse. Both this section and circular isolate and emphasize a particular aspect of *irama* – the shift from a more focused texture, with a clear sense of periodicity, or even *ostinato*, to more diffuse texture where the sense of cyclicity is less pronounced.

The various sections called stretch explore expansion on a more microscopic level. They are all (except the last one) based on the same simple pitch sequence, set in different textures making use of the spatial distribution of instruments, and each involve expansion (and in the case of the last contraction) through repetition of small sections of the larger sequence – not unlike the way in which *cengkok* (melodic patterns on which the parts of the *panerusan* are built) are expanded to last twice as long. The radically reduced texture, however, has more in common with archaic gamelan forms such as *Monggang* and *Kodok Ngorek*. In both texture and technique, stretch has perhaps as much in common with the variation of limited material in the music of Morton Feldman.

The sparse texture of stretch serves to maintain some sense of melodic continuity despite the extreme stretching of material. While in many situations, changes in *irama* transform a melodic line to a sequence of sparse structural tones linked by the melodies of other parts, in other situations a melody is stretched, but kept intact. This aspect of *irama* is treated more directly in **The Isle of Coconuts Beckons** (the pre-recorded tune combined with **Monggang Manisan**) and **why birds**. Here, processes of expansion and contraction are applied to what may more readily be recognized as melody. In the case of the first, a recording of the song *Rayuan Pulau Kelapa* (discussed further below) is stretched using digital sound processing software (Soundhack). In **why birds**, a certain Burt Bacharach tune (two of the other three words in the first line – the source of the title – are "do" and "suddenly") is set in a texture similar to that of **stretch (diffuse canon)**. Over the course of the piece, repetitions of small segments of the arranged melody are reduced until the tune verges on recognizability.

**dribble** (where glass bottles are filled with water) and **slide** (three rebab playing slow glissandi) focus on extended gestures analogous to the gradualness of changes in *irama*.

### Other Themes

*as time is stretched...* incorporates other themes besides the effect music can have on one's sense of time. A simple theme is that of water sounds, whether the bottles being filled in **dribble**, the steady-state but constantly fluctuating recording **trickle**, or the more sparse recording drip (which functions similarly to the sparse strokes of *kendhang* through much of the performance). Other recorded elements evoke the soundscape of Java, both acoustic and electroacoustic. **goods and edibles** is a collage built from a recording of street vendors in Bandung. **tweet** starts out with the ambience of the birds that fly around inside the *pendapa* (a large open-walled marble-floored pavilion) of the Mangkunegaran palace in Surakarta – an ambience which accompanies daytime performances of gamelan. Gradually this is taken over by a collage built from commercial Indonesian cassettes of birdsong. (Whole cassettes are dedicated to single birds, often pointing out on the cover that the bird

\*Marc Perlman, "Unplayed Melodies: Music Theory in Postcolonial Java." Ph.D. Dissertation, Wesleyan University, 1993. Page 297.

in question is a prizewinner at competitions.) **The Isle of Coconuts Beckons** is an approximate translation of *Rayuan Pulau Kelapa*, a song by the Indonesian composer Ismail Marzuki. (*Rayuan* translates as either persuasion or flattery, wooing; *pulau* is island, and *kelapa* is coconut. The exoticist connotations of my rendering are deliberate, in keeping with the suggestion by Yogyakarta resident Eyang Kendro that maybe Marzuki's intention was to recreate songs heard on "Hawaii Calls" – a program from the beach of Waikiki broadcast on Voice of America during the Japanese occupation of Indonesia – in "the Netherland Indies way" (personal communication via e-mail, April 25, 2001). ) The recording uses the particular rendition aired before the National news on Radio Republik Indonesia (which emanates from the mobile van in the middle of the the monthly evening live broadcasts from the Mangkunegaran, wafting through the resonant *pendapa*). Other than time-stretching and some editing, the recording is unaltered – the delicious tension between the sweetness of the tune and its horrendously distorted realization is straight from the original, a dub of which I obtained directly from the RRI station in Surakarta. The time-stretching serves to expose the detail contained within – not unlike what happens as gamelan pieces expand, allowing the panerusan to play more elaborately.

The pairing of the somewhat sentimental *Rayuan Pulau Kelapa* with the austere *gendhing Monggang* may seem somewhat bizarre, but such pairings are not without precedent. Another archaic gamelan piece, *Kodok Ngorek*, is paired with other pieces played on either *gender* or *balungan* instruments. At royal weddings, it is often played simulataneously with other ensembles, including a small European style marching band playing the wedding march from Wagner's *Lohengrin*. (Pak Sumarsam arranged to have the two pieces played together in a more coordinated fashion at his daughter's wedding reception.) But unlike this example, in which the two pieces are coordinated rhythmically but are melodically independent, **Monggang Manisan** alters the basic pattern to conform to the tonal implications of *Rayuan Pulau Kelapa*. The *Manisan* in the title is a qualifier, playing on the use of *manis* (sweet) in titles of traditional gendhing (as in *Gandrung Manis*, as distinct from *Gandrung Mangun Kung* or *Gandrung Mangu*). The suffix *-an* changes the word into sweets, ie. candy, in acknowledgment of the somewhat sacharin quality of this version of *Monggang* and its tonal implications.

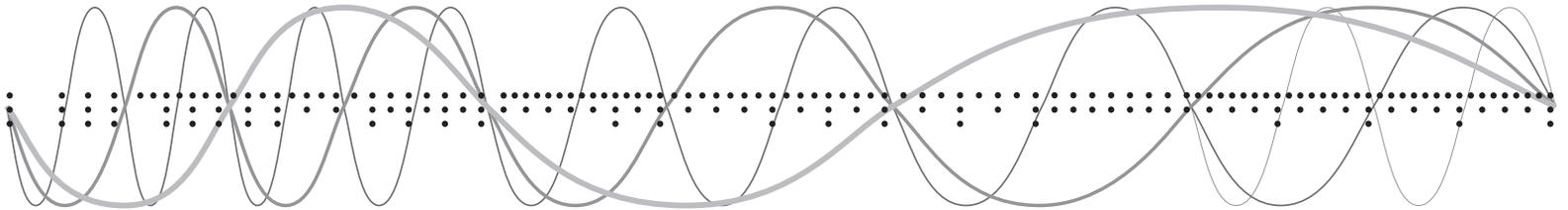
– Chris Miller

### Performers:

Daniele Anastasion, Rees Archibald, Sasha Bogdanowitsch, Josph Getter, David Hanlon, Alec McLane, Brian McKenna, Chris Miller, Ryuko Mizutani, Mike Peluse, Shawn Onsgard, Daniel Raimi, Sarah-Jane Ripa, Shana Smulyan, Julie Strand

### Thanks to:

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