

PART II

RHYTHMIC STRUCTURE

Introduction

Making and Breaking Rhythmic Structure

The word, RHYTHM, as used in everyday language and also in science usually refers to some kind of periodicity--a series of events that recur at regular time intervals. We speak, for instance, of the rhythm of the seasons or of day and night; the rhythm of breathing, of the heartbeat, or walking; the rhythm (period) of a pendulum or of the vibrations of a string.

Rhythm as a musical term has a much broader meaning; it is used to refer to the many different ways in which TIME is organized in music. Indeed, since all music moves continuously through time, its structure is uniquely dependent on the means composers develop to regulate, articulate, group, constrain, and confound the passing of musical time. In turn, the temporal structuring of music is probably the aspect to which we respond most viscerally and most directly.

The term *rhythm* is used by musicians to refer to periodic structures like those mentioned above, but rhythm also applies to aspects of temporal organization that are not easily heard as a simple recurrence of events at regular time intervals. For example, the relative time-spans of motives (as in TUNEBLOCKS) and the relative time-spans of larger entities such as phrases, generate structural rhythms and these may or may not be periodic in their relationships. Or we speak of harmonic rhythm referring to the rates at which chords change in an accompaniment. And on a more detailed level, there is the "rhythm-of-a-tune"--the particular and usually varied durations of notes in a melody. For instance, try clapping just the rhythm of "Hot Cross Buns" or "Oh Susanna."

But of all the ways in which musical time is structured, the most fundamental and the one that is shared by the musics of most cultures including our own, is the presence of an underlying beat or pulse. The term, "beat," refers to that aspect of music which marks off time into regularly recurring units. To mark a pulse or to "keep a beat" seems to be an ability we are all born with--for instance the new born baby's rhythmic sucking or rhythmic rocking. This innate ability may be the

earliest sign of our capacity to segment continuous phenomena (especially the flow of time) and as such it is thought to be the beginnings of our abilities to construct units and to measure.

Indeed, it is in relation to this regularly recurring beat that all the other dimensions of rhythm are felt and heard. The beat serves most specifically as the temporal unit in relation to which we measure varied durations of a melody or rhythm. But there is a paradox, here: unlike other units of measure (an inch, an hour, a pound) which remain fixed, outside, and uninfluenced by the material matter that is being measured, a beat is continuously being re-generated as a piece is performed. Relations among events internal to each piece of music generate this and the beat also serves as the unit for measuring these events which create it.

This paradox raises a number of intriguing questions which you will be exploring in Part II. For example, while most everyone can feel the beat generated by a piece, it is not so obvious just what kinds of relations among performed events function to generate this beat. Moreover, we will want to ask, what are the interactions between the piece and the performer of that piece with respect to the underlying beat? Does the performer follow a beat or create a beat as he or she goes along? And what are the relationships between these underlying, invariant temporal units and the boundaries of melodic motives (figures), phrases, and sections that you have been listening to and working with in Part I?

Metric Hierarchies

In your work on Projects 1.1 and 1.2, you found that tunes generate multiple structural levels or what we called structural hierarchies. These hierarchies we represented as tree structures where smaller structural elements (figures/tuneblocks), grouped together to form larger structural elements (phrases), and these grouped together to form still larger structural elements (sections). Similarly, most of the melodies that we hear everyday generate metric hierarchies.

Both structural hierarchies and metric hierarchies are actually generated by the relations among performed events. However there are significant differences between them. The elements of structural hierarchies--figures, phrases, sections, are the particular musical gestures of a melody--those that we follow from one goal of motion to the next. The elements of metric hierarchies are

the regularly recurring time units we call beats; the proportional relations among rates of beats at each level determine the metric hierarchy of a piece.

We might compare figures and phrases to the elegant and varied figures/shapes that form both details and large design in Leonardo di Vinci's anatomical drawings. The time units (beats) that form the metric hierarchy might be compared to the spatial units that Leonardo sometimes used as a grid to measure and guide the relations among the shapes he drew.

(Pictures, here: Leonardo face with grid and without)

Just as Leonardo's grid marked off proportional relations in space, so metric hierarchies mark off proportional relations in time. But there is also an important difference between Leonardo's spatial grid and the temporal metric of music. While the spatial grid is given before hand, the temporal grid is not; rather, as suggested earlier, a temporal grid is generated by the relations among pitch/time events as a piece unfolds. Moreover, in looking at Leonardo's drawings, we can ignore the spatial grid; it may be part of the anatomy of Leonardo's drawing process, but it is certainly not generated by Leonardo's unique spatial gestures through which he forms figures and shapes. In contrast, temporal grids in music are generated by the unique sound gestures of a composition and they are continuously regenerated by the musical relations the composer has created.

This process of regenerating time units creates the underlying temporal framework of a piece against which particular temporal relations are heard to conform or to conflict. Thus, unlike Leonardo's grid which remains static, always the same and unaffected by what is drawn in relation to it, the metric hierarchy is a regenerating, living constituent of the piece as it moves through time.

Another interesting paradox emerges here: While time is continuous in its essence, our experience of organized time is dependent on the boundaries that segment this continuousness. On one hand, the flow of time is marked off into discrete, invariant units--the metric dimension of temporal structure; and on the other, the continuous flow of musical time is marked off by the arrivals and departures of figures and phrases.

The Projects

In your work with melodic figures (especially "editing" the given tuneblocks in Project 1.2 to make them conform to your intuitive preferences), you learned that both pitch and duration contribute to "shaping" figures and to the coherence of melodies of which they are a part. Working on the projects in PART II, you will focus primarily on varied durations played by non-pitch percussion instruments. In Project 2.1 you will play and play with the structure and function of metric hierarchies. In Project 2.2, you will use Impromptu and the synthesizer's percussion instruments to reconstruct the metric hierarchies that you hear in familiar tunes. Once built, these temporal frameworks will become the basis for composing more interesting and varied percussion accompaniments. Project 2.3 and 2.4 will involve you in composing your own, original percussion pieces.

The large goal of these projects is to help you appreciate the many ways in which composers play with temporal frameworks to create exciting complexity and surprise. The specific, smaller goal of each task is to give you more intimate experience with the musical means that create this rhythmic interest and surprise.

Project 2.1 focuses on helping you notice and make explicit your very basic sense of "keeping time"--of moving along with the beat of a piece. In turn, this project will help you hear and play metric hierarchies--the several layers of beats that are going on simultaneously.

The metric hierarchy is certainly not something you ordinarily listen to by itself, separate from compositions that are generating these structures. But the hierarchy, often "running in the background," serves as a critical organizing frame not only for a melody, but also for events in all other parts of the texture. Indeed, once established by the events in a composition, this frame creates expectations for continuation while deviations from the metric frame are noticed as surprising.

But you can't be surprised unless you have expectations, and it is to establish expectations that metric frameworks are all about. A composition in which the framework is established but never "attacked" is like a mystery story that is boring because you can predict every move. Once the

metric framework is established in a composition, then there is a potential for surprise as conflict is introduced in relation to that "norm." This is like a mystery story where the author builds a firm structure of expectations and then introduces that brilliant twist carrying you off in a direction that you could never have anticipated.

It would be a mistake to think that all music generates a beat or groupings of beats. Indeed, composers can use the presence or absence of a beat as a means for creating contrasting feelings and also different structural functions. Further, in the musics of other cultures, the organization of time is often quite different from what we take for granted as "making sense." It is useful to listen to some examples of music that is organized differently from ours with respect to temporal structure. By moving away from what we know best and then looking back, we can often discover what it is we know so well.

So before beginning your work on actually building meter, listen to some examples of music in which time is organized in differing ways.

LISTENING EXAMPLES

BEAT, METER, RHYTHM

Example 2.1: *Bhimpalasi* (sitar played by Ravi Shankar)

Example 2.2 Hindemith, *Kleine Kammermusik*, fourth movement 1922

Example 2.3: Billie Holiday, *Fine and Mellow* 1939

Example 2.4 Sousa, *Stars and Stripes Forever* 1888

Example 2.5 Lanner, *Styrian Dances* 1840

Each of these examples comes from a different place and a different musical culture. It is not surprising, then, that in each piece, time is also organized quite differently.. Listen particularly for the beat and the different role it plays in organizing the music. For instance, do you immediately feel the presence of a beat, does it appear gradually, or is a beat entirely absent?

Bhimpalasi, a piece from India, begins with a free improvisatory feeling. Ravi Shankar, playing the sitar, is accompanied by the tamboura, a stringed instrument that is "plucked" continuously so

as to make a drone. As the piece goes on, the two performers are joined by a third playing an Indian drum called a tabla. Listen for the change in sound when the tabla comes in. Can you hear the increasingly strong presence of a beat? How would you describe the difference in feeling between the opening part and the later continuation of the excerpt?

*Kleine Kammermusik*¹ was composed by Hindemith for five wind instruments: flute, oboe, clarinet, horn, and bassoon.

[Insert picture of wind quintet]

As you listen, notice the alternation between passages where all the instruments are playing together in rhythmic unison (same rhythm, different pitches), and solo sections where each player, in turn, is given a chance to show off his instrument. What creates the difference in feeling between the unison sections, on one hand, and the solo sections, on the other? How do these contrasts relate to the presence or absence of a beat?

There is no question about the presence of a strong beat in *Fine and Mellow*. But notice how Billie Holiday plays with, almost teases this underlying pulse. While she moves elegantly around and against the bass player's ever present beat, she always comes out just right at the end of phrases and sections. This is an example of a beat providing a strong framework within which an artist performer can be free to wander but is never lost.

In fact, performers of all kinds of music rarely play a mechanically exact beat such as we hear in computer generated music. Rather, performers "bend" the beat, subtly stretching or contracting it so as to animate the motion towards goals and to emphasize the arrival at boundaries of structural events. Indeed, this flexibility makes the difference between what we call a "musical" performance in contrast to a "mechanical" performance.

Lanner's dance represents popular music of another time and place--the Vienna coffeehouse in the late 19th century. Again there is a clear and present beat, but if you listen closely, you will hear that these performers are also "bending" the beat. They are doing so in a quite different way from Billie Holiday but one that is typical of the performance of Viennese waltzes. As you listen,

¹*Kleine Kammermusik* (German) "A Little Chamber Music."

make a little experiment: Move with the beat that you feel (clap or tap along). Then listen again and make an equally steady but slower beat and then an equally steady but faster beat. What are the relations among these three rates of beats? How could you find out?

The Sousa march brings you to music that is probably most familiar. Listening to it after your experience with music of other cultures and different times, how would you describe what is so "comfortable" about the organization of time in this march? There is no question about the presence of a beat. But what else is going on? Move along with the beat just as you did with the Lanner dance. Then listen again and clap a slower beat; and, as you listen once more, clap an equally steady but faster beat. Are the relations among the beats the same as in the Lanner Dance?

The internal relations among these beats, which you can feel and follow, make up the metric hierarchies of the two pieces.. The structure of metric hierarchies is the topic of Projects 2.1 and 2.2. We will return to the differences between the metric hierarchies of the waltz and the march after you have completed Project 2.1.