## *Review-Essay and Response*

# Hasty's Dichotomy

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### 1. INTRODUCTION: TAKING TIME SERIOUSLY

When music theorists muddle through issues of rhythm, meter, duration, grouping, tempo, phrasing, and the like, we often forget that we are also meddling with broader issues of time, motion, temporal continuity, and temporal experience. Christopher Hasty does not forget, and in *Meter as Rhythm* (Oxford: Oxford University Press, 1997) he explicitly aims to "take time seriously," following the exhortation of Alfred North Whitehead (ix). And take it seriously he does, for if nothing else, *Meter as Rhythm* is the most philosophically informed treatise on musical rhythm published since Zuckerkandl's *Sound and Symbol.*[1] While Hasty is careful to claim that "an attempt to ground this theory of musical meter in a general theory of time or process, while clearly desirable, would far exceed the bounds of this study" (ibid.), his work comes close to achieving just that in many respects.

Perhaps because of his desire to take time seriously, Hasty asks some very good questions. What accounts for the *qualitative* differences between duple and triple meter that give them their distinct expressive characters? What accounts for the *metric* difference between measures that include anacruses and those that do not? And most importantly: If rhythm and meter consist of fundamentally different musical objects—durational patterns in the case of rhythm, time-point hierarchies in the case of meter—how is it possible to speak of their interaction and conflict? This last question is of fundamental significance for Hasty, and in response to it he grasps the nettle. He rejects the categorical separation between rhythm and meter, between rhythmic versus metric accent, between time-span versus time-point hierarchies. The central claim of *Meter as Rhythm* is just that: that meter is a particular kind of rhythmic structure. Or as Hasty might say, all rhythm involves durational and projectional processes, of which meter is a particular kind of projection.

From the outset, let me say that while I both admire and appreciate Hasty's argument, I also think that it is fundamentally wrong. I will argue below that putting rhythm and meter back together creates more problems than it solves. More importantly, I think it is possible to maintain their separation while acknowledging and incorporating many of Hasty's points regarding the "objectification" of meter. In part I think Hasty comes to his position on the ontology of rhythm and meter from certain philosophical sources, in which case my disagreement is not with Hasty but with them (mainly Whitehead). I also think Hasty comes to his position out of a desire to extend the concept of meter as widely as possible, to both pre- and (especially) post-tonal musics.

A complete account and response to all the topics and ideas discussed in *Meter as Rhythm* would require a book in its own right. I will therefore of necessity pass over many parts of Hasty's book, including his chapters on eighteenth-, nineteenth-, and twentieth-century discussions of meter (which include valuable critiques of the work of Friedrich Neumann, Fritz Kuba, and Thrasybulos Georgiades, theorists who have unfortunately been neglected in most English-language discussions of rhythm and meter), his observations on the historical origin of the rhythm-meter separation and historical precedents for his own theory, his approach to the question of hypermeter, his detailed analyses of various seventeenth- and twentieth-century musical examples, and (last but not least) his brilliant critique of the concept of moment form. Instead, I focus in this essay on the central tenets and claims of Hasty's theory of meter-as-projective-process. First, I present a brief introduction to the philosophical background informing

[1]Viktor Zuckerkandl, *Sound and Symbol: Music and the External World* (New York: Pantheon Books, 1956).

Hasty's theory, engaging basic concepts of duration, succession, being and becoming, and the metaphysics of temporal processes. I then give an overview of Hasty's theory with running commentary, including his approach to durations and durational succession, projective processes, metrical types, and metrical accent. Some music-theoretic and philosophical disagreements and criticisms then follow. Lastly, I attempt to situate his work in its particular intellectual and musical contexts.

## 2. SOME PHILOSOPHICAL BACKGROUND

### *2.1 Zeno's Dichotomy*

Zeno of Elea (fifth century BCE) is famous for his four paradoxes of time and motion, as they illustrate and problematize some of our basic assumptions regarding the nature of time and space.[2] Actually, there are two pairs of paradoxes, as the "arrow" and "stadium" paradoxes assume that space and time are made of discrete indivisible units, while the "Achilles" and "dichotomy" paradoxes assume that space and time are infinitely divisible. The dichotomy is perhaps the most famous, as it is the simplest of Zeno's posers. If I wish to get up from my desk and leave my office I must get to the door. But before I can get to the door, I must first get halfway to the door. Assuming I can do that, I must then cover half of the remaining distance, and then half of that, and so on, and so on. No matter how many halves I traverse, there is always another half before I reach the door. It is the problem of an infinite series that approaches a limit: 1/2 + 1/4 + 1/8 + 1/16. . . . One cannot use ordinary arithmetic to add an infinite number of terms, and even if one uses a mathematical theory of limits, while that may allow me to get arbitrarily close to the door (as I approach the limit of 1 for the series), it does not allow me actually to reach the door. For in order to get to the door I still have to do an infinite number of things.[3] One can circumvent this problem by noting that I do not have to use the infinite series as a measure of the distance from my chair to the door. I can simply say the distance is 1, and traverse it.

The real problem is not a problem of measure, however, but one of order: in order to move from my chair (point A) to the door (point B), I must first move to an intervening point in space (point C). But before I can reach C, I must first move to a point between A and C, and so on, and so on. If time and space are infinitely divisible, then there is no next/adjacent point in space to which I can move (and in the temporal domain, no next instant in which I might do it). The only way out of this paradox is to deny that time and space are infinitely divisible—this gets us out of the dichotomy, but into one of Zeno's other paradoxes.

### *2.2 Duration and Change*

Zeno's dichotomy remains plangent in discussions of temporal and spatial location and extension, for it shows that while the mathematical continuum (i.e., lines of space or spans of time comprised of an infinite set of points) is an interesting concept, if I am really able to get up and exit my office it cannot be part of the real world or our experience of it. Thus, as Henri Bergson has argued, if we are to talk of real time and real space we must ground our theoretical conceptions of them upon our experience of durations and distances, experiences in which extensionless points of time or space play no part.[4]

[2]For many helpful and illuminating discussions of Zeno, Bergson, Whitehead, and their theories of time and motion I wish to thank my colleague David Sipfle. Much of the following discussion relies on Sipfle's "The Sciences and Other Humanities: Zeno's Paradoxes and Human Freedom," a convocation lecture given at Carleton College, 1 May 1998.

[3]To put a finer point on it, it is not that it will take an infinite amount of time to do this infinite number of things, as one might first suppose. If it takes me half a minute to get halfway to the door, then 1/4 of a minute to go the next quarter, and so on, if I could finish, it would take exactly one minute. But since this is an infinite series, I am trapped within the span of a never-quite-completed duration.

[4]Henri Bergson, *Matter and Memory* (New York: Macmillan, 1946).

Central to Bergson's philosophy of time is the experience of duration (*la durée real*). Influenced by William James and by phenomenologists such as Husserl, Bergson stipulates that the awareness of duration requires that I am aware of something-as-present while also remembering it as immediately past, a past that is nonetheless distinct from the present. To achieve this separation requires change; I must experience novelty in the present moment as well as continuity with the past. Such novelty may be merely the memory that there was a preceding moment; it may be proprioceptive awareness of changes within our physical and/or cognitive selves; or it may be awareness of changes in our environment relative to the enduring object or process (such as an ongoing musical tone). Susanne Langer, strongly influenced by Bergson, speaks of the direct experience of time as "passage, or the sense of transience."[5] She notes that "The phenomena that fill time are *tensions*—physical, emotional, or intellectual. Time exists for us because we undergo tensions and their resolutions. Their peculiar building up, and their ways of breaking or diminishing or merging into longer and greater tensions, make for a vast variety of temporal forms."[6] For Langer, passage is the temporal canvas of and through which works of music are created and experienced.

### *2.3 Being and Becoming*

Langer's discussion of duration leads naturally to the distinction between *being* versus *becoming,* the Bermuda triangle of many a discussion of time and temporality. These two terms make the most sense when applied to material objects that endure in the world. One can speak of the creation of such objects (the forging of a sword, the assembly of a watch, the gestation of a baby), that is, the process through which they *become* complete or finished objects. Once created they have continued existence in the world (a sword, a watch, a person). Of course, one may apply these terms in a nuanced fashion: once born a baby exists (i.e., has the property of being a person), but as a child we may then say that children are persons in the process of becoming an adult. Moreover, there is a reasonably clear demarcation between being and non-being: the sword may rust away, the watch may fall and break, a person grows old and dies. When the notions of being and becoming are applied to non-material entities, events, or processes the result can be confusing, to say the least. While people and swords exist, events or processes happen or occur. As Vere Chappell has aptly noted:

> It follows that there is a crucial difference between happening and becoming in the proper sense and also between objects or things and events. For the being or existence of a thing is distinct from its becoming, but the "being" of an event just is its occurrence or happening, so that in the case of events "being" and "becoming" coincide.[7]

Chappell's account clears up many of the problems which attend to descriptions of temporal processes and our experience of them. Indeed, his remarks occur in the context of a critique of Whitehead's theory of temporal becoming. I will return to Chappell's challenge in Section 4, but at present we must turn to Whitehead's theory of time.

### *2.4 Whitehead's Temporal Metaphysics*

Two of the most central concepts in Whitehead's theory of time are *concrescence* and *actual entities.*[8] For Whitehead, like Bergson, the world is in an ongoing state of becoming as it endures through time. Given this premise, for things to have an independent existence in the world they must be separated from the stream of becoming in a coherent fashion. This separation occurs through of the process of *concrescence,* which is "divisible into an

[5]Susanne Langer, *Feeling and Form* (New York: Scribners, 1953), 112.
[6]Ibid., 112–13.

[7]Vere C. Chappell, "Whitehead's Theory of Becoming," *Journal of Philosophy* 58/19 (1961): 516–28 [523].

[8]Whitehead's philosophical writings are notoriously dense and obscure. The following quotations and discussions are taken from Donald Sherburne's *A Key to Whitehead's Process and Reality* (New York: MacMillan, 1966), in which Sherburne reorganizes Whitehead's text and provides clarifying commentary.

initial stage of many feelings, and a succession of subsequent phases of more complex feelings integrating the earlier simpler feelings, up to the satisfaction which is one complex unity of feeling."[9] These "complex unities of feeling" are *actual entities,* beings which have precipitated out of becoming. Whitehead goes on to note that "an actual entity is a process in the course of which many operations with incomplete subjective unity terminate in a completed unity of operation, termed the 'satisfaction.' "[10] Thus actual entities themselves are also processes, but processes that have achieved enough of a sense of unity or closure to have become separated from other actual entities in the world. Finally, Whitehead observes that "an actual entity is at once the subject experiencing and the superject of its experiences. It is the subject-superject, and neither half of this description can for a moment be lost sight of."[11] Again, like Bergson, Whitehead grounds his theory of time in subjective experience (hence the remarks about "feelings" in his account of concrescence).

There is a danger here of infinite regress, and hence of getting trapped once again in Zeno's dichotomy (to paraphrase a famous philosophical remark, it would be "concrescence all the way down"). Whitehead is aware of this, as Chappell makes clear:

> Time (or becoming) "is not another continuous process [but] is an atomic succession." . . . This means that particular processes, particular stretches of time or becoming, cannot always be divided into divisible processes, for at some point the division will reach the atomic units of these processes, the units whose succession constitutes these processes. . . . The composite sort of process Whitehead calls macroscopic, or the "process of transition" the [atomic] unit sort he calls microscopic, or "the process of concrescence."[12]

The process of concrescence thus forms the microscopic actual entities that serve as the building blocks of reality and experience; concrescence provides the stepping stones from which one could escape Zeno's dichotomy. For as Chappell notes:

> A process of transition is a succession of processes of concrescence; the former process is discontinuous, because division of it will eventually yield its component processes of concrescence and these component processes are themselves indivisible. The process of transition is divisible, but not *in infinitum.*[13]

The problem, however, is how to achieve the transition from concrescence to concrescence. And for this Whitehead has an answer (which we will revisit later): actual entities are temporally extended, but their acts of becoming are not.

### *2.5 The Relevance of These Concepts for Hasty*

In framing his approach to rhythm and meter Hasty is acutely concerned with these philosophical perspectives on duration, motion, and the ontology and epistemology of temporal processes. The specific ways in which these concerns are cashed out in music-theoretic terms will be made clear in the following section, but we may note that more broadly:

1. In accepting a Bergsonian approach to time, temporal becoming—a continuous durational unfolding—must be the basic substrate for musical rhythm and meter. Thus Hasty often emphasizes the novelty and creativity inherent in rhythmic experience, including metric experience.

2. Hasty's approach to durations and measures has many parallels with Whitehead's concept of actual entities: determinate durations arise through something akin to Whitehead's process of concrescence. The "satisfaction" of a projective process is what gives rise to a mensurally determinate duration. Similarly, more complex rhythmic and metric structures are akin to Whitehead's macroscopic processes of transition.

3. Also in following Bergson and Whitehead, as temporal instants are not a feature of the real world or our experience of it, Hasty rejects the use of time points as elements in an account of rhythm or (especially) meter (see pp. 69–70).

[9]Ibid., 36.
[10]Ibid., 14.
[11]Ibid., 15.
[12]Chappell, "Whitehead's Theory of Becoming," 517.
[13]Ibid.

## 3. AN OVERVIEW OF HASTY'S THEORY OF RHYTHM AND METER

In this section the basic elements of Hasty's theory of meter as a projective process are presented, along with running observations and commentary. This overview must necessarily ignore a number of topics that Hasty examines in depth, including metrical re-interpretation and projective overlap, metric hiatus and the dissolution of meter, projection in complex (i.e., five-element) durational sequences, and the limits of metric projection *vis à vis* hypermeter.

### *3.1 Putting Rhythm and Meter Back Together Again*

We begin with Hasty's central claim that the opposition of meter and rhythm is overstated and misleading: "It is customary to view rhythm as a rich and fully sensuous embodiment of music's temporal progress and meter as rhythm's shadowy, schematic counterpart—abstract, mechanical, and devoid of any intrinsic expression" (viii). Elsewhere Hasty characterizes meter as the mechanical repetition of durational quantity. And so: "what is lost in this simplification is the specifically temporal character of repetition and therefore the claim of meter to be regarded as fully sensible and expressive" (ibid.). Hasty rightly notes that many analytical accounts of meter distill out a sense of motion and seek a "fixity of what can be grasped as order in abstraction" rather than "the fluidity of a felt order in experience" (3). In order to respect this "fluidity of felt order," Hasty moves from a general theory of durations (and our experience of them) to a more particular theory of durational succession that gives rise to meter. That is, any series of musical articulations that involves a durational projection is a kind of rhythm, and meter involves a distinctive type of durational projection. Note that it is not just that rhythm is prior to meter, but rather that meter is a subspecies of rhythm. This is how Hasty solves the problem of rhythm-meter interaction, for indeed, the notion of their "interaction" is an empty one. There is no interaction between these two parameters because they are one and the same.

### *3.2 Definite Durations*

To have a meter, one must have a series of durations, and the durations themselves must have beginnings. But beginnings are not time points (as independent objects in our temporal experience). Rather, beginnings are potentials for duration. With the onset of a tone we have a "feeling of growth, a feeling of continually new and expanding duration, and a feeling of potential for becoming" (72). The ensuing durations themselves may be more or less determinate: "Durational determinacy is when a completed duration is or can be involved in the becoming of another event, for example, by being compared to another duration"; and, "If durational determinacy is linked to the effect a duration has or can have on the formation of other events, we may speak of degrees or types of determinacy. . . . A specific sort of determinacy characterizes the durations we call metrical" (78). Hasty links determinacy not only to the articulation of a given note, but also to perceptual factors such as absolute length (i.e., very long durations are less likely to give rise to feelings of definite duration than shorter durations). While Hasty gives a few rough examples of determinate versus indeterminate durations, he unfortunately does not avail himself of the more nuanced psychological studies that show how durational judgments follow a modified form of Weber's law, studies that have uncovered the very shortest and the longest durations that can be involved in metric constructs, as well as studies of the different degrees of metric salience within this range.[14]

[14]Durational judgments are discussed by Lorraine G. Allan, "The Perception of Time, *Perception and Psychophysics* 26/5 (1979): 340–54; Andrea R. Halpern and Christopher J. Darwin, "Duration Discrimination in a Series of Rhythmic Events," *Perception and Psychophysics* 32/1 (1982): 86–89; and Ira J. Hirsh, Caroline B. Monohan, Ken W. Grant, and Punita G. Singh, "Studies in Auditory Timing: 1. Simple Patterns," *Perception and Psychophysics* 47/3 (1990): 215–26. For a summary of psychophysical data on the limits of durational sensitivity see David Butler, *The Musician's Guide to Perception and Cognition* (New York: Schirmer Books, 1992), 98–100. For a study of the relative sensitivity within this range, see Richard Parncutt, "A Perceptual Model of Pulse Salience and Metrical Accent in Musical Rhythms," *Music Perception* 11/4 (1994): 409–64.

*3.3 Meter as Projection*

Hasty's approach to meter may be summarized as "determinate durations in action." Example 1 shows his introductory example. In this diagram, lower case letters mark the onset and duration of tones, while upper case letters mark the beginning and duration of the interval from tone onset to tone onset. Q, Q′, and R (and their attendant arcs) mark various projections. The arcing arrows thus symbolize the "feeling of continually new and expanding duration, and a feeling of potential for becoming" noted above. The projective process in this example unfolds in the following manner. With the onset of b, A is defined as a determinate duration, and the projective potential Q becomes concretized. At this point, Q is *projective* of a following, equal duration, B. Q′ is *projected* in anticipation of a third event c/C, and this entire process involving Q and Q′ is the *projection* which involves projective and projected elements. If c/C occurs, then another projective duration, R, is formed. In this particular example, however, since c/C does not occur, R is denied and Q loses its mensural determinacy. Q′ is still present, for given Q, the span of Q′ is not dependent on any subsequent articulations. Indeed, Hasty goes into great detail (86–91) as to the effect of "early" and "late" onsets of c/C. Projection is thus a first-order Markov process, as the onset of each projection is dependent on the satisfaction of the projection immediately prior to it. As a result, mensural determinacy is a relatively fragile affair, as the absence of a few expected articulations can readily cause the collapse of the projective field.

Projection (with its projective and projected elements) is the essence of meter: "projection and meter are one" (91). From this definition of meter it follows that:

—Meter need not be continuous or contiguous.

—Meter does not necessarily involve a hierarchic organization of pulse streams; a simple iterative train of pulses is metric, and measures themselves involve important non-hierarchic features.

—Meter does not require accent.

All of these claims may seem counterintuitive. I discuss each of them, in turn, in the following sections (3.4, 3.5, 3.6).

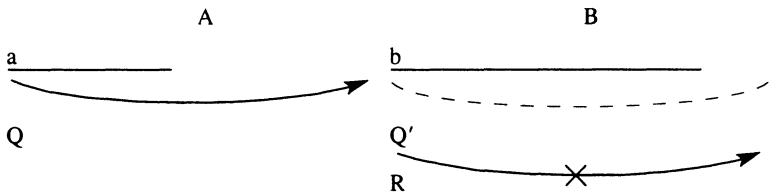
*3.4 Metrical Particularity and Metric Continuity*

Hasty's allowance for non-continuous and non-contiguous meters follows from his metric nominalism. He continually emphasizes the particularity and uniqueness of each metric experience. He argues against "the reification of the [metric] type or an identification of the type with a particular instance" and against the idea that "once '*the* meter is established' it can be thought to perpetuate itself, reproducing again and again groupings of equal beats. . . . The only contextual pressures that affect the measure as measure are those that would alter the metrical type and thus subvert its perpetuation" (148). Thus rather than a few basic types, Hasty suggests that while there is some practical use in describing meters according to type, in the reality of our experience there are an infinite number of metric possibilities. For "the rhythmic particularity of a bar will be inseparable from its metrical particularity. And each measure or metrical unit could be viewed as a *unique* [italics mine] projective situation in which uniqueness or particularity arises both from the measure's internal constitution and from its assimilation of prior events" (149). Thus any series of events (i.e., three or more) that frames a determinate duration and hence spawns a projective process may be regarded as metric. Indeed, there are few durational sequences that would *not* be metric under such a view.

Hasty's emphasis on the particularity of meter lumps all metric experience together (in that all experiences are different). However, as others have noted, there are essential differences between the experience of meter when a piece begins—when the listener must discover if a regular pattern is present, and if so, how that pattern is organized—versus the experience of meter in an established rhythmic context (i.e., pattern maintenance).[15] Hasty's

[15]The differences between initial versus ongoing metric contexts have been discussed by Fred Lerdahl and Ray Jackendoff, *A Generative Theory of Tonal*

Example 1. Processive representation of projection in the actualization of potentials Q and Q′ (Hasty's Example 7.2, 85)




analyses, most of which only involve a few durations, can be readily be understood as fine-grained explanations of metric recognition. Hasty does not include more extensive metric contexts in the exposition of his theory.[16]

While it is clear that Hasty feels that metric determinations are context-sensitive, this does not stem from his recognition of any fundamental difference between initial and ongoing metric contexts. Rather, it derives from his general notion that every metric context is the unique product of the cumulative effect(s) of the previous measures (or lack thereof). This explains why Hasty does not require that meter be continuous and/or contiguous. For if one is always in the position of discovering and establishing the projective pattern for the next measure, then it does not matter if successive "measures" are contiguous and continuous. But if one admits that our metric experiences in established versus initial metric contexts are of different orders, this then presupposes that metric contexts typically involve continuous and contiguous processes.[17]

### *3.5 Complex Projective Patterns and Metrical Hierarchies*

The projective pattern in Example 1 involves a series of isochronous durations. As such, it is a stream of projections that inhabit a single level of metric structure. Hasty of course acknowledges that in many, if not most contexts, metric projection involves more than one level of projective potentials; indeed, his treatment of metric hierarchies is one of the more significant contributions of the book. Example 2 shows his diagrams of two possibilities for projection within a $\frac{4}{4}$ measure. Hasty uses two additional analytic symbols in these diagrams, a vertical line (|) to indicate a metric beginning, and a backward slash (\) to indicate a continuation. In these examples it is because Q and R do not become fully realized as mensurally determinate durations that their

*Music* (Cambridge, Mass.: MIT Press, 1983); Joel Lester, *The Rhythms of Tonal Music* (Carbondale: Southern Illinois University Press, 1986); Mari Riess-Jones and Marilyn Boltz, "Dynamic Attending and Responses to Time," *Psychological Review* 96/3 (1989): 459–91; and Justin London, "Loud Rests and Other Strange Metric Phenomena, or Meter as Heard," *Music Theory Online* 0/2 (1993).

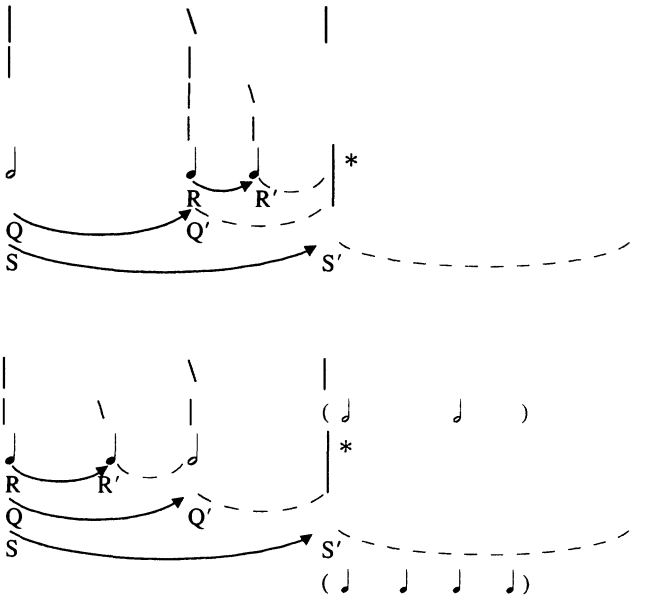
[16]He does consider more extended metric contexts in subsequent analyses, most especially and obviously in his discussion of hypermeter (183–209). Nonetheless, his basic theoretical and analytical categories are developed within the context of a single measure or two.

[17]Another consideration may be Hasty's commitment to the analytic tradition ("analytic" here in its philosophical sense), wherein one begins with elementary examples and/or principles and then builds larger and more complex cases. In many respects this is Hasty's approach to rhythm: he begins with simple cases of two durations, then three and four durations, and so forth. From these short examples he builds his general theory of rhythm and meter. The analytic method, then, may be a reason why Hasty does not regard discontinuous and continuous musical rhythms as categorically different, since "analytically speaking" the former are building blocks for the latter.

beginnings function as continuations, rather than metric beginnings in their own right. The initiating event of the measure (i.e., a downbeat) begins a number of projective potentials, including one for the measure as a whole (S). Other events within the measure do not usurp S's sense of beginning, but serve as continuations of its projective potential. Hasty's approach to meter is thus explicitly non-recursive: events on a single level of meter are not all alike. Hasty makes this plain: "In example 9.5 [excerpted here as Example 2] several projections are indicated. . . . Can continuations [Q on the half-note level, and R on the quarter-note level] engender projective potentials that are independent of the dominant projective potential? Strictly speaking, the answer is no" (108, and hence the dotted lines with respect to Q′ and R′).[18]

In this way Hasty addresses a question that few theorists have confronted, namely, what is it that binds the elements of a measure together? While time-point hierarchies, such as those proposed by Komar, Yeston, or Lerdahl and Jackendoff, account for the *differences* among various metric events (usually in terms of hierarchically based accents), they do not explain how such differentiation leads to the formation of a metric unit.[19] In Hasty's theory, it is the level of the measure which informs the structuring of subordinate events: the measure establishes a complex projective field. The motion from beat to beat within the measure is fundamentally different from the motion from downbeat to downbeat. Hasty acknowledges that there is at least in part a perceptual basis

Example 2. Projective Boundaries (Hasty's Examples 9.5a and 9.5d, 109)




for this difference, as he claims that "in general, larger durations are potentials for action and smaller durations are opportunities for gaining accuracy in prediction" (110).[20]

Hasty rightly notes that there are important rhythmic and metric differences between the two diagrams in Example 2—these rhythms have very different perceptual attributes ("qualia" in

[18]In the first diagram of Example 2 there is a hierarchic detail that needs clarification. In this diagram it seems clear that R–R′ with respect to Q′ is analogous to Q–Q′ with respect to S—namely, that both projections R′ and Q′ falter as determinate durations because they are subsumed by the dominant projective field S. But if this is so, how is it possible for Hasty to speak of a hierarchically nested projection? The | and \ symbols over the R–R′ projections make sense only if Q′ itself is a mensurally determinate projection, but the dominance of S would seem to forestall this possibility.

[19]Arthur Komar, *Theory of Suspensions* (Princeton: Princeton University Press, 1971); Maury Yeston, *The Stratification of Musical Rhythm* (New Haven: Yale University Press, 1976); Lerdahl and Jackendoff, *A Generative Theory of Tonal Music*.

[20]This observation is supported by the research of L. H. Shaffer ("Rhythm and Timing in Skill," *Psychological Review* 89/2 [1982]: 109–22) and L. H. Shaffer, Eric Clarke, et al. ("Metre and Rhythm in Piano Playing," *Cognition* 20/1 [1985]: 61–77), who describe a regular pattern of covariance between large versus small durations in piano performance.

philosophical parlance). In particular, he notes that patterns such as those in the first diagram are likely to engender a sense of $\frac{4}{4}$ while those in the second are likely to educe $\frac{2}{4}$. Hasty brings this qualitative sensitivity to other aspects of metric construction. He distinguishes between two types of continuations, those that are *arsic* (flowing from the metric beginning), marked with the backward slash (\), versus those that are *anacrustic,* marked with a forward slash (/). Hasty's distinctions here have obvious parallels with Berry's categories of *initiative, conclusive, reactive,* and *anticipative* metric impulses.[21] In other approaches one finds an acknowledgment of the congruence versus non-congruence of metric and rhythmic units, but Hasty's claim here is that non-congruent rhythmic groups (that is, anacrustic patterns) are *metrically different* from those rhythms whose boundaries align with the measure.[22] The different kinds of metric continuations (arsic versus anacrustic) that Hasty discusses may occur in both duple and triple meters, giving them each different projective potentials and hence different metric experiences for the listener.

Hasty also discusses the qualitative differences between duple and triple meters themselves, making a distinction between equal versus unequal metric types. It follows from Hasty's basic account of projection that duple patternings are privileged: "The difficulties presented by triple meter arise from a privileging of *Paarigkeit.* Such a privileging is, I think, justified, but not on the grounds of metrical unity composed of weak and strong beats. From the standpoint of projection there is a privileging of immediate succession, and immediate succession can involve only two terms" (103). That is, a determinate duration most strongly and immediately impinges on the following duration, such that the projective and projected durations join in a projective process. This cements their relationship into a rhythmic unit of a higher order. Consider a series of three articulations which forms two isochronous durations. The third articulation does two things: it not only defines the projective potential from the second to the third articulation; it also confirms the projective potential from the first to the second. A fourth articulation, if then added, stands in the same relation to the second and third, but not the first. Given this inherent binary bias, triple meters must involve another metric element, what Hasty terms *deferral* (notated with a dash plus a backward slash: —\).

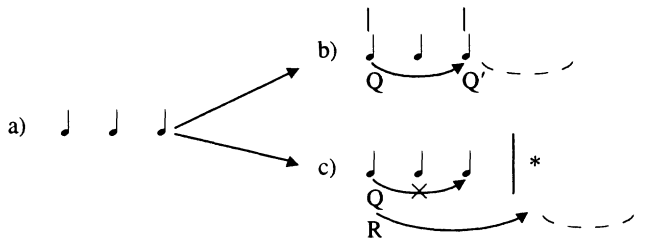
Example 3a consists of three even quarter notes (which represent three even beats). In 3b we see the normative interpretation: the onset of the third note concretizes a larger projective potential Q (and is projected as Q′). In order to form a measure of $\frac{3}{4}$, this concretization must be overridden, as in Example 3c. According to Hasty, this deferral results in "a postponement of a decision that would create a definite *projective* potential from Q to R (or a yield of Q to R's projective claim), . . . a deferral of *projective* potential. But this is only one aspect of the deferral, and cannot in itself account for the phenomenon of triple meter. The other aspect of deferral directly involves not the expansion of projective potential, but the expansion of a projection . . . the deferral of *projected* potential" (133). Thus deferral affects both sides of the projective equation. In deferring not just the projective potential of Q, we have a different determinate duration. As a result, if we hear triple meter, we do not first hear duple meter (Example 3b) and then a change from duple to triple (Example 3c). This seems quite true: triple meter is not duple meter manqué.

On the other hand, one could just as readily argue that deferral is operative in both duple and triple meters, and hence one does not need separate categories of continuation versus deferral. For in a duple meter the "weak beat" articulation must, just as in the case of a triple meter, act as a continuation of the dominant projective process that moves from downbeat to downbeat. It is always possible the "next articulation" which follows a beat can itself be the beginning of a projective process—in other words,

[21]Wallace Berry, *Structural Functions in Music* (Englewood Cliffs, N.J.: Prentice Hall, 1976).

[22]For discussions of rhythmic/metric non-congruence see, for example, Grosvenor Cooper and Leonard B. Meyer, *The Rhythmic Structure of Music* (Chicago: University of Chicago Press, 1960), and Lerdahl and Jackendoff, *A Generative Theory of Tonal Music.*

Example 3. Projective decisions for equal and unequal measure (Hasty's Examples 9.18d, 9.18e, and 9.18f, 132)




another downbeat. Hasty's need for a separate mechanism of deferral (as opposed to just continuation) stems from his initial commitment to *Paarigkeit.* But if one speaks of all subordinate projective processes in terms of deferral (or continuation—take your pick), one can avoid having to posit a special process for triple meters. The qualitative difference between duple and triple meters may be the distinction between a simple (one-place) deferral versus a compound (two-place) deferral.

### *3.6 Meter Without Accent*

Perhaps the most challenging aspect of Hasty's theory is his contention that accentual differentiation is not a necessary condition for meter: "Since projection has been described without invoking the distinction between strong and weak beats, the equation of projection and meter carries the implication that the existence of meter precedes or is not necessarily dependent upon this distinction" (103). This does not mean that there are not differences between successive beats, and that the terms "accented" and "unaccented" carry no meaning in describing, at least in part, those differences. But as Hasty explains: "Such marked beats are the products of meter and, as products, can be effectively used to describe metrical phenomena. . . . but such products cannot be understood as independent entities or things that can exist apart from an evolution that continually creates new relevancies" (106). Thus while there may be continuations and/or deferrals within a projective process, these are not "unaccented" relative to the initial beginning of the process; Hasty rejects the atomistic approach to meter and metric continuity. Beginnings, continuations, and deferrals are interdependent elements in the creation of the metric field. It is also clear from Hasty's account of projection and accent that projection is a sense which flows from recently past and current events to future events. Not just a sense of *when* something is going to happen, but also *what* (see, for example, his discussion of the "inheritance of projective complexity," 149–51).

A different approach to projection is that it consists not in expectancies for durational events, but rather for the *locations* of event onsets. If some of these locations may be more or less salient than others—more or less "marked for consciousness," to use Cooper and Meyer's vague but nonetheless useful term, then a sense of accent may stem from the listener's projective behavior regarding the relative salience of successive temporal locations, rather than particular patterns of temporal durations. But this leads us to more substantive disagreements with Hasty's approach to meter, and that is the subject of the following section.

## 4. SOME DISAGREEMENTS AND CRITICISMS

### *4.1 Determinate Durations and Expressive Variations*

Like many theorists, Hasty begins his account of meter with the speculative examination of a series of isochronous durations. However, recent studies have documented what musicians have long known: that regular durations are almost never isochronous in live performance, but subject to what has been termed "expressive variation," a complex time-course function which gives rhythmic and metric definition to a passage.[23] These variations are

[23]See, for example, Eric Clarke, "Structure and Expression in Rhythmic Performance," in *Music Structure and Cognition,* ed. Peter Howell, Ian Cross,

systematic, stable (and hence replicated in different performances), and manifested hierarchically.[24] Moreover, Bruno Repp has shown that listener expectations embody similar patterns of expressive variation: our perceptual background for an "even" measure of $\frac{4}{4}$ involves a pattern of longer and shorter durational expectations.[25] Thus metric projection does not involve the simple replication of a definite duration, as such replication is never present in actual performance. Performance and perceptual studies also make clear that playing and listening metrically is a skilled behavior—we *learn* to engage in these contextually appropriate metric behaviors. Learned behaviors play a minimal role in Hasty's theory (see his comments contra "meter as habit," 168–74).

*4.2 The Binding of Rhythm and Meter*

Hasty's central claim is that meter is a subspecies of rhythm. While I believe Hasty is correct when he argues that meter cannot be an "object" comprised of extensionless time-points, I would claim, as have others, that meter is not an object, but a kind of listener behavior. As Robert Gjerdingen has aptly put it, meter is a "mode of attending."[26] Meter and rhythm remain separate and separable aspects of musical structure.[27] On this view meter involves a very general and very basic perceptual ability, the ability to *entrain* or *attune* our attention to temporally invariant aspects of our environment.[28] Entrainment is the regularized ebb and flow of attention over time. Local peaks of awareness/expectation within our continuous attending mark particular locations in time; those peaks are what we experience as beats and downbeats. Metric listening is therefore a habit of attending, a skilled behavior that we develop through musical enculturation (and sometimes structured learning) which engages our innate proclivity for entrainment in the particular context of music.[29] It is not a passive habit, but an active mode of perception. To be sure, metric attend-

and Robert West, (London: Academic Press, 1985), 209–36; Eric Clarke, "The Perception of Expressive Timing in Music," *Psychological Research* 51/1 (1989): 2–9; Alf Gabrielsson, "The Perception and Performance of Musical Rhythm," in *Music, Mind, and Brain*, ed. Manfred Clynes (New York: Plenum Press, 1982), 159–69; Alf Gabrielsson, "The Complexities of Rhythm," in *Psychology and Music: The Understanding of Melody and Rhythm*, ed. Thomas J. Tighe and W. Jay Dowling (Hillsdale, N.Y.: Lawrence Erlbaum, 1993), 93–120; and Bruno Repp, "Probing the Cognitive Representation of Musical Time: Structural Constraints on the Perception of Timing Perturbations," *Cognition* 44/3 (1992): 241–81.

[24]Manfred Clynes and Janice Walker, "Music As Time's Measure," *Music Perception* 4/1 (1986): 85–120.

[25]Bruno Repp, "Detectability of Duration and Intensity Increments in Melody Tones: A Partial Connection Between Music Perception and Performance," *Perception and Psychophysics* 57/8 (1995): 1217–32.

[26]Robert Gjerdingen, "Meter as a Mode of Attending: A Network Simulation of Attentional Rhythmicity in Music," *Intégral* 3 (1989): 67–91.

[27]To be clear, "musical structure" here means musical sounds as heard and understood by a listener. This view presupposes that musical sounds *qua* music are constituted not only in their sonic production but also and equally through the listener's perception and cognition of them as such.

[28]See, for example, Mari Riess-Jones "Time, Our Lost Dimension: Toward a New Theory of Perception, Attention, and Memory," *Psychological Review* 83/5 (1976): 323–55; Paul Fraisse, "A Historical Approach to Rhythm," in *Action and Perception in Rhythm and Music*, ed. Alf Gabrielsson (Stockholm: Royal Swedish Academy of Music, 1987), 7–18; Jones and Boltz, "Dynamic Attending and Responses to Time"; and Caroline Palmer and Carol Krumhansl, "Mental Representations for Musical Meter," *Journal of Experimental Psychology: Human Perception and Performance* 16/4 (1990): 728–41.

[29]As a skilled behavior, metric entraintment may be in many ways analogous to what we do in recognizing words and faces, that is, a cognitive faculty or "module" of the sort described by Jerry Fodor in *Modularity of Mind* (Cambridge, Mass.: MIT Press, 1983). A Fodorian "meter module" would be speficic to the auditory domain, fast and mandatory in its operation, isolated from higher levels of cognition (i.e., thinking about meter does not change one's metric perceptions), have a conceptually "shallow" output, and so forth. For further discussion of Fodorian modules and their relevance to musical understanding see Mark Debellis's *Music and Conceptualization* (Cambridge: Cambridge University Press, 1995).

ing (as a form of entrainment) has its "feedforward" aspects, and these accord nicely with Hasty's characterization of projection. If meter is regarded as a species of entrainment, then the rhythm-versus-meter distinction is precisely that between the durational structure of a musical pattern (or other temporal stimulus) versus the attending behavior of the listener. This is a useful and important distinction, one that is lost when meter is collapsed back into rhythm. While it is true that some rhythmic patterns engender metric behaviors while others do not, this does not make meter itself a subspecies of rhythm. The difficulty lies in that our knowledge of regular rhythmic patterns requires our regularized attention to them, often with a seamless fusion of percept and perception. While meter and rhythm remain ontologically separate, they are epistemically mixed categories of musical structure.

How then do rhythm and meter interact? There are at least two alternatives to Hasty's view. One is that if rhythm inheres in the structure of actual durations, while meter inheres in our attentional expectations, then their interaction occurs on cognitive ground (a fairly low-level cognitive ground, to be sure): rhythm and meter meet in the play between the events (and their durations) we expect versus those that we get. This is very close to Hasty's own view, save that for him instead of actual durations one has perceived projections and projective potentials. A second possibility is that meter and rhythm remain in separate cognitive domains: meter involves anticipatory attending, while rhythm involves durational perception and knowledge. But there are two durational patterns to be dealt with: one created by the performer and one created by the listener, for *the listener's metric behavior itself generates a rhythm.* In listening we therefore compare the rhythms we internally generate (from our metric entrainment) with those rhythms in our external environment. In this sense Hasty's title is apt, for meter *does* have a sense as a rhythm—there is a rhythmic product to metric behavior. This is of course the opposite of Hasty's claim, namely, that in certain cases there is a metric product to rhythmic processes.

*4.3 Temporal Locations and Definite Durations*

In his emphasis on the temporal nature of rhythm, Hasty repeatedly decries theories and analyses of meter which reify dynamic processes into static patterns. Hasty clearly favors a tensed rather than a tenseless account of music. While Hasty eschews the tenseless mode, it should be pointed out that both are philosophically legitimate; in philosophical circles the arguments are whether one is prior to the other, how they might be commensurable (or not), and so on. For temporal processes qua processes have a structure to them, whose elements may be described in either a tenseless or a tensed fashion. While I concur with Hasty that our experience of musical processes is in essence a tensed one, it does not mean that tenseless accounts necessarily distort or misrepresent those processes. This is expressly the case when it is the replicable aspects of that process—the temporally invariant features of our environment—that the tenseless description aims to capture.

What then of "locations in time?" While an extensionless "time point" may be of no use in creating extended temporal durations, it is not necessarily meaningless when applied to locations within a temporally extended process. "When" an event happens is separable from the event itself. Hasty, as a proper student of Whitehead, denies this claim (see 69–71). For "if to be a beginning requires becoming" (and Hasty most assuredly feels that it does) then "beginning cannot be said to be instantaneous, and beginning cannot be said to precede duration. Only when there *is* duration, and not before there is duration, is there a beginning *of* duration" (70). Let us return to Chappell's critique of Whitehead, mentioned in section 2 above, which I now quote at some length:

> An event or occasion is said to exist from time t0 to time t1 because an act of becoming, the act whereby it comes into being, occurs at t0. But what does it mean to say that an event or occasion comes into being? *Things* come to be, but events *occur* or *happen.* Yet the products of acts of microscopic becoming [i.e., Whitehead's concrescences] *are* events or

occasions according to Whitehead, and are not things or objects. What Whitehead must mean, therefore, when he says that actual occasions become, is just that they happen; or at any rate he must allow that what "becoming" signifies, when used of actual occasions, is no different from what we should ordinarily call "happening." Substituting "happening" for "becoming," then, the above conclusion reads: an actual occasion exists from t0 to t1 because it happens at t0; the occasion, which is temporally extended, begins at the time of its happening. . . . But how does an event differ from its happening, or how does its existence do so? The answer is that it differs not at all. An event is not one thing and its happening another. . . . An event, in short, *is* its happening; to be an event and to happen are one and the same.[30]

In all but one crucial respect, Chappell's claim of events-consisting-in-their-happenings accords well with Hasty's account of musical beginnings: sounds and silences are events, and as such they consist in their happenings. The crucial difference is with respect to the listener's frame of reference for those events. For Chappell notes that "the occasion, which is temporally extended, *begins at the time of its happening*" [italics mine]. I take "at the time of its happening" to mean that the event begins at some more-or-less temporally determinate location. But Hasty would seem to deny the possibility of determinate temporal locations, in that he claims that in attending to durations we are wholly focused on the durations themselves: "There will be no reason to coordinate this event [i.e., a note onset] with a clock or with a spatial representation. If this is an actual event that we are attending to, the only coordination we could speak of would be the coordination of our attention with the event that we are attending to, and such an act of attention cannot itself be durationless" (71). Hasty's principal aim here is to include the beginning of an event within the span of the presentness of that event. But in so doing, he seems to have made any sense of the temporal location for the onset of a musical event hopelessly opaque. In focusing on the duration/event itself, we have a growing awareness of its occurrence, then a robust sense of its presence, and then, once it is finished, an emergent sense of it having become past. But on this view we have no clear sense as to when the event began or ended, only that it did so.

And if the locations for temporal beginnings are logically or perceptually indeterminate, then how can one speak of definite durations, and the mensurally projective processes upon which they depend? Strict adherence to the "no time points" perspective would seem to prove fatal for Hasty's theory. Perhaps, however, one can make a useful distinction regarding the listener's possible frame(s) of reference. For both Hasty and Whitehead, the precise perception of a temporal location is usually a retrospective affair —the product of an observer who awaits but does not anticipate future events (e.g., "until there is an actual sound . . . that follows a prior and independent instant, this point cannot, in fact, be a beginning," 70). From such a frame of reference temporal locations for event onsets will necessarily be indeterminate—it is Zeno's dichotomy all the way down. Yet in the case of the listener who actively anticipates future events at certain locations—that is to say, a listener who is metrically entrained—temporal locations are not dependent on such retrospective discovery procedures. In this context, actual events function to a significant degree as *confirmations* for temporal locations that are known prospectively, rather than as locations that can only be known in retrospect.[31]

## 5. HASTY'S DICHOTOMIES

### *5.1 How Many Kinds of Meter?*

Zeno's dichotomy is but one of his four paradoxes, yet at a deeper level Zeno's "real dichotomy"—the antinomy that his paradoxes illustrate so well—is that between discontinuous versus continuous models of time and space. Hasty too has his dichotomies. On one level, Hasty's greatest concern is the di-

[30]Chappell, "Whitehead's Theory of Becoming," 522–23.

[31]Metric locations for the robustly entrained listener are not dependent on actual durations for their continued presence—see, for example, London, "Loud Rests and Other Strange Metric Phenomena."

chotomy between rhythm and meter, between the dynamic versus the static in musical structure and analysis:

> Meter, which, as the ordered articulation of 'time's flow' seems the most purely temporal of music's components, and which can be felt as one of the most active, energetic, and palpably *rhythmic* of musical properties, can, nevertheless, be treated as a static grid or container for the real motions created by tones and harmonies (59).

Hasty's solution, like Bergson's, is to cast his lot with continuity —hence the ontological priority he gives to rhythm, and his subsequent claim that meter is but a particular kind of projective process.

But over the course of *Meter as Rhythm* Hasty also stakes out another dichotomy: the opposition between meter-as-reducible-to-a-few-mechanical-types versus his view of meter as infinitely particular and hence irreducible. In large part Hasty's metric nominalism is defined by its opposition to the idea that there are only a few possible "grids" or "containers" for the manifold kinds of rhythmic motion we find in music. I propose a middle course. While I feel that Hasty's claims of metric particularity are overstated, I agree that meter is more variegated than traditional taxonomies suggest. There is more to meter than just duple versus triple beat patterns and simple versus compound subdivision. Meters may be distinguished by the number of levels present above and/or below the beat, hence relatively thick versus relatively thin meters. There are those meters where all levels consist of more or less even durations versus those which involve categorically different durations on the same level (so called additive meters). Meters may be distinguished by the degree of continuity on some levels, as in those with continuous subdivision versus those without. Given these manifold varieties of meter, the meter of a piece may (and usually does) shift many times over the course of a piece, even if there is no obvious change of time signature or shift of barline. And if meter consists of a complex, hierarchic set of temporal expectancies, one may even distinguish meters by style and genre. For example, the particular timing patterns for a Mozart minuet and a Strauss waltz may differ enough so that they may be regarded as metrically distinct, even though both are notated in simple triple time and with the same tempo marking. The metric manifold that I propose aims to capture Hasty's insight that meter is far more variegated than the traditional taxonomy allows. It stops short, however, of claiming that every metric structure and/or experience is unique. For performers learn to be metrically consistent, and listeners expect such consistency, a "sense of time" that is apropos for the given style, genre, and piece. Given that we can and do make judgments as to whether the performance of a particular passage is rhythmically appropriate (or not), it would seem that the basis for such judgments would be a stable, long-term, and highly particularized knowledge of metric types.

### *5.2 Aesthetic Considerations*

Hasty is keenly interested in music from outside of the common-practice-period canon, especially contemporary music, and in freeing metric theory from historical bias:

> Modern studies of meter have generally been restricted to eighteenth- and nineteenth-century practices and have developed theories of meter based upon notions of regularity observed from these practices. I have argued, however, that even in "Classical Style" the appearance of metrical regularity or homogeneity is largely the result of abstraction. Since from a projective standpoint, meter is characterized by novelty rather than by repetition of the same, styles that feature a high degree of ambiguity and severely limited mensural determinacy must be regarded as no less metrical than styles in which we can observe the "rule" of a single mensural type (237).

While I would agree that the operative features of meter are universal, and can arise in any stylistic or cultural context, in the Western tradition they are especially robust in tonal music because of the use of periodic phrase structure and continuous homophonic textures. The metricity of classical music is a contingent rather than a necessary feature, an effect more than a cause.

This does not mean, however, that the meter we hear in this music is "an abstraction"—the metric behaviors this music engenders are very real. Nor is it wrong-headed for theorists to ground their models for rhythm and meter in those contexts that are most likely and most strongly to elicit such behaviors. If Hasty's approach asks, in part, what it might be like to "unlearn" our metric habits, in much twentieth-century music this learning is moot anyway. Rather, Hasty's interest in extending meter to these other repertoires (and even in some ways centering it in those repertoires) may stem from considerations of aesthetic value.

Early on, Hasty notes that being rhythmic is an aesthetic virtue: "it would make no sense to say that a performance is too rhythmic" (5). Since, following Hasty's central claim, meter is a kind of rhythm, therefore to be metric is one of the ways one can be more rhythmic (though to be metric in a mechanical and unfeeling way is to be avoided—see p. 5). One may cautiously draw the following inferences from Hasty's presentation. If something is projective it is metric (to a greater or lessor degree). Almost all durational sequences involve projection (to a greater or lessor degree). Therefore, almost all durational sequences—almost all music, in other words—involves some degree of meter or metric potential. And if that is the case, then if a musical passage is without meter, in Hasty's view it is practically without rhythm. For Hasty to admit that large portions of the twentieth-century canon have little or no meter would be to devalue a repertoire that he obviously knows and loves. Hence these pieces are "no less metrical" than Bach or Brahms. Indeed, these pieces often take center stage in Hasty's discussion of metric theory, in spite of the special difficulties they contain with respect to continuity of beat and subdivision, contiguity of durational patterns, lack of regular phrase structure, and so forth (e.g., using Wolpe's Piece in Two Parts for Violin Alone for a discussion of the interaction between mensural projections and silences, 169–74). In short, these examples lack the kinds of temporal invariances that meter normatively is presumed to capture. In his desire to be metrically inclusive, Hasty illustrates his theory with the hardest of metrical cases. But to paraphrase an old legal saying, hard cases make bad theory.

### *5.3 Hasty's Challenge to Music Theory*

There is perhaps no higher praise one scholar can give another than to acknowledge that a particular scholarly work has changed one's own thinking in a fundamental way. Confronting Hasty's *Meter as Rhythm,* its provocative thesis and its many detailed arguments has caused me to do just that. Hasty's discussion of metric particularity was a catalyst for the "many kinds of meter" taxonomy proposed at the beginning of this section. Similarly, in confronting Hasty's argument regarding the interaction between rhythm and meter I came to realize that in listening metrically we also (and necessarily) generate a durational pattern. Even if one disagrees with Hasty's conclusions, his challenging and finely honed arguments will engender many reactions and responses from theorists, psychologists, and (one hopes) even philosophers concerned with the nature of time and knowledge. For the rich and pungent spice that *Meter as Rhythm* adds to the theoretical debate on rhythm and meter, we can only be thankful.