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Metrical Phase Shifts in Stravinsky's *The Rite of Spring*

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ABSTRACT: A metric model is proposed which incorporates different phases of a single meter. Metric irregularities are interpreted in this model as phase shifts. A phase-shift analysis of three problematic passages from Stravinsky's *The Rite of Spring* reveals a discourse of metric events not bound by sequence. Van den Toorn's concept of metric polarity is invoked although modified to explain the aesthetic impact of these shifts.

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I. Introduction

[1.1] Stravinsky embodied in *The Rite of Spring* an aesthetic experience so profound that it continues to stir us today. In listening to *The Rite* our attention is drawn to certain combinations of chords, melodies, and movements, which are satisfying in themselves, reshaping traditions of the past, infusing old forms with new spirit. Yet it is hard for us to empathize with the audience who attended *The Rite's* premiere. In 1913, there was little in the concert repertoire to soften its impact, to prepare the audience. Without the prior knowledge or experience necessary to give such music meaning, how could it have been understood? It is different for us today for we have the advantage of almost a hundred years experience from which to draw when contemplating *The Rite*. It is from here that we gain admission into its sound world and begin to understand the combinations which make this work unique.

[1.2] We can also see where earlier attempts to come to grips with Stravinsky's music might have gone astray. Without recourse to this fund of experience, theorists seeking to explain or justify the music inevitably turned toward models of the past to guide them. In the realm of rhythm and meter, this meant a periodic model of meter: a single, steady meter as manifest in the music of the tonal tradition. They were right in attributing periodicity to this model, for periodicity is an intrinsic quality of meter, but wrong in confining meter to a *single* course of projection.(1) This assumption forced Stravinsky's metric invention, full of unexpected twists, into a mould which didn't quite fit. As a result, these twists, or irregularities, were interpreted as deviations from the periodic model, a model whose one-dimensional implications were taken for granted. This view has persisted, and where old forms are used to interpret new expressions, aesthetic appreciation is apt to be misled.

[1.3] However, in recent research models have emerged in which meter is no longer bound to a single course. In "A Theory of Musical Meter" William Benjamin proposes that the phenomenon known as elision is counted on two overlapping meters of the same time signature.(2) Pieter van den Toorn suggests moreover that we hear the foreground irregularities of

Stravinsky's music in the context of a steady background meter.[3] Both authors reconcile cherished notions of periodicity with irregularity by extending meter beyond the confines of a single course. This is fitting, and it is to this cause that the current article is dedicated. The task at hand is to present a model of meter which takes into account the potential phases inherent within meter, and to explore a specific kind of metric interaction implicit in this system — phase shift. This model is based on the work of John Roeder, who uses pulse streams to illustrate concurrent meters in the works of Schoenberg and Bartok.[4] The phase-shift model is applied to a number of episodes from *The Rite of Spring* in which meter and the musical substance in general are governed by a *determinant motive*—any musical event central to metric projection. Metric irregularities often arise by way of the displacement of a determinant motive, either by varying the period at which it is repeated, or by altering some aspect of its configuration. But first we step back to look at some of the ideas which contribute to the fund from which we draw.

II. Background

[2.1] An issue that has long interested theorists is that of hypermetric irregularity, irregularity caused by uneven phrase lengths.[5] While most tonal works are periodic at the level of the measure, it is not unusual for such works to break periodicity at the level of the hypermeasure. In attempting to reconcile these breaks with periodicity, theorists have described several processes: two which have figured in the discussion of Stravinsky's music, extension and elision, are briefly considered here. An extension occurs when a hypermeasure exceeds its expected length, the expectation of which is established in the preceding measures.[6] Thus a cycle of four-bar phrases interrupted by a five-bar phrase forms a hypermetric irregularity by means of extension. The converse process, contraction, occurs when a hypermeasure is shorter than its expected length. The conclusion drawn is that the extension or contraction of a musical event triggers a corresponding alteration to the meter, effectively adding or deleting a beat from an otherwise steady meter. This is illustrated by enumerating the metric identities yielded by an extension: 1-2-3-4 1-2-3-4-5 1-2-3-4. Metric identity here denotes a number corresponding to the beat projected by an event, the succession of which reveals a pattern of such identities.[7]

[2.2] The problem with extension is that it is not, strictly speaking, metric. Adding or deleting beats from an otherwise steady meter compromises periodicity, an intrinsic quality of meter. This cut and paste process is more suitably applied to pitch phenomena, phrases, chords, melodies, and the like, whose extension may trigger an irregularity, but it does not follow that meter has been extended in the same way. What is altered, however, is the pattern of metric identity. Confusion arises when theorists, assuming a single meter is in force, read this pattern as the entire meter. The result is a perception of meter as a single, albeit varying course of projection. It can be tempting to view beats as extended or contracted, as long as we acknowledge that they are a surface projection of meter, an effect, rather than the source. Whether dealing with background hypermetric irregularities of tonal music or the more immediate foreground irregularities of twentieth-century music, extension is of little consequence in reconciling periodicity with irregularity.

[2.3] The second process, elision, involves two phrases which overlap so that the final measure of the first phrase is also the opening measure of the second phrase. The point of overlap between the two phrases has a dual metric identity. The upbeat of the first phrase, count 4, is also the downbeat of the second phrase, count 1, and is interpreted as both simultaneously. In order to reconcile the overlap with periodic meter, Benjamin put forward a model in which the two phrases are counted separately on two meters of the same hypermetric time signature (see **Example 1**).[8] The first phrase is counted in full from 1 to 4, as is the second, only the second phrase is counted alongside or parallel to the first phrase at the point of overlap. Described by Benjamin as 'a transformation of a (strictly) metric structure', it preserves the periodic model, but increases the number of meters used to accommodate the irregularity.[9]

III. Foreground Irregularities

[3.1] Conceptually the tools of extension and elision can be used to interpret foreground irregularities—those compelling metric disruptions in modern music which occur at the more immediate level of the beat and measure.[10] This would correspond to the commonly held view in which 'metric units are not of uniform length. Instead, they are of variable length, corresponding to expansions or contractions in melodic motives.'[11] These 'metric units of varying lengths' are delineated in the score by changing time signatures or by unevenly spaced accents within the framework of a steady meter. In either case, the meter perceived by the listener does not always correspond to the written time signature of the composer, and it is the perceived meter that is the focus of this discussion. The concept of 'varying metric units' is not the premise of any one author but seems to exist in the academic domain by way of default, in lieu of a reasonable alternative. Almost any treatise on modern music will include a discussion of meter along these lines. Needless to say, the idea of 'varying metric units' compromises the periodic model of meter and confines meter to a single, varying course of projection.

[3.2] This issue is taken up by Gretchen Horlacher in “Metric Irregularity in *Les Noces*: The Problem of Periodicity”.[(12)] While acknowledging the periodic nature of meter, Horlacher argues an alternative for Stravinsky’s music. The case is made through analysis, observing the manipulation of a determinant motive from *Les Noces* and the disruptive impact it has on periodicity. The motive appears at the outset in stable metric form, projecting a steady meter. However, this meter is subsequently challenged by an ‘untimely’ entry of the motive which is displaced from the established course. The displacement is made explicit by assigning metric identities to key events within the motive and tracing exactly where these identities contradict the established meter, a point not always evident in the composer’s score.

[3.3] This contradiction is illustrated in **Example 2** with a hypothetical motive X, whose four quarter notes (G B♭ F♯ A) project a $\frac{4}{4}$ meter. We assign each of these notes a 1-2-3-4 metric identity corresponding to the beat they project. The motive is repeated seven beats after the onset of the first entry, arriving on beat 4 of the established meter. In this repetition the motive’s 1-2-3-4 identity coincides with beats 4-1-2-3 of the steady meter; they no longer align. The question then is ‘Should one assign a new metric identity to a motive in order to continue counting periodically, or break the periodicity in order to preserve the motive’s metric identity?’[(13)]

[3.4] For Horlacher, metric identity is preserved. Irregularities occur with such persistence in Stravinsky’s music that listeners learn to admit breaks in periodicity without disrupting the flow of the meter. Periodicity is compromised in favor of a ‘stop and start meter, one full of interruptions, but still in force.’[(14)] The processes of contraction and elision, fashioned initially for hypermetric irregularity, are cited as the means with which foreground irregularities are accommodated.[(15)] This corresponds then to the commonly held view of irregularities as ‘metric units of varying lengths’, lengths determined here by the fixed metric identity of a motive and its displacement. As far as it critically examines the issues, the article is of lasting value, but what Horlacher describes as a ‘stop and start meter’ is an effect of the invention, not the source.

[3.5] It would be worth considering at this point why we choose to preserve a motive’s metric identity. When has the motive become so important in shaping meter? The motive governs metric projection not in deference to some new principle binding modern music, but simply in the absence of a single steady meter. In *The Rite of Spring* the orchestral forces seldom unite in the projection of a steady meter. Either different parts act in concert to project shifting metric patterns, or they act independently of each other, projecting different patterns at the same time. These alternatives are identified by van den Toorn as rhythmic/metric types I and II.[(16)] This situation is quite different from that of the tonal tradition whereby the different parts often unite in the projection of a single steady meter. In this case, where a suspension or syncopation in one part challenges the meter, the other parts more or less hold that meter in place; the metric disruptions are local and short lived.[(17)] But while we acknowledge periodicity as a quality of meter, a composer is no more bound to a *single* meter than to a single diatonic collection. Stravinsky shows no such commitment, and in the absence of a single steady meter, accents —provided most conspicuously by the motive—become central in metric projection. Metric identity is fixed not as a matter of course, but under conditions conducive to its retention. A motive, displaced from an established meter for which there is no support, retains metric identity. Thus, for Stravinsky, meter and motive are intimately linked.

[3.6] For Pieter van den Toorn issues of displacement and fixed metric identity point to the fact that the metric invention exceeds the confines of a single meter. Having observed a motive’s departure from an established meter by means of displacement, van den Toorn notes how successive displacements can effectively transfer the motive *back* to its original course.[(18)] The displacements which unhinged the motive in the first place eventually ‘cancel out’, placing the motive ‘on target’ with the meter established at the outset. At this point the motive’s metric identity and the initial meter realign. For van den Toorn, this suggests that the initial meter is in force throughout in the form of a steady background meter. At times this meter is explicitly projected by an ostinato or accompaniment figure, as in a number of movements from *The Soldier’s Tale*; otherwise it is projected at strategic points, as signaled by the departure and return of the motive, and maintained, perhaps internally, by the listener.[(19)] If motive X were to return to an established meter twelve beats after the onset of an initial statement, as illustrated in **Example 3**, it would effectively arrive ‘on target’ with the initial meter, lending substance to the notion of a steady background meter.

[3.7] In addition to the workings of this model, van den Toorn provides an aesthetic framework within which irregularities start to cohere. Foreground irregularities are neither arbitrary nor a game of chance: their imposition over a steady background meter creates a tension, a heightened presence. This is particularly true for conservative listeners, who ‘cling to an established regularity for as long as possible, and often with the consequence that the effect of conflict or disruption is all the more acutely felt.’[(20)] In this way the seemingly contradictory principles of periodicity and irregularity are brought together: the background periodic meter, established at the outset and reaffirmed at strategic points, acts as a foil to foreground irregularities. This state of conflict is defined as metric polarity, or 'rhythmic-metric-identity *polarities*' — polarities between a motive's metric identity and the steady background meter.(21) The concept is intriguing, and the implications of the departure and return of a motive to a single meter are not to be dismissed. But it is questionable whether a background meter remains in force throughout where it is not explicitly projected, and if it does, is it of sufficient strength to function as a pole against which foreground irregularities are perceived?(22)

IV. Phase-Shift Model

[4.1] Foreground irregularities are still not given their due. They are not the product of varying metric units or changing time signatures, nor are they necessarily perceived against a steady background meter. Irregularities arising from the displacement of a determinant motive are interpreted here as shifts in projection of a number of meters—parallel meters—whose time signatures are the *same*, but whose metric patterns are *out of phase*. Each of these meters is periodic in and of itself, and is identical to other parallel meters in all respects barring metrical alignment: their beats are synchronized, but their 1-2-3-4 counts are out of phase. They are in essence different phases of the same meter, and, while they coincide, they never merge. To illustrate, in $\frac{4}{4}$ there are four phases of the same meter whose quarter-note beats coincide. The model in **Example 4** depicts the four phases as parallel lines in graph form. The small bar lines mark the measures of each phase through which the out-of-phase alignment becomes apparent. The implicit 1-2-3-4 count is written in the first complete measure of each phase.

[4.2] Depicting the meters side by side does not suggest the simultaneous projection of all phases. If this were the case, every metric identity would sound at once, rendering the model useless for analytic purposes. Neither is it supposed that these meters have any existence independent of the music. Rather, they illustrate the *potential* phases of a meter within a given context. The phases are projected in accordance with motivic displacement and can be traced as follows: One of the meters is established at the outset by a determinant motive and to this motive we assign the metric identities 1, 2, 3, or 4, corresponding to the beats it projects. The established meter remains in force until such time that the motive is displaced so that its metric identity and the meter's 1-2-3-4 count no longer align. Despite the contradiction, metric identity is retained, forging a shift in projection from the established meter to an out-of-phase meter of the same time signature. The motive's metric identity serves to indicate which phase of meter is set in motion. This newly established meter remains in force until it too is contradicted, at which point it serves as a point of departure for the shift in projection, either back to the initial meter, or to another of the four phases. An irregularity then is the juncture at which the music shifts projection from one phase to another, and as interpreted in this model, is rightly regarded as a *phase shift*. If the irregularities caused by the displacement of motive X are interpreted as phase shifts, two of the four potential meters are drawn upon. These meters appear above the staff in **Example 5** and their projection is indicated in cue-size notation. That the motive departs from and returns to the meter established at the outset can be visually apprehended in the model; the first and third statements project the same phase of meter.

[4.3] To give credit where it is due, the model of out-of-phase meters is identical in principal to Roeder's pulse streams. Roeder prefers the term pulse stream over meter as it connotes the continuous flow of music's time. Roeder demonstrates how different streams of the same pulse—phases—can be activated by different strands within a contrapuntal texture. In his own words:

> 'Essentially the theory represents rhythmic polyphony as two or more concurrent "pulse streams" created by regularly recurring accents. These pulse streams are considered to be distinct continuities, not "levels" or groupings of each other, so this approach does not involve meter in the exclusive and hierarchical sense defined by the theorists just mentioned. Rather it analyzes an irregular surface as the sum of several concurrent regular continuities, much as a Fourier transform analyzes a complexly aperiodic sound as the sum of periodic sine waves.'(23)

There are minor differences in how the two models are presented and naturally the observations and conclusions regarding Stravinsky's music differ from those of Bartok and Schoenberg. Roeder links rhythmic process with the music's formal design, paying particular attention to how pulse streams interact within sections, how they articulate boundaries, and how they create continuity. The cues from which accents are drawn may or may not be motivically generated. The present work focuses on passages in which all voices act in concert to project shifting metric patterns. In this 'single-voice' texture only one phase is projected at any point and the phase shifts are allied with the action of a determinate motive. This work also explores the aesthetic rather than the formal implications of the model. It should be noted that an instance of a phase shift similar to that described here is given in Example 1 of Roeder's "Rhythmic Process and Form in Bartok's *Syncopation*."

[4.4] This model also shares certain similarities with that of Benjamin (see Example 1). Both employ different meters of the same time signature—phases—although Benjamin does not use this term. Here the model is extended to embrace all potential phases within a given passage. These meters are depicted side by side because irregularities occur with such persistence in Stravinsky's music that a number of meters can be brought into play over a short period. It is helpful to grasp these meters visually on the hypothetical model: it makes intelligible to the eye what is aurally perceived. Benjamin depicts meters parallel only at the point of overlap, the purpose of which is to demonstrate the dual metric identity of an event at that point. Overlap or dual metric identity does not figure prominently here because the phase shift is not the result of a dovetailing from one phrase or motive to another. In the absence of a steady course of projection, when a motive is displaced with nothing to counter it, its metric identity is retained. As a result, the projection of meter shifts forcibly from one phase to another without overlap, and so without reinterpretation or dual metric identity. Where dual metric identity occurs, it does so because there are conflicting metric cues, but this does not entail an overlap from one statement of the motive to another.

V. ***The Sacrificial Dance*** **I**

[5.1] To apply this model to Stravinsky, rehearsal numbers 149-60+2 of the *Sacrificial Dance* will be examined, a passage whose complex rhythmic surface veils a simple yet ingenious metric design.(24) The metric invention here derives from a determinant motive—a chord—and its alternating projection of two phases of meter (see **Example 6**. We can penetrate this invention for the most part by preserving metric identity. The chord, of a sixteenth-note duration, functions as a downbeat and is assigned a count 1 identity. Over an eighth-note pulse the chord projects a steady $\frac{2}{8}$ meter when repeated at quarter-note periods, a 1-2 succession. However, when the chord is repeated at eighth-note periods, fixed metric identity yields a 1-1 succession; the chord's count 1 identity falls on successive eighth-note beats. This downbeat succession forces a shift in projection from one phase of meter to the other. The irregularities, or phase shifts, come by way of eighth-note repetition of the chord at the expense of the $\frac{2}{8}$ meter, and the entire passage can be accommodated on two out-of-phase meters, whichever meter aligns with the downbeat identity of the chord at any point. For instance, at numbers 150+2-4 the varied repetition of the chord yields a 1-2 1-2 1-1-2 pattern of identities. The consecutive downbeats at number 150+4, 1-1, indicate a shift in phase.

[5.2] More intriguing, and problematic from an analytical viewpoint, is that the passage opens with a shift in phase. The first two statements of the chord appear in eighth-note succession and retaining metric identity yields two successive downbeats. The question here is whether it is possible to perceive a shift in phase before the $\frac{2}{8}$ meter has been established. That the first chord is perceived as a downbeat is self-evident as it begins the passage. In a conventional reading one might interpret the second chord as an upbeat in relation to the first. Note, however, the precision of the articulation, the exact repetition of the chord, and the absence of any other metric cues give weight to fixed metric identity. Under these conditions the second chord, rather than being heard as a continuation of the first, retains its downbeat identity; it resets the meter, shifting the phase and thus denying the opportunity for the first chord to realize a full measure.

[5.3] However, there is an exception to this fixed interpretation. When the chord is repeated three times in eighth-note succession, fixed metric identity yields a 1-1-1 pattern. A triple succession of downbeats departs from and returns to an established meter within a three-beat period. The listener is provided with conflicting metric cues, one drawn from fixed metric identity (1-1-1) and one drawn from sequent succession (1-2-1), and while we apprehend the shifts in phase, they 'cancel out'. The phase shifts, although still in evidence, are likely to be subsumed here by a single phase of meter. Example 6 provides a graphic analysis of the passage as interpreted on two phases of $\frac{2}{8}$ meter. The lower two staves give the piano reduction of the score (excluding the intermittent entries of solo instruments) whilst the upper two staves present the two phases of $\frac{2}{8}$ meter. The bracketed note at number 149+3 indicates the first instance of a triple succession of downbeats whose phase shifts are subsumed by a single meter.

[5.4] It is tempting to assign a principal status to one of the two phases. Such a hierarchy would enable us to treat one phase as *the* meter, and the other as a counter-meter or syncopation. However there is scant evidence for this interpretation. The action takes place more or less evenly over both phases: a total of forty four and forty beats are projected by the upper and lower phases respectively. We could also expect that if one phase were of principal status, then that phase would figure prominently at the outset. But the passage opens with a phase shift, an irregularity which is likely to 'throw' the listener rather than establish the dominance of a single phase. The music does favor the lower of the two phases between numbers 149-51, but then this preference is reversed from numbers 151-54. Towards the climax at number 161 the shifts become increasingly frequent, yielding four successive downbeats from number 158+2 and five downbeats from number 159. It is difficult to argue the dominance of a single phase in the midst of such agile invention. In fact, to do so, even if one were statistically evident, might be to miss the point.

[5.5] The graphic analysis constitutes a schema, by means of which the irregularities can be counted and shifts in projection traced. However, with this model something of the overall aesthetic also begins to emerge. At points of irregularity, where the projection of meter shifts from one phase to another, a kinetic impulse is issued not unlike that of syncopation, only more forceful, one wrought by a shift in phase. It is this impulse which imparts vigor to the invention. Now a number of terms could well describe this impulse: phase-shift accent, 'metrical dissonance',[25] but van den Toorn's 'metric polarity' is particularly apt. However, the concept of foreground/background polarity is modified here apropos of the present model. Remembering that each phase of meter is nothing less than an authentic meter in its own right, each of equal *potential*, it qualifies then as a pole, being self-contained by virtue of its periodicity, but standing in opposition to other meters by virtue of its out-of-phase alignment. A polarity occurs where projection shifts from one phase of meter to another. The two meters at this juncture are the two poles, the opposition of which is realized by the shift in projection *from* one pole *to* the next. It is during the course of the shift that the out-of-phase alignment of the two meters is exposed and a polarity occurs (see **Example 7**). The two poles then are not heard together but in succession, and thus they are linear in orientation. Once established, the new meter emerges as a point of departure for a further shift in projection to any of the other phases, not necessarily that established at the outset. In this interpretation polarity takes place entirely at the foreground level between different phases of the same meter. If all that is required to apprehend the shift is two meters—two poles—and neither of these need be that stated at the outset, then it follows that the apprehension of this phenomenon is not contingent upon a steady background meter.

[5.6] For van den Toorn the concept of polarity rests upon the background meter, established at the outset and reaffirmed at strategic points, in simultaneous opposition to the foreground irregularities, forming 'dual, concurrent meters'.[26] Pursuant to the present model, whereby the metric poles are heard in succession, to suggest that the initial meter remains in force after the juncture is to suggest overlap or uncertainty, which would weaken, rather than heighten the effect of displacement. To 'cling to an established regularity' would indicate that the shift had not forcibly occurred with the result that we are unconvinced of the new meter set in motion. Polarity in the *Sacrificial Dance*, or any of the other passage discussed here, is not a continuing state between two non-aligned meters, one implied, the other projected. Rather it is the fleeting, momentary experience of two self-contained but opposing forces brought into contact via the phase shift. When an established meter is maintained throughout by an ostinato or accompaniment figure, as in a number of movements from *The Soldier's Tale*, then there is room for talk of foreground/background, metric opposition. One should nevertheless recall that the simultaneous conflict between concurrent meters is closer in design to polymeter in which conflicting meters are heard simultaneously. With such conflict the poles are in vertical, not linear alignment.

VI. *Ritual of the Two Rival Tribes*

[6.1] In the *Ritual of the Two Rival Tribes* the action takes place entirely in the linear domain. At number 57+4 the determinant motive comprises two pitches, G♯ and F♯, heard in half-note succession a 'major-ninth' apart (**Example 8**). Together, these pitches project a 4/4 meter as written, and are assigned the metric identities 1-2 and 3-4 respectively. Note the rhythmic symmetry of the motive; it lends conviction to the projection of 4/4 meter. The motive is repeated immediately in the following bar, number 57+5, but altered in contradiction of the established meter. G♯ is shortened from half-note to quarter-note, and retains only count 1 of its metric identity. F♯ is thus displaced forward, arriving on the *second* beat of the bar, but retaining its 3-4 identity. The metric pattern yielded in this measure is 1-3-4, which places the irregularity on the second beat of the bar. At this point the early arrival of F♯'s 3 count forces a shift in phase. We experience this shift as a polarity, a kick, issued as the out-of-phase alignment of meters is exposed. In context of the two bars, the metric pattern is 1-2-3-4 1-3-4, with a distinctive shift from 1 to 3 in the second bar.

[6.2] Fixed metric identity proves invaluable here in identifying the 1-3-4 irregularity. Conventionally a three-beat succession would be read as a 3/4 measure. Indeed it is barred as such and it seems logical to prefer a sequential 1-2-3 count. But 1-2-3 and 1-3-4 do not represent the same events, though they span the same length. In context of the preceding 4/4 meter, a conventional 1-2-3 count represents an incomplete measure. The absence of beat 4 triggers the 'early' arrival of beat 1 in the following bar, effectively displacing that bar one beat forward. This would place the irregularity on the *fourth* beat, the beginning of the next bar, 1-2-3-4 1-2-3 1-2-3-4. The early arrival of F♯ then amounts to a syncopation. In contrast, 1-3-4 is not sequential. The absence of beat 2 triggers the 'early' arrival of beats 3 and 4, placing the irregularity on the *second* beat, much earlier than in a 1-2-3 reading. In this case the middle of the bar is displaced one beat forward and the following bar continues in line with its new course, 1-2-3-4 1-3-4 1-2-3-4. While this 1-3-4 pattern challenges traditional, or sequential, metric thinking, it reflects what the music actually does. The shortening of G♯ at number 57+5 has immediate impact, forcing the unexpected arrival of F♯ and breaking the symmetry which defined the meter at the outset. Even the orchestration, heavy brass, marks the 'early' arrival of F♯. If the disruption is felt on the second beat, then that is the point of irregularity, rendering a conventional 1-2-3 count unsustainable (see **Example 9**). The point is stressed not just because this 1-2-3-4 1-3-4 pattern challenges traditional thinking, but because its 1-3 shift is distinctive. This pattern is marked for distinction by Stravinsky who employed it towards the end of *The Rite of Spring* (see penultimate chapter) and throughout the fourth tableau of *The Wedding* (*Les Noces*).(27)

[6.3] The mechanics of this model have been demonstrated where a determinant motive is displaced from an established course. These displacements are wrought by varying the period at which the motive is repeated, as in the *Sacrificial Dance*, or by altering some aspect of its configuration, as in the *Ritual of the Two Rival Tribes*. However, the projection of out-of-phase meters is not limited to the action of a determinant motive. Any event which is able to project its metric identity convincingly enough to counter an established meter is able to force such a shift. This is precisely what the entry of the G♯ - F♯ motive does at number 57+4. Taking for granted the 4/4 meter established two bars earlier at number 57+2, the arrival of the G♯ - F♯ half-note succession seven beats later marks a shift in phase. G♯'s downbeat identity, count 1, arrives on the upbeat of the established meter, count 4. And while the G♯ - F♯ motive is still in 4/4, it is not the same phase in motion at number 57+2. That phase is disrupted by the 'early' arrival of G♯, whose downbeat identity signals a phase shift. A polarity is issued at this juncture as the alignment of the two phases is momentarily exposed. The graphic analysis is extended from numbers 57+2 to 58+6 in **Example 10** and a more complete picture of parallel meters emerges in which 3 phases are set in motion.

[6.4] It is curious that the composer should bar number 57+3 in 3/4, for the graphic analysis shows the music in this passage employing different phases of 4/4 meter. Why the 3/4 bar? Between the 4/4 bars at number 57+2 and 57+4 there are only three beats. The intervening 3/4 bar naturally measures this three-beat period, but does it signal a shift from a 4/4 to a 3/4 meter? According to van den Toorn, the 'initial 4+3 count at number 57+2 might be heard and understood as an abbreviation of a 'rational' 4+4 count (with, in other words, Block C [G♯-F♯] entering a quarter-note beat too soon at number 5[7]+4)'.(28) If so, then the 1-2-3 count at number 57+3 is heard as an incomplete 4/4 measure, not a complete 3/4 measure, and as such does not signal an authentic shift to 3/4. A 1-2-3 count in 3/4 and an incomplete 1-2-3 count in 4/4 are not the same, though they bear the same pattern. **Example 11** illustrates their difference by invoking Zuckerkandl's cyclic concept of meter, the crux of which is that every beat in a measure has a unique identity according to its position within a metric cycle. 1-2-3 represents a complete cycle in 3/4, but only a three-quarter cycle in 4/4.(29) It follows from this that the phenomenon of equivalence class that exists between analogous beats of different measures of the same meter does not hold true for different measures of different meters. Count 3 represents a close in 3/4, but a midpoint in 4/4: they don't hold an identical position within the bar, so they are not 'functionally equivalent'.(30) Just as counts 1-2-3 and 1-3-4 are not the same, though spanning the same length, likewise with counts 1-2-3 in 3/4 and 1-2-3 (incomplete) in 4/4.

[6.5] The distinction between 1-3-4, 1-2-3 in 3/4, and an incomplete 1-2-3 in 4/4, however subtle, is one on which the present model is predicated. If we reject this distinction, the music submits to forms of analysis based on 'metric units of varying lengths', a single, changing meter. We are forced then either to interpret the music as ametric—the absence of periodicity intimates that meter is no longer in force; or to redefine meter, forgoing periodicity as an intrinsic quality, in order to accommodate the invention. But accepting the distinction emancipates us from both propositions, neither of which is satisfactory. This distinction also raises a fundamental question concerning the nature of irregularity: are irregularities ever the result of an authentic change between meters of different time signatures? The immediate answer, as far as motivic displacement in concerned, is no. Despite the assortment of time signatures used to bar the invention, irregularities forged through displacement and conflicting metric identity are not the product of changing time signatures, and should not be regarded as 'metric units of varying lengths'. It is not the time signature, but the phase of meter which alters. This is where the graphic analysis is useful, for it allows us to grasp visually the shifts in projection of the out-of-phase meters.

[6.6] Nevertheless the analysis does reveal various patterns of metric identity, and on the surface these patterns appear to represent 'metric units of varying lengths'. These units do not, however, measure the same thing, each unit representing the count of a different phase. Belonging then to different phases, the units cannot be correlated as a single entity, as *the* meter. While we recognize the confusion here is partly semantic, stemming from what we choose to term meter,(31) it is also partly conceptual, the concept of phase being overlooked by all but a few observers.[32] It is easy nevertheless to see how this has come to pass. Imagine the out-of-phase meters casting metric identity onto a screen. In shifting from one phase of meter to another, various patterns of metric identity are thrown forth. We measure these patterns to determine the meter, and conclude that meter is composed of varying lengths, $\frac{3}{4}$, $\frac{4}{4}$, $\frac{5}{4}$ and so on. The surface pattern of metric identities conceals the phases from which they are determined. Varying metric patterns are revealed, such as 1-2-3-4 1-3-4 in the *Ritual of the Two Rival Tribes* or 1-2 1-2 1-1-2 in the *Sacrificial Dance*, but these are not in themselves the meter. These patterns serve an analytical purpose only as far as they indicate the phase shifts; they otherwise hold nothing more than a surface position within the analysis.

[6.7] As for Stravinsky's purpose in barring the music as he did, that is beyond the scope of the present article, suffice to say that the written meter does not always correspond with that perceived by the listener. This is not to imply any lack of design on the composer's part but only to acknowledge that the invention transcends the system of notation with which it is written. Like the serial composer forced to present certain tones on the diatonic staff as chromatic alterations of others, though all twelve are considered equal, so too with Stravinsky who recorded the multiple phases of his invention as a single metric continuum. Consider number 57 + 2 and 57 + 5 in the Ritual, in which the metric patterns 1 2 3 (incomplete $\frac{4}{4}$) and 1 3 4 are both cast in a conventional $\frac{3}{4}$ bar. The shifts in phase are rendered through motivic displacement and made more forceful through articulation and accents. The depth of the composer's insight, however, is masked by the traditional system of notation.

VII. *The Sacrificial Dance* II

[7.1] In further illustration of phase shifts the model is applied to one of the most striking examples of meter in Stravinsky's output, the climactic final of *The Rite*, the closing episode of the *Sacrificial Dance*. From numbers 186-201 the music comprises a number of determinate motives which generate and govern every aspect of the meter. What distinguishes the action here is that irregularities arise not just by the displacement of these motives, but by their juxtaposition. They interlock to produce a variety of intricate metric patterns which challenge conventional metric thinking. However the episode lends itself readily to an analysis of its phase shifts. The design of each motive is distinct. Once the determinate motives and metric identity have been established and plotted in the graphic analysis, the complexities of the passage emerge with new clarity.

[7.2] The underlying meter for the episode is 4/16 ($\frac{2}{8}$), and the unit at which the disruptions occur is the sixteenth-note. The invention then is accommodated on four out-of-phase 4/16 meters. Rather than detailing an account of the entire passage, the first two determinant motives are examined together with points of significance, followed by a graphic analysis in **Example 12**. For the sake of brevity the analysis will extend only as far as number 189+2.

[7.3] The key to the entire episode, on which much of the analysis is focused, is motive A, the two-note figure of the bass at number 186. Doubled at various points by timpani, tuba, and contrabassoon, the bass is pivotal in determining the downbeats throughout, although it may not receive the same orchestral prominence as other motives. In its determinant form, the motive comprises two pitches, A and C, in eighth-note succession. Over a sixteenth-note pulse they project a 4/16 meter and acquire a metric identity of 1-2 and 3-4 respectively. The rhythmic symmetry of the motive reinforces their 1-2 and 3-4 identities. The accompanying chords of this motive, the 'right hand' at the piano, punctuate the upbeats. These chords are not assigned a fixed metric identity but fill in the gaps in relation to the bass, beats 2 and 4.

[7.4] Motive A is stated in full at number 186. Cast in a 5/16 bar, the two eighth-notes A and C project a 1-2-3-4 count in 4/16. The final sixteenth note of the bar, A, begins a varied repetition of the motive. However, as its value is halved, A projects only count 1 before the arrival of C with its count 3 'too soon' in the following bar. This displacement yields a 1-2-3-4 1-3 pattern with the same distinctive 1-3 shift as in the *Ritual of the Two Rival Tribes*. The sixteenth-note level is shallower here, the meter being cast at the quarter-note level in the *Ritual*, and it is barred differently to accommodate other events. However, if these passages are heard and compared 'side by side' the 1-3 shift is unmistakable, though more to the ear than the eye. This pattern acquires a certain identity of its own as it is repeated seven times before number 192, each time signaling a 1-3 phase shift.

[7.5] Motive B at number 186+1 comprises the string's three sixteenth-note chords whose 2-3-4 metric identity coincides with their position within the bar. This proves something of an anomaly for the whole bar, a metric pattern of 3-2-3-4. How can C's 3 count be followed by 2-3-4 of motive B? The fixed metric identity of the bass has been established, so count 3 is defensible. The key is that the metric identity of motive B is not shaped by the events that precede it. The motive itself in its pitch, rhythm, and form, delineates the accents from which we infer metric identity. The three sixteenth-note chords of motive B lead into a restatement of motive A whose downbeat entry in the following bar is unmistakable. The effect of the three notes is of a lead-in, an anacrusis. This gesture is distinct, easily identified by the listener, and so the motive's 2-3-4 metric identity exists independently of prior events. The invention here is extreme and the interpretation may test the credulity of some listeners, but is anything to be gained by sacrificing C's fixed 3 identity to preserve a 1-2-3-4 periodic count? Periodicity is already preserved, four times over, in the out-of-phase meters.

[7.6] Motive A and its displacement interlock with motive B in the first two bars, yielding a combined metric pattern of 1-2-3-4 1-3-2 3-4. This pattern embraces a jump from 1 to 3, and a retrogression from 3 to 2. Bearing in mind that non-sequential beats belong to different phases of the same meter, it is not as ametric as it appears. The 1-3-2 succession is the consequence of fixed metric identity, displacement, and juxtaposition. Metric identity is disclosed here in accordance with the events which project it, and although these events tend in sequence, their metric patterns need not. A 1-3-2 succession, impossible on a single periodic model of meter, is entirely plausible in the context of out-of-phase meters.

[7.7] Stravinsky's timing was impeccable, and it is evident if we extend the analysis into the final measures that a single steady meter does surface towards the end, the same phase on which the episode started. It is doubtful, however, that a steady background meter is founded on these points alone as the phase established at the outset is so brief. These strategic points confirm not the presence of a background meter, but the referential function of a single phase. Commencing and concluding the passage with the same phase could serve to unify or impart closure to the passage. But the action itself takes place more or less equally over all four phases, and the polarity, the thrust of the invention, occurs at the foreground level in linear alignment.

VIII. Conclusion

[8.1] The attraction of the model proposed here lies in its ability to unify some of the complex metric events of *The Rite of Spring*. Irregularities arising by way of displacement are cohesively bound on a system of out-of-phase meters of the same time signature. This interpretation spares us from redefining meter, foregoing periodicity as an intrinsic quality, to accommodate the invention. In the broader sense periodicity is not forfeit but intensified: in shifting projection from one phase of meter to another, periodicity is made to conflict with itself. Van den Toorn eloquently describes this process in the following:

> Themes, motives, and chords are repeated not to be developed along traditional lines but to be displaced. And in seeking thus to displace a repeated theme, motive, or chord, the composer retains features other than alignment in order that alignment itself (and its shifts) might be set in relief.[33]

[8.2] It is clear that in listening to *The Rite of Spring* we are granted an experience of meter beyond that of the ordinary. Stravinsky portrays a meter not bound by sequence. By unlocking its potential phases, music's time is made to jump forward, remain static, and even reverse. These maneuvers materialize as a result of the manipulation of the determinant motive and the different phases thus set in motion. It is tempting even to speculate a cognitive discord which exists between our conflicting experiences of time passing—chronometric time—and that of meter. For, as much as we are drawn into *The Rite of Spring* and partake of the experience it records, ultimately the clock will reveal that no span of real time has been elided, arrested or reversed. It is a satisfying experience nonetheless, and a measure of the composer's insight into the sound world which is music's domain.

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Footnotes

1. A single course of projection refers here to a single periodic meter. The concept of meter as projection is taken from Christopher Hasty, *Meter as Rhythm.* (New York: Oxford University Press, 1997) and denotes meter 'as a process internal to

the sounds themselves, an experience, rather than something already determined in advance and imposed from without.' See Joseph P. Swain, "Shifting Metre." *Music Analysis* 20/1 (2001): 119–41 [122]. This author's use of the term projection is not necessarily in accordance with Hasty's, and while Hasty's concept of meter is refreshing, it is not fully assimilated here. The current model, printed as part of a thesis in 1996, was conceived outside of Hasty's paradigm.
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2. William Benjamin, "A Theory of Musical Meter." *Music Perception* 1/4 (1984): 335–413 [391–96].
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3. See Pieter C. van den Toorn, *The Music of Igor Stravinsky*. (New Haven: Yale University Press, 1983) chapter 8, and *Stravinsky and 'The Rite of Spring'; The Beginnings of a Musical Language*. (Berkley: University of California, 1987), chapter 3.
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4. The model of pulse streams appears in John Roeder's "Interacting Pulse Streams in Schoenberg's Atonal Polyphony." *Music Theory Spectrum* 16/2 (1994): 231–249, and "Pulse Streams and Problems of Grouping and Metrical Dissonance in Bartok's *With Drums and Pipes*." *Music Theory Online* 7/1 (2001). A further application is found in an unpublished article "Rhythmic Process and Form in Bartok's *Syncopation*." retrieved Jan 10, 2006, from http://theory.music.ubc.ca/preprints/syncopation.pdf.
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5. For instance: Benjamin 1984, 390–403, Andrew Imbrie, "Extra Measures and Metrical Ambiguity in Beethoven." In *Beethoven Studies*. Ed. Alan Tyson. (New York: Norton, 1973) [45–66], Jonathan D. Kramer, *The Time of Music; New Meanings, New Temporalities, New Listening Strategies*. (New York: Schirmer Books, 1988) [98–107], Fred Lerdahl, and Ray Jackendoff, *A Generative Theory of Tonal Music*. (Cambridge: MIT Press, 1983) [99–104], and Carl Schachter, "Aspects of Meter." *Music Forum* VI (1987):1–59 [32–56]. For a comprehensive account of sources of hypermetric irregularity see William Rothstein, *Phrase Rhythm in Tonal Music*. (New York: Schirmer Books, 1989).
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6. This definition is paraphrased from Kramer 1987, 102–3, but the broader picture is more complicated, there being a number of different terms to describe the same or similar things. For example, Benjamin, Horlacher, Kramer, and Rothstein use overlap, elision, and reinterpretation to describe roughly the same process. See Gretchen Horlacher's discussion in "Metric Irregularity in *Les Noces*: The Problem of Periodicity." *The Journal of Music Theory* 39/2 (1995): 285–309 [291–94].
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7. Both van den Toorn and Horlacher prefer descriptive terms when discussing metric identity, such as the 'over-the-barline, upbeat-downbeat identity.' (van den Toorn 1987, 76). This author prefers numbers representing beats as they are provide a greater degree of accuracy in tracing irregularities and the course of projection. David Temperley in *The Cognition of Basic Musical Structures*. (Cambridge, MA: MIT Press, 2001) [331–33] goes further in assigning a 'metric address' to an event—a series of numbers which records the exact location of an event within all metric levels. Of course such numbers are purely abstract but they are a useful tool for analytical purposes. Such a level of abstraction is in truth no different than assigning numbers to pitches and chords, a practice few would question.
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8. Benjamin 1984, 392.
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9. Ibid.
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10. 'Theoretically, these three operations [extension, contraction, and elision] can occur on any level, although in tonal music they most often appear as middleground phenomena.' (Kramer 1988, 106–7).
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11. Joel Lester, *Analytic Approaches to Twentieth-Century Music*. (New York: W.W. Norton & Company, 1989) [18].
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12. Horlacher 1995. Horlacher takes a more flexible approach to metric analysis in "Bartok's *Change of Time*: Coming

Unfixed." *Music Theory Online* 7/1 (2001).
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13. Horlacher 1995, 289.
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14. Horlacher 1995, 290.
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15. Horlacher uses the terms deletion and reinterpretation.
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16. A more detailed discussion of these rhythmic/metric types can be found in van den Toorn 1983, 216–18 or 1987, 99–101.
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17. Hence Kramer's perception of meter being 'resistant to change' (Kramer 1988, 83); once a steady meter is established, it tends to remain in force throughout a piece.
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18. Van den Toorn 1987, chapter 3.
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19. The reference to an internalized meter appears in van den Toorn, "Stravinsky, *Les Noces* (*Svadebkas*), and the Prohibition against Expressive Timing." *Journal of Musicology* 20/2 (2003): 285–304 [295].
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20. Van den Toorn 1987, 67.
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21. Van den Toorn 1983, 215. Concepts of polarity date back to Stravinsky's evocative remarks from the *Poetics of Music* but take on a more concrete form in Berger's discussion of polarity in relation to the symmetrical properties of the octatonic scale. See Igor Stravinsky, *Poetics of Music in the Form of Six Lessons*. Trans. Arthur Knodel and Ingolf Dhal. (Cambridge, MA: Harvard University Press, 1947) [36–40], and Arthur Berger, "Problems of Pitch Organization in Stravinsky." *Perspective of New Music* 2/1 (1963): 11–42 [25–26]. Van den Toorn extends Berger's work, tying in also meter, form (block juxtaposition) and melodic style, to elucidate the distinctive identity of Stravinsky's music.
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22. For Berger the 0/6 axes of the octatonic scale are of 'equal and thus independent weight' which leads to the condition of polarity, namely 'the denial of priority to a single pitch class precisely for the purpose of not deflecting from the priority of a whole *complex sonore*.' (Berger 1963, 25). By substituting metric identity for 'pitch class' and meter for '*complex sonore*', we arrive at a definition which serves van den Toorn's concept of 'rhythmic-metric-identity *polarities*'. The question then is whether a steady background meter is of 'equal and thus independent weight' where it is not explicitly projected. Van den Toorn appeals to Andrew Imbrie's radical/conservative distinction (Imbrie 1973, 65) to reason that it might be, because a steady background meter exists more strongly for conservative listeners who continue counting periodically in the face of foreground irregularities.
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23. Roeder 1994: 232–233. The theorists referred to are Jonathan Kramer, Charles D. Morrison, and Lerdahl and Jackendoff.
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24. Musical examples are drawn from the Dover edition 1989, a reproduction of the Izdatel'stvo "Muzyka" edition, 1965.
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25. See Harald Krebs, *Fantasy Pieces: Metrical Dissonance in the Music of Robert Schumann*. (New York: Oxford University Press, 1999) and "Some Extensions to the Concept of Metrical Consonance and Dissonance." *Journal of Music Theory* 31/1 (1987): 99–120. Krebs uses the metaphor of metric dissonance to classify a number of metric effects resulting from varying degrees of alignment between metric levels. The irregularity resulting from motive displacement, described here as a phase shift,

would be classified as *indirect displacement dissonance*.<
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26. Van den Toorn 1983, 228.
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27. The distinctive 1-2-3-4 1-3-4 pattern surfaces throughout the fourth tableau of Stravinsky's *The Wedding*. Consider rehearsal number 91, setting aside for the moment the composer's own barring which introduces the motive as an upbeat syncopation in $\frac{4}{4}$. The bass, taken from its first eighth-note, yields a quarter-note, quarter-note, eighth-note, quarter-note succession, proportionally identical to the half-note, half-note, quarter-note, half-note succession in the *Ritual of the Two Rival Tribes*, numbers 57+4-5. Over an eighth-note beat, the two quarter-notes (1-2-3-4) establish a $\frac{2}{4}$ meter which is challenged and shifted by the following eighth-note-quarter-note (1-3-4). The listener is able to infer this pattern without reference to a fixed set of pitches or its displacement; the rhythm itself delineates the accents required for its projection.
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28. Van den Toorn 1987, 104.
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29. Victor Zuckerkandl, *Sound and Symbol; Music and the External World*. Trans. Willard R. Trask. (London: Routledge & Kegan Paul, 1956) [168–74].
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30. Benjamin 1984, 375. Benjamin draws an analogy between equivalence classes in the domain of pitch and that of meter. Beats which hold an identical position in the measure are said to be 'functionally equivalent' between different measures of the same meter.
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31. If by meter we mean the composer's time signature, then meter does change, and likewise if by meter we mean phase. But if by meter we mean the time signature common to the different phases, then it is the phase which changes, not the meter.
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32. Already acknowledged in this respect are Benjamin, Roeder, and Krebs. Although they do not use the term phase their models of meter take phase or alignment into account. Van den Toorn also regards alignment as a significant factor in Stravinsky's music. Temperley and Bartlett discuss phase in traditional tonal music, remarking that motivic parallelism is a significant factor in defining metric periods, but not the phase of the meter. See David Temperley and Christopher Bartlette, "Parallelism as a Factor in Metrical Analysis." *Music Perception* 20/2 (2002): 117–49 [117]. Temperley also mentions *The Rite of Spring* as a work whose irregularities are governed by 'motivic parallelisms'—the displaced motives observed by van den Toorn and Horlacher (Temperley 2001, 302).
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33. Van den Toorn 2003, 295.
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