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LUCIANO BERIO'S CIRCLES, FIRST MOVEMENT[1]

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My concern in this paper is with pitch hierarchy and related aspects of formal design in the first movement of Berio's Circles (1960) for mezzo-soprano, harpist, and two percussionists. Some of the differences in pitch structure and formal design between Circles and earlier works of Berio can be attributed to moment form or non-teleological thought,[2] where a contextually devised pitch structure need not rely upon group-theoretic transformation of pitch class sets to insure a normative process; and musical implication, continuity of pitch structure, musical gesture need not absorb and explain the ambiguity of discontinuity.[3] On the contrary, continuity and musical implication are options; returned events are no longer confirmations of implied goals (as they are traditionally) but rather, the flash back of memory triggered by "distinctly similar"[4] materials. The entire sonic design of a moment form is a sample of musical consciousness that starts and stops without the usual connectives and chain of developed events.

Most post World War II composers have unique ways to evoke musical consciousness by non-teleological means. Circles uses the concept of design I have called continuum -- two extremely divergent musics form the poles of a continuum of possible musical states which lie between those poles.[5] Neither pole is more important than the other and thus this bi-polar continuum stands as a metaphor for the title. In Circles, the polar musics can be understood as such by the vivid contrasts they provide for one another in five separate aspects of the design;

		Polar Music ∝	Polar Music ∿
1.	Pitch Structure	Teleological, hierarchical	Non-teleological, non-hierarchical (improvisatory with pitches not fully specified)

2.	Time	Rhythms specified with traditional symbols (a chrono-metric model)	Open, time-field notation (a synchronometric model)
3.	Text Structure (Poet's and Setting (Composer's)	Both relatively traditional	Non-traditional syntax, spelling, syllabification, capitalization, and word-line enjambments; the text is broken into its phonemes in the setting
4.	Stage Deportment	Performers in traditional fixed position	Singer moves to other positions on the stage; percussion layout designed so that the music causes the performers to move in circular routes around the instruments
5.	Timbral Usage	Relatively traditional performance techniques	New vocal and instrumental performance techniques

Example 1 contains score pages 2 and 3 from the first movement of Circles and represents the polar music $\mathcal{C}$. Example 2 displays score pages 19 and 28 from the third movement and represents the polar music $\mathcal{A}$. I will now turn to the pitch structure of the first movement and its relation to the bi-polar continuum.

II

Within the improvisatory character of the bipartite first movement, a vocal/harp duo followed by a harp/percussion trio, four different surface levels of pitch presentation can be discerned in the voice part. In

increasing order of importance they are:

Embellishing pitches
Hummed pitches of relatively short duration indicated by +
Hummed pitches of longer duration
Texted pitches

In each subsection of the vocal/harp duo, a collection of texted pitches in the voice and emphasized pitches in the harp predominate. These I have called pitch pillar sets -- pitches which stand out by means of significant, perceptually audible differences from other pitches in their local contexts. The order of elements within the pitch pillar sets is usually not significant. Criteria for the inclusion of pitches in a pitch pillar set (henceforth, p-p set) is as follows:[6]

Pitches at beginning/ending points of phrases
Pitches which form high/low points of a phrase
Pitches at marked points of vertical coordination
Pitches which precede or follow a rest of comma
Pitches which are embellished
Pitches which have contextually long duration
Pitches with contrasting use of dynamics
Pitches at the point of change in the direction of a line
Pitches indicated by the sign o.

P-p sets themselves may be divided into hierarchically related subsets, primary and secondary. The greater the number of criteria met, the more likely the pitch's assignment to the primary subset; the fewer (and there must be more than one met), the more likely to the secondary subset.[7] These subsets hold no elements in common. In this first movement of Circles, the first half vocal/harp duo is a goal oriented process of primary p-p subsets.

Pitches not selected as elements in a p-p set are elaborative and form layers of structure lying closer to the surface of the movement. These pitches either span elements, embellish individual elements, or

embellish spanning pitches of the p-p sets. These elaborative pitches form 11 of the 12 possible trichordal set-types and 4 of the possible 29 tetrachordal set-types. They are: 012, 013, 014, 015, 016, 024, 025, 026, 027, 036, 037; and 0123, 0134, 0246, 0268.[8] Criteria for these elaborative set-types is as follows:

Timbral association
Vertical association
Registral association
Similarities of articulation
Similarities of duration or rhythm
Sequential or other modes of patterning
Changes of direction in line
Inclusion between rests or commas, marked points of coordination, or combinations of the above

Example 3 contains the opening of Circles along with three layers of this analysis vertically aligned beneath it.[9] Layer 1 displays the elements of the primary p-p subsets in the order in which the elements occur. Layer 2 displays the elements of both p-p subsets along with some of the principal spanning pitches. Layer 3 includes all of layer 2 and most of the prominent embellishing pitches. The space below is used to display other third-layer pitches which physically did not fit on layer 3. Within layer 2 each element of the secondary p-p subset is either at an interval of a minor or major second away from some element of the primary p-p subset. Therefore, by proximity, the less perceptually prominent pitch-pillars of the secondary p-p subset are deeper-layer neighbors to the elements of the primary.

The elaborative set-types can be related to one another in ways which readily account for the common and simple improvisatory techniques of reordering, slight alteration, and combination of contextually important intervallic cells. Two trichordal set-types can generate, through two mechanisms, all of the frequently occuring set-types in Circles. These two set-types are examples of what I call generator set-types. The first mechanism is the transposition of only one element of the generator

set-type by interval class one, thereby creating a new set-type.[10] This is symbolically represented as SGM1 (set-type generating mechanism one). The second mechanism is the combination of two representative pitch class sets of the same generator set-type that have n-1 common tones, where n is the cardinality of the generating set-type. This yields a new set-type of n+1 cardinality. Symbolically, SGM2 represents this idea in a similar manner. As a more concrete demonstration of these two mechanisms, Example 4 shows the products of both generator set-types on Circles, using two arbitrarily chosen pitch class sets. In that example, all possible and different set-types are presented without the further application of the mechanisms to their products or the combination of the two mechanisms. Without these two restrictions, the mechanisms would take on an open character which would eventually generate all set-types, thereby losing analytic usefulness.

In order to understand the still deeper hierarchical layer of the pitch-pillar set structure, a brief description of the form of the movement is needed. As already described, the movement is bipartite with a vocal/harp duo followed by a harp/percussion trio. The first part is further divided into subsection which alternate the vocal/harp with solo harp interjections. The duo forms a goal-oriented process; and the solo harp interjections gradually shed layers of pitch structure.

While a graphic analysis of each subsection shows much useful information on the immediate hierarchical nature of pitch relations, a deeper and possible precompositional layer of the p-p sets' structure can also be inferred from that analysis. Example 5 displays the p-p sets for the vocal/harp duo's subsections. The duo's p-p sets form a closed, goal-oriented progression -- a mataphoric circle. Since the vocal pitch-pillars predominate, the harp pitch-pillars are not included. The pitch-pillars are listed from lowest to highest rather than in the order of occurrence in the movement. Incidentally, the text given in Example 5 is as it appears in the score and not in the layout given by the poet, E.E. Cummings.

Example 5 reveals some of the progressive relationships between the subsections of the vocal/harp duo. Starting with the progression of the

secondary p-p subsets found in the middle of the example, note that the metamorphic process SGM1 links subsection 1 through 7 to 9. As subsection 5 is interpreted to lack a secondary p-p subset, only subsection 3 secondary p-p subset is not linked through the SGM1 process. However, the secondary p-p subset of 9 is itself a subset of secondary p-p subset 3. If one observes the pitches held in common between beginning and each following subsection one can envision a metaphoric circle with the subset of 5 representing the furthest point on the circle from the point of origin and the ultimate, modified return, in sub-section 9. This metaphoric circle can also be seen in the p-p set and primary p-p subset progressions. Note that the pitch A^4 occurs as a secondary pitch-pillar in three of the four subsections that have secondary p-p subsets and is the only pitch held in common by the set intersections of adjacent subsections' secondary p-p subsets. In summing up, the secondary p-p subset of 9 evolves via a metamorphic process from the subset of 1 and returns to the pitch A^4 while recalling the secondary p-p subset of 3.

Turning to the progression of the primary p-p subsets, note the emphasis of the set of intersections on the pitches $D^4F^{\#4}B^4$. The table at the bottom of Example 5 points out the number of subsections in which each pitch-pillar occurs and its proportion of primary to secondary assignments. Asterisks point out the same $D^4F^{\#4}B^4$ as being the most prominent pitch-pillars. These pitches are a subset of subsection 9 primary p-p subset and are in a SGM1 relation with the primary p-p subset of subsection 1 -- that is $D^4F^{\#4}B^{b4}$. Thus, the subset $D^4F^{\#4}B^4$ of the final subsection 9 is the goal of the pitch-pillar progression. It is also interesting to note that: D^4 is the center of registral deployment of the movement (from A^{b1} to A^{b6}); that $F^{\#4}$ and G^4 are the center of registral deployment for the voice (from A^{b3} to F^5); and that B^4 and D^4 are used exclusively as primary pitch-pillars.

The solo harp interjections start in subsection 2 and foreshadow the pitch-pillars of subsection 3. Gradually the layers of pitch structure containing the pitch-pillars of the harp interjections' subsections are stripped away until only the lowest layer containing set-types associated by the two set-type generating mechanisms remains. This gradual process of

a pitch hierarchy strip tease in the harp interjection subsections completes itself with the arrival of the second part harp/percussion trio immediately after the vocal/harp duo achieves its goal at the end of subsection 9. This harp interjection process starts the succession along the continuum from the pitch hierarchical and goal-oriented pole () to the noise-like and non-teleological pole ().

III

While a full discussion of Circles would be valuable, that is not possible within the scope of this paper. Therefore, the following discussion is intended to assist readers towards a more complete view of the work. The pitch and formal processes of the first movement parallel those of the work as a whole. The vocal/harp duo's subsection (with their goal-oriented and hierarchical pitch structure) parallel an eventual return, over the course of the work, to the p-p sets in the fifth and final movement. The strip tease of hierarchical layers of pitch structure in the solo harp subsections reflects the path that the moment forms (sections and subsections) take to the opposite polar music () in the third movement -- that is from greater to lesser organization and specification of pitch relations -- back (related by the retrograde) to the highly specified and hierarchically organized last movement.

The text of three poems by E.E. Cummings, as chosen and ordered by Berio, parallel the pitch structure. The text ranges from the relatively traditional syntax, layout, metaphors, etc. in the first poem/first and fifth movements -- "stinging" -- to the extremes of non-traditional syntax, spelling, etc. in the third poem/third movement -- "n(o)w". The second poem/second and fourth movements -- "riverly is a flower" -- strikes a midpoint, literally and figuratively, between them.[11]

Though the order of the texts is linear, the succession of moment forms is not always in a linear and progressive sequence from one polar music to the other and back. Successions of the previously mentioned five aspects of design, constituting the opposition between the polar musics, do

not change uniformly in similar manners. The overall circular route between the polar musics is clear; but, the details of the route, while understandable, seem neither obvious nor predictable.

The premise of the work is clearly structuralist in that it is an internally coherent whole; a system of transformations (five aspects of design); and it is self-regulating (SGM1 and 2 restrictions, and the notation of the work itself). Also, the differences and, hence the opposition of the two polar musics as defined in the five aspects of design, agree with a structuralist viewpoint that the relationship between entities is their essential nature rather than some scientific description of the ultimate reality of each entity considered in isolation. In short, the context is the key.[12]

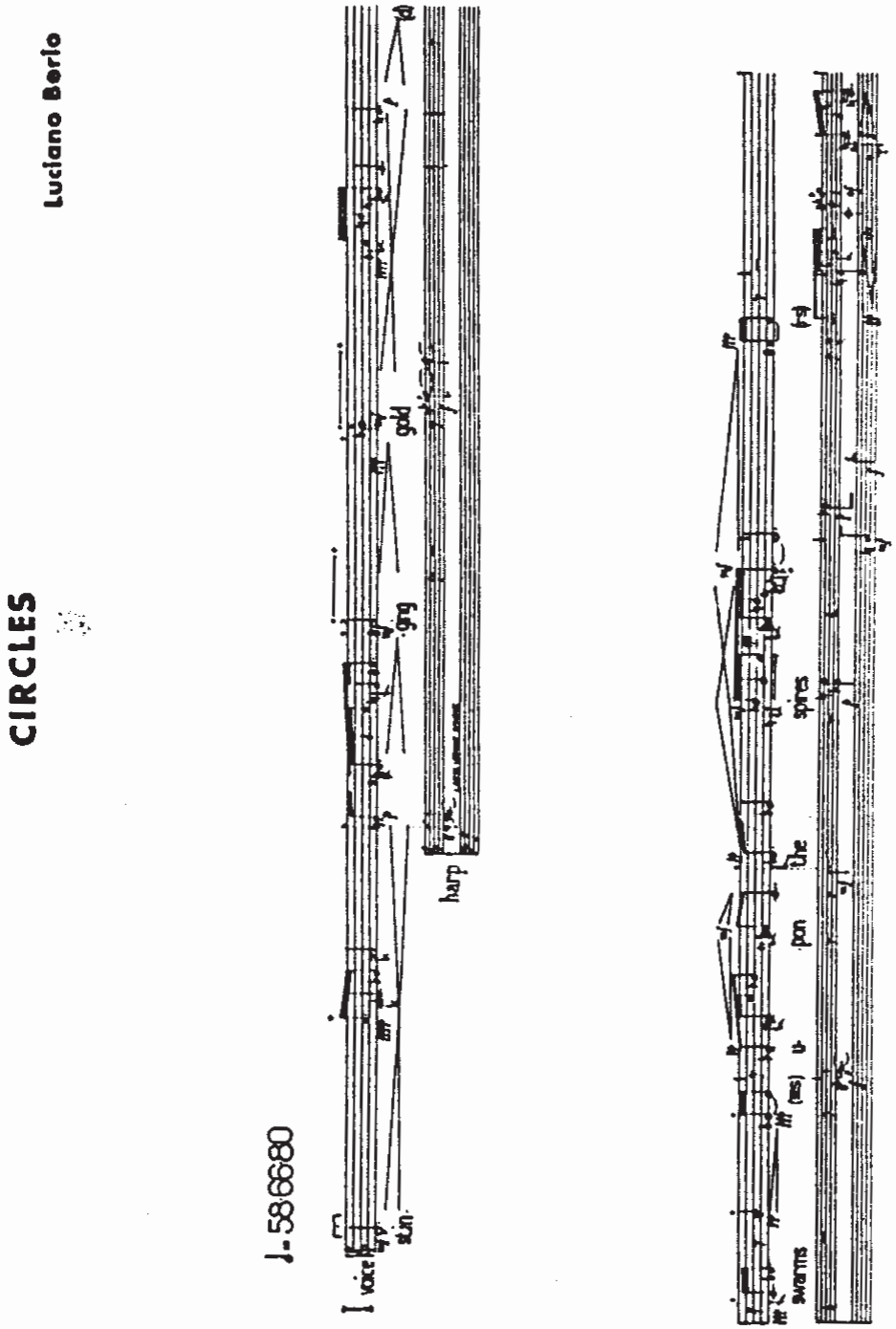
In Circles, the pitch structure of the first movement's vocal/harp duo mimics the pitch class set and gestural usage of the total serialists then in vogue.[13] However, by placing this passage in the context of the entire work, this duo becomes an icon, a sign, for total serialism that due to its place within the structure constituting Circles and its own local, non-serial pitch structure, is not equal to its referent. Circles reinterprets total serialism as an icon and incorporates it as a generic music into a larger system of oppositions forming a different kind of whole as described above.

The tactic of taking familiar materials and making them appear strange (Verfremdung in Brechtian terms of alienation) is a typical procedure of creative artists. In Circles it is accomplished by changing the frame of reference (context). The benefit of this game is in disrupting acquired learning, which tends to generate stock responses, thus heightening awareness of the work's distinctive features. Ironically, this tactic was employed by the neo-positivistic total serialists on listeners accustomed to the expressionistic serialists by radically extending the ordering principal to other musical aspects other than pitch.

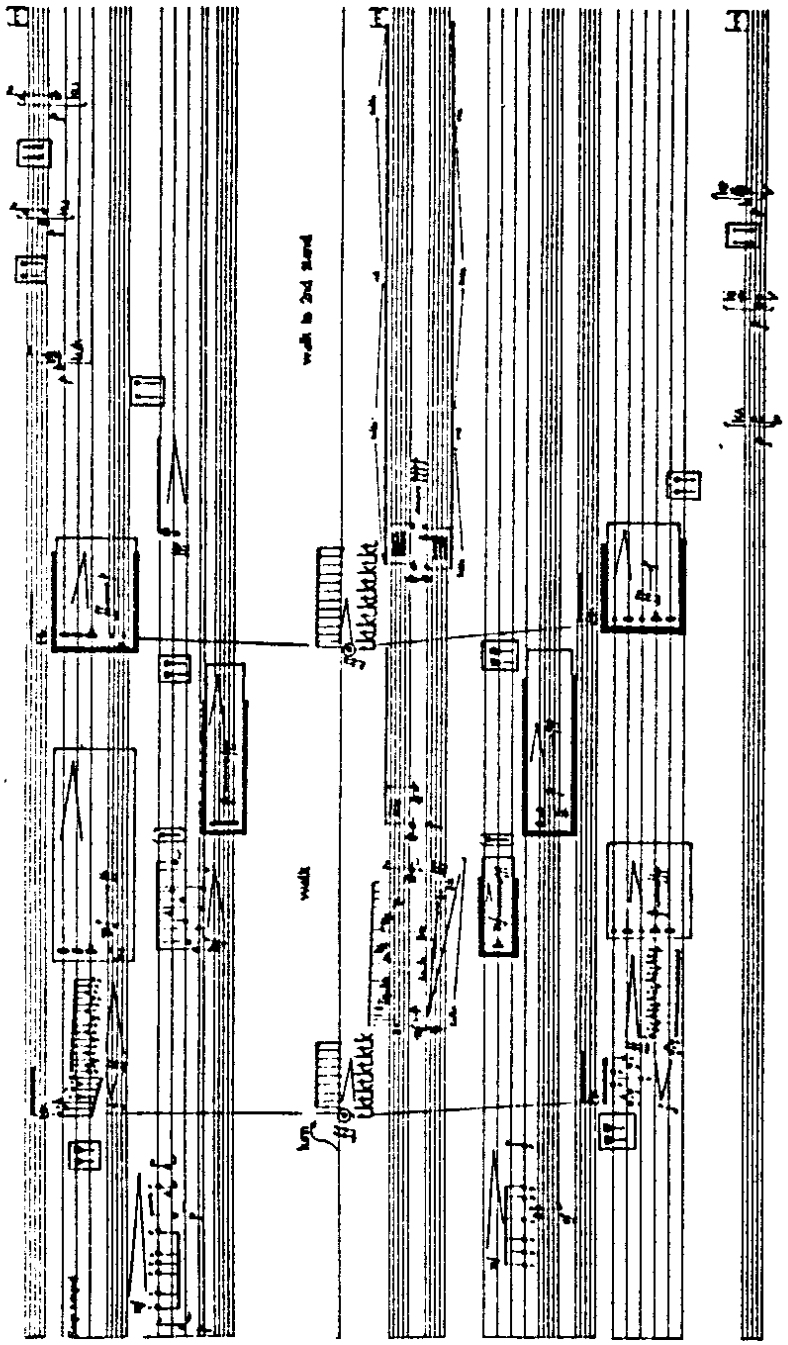
Finally, the polar musics can be understood as symbols for syntagmatic, diachronic, and metonymic music (∝C), and for metaphoric, syn-

chronic, and improvisatory-like music (~). Circles is an entirely self-conscious work (parloe) which points to even deeper resources available within the language (langue) of music. In Berio's own words: "(The composer must) face the multiple character of experience and find conceptual schemes open enough to allow him to select, to process, to combine the many aspects of reality, always bearing in mind that any significant musical idea is not the result of a neo-positivistic procedure but a system of interrelationships in progress."[14]

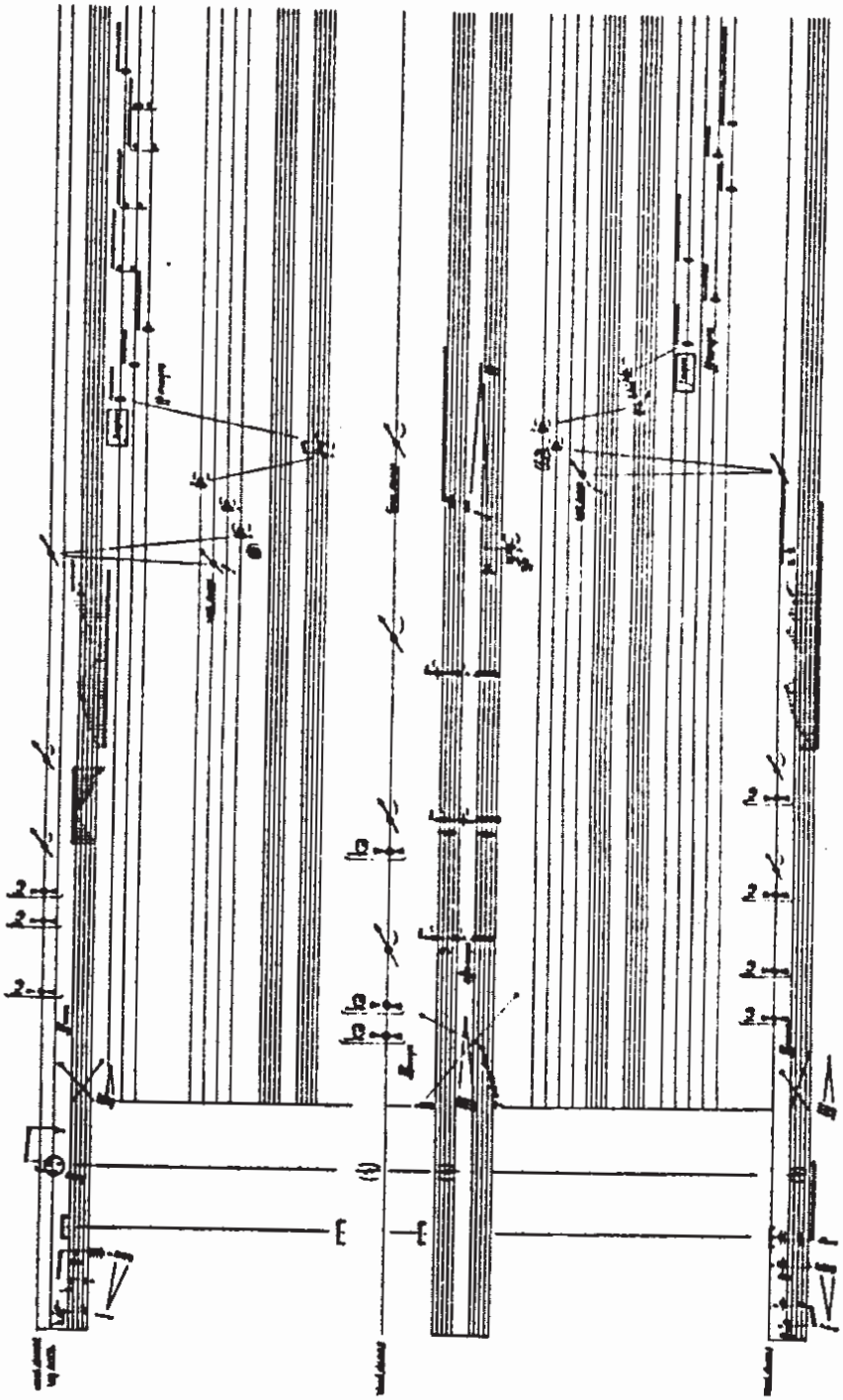
Example 1 Polar Music ∝C



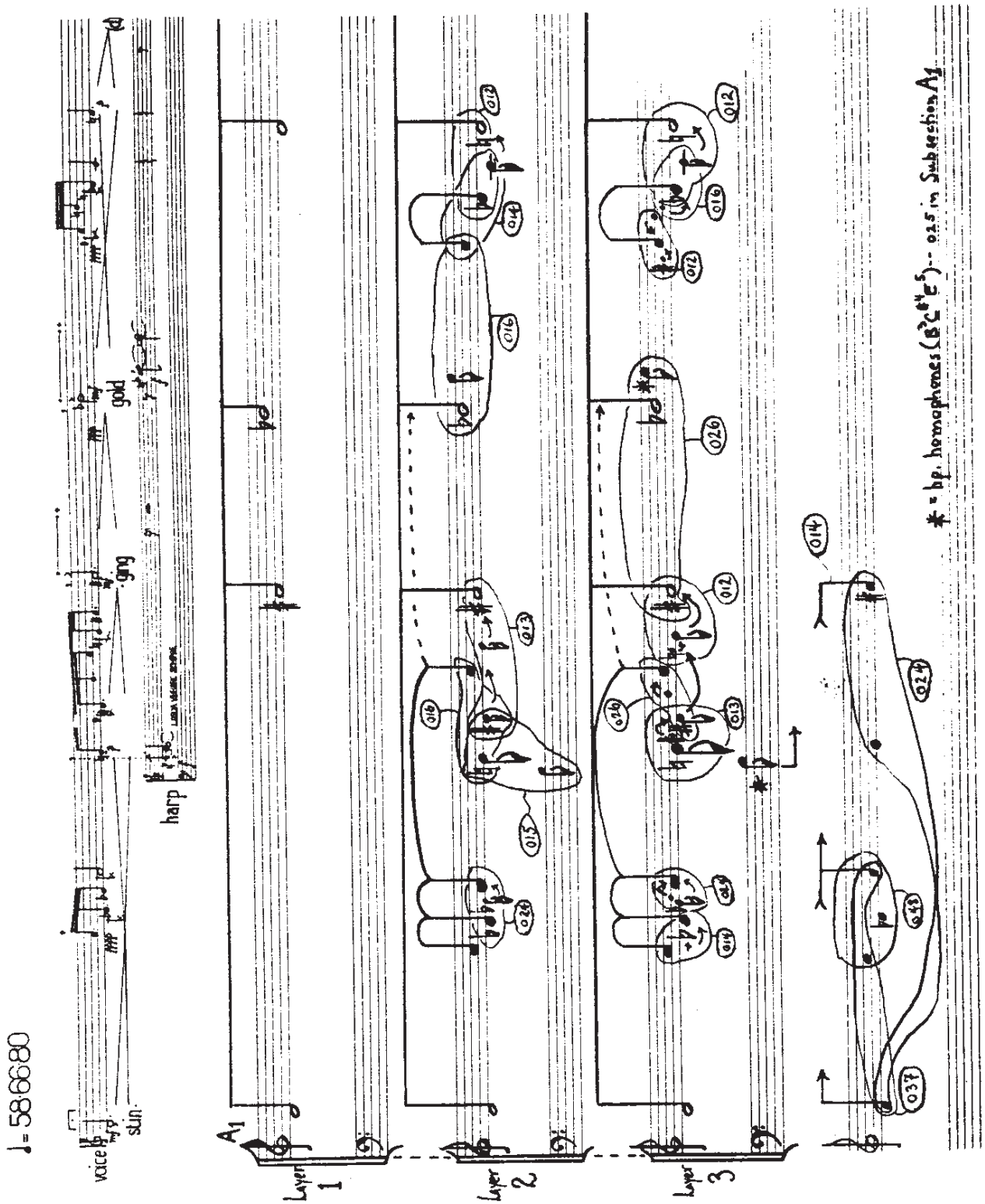
Example 2. Polar Music



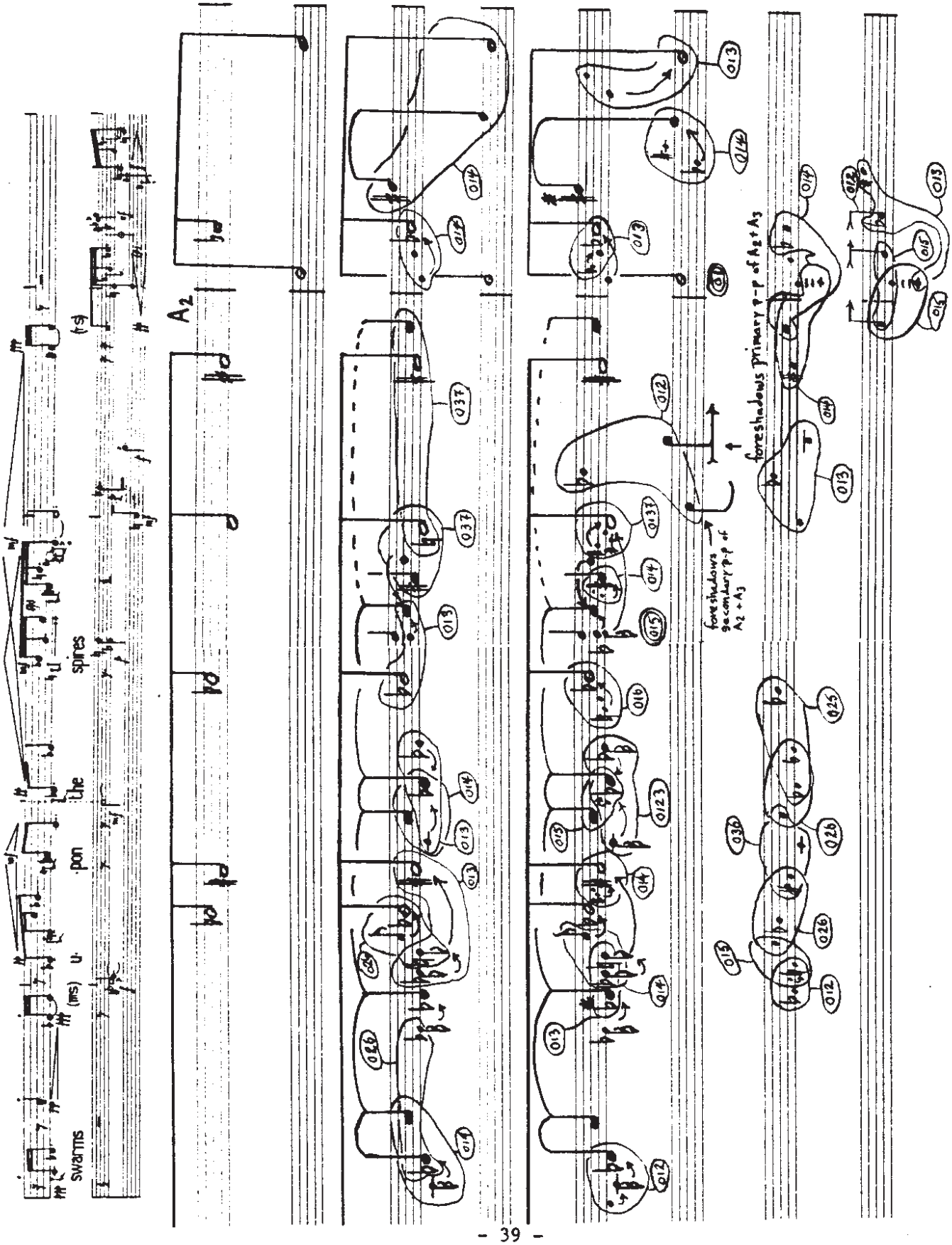
Example 2 (cont.)



Example 3


♩= 58 66 80
voice
sun
gold
harp
A1
Layer 1
Layer 2
Layer 3
* = bp. homophones (B♭C♯E♭) -- 025 in Subsection A1

Example 3 (cont.)

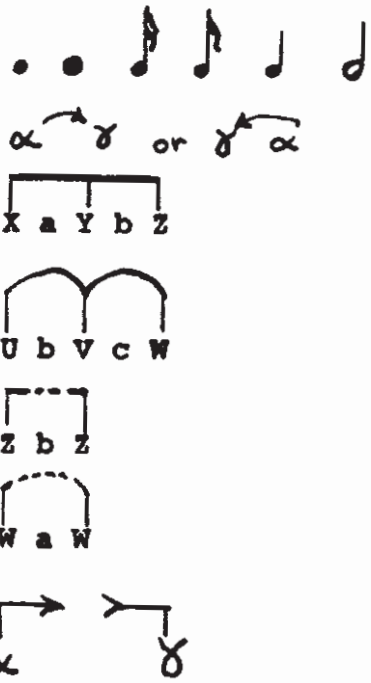


Indications to Example 3.

X,Y, and Z are primary pitch-pillars

U,V, and W are secondary pitch-pillars

The letters a,b, and c are elaborative pitches



Listed from left to right are pitches of increasing structural importance

Pitch α embellishes pitch γ

Projection in time across intervening material of elements from the primary p-p subset

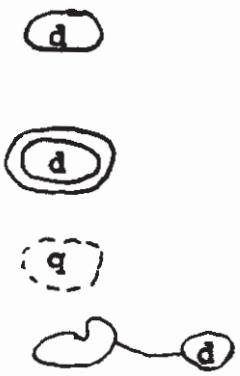
Same as above for secondary p-p subset

Influence of p-p Z maintained across intervening material

Influence of p-p W maintained across intervening material

Beamed arrow connects pitch α to pitch γ of beamed arrow catcher pointing out a relationship across intervening material (symbols adapted from Leonard B. Meyer's Explaining Music)

In the following the prime forms of set-types are represented symbolically by the lower case letter d. The lower case letter q represents d or some interval referred to in the abstract. (The following symbols adapted from Cogan and Escot Sonic Design published by Prentice-Hall)



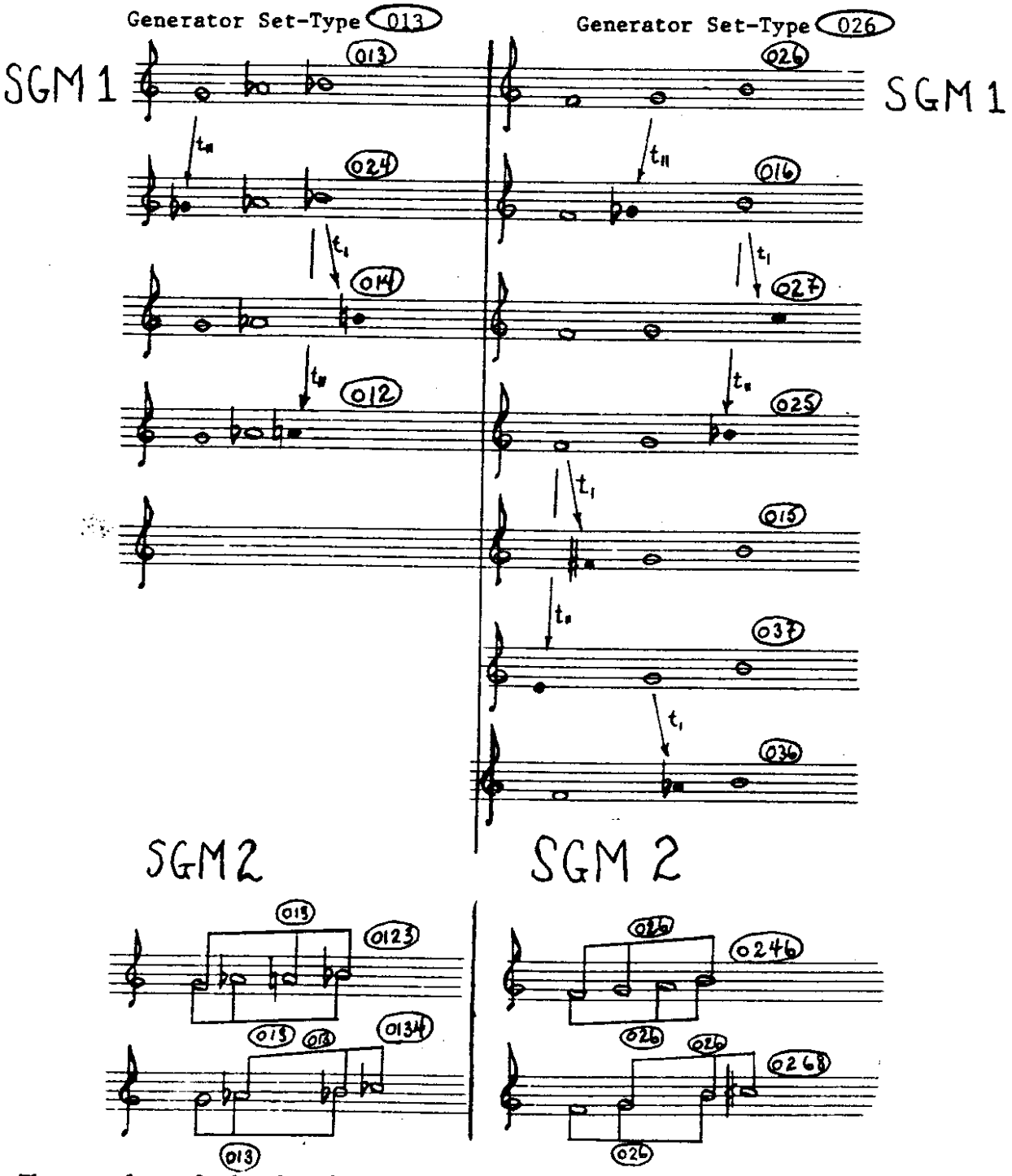
Listing of set-type describing some linear (melodic) relationship

Same as above but for some simultaneous relationship (harmonic)

Some interval or set-type referred to in the abstract

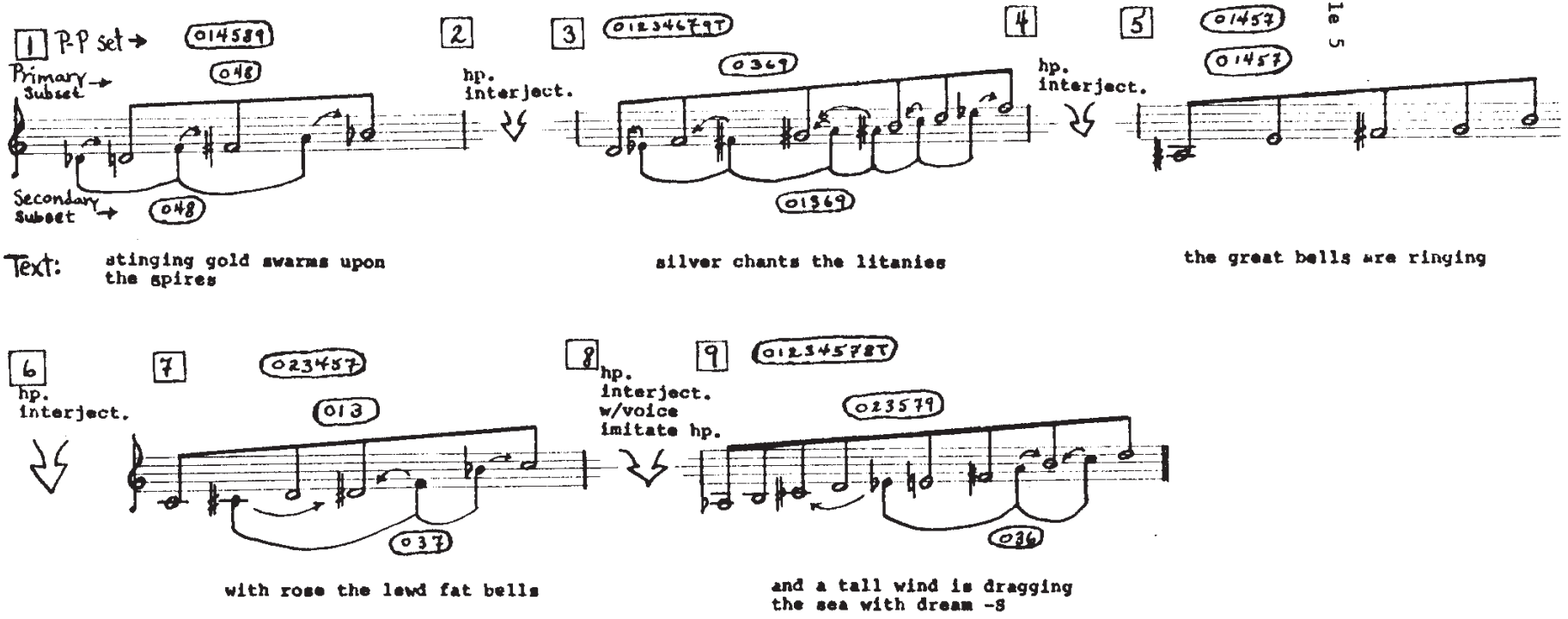
Listing of some set-type describing pitches selected from the local context

Example 4. Products of SGM1+2



The results of the SGM 1 and 2 are the "Set of Set-types" associated with the generator set-type. Listing the set-types within the set of set-types, need not be ordered; however, a specific ranking could be based on frequency of occurance or by some other context derived priority.

Example 5



Pitch-pillar Frequency
(no. of subsections in which it appears)

Pitch	$A^{\flat 3}$	$A^{\natural 3}$	B^3	C^4	$C^{\sharp 4}$	D^4	$D^{\sharp 4}$	E^4	F^4	$F^{\sharp 4}$	G^4	$G^{\sharp 4}$	A^4	$B^{\flat 4}$	B^4	C^5	D^5	$E^{\flat 5}$	F^5
Prim/Sec	1/0	1/0	1/0	1/0	1/2	4/0	1/2	1/1	1/2	3/1	1/0	1/0	0/3	1/2	3/0	1/2	2/0	0/1	1/0
Total	1	1	1	1	3	4	3	2	3	4	1	1	3	3	3	3	2	1	1

NOTES

1. This paper is adapted from "Some New Analytical Techniques for the Post-Serial Repertoire, Re: Luciano Berio", first read by the author at the Society for Music Theory Annual Convention, Yale University, Connecticut; November 10, 1983.

2. Jonathan Kramer points out that the use of non-teleological thought does not start with the Darmstadt generation, but has its roots in the musics of Debussy, Stravinsky, Varèse, Ives, Webern, and Messian. See his "Moment Form in Twentieth-Century Music", Musical Quarterly, Volume 64, No. 2, April 1978, pp. 177-194.

3. Musical implication as used by Leonard B. Meyer. See his Explaining Music (Chicago: University of Chicago Press, 1973), p. 110. For a discussion of the term in the general teleological sense see Marion Bunge, Causality and Modern Science, (New York: Dover, 1979), pp. 36 and 39. For a complementary view on non-teleological form, see Pozzi Escot, "Towards a Theoretical Concept, Non-Linearity in an Eve Song", and "Towards a Theoretical Concept: Non-Linearity in Webern's Opus 11, No. 1", Sonus, Volume I, No. 1 and Sonus, Volume 3, No. 1.

4. Distinctly similar as used by Wolfgang Köhler. See his Dynamics in Psychology (New York: Liveright, 1940), p. 155.

5. Continuum is used metaphorically rather than in a strict mathematical usage. See F. M. Hall, An Introduction to Abstract Algebra, Volume 1, (Cambridge: Cambridge University Press, 1972), p. 78 for the technical sense of the word.

6. In a conversation, Prof. John Rahn of the University of Washington called this criteria a 'Theory of Protuberance'. A possible underlying psychophysical explanation of how such criteria and the effects of past learning may cause listeners to hear certain musical events as protruding over others was put forth by Donald D. Hebb in 1949. It is

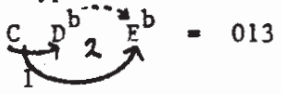
summarized in Julian Hochberg, Perception (Englewood Cliffs, New Jersey: Prentice Hall, 1976), p. 431.

7. Pitch-pillars differ from the invariants of both serial and atonal set theory origins. Serial invariants are created by the specific ordering of pitch classes -- and hence interval classes -- and the manner in which multiple, simultaneous series are combined and succeed one another. This causes some groupings of pitch classes to remain in adjacent order positions within the series (invariants) throughout the application of certain carefully chosen transpositions, inversions, etc. These tend to be compositionally highlighted as fixed pitches while the other pitch classes 'migrate' registrally. See Milton Babbitt, "Twelve-Tone Invariants as Compositional Determinants" in Problems of Modern Music, ed. P. H. Lang, (New York: Norton, 1960).

   In atonal non-serial music, invariants are those pitch classes which are held in common between two or more pitch class sets (set intersection). See Allen Forte, The Structure of Atonal Music (New Haven, Connecticut: Yale University Press, 1973), pp. 29-45, 104-107.

   Pitch-pillars are the result of significant perceptual difference from the other pitches in the local context. Other members of the same pitch class as the pitch-pillar may be present locally; however, they are not pitch-pillars.

8. A set-type contains all collections of pitch classes which have the same number of elements and can be rendered equivalent through one or more of the following operations; transposition, inversion, and reordering. 0 indicates arbitrarily a pitch element and intervallic distances are read in semitone measurement to the other pitch classes. For example, if the pitch class C is arbitrarily indicated as 0 then the following set-type can be read as:



9. The analytical technique here used draws from musical graphic representational systems, set theory, Hegelian-inspired interdependent structural layering, and Gestalt psychologists' ideas on perception.

10. It is conceivable that set-types other than 013 and 026 and interval classes other than 1 can be used to generate the set-types here applied. However, interval class 1 is the most reasonable as it creates the smallest possible difference, thereby preserving similarity; and is the lowest common denominator by which intervals are measured.

11. E. E. Cummings, Complete Poems (New York: Harcourt, Brace, and Jovanovich, 1979), pp. 51, 90, 347.

12. I am indebted to the following works for much of the conceptual thought in part III of this paper:

    Roland Barthes, Mythologies, trans. Annette Lavers, (New York: Hill and Wang, 1972)

    Terence Hawkes, Structuralism and Semiotics (Berkeley and Los Angeles: University of California Press, 1970) Jean Paiget, Structuralism , translated and edited by Chaninah Maschler, (New York: Harper Colophon, 1970)

    It should be noted that Berio has had long association with three outstanding Italian authors/linguists, Umberto Eco, Italo Calvino, and Edoardo Sanguinati.

13. Gyorgy Ligeti, "Pierre Boulez: Decision and Automatism in Structure Ia", Die Reihe, Volume 4, pp. 36-62 is a description and criticism of a total serial composition.

14. Cited in George W. Flynn, "Listening to Berio's Music", Musical Quarterly, Volume 61, No. 3, p. 394.