

Chapter 2

THE ANALYTIC METHOD

When analyzing music for which no harmonic language has been defined, the initial research stage poses a considerable problem of selectivity. This lack of focus makes it necessary to consider, through a laborious process of segmentation, a burdensome amount of diverse data, of which only a scant 25% may actually be significant. The process which determines the limitation of such material to pertinent data can be said to define the harmonic language of the work.

Allen Forte's theory of the Set Complex¹ defines one process of selectivity by isolating elements of this enormous collection by inclusion relationships, and by filtering out a single set class, the "nexus set," as a focal point for the work. By viewing the work through the lens of the nexus set, all the other segmented set classes fall into varying degrees of clarity and obscurity, and the work attains a certain harmonic profile.

¹See Forte, op. cit., Part 2.

In this paper a similar method of analytic selectivity is proposed which uses a set-class property as the focal point; that is, the degrees of clarity and obscurity are defined by the possession of specific attributes rather than the relation to a single set. As in linguistics, or propositional calculus, the sets we choose to segment must contain strings of pitch classes which are "well-formed" according to the defined property. Those sets which are not well-formed strings are either pitch-class sets which we may regard as coincidental, or, in the case where entire passages are lacking the property, require some other determinant of "well-formedness." Two such property sets will now be defined.

Cluster/6

The first is called the "cluster-tritone" property, hereafter abbreviated by "cluster/6." This set-class type is any chromatic set-class of cardinalities two through five (i.e., SCs 2-1, 3-1, etc.) plus one or more ic(6)s appended to any or all of its pc members. For example, using chromatic set-class 2-1, we may generate SC 3-5 ($\{016^{\sharp}\}$ or $\{017^{\flat}\}$) or SC 4-9 ($\{0167^{\flat}\}$); using SC 3-1, we may generate SC 4-5 ($\{0126^{\flat}\}$ or $\{2108^{\flat}\}$), SC 4-6 ($\{0127^{\flat}\}$), SC 5-7 ($\{01267^{\flat}\}$), and so on. All the cluster/6 sets of cardinalities three through six are shown in example 6; asterisks indicate sets which are common throughout

Ecuatorial.²

Example 6 Cluster/6 sets

*SC 3-5 (016)	*SC 5-4 (01236)
*SC 4-9 (0167)	*SC 5-5 (01237)
	*SC 6-5 (012367)
*SC 4-5 (0126)	*SC 6-38/6 (012378)
*SC 4-6 (0127)	SC 6-41/12 (012368)
*SC 5-7 (01267)	SC 6-42/13 (012369)
SC 5-15 (01268)	
*SC 6-7 (012678)	SC 6-2 (012346)
	*SC 6-36/3 (012347)
	*SC 6-37/4 (012348)

Of the two properties defined in this chapter, cluster/6 is clearly the dominant set type. A complete account of all possible vertical "slices" and melodic segments was made in the initial stages of this study, revealing the remarkable fact that cluster/6 comprises 25% of all such sets.

The most common cluster/6 set in Ecuatorial is SC 4-5; it is in fact the dominating pitch-collection of the entire work. SC 4-5 spawns many significant subsets as well: SC 3-1 (m. 1, piano, for example); SC 3-5 (mm. 59-60, voice);³ and SC 3-8 (m.8, trumpet 3).

Sub-properties of the cluster/6 set become important sets themselves: the general cluster property is extended to form large chromatic, or "space-filling" sets at many points in the work (for example, the SC 9-1 in piano

²Cluster/6 sets of cardinality seven and higher occur as well, but less frequently.

³Although SC 3-5 is itself a cluster/6 set, at times its presence is best accounted for as a set dependent upon another note to complete SC 4-5.

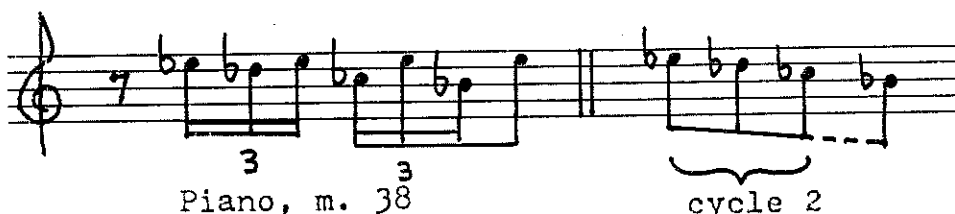
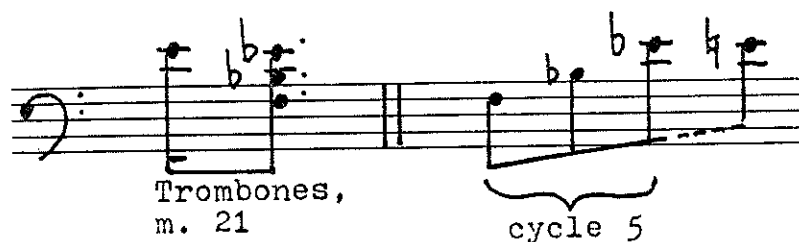
at mm. 194-195). A significant manifestation of the two primary components of the cluster/6 set, the half-step and the tritone, is the continually returning "falling tritones" passage---a stationary ic(1) set against chromatically descending tritones---which makes its first appearance in m. 12. This passage will receive considerable attention in the course of the analysis.

Cycle/1

The second property occurs less frequently, but it occasionally controls certain passages in order to contrast with cluster/6 controlled passages: it is called "cyclic set with ic(1) appendages," or simply "cycle/1." Simply defined, it consists of a cyclic set (an unbroken scale of cyclic interval 2, 3, 4, or 5) of cardinality three or higher plus one pc appended at the upper or lower end of the cyclic set so that the appendage is the outermost pc of the configuration. Two such sets are shown in example 7.

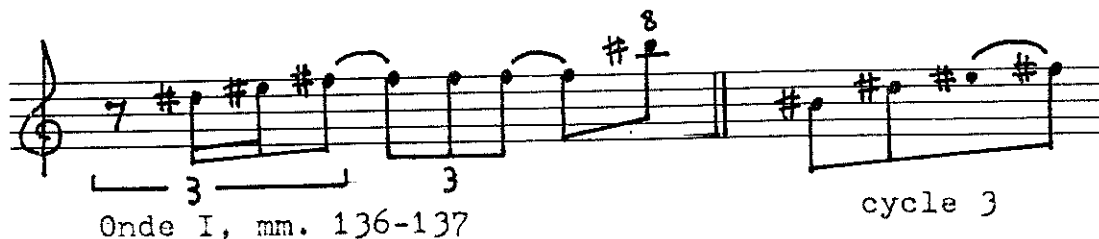
When referred to, these sets will be indicated by a representation of their normal form, ordered in a format which shows the cyclic/appendage property. Both excerpts in example 7 are represented as (741/0): (0147) is the normal form of their set class, SC 4-18; on the left of the virgule is the cyclic set and to its right is the appended pc.

Example 7 Cycle/1 sets in Ecuatorial



There is also a "second order" cycle/1 property set: these are cyclic sets which may have up to two appendages and which may be appended to any member of the series, not just the outermost points. Two instances are shown in example 8.

Example 8 Second order cycle/1 sets in Ecuatorial



A different representation is used for second order cycle/1 sets: the normal form is shown, with appendage pcs indicated by carets. The two excerpts in example 8, for example, are represented by $(\hat{0}13\hat{7}8)$ and $(0\hat{1}36)$, SCs 5-20 and 4-13, respectively. Although the cyclic component is less easy to see in this format, it can be calculated fairly quickly.

A complete list of the first and second order cycle/1 sets of cardinalities four through six is shown in example 9. Two limitations have been placed on the generation of second order cycle/1 sets: 1) No single cyclic member can have more than one appendage; 2) only the outermost members of an $i(2)$ cycle may have appendages, which must occur on the outside of the cycle. The reason for the latter limitation is that inserted pcs in a cycle(2) scale produce chromatic segments, thereby trivializing the cyclic property.

The primary representation of this property set is SC 4-12 ($0\hat{2}36$); it plays a role analogous to SC 4-5 in the cluster/6 family of sets.⁴ SC 4-6 is also an important cycle/1 set: it has the distinction of being common to both the cluster/6 and cycle/1 families of sets, as well as being closely related to the cluster/6 primary representative

⁴The two primary representatives SC 4-5 and SC 4-12 are brought into a close relationship through the "falling tritones" passages (e.g., m. 12, organ and trombones); this feature is discussed in detail on pp. 43-44.

Example 9 First and Second Order Cyclic Sets

FIRST ORDER CYCLE/1 SETS

cycle(2)	cycle(3)	cycle(4)	cycle(5)
4-11 (531/0)	4-18 (741/0)	4-19 (480/1)	4-6 (720/1)
5-24 (7531/0)			5-14 (5072/1)
6-34 (97531/0)			5-23 (5072/3)
			6-32 (07294/5)
			6-33 (07249/3)
			6-247 (49270/1)

SECOND ORDER CYCLE/1 SETS

5-Z12 ($\hat{0}1356$)	4-12 ($\hat{0}236$)	5-Z17 ($\hat{0}1348$)	4-14 ($\hat{0}237$)
6-26 ($\hat{0}13578$)	4-13 ($\hat{0}136$)	5-21 ($\hat{0}1458$)	4-16 ($\hat{0}157$)
	5-10 ($\hat{0}1346$)	5-22 ($\hat{0}1478$)	5-Z18 ($\hat{0}1457$)
	5-Z12 ($\hat{0}1356$)	6-Z19 ($\hat{0}13478$)	5-20 ($\hat{0}1378$)
	5-16 ($\hat{0}1347$)	6-20 ($\hat{0}14589$)	5-29 ($\hat{0}1368$)
	5-18 ($\hat{0}1457$)		6-18 ($\hat{0}12578$)
	5-19 ($\hat{0}1367$)		6-Z24 ($\hat{0}13468$)
	5-22 ($\hat{0}1478$)		6-Z25 ($\hat{0}13568$)
	5-31 ($\hat{0}1369$)		6-Z29 ($\hat{0}13689$)
	6-27 ($\hat{0}13469$)		6-Z48 ($\hat{0}12579$)
	6-Z28 ($\hat{0}13569$)		
	6-Z29 ($\hat{0}13689$)		
	6-30 ($\hat{0}13679$)		

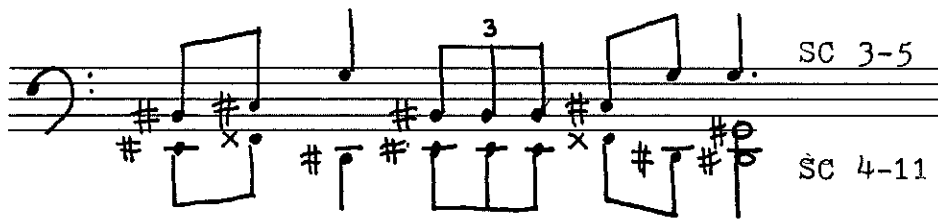
SC 4-5.⁵

Unlike cluster/6 sets, cycle/1 sets only rarely appear as prominent melodic features on the surface of Ecuatorial. While they frequently appear as verticalities, as melodic lines they are mainly restricted to instrumental parts. On

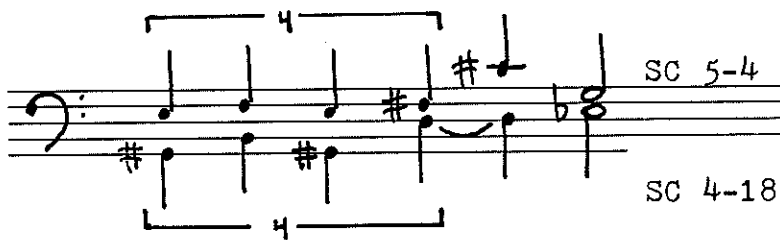
⁵At m. 21 the SC 4-6 in trumpet 1 acts as a pivot between two passages controlled by cluster/6 and cycle/1. Measures 1-20 focus entirely on cluster/6 set 4-5, and at m. 21 the focus abruptly shifts to cluster/1 sets. The prominent melodic SC 4-6 bridges the two by both its dual-property feature and its relationship to SC 4-5.

certain occasions, however, they appear as accompanying^{sf} lines in counterpoint with the lines of the solo bass. Two examples of this are shown below.

Example 10a Measure 86, voice, trombones 2 and 4



Example 10b Measures 176-177, voice, trombone 4



SCs 4-15/29

Although cluster/6 and cycle/1 themselves function as opposing elements and articulate contrasts throughout Ecuatorial, the two all-interval tetrachords play a larger role of contrasting with both property sets: for cluster/6 and cycle/1 share the property of having interval vectors with distributions favoring a single interval class, while SCs 4-15/29 have an equal distribution of interval classes (vector: [111111]).

These two sets are primarily associated with the recurring passage which first appears at m. 80 ("Que Tranquilas"). Example 11 shows how both Z-pairs interact in this passage.

Example 11 Measures 80-81, voice and organ

The image shows musical notation for two staves. The top staff is a vocal line with a treble clef and a colon after the clef. It contains a melodic phrase starting on a whole note G4, followed by quarter notes A4, B4, and A4, and ending with a quarter note G4. The bottom staff is an organ line with a bass clef and a colon after the clef. It contains a harmonic accompaniment consisting of a whole note chord (G4, B4, D5) and a half note chord (G4, B4, D5). A vertical line connects the two staves, indicating a measure-for-measure relationship. The label 'SC 4-15/29' is placed between the staves, and the label 'SC 4-29/15' is placed below the organ staff. A small '8' is written below the organ staff.