Anyone who has listened to Beethoven's "Ode to Joy" or been stirred by "Stars and Stripes Forever" would likely agree that much of music's appeal is its ability to communicate feeling and evoke emotion in ways that words can not. However, this view of music is heavily influenced by the Romantic age and its belief in the importance of emotion and expression. If we turn toward an earlier musical language, we find a compositional system governed by rules and evolved from the vocal nature of early music. The musical language of the Renaissance and Baroque periods is based on the rules of counterpoint and loosely exhibits the characteristics of an axiomatic system.

Greatly generalized, the axiomatic method consists of two steps. Beginning with indefinable terms, a statement or series of statements is made regarding these terms. These statements (or axioms) are not provable, but are accepted as true because they seem intuitively correct (Greenberg 10). Second, the rules of logic are used to deduce further information about the system and the undefined terms. If one can show that a deduction is logically sound and based solely on the axioms given and previous deductions, then that deduction is accepted as true and can be used to obtain further results. In an axiomatic system, all knowledge, whether directly or indirectly, grows from the axioms.

Instinct might not lead us to believe that musical composition is a form of an axiomatic system. The Romantic period (i.e., most of the 19th century) gave us great composers such as Schubert and Chopin, and also embedded in us the idea that music is an emotional art. Composition before the Romantic period, however, was based on a strict set of rules that, when examined, show evidence of the axiomatic system.

The fundamental axioms of counterpoint are:

Definition:

Interval - The distance between two notes. For instance, the interval between C and D is a second, and the interval between C and G is a fifth.

1.) *"When two notes are sounded concurrently, they must be consonant with one another."*

2.) *"If the interval measured from the lower note to the higher note is a unison, 3rd, 5th, 6th, or octave, the interval is consonant."*

The undefined term in these axioms is "consonant." Also undefined, though not used in these axioms, is the term "dissonant." The second axiom above defines certain intervals as consonant, but leaves room for further interpretation because it addresses only five of the eight possible intervals. Moreover, the term dissonant was left without any further clarification.

The earliest music was purely vocal, and throughout the middle ages and Renaissance, vocal music played an enormous role in the development of musical style. the reason for the development of these two axioms was very practical: it was easiest to sing the pieces that followed these rules.

Employing these two axioms, the earliest forms of contrapuntal music were written. (Counterpoint, most simply defined, is the combination of two or more independent musical voices simultaneously.) As we saw in the development of neutral geometry, the first steps seem rather rudimentary. In this same way, the earliest

contrapuntal compositions were based on the two voices in a simple 1:1 relationship as shown in the following example:

EXAMPLE 1

This is the most elementary form of counterpoint. As shown in the analysis above, this composition fits the axioms and was therefore an acceptable work based on the "rules" of counterpoint.

Just as in geometry where certain axioms pertain to incidence, some to betweenness, and others to congruence, early counterpoint also fell into certain classifications, called species. In the example above, for every note in one voice, there was exactly one note in the other voice. This became known as first species. Just as an understanding of the principles of incidence geometry led to betweenness and congruence geometry, first species counterpoint eventually led the way to second species.

Second species counterpoint is based on a 2:1 ratio of notes between two voices. The axioms from first species still apply, but the first axiom specifically requires consonance when notes "are sounded concurrently." In other words, as shown in the example below, just those notes that begin simultaneously must be consonant.

In the example we find the use of 2nds, 4ths, and 7ths, intervals not listed as consonant by Axiom #2. However, they are always used as "passing tones," or the notes that aren't played together. Composers at this time implicitly believed that because 2nds, 4ths, and 7ths weren't defined as consonant they must be dissonant. This belief was based on the assumption that either an interval was consonant or dissonant (essentially applying the "Law of Excluded Middle" to a musical situation). As we will later see, this assumption was later challenged and the result led to the development of another model of counterpoint.

Because music was being written primarily for singers, further axioms developed to make the music more singable.

3.) *In vocal music, any note that leaps (moves by more than one step) to the next note, must be followed by a step in the opposite direction.*

This axiom is demonstrated in Example 3.

EXAMPLE 3

As counterpoint evolved from second species (2:1 ratio of notes), the next logical development was to compose several notes played in one voice against a single note in the other voice. As in second species, it is only important that the notes sounded together (or "on the beat") are consonant. Third species, then, was defined as a ratio of notes greater than 2:1. Example 4 shows a standard form of third species counterpoint (a 4:1 ratio was the most common type of third species written in the Renaissance).

Example 4

Just as adding new axioms and theorems leads to a more complex (though potentially better understood) situation, music expanded from just two voices. This necessitated an expansion of understanding and led to the following corollary:

Corollary 1.) For music in three voices to be consonant, all intervals between the soprano and alto, soprano and bass, and alto and bass must be consonant.

Example 5 shows the complicated task of keeping all parts consonant with all other parts.

Example 5

As contrapuntal writing began to expand to four, five, and even more voices, composers continued to follow the above rule, applying it to all of the voices used in the work. And as the music became more complex and keeping the voices consonant against so many other voices became an increasingly intricate task, the number of theorems and rules increased, providing order to such a complicated system.

Beginning with the Classical period and extending throughout the Romantic period, when emotion within music was greatly stressed, using counterpoint as a compositional tool fell out of favor with most composers and audiences. Even the work of J.S. Bach, the master of Baroque counterpoint, was unplayed and nearly forgotten. Although aesthetic qualities were always important to the composer of a contrapuntal work, composers of the Classical and Romantic periods saw counterpoint as an academic exercise, not as a viable artistic form by itself anymore. The system of counterpoint remained essentially unchanged until the beginning of the 20th century.

As in many fields, the 20th century saw an incredible change in music. Conflicting beliefs about the aesthetic of music (which had been raging since the end of the Romantic era) poured forth from the top composers at the beginning of the century. Important changes in music came from examining a challenging question: What is music? As fundamental questions like this were posed by composers, all parts of music were re-examined, including the notion of consonance.

Part of the new aesthetic developed by 20th century composers was based on a rebirth of counterpoint. Counterpoint in the 20th century, however, developed from a

different "model" than in the Renaissance and Baroque. Implied by the style of early music and the eventual emergence of harmony from the counterpoint in early music is that our second axiom on consonance is an "if and only if" statement. More simply stated, during the 1500-1750s, the intervals of unison, 3rd, 5th, 6th, and octave were the only ones considered consonant (implying 2nds, 4ths, and 7ths were dissonant). While 20th century composers continued to believe that these were consonant intervals, they began to compose based on the belief that an interval that followed an interval more dissonant than itself could be considered consonant. This served to create a fundamental change in the perception of music because no longer was there just consonance and dissonance, but varying degrees of both. The consonance of an interval was based primarily on its relation to the interval before. For example, a 4th might sound more consonant if preceded by a 7th, or less consonant if preceded by a 3rd. "Tonal relativism" became a new model for counterpoint.

Alban Berg, Igor Stravinsky, and Bela Bartok all followed this new model and produced a number of influential works. The example below is taken from Bartok's piano cycle *Mikrokosmos*.

EXAMPLE 6

As we can see, all intervals are used to create a much different sound than in the Renaissance or Baroque period. Though to a modern ear the music might still sound entirely "dissonant", by defining consonance as anything less dissonant that what was before it, Berg created this piece based on the new model.

Some 20th century composers were unwilling to abandon the earlier model of counterpoint and adapted it to suit their own compositional style. If we examine the Fugue (a form of contrapuntal composition) in D-flat by Dmitri Shostakovich, we find that the main melody of the piece contains a large number of chromatic tones and is hardly "singable" (see attached example). However, Shostakovich is careful to write counterpoint which continues to follow the rules established hundreds of years before. The intervals between all of the voices are consonant by the "traditional" definition. Unlike the Berg example, Shostakovich stretches the opening melody of the fugue, but follows all of the rules when new voices enter against it.

It possible that pushing the rules of counterpoint to conform to an axiomatic mold might be too great a stretch. After all, music and these rules were not "deduced" but developed from logical and practical needs. However, the similarities are strong enough that the relationship merits analysis. In a seemingly subjective field like music, it is important to find some points of order and organization to build from. And while any composer can create notes that follow the rules, the *art* of music comes in the ability of the composer to use the rules in order to create an aesthetically pleasing (and sometimes emotional) work.

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