Metric Modulation and Elliott Carter's *First String Quartet*

GEORGE PETER TINGLEY

The elevation of rhythm from a position of secondary to primary structural importance is a major contribution of much twentieth-century music. Although it is often not very well understood, one of the better known techniques to have emerged in the area of rhythm is metric modulation, a device perhaps traceable to several composers, but whose full structural and expressive potential was first tapped by Elliott Carter in his *First String Quartet* (1951). In this study, we shall examine several examples of metric modulation taken from the work. A discussion of how the process fits into the overall structure of the quartet follows.

Definition and Single-line Examples

Metric modulation, briefly defined, is a precise and controlled method of proceeding from one metronomic speed to another. Example 1a demonstrates the stretching of the metric referential from a quarter note or $4 \times 16$th-note equivalent in $\frac{2}{4}$ meter to a $5 \times 16$th-note equivalent in $\frac{10}{15}$ meter. The latter value subsequently becomes the norm of the new quarter note whose length, in effect, is greater than the original quarter note by a ratio of $5:4$. The metronomic speed, exhibiting the same ratio, thus "ritards" from $\frac{\cdot}{\cdot}=80$ to $\frac{\cdot}{\cdot}=64$ (the greater the pulse value, the lower the metronome marking—and so the inverse relationship of $4/5$ with $80/64$).
Example 1. Slowing the Pulse.


\[ \begin{array}{c}
\text{\( J = 80 \)} \\
\text{\( J = 64 \)}
\end{array} \]

b. Basic modulation process.
c. Notation needed to obtain the rhythmic durations of mm. 29-31 in the original tempo.

\[ \begin{align*}
\text{Tempo} & : 4 \text{\ m}\frac{4}{5} (J = 80) \\
\text{Notation} & : \frac{\text{\#} \text{\#} \text{\#} \text{\#}}{\text{\#} \text{\#} \text{\#}} \\
\text{Transposition} & : \frac{29}{32} \rightarrow \frac{30}{32} \\
\end{align*} \]

unit is shortened. Quintuplet 16th notes first become straight 16ths, which are then re-notated as eighth notes. As a result of these adjustments, the new quarter note has shrunk to 2/5ths of its original value, and thus the accelerando metronomically from \( \text{\#} = 64 \) to \( \text{\#} = 160 \) (the shorter the pulse value, the higher the metronome marking—and so, again, the inverse relationship, this time 5/2 with 64/160). As with the earlier example, transposition of the new rhythmic durations into the old tempo proves difficult and impractical.

Polyphonic Examples of Metric Modulation

Metric modulations often involve two or more lines of music, an aspect of the technique which is revealed in one of the composer's own descriptions: "Say, one part in triplets will enter against another part in quintuplets and the quintuplets fade into the background and the triplets establish a new speed . . . " (each new speed may then function as a springboard for another such operation).\(^1\) Carter might very well have been alluding to the passage shown in Example 3.

The quintuplets and triplets are, of course, found in the second and first violins respectively: quintuplet-eighths within \( \frac{5}{4} \) meter, \( \text{\#} = 60 \); triplet eighths within a superimposed \( \frac{5}{4} \) meter, \( \text{\#} = 180 \) (which then become straight eighths in \( \frac{1}{4} \) meter, \( \text{\#} = 180 \)). The 5:9 ratio of characteristic eighth-note motion and 2:3 ratio of quarter-note motion form strong bases of conflict. These incompatible frameworks vie

---

Example 2. Speeding the Pulse.


\[ \begin{array}{c}
 j = 64 \\
 \begin{array}{c}
 \frac{2}{4} \quad \begin{array}{c}
 \text{\textcopyright 1968}
 \end{array} \\
 \quad \text{263} \\
 \quad \text{264} \\
 \quad \text{265} \\
 \quad \text{266}
 \end{array}
\end{array} \]

\[ \begin{array}{c}
 j = 160 \\
 \begin{array}{c}
 \frac{5}{8} \quad \begin{array}{c}
 \text{\textcopyright 1968}
 \end{array} \\
 \quad \text{267} \\
 \quad \text{272}
 \end{array}
\end{array} \]

b. Basic modulation process.

\[ \begin{array}{c}
 j = 64 \\
 \begin{array}{c}
 \begin{array}{c}
 \frac{5}{2} \\
 \begin{array}{c}
 \text{\textcopyright 1968}
 \end{array} \\
 \quad \text{267}
 \end{array}
\end{array}
\end{array} \]

\[ \begin{array}{c}
 j = 160 \\
 \begin{array}{c}
 \begin{array}{c}
 \frac{5}{2} \\
 \begin{array}{c}
 \text{\textcopyright 1968}
 \end{array} \\
 \quad \text{267}
 \end{array}
\end{array}
\end{array} \]

\[ (\frac{5}{2}) = (\frac{10}{4}) = [(\begin{array}{c}
 \text{\textcopyright 1968}
 \end{array}) \text{ or } (\begin{array}{c}
 \text{\textcopyright 1968}
 \end{array})] \]

\[ 5 : \quad 2 \]

\[ \quad \text{\textcopyright 1968} \]
for dominance, with the two parts acting out a kind of mini-drama. After a brief "struggle," the quintuplets fade and the second violin ultimately assimilates the eighth-note speed of the first violin. (The lower parts, moving evenly beneath, provide a metric point of reference for both upper parts, and thus function as a sort of common denominator.) The example illustrates perfectly Carter's extension (or elevation) of the principles of counterpoint from a simply rhythmic level to a metric level.

A metric modulation involving three parts is shown in Example 4. In this passage, a modulation from $J=100$ to $J=140$ is accomplished through overlapping entries of progressively faster rhythms, and the usual types of value equations. The effect is not so much a "tug of war" (as in


\[ J = 100 \quad (J = 150 - J = 40 \quad J = 40) \quad J = 140 \]

\[ \text{VN.I} \]

\[ \text{VN.I} \]

\[ \text{VN.I} \]

\[ \text{bars: 180 - 181 - 182 - 184 - 185 - 186 - 187 - 188 - 189} \]

the previous example) as it is reminiscent of a footrace in which runners, though competing, still agree as to the direction in which they are headed.

Metric Modulation and the Larger Design

The discussion thus far has focused on separate and isolated examples of metric modulation, and has demonstrated the technique as it operates on the micro-structural levels. Metric modulation also plays a significant role in shaping and molding the work's larger design or macro-structure.
A visual representation of the quartet's overall form showing its underlying structure of tempos is shown in Example 5. Various departure and return gestures, ranging from recapitulations within sections to the reprise of the cadenza at the work's conclusion, can be seen to be supported by an analogous tempo scheme. Recurring harmonic and textural relationships also are reinforced through associations with tempo. And in the Variations, tempo (♩=120) functions as a formal delineator, marking the beginning and end of a large unified structural block of 138 measures. Overall, the work's metronomic center is M.M. 42, which serves as the primary referent throughout.

The use and non-use of metric modulation are fundamental to Carter's overall structure of the work as well. The middle portion of the work, without metric modulation, assumes a more stable sense of pulse that contrasts with the metric fluidity of the outer portions.

In summary, the technique of metric modulation serves the following musical purposes in Carter's First String Quartet:

1) Metric modulation is a controlled method of speeding or slowing the pulse, thus rendering the beat supple and elastic.

2) By diversifying metronomic speeds, metric modulation opens up a variety and range of durational values that are either very difficult (see Example 1c) or impossible to exploit in a fixed tempo, and thus makes for a more "chromatic" rhythmic palette.

3) Metric modulation, when used polyphonically, provides a basis for counterpoint in a more extended sense, allowing individual parts to move with greater independence and in greater contrast to one another.

4) The use and non-use of the technique contribute importantly to the work's overall formal definition.

5) Metric modulation makes possible the departure and return of tempos, which constitute an essential and integral part of the work's design (analogous, in this respect, to the modulation of keys in tonal music).
Example 5. Overall Form of Carter's First String Quartet

mvt. I
themes
restatement
\( d = 72, 120 \rightarrow 120, 72, 120 \)

mvt. II
"E major"
"C minor"
\( d = 72 \)
\( d = 72 \)

mvt. III
fragmented canon
reprise
\( d = 72 \)

flash forward
mosaic texture
\( d = 135 \)
\( d = 135 \rightarrow 135 \)

trpl.
\( d = 108 \)
dp1.
\( d = 72 \)

formal delineant
\( d = 120 \rightarrow 120 \)
Example 6. Fluctuations of Quarter-Note Speed in the Fantasia.