

Proportional Tempos in the Concertos of Antonio Vivaldi

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Performers face many challenges when setting tempos in music written prior to the twentieth century. This is all the more true for Baroque music that was written well before the widespread use of pendulum timing systems—precursors to the metronome.¹ It is true that performers are supplied with tempo indications (*Adagio*, *Andante*, etc.), but these are more descriptive of the character of the work than precise metronomic instructions for tempos. There should be little wonder that different performers playing the same composition can render it in wildly contrasting tempos, for without additional guidelines it is only the performer's whim that dictates the speed of the notes. This article will briefly present three wide-spread methods of selecting tempos for Baroque compositions, discuss in more detail a fourth method for selecting tempos, and provide an illustration of tempo selection in a concerto by Antonio Vivaldi.

COMMON APPROACHES TO THE SELECTION OF TEMPOS IN BAROQUE MUSIC

There are three approaches to setting tempos that are routinely employed in the performance of Baroque music today. One approach might best be described as “experiential,” that is, selecting a tempo that feels good, that lies well under the fingers, and provides a good tempo for musical expression. This approach certainly will yield a performance that is competently performed, but it may also bring about tempos that greatly depart from the composer's intent. A second approach might be characterized as “authoritarian,” that is, selecting tempos adopted by recognized performers or experts, who themselves found the tempos experientially or by some other means. Performance traditions often have their start in this second approach. A third approach to setting tempos might best be termed the “historical” approach. This would involve the careful consideration of the writings of performers, composers, theorists and other documents from the time period that shed light on the issue of tempo. While this approach promises to bring us closer to the composer's intent, the precise fulfillment of this approach can be difficult, if not at times unattainable. Let's discuss this third approach in

more detail.

The setting of tempos for Baroque works is not easily clarified by consulting historical sources. In some instances the historical documents discussing tempo are vague, occasionally contradictory, or at least in mild disagreement between authors. Much of the apparent disension between writers might be explained by national differences or by the changing definition of musical terms. Georg Muffat writes that compositions routinely were performed at different tempos depending upon the artist's nationality:

*In directing the measure or beat, one should for the most part follow the Italians [as opposed to the Germans], who are accustomed to proceed much more slowly than we do at the directions **Adagio**, **Grave**, **Largo**, etc., so slowly sometimes that one can scarcely wait for them, but, at the directions **Allegro**, **Vivace**, **Presto**, **Più Presto**, and **Prestissimo** much more rapidly and in a more lively manner.*²

Johann Joachim Quantz writes that the terms indicating tempo changed meaning over a period of time:

*What in former times was considered to be quite fast would have been played almost twice as slow as in the present day. An **Allegro assai**, **Presto**, **Furioso**, &c., was then written, and would have been played, only a little faster than an **Allegretto** is written and performed today. The large number of quick notes in the instrumental pieces of the earlier German composers thus looked much more difficult and hazardous than they sounded. Contemporary French musicians have retained this style of moderate speed in lively pieces to a large extent.*³

Even with the world's best musicologists aiding us it still might not be possible to narrowly define tempos for Baroque compositions based solely upon the evidence in treatises. The interpretation of a single tempo indication as a range of tempos might be the best we can hope for from the historical documents.

A cynic would take this observation as license to perform at any tempo whim dictates. However, a careful balancing of the historical approach with the two other approaches mentioned above would, no doubt, greatly inform a performance. All three approaches have merit and should be considered in the performance of a Baroque composition. One additional approach, however, brings the experiential, authoritative, and historical approaches into a unified equilibrium, a state of balance that can greatly inform the performance.

PROPORTIONAL TEMPOS

David Epstein addresses this issue of tempo by proposing a novel yet historically grounded approach. His book *Shaping Time* advances a theory of proportional tempos that, if correct,

Mvt.	Meter	Tempo (in words)	Tempo (metronome)	Relation 1	Relation 2
I	6/8	Leicht bewegt	♩ =72	← 1:1	← 3:2 (Δ4%)
II	3/4	Langsam	♩ =50		
	2/2	Marsch	♩ =72		
	6/8	Pastorale-Ruhig	♩ =56		

FIGURE 1. Hindemith's *Sonate for Bassoon and Piano*.

would indeed aid the performer in setting tempos for many Baroque works in addition to works from other time periods.⁴ This method of tempo selection should not be viewed as replacing the three approaches mentioned above; rather it provides a concept under which the three approaches could be unified into a new result.

Epstein's 598-page tome employs several arguments to support his proposition that Baroque, Classical, Romantic, and even some twentieth-century composers favored proportional tempos in their works. Historical evidence for proportional tempo is found in the Renaissance concept of the *tactus*, which was largely viewed as a base or fundamental pulse from which other tempos were derived. The German term *takt* in the Classical period also refers to a reigning "master pulse" from which one may depart to related tempos and later return. Tempo designations by Johann Joachim Quantz in his treatise *On Playing the Flute* (1789) illustrate varied tempos relating to a single underlying tempo. In his work Quantz relates tempo to "the pulse beat of the hand of a healthy

person" and further explains that this person be in "cheerful, high spirits" between noontime and evening. A good estimate of this tempo is about 80 beats per minute. Quantz then proceeds to correlate this pulse to Italian tempo designations:

- Allegro assai pulse is a half note
- Allegretto..... pulse is a quarter note
- Adagio cantabile... pulse is an eighth note
- Adagio assai pulse is a sixteenth note⁵

Here the tempo relationships are 2:1 between adjacent entries. For instance, Quantz specifies that one half note in Allegro assai takes the same time as one quarter note in Allegretto. In the treatise he goes on to relate other Italian tempo indications to these four terms, some with 3:1 and 3:2 tempo relationships.⁶ In addition to Quantz, other writers from various countries also present tables of tempos or other indications that contain proportional tempo relationships.⁷

David Epstein further bolsters his concept of proportional tempo with discussions of musical scores, psychology, physiology, and the music of different world cultures. I will not attempt to summarize all this material here, since this would draw us away from the focus of our article: setting tempos for compositions by Vivaldi. In brief Epstein's thesis is that simple proportional tempo relationships such as 1:1, 1:2, 2:3, 3:4 are preferred over complex tempo relationships such as 5:6, 6:7, 7:8, etc. for cultural, physiological, and psychological reasons. The reader may refer to the numerous examples he gives in his book from Western and world music cultures.⁸ Here are some examples of tempo relationships I have come across recently. The popular Beatles' song, "Lucy in the Sky with Diamonds" presents an almost perfect 3:2 tempo relationship between the opening verse (quarter note =135) and the chorus (quarter note =91). Hindemith's *Sonate for Bassoon and Piano* exhibits 3:2 and 2:3 tempo relationships in addition to 1:1 relationships (Figure 1). Hindemith makes the 2:3 tempo relationship explicit with the eighth-note triplets in the piano at the end of the *Langsam* movement (see the arrow in Figure 2). The speed of the eighth notes in the triplet approximates the speed of the quarter notes in the *Marsch*.⁹ More complex tempo relationships are much rarer in popular or vernacular musi-



FIGURE 2. Eighth-Note Triplets in the Piano Leading to the Marsch in Hindemith's Sonata.

cal cultures, but these simpler relationships are quite numerous. David Epstein maintains that proportional tempo should be an underlying assumption for the performance of much of Western music, since a preponderance of evidence points to this being the practice.

The historical evidence supporting proportional tempos is further documented by other discoveries. William Malloch presents research on a catalogue of music written for a remarkable instrument called the "barrel organ" or "machine organ."¹⁰ The organ was built by a well-known London watchmaker named Cumming (1722-1814) for John Stuart (1712-1792), the third Earl of Bute. The organ was built to receive interchangeable barrels, each containing no more than 12 minutes of music. John Christopher Smith (1712-1795), whose choices represented the best of mid-18th century English tastes, supplied the programming and tempos for all the barrels. This "player organ" unfortunately is no longer in existence. However, the catalogue of the music and the timings of each composition have survived. From this catalogue William Malloch carefully works out tempos for each of the compositions. Malloch concludes in his research that the tempos were freely chosen and all appear spontaneous as if performed live. The tempos were not sped up or slowed down to fit each barrel.

This remarkable bit of research furnishes us with tempos of works by several Baroque

composers. The documentation of Handel's compositions is perhaps the most significant aspect of the find, since many of the barrels were created in 1762, within three years of Handel's death. For our discussion here, however, we are fortunate that several works by Vivaldi were included on the organ barrels. The documentation for tempos of two Vivaldi oboe concertos is of particular interest to IDRS members.

For the purpose of our study let us consider only simple tempo relationships of 1:2, 1:3, 1:4, 2:3 or their converse 2:1, 3:1, 4:1, or 3:2.

In addition we will limit the simple relationships to tempo deviations of 4% or less. The figure 4% or less is not capriciously chosen on my part. The standard metronome features gradations of tempos generally of 4-5%. In the course of the metronome's development these gradations were chosen as significant tempo differences. We will adopt the gradations contained in this tempo measurement device for our study as well.

Records of the barrel organ contain tempos for nine complete Vivaldi concertos. I have relied on William Malloch's unpublished calculations for the tempos of the works by Vivaldi to generate the figures in this article.¹¹ As an example of how the simple tempo relationships work, please consider Figure 3. Note in Figure 3 that the first and second movements of Vivaldi's *E Major Violin Concerto* are in a 3:2 tempo relation-

Mvt.	Barrel/Pc.	Meter	Tempo (in words)	Malloch's Tempos	Relation 1	Relation 2
I	7-2	C	Allegro non molto	♩ = 106		
II	7-3	C	Largo	♩ = 71		
III	7-4	3/8	Allegro non molto	♩ = 57		

FIGURE 3. Vivaldi's *Concerto in E Major for Violin, Strings and Cembalo*. (F.I, no. 48; P. 242).

ship with a 0.9% deviation. This relationship fits our criteria for a simple tempo relationship with less than a 4% deviation. The relationship between the first and the third movements, however, does not meet our criteria since the deviation is greater than 4%.

Number of Simple Tempo Relationships Between Movements	Number of Concertos
0	3
1	5
2	1

FIGURE 4. *Tabulation of Simple Tempo Relationships Between Movements in the Nine Complete Vivaldi Concertos.*

Figure 4 gives a tabulation of the number of simple proportional tempos contained in the nine complete Vivaldi concertos on the barrel organ. You will note that two thirds of the concertos contain at least two movements in a simple tempo relationship.¹² It is interesting to note that all but one of these concertos feature this relationship between the first and second movements.¹³ Apparently it is normal for the third movement to deviate from the coupling established by the first two movements.

In Figure 4 you will note that three of the concertos do not have simple relationships within the 4% deviation. The C Major Violin concerto has three simple tempo relationships with less than a 6% deviation (Figure 5), but none within the 4% criteria. Ironically for IDRS members the other two concertos that do not conform are written for oboe (Figures 6 and 7). These are the only concertos by Vivaldi for wind instruments that were included in the organ barrels. The fermata passage (which calls for a cadenza) at the end of the second movement (Figure 8) might explain the lack of proportional tempos in the F. VII, no.14 concerto.

Mvt.	Barrel/Pc.	Meter	Tempo (in words)	Malloch's Tempos	Relation 1	Relation 2
I	10-1	C	Allegro	♩ = 151	← 1:1 Δ5.2%	← 2:1 Δ5.2%
II	10-2	3/8	Largo	♩ = 136		
III	10-3	3/8	Allegro	♩ = 72	← 2:1 Δ5.6%	

FIGURE 5. *Vivaldi's Concerto in C Major for Violin, Strings, and Cembalo (F. I, no. 198; P. 5).*

Mvt.	Barrel/Pc.	Meter	Tempo (in words)	Malloch's Tempos	Relation
I	11-1	2/2	Allegro	♩ = 66	← 1:3 Δ3.8%
II	11-2	2/2	Adagio	♩ = 48 (if ♩ = 50)	
III	11-3	12/8	Adagio	♩ = 156	

FIGURE 6. *Vivaldi's Concerto in Bb Major for Oboe, Strings, and Cembalo (F. VII, no. 14; P. 331).*

Mvt.	Barrel/Pc.	Meter	Tempo (in words)	Malloch's Tempos	Relation
I	11-1	2/2	Allegro	♩ = 62	No appreciable tempo relations
II	11-2	C	Adagio	♩ = 35	
III	11-3	3/8	Adagio	♩ = 75	

FIGURE 7. *Vivaldi's Concerto in Bb Major for Oboe, Strings, and Cembalo (F. VII, no. 15; P. 334).*

If greater time is taken at the end of the movement than Malloch calculated this would mean that the rest of the movement is performed slightly faster. If we assume a tempo of 50 then the last two movements are in a 1:3 relationship

FIGURE 8. The end of the second movement to Vivaldi's *Bb Major Oboe Concerto, F. VII, no. 14*

(see Figure 6). However, in the other *Bb* oboe concerto, F. IV, no. 10 (Figure 7), the movements do not appear to be in any simple tempo relationships whatsoever. This points out that while simple tempo relationships are a useful guideline for many of Vivaldi's concertos, it is not mandatory that all concertos contain them.

APPLICATION

I have chosen Vivaldi's "La Notte" (The Night) bassoon concerto (F. VIII, no. 1; P. 401) as an example of how to prepare the performance of a Vivaldi concerto applying the four approaches to tempo selection made above. This concerto is one of his more complex compositions, featuring multiple tempos in a single movement and a great variety of contrasting materials.

1) Experience the composition yourself and arrive at a range of tempos for each movement or section that are comfortable for your musical expression and technical fluency.

The opening of the work (Figure 9) is most

FIGURE 9. Bassoon Part to Vivaldi's "La Notte" (f. VIII, no. 1; P. 401), mm 1-2.

expressive at a tempo of a quarter note = 40-50 with my preference for the slower portion of the tempo range. If it gets any slower it is too lethargic, any faster and it is no longer *Largo* in feeling—at least to me. The dotted-eighth and sixteenth-note figure should be double dotted (double dotted-eighth note followed by a 32nd note). By the way, I play all the notes Vivaldi wrote for my instrument when I perform his concertos—this includes any "tutti" sections. My reasons for this are detailed in my past article in this journal.¹⁴ The *Andante molto* (Figure 10) is most comfortable in the range from quarter note

FIGURE 10. Bassoon Part to Vivaldi's "La Notte" mm 11-12.

= 56-72 with my preference again for the slower tempos. The fermatas in this section are opportunities for cadenzas. The first fermata could be a short violin cadenza. The second fermata a short cello cadenza. The last fermata in measure 19 could be a bassoon cadenza such as the one in Figure 11. The *Presto* starting at measure

FIGURE 11. Ewell's Cadenza for Measure 19 of "La Notte"

20, "I Fantasmi," (Nightmares, Apparitions) is cleanest at the tempos of a quarter note = 72-88 with the faster tempos preferred by me. Any faster tempo than a quarter note = 88 lacks clarity, especially with the quickest figures (Figure 12). The final *Presto* in measure 55 to the end could be played at a wide tempo range of dotted-

FIGURE 12. Bassoon Part to Vivaldi's "La Notte" mm 31-32.

quarter note = 88-120. I play the *Adagio* in measures 80 and 81 freely (Figure 13), with a rather

FIGURE 13. Bassoon Part to Vivaldi's "La Notte" mm 80-81.

long cadenza. Note the similarity of these measures to the end of the 2nd movement of the Oboe Concerto FVII, no. 14 contained in Figure 8. Figure 14 gives my cadenza for these measures. The first line occurs during the first fermata half



FIGURE 14. Ewell's Cadenza for the Adagio in "La Notte"

note, the second line during the second fermata half note, and the last line during the fermata whole note.

The editors of the *Urtext* version of "La Notte" contained in the Ricordi Vivaldi collection (Tomol2) mark the tempo of the next movement *Andante molto*. A slower tempo for this movement called "Il Sonno" (Sleep) seems most appropriate and I have selected the tempo range at a quarter note = 48-58 with my preference for the slower tempo markings particularly in order to add some ornamentation. The last movement, "Sorge L'Aurora" (Rising Dawn) marked *Allegro*, seems best at quarter note = 84-100 with my preference for the faster tempos.

2) Familiarize yourself with tempos set by other performers to glean their perceptions of the work.

Listening to recordings made by other performers can help define the tempos you will choose. The article by Todd Goranson contained in this journal issue also supplies tempos for many recordings of the Vivaldi concertos. When judging the tempos selected by a performer you should also judge the quality of the performance and if possible the training and reputation of the performer. The International Double Reed Society journals are an excellent resource for professional reviews of double reed recordings. Members of International Double Reed Society can initiate a search of the journals available on the IDRS web site (www.idrs.org). A search for

Daniel Smith, for instance, will yield numerous reviews of his recordings from which one could arrive at an informed judgement concerning the quality of his recordings. A further resource that might be helpful is the IDRS "Who's Who" found at the URL <http://www.idrs.org/www.idrs/registration/ww6.taf>. This is a database of professionals, amateurs, students, and enthusiasts who have performed at IDRS conferences in recent years or whose biographical information appears in the IDRS journals. A search for Gábor Janota, for instance, will yield some biographical information on the performer.

Figure 15 summarizes the tempo ranges I choose for "La Notte" and compares them to the tempos of other performers and publications of the work.¹⁵ You will note the wide variance in tempos between the performers, particularly in the *Andante molto* section (mm. 11-19). Gábor Janota performs this section more than twice

Mvt	Indication	Tempo Range by Ewell	Janota (recording)	Ghedini (music)	Smith (recording)
I?	<i>Largo</i> 4/4	♩ = 40-50	♩ = 31 (♩ = 62)	♩ = 52	♩ = 48
	<i>Andante molto</i> 4/4	♩ = 56-72	♩ = 31 (♩ = 62)	♩ = 72	♩ = 48
II?	<i>Presto</i> 4/4	♩ = 72-88	♩ = 82	♩ = 96	♩ = 108
	<i>Presto</i> 3/8	♩ = 88-120	♩ = 82	♩ = 120	♩ = 108
	<i>Adagio</i>	ad lib.	ad lib.	ad lib.	ad lib.
III?	[None] 3/4	♩ = 48-58	♩ = 66	♩ = 44	♩ = 42
IV?	<i>Allegro</i> 4/4	♩ = 84-100	♩ = 112	♩ = 100	♩ = 120

FIGURE 15. A Comparison of Performance Tempos for "La Notte" (F. VIII, no. 1; P. 401)

as slow as G. F. Ghedini recommends. Clearly these two interpretations project a different mood in this section. Janota's recording of the concerto emphasizes exact simple tempo ratios: 1:1 between the *Largo* and *Andante Molto*, 1:1 between the two *Prestos*; and 2:1 between the last two movements, "Il Sonno" and "Sorge l'aurora." His pairings create three major divisions in the concerto. G. F. Ghedini does not recommend simple tempo ratios anywhere in this work. On the whole Ghedini prefers faster tempos with the exception of "Il Sonno." Daniel Smith's recording pairs the *Largo* and *Andante Molto* and the two *Prestos*, otherwise there are no simple tempo ratios.

3) Search for historical evidence that clarifies the tempos in the work.

An understanding of period instruments, a study of source materials from the period, a

knowledge of dance forms, etc. may all help to inform the performer about stylistic decisions in Baroque music and ultimately help to shape decisions about tempo. For instance, the need to provide further variety and ornamentation in the “Il sonno” section of “La Notte” compels me to select a slower tempo than Janota.

Figure 16 correlates Vivaldi’s tempo indications with metronomic markings derived by Malloch. I have included all the tempo indications from the complete and the incomplete concertos by Vivaldi contained in the records of the barrel organ. The tempo markings with the greatest number of entries (Largo and Allegro in common time) underscore the statement made at the beginning of this article that tempo indications are more indicative of mood than actual tempo. A study of Malloch’s metronomic indications with the actual works can be quite instructive for general information and developing a sense of proper tempo for stylistic figures. For

particular pieces the metronomic indications are quite informative. For instance, if I were performing either of the Bb Major oboe concertos (F. VII, 14 and 15) I would carefully consider the tempo markings given by Malloch (Figures 6 and 7). This does not mean that I would be bound by them, but they do furnish excellent information on period practice in London and clearly should be taken into account.

4) Examine the range of tempos and the information you have gleaned to see if an arrangement of proportional tempos will unify the composition. Be particularly sensitive to the relationship between the first and second movements of the concerto by Vivaldi, since these are the movements most likely to be in a simple proportional relationship.

Interpreting “La Notte” is challenging and indeed rewarding because it departs from the three-movement concerto form in many ways. It is difficult in fact to divide the work into distinct movements at all since all portions of the work are linked in one manner or another. For instance, the *Andante molto*, the last *Presto*, and the *Adagio* all end on the dominant chord which leads directly to the tonic of the next sections. Also the “sleepy” Bb ending in “Il Sonno” in the bassoon, cello, and bass is retained in the start of “Sorge L’Aurora.” Since these two movements are so closely linked, I see little reason for any substantial pause between them. In other words an *attacca* is called for here, with only a breath separating the movements. Despite the links Vivaldi gives between sections of the piece, setting appropriate tempos for the varied musical materials and tempo indications is far from obvious. The four performers’ suggestions or editors given in this article differ quite dramatically.

Let’s more closely examine the tempos chosen by Ghedini, Janota, and Smith. The tempos suggested by Ghedini do nothing to solidify the disjoint nature of this composition. Some of his tempos are

Vivaldi's Tempo Indications	Meter	Malloch's Metronomic Indications
Largo	C	♩ = 32, 35, 35, 46, 72
Largo	3/4	♩ = 68, 69
Largo	3/8	♩ = 76, ♩ = 45
Largo cantabile	3/4	♩ = 73
Larghetto e spiritoso	3/4	♩ = 48
Grave	2/2	♩ = 66
Adagio	C	♩ = 65
Adagio	2/2	♩ = 48
Aria: Andante	C	♩ = 66
Andante	3/4	♩ = 48
Allegro non molto	C	♩ = 100
Allegro non molto	3/8	♩ = 57
Allegro	C	♩ = 109, 112, 123, 131, 136, 151, 170
Allegro	2/2	♩ = 62, 66
Allegro	3/4	♩ = 136, 153
Allegro	2/4	♩ = 134, 137
Allegro	12/8	♩ = 156
Allegro	6/8	♩ = 77
Allegro	3/8	♩ = 72, 75
Allegro assai	2/4	♩ = 146

FIGURE 16. Vivaldi's Tempo Indications in Concertos correlated with Malloch's Metronomic Indications.

appealing to me for musical expression and technical comfort, but overall the work receives no unification through his metronomic choices. Janota's interpretation of the work, however, does unify the work in quite an interesting way. His choice of tempos creates three relationships in the work: 1) *Largo-Andante molto*, 2) *Presto-Presto (Adagio)*, 3) "Il sonno"-*Sorge l'aurora* (Allegro). The record jacket to Janota's recording does not specify how many movements are in the work, but it is likely he considers "Il sonno" and "Sorge l'aurora" separate movements, thus he might advocate four movements. Smith specifies that the work has four movements: 1) *Largo-Andante molto*, 2) *Presto-Presto (Adagio)*, 3) "Il sonno" 4) "Sorge l'aurora" (Allegro). Smith uses 1:1 tempo relationships between the *Largo-Andante molto* and then 1:1 relationships between the two *Prestos*. One of the weaknesses of Janota's and Smith's interpretations is that they perform the opening *Largo* and the *Andante molto* at the same tempo. This seems to contradict the distinction Vivaldi made with the different tempo indications.

My interpretation creates a two-fold division of tempos in the work (Figure 17). I unify what I call the first and second movements by simple tempo relationships. What I identify as the third and fourth movements are also unified by a simple tempo relationship. I view the first movement as an introduction (*Largo*) followed by a recitative (*Andante molto*). This recitative section is performed rather freely with rubato rather than a stricter tempo in the preceding *Largo* or the following *Presto*. Janota's and Smith's performance of the two *Prestos* (second movement) in the same tempo does provide important unification to the work. Indeed this is quite a viable solution. However, given the "fantastic" nature of these night visions I prefer to push the tempo of the last *Presto* just a bit faster. This faster tempo provides a compelling conclu-

sion to the unified tempos I have in the first and second movements and accentuates the abrupt halt before the *Adagio* measures 80-81 (Fig. 13). I avoid simply playing the last *Presto* as fast as I can, instead I prefer to link the tempo to the earlier portion of the movement.

My choice to link the last two movements ("Il Sonno" and *Sorge L'Aurora*) in a 1:2 ratio parallels Janota's sensibilities. I choose the slower tempos to emphasize the lyric quality of the second movement and to provide an opportunity for ornamentation. Janota chooses the faster tempos to emphasize the virtuosic quality of the last movement. This makes sense for Janota since he does not ornament "Il Sonno." Both choices have their merits.

CONCLUDING REMARKS

The preceding discussion of "La Notte" underscores the need for a flexible approach to the application of proportional tempo. Just as dogmatic adherence to other methods of setting tempos (experiential, authoritarian, historical) will yield stiff and unmusical results, a procrustean insistence that all tempos of a work adhere to a single underlying beat or proportional relationships will also lead to poor results. William Malloch commends John Christopher Smith for his good musical taste in his selection of the tempos for compositions on the machine organ:

There appear to be the very healthy vestiges of a flexible tactus uniting much of the contents of all 54 barrels. It is an elastic tactus... a pair of very gentle and practiced Baroque hands doing the stretching.

Likewise it should be our aim to apply the principle of proportional tempo to our performances in a flexible and knowledgeable manner. With all four approaches to selecting tempos carefully considered, the musician can make wise performance choices.

Mvt.	Indication	Tempo	Relation 1	Relation 2
I	Largo 4/4	♩ = 40	← [2:3] ←	← [1:2] ←
	Andante 4/4	♩ = 60		
II	Presto 4/4	♩ = 80	← [1:1 △10%] ←	← [1:2] ←
	Presto 3/8	♩ = 88		
	Adagio	ad lib.		
III	[None] 3/4	♩ = 50	← [1:2] ←	
IV	Allegro 4/4	♩ = 100		

FIGURE 17. Ewell's Proportional Tempos for "La Notte".

END NOTES

1. Frédéric Thiémé and C. Mason are credited with the development of timing systems in 1801 and 1806 respectively. Timing machines created by Sauveur in 1701 and Michel L'Affillard 1697 received some notice in scientific circles, but evidently were not widely used for music at those times. See

David Epstein, *Shaping Time* (New York: Schirmer Books, 1995), pp. 111-116.

2. Georg Muffat, "Auserlesne Instrumental-Music," in Oliver Strunk, *Source Readings in Music History* (New York: W. W. Norton & Company, 1950), p. 451.

3. Johann Joachim Quantz, *On Playing the Flute*, translation by Edward T. Reilly (New York: Schirmer Books, 1966), p. 283.

4. David Epstein, *Shaping Time* (New York: Schirmer Books, 1995).

5. Quantz, *On Playing the Flute*, p. 285. These tempos may be most accurately applied to Quantz's own compositions.

6. *Ibid.*, pp. 286-287.

7. Epstein, *Shaping Time*, pp. 112-126.

8. See Epstein, *Shaping Time*, chapters 6 through 9.

9. If Hindemith had chosen a tempo of 48 for the *Langsam* the 2:3 relationship would be exact. This technique of matching the speed of note values in a prior tempo to the speed of note values in a new tempo is termed "metric modulation" in the music of Elliott Carter.

10. W. Malloch, "The Earl of Bute's machine organ: a touchstone of taste," *Early Music* 11/2 (April 1983): 172-194.

11. I am grateful to David Epstein for supplying me with William Malloch's unpublished notes.

12. The B minor Concerto for Four Violins (F. IV 10) features two simple tempo relationships according to Malloch's notes. However, the third movement contains three different tempos (*Larghetto*, *Adagio*, and *Largo*) casting doubt on whether any tempo can precisely be determined from the length of the third movement.

13. The exception is the E Major Concerto for Violin (F. I, 48), which features a 1:3 relationship between the tempos of the 2nd and 3rd movements, quarter note=46 and quarter note =137 respectively.

14. "Playing those 'Missing' Notes in Baroque and Classical Concerti," *The Double Reed* 20/1 (1997): 85-90. This article is also available on the IDRS Web site at: <http://idrs.colorado.edu/Publications/DR/DR20.1.pdf.code1/DR20.1.1997.pdf>.

15. The two recordings: *Antonio Vivaldi: Six Concerti for Bassoon and Strings and Harpsichord*; Gábor Janota, bassoon; Liszt Ferenc Chamber Orchestra, Frigyes Sándor, conductor (Hungaroton SLPX11643). *Vivaldi: Concerti for Bassoon and Orchestra, Vol. III*; Daniel Smith, bassoon; English Chamber Orchestra, Philip Ledger, conductor (Musical Heritage Society Compact Disc 513082L). The published music: *Vivaldi Concerto "La Notte" for Bassoon and Piano*, edited by G. F. Ghedini (New York: International Music Company, 1951).