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UNIVERSITY OF NORTHERN COLORADO

Greeley, Colorado

The Graduate School

PROPORTIONAL SIGNS IN THE WORKS OF HEINRICH SCHÜTZ

A Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Arts

Jang Woo Park

College of Performing and Visual Arts
School of Music
Music History and Literature
May, 2010

THIS DISSERTATION WAS SPONSORED
BY

Deborah Kauffman, D.M.A.
Research Advisor

Jang Woo Park

DISSERTATION COMMITTEE

Advisory
Professor _____

Jonathan Bellman, D.M.A.

Advisory
Professor _____

Robert Ehle, Ph. D.

Faculty Representative _____

Joonok Huh, Ph. D.

Assistant Vice President for Research
Dean of the Graduate School & International Admissions

Robbyn R. Wacker, Ph. D.

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ABSTRACT

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Some time signatures used in the *Neue Schütz Ausgabe* (Bärenreiter, 1955–2008) differ from both modern signatures and contemporary mensuration signs, obscuring Schütz's original intentions. A review of the history of proportion signs from the late 14th century to the 17th century shows that the four basic mensuration signs of the late 14th century were the foundation of the proportion system throughout the period, and that the proportion signs of the 16th and 17th century were adaptations of *modus cum tempore* signs and fractions. Although confusion was created through misunderstandings of the meanings of the signs and by attempts to reform the system, the original meanings of the mensuration-proportion signs were retained throughout the period.

A study of the proportion signs used in the *Psalmen Davids* (1619) and in the *Symphoniae Sacrae III* (1650), as well as several signs found in a few of his other works, shows that Schütz's notation is within the conventional practice of mensuration-

proportion notation. Some of Schütz's signs are open to more than one interpretation, requiring an explanation of possible interpretations of the signs and some suggestions for modern performance.

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CHAPTER I

INTRODUCTION















At first glance, some of the meter signs used in the volumes of the Heinrich Schütz *New Complete Works* (*Neue Ausgabe sämtlicher Werke*) may seem strange when viewed from the standpoint of modern notation. In fact, the signs in the complete works volumes are not modern time signatures at all, but modified versions of the original mensuration-proportion signs used by Schütz. The editors who transcribed the original notation into modern modified them to convey to modern readers, scholars, and performers the proportional relationships inherent in the original signs. Although the introduction to the complete works provides common principles used in the transcriptions, each editor has applied slightly different methods to the interpretation of the mensuration-proportion signs. Some of these interpretations have gone rather far from Schütz's intentions, even sometimes obscuring the meanings of the original signs, thus leading performers to misunderstand the relative tempi of sections of music within a piece. In order to solve this problem, it is necessary to recognize that Schütz followed the

traditional mensuration-proportion practice, which is strongly based on the concept of the invariable uniform tactus and the original meanings of the mensuration signs.

Although great confusion on the interpretation of proportion signs existed throughout the era of the proportional practice—from the early fourteenth century to the early eighteenth century—and a strong transitional tendency from proportional practice toward the modern notational system was a mainstream throughout the seventeenth century, the discussions of the proportional signs presented in the writings of some of Schütz's predecessors and contemporaries support his use of the signs within the tradition of mensuration-proportion practice, in which the original meanings of the mensuration signs are clearly retained: In particular the two treatises of Adriano Banchieri, *Conclusioni nel suono dell'Organo* (1609) and *Cartella musicale* (1614), strongly advocate the mensuration-proportional practice.

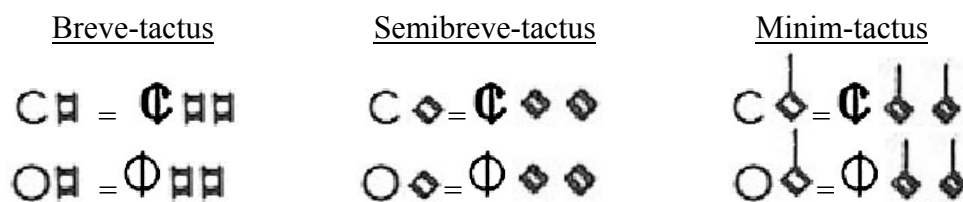
In this tradition, the mensuration-proportion signs are derived from the earlier mensuration signs which are basically associated with the concept of tactus, although the appearance of the term "tactus" in the written sources occurs much later than the beginning of the use of the mensuration signs (around the 1250s). Giorgio Anselmi is the earliest theorist who discusses the tactus concept in 1434 in his *De musica*. The tactus is the regular beating of time, used from the very beginning of mensural notation; the

invariable uniform tactus concept was confirmed mainly for church vocal polyphonic music in the late fifteenth century. Throughout the practice of the tactus, its speed was generally considered to be equal to the pulse rate of a healthy person breathing under normal conditions—that is, about 60 beats per minute. There are basically two kinds of tactus: the equal and the unequal. In the equal tactus, the length of time for the down motion and the up motion of a tactus is the same, resulting in a duple subdivision. The unequal tactus uses the same two motions, down and up, but the down motion lasts twice as long as the up motion, thus a triple subdivision.

The four basic mensuration signs used from around 1340—, , , and —were replaced by the signs , , , and  in the late fourteenth century; a detailed explanation of these is given in chapter II. In the late fourteenth and the early fifteenth centuries, only eight proportions, possibly indicated by the mensuration signs alone, were used: *dupla* (2/1), *tripla* (3/1), *quadrupla* (4/1), *sesquialtera* (3/2), *sesquitertia* (4/3), *sesquioctava* (9/8), *dupla sesquiquarta* (9/4), and *dupla superbipartiens tertia* (8/3). Numeral fractions, which began to be used as proportion signs in the early 15th century, gave composers a chance to try other proportions than the eight common ones. Other types of signs, such as ₂, ₃, ₂, ₃, ₂, or ₃, called *modus cum tempore*, also began to be used as proportion signs from around 1420. They indicated *modus* (the

mensuration of a longa into either perfect or imperfect subdivision) and *tempus* (the mensuration of a breve into either perfect or imperfect subdivision); a more detailed explanation of these signs is given in chapter II.

By about 1430, numbers and numerically or graphically modified mensuration signs, such as 2, 3, C_2 , C_3 , C_3 , or C_3 , were added to the pre-existing proportion signs. Around this time, the O and C signs were commonly used to designate the *integer valor*, a standard note value to which proportions are compared, with a semibreve tactus. Other signs were compared to them to create proportional relationships: for example, in the proportion indicated by the C sign (*integer valor*) followed by the C_2 sign, two semibreves under C_2 sign are sung in the time duration of a semibreve under the *integer valor*, the C sign, creating the *dupla* (2/1) proportional relationship. The addition of a stroke through any sign (called a cut sign), such as the C sign or C sign, represents *diminutio dupla*, resulting in a doubling of the number of basic unit notes within a tactus (see Ex.1.1), effectively doubling the tempo.



Ex.1.1 The Cut Signs

Theorists in the late fifteenth century, influenced by the rebirth of the mathematics of Boethius, theorized complex proportions that were not adopted into actual proportional practice. During the same period, reformers of the notational system, represented by Tinctoris and Gaffurius, tried to change the conventionally non-cumulative successive-proportional relationship, in which a succession of more than one proportional relationship within a piece was interpreted as non-cumulative, to a cumulative practice, in which each successive proportion is cumulative. This follows the principle of the Hindu-Arabic fraction, which had become a commonly recognized feature of mathematics. Although some followers of the reformers practiced the cumulative relationship of successive proportions, others continued using the conventional non-cumulative practice, creating an element of uncertainty in how to interpret proportion signs for any given piece of music.

In addition to the pre-existing confusion of the use of proportion signs created by individual interpretation without uniform understanding, the occurrence of the minim tactus by the mid-sixteenth century creates even more uncertainty; notation under the C and C signs became identical when using the minim tactus. Confusion about the interpretations of proportional relationships when used when the semibreve is divided into three (called major prolation, represented by the signs C and C) or into two

(called minor prolation, represented by the signs, **C** and **O**), which began in the early fifteenth century, continued into the sixteenth and seventeenth centuries. However, the interpretation of these relationships based on the original mensuration meanings of the signs was never entirely given up by some composers.

By the mid-sixteenth century, the five simplest proportions—*dupla* (2/1), *tripla* (3/1), *quadrupla* (4/1), *sesquialtera* (3/2), and *sesquitercia* (4/3)—were used most commonly, with the more complex proportions avoided, due to their difficulty in singing. By the late sixteenth century, the **O** sign was no longer used as the initiating sign (*integer valor*), leaving the **C** and **Φ** signs as the only initiating signs. In the early seventeenth century, Adriano Banchieri pointed out the incorrect use of proportion signs and provided a correct and systematic interpretation of proportion signs based on the conventional mensuration-proportion practice, in which the original mensural meanings of the mensuration signs, used as proportion signs, were clearly retained:

$C \rightarrow C \frac{3}{2}$, $C \rightarrow C \frac{3}{1}$, $\Phi \rightarrow \Phi \frac{3}{2}$, $C \rightarrow C_{6/4}$, $C \rightarrow \Phi \frac{3}{2}$, $C \rightarrow \Phi \frac{3}{2}$, $\Phi \rightarrow$
 $\Phi \frac{3}{2}$, $C \rightarrow \Phi \frac{3}{1}$, $C \rightarrow C \frac{3}{2}$, and $\Phi \rightarrow C \frac{3}{2}$. These are discussed in more detail in

Chapter II, section 3.

The proportion sign, a combination of a mensuration sign and a fraction, such as $C \frac{3}{2}$, or just a fraction, such as $\frac{3}{2}$, or even just a number alone, such as 2, signals a

change of the number of unit notes within the tactus, with the lower number of the fraction representing the number of unit notes in the tactus under the *integer valor*, and the upper number representing the number of unit notes in the tactus under the proportion.

Throughout the entire era of proportional notation, six proportional indications, $C \rightarrow C \frac{3}{2}$, $C \rightarrow C \frac{2}{1}$, $C \rightarrow C \frac{3}{1}$, $O \rightarrow \Phi$, $C \rightarrow \Phi \frac{3}{2}$, and $C \rightarrow \Phi \frac{3}{1}$, were most commonly used within the conventional mensuration-proportion practice.

Nevertheless, theories about the proportional signs developed differently in different regions; sometimes theorists even within a same region developed different theories. The diversity of theories about proportion signs, and the fact that Schütz never discussed his own practice, creates some difficulty in interpreting his use of the signs. The goal of my research is to demonstrate that Schütz's use of the proportion signs followed the tradition of the older mensuration-proportion practice inevitably associated with the concept of tactus and the original meaning of mensuration signs.

To do this, it will be important to discuss the predominating conventions of proportional signs with which Schütz would have been familiar. Afterwards, through the study of exemplars of the original publications of *Psalmen Davids* (1619) and *Symphoniae Sacrae Tertia Pars* (1650), I will carefully examine Schütz's use of proportional signs and their meanings. Because these two works represent compositions

from earlier and later points in Schütz's career, it should be possible to determine if any changes in his use occurred.

This study will help me develop other alternative ways to represent proportion signs than those used by the editors involved with the Heinrich Schütz New Complete Works (*Neue Ausgabe sämtlicher Werke*), who took a middle ground between retaining the original proportion signs and using modern time signatures. In terms of both scholarly and practical use, this middle ground leaves some degree of discrepancy in the distribution of barlines, in the decision of tempo, and in the choice of modern time signatures for the original proportion signs. Two other approaches to transcription can be used that show more clearly the intended proportional relationship between tempos: The first is to transcribe the original proportion signs completely into modern time signatures, but include an indication of the tempo relationships between the different time signatures; the second is to keep the original proportion signs and note values and apply regular barlines only to the unit of a tactus. The latter method requires a thorough explanation of the original proportion system and would be more appropriate for scholarly use than for performance; nevertheless, it would be an excellent aid to musicians who are interested in historical performance and eager to perform the works of Schütz.

CHAPTER II

THE PROPORTIONAL PRACTICE AS INHERITED BY SCHÜTZ

In this chapter, I will describe the proportion practices from the beginning to the end, from the fourteenth century to the seventeenth century, as chronologically as possible to show how the practice developed and changed. Nevertheless, the primary purpose of this chapter is to trace the long convention of mensuration-proportion practice, which reached to Heinrich Schütz.

Mensuration Signs in the Fourteenth Century

The notation of the French *Ars nova* (the second half of the fourteenth century) uses four basic note values, maxima, longa, breve, and semibreve, each of which can be either perfect (triple subdivision) or imperfect (duple subdivision). The four basic mensuration signs represent the combination of divisions of the breve and semibreve into triple or duple. The earliest treatise to introduce the signs is Johannes de Muris's *Libellus cantus mensurabilis* (c. 1340): ☺ for *tempus perfectum cum prolatio maior*, ☹ for *tempus perfectum cum prolatio minor*, ☺ for *tempus imperfectum cum prolatio maior*,

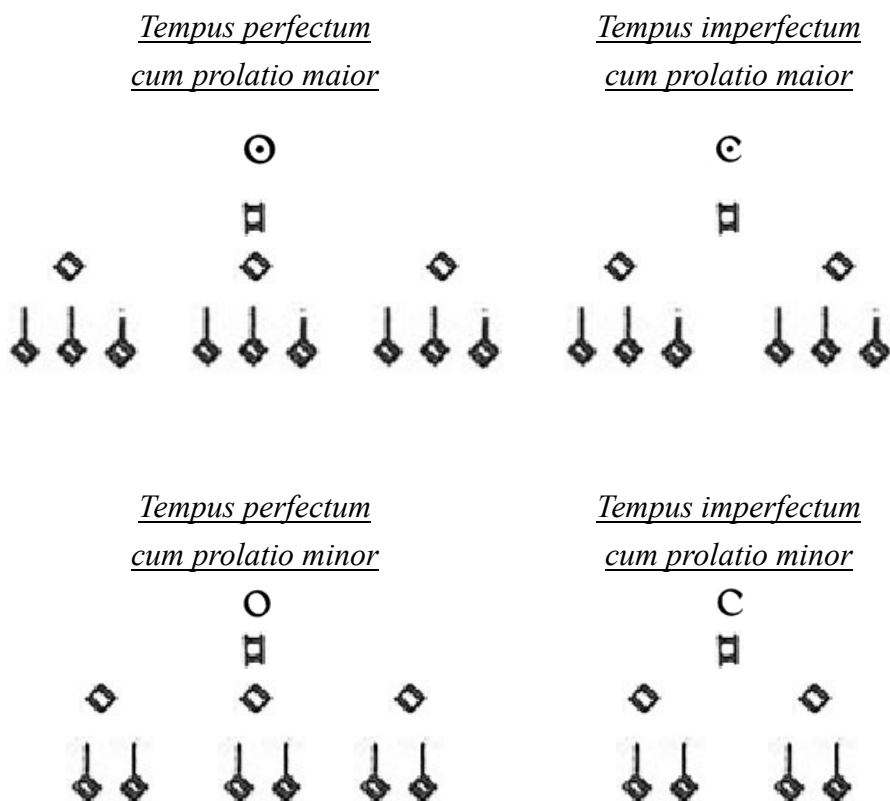
and C for *tempus imperfectum cum prolatio minor*,¹ which were replaced by the C , C , C , and C signs beginning in the late 14th century and finalized in the fifteenth century.²

The mensuration of the breve was called *tempus* and that of the semibreve *prolatio*. Both *tempus* and *prolatio* are classified into two kinds, perfect and imperfect. The perfect *tempus* (*tempus perfectum*) divides a breve into three semibreves; the imperfect *tempus* (*tempus imperfectum*) divides a breve into two. The perfect *prolatio* (*prolatio maior*) divides a semibreve into three minims, and the imperfect *prolatio* (*prolatio minor*) divides a semibreve into two. *Tempus perfectum cum prolatio maior* is indicated by the C sign and *tempus imperfectum cum prolatio maior* by the C sign. *Tempus perfectum cum prolatio minor* is indicated by the C sign and *tempus imperfectum cum prolatio minor* by the C sign (see Ex.2.1).³

¹ Anna Maria Busse Berger, “The Evolution of Rhythmic Notation”, in *The Cambridge History of Western Music Theory*, ed. Thomas Christensen (Cambridge: Cambridge University Press, 2002), 636-37.

² Willi Apel, *The Notation of Polyphonic Music 900-1600* (Cambridge: The Mediaeval Academy of America, 1953), 145.

³ Apel, *The Notation of Polyphonic Music*, 96.



Ex 2.1 The basic four mensuration signs and their mensurations

The semibreve and the minim were understood as divisions of the breve, and the longa as a multiplication of the breve. Thus the breve operates as the central note value.

Over the course of the fourteenth century, theorists began to speculate on the proportional relationships between note values.⁴ The earliest discussions of the *proportiones* take

⁴ Anna Maria Busse Berger, *Mensuration and Proportion Signs: Origins and Evolution* (Oxford: Clarendon Press, 1993), 33-34.

place in two different works: the treatise of Johannes de Muris, *Ars discantus secundum* (c.1350), and in the anonymous treatise *De proportionibus* (c. 1350).⁵

The concept of a central breve is different from that of the equal breve. The central breve is the central or standard note value of the mensuration, so larger note values are indicated by a multiplication of it and the smaller by division. The time duration of the central breve is variable depending on its mensuration (perfect or imperfect). The equal breve is a kind of invariable time-length, regardless of its mensuration.⁶ However, the equal breve is not the same as the invariable uniform tactus theorized since the late fifteenth century. The invariable time length of the equal breve is confined within a specific proportional application. So the time duration of the equal breve might change in different proportional applications.

The central breve practice actually began in the late thirteenth century. Following this tradition, Johannes de Muris divided the breve into two to nine equal semibreves. Development in innovative French Ars Nova notation shifted the central note value from the breve to the minim.⁷ In later fourteenth-century notation after Muris, the comparison of different mensuration (perfect with imperfect) is based on the minim equality rather

⁵ J.A.Bank, *Tactus, Tempo and Notation in Mensural Music from the 13th to the 17th Century* (Amsterdam: Annie Bank, 1972), 43.

⁶ Busse Berger, *Mensuration and Proportion Signs*, 81-82.

⁷ *Ibid.*, 80-81.

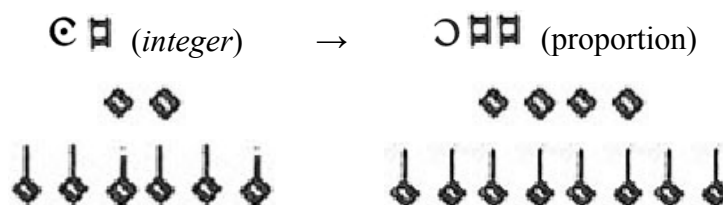
than breve or semibreve.⁸ Some of the musical works of the *ars subtilior* style between c.1380 and c.1420 show the earliest examples of the use of notation using mensuration signs to indicate proportions rather than simple divisions. Mensuration signs used as proportion signs overrode the minim-equality mensuration practice that predominated during that period.⁹ The central breve became the equal breve for proportional notation, in which the time duration of the breve is the same and the smaller note values, such as semibreve and minim, were compared proportionally.¹⁰ An example of the proportional use of mensuration signs at the end of the fourteenth century is the *sesquitertia* proportion (4/3) on the minim level under breve equality, indicated by the C sign (*integer valor*) followed by the O sign (= C sign) (proportion), in which four minims in the proportion are sung in the time duration of three minims in the *integer valor*: i.e., the initial mensuration sign. The mensuration of the C sign, *tempus imperfectum cum maior prolatio*, divides a breve into two semibreve and successively subdivides each of the semibreves into three minims resulting in six minims per breve. The mensuration of the O sign, a diminution by half of the *tempus imperfectum cum minor prolatio*, divides a breve into two semibreves and successively subdivides each of the semibreves into two

⁸ Busse Berger, "The Evolution of Rhythmic Notation", 645.

⁹ Roger Bowers, "Proportional Notation," *The New Grove Dictionary of Music and Musicians*, 2nd ed., ed. Stanley Sadie (London: Macmillan, 2001), vol. 20, 428.

¹⁰ Busse Berger, "The Evolution of Rhythmic Notation", 642.

minims, after which each note value is multiplied by two, resulting in eight minims per breve. Under the equal-breve principle, the eight minims under the C sign (proportion) are sung in the time duration of the six minims under the C sign (*integer valor*) creating a *sesquitertia* (4/3) proportional relationship (see Ex.2.2). The *integer valor* or *integer* is the “full value” or standard value to which the note values in the proportion are compared.¹¹ Proportional notation then creates diversity of rhythmic expression within the mensuration system.¹²



Ex.2.2 *Sesquitertia* proportion (4/3) by $\text{C} \rightarrow \text{C}$ on minim level in breve equality

Breve equality generally dominates throughout the fifteenth and the early sixteenth centuries until c. 1510, when the equal minim comes to the fore for the comparison of the different mensurations (perfect and imperfect), due to the success of the late fifteenth-century reform of proportional notation by Tinctoris and Gaffurius.

¹¹Bank, *Tactus, Tempo and Notation in Mensural Music from the 13th to the 17th Century*, 67-69.

¹² Margaret Bent, “Notation: Polyphonic Mensural Notation”, *The New Grove Dictionary of Music and Musicians*, 2nd ed., ed. Stanley Sadie (London: Macmillan, 2001), vol. 18, 136-37.

Nevertheless, minim equality as advocated by the reformers was not newly invented, but taken from the past—specifically speaking, from the practice of the *ars subtilior*.¹³

Fourteenth- and Fifteenth-century Practice

The Tactus in the Fifteenth Century

By 1430, theorists began to discuss the concept of *mensura*, *battuta*, or *tactus* as the unit for beating time. In his treatise *De musica* (1434), Giorgio Anselmi addresses *tactus* as a regular beating of time by the front of the foot, by clapping of the hands, or by the hand on the back of the student. According to Anselmi, the tempo of the *tactus* is moderate and not yet fixed as is the *tactus* theorized from the late 15th century, which falls on the breve. Theorists after Anselmi advocated the *tactus* falling on the semibreve.¹⁴ A *tactus*, as explained in most of the 16th-century treatises, consists of two motions, usually down-and-up or up-and-down hand motions.¹⁵

By the end of the fifteenth century, the concept of the invariable uniform *tactus* was invented in the context of church polyphony with the actual speed of the notes related to the *tactus*.¹⁶ The speed of the *tactus* is equal to the pulse rate of a healthy

¹³ Busse Berger, *Mensuration and Proportion Signs*, 82-83.

¹⁴ *Ibid.*, 78.

¹⁵ Bank, *Tactus, Tempo and Notation in Mensural Music from the 13th to the 17th Century*, 231.

¹⁶ Bowers, "Proportional Notation," 429.

person breathing under normal conditions, about 60 beats per minute, and remains constant throughout a section of a piece, no matter how the meter changes.¹⁷

The concept of the tactus began with the beginning of mensural music. Since the late thirteenth century, after the time of Franco, the central breve had been the norm, with the central breve functioning as the standard time value to which the other note values are compared. In this way, it functioned similarly to the invariable breve tactus addressed in treatises after the late fifteenth century. However, the central breve was actually flexible in duration depending on the mensuration. After the time of Vitry and Marchettus, both the central breve and the central semibreve were commonly used. The central note value is named *mensura temporis* (time measure) in most of the treatises of the fifteenth century. Treatises between 1450 and 1530 discuss the two or three note values that relate to the tactus: the breve, the semibreve, and the minim. Before the invariable uniform tactus became the norm in the 16th century, the flexible tactus was commonly practiced.¹⁸

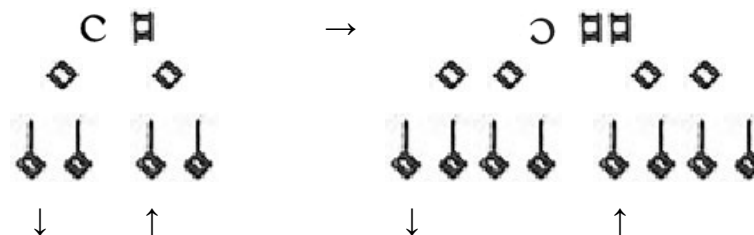
Proportion Signs in the Late Fourteenth and the Early Fifteenth Centuries

The proportions commonly used from the late fourteenth to the early fifteenth centuries were *dupla* (2/1), *tripla* (3/1), *quadrupla* (4/1), *sesquialtera* (3/2), *sesquitertia*

¹⁷ Mary Cyr, *Performing Baroque Music* (Portland: Amadeus Press, 1992), 30.

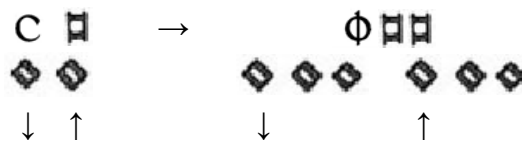
¹⁸ Bank, *Tactus, Tempo and Notation in Mensural Music from the 13th to the 17th Century*, 115.

(4/3), *sesquioctava* (9/8), *dupla sesquiquarta* (9/4), and *dupla superbipartiens tertia* (8/3), which can be indicated by the mensuration signs alone. The use of mensuration signs as proportion signs during this period is generally based on breve equality to override the predominating rule of the minim equality used for mensuration. The *dupla* (2/1) proportion was indicated by $\text{C}(\text{integer}) \rightarrow \text{C}(\text{proportion})$ on the level of breve, semibreve, or minim. In this proportion, a breve, two semibreves, and four minims in the *integer* correspond to two breves, four semibreves, and eight minims in the proportion respectively (see Ex.2.3). In the examples, the down and up arrows indicate the down and up motions of the tactus.



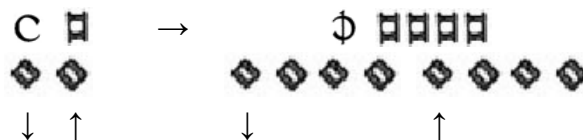
Ex.2.3 *Dupla* proportion (2/1) by $\text{C} \rightarrow \text{C}$

The *tripla* proportion (3/1) was indicated by $\text{C}(\text{integer}) \rightarrow \text{C}(\text{proportion})$ on the semibreve level, in which three semibreves under the proportion correspond to a semibreve under the *integer* (see Ex.2.4).



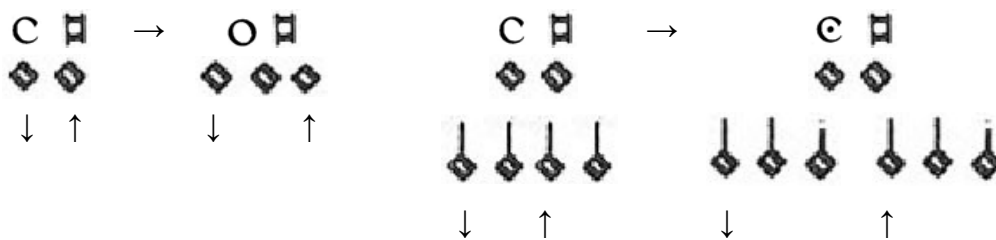
Ex.2.4 The *tripla* proportion (3/1) by $C \rightarrow \Phi$

The *quadrupla* proportion (4/1) was indicated by C (*integer*) $\rightarrow \Phi$ (*proportion*) on the semibreve level (see Ex.2.5).



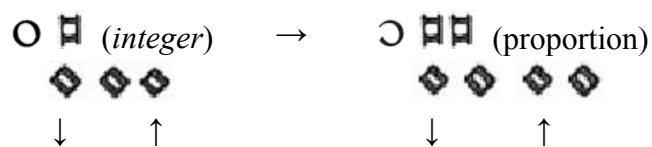
Ex.2.5 *Quadrupla* proportion (4/1) by $C \rightarrow \Phi$

The *sesquialtera* proportion (3/2) was presented either by C (*integer*) $\rightarrow \textcircled{O}$ (*proportion*) on the semibreve level or C (*integer*) $\rightarrow \textcircled{C}$ (*proportion*) on the minim level (see Ex.2.6).



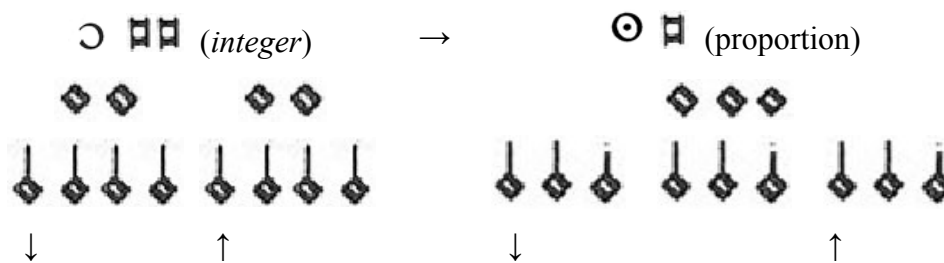
Ex.2.6 *Sesquialtera* proportion (3/2) by $C \rightarrow \textcircled{O}$ and $C \rightarrow \textcircled{C}$

The *sesquitertia* proportion (4/3) was presented either by $\bigcirc(\text{integer}) \rightarrow \supset(\text{proportion})$ on the semibreve level or by $\textcircled{C}(\text{integer}) \rightarrow \supset(\text{proportion})$ on the minim level (see Ex.2.7).



Ex.2.7 *Sesquitertia* proportion (4/3) by $\bigcirc \rightarrow \supset$

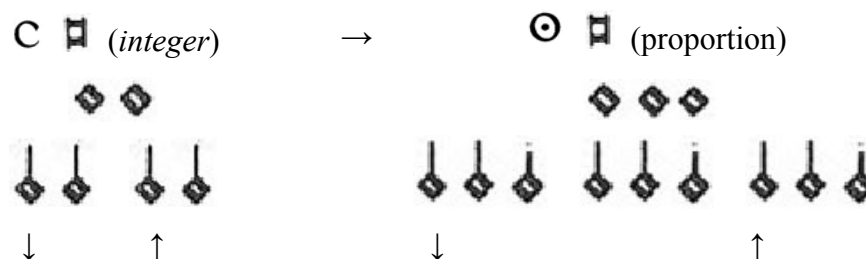
The *sesquioctava* proportion (9/8) was indicated by $\supset(\text{integer}) \rightarrow \textcircled{\ominus}(\text{proportion})$ on the minim level (see Ex.2.8).



Ex.2.8 *Sesquioctava* proportion (9/8) by $\supset \rightarrow \textcircled{\ominus}$

The *dupla sesquiquarta* proportion (9/4) was represented by $\textcircled{C}(\text{integer}) \rightarrow \textcircled{\ominus}$

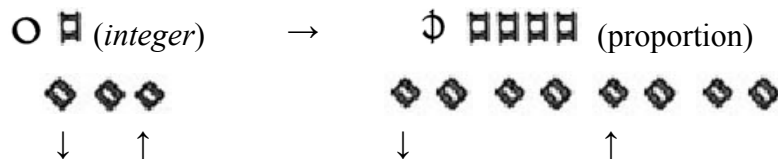
(proportion) on the minim level (see Ex.2.9).



Ex.2.9 *Dupla sesquiquarta* proportion (9/4) by $C \rightarrow \odot$

The *dupla superbipartiens tertia* proportion (8/3) was indicated by \odot (integer)

$\rightarrow \Phi$ (proportion) on semibreve level (see Ex.2.10).¹⁹



Ex.2.10 *Dupla superbipartiens tertia* proportion (8/3) $\odot \rightarrow \Phi$

The Fraction

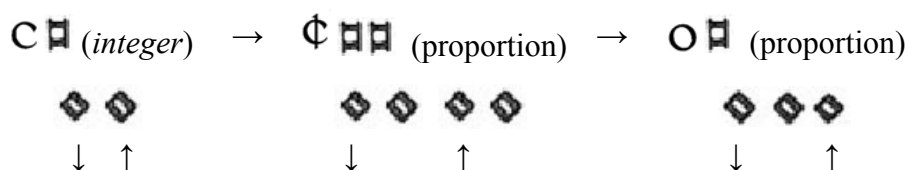
Around 1400, fractions were increasingly used as proportion signs, such as 2/1, 3/1, 3/2, 4/3, etc.²⁰ The fraction, which was introduced into the notation system as a proportion sign in the early fifteenth century, functioned as a useful tool for composers to

¹⁹ Busse Berger, *Mensuration and Proportion Signs: Origins and Evolution*, 54-56, 166-75.

²⁰ Bank, *Tactus, Tempo and Notation in Mensural Music from the 13th to the 17th Century*, 65.

expand proportional possibilities beyond the basic eight proportions designated by the mensuration signs mentioned above.²¹ The earliest treatise addressing rhythmic proportions using fractions is Prosdocimus de Beldemandis's *Tractatus practice de cantus mensurabilis* (1408),²² in which he discusses the *dupla* (2/1), *tertia* (3/1), *sesquialtera* (3/2), *sesquitertia* (4/3), and *dupla sesquiquarta* (9/4) proportions.²³

Before the reform of Tinctoris in the late fifteenth century, successive proportions, which are indicated by mensuration signs or numerical signs (single figures or fractions), were not cumulative, but were always compared to the initiating sign (*integer valor*). For example, with successive **C**, **Φ**, and **O** signs, the **Φ** sign compared to the *integer* **C** sign creates *dupla* proportion (2/1) and the **O** sign compared to the *integer* **C** sign independently creates *sesquialtera* proportion (3/2), both on the semibreve level (see Ex.2.11).²⁴



Ex.2.11 Non-cumulative proportional relationship

²¹ Busse Berger, *Mensuration and Proportion Signs: Origins and Evolution*, 166-178.

²² *Ibid.*, 164.

²³ Apel, *The Notation of Polyphonic Music 900-1600*, 145.

²⁴ Busse Berger, "The Evolution of Rhythmic Notation", 649.

This began to change in the early sixteenth century in the works of composers following the reform.

Modus Cum Tempore Signs

The use of the *modus cum tempore* signs began from around 1420 and lasted until the 1530s. These are combinations of a mensuration sign, such as the \bigcirc , C , C , or C sign, and one or two figure, such as 2, 3, 22 or 23: $\bigcirc 2$, $\text{C} 3$, $\bigcirc 22$, $\text{C} 23$, $\text{C} 2$, or $\text{C} 3$, etc. There are three ways to interpret them. The usual interpretation of the signs, supported by the largest group of theorists of the period, including John Hothby, is that in a combination of a mensuration sign and a figure the mensuration sign represents the *modus* (the mensuration of the longa or division into either two or three breves) and the figure represents the *tempus* (the mensuration of the breve). For example, in the $\bigcirc 2$ sign, the mensuration sign \bigcirc represents the perfect mensuration of the longa and the figure 2 the imperfect mensuration of the breve. When a mensuration sign is combined with two figures, the mensuration sign represents the mensuration of the maxima, the first figure that of the longa, and the second figure that of the breve. For example, in the $\text{C} 23$ sign, the C indicates imperfect mensuration of the *maxima*, the first figure 2 the

imperfect mensuration of the *longa (modus)*, and the second figure 3 the perfect mensuration of the *breve (tempus)*. When the ☉ or ☺ sign is combined with a figure, the circle or the semicircle represents the mensuration of the *longa (modus)*, the figure that of the *breve (tempus)*, and the dot that of the *semibreve (prolatio)*. For example, in the ☉2 sign, the ☉ indicates the perfect mensuration of the *longa (modus)*, the figure 2 the imperfect mensuration of the *breve (tempus)*, and the dot the perfect mensuration of the *semibreve (prolatio)*.²⁵

The second interpretation of the *modus cum tempore* signs, represented by a small group of theorists in the late fifteenth and early sixteenth centuries, is that the mensuration sign, the ○ or ☺ sign, always represents the mensuration of the *breve (tempus)*, the first figure the *longa (modus)*, and the second figure the *maxima*. For example, in the ○32 sign, the ○ indicates the perfect mensuration of the *breve*, the first figure 3 the perfect mensuration of the *longa*, and the second figure 2 the imperfect mensuration of the *maxima*.²⁶

In the third interpretation, represented by some theorists of the era, including Sebald Heyden, the *modus cum tempore* signs are understood as follows: The

²⁵ Busse Berger, *Mensuration and Proportion Signs: Origins and Evolution*, 20-23.

²⁶ *Ibid.*, 21.

mensuration sign, the \bigcirc or \mathbb{C} sign, indicates the mensuration of the breve (*tempus*), a figure 2 the *proportio dupla* (2/1), and a figure 3 the *proportio tripla* (3/1). For example, in the \bigcirc_2 sign, the \bigcirc sign is for the perfect mensuration of the *breve* (*tempus*) and the figure 2 the *proportio dupla* (2/1), in which two compared notes under proportion correspond to one note of the same value under *integer*. In this interpretation, the original meaning as the *modus cum tempore* sign is lost and a proportional meaning is attached to the sign.²⁷

The adaption of the *modus cum tempore* signs into proportion signs, beginning in the later fifteenth century, results in the replacement of proportion signs for the older signs consisting of a mensuration sign and a fraction: For example, the \mathbb{C}_2 sign can be used instead of the $\mathbb{C} \frac{2}{1}$ sign and the \mathbb{C}_3 sign instead of the $\mathbb{C} \frac{3}{1}$ or the $\mathbb{C} \frac{3}{2}$ sign.²⁸ However, during the almost 100 years of their use, such signs were used as either mensuration signs or proportion signs;²⁹ i.e., some composers use the \bigcirc_3 , \bigcirc_2 , \mathbb{C}_3 , \mathbb{C}_2 signs as *modus cum tempore* signs while others use them as proportion signs, in which the figure 3 designates either *proportio tripla* (3/1) or *sesquialtera* (3/2) and the figure 2 *proportio dupla* (2/1).³⁰

²⁷ Busse Berger, *Mensuration and Proportion Signs: Origins and Evolution*, 21.

²⁸ Bowers, "Proportional Notation," 428.

²⁹ Busse Berger, *Mensuration and Proportion Signs: Origins and Evolution*, 148.

³⁰ Bank, *Tactus, Tempo and Notation in Mensural Music from the 13th to the 17th Century*, 167.

In part to the controversial nature of the interpretation of the *modus cum tempore* signs, after the invention of the music printing, music publishers use the simpler signs, such as the C and *sesquialtera* proportion signs, $3/2$, instead of the complex *modus cum tempore* signs, with the practical reason to sell more books to the large group of singers who were not well educated in the use of proportion signs. In his treatise *De arte canendi* (1540), Sebald Heyden tried to transcribe pieces with the old complex signs using only the C sign, because most musicians no longer understood the old *modus cum tempore* signs. The O and C signs (the cut signs) were already introduced in the late fourteenth century as proportion signs indicating diminution by half, i.e., *dupla* proportion ($2/1$).³¹ Since then the C and the O signs were treated as the same.

Almost throughout the fifteenth century, the $\text{O}2$ and $\text{C}2$ signs were treated the same as the O and C signs respectively.³² In the late fifteenth and the early sixteenth centuries, the cut signs, C and O , were interpreted in three different ways, as diminution by one-half, diminution by one-third, or just a slightly faster tempo.³³ That the C sign and O sign were used to indicate either quicker performance or the substitution of a breve for a semibreve, a semibreve for a minim, and a longa for a breve

³¹ Busse Berger, *Mensuration and Proportion Signs: Origins and Evolution*, 162-63.

³² Busse Berger, "The Evolution of Rhythmic Notation", 647-48.

³³ *Ibid.*, 638.

(resulting in *diminutio dupla*), is addressed by Anonymous XII (c.1460).³⁴

Proportion Signs in the Fifteenth Century

By c.1430, proportion signs were diversified through the use of numbers as well as numerically or graphically modified mensuration signs, such as 2, 3, Φ_2 , Φ_3 , \textcircled{C}_3 , \textcircled{O}_3 , etc.³⁵ The breve tactus was commonly used for the signs \textcircled{O} , Φ , \textcircled{C} , Φ , \textcircled{C}_3 , Φ_3 , and \textcircled{O}_3 . By 1450, the semibreve tactus becomes the normal invariable tactus under the \textcircled{C} sign, following the principle of the human pulse rate.³⁶ Nevertheless, throughout the century, the breve tactus and the semibreve tactus, the two common *tactus-mensurae*, were used together side-by-side.³⁷

The *sesquialtera* (3/2), *dupla* (2/1), and *tripla* (3/1) proportions were most frequently used before 1450. The *sesquialtera* proportion (3/2) is indicated by the \textcircled{C} sign as *integer valor* and the $\textcircled{C} \frac{3}{2}$ sign as proportion on the semibreve level with a breve tactus, in which three semibreves under the proportion are sung in the time duration of two semibreves under the *integer* (see Ex. 1.12).

³⁴ Bank, *Tactus, Tempo and Notation in Mensural Music from the 13th to the 17th Century*, 97.

³⁵ Bent, "Notation: Polyphonic Mensural Notation", 136-37.

³⁶ Bank, *Tactus, Tempo and Notation in Mensural Music from the 13th to the 17th Century*, 155.

³⁷ *Ibid.*, 161-63.

$$\begin{array}{ccc} \mathbf{C} \diamond \diamond (\text{integer}) & \rightarrow & \mathbf{C} \frac{3}{2} \diamond \diamond \diamond (\text{proportion}) \\ \downarrow \uparrow & & \downarrow \uparrow \end{array}$$

Ex.2.12 $\mathbf{C} \rightarrow \mathbf{C} \frac{3}{2}$: *sesquialtera* (3/2); semibreve level, breve-tactus

The *dupla* proportion (2/1) is indicated by the \mathbf{C} sign (*integer*) followed by $\mathbf{C} \frac{2}{1}$ or $\mathbf{C} 2$ (proportion) on the semibreve level with a semibreve tactus (see Ex.2.13).

$$\begin{array}{ccc} \mathbf{C} \diamond (\text{integer}) & \rightarrow & \mathbf{C} \frac{2}{1} \diamond \diamond (\text{proportion}) \\ \downarrow \uparrow & & \downarrow \uparrow \end{array}$$

Ex.2.13 $\mathbf{C} \rightarrow \mathbf{C} \frac{2}{1}$: *dupla* (2/1); semibreve level, semibreve-tactus

The *tripla* proportion (3/1) is indicated by the \mathbf{C} sign (*integer*) followed by the $\mathbf{C} \frac{3}{1}$ or $\mathbf{C} 3$ sign on the semibreve level with a semibreve tactus (see Ex.2.14).³⁸

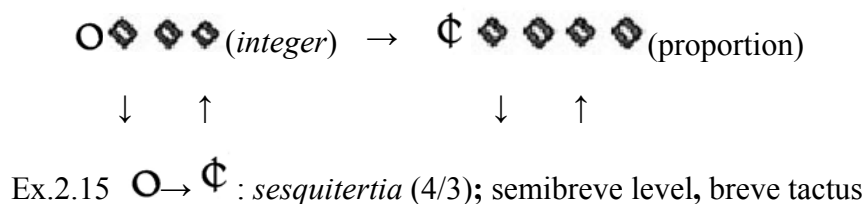
$$\begin{array}{ccc} \mathbf{C} \diamond (\text{integer}) & \rightarrow & \mathbf{C} \frac{3}{1} \diamond \diamond \diamond (\text{proportion}) \\ \downarrow \uparrow & & \downarrow \uparrow \end{array}$$

Ex.2.14 $\mathbf{C} \rightarrow \mathbf{C} \frac{3}{1}$: *tripla* (3/1); semibreve level, semibreve tactus

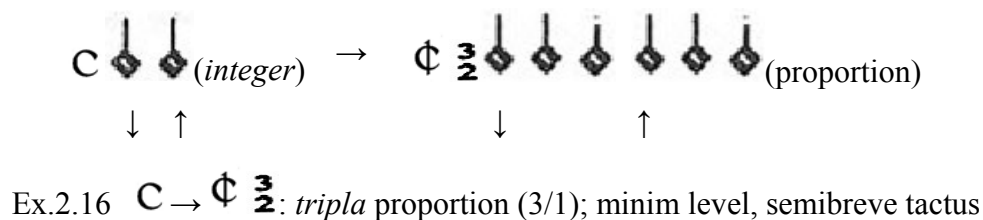
By 1450, the *sesquitertia* proportion (4/3) was designated by \mathbf{O} (*integer*)

³⁸ Bowers, "Proportional Notation," 428.

→ Φ (proportion) on the semibreve level with a breve tactus (see Ex.2.15).³⁹



In the end of the 15th century, the *tripla* proportion (3/1) on the minim level with a semibreve tactus was indicated by the symbol C followed by $\Phi \frac{3}{2}$ (see Ex.2.16).⁴⁰



The Reform of Proportional Notation in the Late Fifteenth Century

Due to the rebirth of ancient Greek ideas, specifically the influence of the mathematics of Boethius, late fifteenth-century treatises, including *De preceptis artis musice libellus* of Guilelmus Monachus (c.1460), *Proportionale musices* of Johannes

³⁹ Ibid.

⁴⁰ Bowers, "Proportional Notation," 429.

Tinctoris (1473), and *Practica musicae* of Franchinus Gaffurius (1497), categorize proportions into five different species: *genus multiplex*, *genus superparticulare*, *genus superpartiens*, *genus multiplex superparticulare*, and *genus multiplex superpartiens*. The *Genus multiplex* consists of all the fractions whose denominator is 1: *proportio dupla* (2/1), *tripla* (3/1), *quadrupla* (4/1), etc. The *genus superparticulare* consists of all the fractions whose numerator is larger than the denominator by 1: *sesquialtera* (3/2), *sesquitertia* (4/3), *sesquiquarta* (5/4), etc. The *genus superpartiens* contains the fractions in which the numerator is larger than the denominator by two, three, etc.: *proportio superbipartiente tertias* (5/3), *proportio supertripartiente quinta* (8/5), etc. The *genus multiplex superparticulare* includes the fractions in which the numerator is one plus the multiplication of the denominator and a given number: *proportio tripla sesquitertias* $((3 \times 3 + 1)/3 = 10/3)$, *proportio quadrupla sesquiquinta* $((4 \times 5 + 1)/5 = 21/5)$, etc. The *genus multiplex* comprises fractions in which the numerator is the multiplication of the denominator and a given number plus another given number: *proportio quadruple sesquiquinta* $((4 \times 2 + 3)/4 = 11/4)$, etc. Only simple proportions were used in actual practice and complex proportions were retained in theory.⁴¹

The late fifteenth-century reformers of rhythmic notation, represented by

⁴¹ Apel, *The Notation of Polyphonic Music 900-1600*, 145-46.

Tinctoris and Gaffurius, tried to reform proportional notation by applying the arithmetic rule of the Hindu-Arabic fraction against the old and contemporary proportional practice, which was based on non-cumulative proportional relationship. Thus after Tinctoris's reform of proportional notation, successive proportions are frequently interpreted cumulatively following the arithmetic rule of the Hindu-Arabic fraction by followers of the reformers. For example, with successive \mathbf{C} , Φ , and \mathbf{O} signs, the *dupla* proportion (2/1) created between the \mathbf{C} and the Φ signs is multiplied by the *sesquialtera* proportion (3/2) between the \mathbf{C} and the \mathbf{O} signs. The result is a *tripla* proportion (3/1) through the arithmetically cumulative process ($2/1 \times 3/2 = 6/2 = 3/1$) (see Ex.2.17).⁴²

This contrasts to the earlier practice, where a new sign is always compared to the initiating proportion sign, the *integer valor*.



Ex.2.17 Cumulative proportional relationship

Because the Hindu-Arabic fraction was commonly taught and used, the

⁴² Busse Berger, "The Evolution of Rhythmic Notation", 649.

cumulative proportional relationship became a kind of trend in the early sixteenth century, reflecting the great vogue of the use of the Hindu-Arabic fraction, and widely accepted by composers. Nevertheless, the conventional mensuration-proportion practice based on non-cumulative proportional relationship continued.

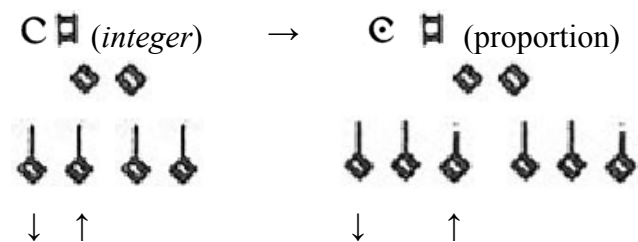
Sixteenth- and Seventeenth-century Practice

By the end of the fifteenth century, some composers arbitrarily used some mensuration signs without proper knowledge of the original meanings of the signs and used them interchangeably. Furthermore, the arbitrary use of proportion signs depending on the personal choice of individual composers creates great confusion in understanding their meaning. In the early sixteenth century, composers avoided a good deal of confusion by generally using only simple proportion signs, leaving the more complex proportions out of the actual practice. The growing tendency to use smaller note values resulted in the need for the semibreve tactus and minim tactus as norms.⁴³

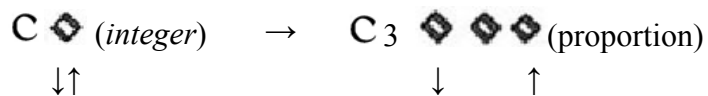
The Tactus in the Sixteenth and Seventeenth Centuries

⁴³ Bank, *Tactus, Tempo and Notation in Mensural Music from the 13th to the 17th Century*, 173.

By the early sixteenth century, three kinds of tactus are discussed most commonly in treatises: the unequal tactus, the breve tactus, and the semibreve tactus. The unequal tactus is the ternary tactus in which three notes fall on the down and up motions of the tactus beating: the first and second notes on the down motion and the last note on the up motion. The unequal tactus involves the *prolatio tactus* under the C sign and the *tripla tactus* under the $\text{C} 3$ sign. The C sign, following its original mensuration meaning, divides a breve into two semibreves and subdivides each of the two semibreves into three minims. When the C sign as proportion follows the *integer* C sign, three minims under the C sign correspond to two minims under the C sign, creating the *prolatio tactus* (see Ex.2.18). The *tripla tactus* occurs under the $\text{C} 3$ sign (proportion) in the proportional relationship to the *integer* C sign, in which three semibreves under the $\text{C} 3$ sign correspond to a semibreve under the *integer* C sign (see Ex.2.19).

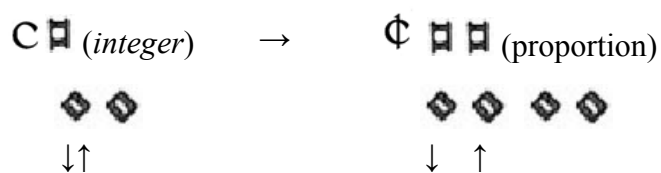


Ex.2.18 Unequal tactus, *prolatio tactus* in C sign

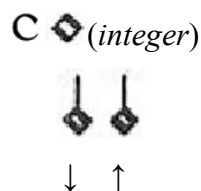


Ex.2.19 Unequal tactus, *trippla tactus* in C 3 sign (proportion)

The breve tactus occurs under the Φ sign (proportion) in the proportional relationship to the *integer* C sign in which two semibreve under the Φ sign correspond to a semibreve under the C sign (see Ex.2.20). The semibreve tactus occurs under the *integer* C sign (see Ex.2.21); this is the most common tactus in both centuries.⁴⁴



Ex.2.20 Breve tactus in Φ sign



Ex.2.21 Semibreve tactus in C sign

In the first half of the sixteenth century, six sorts of tactus are also addressed by

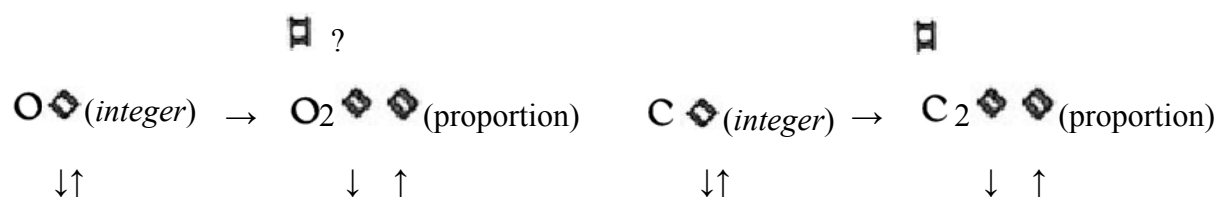
⁴⁴ Bank, *Tactus, Tempo and Notation in Mensural Music from the 13th to the 17th Century*, 121.

some theorists: *tactus generalis*, *sepcialis*, *semiditatis*, *augmentationis*, *diminutionis velocior*, and *diminutionis cum augmentione*. Out of the six, only the *tactus generalis* (general tactus) is used under *integer valor*, while the rest are used under proportion. The *tactus generalis* (general tactus) is the semibreve tactus in the \bigcirc and C signs (see Ex.2.22). The *tactus specialis* (special tactus) is the breve tactus in the $\bigcirc 2$ and $\text{C} 2$ signs when they are proportionally related to the \bigcirc and C signs respectively; i.e., the $\bigcirc 2$ following \bigcirc and the $\text{C} 2$ following C (see Ex.2.23). The *tactus semiditatis* (half diminished tactus) is the breve tactus in the Φ sign (see Ex.2.24). The *tactus augmentationis* (augmented tactus) is the minim tactus in the C sign (see Ex.2.25). The *tactus diminutionis velocior* (diminished quicker tactus), represented by $\bigcirc \rightarrow \Phi$, calls for a quickening of the tactus. The *tactus diminutionis cum augmentione* (diminution with augmentation) is the semibreve tactus in the Φ sign (see Ex.2.26).⁴⁵

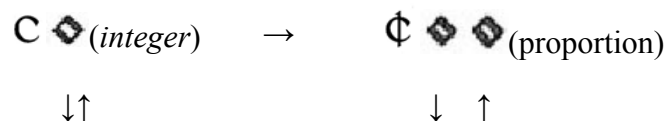


Ex.2.22 *tactus generalis (integer)*, semibreve tactus in \bigcirc and C signs

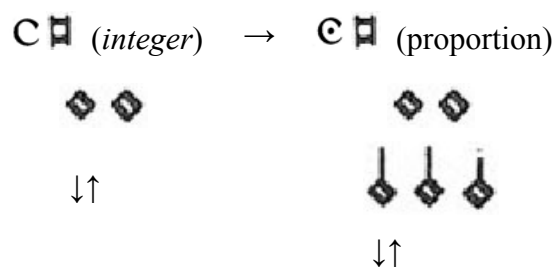
⁴⁵ Bank, *Tactus, Tempo and Notation in Mensural Music from the 13th to the 17th Century*, 203-07.



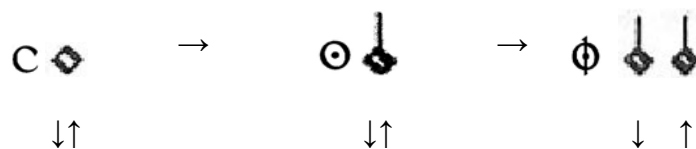
Ex.2.23 *tactus specialis*, breve tactus in $\text{O}2$ and $\text{C}2$ signs



Ex.2.24 *tactus semiditatis*, breve tactus in Φ sign



Ex.2.25 *tactus augmentationis*: C , minim tactus



Ex.2.26 *tactus diminutionis cum augmentione*, semibreve tactus in Φ sign

In the mid-sixteenth century, Sebald Heyden addressed the idea of the invariable

semibreve tactus as a norm.⁴⁶ In his *Musicae Stoicheiosis* (1532), Heyden states that the *mensura* or *tactus* consists of two equal movements to which the quantity of the note values, both in the *integer valor* and the proportion, is arranged in such a way that the proportioned note values in the proportion fall in the same time duration of the invariable tactus falling on the semibreve in the *integer valor*.⁴⁷

In his *Dodekachordon* (1547), Heinrich Glareanus addresses the practice of a flexible application of tactus. He explains that, to avoid the listener's weariness, musicians quickened the tempo by adding a stroke to the sign, such as Φ or Φ , calling them *diminutio*. However, in this context the term *diminutio* does not mean real proportional diminution, but just a slightly quicker beating of the tactus.⁴⁸ An example given by Glareanus is that sometimes the \circ , Φ , and Φ signs were used in the three sections of Kyrie movement successively to speed up the tempi to avoid being tiresome to the audience; the cut signs do not mean the exact duple diminution, but just a slight quickening of the tempo.⁴⁹

Throughout the sixteenth and the seventeenth centuries, three basic tactus concepts are used: *tactus maior*, *tactus minor*, and *tactus proportionatus*. The *tactus*

⁴⁶ Bank, *Tactus, Tempo and Notation in Mensural Music from the 13th to the 17th Century*, 171.

⁴⁷ Bank, *Tactus, Tempo and Notation in Mensural Music from the 13th to the 17th Century*, 211.

⁴⁸ *Ibid.*, 215.

⁴⁹ George Houle, *Meter in Music, 1600-1800* (Bloomington: Indiana University Press, 1987), 13.

maior (the greater tactus, the whole tactus, or the total tactus) is the true tactus, falling on the semibreve under the *integer valor*, the full value before being proportioned: in other words, the value to which the proportion is compared (see Ex.2.27).



Ex.2.27 *tactus maior*

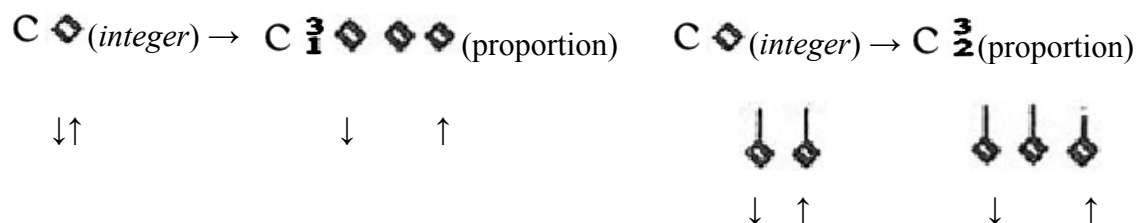
The *tactus minor* or *semitactus* is twice as fast as the *tactus maior* and used by the amateurs who cannot follow the *tactus maior* (see Ex.2.28). Both the *tactus maior* and *tactus minor* are binary (equal tactus).



Ex.2.28 *tactus minor* or *semitactus*

The *tactus proportionatus* (the proportionate tactus) is the ternary tactus (unequal tactus),

used for *tripla* (3/1) or *sesquialtera* (3/2) proportions (see Ex.2.29).⁵⁰



Ex.2.29 *tactus proportionatus* in the proportion

Again the tactus is invariable; in other words, the time duration of the tactus is fixed.

According to Dowland in late sixteenth century, the equal tactus features two minims, four semiminims, eight eighth notes, or sixteen sixteenth notes within one tactus.⁵¹

According to Zarlino, the equal tactus is used in the \circ , C , ϕ and C signs, which designate the imperfect semibreve mensuration (*prolatio minor*). The

unequal tactus is used with the \odot , \odot , ϕ , and C signs, in which the dot designates the perfect semibreve mensuration (*prolatio maior*).⁵² One important point to make is

that most sixteenth-century theorists discuss the tactus in strict relation to mensural

⁵⁰ Houle, *Meter in Music, 1600-1800*, 4.

⁵¹ Houle, *Meter in Music, 1600-1800*, 4.

⁵² Ibid.

notation: in other words, retaining the original meaning of the mensuration signs. This tendency continues in the seventeenth century, at least the first half of the century, as a mainstream idea.⁵³

Sixteenth-century theorists remained in agreement about the speed of the *tactus*: As in earlier eras, the tempo of the *tactus maior* or the *tactus proportionatus* was MM 60-80, following the normal human pulse rate under normal conditions.⁵⁴ Nevertheless, according to Mersenne in the early seventeenth century, the tempo of the *tactus* varies according to the affection of the music, including the character, words, and emotion of the music.⁵⁵

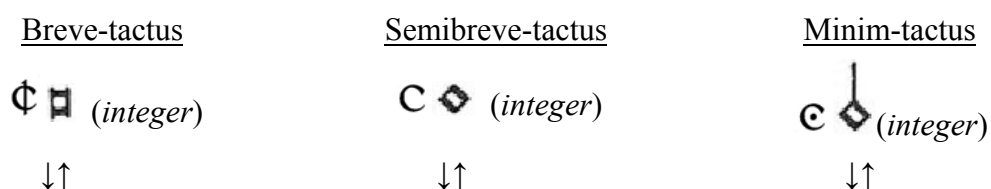
In sum, two different classifications of the *tactus* were used throughout the sixteenth and the seventeenth centuries. In the first classification, the *tactus* is divided into three kinds depending on the choice of the unit note-value: the *breve-tactus*, the *semibreve-tactus*, and the *minim-tactus*. In the *breve tactus* the *tactus* falls on the *breve*, in the *semibreve tactus* on the *semibreve*, and in the *minim tactus* on the *minim*. The time duration of the *tactus* is the same regardless of which kind of note it falls on; in other

⁵³ Ibid.

⁵⁴ Houle, *Meter in Music, 1600-1800*, 5.

⁵⁵ Ibid.

words, the time duration of the breve tactus, the semibreve tactus, and the minim tactus is the same (see Ex.2.30).⁵⁶



Ex.2.30 Tactus on different note values

Under the second classification, there are actually two kinds of tactus: the equal or binary tactus and the unequal or ternary tactus (see Ex.2.31). In the equal tactus, the time duration of the down motion is exactly as long as the up motion. For example, the equal tactus falling on the semibreve is used in the imperfect mensuration of the semibreve under *integer valor*; i.e., a *semibreve* is divided into two equal minims. Thus the down hand motion falls on the first minim and the up hand motion on the second minim. The unequal tactus uses the same two motions, down and up, but the down motion lasts twice as long as the up motion. This is used in perfect mensuration. For

⁵⁶ Bowers, "Proportional Notation," 428.

example, the unequal semibreve-tactus consists of 3 minims; the first and second minims are indicated by the down motion of the hand and the third by the up motion.⁵⁷



Ex.2.31 Equal-tactus and Unequal-tactus at the semibreve level

In the early seventeenth century, at the beginning of the Baroque era, innovations in musical style and notation took place primarily in instrumental music and solo vocal music, whereas the conservative stream of the old notational tradition based on mensuration and proportion continued in the mainstream, especially for polyphonic vocal ensemble works.⁵⁸

Proportion Signs in the Sixteenth Century

⁵⁷ Arnold Dolmetsch, *The Interpretation of The Music of the XVII and XVIII Centuries* (London: Oxford University Press, 1946), 28-32.

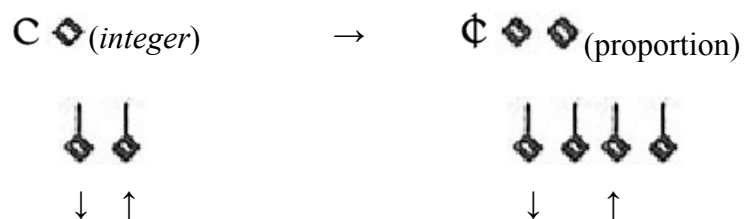
⁵⁸ Houle, *Meter in Music, 1600-1800*, 8.

Many medieval proportion signs were used throughout the sixteenth century; however, individual applications of the signs beyond their original meanings created confusion.⁵⁹ By mid-sixteenth century, the occurrence of the *minim tactus* caused confusion in the use of proportional notation. For example, notation under the

C and Φ signs is identical in the *minim tactus* (see Ex.2.32); the only way to distinguish between them is to use them in the *dupla* proportional relationship (see Ex.2.33).⁶⁰



Ex.2.32 C and Φ signs in the *minim tactus*

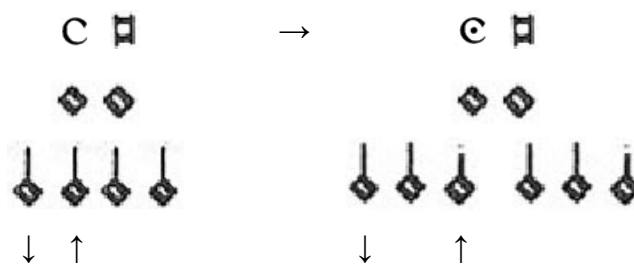


⁵⁹ Richard Rastall, *The Notation of Western Music*, 113.

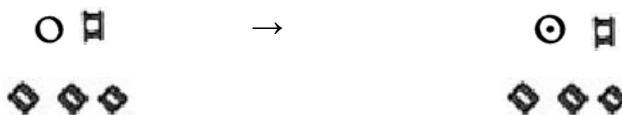
⁶⁰ Richard Rastall, *The Notation of Western Music*, 188.

Ex.2.33 *dupla* proportional relationship of $C \rightarrow \mathcal{C}$

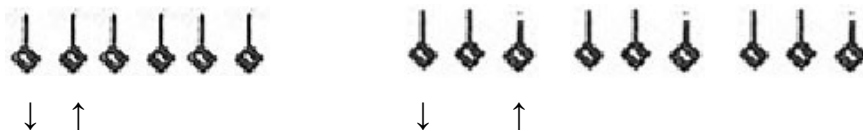
From the early fifteenth century, there was confusion about the relationships between the major prolation or *prolatio perfecta* signs (\mathcal{C} and \mathcal{O}), in which a semibreve is divided into three minims, and the minor prolation or *prolatio imperfecta* signs (C and O), in which a semibreve is divided into two minims, indicated by $C \rightarrow \mathcal{C}$ and $O \rightarrow \mathcal{O}$. A majority of theorists advocated the *sesquialtera* proportional relationship on the minim level with a semibreve tactus, following the original meanings of the mensuration signs (see Ex. 2.34 and Ex. 2.35).⁶¹



Ex.2.34 *Sesquialtera* proportional relationship by $C \rightarrow \mathcal{C}$



⁶¹ Busse Berger, *Mensuration and Proportion Signs: Origins and Evolution*, 101.



Ex.2.35 *Sesquialtera* proportional relationship by $\circ \rightarrow \odot$

On the other hand, there were five other possible interpretations of the relationship between the major prolation and minor prolation signs, which do not retain the original mensuration meaning of the signs. The first was based on minim equality, thus a minim under the minor prolation signs (\mathbb{C} or \mathbb{O}) corresponded to a minim under the major prolation signs (\odot or \odot) (see Ex.2.36).

$$\mathbb{C} \text{ or } \mathbb{O} \text{ } \downarrow = \odot \text{ or } \odot \text{ } \downarrow$$

Ex.2.36 Interpretation 1

The second interpretation was that a minim under the major prolation signs (\odot or \odot) was equal to a breve under the cut minor prolation signs (\mathbb{C} or \mathbb{O}) (see Ex.2.37).

$$\odot \text{ or } \odot \text{ } \downarrow = \mathbb{C} \text{ or } \mathbb{O} \text{ } \square$$

Ex.2.37 Interpretation 2

In the third interpretation, a minim under the major prolation signs (\textcircled{C} or $\textcircled{\ominus}$) corresponded to a semibreve under the cut minor prolation signs ($\textcircled{\text{C}}$ or $\textcircled{\text{O}}$) (see Ex.2.38).

$$\textcircled{C} \text{ or } \textcircled{\ominus} \text{ } \textcircled{\text{C}} = \textcircled{\text{C}} \text{ or } \textcircled{\text{O}} \text{ } \textcircled{\text{C}}$$

Ex.2.38 Interpretation 3

In the fourth interpretation, three minims under the major prolation signs (\textcircled{C} or $\textcircled{\ominus}$) corresponded to four minims under the minor prolation sign \textcircled{C} , creating *sesquitertia* (see Ex.2.39).⁶²

$$\textcircled{C} \text{ or } \textcircled{\ominus} \text{ } \textcircled{\text{C}} \rightarrow \textcircled{C} \text{ } \textcircled{\text{C}}$$

Ex.2.39 Interpretation 4

The fifth interpretation occurred when the major prolation signs (\textcircled{C} and $\textcircled{\ominus}$) were used

⁶² Busse Berger, *Mensuration and Proportion Signs: Origins and Evolution*, 87-89.

for augmentation, in which the minim tactus under the major prolation signs was used instead of the semibreve tactus under the minor prolation sign C ; in other words, a minim under the major prolation signs (C and O) was equal to a semibreve under the C sign (see Ex.2.40). With the *prolatio perfecta diminutionis cum augmentione* or *prolatio maior diminuta* signs (C and O), a minim under the major prolation signs (C and O) was equal to a semibreve under the *prolatio maior diminuta* signs (C and O) (see Ex.2.41).⁶³

$$\text{C} \square \diamond = \text{C} \text{ or } \text{O} \downarrow$$

Ex.2.40 Interpretation 5: augmentation under C or O

$$\text{C} \text{ or } \text{O} \downarrow = \text{C} \text{ or } \text{O} \diamond$$

Ex.2.41 Augmentation under C or O

In the sixteenth century, the cut signs, C and O , were interpreted by some musicians as either *diminutio semiditas* (half diminution) or *diminutio per tertiam partem* (diminution by 1/3, leaving 2/3 of the original value), whereas others, such as Glareanus,

⁶³ Bank, *Tactus, Tempo and Notation in Mensural Music from the 13th to the 17th Century*, 203-07.

interpreted them as indicating a slightly faster tempo instead of one exactly two times faster. Regarding proportion signs derived from *modus cum tempore* signs, the O_2 and C_2 signs were interpreted as either *diminutio per mediam partem* or *semiditas* like the cut signs, while the O_3 and C_3 signs were interpreted as either *proportio tripla* (3/1) or *sesquialtera*(3/2).⁶⁴ Practically, there was no uniform understanding or uniform application of the proportion signs for the proportional relationships. The fact that the choice of the proportion signs depended on the personal choice of the composers resulted in different interpretations of them. In other words, composers arbitrarily selected proportion signs that, in their opinion, fitted their compositions best.⁶⁵

Fractions, modified mensuration signs, and a combination of a mensuration sign and a figure were used even for the simplest proportions, *proportio dupla* and *proportio tripla*: the C_1 , C , C , C_2 , C , and O_2 signs for *proportio dupla*, and the C_1 , C_3 and O_3 for *proportio tripla*.⁶⁶ In his treatise *A Plain and Easy Introduction to Practical Music* (1597), Thomas Morley mentions that five proportions – *dupla* (2/1), *tripla* (3/1), *quadruple* (4/1), *sesquialtera* (3/2), and *sesquitertia* (4/3) – were used most commonly,

⁶⁴ Bank, *Tactus, Tempo and Notation in Mensural Music from the 13th to the 17th Century*, 203-07.

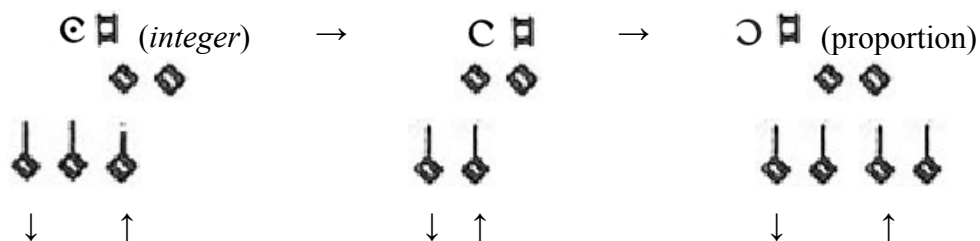
⁶⁵ Bank, *Tactus, Tempo and Notation in Mensural Music from the 13th to the 17th Century*, 171-73.

⁶⁶ Apel, *The Notation of Polyphonic Music 900-1600*, 147.

while the more complex proportions were avoided due to their difficulty in singing.⁶⁷

The *sesquitertia* proportion (4/3) is represented by C as *integer valor* followed by C as a proportion: The *integer* C sign retains the original mensuration meaning of the *tempus imperfectum cum prolatio maior*, with three minims to the semibreve tactus, and the proportion C sign keeps its original mensuration meaning of the *alla breve* of the *tempus imperfectum cum prolatio minor*, with four minims to the breve tactus. In other words, the *sesquitertia* proportion (4/3) indicated by the C (*integer*) \rightarrow C (proportion)

signs is on the minim level in proportional relationship in the semibreve tactus of the *integer*. (see Ex.2.42).⁶⁸

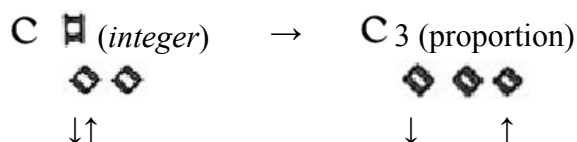


Ex.2.42 The *sesquitertia* (4/3) proportional relationship between C (*tempus imperfectum cum prolatio maior* in semibreve tactus) and C (*alla breve* of the *tempus imperfectum cum prolatio minor* in breve tactus)

⁶⁷ Thomas Morley, *A Plain and Easy Introduction to Practical Music*, ed. R. Alec Harman (New York: W. W. Norton & Company, 1966), 47.

⁶⁸ Apel, *The Notation of Polyphonic Music 900-1600*, 151.

In the *tripla* (3/1) proportional relationship between the C sign and C_3 sign, *proportio tripla of tempus imperfectum*, the C sign in the *integer valor* retains the original mensuration of the *tempus imperfectum cum prolatio minor*, and the C in the C_3 proportion sign preserves the original mensural meaning of the minor prolation (imperfect semibreve). The mensuration of the breve in the proportion under the C_3 sign could be perfect or imperfect depending on the context. The *tripla* proportional relationship occurs basically on the semibreve level in a semibreve tactus: i.e., one semibreve in the *integer* in the time of three semibreves in the proportion (see Ex.2.43).⁶⁹

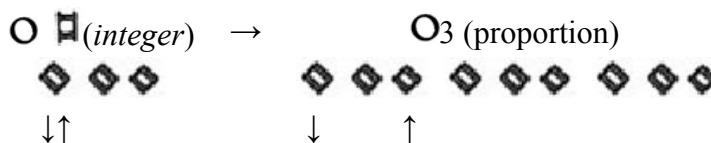


Ex.2.43 *Tripla* (3/1) proportional relationship between the C and C_3 signs

In the *tripla* (3/1) proportional relationship between the O and O_3 signs (*proportio tripla of tempus perfectum*) on the semibreve level with a semibreve tactus, the O sign in the *integer valor* retains the original mensuration of the *tempus perfectum cum prolatio minor*. The O sign in the O_3 proportion sign keeps the original

⁶⁹ Ibid., 155-56.

mensuration meaning of minor prolation. (see Ex.2.44).⁷⁰

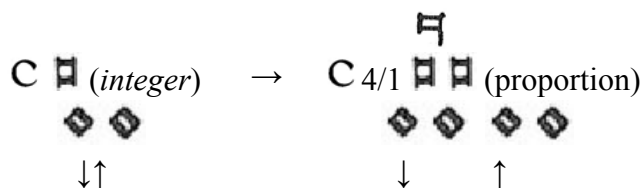


Ex.2.44 *Tripla* proportional relationship between \bigcirc and \bigcirc_3 signs

In the *proportio quadrupla* (4/1), indicated by 4/1, 4, $\mathbb{C}_{4/1}$, \mathbb{C}_4 , $\bigcirc_{4/1}$, \bigcirc_4 , \mathbb{C}_2 , Φ_2 , \mathcal{O}_2 , $\mathcal{O}_{2/1}$, $\mathcal{O}\mathbb{C}$, or \mathbb{D} signs in the proportion, the *integer valor* is given a semibreve tactus, and the proportion, under one of the signs above, has four

semibreves per tactus. The mensuration of the breve is always imperfect and the tactus

falls on a *longa* in the proportion, so it is called *alla longa* (see Ex.2.45).⁷¹



Ex.2.45 *Proportio quadrupla*

⁷⁰ Apel, *The Notation of Polyphonic Music 900-1600*, 157.

⁷¹ Apel, *The Notation of Polyphonic Music 900-1600*, 157-58.

The *proportio sesquialtera* (3:2), indicated by the $C \frac{3}{2}$, $O \frac{3}{2}$, $\frac{3}{2}$, or 3 signs in the proportion, can be presented in the breve tactus or the semibreve tactus. The *sesquialtera* proportion (3/2), indicated by the $C \rightarrow C \frac{3}{2}$ signs, takes place on the semibreve level in the breve tactus or on minim level with a semibreve tactus (see Ex.2.46).

$$\begin{array}{ccc}
 C \square & \rightarrow & C \frac{3}{2} = \frac{3}{2} = 3 \\
 \diamond \diamond & & \diamond \diamond \diamond \\
 \downarrow \uparrow & & \downarrow \uparrow
 \end{array}$$

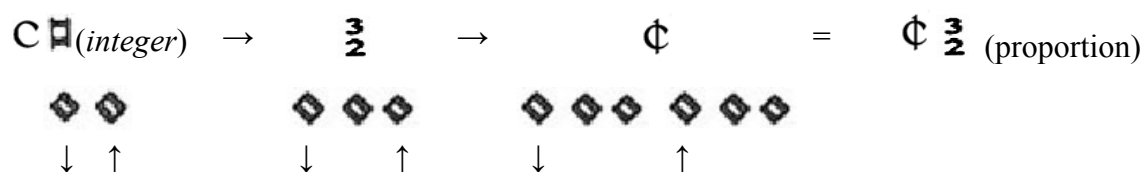
Ex.2.46 *Sesquialtera* (3/2) by $C \rightarrow C \frac{3}{2}$, semibreve level, breve tactus

The *sesquialtera* proportion (3/2), indicated by the $O \rightarrow O \frac{3}{2}$ signs, is on the minim level with a semibreve tactus (see Ex.2.47).

$$\begin{array}{ccc}
 O \square & \rightarrow & O \frac{3}{2} = \frac{3}{2} = 3 \\
 \diamond (\diamond \diamond) & & \\
 \downarrow \uparrow & & \downarrow \uparrow
 \end{array}$$

Ex.2.47 *Sesquialtera* (3/2) by $O \rightarrow O \frac{3}{2}$, minim level, semibreve tactus

The *sesquialtera diminuta* proportion (6/2), indicated by the $C \rightarrow \Phi \frac{3}{2}$ signs, occurs on the semibreve level with a breve tactus, through the double operation of the two proportion signs in the proportion: the $\frac{3}{2}$ sign for *sesquialtera* (3/2) and the Φ sign for *diminuta* (2/1), resulting in *sesquialtera diminuta* (6/2) (see Ex.2.48).⁷²



Ex.2.48 *Sesquialtera diminuta* (6/2) by $C \rightarrow \Phi \frac{3}{2}$, semibreve level, breve tactus

The long tradition of using the mensuration-proportion signs within the original mensural meanings continued throughout the sixteenth century, together with the confused use of the signs, which was caused either by lack of proper knowledge of the mensuration-proportion convention or by attempts to establish a new standard of proportional practice or to theorize some complex proportional relationships for the sake of just theoretical. The convention of the mensuration-proportion practice continued into the seventeenth century.

⁷² Apel, *The Notation of Polyphonic Music 900-1600*, 158-59.

Proportion Signs in the Seventeenth Century

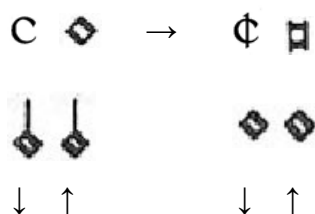
The transition from proportional notation to modern notation took place over the course of the seventeenth century. Nevertheless, the old conventions of the mensuration-proportion practice, based on the original mensural meanings and the invariable uniform tactus, continued at least until the mid-century. In the early seventeenth century, some composers used the minim tactus under the **C** or **O** signs, while others applied the minim tactus under the **♢** or **♣** signs.⁷³ Some composers maintained the exact proportional meaning of the **C**, **♢** and **♣** signs as 4:2:1 proportions, whereas others interpreted them as relative tempo changes: the **C** sign represents a slow tempo; the **♢** sign a moderate tempo; and the **♣** sign a brisk tempo.⁷⁴

In his treatise *Conclusioni nel suono dell'Organo* (1609), Adriano Banchieri presents a discussion of tactus and some proportions, in which he uses the term *tempo perfetto* for the tempo of the *tactus alla breve* (breve tactus) in **♢** sign, and *tempo imperfetto* for the tempo of the *tactus alla semibreve* (semibreve tactus) in **C** sign. Because his tactus for the proportions is the same invariable time duration that originated at the end of the fifteenth century, the time duration of both the *tempo perfetto* and the

⁷³ Rastall, *The Notation of Western Music*, 188.

⁷⁴ Rastall, *The Notation of Western Music*, 188-89.

tempo imperfetto is actually the same. The *tactus equalis* is simply the binary tactus, and the *tactus inequalis* the ternary.⁷⁵ Banchieri no longer uses the \bigcirc sign (*tempus perfectum*) as the initiating sign (*integer valor*). Also at this time the \mathbf{C} and Φ signs, when used as *integer valor*, are treated equally except for the tactus: the semibreve tactus for the \mathbf{C} sign and the breve tactus for the Φ sign (see Ex.2.49).⁷⁶



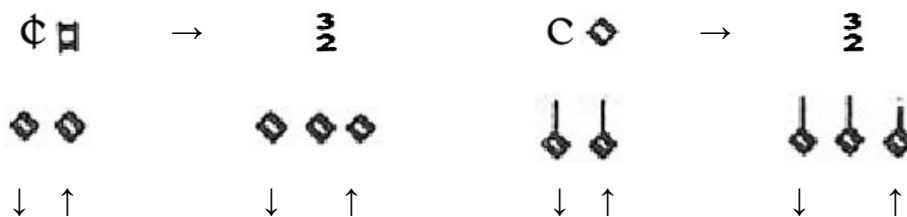
Ex.2.49 Semibreve tactus in \mathbf{C} sign (left) and breve tactus in Φ sign (right)

Banchieri indicates the *sesquialtera* proportion (3/2) either by $\Phi \rightarrow \frac{3}{2}$ on the semibreve level in the breve tactus, or by $\mathbf{C} \rightarrow \frac{3}{2}$ on the minim level in the semibreve tactus (see Ex.2.50). The *tripla* proportion (3/1) is designated by $\mathbf{C} \rightarrow \frac{3}{1}$ on the semibreve level in

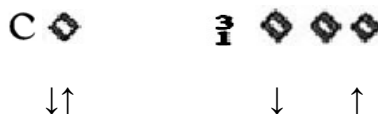
⁷⁵ Roger Bowers, "Proportioned Notation in Banchieri's Theory And Monteverdi's Music", *Performing Practice in Monteverdi's Music: The Historic – Philological Background*, ed. Raffaello Monterosso (Cremona: Fondazione Claudio Monteverdi, 1995), 56-57.

⁷⁶ *Ibid.*, 56.

the semibreve tactus (see Ex.2.51).⁷⁷



Ex.2.50 *Sesquialtera* (3/2) by $\text{C} \rightarrow \frac{3}{2}$ in the breve tactus and by $\text{C} \rightarrow \frac{3}{2}$ in the semibreve tactus



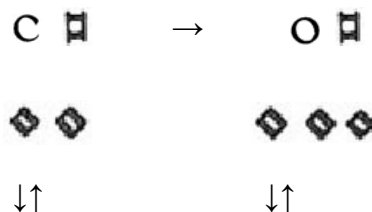
Ex.2.51 *Tripla* (3/1) by $\text{C} \rightarrow \frac{3}{1}$ in the semibreve tactus

In another treatise, *Cartella musicale* (1614), Banchieri tries to rectify other composers' incorrect usages of the proportional signs by describing their precise, rational, and conventional system. Banchieri believed that confusion in proportional notation was due to the arbitrary use of proportion signs by composers who had an incorrect understanding of the system of proportional notation.⁷⁸ Banchieri explained systematic proportion signs in the following way: The proportion signs are clearly and strictly related to the *integer valor*; when a mensuration sign has no proportional meaning, the

⁷⁷ Roger Bowers, "Proportioned Notation in Banchieri's Theory And Monteverdi's Music," 59-60.

⁷⁸ Roger Bowers, "Proportioned Notation in Banchieri's Theory And Monteverdi's Music," 66.

mensuration is based on semibreve equality to what came before. For example, the **C** sign followed by the **O** sign and the **♯** sign followed by the **♯** sign do not have proportional meaning, only mensurational. In the former (**C** → **O**) the **C** sign indicates the *tempus imperfectum* mensuration, the duple division of the breve into the two semibreves, and the **O** sign indicates the *tempus perfectum* mensuration, the triple division of the breve into the three semibreves, in semibreve equality (see Ex.2.52).⁷⁹ Each of the cut signs (**♯**, **♯**) indicates *diminutio dupla* to the former: Thus the **♯** and **♯** signs are *diminutio dupla* of the **C** and the **O** signs respectively.

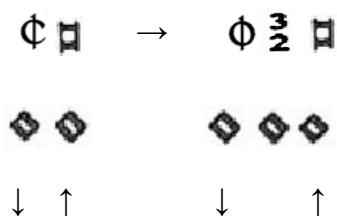


Ex.2.52 **C** → **O**, without proportional meaning in semibreve equality

On the other hand, when the **♯** sign is followed by the **♯**³ sign, a proportional relationship is indicated, with the two semibreves under the **♯** sign (*integer valor*) counted in the breve tactus during the time of the three semibreves under

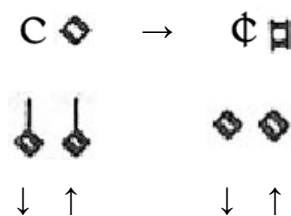
⁷⁹ Ibid., 67.

the $\Phi \frac{3}{2}$ sign (see Ex.2.53). In this case only the $\frac{3}{2}$ sign in the $\Phi \frac{3}{2}$ sign indicates the proportion, while the Φ sign only indicates the result of the *sesquialtera* proportion, the triple division of the breve, but does not affect the proportional process.⁸⁰



Ex.2.53 The single operation of the proportion signs in $\Phi \rightarrow \Phi \frac{3}{2}$ in breve tactus

Although the C and Φ signs can be equally treated as *integer valor*, when the Φ sign follows C , it designates the *proportio dupla* in the overall proportional context (see Ex.2.54).⁸¹

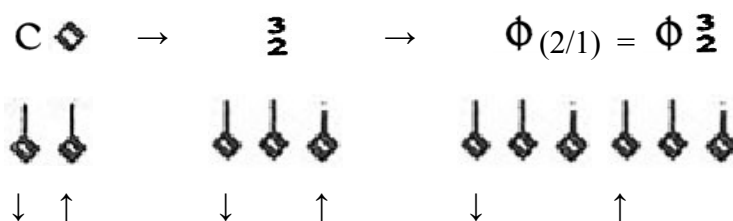


Ex.2.54 The *dupla* proportional relationship of $C \rightarrow \Phi$ in overall proportional context

⁸⁰ Roger Bowers, "Proportioned Notation in Banchieri's Theory And Monteverdi's Music," 67.

⁸¹ Roger Bowers, "Proportioned Notation in Banchieri's Theory And Monteverdi's Music," 75.

All the diminution signs or cut signs affect the proportional relationship. For example, when the \mathbf{C} sign is followed by the $\Phi \frac{3}{2}$ sign, the cut sign, Φ , indicates the *dupla* proportion (2/1) and the diminution sign, $\frac{3}{2}$, indicates the *sesquialtera* proportion (3/2) resulting in the *tripla* proportion (3/1) by the double operation: $3/2 \times 2/1=3/1$ (see Ex.2.55).⁸²



Ex.2.55 The double operation of the proportion signs in $\mathbf{C} \rightarrow \Phi \frac{3}{2}$ in semibreve tactus

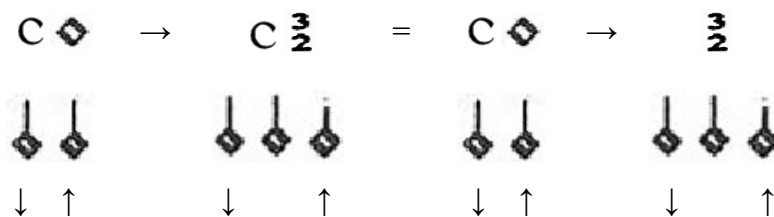
Based on the principles mentioned above, ten different proportional indications are possible using proportion signs made up of the combination of a mensuration sign and a fraction; these are shown in Table 2.1.

In the first four proportions in Table 1, the proportional relationships are determined only by the numerical fractions, because the same mensuration signs, \mathbf{C} and Φ , are used in both the *integer* and the proportion. In such cases, the omission of the mensuration sign of the proportion does not affect the result; for example, the first

⁸² Ibid.

proportion in Table 2.1, $C \rightarrow C \frac{3}{2}$ indicates the *sesquialtera* proportion (3/2) on the minim level in the semibreve tactus (see Ex.2.56). This proportion can also be written as

$C \rightarrow \frac{3}{2}$ without any change in its meaning.⁸³



Ex.2.56 $C \rightarrow C \frac{3}{2}$: *sesquialtera* (3/2) on minim level in semibreve tactus

Table 2.1 Possible proportional relationships using signs made up of a mensural sign and a numerical fraction

1	$C \rightarrow C \frac{3}{2}$
2	$C \rightarrow C \frac{3}{1}$
3	$\Phi \rightarrow \Phi \frac{3}{2}$
4	$C \rightarrow C \frac{6}{4}$
5	$C \rightarrow \Phi \frac{3}{2}$

⁸³ Bowers, "Proportioned Notation in Banchieri's Theory And Monteverdi's Music," 76.

6	$C \rightarrow \Phi \frac{3}{2}$
7	$\Phi \rightarrow \Phi \frac{3}{2}$
8	$C \rightarrow \Phi \frac{3}{1}$
9	$C \rightarrow C \frac{3}{2}$
10	$\Phi \rightarrow C \frac{3}{2}$

The second proportion in Table 2.1, the C sign followed by the $C \frac{3}{1}$ sign, indicates the *tripla* proportion (3/1) on the semibreve level in the semibreve tactus (see Ex.2.57).

$$\begin{array}{ccccccc}
 C \diamond & \rightarrow & C \frac{3}{1} \diamond \diamond \diamond & = & C \diamond & \rightarrow & \frac{3}{1} \diamond \diamond \diamond \\
 \downarrow \uparrow & & \downarrow \quad \uparrow & & \downarrow \uparrow & & \downarrow \quad \uparrow
 \end{array}$$

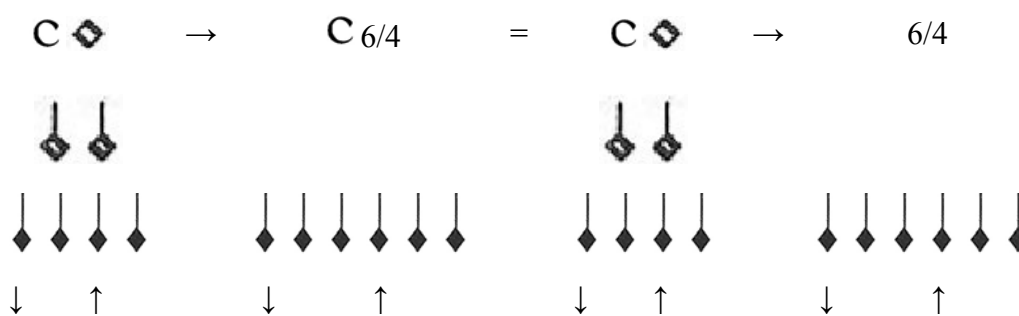
Ex.2.57 $C \rightarrow C \frac{3}{1}$: *tripla* (3/1) on semibreve level in semibreve tactus

The next proportion, $\Phi \rightarrow \Phi \frac{3}{2}$, indicates the *sesquialtera* proportion (3/2) on the semibreve level in the breve tactus (see Ex.2.58).

$$\begin{array}{ccccccc}
 \Phi \square & \rightarrow & \Phi \frac{3}{2} & = & \Phi \square & \rightarrow & \frac{3}{2} \\
 \diamond \diamond & & \diamond \diamond \diamond & & \diamond \diamond & & \diamond \diamond \diamond \\
 \downarrow \quad \uparrow & & \downarrow \quad \uparrow & & \downarrow \quad \uparrow & & \downarrow \quad \uparrow
 \end{array}$$

Ex.2.58 $\Phi \rightarrow \Phi \frac{3}{2}$: *sesquialtera* (3/2) on semibreve level in breve tactus

The fourth proportion, the C sign followed by the $\text{C}_{6/4}$ sign, indicates the *sesquiquarta* proportion (6/4) on the semi-minim level in the semibreve tactus (see Ex.2.59).⁸⁴



Ex.2.59 $\text{C} \rightarrow \text{C}_{6/4}$: *sesquiquarta* (6/4) on semi-minim level in semibreve tactus

The next four proportional indications in Table 2.1 (numbers 5 through 8) use different mensuration signs in the *integer* and the proportion, providing a double proportional operation, represented by both the mensuration sign and the fraction. The $\text{C} \rightarrow \Phi \frac{3}{2}$ signs indicate the *tripla* proportion (3/1) on the semibreve level in the semibreve tactus, with the 3/2 proportion multiplied by 2/1 proportion (see Ex.2.60).

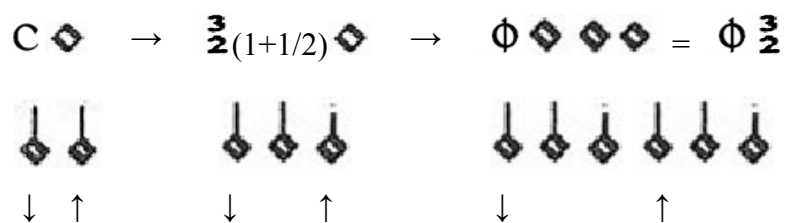
$$\text{C} \diamond \rightarrow \frac{3}{2}(1+1/2) \diamond \rightarrow \Phi \diamond \diamond \diamond = \Phi \frac{3}{2}$$

⁸⁴ Bowers, "Proportioned Notation in Banchieri's Theory And Monteverdi's Music," 76.



Ex.2.60 $C \rightarrow \Phi \frac{3}{2}$: *tripla* ($3/2 \times 2/1 = 3/1$) on semibreve level in semibreve tactus

The $C \rightarrow \Phi \frac{3}{2}$ signs also indicate the *tripla* proportion ($3/2 \times 2/1 = 3/1$), but on the minim level in the semibreve tactus, with the $3/2$ proportion multiplied by the $2/1$ proportion (see Ex.2.61).



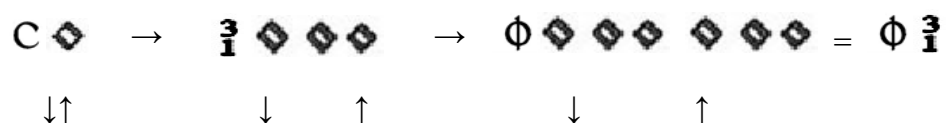
Ex.2.61 $C \rightarrow \Phi \frac{3}{2}$: *tripla* ($3/2 \times 2/1 = 3/1$) on minim level in semibreve tactus

The $C \rightarrow \Phi \frac{3}{1}$ signs indicate the *sextupla* proportion ($6/1$) on the semibreve level in the semibreve tactus, with the $3/1$ proportion multiplied by the $2/1$ proportion (see Ex.2.62).⁸⁵

This proportion was invented in the early 17th century.⁸⁶

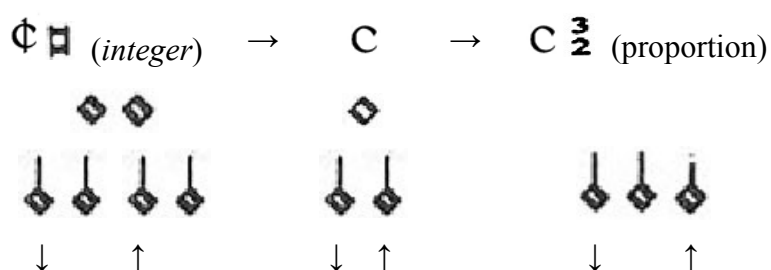
⁸⁵ Bowers, "Proportioned Notation," 76.

⁸⁶ Bowers, "Proportional Notation," 429.



Ex.2.62 $C \rightarrow \Phi \mathbf{3}$: *sextupla* ($3/1 \times 2/1 = 6/1$) on semibreve level in semibreve tactus

The $\Phi \rightarrow C \mathbf{3}$ signs indicate the *subsesquitertia* proportion ($3/4$) on the minim level in the breve tactus, with the $3/2$ proportion multiplied by the $1/2$ proportion (see Ex.2.63).⁸⁷

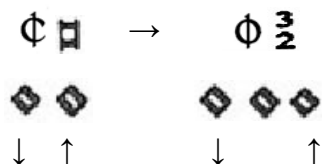


Ex.2.63 $\Phi \rightarrow C \mathbf{3}$: *subsesquitertia* ($3/2 \times 1/2 = 3/4$) on minim level in breve tactus

The last two proportional indications (numbers 9 and 10) also use different mensuration signs between the *integer valor* and the proportion. The different signs do not create a proportional relationship, but only show that the result retains the original mensuration meaning of the signs. Thus $\Phi \rightarrow \Phi \mathbf{3}$ signs indicate the *sesquialtera*

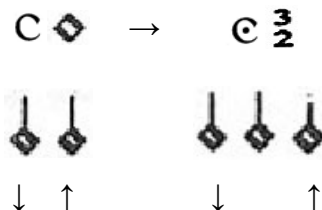
⁸⁷ Bowers, "Proportioned Notation", 76.

proportion (3/2) on the semibreve level in the breve tactus (see Ex.2.64).



Ex.2.64 $\text{C} \rightarrow \text{C} \frac{3}{2}$: *sesquialtera* (3/2) on the semibreve level in the breve tactus

Similarly, the $\text{C} \rightarrow \text{C} \frac{3}{2}$ signs indicate the *sesquialtera* proportion (3/2) on minim level in the semibreve tactus (see Ex.2.65).⁸⁸



Ex.2.65 $\text{C} \rightarrow \text{C} \frac{3}{2}$: *sesquialtera* (3/2) on minim level in the semibreve tactus

According to Roger Bowers, conventional proportional notation as seen in Table 2.1 was the mainstream practice in the early 17th century, especially during the first two or three decades, with the full understanding of the composers, who strictly applied the

⁸⁸ Bowers, "Proportioned Notation", 76.

rules to their compositions. Bowers confirms that Claudio Monteverdi followed the proportional practice as described by Banchieri.⁸⁹

On the other hand, the use of Italian tempo words or mood words, such as *tarde*, *velociter*, *adagio*, and *presto*, began in the early 17th century to indicate tempo inflections that the proportional system was incapable of showing.⁹⁰ Over the course of the seventeenth century, proportion signs began to be interpreted generally as tempo modifications indicating a slower or quicker tempo. The fraction-proportion signs began to be interpreted in the semi-minim equality; for example, the fraction 3/4, which used to designate the proportional relationship of three semi-minims in the time duration of four in the *integer valor*, came to be interpreted as three quarter notes in a measure.⁹¹

From the very beginning of mensuration practice in the fourteenth century, composers expressed proportions inherent in the concept of mensuration based on the central breve or the equal breve principle. Mensuration signs were useful tools for composers to indicate proportional relationships within the breve equality, which functioned as a ruler for regular *mensura* or *tactus*. Indeed, the regular beating practice might have begun with the beginning of mensural notation. Most likely, from the very

⁸⁹ Bowers, "Proportioned Notation", 77, 90.

⁹⁰ Houle, *Meter in Music, 1600-1800*, 2.

⁹¹ *Ibid.*

beginning, the tempo of the tactus was flexible within the moderately controllable tempo of the human pulse rate under normal conditions of around M.M. 60. Although the invariable uniform tactus was discussed and strongly advocated for church polyphony by the majority of theorists from the late fifteenth century until allegedly the early seventeenth century, a flexible tempo range of the tactus was practiced according to the taste of the performers. However, the uniform tactus within a moderate range of flexibility functioned as the foundation of tempo, at least in vocal ensemble music of the late Medieval and Renaissance eras before the new Baroque musical styles, in which tempo or mood words began to be used to indicate tempos out of the normal tactus range, which initiated the dissolution of the invariable uniform tactus practice as well as proportional practice.















CHAPTER III

SCHÜTZ'S USE OF PROPORTIONAL SIGNS
IN HIS *PSALMEN DAVIDS* (1619) AND
SYMPHONIAE SACRAE TERTIA PARS (1650)

For the correct understanding of the proportional relationships used in the works of Schütz, a precise knowledge of the note and rest signs of his time, which are a little bit different from the modern signs, is required. During Schütz's time, composers retained the note and rest signs used in the previous century; these are primarily the note values of the breve, semibreve, minim, semi-minim, and fusa (see Table 3.1). When a note is dotted, the dot means an addition of half of the note value (*punctis additionis*); for example, a dotted breve designates the value of one and half breves and a dotted semibreve the value of one and half semibreves. Under the $\text{♃} 3$ or $\text{♃} 3/1$ signs, the breve rest sign has the same value as a dotted breve or three semibreves (see Ex. 3.7 and Ex. 3.15). Coloration – that is, the use of blackened notes – principally indicates the *hemiola* rhythm (see Ex. 3.30 and Ex. 3.31).

Table 3.1 The primary signs for the notes and rests used during c. 1450 to 1600s

Note value	Note sign	Rest sign
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Longa		
Breve		
Semibreve		
Minim		
Semi-minim		
Fusa		
Semi-fusa		

Proportional Signs Used in *Psalmen Davids* (1619)

The *Psalmen Davids* (1619) contains 26 pieces that include settings of 22 complete Psalm texts, a compiled Psalm text (verses from Ps. 96, 98, 148, 150 and the complete Ps. 117), two texts from other Biblical sources, and a motet text; Table 3.2 lists each piece, with the text it sets and its *Schütz Werke Verzeichnis* (SWV) catalog number.

Table 3.2 Titles of the 26 pieces in the *Psalmen Davids*

No.	Text	Title	SWV
1	Psalm 110	<i>Der Herr sprach zu meinem Herren</i>	22
2	Psalm 2	<i>Warum toten die Heiden</i>	23
3	Psalm 6	<i>Ach Herr straf mich nicht in deinem Zorn</i>	24
4	Psalm 130	<i>Aus der Tiefe ruf ich, Herr, zu dir</i>	25
5	Psalm 122	<i>Ich freu mich des, das mir geredt ist</i>	26
6	Psalm 8	<i>Herr unser Herrscher wie herrlich ist dein Nam</i>	27
7	Psalm 1	<i>Wohl dem, der nicht wandelt im Rat der Gottlosen</i>	28
8	Psalm 84	<i>Wie lieblich sind deine Wohnungen</i>	29
9	Psalm 128	<i>Wohl dem, der den Herren fürchtet</i>	30
10	Psalm 121	<i>Ich hebe meine Augen auf zu den Bergen</i>	31
11	Psalm 136	<i>Dancket dem Herren den der ist freundlich</i>	32
12	Psalm 23	<i>Der Herr ist mein Hirt</i>	33
13	Psalm 111	<i>Ich dancke dem Herrn von ganzem hertzen</i>	34
14	Psalm 98	<i>Singet dem Herr nein neues Lied</i>	35
15	Psalm 100	<i>Jauchzet dem Herren alle Welt</i>	36
16	Psalm 137	<i>An den Wassern zu Babel fassen wir</i>	37
17	Psalm 150	<i>Alleluja. Lobet den Herren in seinem Heiligtum</i>	38
18	Psalm 103	<i>Lobe den Herren, meine Seele</i>	39
19	Jeremiah 31, 20	<i>Ist nicht Ephraim mein teuer Sohn</i>	40
20	Psalm 103	<i>Nun lob, mein Seel, den Herren</i>	41
21	Motet	<i>Die mit Tränen säen</i>	42
22	Psalm 115	<i>Nicht uns, Herr, sondern deinem Namen gib Ehre</i>	43
23	Psalm 128	<i>Wohl dem, der den Herren fürchtet</i>	44
24	Psalm 136	<i>Danket dem Herren, den er ist freundlich</i>	45
25	Isaiah 49: 14-16	<i>Zion spricht, der Herr hat mich verlassen</i>	46
26	Compiled Psalm texts	<i>Jauchzet dem Herren, alle Welt, singet, rühmet, lobet</i>	47

Schütz uses only three proportion signs in the *Psalmen Davids*: ♩ , 3, and ♩ 3.

Table 3.3 shows these proportional relationships and their possible interpretations, and groups the 26 pieces according to which relationships are found in them.

Table 3.3 Categorized proportional indications in the *Psalmen Davids* (1619)

Category	Proportional indication	Possible interpretations	Nos. of the pieces
1	$\text{♩} \rightarrow 3$	1) $\text{♩} \rightarrow 3/1$, breve tactus of the <i>integer</i> 2) $\text{♩} \rightarrow 3/2$, breve tactus of the <i>integer</i> 3) $\text{♩} \rightarrow 3/1$, semibreve tactus of the <i>integer</i> 4) $\text{♩} \rightarrow 3/2$, semibreve tactus of the <i>integer</i>	1, 2, 11, 12, 20, 22, 24
2	$\text{♩}_3 \rightarrow \text{♩}$	1) $\text{♩}_{3/1} \rightarrow \text{♩}$, breve tactus of the <i>integer</i> 2) $\text{♩}_{3/2} \rightarrow \text{♩}$, breve tactus of the <i>integer</i> 3) $\text{♩}_{3/1} \rightarrow \text{♩}$, semibreve tactus of the <i>integer</i> 4) $\text{♩}_{3/2} \rightarrow \text{♩}$, semibreve tactus of the <i>integer</i>	5, 7, 15, 17, 18, 26
3	♩	1) ♩ , breve tactus 2) ♩ , semibreve tactus	3, 4, 6, 8, 9, 10, 13, 14, 16, 19, 21, 23, 25

The first two possible interpretations in categories 1 and 2 are based on the breve tactus of the *integer valor*, while the third and fourth are on the semibreve tactus of the *integer valor*. In category 3, the first interpretation is based on the breve tactus and the second on the semibreve tactus. The tempo of the breve and the semibreve tactus is the same, around M.M. = 60.

An interesting feature of this publication, and others by Schütz, is that only the basso continuo parts show regular bar lines, corresponding to the *tactus maior*. Ex.3.1, the basso continuo part of *Lobe den Herren, meine Seele*, no.18 of the *Psalmen Davids*, shows an example of the printed regular barlines: In this case, barlines appear every six semibreves in the opening ♩ 3 section, and every two semibreves in the subsequent ♩ section, each corresponding to the *tactus maior* in that section.

XVIII. Concert. à 8. in die Orgel.

Obe den Herren
meine Seele.

Capella.

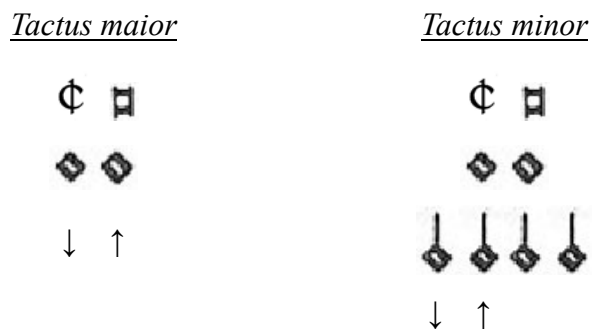
Tenore solo.

Capella.

The image shows a page of a musical score. At the top, it is titled 'XVIII. Concert. à 8. in die Orgel.' Below the title, there is a large, ornate initial 'D' for the first line of music. The text 'Obe den Herren meine Seele.' is written across the first two staves. The score consists of four staves of music. The first two staves are labeled 'Capella.' and the last two are also labeled 'Capella.' with 'Tenore solo.' written between the second and third staves. The music is written in a mensural style with various note values and rests. There are several mensuration signs (breve and semibreve) and some numbers (6, 3, 4, 3) above the notes, indicating the time signature or the number of parts.

Ex.3.1 Basso continuo part of *Lobe den Herren, meine Seele*, no.18 of the *Psalmen Davids*: printed regular barlines corresponding to the *tactus maior*

To clearly understand the possible interpretations of the proportional relationships, a short review of the possible *tactus tempi* in the time of Schütz is needed before a detailed explanation of the proportional interpretations. There are two possible *tactus*: the breve (□) and the semibreve (◇). Strictly following the conventional mensuration-proportion practice, which retains the original meanings of the mensuration signs, the breve *tactus* is the *tactus maior* for all pieces in *Psalmen Davids* (1619). With the breve *tactus* as the *tactus maior*, the semibreve *tactus* becomes the *tactus minor*, having half of the time duration of the *tactus maior*, resulting in a tempo twice as fast as the *tactus maior* (see Ex.3.2).



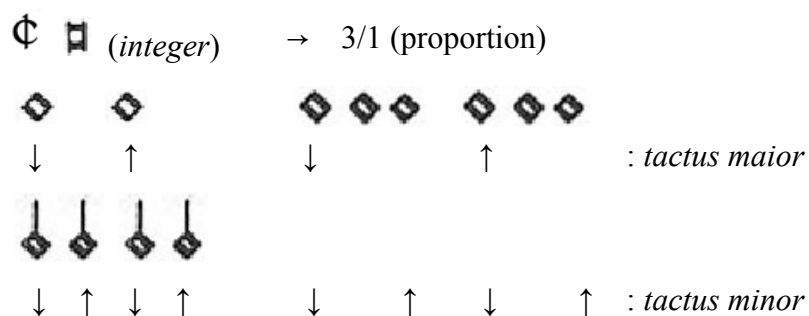
Ex.3.2 Breve tactus as *tactus maior* and semibreve tactus as *tactus minor*

When the *tactus maior* is used, a slight slowing down of the tempo might be needed sometimes in pieces having many semi-minims or fusas. Because the *tactus maior* was for professional musicians who could read the rhythm precisely, just a slight tempo adjustment would be good enough for the professional musicians to perform the works.

The semibreve tactus as *tactus minor* might have been used by semi-professional musicians when taken within the normal tempo range of the breve tactus (*tactus maior*), around M.M. = 60. This would require a change of tactus types between equal and unequal, which would help the musicians perform the rhythm of the pieces correctly. However, the overall flow of music could be slightly interrupted by switching between equal and unequal tactus.

Another possible way of choosing a tempo is to take the semibreve as the invariable uniform tactus, whose tempo range is around M.M. = 60. This semibreve tactus as the *tactus maior* or normal tactus might have been used for amateur musicians who could not perform in the fast tempo with the breve tactus as the *tactus maior* or the semibreve tactus as the *tactus minor* used by professional performers.

As discussed in Chapter II, the first category in Table 3.3, $\text{♃} \rightarrow 3$, can be interpreted as either the *tripla* (3/1) or *sesquialtera* proportion (3/2) within the conventional mensuration-proportion practice. In the former interpretation, the *tripla* proportion occurs on the semibreve level with a breve tactus of the *integer valor*, resulting in three semibreves in the same time as the previous one semibreve. The *tactus minor* beating, falling on the semibreve of the *integer*, creates a tactus-type switch between equal and unequal tactus; instead of two equal down and up motions for a single breve with the *tactus maior*, the tactus will have one longer down motion for two semibreves and a shorter up motion for one semibreve under the proportion sign 3 (unequal tactus) following the equal tactus under the *integer* sign ♃ , in which each of the down and up motions of equal time duration fall on a minim (see Ex.3.3). This slightly interrupts the musical flow at these switching points.



Ex.3.3 *tripla* (3/1) interpretation of $\Phi \rightarrow 3$, *tactus maior* and *tactus minor*

Ex.3.4, showing this proportion, is from Schütz's *Der Herr ist mein Hirt*, no.12 of the *Psalmen Davids*. The six semibreves under the proportion sign 3 are to be played during the same time of the two semibreves or four minims or eight semi-minims under the *integer* sign Φ in the *tactus maior* (breve tactus), creating the *tripla* proportional relationship. Ex.3.5 shows added vertical lines corresponding to the *tactus maior*. The three longa rests and one semibreve rest at the beginning are equal to six and a half breve rests, corresponding to six and a half bars in the *tactus maior*. Under the proportion sign 3, a breve rest has the same value as three semibreves or a dotted breve, and a semibreve rest has the same value as a semibreve. The *tactus maior* beating will be enough for professional musicians, while the *tactus minor* beating would be helpful for semi-professional musicians without slowing down the tempo (as shown in Ex.3.3).

XII. *BASSVS II, Chori, Capella.*

Er Herr ist mein Hirt if mir
wird nichts mangeln if mir wird nichts man geln
Er er qui det me ne Seele if Er sah ret

Ex.3.4 *Der Herr ist mein Hirt*, no.12 of the *Psalmen Davids*: $\text{C} \rightarrow 3$

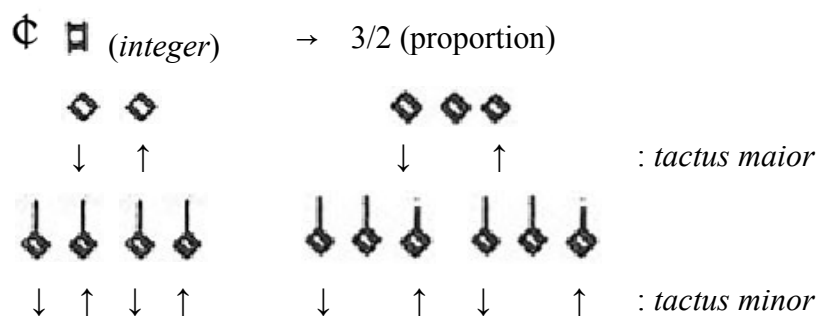
XII. *BASSVS II, Chori, Capella.*

Er Herr ist mein Hirt if mir
wird nichts mangeln if mir wird nichts man geln
Er er qui det me ne Seele if Er sah ret

Ex.3.5 *Der Herr ist mein Hirt*, no.12: *tripla* (3/1) interpretation of $\text{C} \rightarrow 3$ with the breve tactus of the *integer*, with added vertical lines

The second interpretation of $\text{C} \rightarrow 3$ as $\text{C} \rightarrow 3/2$ as the *sesquialtera* proportion (3/2) occurs on the semibreve level with a breve tactus of the *integer* (*tactus maior*), in which three semibreves under the proportion sign 3 correspond to two semibreves under the *integer* sign C (see Ex.3.6). The *tactus minor* beating under the proportion sign 3/2 is not supported by the actual notation, in which the consecutive three semibreves consist of the basic rhythmic construction with rarely used minims (see Exx.3.6 and 3.7). All the

actual triple-meter notation by Schütz under the Φ 3 or 3 sign in the *Psalmen Davids* is clearly on the semibreve level, not the minim level, with the predominating use of dotted breves, pairs of a breve and a semibreve, and three consecutive semibreves as the units of the triple rhythm, as seen in Ex.7, *Wohl dem, der nicht wandelt im Rat der Gottlosen* (no.12) and *Der Herr ist mein Hirt* (no.12) from the *Psalmen Davids*. Non-consecutive minims and semi-minims, shown in Ex.3.15, *Jauchzet dem Herren alle Welt* (no.15 of the *Psalmen Davids*), are used only rarely to create a dotted rhythm within the semibreve-level rhythmic design. Thus, the *sesquialtera* proportion (3/2) with the *tactus minor* is most likely not intended. Ex.3.8 shows the *sesquialtera* interpretation of no.12, *Der Herr ist mein Hirt*, with the addition of vertical lines corresponding to the *tactus maior*, in which three semibreves under the proportion sign 3 correspond to two semibreves under the *integer* sign Φ .



Ex.3.6 *sesquialtera* (3/2) interpretation of $\Phi \rightarrow 3$, *tactus maior* and *tactus minor*

VII. *BASSVS II, Chori.*

Di dem. Noch si set Noch si set

XII. *BASSVS II, Chori, Capella.*

Er Herr ist mein Hirt # mir

Ex.3.7 Actual notation under C 3 or 3 sign, nos. 7 and 12

XII. *BASSVS II, Chori, Capella.*

Er Herr ist mein Hirt # mir

wird nichts mangeln ij mir wird nichts man geln

Er er qui est me ne Seele ij Er führet

Ex. 3.8 *Der Herr ist mein Hirt*, no.12: *sesquialtera* (3/2) interpretation of C \rightarrow 3 with the breve tactus of *integer*, on semibreve level, with added vertical lines

The third and fourth interpretations of the first category are based on the semibreve tactus of the *integer valor*, in which the tempo of the semibreve tactus is around M.M. = 60. These interpretations take a tempo twice as slow as the first and second, and are exactly the same interpretations as the first and second interpretations

except for the semibreve as the *tactus maior* instead of the breve.

The third interpretation of $\text{C} \rightarrow 3$ is as a *tripla*, with three semibreves under the proportion sign 3 corresponding to one semibreve under the *integer* sign C (see Ex.3.9).

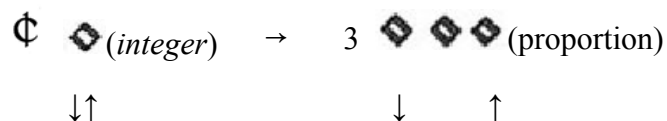
As seen in the comparison of the first and third interpretations of the first category in

Ex.3.10, the only difference between these two is a tempo that is twice as slow in the

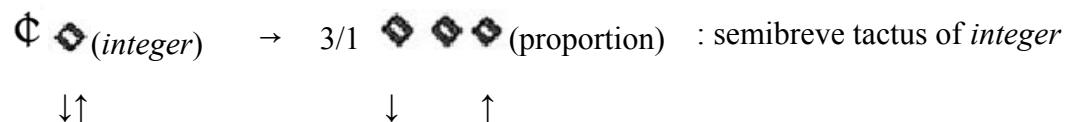
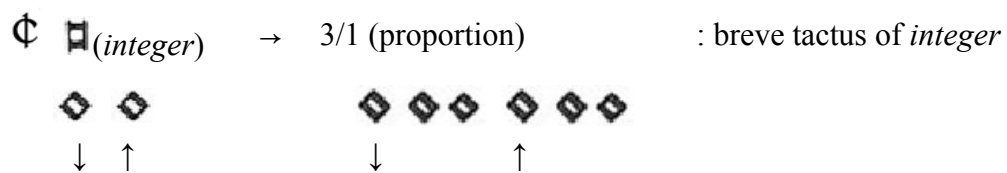
third interpretation than in the first. Ex. 3.11 shows this interpretation of no.12 in

Psalmen Davids, with the added vertical lines corresponding to the semibreve tactus of

the *integer valor*.



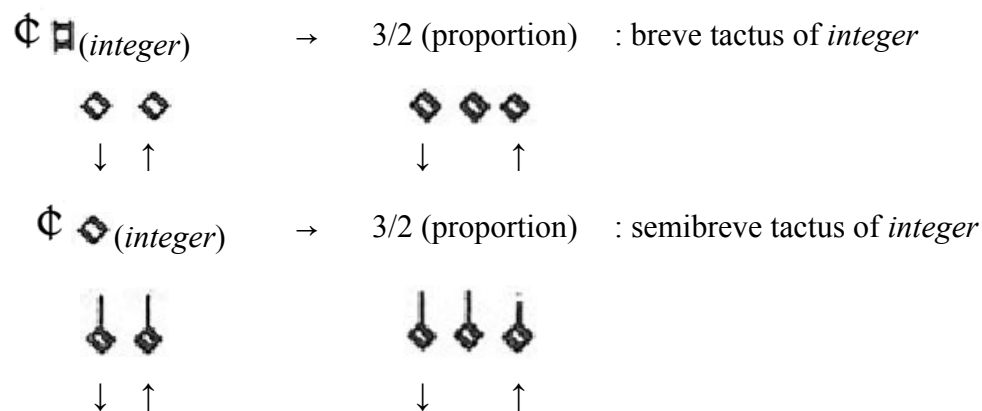
Ex.3.9 *tripla* (3/1) interpretation of $\text{C} \rightarrow 3$ with the semibreve tactus of the *integer*



Ex.3.10 comparison of interpretations 1) and 3) of category 1 in Table 3.3

Ex.3.11 *Der Herr ist mein Hirt*, no.12: *tripla* (3/1) interpretation of $\text{C} \rightarrow 3$ with the semibreve tactus of the *integer*, on semibreve level, with added vertical lines

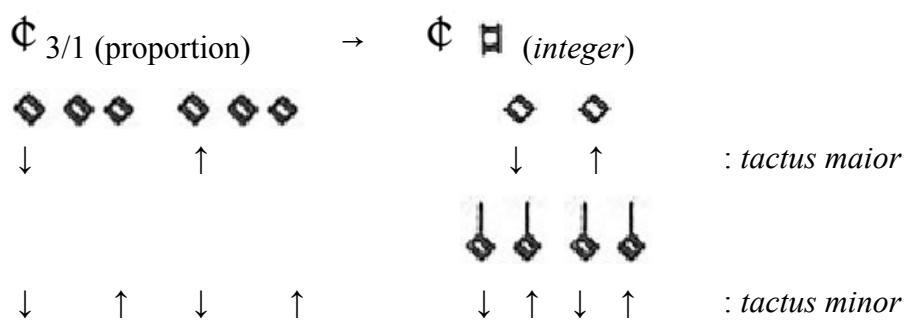
The fourth interpretation of the first category in Table 3.3, *sesquialtera* (3/2) with the semibreve tactus of the *integer valor*, results in a tempo twice as slow as the second interpretation, *sesquialtera* (3/2) with the breve tactus of the *integer valor* (see Ex.3.12). As mentioned above, this fourth interpretation is not intended by Schütz because of his use of semibreves in triple meter. Thus, drawing barlines corresponding to the semibreve tactus of the *integer valor* is impossible under the proportion sign 3.



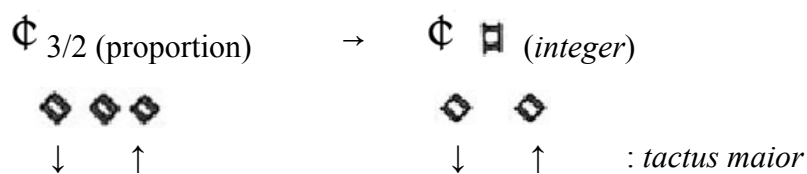
Ex.3.12 comparison of interpretations 2) and 4) of category 1 in Table 3.3

The second category in Table 3.3, $\Phi_3 \rightarrow \Phi$, represents the exact same proportional relationship as the first category. The only difference is the use of Φ_3 as the initial sign, which itself does not represent the *integer valor*. Only \mathbb{C} , Φ , \mathbb{O} , and Φ signs function as *integer valor*, to which other proportion signs compare specific note values to create proportional relationships. Thus, in $\Phi_3 \rightarrow \Phi$, the Φ sign is the *integer valor*, as seen in Ex.3.13, which also shows the *tripla* (3/1) proportional relationship indicated by $\Phi_3 \rightarrow \Phi$, in which three semibreves under the proportion sign Φ_3 correspond to one semibreve under the *integer* sign Φ . Ex.3.14 shows the *sesquialtera* (3/2) proportional interpretation of $\Phi_3 \rightarrow \Phi$ with the breve tactus of the *integer valor*, in which three semibreves under the proportion sign Φ_3 correspond to

two semibreves under the *integer* sign Φ . Ex.3.15, the original *Jauchtzet dem Herren alle Welt*, no.15 in the *Psalmen Davids*, is an example of the $\Phi_3 \rightarrow \Phi$ proportion indication, which can be interpreted as either *tripla* proportion (3/1) or *sesquialtera* proportion (3/2). Ex 3.16 shows the *tripla* proportional interpretation using the breve tactus of the *integer valor*, with added vertical lines corresponding to the breve tactus. Ex 3.17 shows the *sesquialtera* proportional interpretation with the added vertical lines corresponding to the breve tactus.



Ex.3.13 *tripla* (3/1) proportional interpretation of $\Phi_3 \rightarrow \Phi$ with the breve tactus of the *integer*, *tactus maior* and *tactus minor*



Ex.3.14 *sesquialtera* (3/2) proportional interpretation of $\Phi_3 \rightarrow \Phi$ with the breve tactus of the *integer*, *tactus maior*

XV. Echo, BASSVS II, Chori.

Jauchzet dem Herren Jauchzet dem Herren

le Welt Jauchzet dem Herren al le Welt mit

Ex.3.15 *Jauchzet dem Herrn*, no.15: $\text{♩} 3 \rightarrow \text{♩}$

XV. Echo, BASSVS II, Chori.

Jauchzet dem Herren Jauchzet dem Herren

le Welt Jauchzet dem Herren al le Welt mit

Ex 3.16 *Jauchzet dem Herrn*, no.15: *tripla* (3/1) proportional interpretation of $\text{♩} 3 \rightarrow \text{♩}$ with the breve tactus of the *integer*, with addition of vertical lines corresponding to the breve tactus

XV. Echo, BASSVS II, Chori.

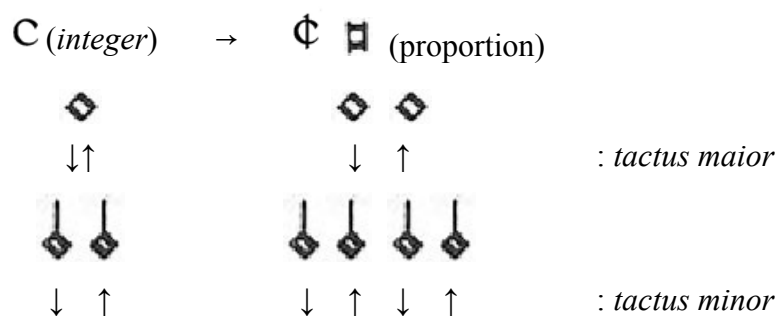
Jauchzet dem Herren Jauchzet dem Herren

le Welt Jauchzet dem Herren al le Welt mit

Ex.3 17 *Jauchzet dem Herrn*, no.15: *sesquialtera* (3/2) proportional interpretation of $\text{♩} 3 \rightarrow \text{♩}$ with the breve tactus of the *integer*, with addition of vertical lines corresponding to the breve tactus

The third and fourth interpretations of the second category of Table 3.3, the *tripla* (3/1) and *sesquialtera* (3/2) proportional interpretations with the semibreve tactus of the *integer valor*, are exactly the same as those of the first category.

For the third category in Table 3.3, which uses the Φ sign alone, either *tactus maior* or *tactus minor* can be used. Following the convention of the *alla semibreve* sign \mathbb{C} , in which the semibreve tactus functions as the *tactus maior*, the proportional relationship between the \mathbb{C} sign and the Φ sign (*alla breve*) is *dupla* (2/1), in which two semibreve under the proportion sign Φ correspond to a semibreve under the *integer* sign \mathbb{C} with a semibreve tactus of the *integer* (see Ex.3.18).



Ex.3.18 Φ sign alone

Ex.3.19 shows the opening of *Aus der Tiefe ruf ich, Herr, zu dir*, no.4 in the *Psalmen Davids*, which uses only the Φ sign throughout the piece. As explained above,

the breve tactus functions as the *tactus maior* under the *alla breve* sign C , as shown in Ex.3.20, in which the added vertical lines correspond to the breve tactus. Ex.3.21 shows the interpretation of the semibreve tactus as the *tactus maior*, in which the added vertical lines correspond to the semibreve tactus.

IV. *BASSVS II, Chori.*

Aus der tieffe. Herr Herrhö re mei ne Stimme Herrhö re
mei ne Stimme Laß dei ne Ohren mer eken auff die Stimme meinetes te

Ex.3.19 *Aus der Tiefe*, no.4: C sign alone

IV. *BASSVS II, Chori.*

Aus der tieffe. Herr Herrhö re mei ne Stimme Herrhö re
mei ne Stimme Laß dei ne Ohren mer eken auff die Stimme meinetes te

Ex.3.20 *Aus der Tiefe*, no.4; C sign alone with the breve tactus with added vertical lines corresponding to the breve tactus



Ex.3.21 *Aus der Tieffe*, no.4: C sign alone with the semibreve tactus with added vertical lines corresponding to the semibreve tactus

Proportional Signs Used in *Symphoniae Sacrae Tertia Pars* (1650)

The original *Symphoniae Sacrae Tertia Pars* was published in 1650 in twelve partbooks: 1) Prima Vox, 2) Secunda Vox, 3) Tertia Vox, 4) Quarta & Ultima Vox, 5) Violinum Primum, 6) Violinum Secundum, 7) Cantus Complementi, 8) Altus Complementi, 9) Tenor Complementi, 10) Bassus Complementi, 11) Bassus Ad Organum, and 12) Bassus Pro Violone.⁹² Table 3.4 lists the pieces, their German titles, and SWV numbers. Like the original prints of the *Psalmen Davids*, only the basso continuo parts show regular barlines, corresponding to the *tactus maior*.

⁹² Werner Breig, Critical Notes to Volume 18, *Heinrich Schütz Neue Ausgabe sämtlicher Werke*, ed. Werner Breig (New York: Bärenreiter, 1989), 143.

Table 3.4 The titles of the 21 pieces in *Symphoniae Sacrae III*

No.	Title	SWV no.
1	<i>Der Herr ist mein Hirt, mir wird nichts mangeln</i>	398
2	<i>Ich hebe meine Augen auf zu den Bergen</i>	399
3	<i>Wo der Herr nicht das Haus bauet</i>	400
4	<i>Mein Sohn, warum hast du uns das getan?</i>	401
5	<i>O Herr, hilf, O Herr, laß wohl gelingen</i>	402
6	<i>Siehe, es erschien der Engel des Herren Joseph im Traum</i>	403
7	<i>Feget den alten Sauerteig aus</i>	404
8	<i>O süßer Jesu Christ, wer an dich recht gedenket</i>	405
9	<i>O jesu süß, wer dein gedenkt super Lilia convallium</i>	406
10	<i>Lasset uns doch den Herren, unsern Gott, loben</i>	407
11	<i>Es ging ein Sämann aus, zu säen seinen Samen</i>	408
12	<i>Seid barmherzig, wie auch euer Vater barmherzig ist</i>	409
13	<i>Siehe, dieser wird gesetzt zu einem Fall</i>	410
14	<i>Vater unser, der du bist im Himmel</i>	411
15	<i>Siehe, wie fein und lieblich</i>	412
16	<i>Hütet euch, daß eure Herzen nicht beschweret werden</i>	413
17	<i>Meister, wir wissen, daß du wahrhaftig bist</i>	414
18	<i>Saul, Saul, was verfolgst du mich</i>	415
19	<i>Herr, wie lange willst du mein so gar vergessen</i>	416
20	<i>Komm, heiliger Geist, Herre Gott</i>	417
21	<i>Nun danket alle Gott</i>	418

In Ex.3.22 , *Der Herr ist mein Hirt, mir wird nichts mangeln* (no.1 of the *Symphoniae Sacrae III*), it is hard to tell whether the initial sign and the sign in the fourth system are the C sign or the C sign. However, the C sign of *Aus der Tiefe ruf ich*,

Herr, zu dir (no.4 in the *Psalmen Davids*), is crystal clear (see Ex.3.23). Nevertheless, a close study of the original notations and their possible interpretations and a comparison to those of the *Psalmen Davids* provide a clue to clarify the problem.

The image shows a page of a musical manuscript with five staves. The first staff is labeled 'I. à 5.' and 'Organum.' and contains a large decorated initial 'H'. The second staff is labeled 'Symphonia.' and 'Er Herr ist mein Hirt. re.' and contains a large decorated initial 'H'. The third staff is labeled 'Der Herr ist mein Hirt.' and contains a large decorated initial 'H'. The fourth staff is labeled 'Er weidet mich.' and contains a large decorated initial 'E'. The fifth staff is labeled 'Er erquicket meine Seele.' and 'Und ob ich' and contains a large decorated initial 'E'. The manuscript includes various signs such as '65', '6', '4', '3', 'b', 'h', '66', '56', '3443', and '4' above the notes, and a large decorated initial 'H' at the beginning of the first two staves.

Ex.3.22 *Der Herr ist mein Hirt*, no.1: unclear C sign or C signs

IV. *BASSVS II, Chori.*

Aus der tieffe. Herr Herrhö re mei ne Stimme Herrhö re
mei ne Stimme Laß dei ne Ohren mer eken auff die Stimme meinee fle

Ex.3.23 *Aus der Tiefe*, no.4 of the *Psalmen Davids*: clear Φ signs

Table 3.5 shows the series of proportion signs within each piece, as found in the original 1650 publication.

Table 3.5 Proportional indications in *Symphoniae Sacrae III* (1650)

No.	Proportion signs as shown in a piece
1	$\Phi \rightarrow \frac{3}{1} \rightarrow \Phi \rightarrow \frac{3}{1} \rightarrow \Phi \rightarrow \frac{3}{1} \rightarrow \Phi \rightarrow \frac{3}{1} \rightarrow C$
2	$C \rightarrow \frac{3}{1} \rightarrow \Phi \rightarrow \frac{3}{1}$
3	$C \frac{3}{1} \rightarrow C \rightarrow \frac{3}{1} \rightarrow C \rightarrow \frac{3}{1} \rightarrow \Phi \rightarrow \frac{3}{1} \rightarrow \Phi \rightarrow \frac{3}{1} \rightarrow C$
4	$C \rightarrow \frac{3}{1} \rightarrow \Phi$
5	$\Phi \rightarrow \frac{3}{1} \rightarrow \Phi$
6	$\Phi \rightarrow \frac{3}{1} \rightarrow \Phi \rightarrow \frac{3}{1} \rightarrow \Phi$
7	$\Phi \frac{3}{1} \rightarrow \Phi$
8	$C \rightarrow \frac{3}{1} \rightarrow \Phi \rightarrow \frac{3}{1}$

Table 3.5 Continue

No.	Proportion signs as shown in a piece
9	$C \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}} \Phi \rightarrow \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}} [C] \rightarrow \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}} \Phi \rightarrow \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}}$
10	$\Phi \rightarrow \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}} \Phi \rightarrow \Phi$
11	$\Phi \rightarrow \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}} \Phi$
12	Φ
13	Φ
14	$C \rightarrow \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}}$
15	$\Phi // \Phi$
16	$\Phi \rightarrow \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}} \Phi \rightarrow \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}} \Phi$
17	$C // C \rightarrow \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}} \Phi \rightarrow \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}} \Phi \rightarrow \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}}$
18	$C \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}} C$
19	$\Phi // C \rightarrow \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}} \Phi \rightarrow \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}} \Phi$
20	$\Phi \overset{\mathfrak{z}}{\underset{\mathfrak{2}}{\rightarrow}}$
21	$C \rightarrow \Phi \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}} C \rightarrow \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}} \Phi \rightarrow \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}} \Phi \rightarrow \overset{\mathfrak{z}}{\underset{\mathfrak{1}}{\rightarrow}} C$

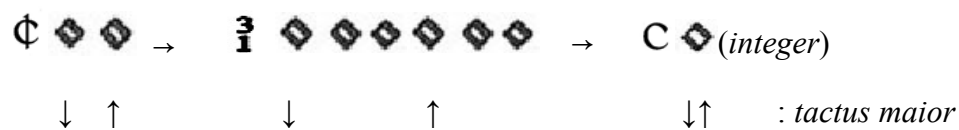
* []: obviously missing sign in no.9

* //: double bars in nos. 15,17, and 19

Three different principles can be used to interpret the proportions in the 21 pieces in the *Symphoniae Sacrae III*, based on the *tactus maior* as given by the *integer* sign of each piece: a literal interpretation; an interpretation of the Φ sign as representing a slightly faster tempo than the C sign; and an interpretation of the C sign as a printing error of the Φ sign.

In the first of these interpretations, the proportion signs shown in the pieces are accepted literally as the intended signs. For example, for the proportion signs in no.1 of Table 3.5 (e.g. *Der Herr ist mein Hirt, mir wird nichts mangeln*, $\Phi \rightarrow \mathfrak{3} \rightarrow \Phi \rightarrow \mathfrak{3} \rightarrow \Phi \rightarrow \mathfrak{3} \rightarrow \Phi \rightarrow \mathfrak{3} \rightarrow C$), the *tactus maior* falls on two semibreves under Φ , six semibreves under $\mathfrak{3}$, and one semibreve under C respectively (see Ex.3.24). In this case, the C sign, not the initial Φ sign, is the *integer valor*, to which other proportion signs are compared to create proportional relationships, as explained in Chapter II; when the signs C and Φ are used together the proportional relationship is *dupla* (2/1), indicated by $C \rightarrow \Phi$, with the C as the integer and the Φ as the proportion, in which two semibreves and four minims under the Φ sign correspond to one semibreve and two minims under the *integer* sign C . The successive proportional relationship is non-cumulative, with each proportion sign compared to the *integer* respectively, following the conventional mensuration-proportion practice. Ex.3.25 shows the latter part of the

original print of no.1, while Ex.3.26 gives the literal interpretation of the part with added vertical lines corresponding to the *tacti* according to the signs.



Ex.3.24 literal interpretation of no.1, *Der ist mein Hirt*.

The image shows a musical score for a piece titled "Der Herr ist mein Hirt". The score is written on six staves. The first staff has a treble clef and a common time signature. The music is accompanied by figured bass notation, including numbers like 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100. The score includes various musical notations such as notes, rests, and accidentals. The text "Gutes und Wahrheitsigkeit" is written below the second staff, and "Symphonia." is written below the fourth staff.

Ex.3.25 *Der Herr ist mein Hirt*, latter part, no.1 in the *Symphoniae Sacrae III*

Ex.3.26 *Der Herr ist mein Hirt*, no.1 in the *Symphoniae Sacrae III*, with added vertical lines corresponding to the *tacti*

If one interprets the C sign as representing a slightly faster tempo than the C sign, as addressed in Chapter II as a tendency in the notational practice of the seventeenth century, the $\text{C} \rightarrow \mathbf{3}$ proportional relationship of the proportion signs of *Der Herr ist mein Hirt* (no.1 in Table 3.5), $\text{C} \rightarrow \mathbf{3} \rightarrow \text{C} \rightarrow \mathbf{3} \rightarrow \text{C} \rightarrow \mathbf{3} \rightarrow \text{C} \rightarrow \mathbf{3} \rightarrow \text{C}$, is *tripla* (3/1) on the semibreve level with a breve tactus as the *tactus maior* (see Ex.3.27). The tempo under the C sign at the end is intended to be slightly slower than that under C sign, creating a *ritardando* effect at the end of the piece.



Ex.3.27 interpretation 2 of no.1

On the other hand, if the \mathbf{C} sign is regarded as a printing error of the \mathbf{C} sign, the proportion signs of no.1 in Table 3.5 become $\mathbf{C} \rightarrow \mathbf{3} \rightarrow \mathbf{C} \rightarrow \mathbf{3} \rightarrow \mathbf{C} \rightarrow \mathbf{3} \rightarrow \mathbf{C} \rightarrow \mathbf{3} \rightarrow \mathbf{C}$, creating only the *tripla* proportion (3/1), in which six semibreves under the $\mathbf{3}$ sign correspond to two semibreves under the \mathbf{C} sign (*integer*) in the *tactus maior* (breve *tactus*) (see Ex.3.27). Ex.3.28 shows the printing-error interpretation, with added vertical lines corresponding to the *tactus maior*.

Ex.3.28 *Der Herr ist mein Hirt*, no.1 in the *Symphoniae Sacrae III*: print error interpretation with added vertical lines corresponding to the *tactus maior*

This last interpretation is most probably the correct one. Human error may have been introduced when different composers set the wrong type for the different parkbooks for the printing. This possibility is addressed by Roger Bowers, who has identified an inconsistency between the $\Phi \frac{3}{2}$ and $\Phi \frac{3}{1}$ signs in the last quarter of the original partbooks of Monteverdi's *Selva Morale et Spirituale* (1641).⁹³ According to Konrad Ameln, a similar printing error was caused by composers when the number of

⁹³ Bowers, "Proportioned Notation in Banchieri's Theory And Monteverdi's Music", 77-79.

the printing type of a specific proportion sign was insufficient:

The notes of the original were set in type and are not free of errors. Noteworthy is the frequent change of the mensural notation sign or meter: it is found as C or C without any apparent reason in the same voice part of one piece as well as in various parts of the same piece. Often, the vertical bar in the C is hardly visible. This is easy to explain: the typesetter did not have enough alla breve symbols in his case and resorted to the C . But it is clear that C was always intended because of the bar divisions in the thoroughbass, where the bar line is always placed after four half-note values (= 2 semibreves), even when C is placed in front.⁹⁴

Regular printed barlines, in which each bar corresponds to the breve tactus of the *integer* C as *tactus maior*, are used in the basso continuo parts of all 21 pieces in *Symphoniae Sacrae III* with only a few exceptions. Ex.3.29 shows the regular barlines in nos.2 and 19; in both cases, the barlines correspond to the breve tactus, making it highly likely that the C sign was Schütz's original intention.

⁹⁴ Konrad Ameln, Preface to Volume 7, *Heinrich Schütz Neue Ausgabe sämtlicher Werke*, ed. Konrad Ameln (New York: Bärenreiter, 1988), x.

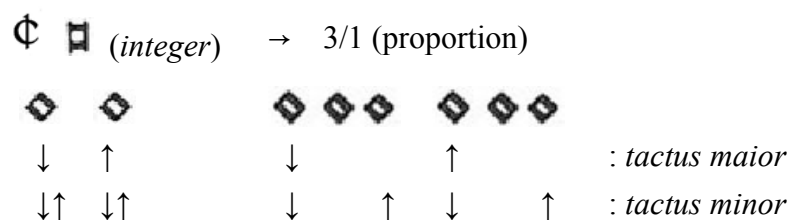
Ex.3.29 Regular barlines corresponding to the breve tactus of the *integer* C in *Ich hebe meine Augen auf* and *Herr, wie lange willst du*, nos.2 & 19 of *Symphoniae Sacrae III*

If all the C signs in *Symphoniae Sacrae III* are regarded as printing errors of the C sign, only three types of proportion indications are found. These, and the pieces in which they occur, are shown in Table 3.6.

Table 3.6 Categorized proportional indications in *Symphoniae Sacrae III* (1650)

Category	Proportion signs	Nos.
1	$\text{C} \rightarrow \frac{3}{1}$	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 16, 17, 18, 19, 21
2	C alone	12, 13, 15
3	$\text{C} \frac{3}{2}$ alone	20

Category 1, indicated by $\text{C} \rightarrow \mathbf{3}$, clearly shows the *tripla* proportion (3/1) with a breve tactus under the *integer* C sign as *tactus maior*. It would also be possible for the *tactus minor* to be beaten for non-professional musicians (see Ex.3.30).



Ex.3.30 *tripla* (3/1) proportion indicated by $\text{C} \rightarrow 3/1$, breve tactus

An example of this category is the piece previously discussed: *Der Herr ist mein Hirt*, no.1 of *Symphoniae Sacrae III* (see Ex.3.31). It begins with C , changes to $\mathbf{3}$ in the second system and returns to C in the fourth system. With the exception of the first and third bars of the first system, and the second bar of the fourth system, all the bars under the C sign represent the length of a breve. The barlines under the $\mathbf{3}$ sign are completely regular for the *tactus maior*, with six semibreves per *tactus maior*. A blackened semibreve followed by a blackened breve, shown in the last bar of the second system, designates coloration, in which the rhythm changes without changing the note values of the semibreve and breve. This coloration is different from the Renaissance

coloration, in which a colored note loses one thirds of its note value. The three consecutive blackened breves at the beginning of the fourth system indicate a *hemiola* rhythm without changing of the note value of the breve.

Ex.3.31 Der Herr ist mine Hirt, no.1 of *Symphoniae Sacrae III*: *tripla* (3/1) proportion indicated by $\text{C} \rightarrow \text{I}$, breve tactus

An example of the same category, but indicated by $\text{C} \text{I} \rightarrow \text{C}$ (with $\text{C} \text{I}$ as the initial sign), is no.18, *Saul, Saul was verfolgst du mich*, in which the regular barlines

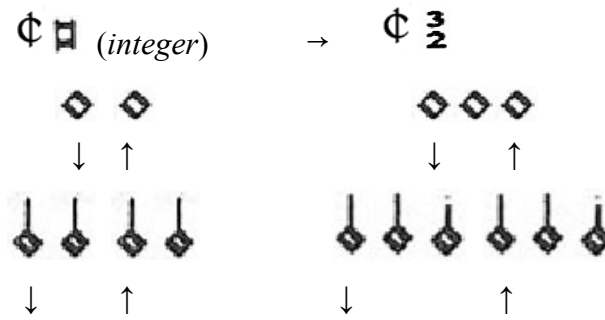
correspond to the *tactus maior*, falling on the breve under the *integer* C sign and on six semibreves under the proportion sign $\text{C} \frac{3}{1}$. The indication of a *hemiola* rhythm by the use of three consecutive blackened breves is seen four times in the first and second systems (see Ex.3.32).

Ex.3.32 *Saul, Saul was verfolgst du mich*, no. 18 of *Symphoniae Sacrae III: tripla* (3/1)
proportion indicated by $\text{C} \frac{3}{1} \rightarrow \text{C}$, breve tactus

Category 2 of Table 3.6, indicated by C alone, represents the breve tactus as *tactus maior*, to which the barlines regularly correspond, as seen in no.13, *Siehe, dieser wird gesetzt* (see Ex.3.33).

Ex.3.33 *Siehe, dieser wird gesetzt*, no 13 of *Symphoniae Sacrae III*: Category 2 indicated by C alone, breve tactus

Category 3 of Table 3.6 is the use of $\text{C} \frac{3}{2}$ alone. The proportional relationship of the sign is compared to the *integer* C , even though it is not shown in the piece, creating the proportional relationship $\text{C} \rightarrow \text{C} \frac{3}{2}$, which represents the *sesquialtera* proportion (3/2) either on the semibreve level or on the minim level, with a breve tactus as the *tactus maior* under the *integer* (see Ex.3.34). Schütz uses the minim-level *sesquialtera* proportion in *Komm heiliger Geist*, no.20, with regular barlines corresponding to the *tactus maior*, six minims under the $\text{C} \frac{3}{2}$ sign (see Ex.3.35).



Ex.3.34 *Sesquialtera* proportion (3/2) by $\text{C} \rightarrow \text{C} \frac{3}{2}$, semibreve level or minim level



Ex.3.35 *Komm heiliger Geist*, no 20 in *Symphoniae Sacrae III*: Category 3 indicated by $\text{C} \frac{3}{2}$ alone, *tactus maior*

Comparison of the Usages of Proportional Signs in *Psalmen Davids* and *Symphoniae Sacrae Tertia Pars*

Table 3.7 outlines the differences in notation and proportion signs between

Psalmen Davids (1619) and *Symphoniae Sacrae III* (1650).

Table 3.7 Comparison of notation between *Psalmen Davids* (1619) and *Symphoniae Sacrae III* (1650)

Category	<i>Psalmen Davids</i> (1619)	<i>Symphoniae Sacrae III</i> (1650)
1	$\text{C} \rightarrow 3$ or $\text{C} 3 \rightarrow \text{C}$	$\text{C} \rightarrow \mathbf{3}$ or $\text{C} \mathbf{3} \rightarrow \text{C}$
2	C alone	C alone
3		$\text{C} \mathbf{\frac{3}{2}}$ alone

In category 1, the proportion signs used in *Psalmen Davids*, $\text{C} \rightarrow 3$ or $\text{C} 3 \rightarrow \text{C}$, remain open to the two possible interpretations of *tripla* (3/1) and *sesquialtera* (3/2) proportions. On the other hand, those used in *Symphoniae Sacrae III*, $\text{C} \rightarrow \mathbf{3}$ or $\text{C} \mathbf{3} \rightarrow \text{C}$, clarify the intended proportional relationship by using the figure $\mathbf{3}$ instead of figure 3.

The proportion in category 2 of both the *Psalmen Davids* and the *Symphoniae Sacrae III*, C alone, does not create the same confusion as category 1; however, the notation opens up two possibilities in the interpretation of the tactus: the breve tactus and the sembreve tactus.

Category 3 shows Schütz's use of a new proportional indication in *Symphoniae Sacrae III*, $\text{C} \mathbf{\frac{3}{2}}$, which was not used in *Psalmen Davids*. By using regular barlines and

notation on the minim level, Schütz clearly shows his intention for the meaning of the proportional relationship indicated by the sign: *sesquialtera* (3/2) on the minim level in the breve tactus of the *integer*.

The comparison of the *Psalmen Davids* (1619) and the *Symphoniae Sacrae III* (1650) gives the strong impression that the earlier use of proportion signs in the *Psalmen Davids* was refined and clarified in the later use in the *Symphoniae Sacrae III*. The notation itself, in its use of note values and the printed barlines corresponding to the *tactus maior*, shows no difference between the two works. This is the case even when different proportion signs are used – the ♃_3 sign in the *Psalmen Davids* and the $\text{♃}_{3/1}$ in *Symphoniae sacrae III*; the note values and the barlines used under the two signs are actually the same: Although the $\text{♃} \rightarrow \text{♃}_3$ proportional indication in the *Psalmen Davids* provides the two possible interpretations, as *sesquialtera* (3/2) by $\text{♃} \rightarrow \text{♃}_{3/2}$ and as *tripla* (3/1) by $\text{♃} \rightarrow \text{♃}_{3/1}$, the comparison to the proportional indication $\text{♃} \rightarrow \text{♃}_{3/1}$ in the *Symphoniae Sacrae III* reveals that the $\text{♃} \rightarrow \text{♃}_3$ proportional indication in the *Psalmen Davids* is intended as the proportional indication $\text{♃} \rightarrow \text{♃}_{3/1}$ shown in the *Symphoniae Sacrae III* because of the identical notation between the two, including the same barlines corresponding to the breve tactus of the *integer*.

Other Proportion Signs Used in Other Works
of Heinrich Schütz

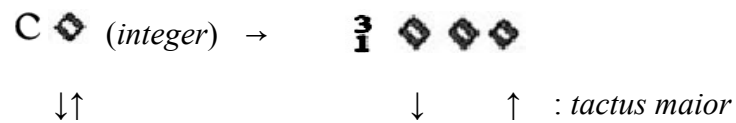
In his other works, Schütz uses seven proportional relationships other than those used in the *Psalmen Davids* and the *Symphoniae Sacrae III*. Table 3.8 shows the proportions and examples of where they occur in Schütz's works.

Table 3.8 Other proportion signs than those used in the *Psalmen Davids* (1619) and the *Symphoniae Sacrae III* (1650)

No.	Proportion signs	Example
1	$C \rightarrow \mathbf{\frac{3}{1}}$	<i>Symphoniae Sacrae I</i> (1629): No.1 <i>Paratum cor meum</i> (SWV 257) No.5 <i>Venite ad me omnes</i> (SWV 261)
2	$C \rightarrow C \mathbf{\frac{3}{1}} \rightarrow C_{6/4}$	<i>Symphoniae Sacrae II</i> (1647): No.10 <i>Lobet den Herrn in seinem Heiligtum</i> (SWV 50)
3	$C \rightarrow \Phi \mathbf{\frac{3}{2}}$	<i>Cantiones Sacrae</i> (1625): No.15 <i>Dulcissime et benignissime Christe</i> (SWV 67)
4	$\Phi \mathbf{\frac{3}{2}} \rightarrow \Phi$	<i>Syncharma musicum</i> (SWV 49)
5	$C \rightarrow \mathbf{\frac{3}{2}}$	<i>Beschluß, der Geburt unseres Herrn und Seligmachers Jesu Christi</i>
6	C_3 alone	<i>Gluck zu dem Helikon</i> (SWV 96)
7	$C \rightarrow 3$	<i>Teutonium dudum belli atra pericla molestant</i> (SWV 338)

The first proportion in Table 4.1, $C \rightarrow \mathbf{\frac{3}{1}}$, indicates the *tripla* proportion on the

semibreve level, in which three semibreves under the proportion sign $\frac{3}{1}$ correspond to one semibreve under the *integer* sign C , as shown in Ex.3.36. Ex.3.37, *Paratum cor meum*, no.1 in the *Symphoniae Sacrae I* (1629), and Ex.3.38, *Venite ad me omnes*, no.5 in the *Symphoniae Sacrae I* (1629), are examples of this proportion. Ex.3.39 shows added vertical lines corresponding to the semibreve tactus of the *integer* as the *tactus maior*.



Ex.3.36 *tripla* proportion (3/1) by $C \rightarrow \frac{3}{1}$, semibreve level, semibreve tactus



Ex.3.37 *Paratum cor meum*, no.1 in the *Symphoniae Sacrae I* (1629): $C \rightarrow \frac{3}{1}$

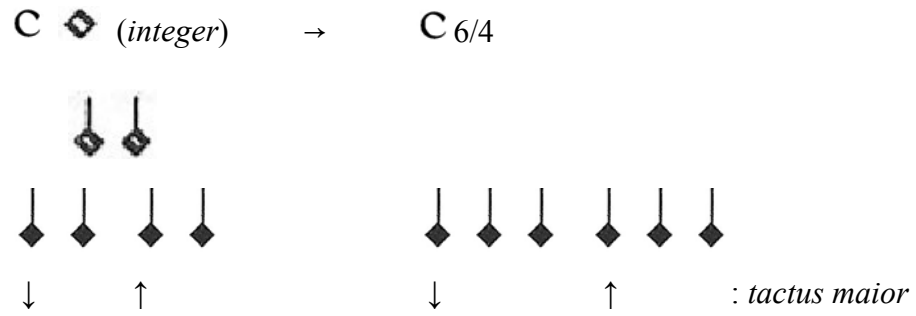
Ex.3.38 *Venite ad me omnes*, no.5 in the *Symphoniae Sacrae I* (1629): $C \rightarrow \mathbf{3}$

Ex.3.39 *Paratum cor meum*, no.1 in the *Symphoniae Sacrae I* (1629): $C \rightarrow \mathbf{3}$, with added vertical lines corresponding to the semibreve tactus as *tactus maior*

In the second proportion in Table 3.8, $C \rightarrow C \mathbf{3} \rightarrow C \frac{3}{4}$, the proportion sign

$C \frac{3}{4}$ is to be compared to the *integer* sign C , following the non-cumulative feature

for successive proportions of the conventional mensuration-proportion practice. Thus the first proportion, indicated by $\text{C} \rightarrow \text{C} \frac{3}{1}$, is exactly the same *tripla* proportion (3/1) as the first proportion in Table 3.8. The other proportion, indicated by $\text{C} \rightarrow \text{C} \frac{6}{4}$, is the *sesquialtera* (3/2) proportional relationship on the semi-minim level with a semibreve tactus as the *tactus maior*, in which six semi-minims under the proportion sign $\text{C} \rightarrow \text{C} \frac{6}{4}$ correspond to four minims under the *integer* sign C (see Ex.3.40). Ex.3.41, from the original of *Lobet den Herrn in seinem Heiligtum*, no.10 in the *Symphoniae Sacrae II* (1647), is an example of this proportional indication, but in this case the printed barlines under the *integer* sign C are not regular. Those under the proportion sign $\text{C} \frac{3}{1}$ regularly correspond to two *tactus maiores* – six semibreves – except for in the first system, while those under the $\text{C} \frac{6}{4}$ sign mostly correspond to the *tactus maior* – six semi-minims – but sometimes to two or three *tactus maiores*, twelve or eighteen semi-minims. Ex.3.42 is the same example as Ex.3.41, but with addition of vertical lines corresponding to the *tactus maior*.



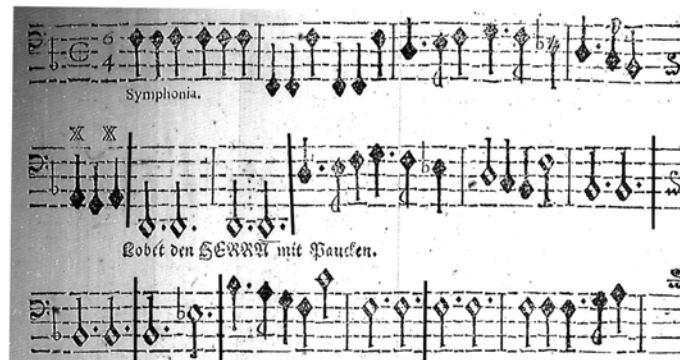
Ex.3.40 *sesquialtera* proportion (3/2) by C → C 6/4, semi-minim level, semibreve tactus of the *integer*





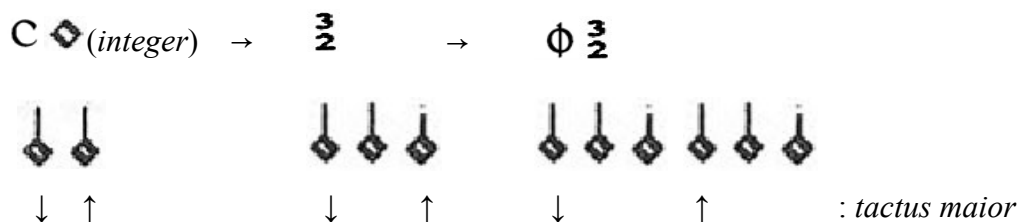
Ex.3.41 *Lobet den Herrn in seinem Heiligum*, no.10 in the *Symphoniae Sacrae II* (1647):

C → C 6/4



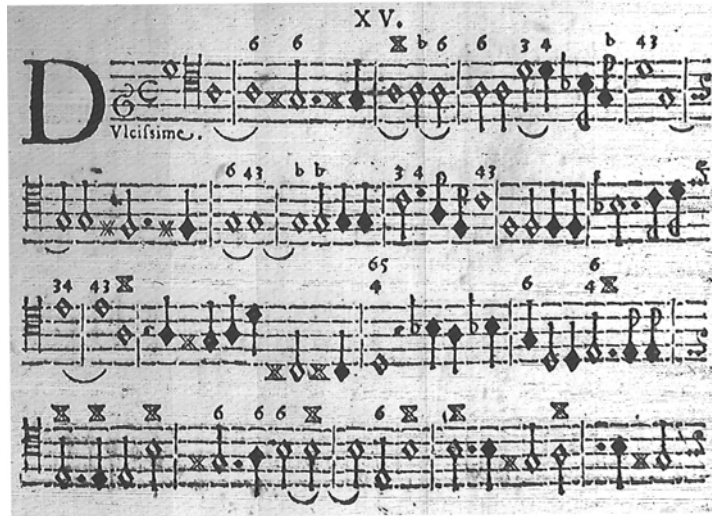
Ex.3.42 *Lobet den Herrn in seinem Heiligtum*, no.10 in the *Symphoniae Sacrae II* (1647):
 $C \rightarrow C \ 6/4$, with added vertical lines corresponding to the *tactus maior*

The third proportion in the Table 3.8, indicated by $C \rightarrow \Phi \frac{3}{2}$, is the tripla (3/1) on the minim level with a semibreve tactus of the *integer* as the *tactus maior*, in which three minims under the proportion sign $\Phi \frac{3}{2}$ correspond to one minim under the integer sign C . The proportion indication involves a double operation of the proportion sign $\Phi \frac{3}{2}$, in which $C \rightarrow \frac{3}{2}$ creates *sesquialtera* proportion (3/2) on the minim level (three minims under the $\frac{3}{2}$ sign corresponding to two minims under the *integer*), while the Φ sign operates as *dupla* diminution (2/1), resulting in the *tripla* proportion (3/1) on the minim level (see Ex.3.43). An example of this proportional indication is *Dulcissime et benignissime Christe*, no.15 in the *Cantiones Sacrae* (1625), in which the printed regular barlines correspond exactly to two *tactus maiores* (see Ex.3.44). Ex. 3.45 shows the same example with added vertical lines corresponding to the *tactus maior*.



Ex.3.43 *tripla* proportion (3/1) by $C \rightarrow \Phi \frac{3}{2}$, minim level, semibreve tactus of the

integer



Ex.3.44 *Dulcissime et benignissime Christe*, no.15 in the *Cantiones Sacrae* (1625):

C → $\Phi \frac{3}{2}$

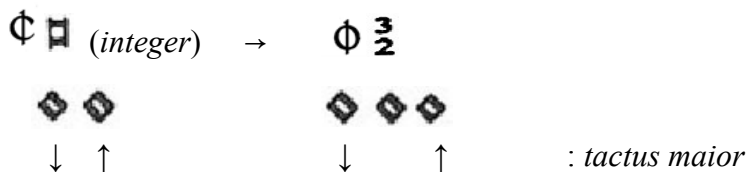
The image shows two systems of musical notation. The top system is labeled 'XV.' and 'Vlcifsim.' and begins with a large 'D' and a common time signature 'C'. It contains four staves of music with various rhythmic values and accidentals. Vertical lines are drawn through the notation to indicate the tactus maior. The bottom system contains five staves of music, also with vertical lines indicating the tactus maior.

Ex.3.45 *Dulcissime et benignissime Christe*, no.15 in the *Cantiones Sacrae* (1625), with added vertical lines corresponding to the *tactus maior*: $C \rightarrow \Phi \frac{3}{2}$

The fourth proportion in Table 3.8, indicated by $\Phi \frac{3}{2} \rightarrow \Phi$ or $\Phi \rightarrow \Phi \frac{3}{2}$, is the

sesquialtera proportion (3/2) on the semibreve level in the breve tactus of the *integer* as the *tactus maior*, in which three semibreves under the proportion sign $\Phi \frac{3}{2}$ sign correspond to two semibreves under the *integer* sign Φ (see Ex.3.46). An example of this proportional indication is found in *Syncharma musicum*, in which the printed barlines under the *integer* sign Φ correspond exactly to the *tactus maior* (one breve); those under the proportion sign $\Phi \frac{3}{2}$ correspond to two *tactus maiores*, except for the beginning of the second system, where a *hemiola* occurs with a blackened breve followed by two blackened semibreves, followed by a dotted semibreve and a minim (see Ex.3.47).

Ex.3.48 shows the same music but with added vertical lines corresponding to the *tactus maior*, except for the semibreve right after the Φ sign at the beginning of the second system, which was barred for a semibreve.



Ex.3.46 *sesquialtera* proportion (3/2) by $\Phi \rightarrow \Phi \frac{3}{2}$, semibreve level, breve tactus of the *integer*

Basso per l'Organo. à 3. Cori di H. Sag.

EN novus Elysiis. Tutti.

Cornetti

Tutti

Ex.3.47 *Syncharma musicum* (SWV 49): $\Phi \frac{3}{2} \rightarrow \Phi$

Basso per l'Organo. à 3. Cori di H. Sag.

EN novus Elysiis. Tutti.

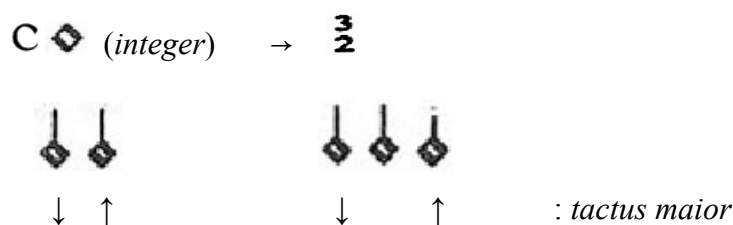
Cornetti

Tutti

Ex.3.48 *Syncharma musicum* (SWV 49): $\Phi \frac{3}{2} \rightarrow \Phi$, with added vertical line corresponding to the *tactus maior*

The fifth proportion in Table 3.8, indicated by $C \rightarrow \frac{3}{2}$, is the *sesquialtera* proportion (3/2) on the minim level with a semibreve tactus of the *integer* as the *tactus*

maior, in which three minims under the proportion sign $\frac{3}{2}$ or $C \frac{3}{2}$ correspond to two minims under the integer sign C (see Ex.3.49). An example of this is found in the *Beschluß* (conclusion) section of *der Geburt unseres Herrn und Seligmachers Jesu Christi*.



Ex.3.49 *sesquialtera* proportion (3/2) by $C \rightarrow \frac{3}{2}$, minim level, semibreve tactus of the *integer*

The interpretation of the sixth proportion in Table 3.8, indicated by $C \text{ } 3$ alone, is either as $C \rightarrow C \frac{3}{1}$ or $C \rightarrow C \frac{3}{2}$. The former is the *tripla* (3/1) proportional relationship to the integer C on the semibreve level in the semibreve tactus of the *integer* as the *tactus maior*, in which three semibreves under the proportion sign $C \text{ } 3$ correspond to one semibreve under the integer C , and exactly the same as the first proportion in Table 3.8. The latter is the *sesquialtera* (3/2) proportion, which is exactly the same as the fifth proportion in Table 3.8, except with the use of only the proportion

sign without the *integer*. An example of this proportional indication is *Gluck zu dem Helikon* (SWV 96).

The last proportional relationship in Table 3.8, $\text{C} \rightarrow 3$, is exactly the same as explanation of the sixth proportion indication, except for the use of both the *integer* sign C and the proportion sign 3. An example of this is *Teutonium dudum belli atra pericla molestant* (SWV 338).

As discussed above, the use of the proportional signs in all the works of Schütz follows the conventional mensuration-proportion practice, in which the original meanings of the mensuration signs are retained. The intended proportional relationships, indicated by the proportional signs used by Schütz, are clear based on the practice. The only practical problem to solve for performing the works is to decide the proper tempo, because Schütz does not differentiate in his use of barlines for pieces with primarily longer note values and others with primarily shorter note values. The former fits the normal tempo of the tactus, but the latter requires a slower tempo to perform the predominantly shorter notes. The tempo practice of the time of Schütz is based on the fixed universal tactus, around 60 M.M. per minute, but with a flexible application of the tactus depending on performance circumstances; mainly on the sort of performers

(professionals or amateurs), but also on other factors like the acoustics of the performance hall.

CHAPTER IV

CONCLUSION

The editors of the Heinrich Schütz *New Complete Works (Neue Ausgabe sämtlicher Werke)* were faced with the task of realizing Schütz's music into modern notation, which has a very different set of conventions with regard to meter. Most of the later editions clarify the metrical confusion created by the original proportion signs through the use of modern time signatures, and distributing barlines according to a set rule, whereby the barline corresponds to one semibreve of the *integer*. However, the relationships of note values between the original proportion signs used in a piece, which are based on the fixed tactus of the time of Schütz, are not clearly indicated, with the exception of only a few editions, in which the editor includes an indication of the relationship of note values between two time signatures, such as \circ (one whole note) = $\circ.$ (one dotted whole note).

The editorial principles of the later *New Complete Works* editions follow those of the *Erbe deutscher Musik* (1967). The original note values under the triple metric

proportion signs, Φ_3 , $\Phi_{\mathbf{3}}$, and $C_{\mathbf{3}}$ are halved, while those under the duplet proportion signs, Φ and C , are retained. The barlines correspond to the semibreve of the *integer valor*, because the editors believed that the semibreve tactus functions as the normal tactus (around M.M. = 60) in the time of Schütz.⁹⁵

Table 4.1 is a comparison between the originally intended proportions, as discussed in Chapter III, and their modern transcriptions in the Complete Works. In the Table, the original signs come from the publications of Schütz's time; the work listed serves as an example of the use of each original proportional indication; the signs under the modern transcription are examples from the Complete Works; the interpretation under the modern transcription shows the proportional relationship actually used for the transcriptions; and the barlines show the note values to which the barlines correspond. The table demonstrates which time signatures the editors used to replace the original proportions signs, how differently the original proportion indications are interpreted in the modern transcriptions in terms of the proportional indication, and whether the barlines of the modern transcriptions correspond to the original barlines corresponding to the *tactus maior*.

⁹⁵ Werner Breig, Preface to Volume 20, *Heinrich Schütz Neue Ausgabe sämtlicher Werke*, ed. Werner Breig (London: Bärenreiter, 1996), xiv.

Table 4.1 Comparison between the interpretations in Chapter III and the modern transcriptions in Heinrich Schütz Complete Works

No.	Original signs	Work	Modern transcription in the New Complete Works		
			Signs	Interpretation	Barlines
1	$\Phi \rightarrow \Phi_3$	Ps. D. no.15	$\Phi \rightarrow \Phi_3$	$C \rightarrow \mathbf{3}$	Semibreve of <i>integer</i>
2	Φ alone	Ps. D. no.4	C	C	Semibreve of <i>integer</i>
3	$\Phi \rightarrow \mathbf{3}$	S.S.III no.1	$C \rightarrow \mathbf{3}$	$C \rightarrow \mathbf{3}$	Semibreve of <i>integer</i>
4	$\Phi \frac{3}{2}$ alone	S.S.III no.20	$\frac{3}{2}$	$\Phi \frac{3}{2}$	Semibreve of <i>integer</i>
5	$C \rightarrow \mathbf{3}$	S.S.I no.1	$C \rightarrow \mathbf{3}$	$C \rightarrow \mathbf{3}$	Semibreve of <i>integer</i>
6	$C \rightarrow C_{6/4}$	S.S.II no.10	$C \rightarrow 6/4$	$C \rightarrow 6/4$	Semibreve of <i>integer</i>
7	$C \rightarrow \Phi \frac{3}{2}$	C.S. no.15	$4/2 \rightarrow 3/2$	$\Phi \rightarrow 6/4$	$4/2$: 2 x <i>tactus maior</i> $3/2$: 1 x <i>tactus maior</i>
8	$\Phi \rightarrow \Phi \frac{3}{2}$	<i>Syncharma musicum</i> (SWV 49)	$\Phi \rightarrow \mathbf{3}$	$C \rightarrow \mathbf{3}$	Φ : $\frac{1}{2}$ x <i>tactus maior</i> $\frac{3}{2}$: 1 x <i>tactus maior</i>

* Ps. D.: *Psalmen Davids*

* S.S.: *Symphoniae Sacrae*

* C.S.: *Cantiones Sacrae*

The originally intended proportion of no.1 of Table 4.1, $\Phi \rightarrow \Phi_3$, is *tripla* (3/1) on the semibreve level in the breve tactus of the *integer* as the *tactus maior*, in which six

semibreves under the proportion sign $\text{♩} 3$ correspond to two semibreves under the integer sign ♩ , as discussed in Chapter III. Ex.3.16, *Jauchzet dem Herrn*, no.15 of the *Psalmen Davids*, shows the original proportional relationship with added barlines, corresponding to the *tactus maior*; Ex.4.1, below, shows how the same passage was transcribed in the *New Complete Works*: the original proportion signs were retained; the note values under the $\text{♩} 3$ sign were halved; and the barlines correspond to the semibreve of the *integer* (half of the *tactus maior*). In this case the proportional indication of $\text{C} \rightarrow \text{♩}$, *tripla* proportion (3/1) on the semibreve level in the semibreve tactus of the *integer* as the *tactus maior*, exactly fits the modern transcription, in which three semibreves under the proportion sign ♩ correspond to one semibreve under the *integer* sign C . Thus, the only difference between the original intention and the modern transcription is the different tactus: the breve tactus in the original notation and the semibreve tactus in the modern transcription (see Ex.4.2). Since the fixed universal tactus of the time of Schütz is the breve (as discussed in Chapter III), with a tempo of around M.M. = 60, the modern transcription is actually twice as slow as the original notation. Although modern performers can easily perform the piece with the modern transcription due to its implied slow tempo, the performance cannot properly express the affection of the piece as originally intended.

Jauch - zet dem Her - ren, jauch - zet dem
Her - ren al - - - le
Welt, jauch-zet dem Her-ren, al - le Weit!

Ex.4.1 *Jauchzet dem Herrn*, no.15 of the *Psalmen Davids*: Complete Works transcription of $\Phi \rightarrow \Phi_3$

<u>Original</u>		<u>Modern</u>	
Φ	→	Φ_3	
Φ	→	Φ_3	
↓	↑	↓	↑

<u>Original</u>		<u>Modern</u>	
C	→	$\frac{3}{1}$	
C	→	$\frac{3}{1}$	
↓	↑	↓	↑

Ex.4.2 The modern interpretation of the original proportion indication of $\Phi \rightarrow \Phi_3$

The original intention of no.2 of Table 4.1, Φ alone, is the breve tactus as discussed in Chapter III and shown in Ex.3.20, *Aus der Tiefe*, no.4 of the *Psalmen Davids*, which shows the added barlines corresponding to the breve. Ex.4.3 is the same passage in its modern transcription, in which the barlines now correspond to the semibreve, creating a tactus tempo twice as slow as the original (see Ex.4.4). This modern transcription

creates the same performance problem as that of no.1 in Table 4.1.

Ex.4.3 *Aus der Tiefe*, no.4 of the *Psalmen Davids*: Complete Works transcription of Φ alone

Original	Modern
Φ \square	C \diamond
\diamond \diamond	
↓ ↑	↓↑

Ex.4.4 The modern interpretation of the original proportion indication of Φ alone

The originally intended proportion of no.3 in Table 4.1, $\Phi \rightarrow \mathbf{3}$, is *tripla* (3/1) on the semibreve level in the breve tactus of the *integer* as the *tactus maior*. Ex.3.28, *Der Herr st mein Hirt*, no.1 of the *Symphoniae Sacrae III*, is an example of this, in which a few vertical lines were added to make the barlines exactly correspond to the *tactus maior*.

Ex.4.5 is its transcription from the *NSA*, in which the original Φ and $\mathbf{3}$ signs were

replaced by C and $\frac{3}{2}$ and the barlines correspond to one semibreve under the C sign, and three semibreves under the $\frac{3}{2}$ sign, making the tactus tempo twice as slow as the original. Moreover, according to the editorial principle, the note values under the original $\frac{3}{1}$ sign were halved (see Ex.4.5). This modern transcription creates the same performance problem as that of no.1 in Table 4.1, while creating additional confusion about the relationship of tempos between the duple and triple sections because of the halving of the original note values under the $\frac{3}{1}$ sign.



Ex.4.5 *Der Herr ist mein Hirt*, no.1 of the *Symphoniae Sacrae III*: Complete Works
transcription of $\text{C} \rightarrow \frac{3}{1}$

The originally intended tactus of no.4 in Table 4.1, $\text{C} \frac{3}{2}$ alone, is six minims per tactus, as shown in Ex.3.35, *Komm, heiliger Geist*, no.20 of the *Symphoniae Sacrae*

III. Ex.4.6 shows the same passage as transcribed in the *NSA*: a $\frac{3}{2}$ sign replaces the original $\text{C} \frac{3}{2}$ sign; the original note values are retained; and the barlines correspond to three minims, which again creates a tactus tempo twice as slow as the original, resulting in the same performance problem as that of no.1 in Table 4.1.



Ex.4.6 *Komm, Heiliger Geist*, no.20 of the *Symphoniae Sacrae III*: Complete Works
transcription of $\text{C} \frac{3}{2}$ alone

The tempi in these four modern transcriptions—twice as slow as the original—are caused by the interpretation of the normal tactus under the *integer* sign C (*alla breve*) as the semibreve instead of the breve. The editors of the *NSA* presupposed that the semibreve tactus is the normal tactus in the time of Schütz, as represented in their editorial principles. However, the discussions in Chapter III advocate for the breve tactus as normal tactus in the proportions having the C sign as *integer*. In the discussions in Chapter III, the proportional indications retaining the *alla breve* sign C as the *integer*, $\text{C} \rightarrow 3$, $\text{C} \rightarrow \frac{3}{1}$, and $\text{C} \rightarrow \text{C} \frac{3}{2}$, have the breve tactus under the *integer* as the normal tactus, around M.M. = 60, and function as the *tactus maior*. And the

proportional indications retaining only one single sign with the *alla breve* sign C in them, C alone and $\text{C} \frac{3}{2}$ alone, also have the breve tactus as the normal tactus.

There are instances when the *tactus maior* is intended to be on the semibreve level: When the integer sign is C . This is the case for no.5 in Table 4.1, $\text{C} \rightarrow \frac{3}{1}$, where the originally intended proportion is *tripla* (3/1) on the semibreve level in the semibreve tactus of the *integer* as the *tactus maior*; three semibreves under the proportion sign $\frac{3}{1}$ correspond to one semibreve under the integer sign C , as shown in Ex.3.39, *Partum cor meum*, no.1 of the *Symphoniae Sacrae I*. Ex.4.7 is the modern transcription of the same passage, in which the original proportion signs C and $\frac{3}{1}$ are replaced by C and $\frac{3}{2}$; the editor also halved the note values under the $\frac{3}{2}$ sign, and inserted barlines corresponding to the semibreve of the *integer*, resulting in the same tempo as the original.



Ex.4.7 *Paratum cor meum*, no.1 of the *Symphoniae Sacrae I*: Complete Works transcription of $\text{C} \rightarrow \frac{3}{1}$

The originally intended proportion of no.6 in Table 4.1, $\text{C} \rightarrow \text{C } 6/4$, is *sesquialtera* (3/2) on the semi-minim level in the semibreve tactus of the *integer* as the *tactus maior*, in which six semi-minims under the proportion sign $\text{C } 6/4$ correspond to four semi-minims under the integer sign C as shown Ex. 3.42, *Lobet den Herrn in seinem Heiligtum*, no.10 of the *Symphoniae Sacrae II*, with barlines corresponding to the semibreve tactus of the *integer*. In the modern transcription (see Ex.4.8), the original proportion signs C and $\text{C } 6/4$ are replaced by C and 6/4. In this case the editor retained the original note values under both signs, so the barlines correspond to the semibreve tactus of the *integer* as in the original.

Violone

Ex.4.8 *Lobet den Herrn in seinem Heiligtum*, no.10 of the *Symphoniae Sacrae II*:
Complete Works transcription of $\text{C} \rightarrow \text{C } 6/4$

In the transcriptions of nos. 5 and 6 in Table 4.1, the editorial principle of taking the semibreve as the normal tactus unit coincides with the original proportional indications, with the sign C (*alla semibreve*) as the *integer*; thus the tempi of these

transcriptions are the same as those intended by the original proportion indications. The modern performer should therefore have little trouble with arriving at the correct tempi through the transcription, and can properly express the affections of the pieces as originally intended.

A different problem is encountered in transcriptions of pieces using the $\Phi \frac{3}{2}$ sign. The originally intended proportion of no.7 in Table 4.1, $C \rightarrow \Phi \frac{3}{2}$, is tripla (3/1) on the minim level in the semibreve tactus of the *integer* as the *tactus maior*, in which six minims under the proportion sign $\Phi \frac{3}{2}$ correspond to two minims under the *integer* sign C . In Ex.3.45, *Dulcissime et benignissime Chirste*, no.15 of the *Cantiones Sacrae*, the original barlines correspond to the semibreve tactus of the *integer*. Ex.4.9 shows the modern transcription: Modern time signs, 4/2 and $\frac{3}{2}$, replace the original proportion signs, C and $\Phi \frac{3}{2}$, respectively. With note values under the $\frac{3}{2}$ sign reduced by half, and barlines under the 4/2 sign corresponding to twice the *tactus maior*, i.e., one breve, the result is a tempo twice as fast as the original. On the other hand, the barlines under the $\frac{3}{2}$ sign correspond to the *tactus maior* as in the original sign $\Phi \frac{3}{2}$. Thus different *tacti* are applied for different signs. The modern transcription actually should have added barlines corresponding to one whole note under the 4/2 sign to make the tempos balance between the two signs, so that the originally intended affection can be properly expressed.



Ex.4.9 *Dulcissime et benignissime Chrite*, no.15 of the *Cantiones Sacrae*: Complete Works transcription of $C \rightarrow \Phi \frac{3}{2}$

The original intention of the last proportion in Table 4.1, $\Phi \rightarrow \Phi \frac{3}{2}$, is *sesquialtera* (3/2) on the semibreve level in the breve tactus of the *integer* as the *tactus maior*, in which three semibreves under the proportion sign $\Phi \frac{3}{2}$ correspond to two semibreves under the *integer* sign Φ , with barlines corresponding to the *tactus maior*, as seen previously in Ex.3.48, *Syncharma musicum* (SWV 49). In the modern transcription (Ex.4.10), the modern time signs, Φ and $\frac{3}{2}$, replace the original proportion signs, Φ and $\Phi \frac{3}{2}$, respectively, while the note values under the $\frac{3}{2}$ sign are halved. The barlines under the Φ sign correspond to half the *tactus maior*, i.e., the semibreve, which results in a tempo twice as slow as the original, while the barlines under the $\frac{3}{2}$ sign correspond to the *tactus maior* as in the original. Like the transcription of no.7 in Table 4.1, this transcription applies different tactus unit to the different signs,

resulting in a totally different tempo relationship between the two signs. In order for the transcription to retain the originally intended affection, every other barline under the

♯ sign has to be removed.

The image shows four staves of musical notation for Syncharma musicum (SWV 49). Each staff begins with a bass clef and a 3/2 time signature. The first three staves have a ♯ sign above the time signature. The fourth staff has a ♯ sign above the time signature. The notation includes various note values, rests, and bar lines.

Ex.4.10 *Syncharma musicum* (SWV 49): Complete Works transcription of ♯ → ♯ $\frac{3}{2}$

Except for the first transcription discussed in this chapter, which retains the original signs with an editorial indication of the relationship of note values between the two signs (♯ = ♯.), the rest of the transcriptions use modern time signatures with their appropriate barlines. Only the transcriptions of nos. 5 and 6 of Table 4.1 match the original intention in their distribution of barlines, because the original proportion

indications having the *alla semibreve* sign C as their *integer* coincide with the editorial principle of taking the semibreve tactus as the normal tactus, around M.M. = 60.

In the first four transcriptions in Table 4.1, which have the *alla breve* sign C as their *integer*, the originally intended breve tactus was disregarded and replaced, on the presupposition of the editors, by the semibreve tactus as the normal tactus, resulting in a tempo twice as slow as originally intended. If an historically-informed performance were attempted with using these transcriptions, a tempo around M.M. = 120 per bar is needed.

In the last two transcriptions in Table 4.1, different tactus units were applied to the different signs, resulting in totally different tempo relationships from the original intention. To recover the originally intended tempo, the addition or subtraction of barlines under one of the two signs in a piece would be required.

In general, the editors involved with the Heinrich Schütz *New Complete Works* (*Neue Ausgabe sämtlicher Werke*), took a middle ground between retaining the original proportion signs and using modern time signatures. However, this middle ground leaves some degree of discrepancy in the distribution of barlines, in the decision of tempo, and in the choice of modern time signatures to replace the original proportion signs.

It would be better in modern transcriptions, if barlines corresponded to the *tactus maior* under both the *integer* and the proportion signs in the original notation, with an

indication of the relationships of the note values between different time signatures provided, such as $\text{♩} = \text{♩}$. As discussed in Chapter III, the tempo decision in the performance practice of the time of Schütz most likely depends on the capability of the performers: Professional musicians could perform the pieces with the tempo corresponding to the *tactus maior*, around M.M. = 60, without considerable slowing down of the tempo, while amateur musicians would need to beat the *tactus minor* or slow down the tempo considerably; taking the semibreve as the *tactus maior* instead of the breve, would result in a tempo twice as slow as the one indicated.

To create a historically-informed performance from the *Neue Schütz Ausgabe* transcription of, for example, *Syncharma musicum* (SWV 49) (Ex.4.10), the performer would have to first refer to the preface to see if the original note values under the 3/2 sign were halved or not, then know that the time length of the bars under the two modern time signatures is equivalent (following the *tactus* practice in the time of Schütz), and finally check in the preface or in the critical notes to see if the transcription's barlines correspond to the *tactus maior* in the original proportion signs. Unfortunately, information on the original proportion signs is not always provided in the *NSA*. Ideally, a new modern transcription is needed to enable historically well informed performances. Such a transcription would include barlines that correspond to the *tactus maior* under both the

integer sign and the proportion sign, and would clearly show the relationship of the note values between the different time signatures. Ex.4.11, a portion of the continuo part of *Syncharma musicum* (SWV 49), shows just such a transcription.

Ex.4.11 *Syncharma musicum* (SWV 49): a new transcription of $\text{♩} \rightarrow \text{♩} \frac{3}{2}$ showing the original intention

Ideally, a new edition of Schütz's works should be made, using this transcription process. The more precisely a modern transcription of the works of Heinrich Schütz can reflect his intended proportional relationships, the more easily historically informed performances of his music could be accomplished.

BIBLIOGRAPHY

- Ameln, Konrad. Preface to Volume 7, *Heinrich Schütz Neue Ausgabe sämtlicher Werke*. Edited by Konrad Ameln. New York: Bärenreiter, 1988.
- Apel, Willi. "The Importance of Notation in Solving Problems of Early Music". *American Musicological Society Papers read by members...* (1938), 58.
- _____. *The Notation of Polyphonic Music 900-1600*. Cambridge, Mass.: The Mediaeval Academy of America, 1953.
- Auda, Antoine. "Le Tactus Principe Générateur de l'interprétation de la musique polyphonique Classique." *Scriptorium* 4 (1950), 44-66.
- Bank, J. A. *Tactus, Tempo and Notation in Mensural Music from the 13th to the 17th Century*. Amsterdam: Annie Bank, 1972.
- Bellermann, Heinrich. *Die Mensuralnoten und Taktzeichen des XV und XVI Jahrhunderts*. Berlin: Walter de Gruyter, 1858.
- Bent, Margaret, "Notation: Polyphonic Mensural Notation", *The New Grove Dictionary of Music and Musicians*, 2nd ed. Edited by Stanley Sadie. London: Macmillan, 2001. Vol. 18, 129-38.
- Berger, Anna Maria Busse. *Mensuration and Proportion Signs: Origins And Evolution*. Oxford: Clarendon Press, 1993.
- _____. "The Evolution of Rhythmic Notation." *The Cambridge History of Western Music Theory*. Edited by Thomas Christensen. Cambridge: Cambridge University Press, 2002.
- _____. "The Myth of *diminutio per tertiam partem*." *Journal of Musicology* 8/3 (1990), 398-426.
- _____. "The relationship between Perfect and Imperfect Time in Italian Theory of the Renaissance." *Early Music History* 5 (1986), 1-28.

- Bowers, Roger. "Proportional Notation." *The New Grove Dictionary of Music and Musicians*, 2nd ed. Edited by Stanley Sadie. London: Macmillan, 2001. Vol. 20, 427-29.
- _____. "Proportioned Notation in Banchieri's Theory And Monteverdi's Music." *Performing Practice in Monteverdi's Music: The Historic – Philological Background*. Edited by Raffaello Monterosso. Cremona: Fondazione Claudio Monteverdi, 1995.
- Breig, Werner. Critical Notes to Volume 18, *Heinrich Schütz Neue Ausgabe sämtlicher Werke*. Edited by Werner Breig. New York: Bärenreiter, 1989.
- _____. Preface to Volume 20, *Heinrich Schütz Neue Ausgabe sämtlicher Werke*. Edited by Werner Breig. London: Bärenreiter, 1996.
- Brown, Howard Mayer. "Performing Practice." *The New Grove Dictionary of Music and Musicians*, 2nd ed. Edited by Stanley Sadie. London: Macmillan, 2001. Vol. 14, 370-93.
- Brown, Howard Mayer and Claus Bockmaier. "Tactus." *The New Grove Dictionary of Music and Musicians*, 2nd ed. Edited by Stanley Sadie. London: Macmillan, 2001. Vol. 24, 917-18.
- Cajori, Florian. *A History of Mathematical Notations*, 2 vols. Chicago: Open Court Pub. Co., 1928.
- Collins, Michael. "The Performance of Triplets in the 17th and 18th Centuries." *Journal of the American Musicological Society* 19/3 (1966), 281-328.
- Cyr, Mary. *Performing Baroque Music*. Portland, Oregon: Amadeus Press, 1992.
- Darbellow, Etienne. "Tempo Relationships in Frescobaldi's *Primo Libro di Capricci*." In *Frescobaldi Studies*, 301-26. Edited by Alexander Silbinger. Durham, N.C.: Duke University Press, 1987.

Dolmetsch, Arnold. *The Interpretation of The Music of the XVII and XVIII Centuries*.
London: Oxford University Press, 1946.

Donington, Robert. *The Interpretation of Early Music*. New York: Norton & Company,
1989.

Gaffurius, Franchinus. *Practica musicae* [1496]. Translated by Clement A. Miller.
Dallas: American Institute of Musicology, 1968.

Gallo, F. Alberto. *La tradizione dei trattati musicali di Prosdocimo de Beldemandis*.
Bologna: Arti Grafiche Tamari, 1964.

Gossett, Philip. "The Mensural System and the *Choralis Constantinus*." In *Studies in
Renaissance and Baroque Music in Honor of Arthur Mendel*, 71-107. Edited by
Robert Marshall. Kassel: Bärenreiter-Verlag, 1974.

Hamm, Charles E. *A Chronology of the Works of Guillaume Dufay: Based on a Study of
Mensural Practice*. Princeton, N.J.: Princeton University Press, 1964.

Heyden, Sebald. *De arte canendi* [1540]. Translated by Clement A. Miller. Dallas:
American Institute of Musicology, 1972.

Hothby, John. and Thomas Walsingham. *Opera omnia de musica mensurabili* [c.1470]
and *Regulae de musica mensurabili* [c.1450]. Edited by Gilbert Reaney.
Neuhausen Stuttgart: Hänssler-Verlag, 1983.

Houle, George. *Meter in Music, 1600-1800: Performance, Perception and Notation*.
Bloomington: Indiana University Press, 1987.

Miller, Clement A. "Early Gaffuriana: New Answers to Old Questions." *Musical
Quarterly* 56/3 (1970), 367-388.

_____. "Gaffurius's *Practica musicae*: Origin and Contents." *Musica disciplina* 22 (1968),
105-128.

Morley, Thomas. *A Plain and Easy Introduction to Practical Music*. Edited by R. Alec
Harman. New York: W. W. Norton & Company, 1966.

- Murata, Margaret. "Pier Francesco Valentini on Tactus and Proportion." In *Frescobaldi Studies*, 327-350. Edited by Alexander Silbinger. Durham, N. C.: Duke University Press, 1987.
- Praetorius, Ernst. *Mensuraltheorie des Franchinus Gafurius und der folgenden Zeit bis zur Mitte des 16. Jahrhunderts*. Translated and edited by Jay A. Huff. Leipzig: Breitkopf & Härtel, 1905.
- Prosdocimus, de Beldemandis. *A Treatise on the Practice of Mensural Music in the Italian Manner*. Dallas: American Institute of Music, 1972.
- Rastall, Richard. *The Notation of Western Music: An Introduction*. London: J. M. Dent & Sons Ltd., 1983.
- Rubio, P. Samuel. *Classical Polypony*. Translated by Thomas Rive. Oxford: Basil Blackwell, 1972.
- Sachs, Curt. *Rhythm And Tempo: A Study in Music History*. New York: W.W. Norton & Company, 1953.
- Schroeder, Eunice. *Mensura according to Tinctoris, in the Context of Musical Writings of the Fifteenth and Early Sixteenth Centuries*. Ph.D. dissertation, Stanford University, 1985.
- _____. "The Stroke Comes Full Circle: Φ and C in Writings on Music, ca. 1450-1540." *Musica disciplina* 36 (1982), 119-66.
- Seay, A. "Translation of Proportionale musices." *Journal of Music Theory* 1/1(1957), 22-75.
- Schütz, Heinrich. *Psalmen Davids*. Dresden, 1619.
- _____. *Symphoniarum Sacrarum Tertia Pars*. Dresden, 1650.
- _____. *Symphoniae Sacrae I pars*. Venice, 1629.
- _____. *Symphoniarum Sacrarum Secunda Pars*. Dresden, 1647.
- _____. *Cantiones Sacrae*. Freibergae, Georgii Hoffmanni, 1625.

_____. *Syncharma musicum*. [Bratislava], 1621.

_____. *Historia, Geburth Gottes und Marien Sohnes, Jesu Christi*. Dresden, 1664.

Tinctoris, Johannes. *Proportionale musices*. Translated by Albert Seay. Colorado Springs: Colorado College Music Press, 1979.

Williams, C. F. Abdy. *The Story of Notation*. New York: Charles Scribner's Sons, 1968.

Wolf, Johannes. *Handbuch der Notationskunde*. Leipzig: Breitkopf & Härtel, 1913-1919.

Zarlino, Gioseffo. *Le istituzioni harmoniche* [1558]. New York: Broude Bros., 1965.