I

The Origins of the Measure in the Seventeenth Century

THE CONCEPT OF the musical measure, time signatures, and bar lines evolved gradually from sixteenth-century mensural notation. Some symbols of modern notation are derived from the mensural system, though we may be unaware of their original significance. Some new symbols were accepted into seventeenth-century notation, but most of those in use were familiar to musicians for over a century.

The semicircle C and its diminution ¢, for example, are mensural symbols, for which 4/4 or 2/2 time signatures were later invented as substitutions. Time signatures using numerical fractions, such as 3/2 or 9/8, evolved from proportions into meter signs. Basic changes in the way musical time and notation were perceived occurred when tempo significance was added to mensural symbols.

The mensural system related all notes to a down-and-up gesture of moderate speed, called the *tactus* (meaning "beat"). Bar lines were used occasionally to indicate note values equivalent to one or two *tactus*, but they did not necessarily define a metrical hierarchy. The *tactus* gradually came to measure a longer span of time, although it continued to be indicated by the same note value; this general trend, perceptible to us through hindsight, was too gradual to occasion comment by theorists and performers in the seventeenth century. Performers became accustomed to reading smaller note values, for several reasons, and the note value associated with a comfortable beat became the quarter note, rather than the semibreve (whole note) or minim (half note) as in the sixteenth century.

The "measure," or time value of the *tactus*, was conducted with an equal down-and-up motion for duple meters, even though it came to include two or four beats instead of one. Triple proportions (triple meters) were conducted by a *tactus* beat with a downstroke double the duration of the upstroke. Seventeenth-century musicians came to interpret mensural signs and proportions themselves as indicating a slower or faster *tactus*, although the change in the speed of the *tactus* was slight—less than the change occasioned by employing another proportion or diminution. Proportions with large-numbered denominators were interpreted to indicate faster tempos and those with small-numbered denominators to indicate slower ones. Because of this, the number of beats included in *tactus* measures varied, and musicians became interested in the practical question of how many beats were included in the measure of the *tactus*.

Another inheritance from mensural notation was the convention that smaller notes were performed faster and larger notes were performed slower; therefore, tempo was indicated not only by the sign or proportion but also by the size of the notes. Compositions written in 3/2 and 𝔠 generally equated the half note or minim with the beat and were slower in tempo than those in 3/4 and 𝐂, where the quarter note represented the beat. Some late seventeenth-century explanations of meter began to equate all quarter notes, for example, even when comparing them in 𝐂 and 3/4 measures. Mensural theory would regard quarter notes in these different measures as different values because 3/4 was a proportion and its three quarters were equivalent in value to the four quarters in 𝐂. As a result, these two logical extensions of mensural principles were sometimes in conflict.

Words to indicate tempo served to mediate the conflicts and uncertainties of note values, signs, and proportions. In the early seventeenth century, *tarde, velociter, adagio,* and *presto* distinguished between fast and slow, that is, degrees of change intermediate to those determined by diminution (2:1) or proportion (usually 2:1, 3:1, or 3:2). As the vocabulary of tempo words became richer and more precise later in the century, the terms gained in authority and were able to indicate finer degrees in the change of speed.

Italian music seems to have been the first to use mensural signs and proportions as time signatures. The most frequently used proportions came to describe how many notes of what size were found in a measure, and 3/4, 6/8, and 12/8 became very popular. 3/1 and 3/2 were still associated with proportions and were less used. Tempo words were Italian; they traveled with Italian music and musicians and gradually converted most of the rest of Europe to Italian practice. At the least, they blended the Italian conversions of mensural signs into time signatures with the more conservative German or English practices.

Note Values and the Tactus

Perhaps the most important change in the evolution from mensural to measure notation was in the relation of notes to the *tactus* beat. In mensural notation the *tactus* governed the performance of "fast" and "slow" music alike: faster music was written in smaller note values and slower music in larger ones, or else a numerical proportion was written in the score to change the value of notes in relation to the *tactus*.

The treatise of Sebald Heyden has influenced many twentieth-century scholars to believe that the *tactus* of the sixteenth century represented an unvarying beat:

> In the examples of these two men [Iohannes Ghiselinus and Iacobus Obrecht] a definite relationship of signs would always be evident if the hidden meaning of the signs were revealed by a prescribed limit in the art, not by the accidental introduction of varying kinds of *tactus*.
>
> Through this accident of changing the *tactus* the relationship and nature of all proportions having mutually dissimilar signs are confused and defective. Indeed how unnecessary it was to invent so many different kinds of *tactus* that even now we endure unwillingly! For when we see many kinds of *tactus* invented simply to change the tempo of a composition frequently, making it now slower, now faster, and now very fast, then I ask, what are we to think later composers understood by proportions, augmentations and diminutions? From the art itself it is absolutely certain that they wanted to show through various kinds of *tactus* the same thing that early composers had indicated more correctly and artistically either by a diminution of signs or by proportions.[1]

Heyden taught that the unvarying *tactus* was a necessary part of mensural notation, although it is clear from this quotation that it was not the only practice of sixteenth-century musicians. J. A. Bank shows that many twentieth-century scholars also believe that an invariable *tactus*-tempo was the basis of sixteenth-century notation, and that they quote Heyden, Ornithoparchus (1517), Listenius (1549), H. Finck (1556), Lanfranco (1533), Schneegasz (1596), and Thomas Morley (1597) in support of this belief.[2] The practice of mensural notation was taught to young musicians then as well as now as if the *tactus* were invariable in speed, a pedagogical technique that simplifies many complexities of actual practice.

The *tactus* was ordinarily equated with the semibreve, as John Dowland's translation of Ornithoparchus's *Micrologus* makes clear: "A *Semibreefe* in all Signes (excepting the Signes of Diminution, augmentation and proportion) is measured by a whole *tact.*"[3]

The speed of the *tactus* in the sixteenth and seventeenth centuries was often described in general terms and sometimes identified with the body's pulse.[4] Of course, the pulse can be quite variable, but it does have the advan-

tage of being instantly available. The *tactus* was designated either as *tactus maior* or *tactus minor,* the latter being twice as fast as the former. Ornithoparchus, in John Dowland's translation, adds a third, *tactus proportionatus,* which will be discussed later in this chapter:

Of the Division of *tact*

Tact is three fold, the greater, the lesser and the proportionate. The greater is a Measure made by a slow, and as it were reciprocall motion. The writers call this *tact* the whole, or totall *tact.* And, because it is the true *tact* of all Songs, it comprehends in his motion a semibreefe not diminished: or a Breefe diminished in a duple.

The lesser *Tact,* is the half of the greater, which they call a *Semitact.* Because it measures by it [*sic*] motion a Semibreefe, diminished in a duple: This is allowed onely by the Unlearned.

The Proportionate is that, whereby three Semibreefes are uttered against one, (as in a Triple) or against two, as in a *Sesquialtera.*[5]

Therefore, although the *tactus* in mensural notation was usually equated with the semibreve, it could be identified with other note values. The speed of the music appears not to be changed by choosing *tactus maior* or *minor* since *tactus maior* was equal to a note value twice as large as that of the *tactus minor.* The choice between them depended upon which was the more convenient in clarifying the *tactus* in performance.

Ornithoparchus-Dowland says, "Wherefore *tact* is a successive motion in singing, directing the equalitie of the measure: or it is a certaine motion, made by the hand of the chiefe singer, according to the nature of the marks, which directs a Song according to measure."[6] The *tactus* beat was given by a down-and-up motion that was either even or uneven. If even, it indicated pulses of duple meter and if uneven, triple meter (two pulses measured on the downstroke and one on the up).

In a diagram, Dowland gives the number of *tactus* equated with various note values in different mensurations and under several proportion signs. Two minims go in the time of a *tactus,* the semiminim (quarter note) goes "4. to one stroake," the eighth note, "8. to one stroake" and the sixteenth note, "16. to one stroake."[7]

Zarlino links the *tactus* with mensural signs: "To indicate equal *battute* (*tactus*) in writing, musicians used these four [mensuration] signs: O, C or ϕ, ¢; and to indicate unequal *battute* these four signs: ʘ, Ɔ, or ϕ, ¢. They could also indicate unequal *battute* with the sign 3/2 preceded by the mensuration sign."[8] "Equal *battute*" means that the *tactus* is conducted with a gesture divided into two equal pulses, one down and one up. "Unequal *battute*" means that the downstroke is given two pulses and the upstroke one. The *tactus* is the interval between two downbeats, so that its length is not changed by the method of beating.

There are physiological limits to the speed of a conductor's beat. If the beat is too slow to be followed easily, the conductor subdivides the gesture, thereby doubling its speed. If too fast, then he or she consolidates two beats in one, halving the speed. In metronome indications, the beat becomes too slow around MM 40, and too fast around MM 130–35. This provides a range of tempo of more than triple the speed of the slowest beat. The *tactus* was near the center of this range, since the body's resting pulse generally corresponds to MM 60–80. The *tactus maior* was equated with this speed, and *tactus minor,* therefore, with MM 120–40. Since MM 140 is uncomfortably fast, it would seem that *tactus maior* might be restricted to the range of MM 60–66.

Marin Mersenne confirms this speculation by equating the *tactus* with a second in time, one-sixtieth of a minute, therefore with MM 60. He also explains that the *tactus* is related to the body's pulse, but the pulse is faster than the *tactus.* In addition he describes how to construct a pendulum with a musket-ball suspended from a string 3½ feet long that will swing back and forth precisely in one second. The string may be shortened by mathematical formulas to correspond to the tempo of different proportions, or "faire prendre l'accoustumance aux Maistres qui font chanter, de batre réglement la mesure de telle vitesse qu'ils voudront" (to suit the custom of singing-masters to beat the measure at whatever speed they wish).[9]

Mersenne discusses how the speed of the *tactus* is frequently quickened or slowed, "suivant la lettre & les paroles, ou les passions differentes du sujet dont ils traitent" (following the characters, words, or the various emotions they evoke). He states that different tempos, like the speeds of different wheels in a clock, may be used to determine the beat of the measure. It may be given by the movement of a torch at night, a piece of wood, or a piece of paper in the day, although "ceux qui conduisent maintenant les concerts, marquent la mesure par le mouvement du manche des Luths ou des Tuorbes, dont ils ioüẽt" (those who conduct at concerts nowadays mark the measure by the movement of the necks of the lutes or theorboes on which they play). However, the manner of giving the beat is of no importance if the singers are accurate, and in some concerts the beat is not conducted at all.[10] From Mersenne's discussion it would seem that there was a normative *tactus* speed, perhaps an old-fashioned or traditional way of regarding the governance of tempo, but that the ordinary practice of performers varied in the matter of speed as well as in the way of indicating the beat.

In the sixteenth century, theorists described the *tactus* in relation to notation rather than as an independent topic. In the seventeenth century, both Agostino Pisa and Pier Francesco Valentini wrote treatises entirely devoted to the *tactus.* Their meticulous consideration of every detail of the *tactus* gesture, a matter that was apparently too obvious to be considered in the sixteenth century, is a sign of change in the meaning of the *tactus.*

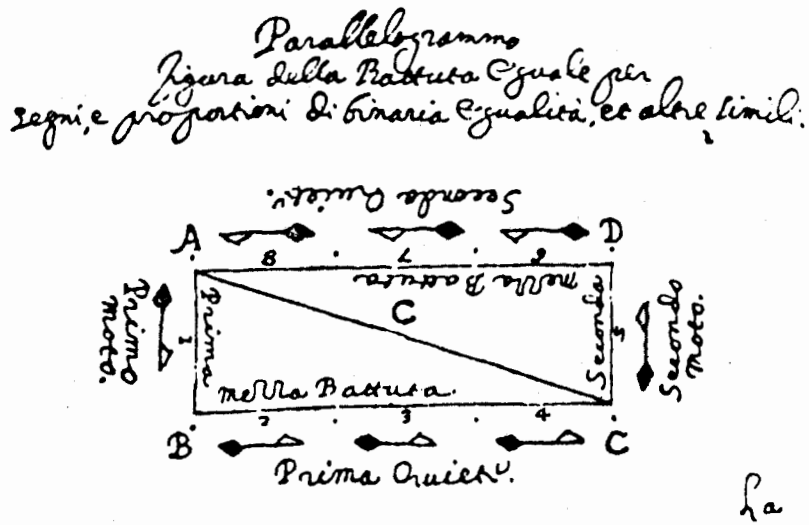


PLATE 1. Parallelogrammo figura della Battuta Eguale. (*Trattato Della Battuta Mvsicale di Pier Francesco Valentini Romano*, para. 154, p. 76.)

Pisa considered these problems: (1) What motion does the hand make when rising to begin the stroke? (2) Does the *tactus* begin at the instant the hand moves or when the hand reaches the bottom of the stroke? (3) Are notes (subdivisions of the *tactus*) performed while the hand moves in the air? (4) Is there an interval of time while the hand stops at the bottom or top of the stroke during which notes are being performed? (5) Is the final note of a piece to be stopped when the hand reaches the top of its last stroke?[11]

Valentini's treatise alludes to Pisa's discussion and often disagrees with it (he refers to Pisa as Asip). In his description of beating the *tactus*, Valentini speaks of a downstroke that is succeeded by "quiete" or reposes, then an upstroke followed by reposes. He also discusses which notes, as divisions of the *tactus*, are performed when the hand is moving, and which when in repose. He includes diagrams to illustrate the relation of notes to the "battuta eguale" and to the "battuta ineguale," which are reproduced in plates 1 and 2.[12]

In the "parallelogrammo" illustrating the equal beat (plate 1), the first eighth-note occupies the time of the first motion, from A down to B, the second, third, and fourth eighth-notes occupy the first repose at the bottom of the stroke, B to C. The fifth eighth-note occupies the time of the second motion, from C up to D, and the sixth, seventh, and eighth eighth-notes occupy the time of the second repose, D to A, at the top of the stroke.[13] The "circolo" (plate 2) demonstrates the method of giving an unequal (triple) beat. The first motion accompanies the first of the twelve semiminims, from A to B, the

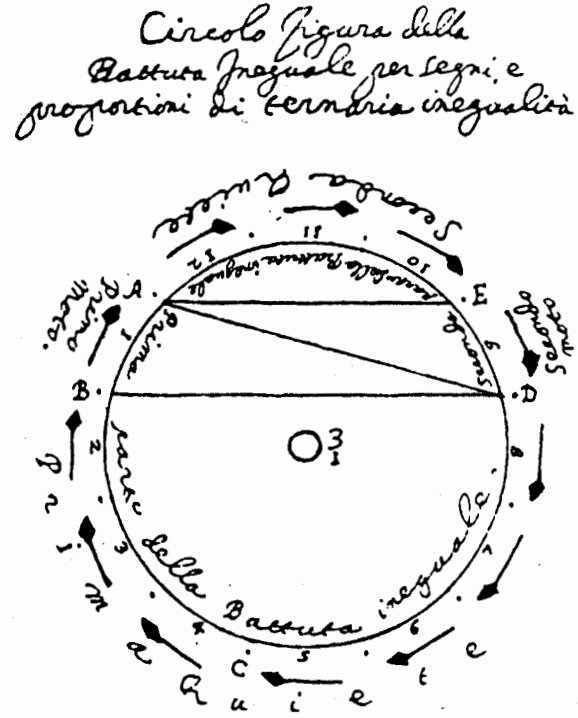


PLATE 2. Circolo figura della Battuta Ineguale. (*Trattato Della Battuta Mvsicale di Pier Francesco Valentini Romano*, para. 156, p. 78.)

first repose accompanies the additional seven semiminims constituting the remainder of the first part of the beat, depicted by the line B to D. The second motion accompanies the ninth semiminim, line D to E, and the second repose accompanies the remaining three semiminims. If one counts semibreves, the first takes the circumference of the circle from A to C, the second from C to D, and the third from D to A, but the beat is still given as before.

The speed of the *tactus* was quite variable, "tal volta adagio, e tal volta presto, e tal volta tra'l presto e l'adagio mediocremente, secondo richiedono li stile delle compositioni, et il scale delle parole" (sometimes slow, sometimes quick, and sometimes between quick and moderately slow, according to the styles of compositions and the indication of the words).[14]

The *tactus* can be represented by various note values: "oltre la Breve et oltre la Semibreve, si nella eguale come anco nella inegual Battuta, qual si voglia nota musicale, per mezzo delle date proportioni può esser misurata, et abbracciata dal tempo et intervallo di una Battuta" (besides the breve and the semibreve under the duple or triple *tactus*, any note value may be equated and embraced by the time interval of a *tactus*, by means of the proportions).[15]

In the seventeenth century, the *tactus* required minute investigation because it so often included many small notes; if these are not to be performed quickly, the *tactus* must be slower. Valentini describes a *Battuta larga,* a "slow beat,"[16] as well as a *Battuta veloce,* a "fast beat,"[17] to accommodate various speeds. If the beat became very slow, the gesture must have been more difficult to follow as well as to give. Although neither Pisa nor Valentini specifically states that the usual *tactus* is now slower than before, this change could be deduced from the meticulous precision of their descriptions of beating the *tactus.*

Valentini was faithful to the conservative Roman style of composition of his teacher, G. B. Nanino. His treatise seems to consider the *tactus* and its relation to notation as it applied to the music of Josquin, Palestrina, and the Roman conservatives, although it is filled with practical hints for the performance of seventeenth-century compositions. We tend to consider the early seventeenth century as a time of rapid change in musical style and notation, yet the force of tradition was very powerful, and innovations in notation competed with strong habits of practice and vigorous expositions of old-fashioned theoretical concepts.

In contrast to the notation of vocal and much instrumental music, smaller note values predominate in lute and keyboard tablatures in the late sixteenth and seventeenth centuries. In consequence, mensurally interpreted note values (*longa, breve,* and *semibreve*) are not usual, and minims and smaller notes are always subdivided by duples unless specially marked as triple, just as in modern notation. The *tactus* remains nominally equal to the value of the semibreve, but the semibreve moves much slower than the beat. William Barley's *A new booke of tabliture* of 1598 explained only the useful small notes, and didn't bother with the *longa* and *breve* at all: "Finally there are certaine figures or characters used in the tabliture, which likewise of necessite must bee known unto you. . . . The figures are thus marked | 𝄽 𝄾 𝄿 𝅀, a semibriefe | , A Minom 𝄽, a Crotchet 𝄾, a Quaver 𝄿, a Semiquaver 𝅀."[18]

This change of notation is mentioned by Thomas Ravenscroft, who, like Valentini, was a conservative in regard to notation and considered the new practices to be corruptions. Ravenscroft's exposition of notation is by no means without its confusions, but he is clear about the fact that the notes in common use are of smaller values than those in older notation. "But in regard the *Notes* now in use are not of so long a quantity, as when the *Perfect Moodes* were used, the most part of the *Notes Ligatured,* & *Ligatures* themselves are layd aside, except the *Breve* and *Semibreve,* which are yet retayned."[19]

Evidence that the *tactus* was generally slower in the seventeenth century is circumstantial since we lack written comparisons between the sixteenth- and seventeenth-century *tactus.* Both John Playford and Christopher Simpson describe the "measure of the *tactus*" to musical beginners so as to suggest that it is quite slow:

> To which I answer (in case you have none to guide your Hand at the first measuring of Notes) I would have you pronounce these words (*one, two, three, four*) in an equal length, as you would (leisurely) read them: Then fancy those four words to be four *Crotchets,* which make up the quantity or length of a Semibreve, and consequently of a *Time* or *Measure:* In which, let these two words (*One, Two*) be pronounced with the Hand Down; and (*Three, Four*) with it up.[20]

A number of seventeenth-century writers describe beating the *tactus* with four motions of the hand or arm rather than the two-part down-and-up gesture of the sixteenth-century *tactus.* Carl Dahlhaus considers a treatise of 1627 as possibly the first to describe the *tactus* as a four-part beat:

> La Compositione di poi della battuta è de due parti, la prima delle quali è il battere, e la seconda l'elevar della mano: di più in cadauna di queste parti sono duoi Tempi, di modo che in tutto sono quatro: in questi si distribuiscono in questo modo: cioè, nell'istesso tempo dell'abbassat' uno, e nel fermar la mano a basso, un'altro vien distribuito: nell'elevar poi similmente si applica il terzo, e nel fermar la mano in alto, il quarto: il qual modo di distribuir questi tempi è il vero, e reale.[21]

> The *tactus* contains two parts, the downbeat and the upbeat of the hand. These are further divided into two parts each, so that the whole consists of four parts, as follows: The first part is lowering the hand, the second is the stop at the bottom of the gesture, the third is raising the hand (analogous to lowering the hand), and the fourth is the stop at the top of the gesture. This is the true and proper way of dividing these beats.

Lorenzo Penna describes the four-part *tactus* beat, adding an "ondeggiare la mano," or wavering of the hand, to the up-and-down motion:

> Hà la Battuta quattro parti, la prima è battere, e la seconda è fermare in giù, la terza è alzare, e la quarta è fermare in sù; Nelle Note nere spiccana benissimo queste quattro parti di Battuta, perche la prima è nel percuotere, la seconda è nel levare un poco ondeggiando la mano, la terza è nell'alzata, e la quarta è nel fermare in sù.[22]

> If the *tactus* has four parts, the first is on the beat, the second is while the beat is down, the third is on the rise, and the fourth is while the beat is up. For black [quarter] notes, mark each part of the *tactus* well, with the first on the downstroke, the second while raising by wavering the hand a little, the third on the upstroke, and the fourth on ending at the top.

Johann Quirsfeld draws diagrams in the shape of a square and a diamond to guide the hand in beating the *tactus:*[23]

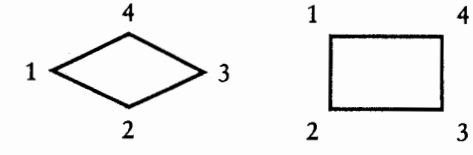


PLATE 3. Conducting with the hand: title illustration from *Musikalischen Arien* by Johann Martin Ruberts (Stralsund, 1647). (*Musikgeschichte in Bildern: Haus und Kammermusik*, ed. Walter Salmen.)

Each stroke of the diagram is equivalent to a quarter part of the *tactus* in these conducting patterns.

At the end of the century, Daniel Merck describes the duple meters as follows:

> Der *Tact*, welcher in vier Theil gerechnet wird/ ist an nachfolgenden Zeichen zu Erkennen. (1) C (2) ¢ (3) 2. Stehet das Zeichen wie Num. 1. wird der *Tact* in 4. Theil langsam geschlagen. Wo das Zeichen Num. 2. sich findet noch so geschwind/ bey den Italianern stehet darbey *alla breve*, und wird der *Tact* mit auf- und Niderschlag gegeben in zwey Theil/ da doch 4. Viertel können aussgetheilet werden. Ist das Zeichen Num. 3. befindlich so wird der *Tact* etwas langsamers geschlagen als bey Num. 2.[24]
>
> The *tact*, which is counted in four parts, is indicated by the following signs: (1) C (2) ¢ (3) 2. If the sign is as no. 1 (C), the beat is given in four slow parts. If the sign is as no. 2 (¢), it is half again as fast, as when the Italians mark "alla breve," and the up and down beat of the measure is given in two parts, which can be divided into four quarters. If the sign is as no. 3 (2), the beat is given somewhat slower than with no. 2.

The translation of *Tact* as "measure," rather than as "beat" or *tactus*, seems justified in this context, as it establishes that the duration of the *tactus*-semibreve is that of four slow quarter notes in C. These are counted either in

PLATE 4. Conducting with a stick: frontal tile of a stove (1705) in the music room of the Winterthur Heimatmuseum, Lindengut Winterthur. (*Musikgeschichte in Bildern: Haus und Kammermusik*, ed. Walter Salmen.)

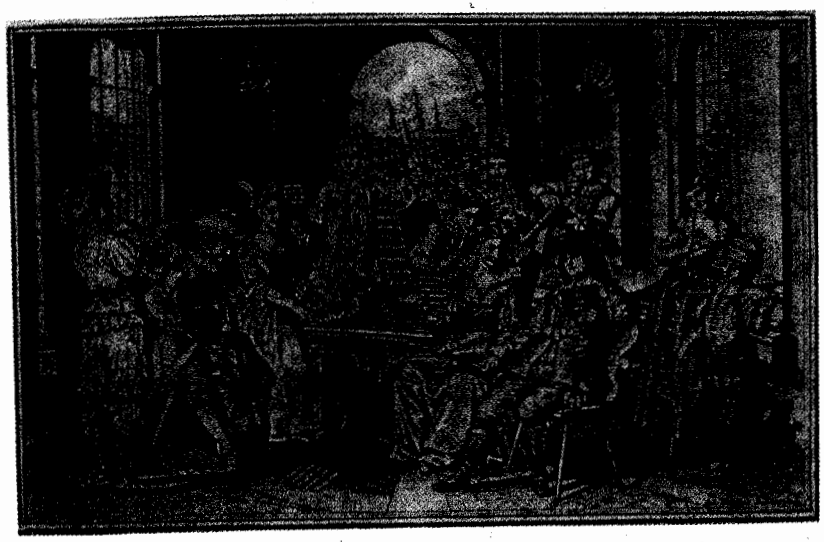


PLATE 5. Conducting with a roll of paper: copper-plate engraving of the rehearsal of a chamber cantata by Johann Christoph Steudner, after Paul Decker the elder, in the Handel-Haus, Halle. (*Musikgeschichte in Bildern: Haus und Kammermusik,* ed. Walter Salmen.)

two or in four when it is taken faster (*alla breve*). The sign 2 is intermediate to these. The measure of C has become virtually a 4/4 measure that lacks only a few details of verbal description, which will soon be added by eighteenth-century writers.

Many pictures show ensembles of the seventeenth and eighteenth centuries being directed by time beaters, and among them three variations in method are found. Plate 3 shows a group of singers and instrumentalists being conducted by the hand gesture of one of the singers. Plate 4 shows a similar group of musicians being led by a singer wielding a rather stout baton. If this stick were struck against a table, it could make a hearty sound, but in this picture the table is covered by a rich cloth that would mute any percussive effect. Plate 5 depicts a rehearsal of a chamber cantata that includes a singing conductor who conducts with a roll of paper in his left hand while holding his score (apparently a vocal part) in his right hand.

The technique of the modern conductor is not yet seen in the seventeenth century, but theorists tell us that the *tactus* was not always a simple beat of one stroke down and the other up. It had become a gesture subdivided into enough segments to allow each part of the *tactus* to be represented by a comfortable beat.

Signs for Duple Meter

Mensuration signs indicated duple or triple metrical relationships and were measured by the *tactus*. Duple subdivision of large note values was indicated by imperfect *tempus* and *prolation*. *Tempus* governed the relationship of the breve to the semibreve and was perfect if three semibreves were included in the breve, imperfect if there were two. *Prolation* governed the relation of the semibreve to the minim; perfection indicated three minims and imperfection two in each semibreve. Additional signs indicated different note relationships to the *tactus*. Signs of diminution, equating larger note values than the semibreve with the *tactus,* were more frequently employed than signs of augmentation. Diminution signs included a vertical line through a mensural symbol, such as ¢, and numbers indicating a proportion, such as 3/2.

Mensuration signs, diminutions, and proportions had a secondary, somewhat illogical use in the sixteenth-century practice of notation: they could be used to indicate a change in the speed of the *tactus*. This change seems to have been less than that brought by the proportions in common use, such as 2 : 1, 3 : 1, or 3 : 2. Glareanus states:

> When musicians are afraid [that] the audience might get tired, they hasten the *tactus* by crossing the circle or semicircle and calling it a diminution. Actually they do not diminish the value or the number of the notes; they just quicken the beat, *quod tactus fiat velocior.* Thus the three sections in a Kyrie in a Mass (Kyrie I, Christe, Kyrie II) are often signed O ¢ Φ to avoid boredom.[25]

Thomas Ravenscroft connected a change of speech of the *tactus* to diminution signs:

> [Diminution] is a certaine Decreasing of the *Quality* (and not of the Quantity) of the *Notes* and *Rests,* by *Internall* and *External Signes:* or when the Element is abated in the *Greater* or *Lesser* of the Nature of it; and it was invented to hasten the *Tact,* for a reviving of the Eare, when it is dul'd and wearied with a slow *Motion;* not that the *Number* or value of the Notes is thereby Diminished, but only that the *Tact* for the *Motion* of it is hastened, both in the *Perfect* and *Imperfect* measure.[26]

This interpretation of mensural signs as indicating tempo change continued into the seventeenth century. According to Wolfgang Caspar Printz:

> 2. Die Zeichen/ so die Hurtigkeit oder Langsamkeit des Tactes andeuten/ werden *Signa quantitatis mensuralis* genennet/ und seyn derselben vier: C, ¢, Φ, Θ. Deren erstes einen sehr langsamen/ das andere einen mittelmässigen/ das dritte einen geschwinden/ und das vierdte einen sehr geschwinden Tact andeutet. 3. Die letzten beyde seyn fast gar abkommen: Wäre aber zu wünschen/ dass sie wieder auffgebracht würden/ . . .[27]

The signs that designate the swiftness or slowness of the *tact* are called *signa quantitatis mensuralis,* and there are four of these: C, ¢, Ø, and Ø. The first denotes a very slow *tact,* the second a medium, the third a fast, and the fourth a very fast *tact.* The last two have fallen into disuse, but it is to be wished that they were still in use.

In 1656, De La Voye-Mignot writes that O, ⊙, O2/3, and Ø2/3 have become obsolete.[28] Only the more conservative and old-fashioned notation of the mid-seventeenth century makes use of these signs.

Henry Purcell confirms Printz's statement regarding the first three of these signs, but has nothing to say about the fourth: "Y^e^ first is a very slow movement y^e^ next a little faster, and last to brisk and airy time, & each of them has allways to y^e^ length of one semibrief in a barr."[29]

Bononcini advocates the use of mensural signs with proportions in order to specify the mensuration to which a proportion relates, but his contemporary Lorenzo Penna gives examples of proportions used as meter signs without mensuration signs. Although C and ¢ were much used, the other mensural signs, O, ⊙, and Ø, became rare in musical notation in the later seventeenth century.

In the early seventeenth century, the performance of music written under the signs C and ¢ was governed by the traditions of mensural notation, but there was some uncertainty about the exact proportion indicated by ¢, as it could be either twice as fast as C or one-third faster. This issue can be resolved only by considering ¢ in the context of the genre of composition and note values used.

The proportion of 2:1 governs ¢ when used simultaneously with C in other contrapuntal voices. However, a 2:1 ratio between C and ¢ does not necessarily indicate a change of speed or of rhythmic quality, since notes of double size are usually found when the *tactus* is twice as fast. A perceptible change in the speed of the music does occur if the *tactus* is "somewhat faster." In order to be precise, this change would need to be represented by a ratio more mathematically complex than 2:1, the proportion specified by many writers for the diminution of ¢.

Proportion and mensuration signs were sometimes interpreted to indicate such mathematically complex, perceptible changes of speed. The relation between the usual *tactus* and one somewhat faster is illustrated by the performance of "note negre" madrigals of the mid-sixteenth century. These are written in C (*tempus imperfectum non diminutum*) and use many minims and semiminims, for which the *tactus* (*maior alla semibreve*) must be given approximately one-third to one-half slower than for the conventional C (also *tempus imperfectum non diminutum*) that uses mostly semibreves and minims. *Note negre* madrigals were considered to be in a new style in the mid-sixteenth century, and their sprightly pace, due to the fast note values, contributed to their freshness.[30]

J. A. Bank comments that

During the last quarter of the 16th century—certainly not earlier—when the madrigal-style has filtered through everywhere and the black notation has become common property, a specific terminology came into being, giving expression to it: *tactus simplex protractior* opposite to *tactus correptior;* according to Christoph Praetorius at Ø, ¢, the *tactus* must be shortened together with the notes (*Erotemata,* 1574, lib. II, cap. 4). V. Goetting speaks of *tactus tardior* C, as opposed to *tactus celerior* ¢ (*Compendium musicae modulativae,* 1586, fol. C 11). G. Schneegasz (1591) and S. Calvisius (1594) use the same terminology, together with Michael Praetorius (1607–19), A. Banchieri (1609), A. Brunelli (1606).[31]

From this we can see that Michael Praetorius's explanation of the tempo relation of C and ¢ reflects a tradition of notation rather than a new practice.[32] He differentiates between "Tactu aequali Tardiore, C, quo signantur Madrigalia" (slow duple *tactus,* C, used in madrigals) and "Tactu aequali Celeriore, ¢, quo signantur Motetae" (quick duple *tactus,* ¢, used in motets).[33]

Although C is generally used in madrigals and ¢ in motets, Praetorius explains that the tempo is determined by the note values and the genre of composition as well:

Jetzigerzeit aber werden diese beyde *Signa* meistentheils also *observiret,* dass das C fürnēlich in *Madrigalien,* das ¢ aber in *Motetten* gebraucht wird. Quia Madrigalia & alia Cantiones, quae sub signo C, Semiminimas & Fusis abundant, celeriori progrediuntur motu; Motectae autem, quae sub signo ¢ Brevibus & Semibrevibus abundant, tardiori: Ideo hîc celeriori, illic tardiori opus est Tactu, quò medium inter duo extrema servetur, ne tardior Progressus auditorum auribus pariat fastidium, aut celerior in Praecipitium ducat, veluti Solis equi Phaëtontem abripuerunt, ubi currus nullas audivit habenas.

Darvmb deuchtet mich nicht vbel gethan seyn/ wenn man die *Motecten,* vnd andere geistliche Gesänge/ welche mit vielen schwarzen Noten gesetzt seyn/ mit diesem *Signo* C zeichnet; anzuzeigen/ dass alsdann der *Tact* etwas langsamer vnd gravitetischer müsse gehalten werden: Wie dann *Orlandus* in seinen *Magnificat 4 Vocum* vnd *Marentius* in vorgedachten *Spiritualibus* vnd andern *Madrigalibus* solches in acht genommen. Es kan aber ein jeder den Sachen selbsten nachdenken/ vnd *ex consideratione Textus & Harmoniae observiren,* wo ein langsamer oder geschwinder *Tact* gehalten werden müsse.

Dann das ist einmal gewis vnd hochnötig/ das in *Concerten per Choros* ein gar langsamer gravitetischer *Tact* müsse gehalten werden. Weil aber in solchen *Concerten* bald Madrigalische/ bald *Motetten* Art vnter einander vermenget vnd vmbgewechselt befunden wird/ muss man sich auch im *Tactiren* darnach richten: Darvmb dann gar ein nötig *inventum,* das bisweilen/ (wie drunten im I Capittel des Dritten Theils) die *Vocabula* von den Wälschen *adagio, presto. h.e. tardè, Velociter,* in den Stimmen darbey *notiret* vnd vnterzeichnet werden/ denn es sonsten mit den

beyden *Signis* C vnd ¢ so offtmals vmbzuwechseln/ mehr *Confusiones* vnd verhinderungen geben vnd erregen möchte.[34]

At the present time these two signs [C and ¢] are used; C usually in madrigals and ¢ in motets. Madrigals and other *cantiones* that abound in quarters and eighths under the sign C, move with a faster motion; motets, on the other hand, that abound in breves and semibreves under the sign ¢, [move with a] slower [motion]; therefore the *tactus* is here faster, and there slower, by which a mean between two extremes is kept, lest too slow a speed produce displeasure in the ears of the listener, or too fast a speed lead to a precipice, just as the horses of the sun snatched away Phaeton, when the chariot obeyed no reins.

This indicates to me that motets and other sacred music written with many black notes and given the sign C must be performed with a *tactus* that is somewhat grave and slow. This can be seen in Orlando [di Lasso]'s four-voiced Magnificat and Marenzio's early sacred and other madrigals. Each person can consider these matters for himself and, considering the text and harmony, take the *tactus* more slowly or more quickly.

It is certain, and important to note, that choral concertos must be taken with a slow, grave *tactus*. Sometimes in such concertos, madrigal and motet styles are found mixed together and alternated, and these must be regulated through conducting the *tactus*. From this comes an important invention. Sometimes . . . the Italian words *adagio* and *presto*, meaning slow and fast, are written in the parts, since otherwise when the signs C and ¢ so often alternate, confusion and problems may arise.

Praetorius continues with brief descriptions of the use of C and ¢ by Orlando di Lasso, Giovanni Gabrieli, Monteverdi, and Viadana. From these it is clear that C used with smaller notes indicates a slower *tactus*, and ¢ used with larger notes, a quicker *tactus*. The signs C and ¢ were the primary indications of the speed of the *tactus*. The text, the frequency of harmonic change, and the use of Italian terms provided additional information to the performer.[35]

A 2:1 ratio between the signs C and ¢ is avoided by using fast notes with the slow *tactus* C, and slow notes with the fast *tactus* ¢; this combination results in an intermediate but appreciable tempo change appropriate to the style of the madrigal or the motet. Therefore, only a slight slowing of the speed of the music is indicated by *Adagio* or *tardè*, and a slight quickening by *presto* or *velociter*. This change would be in the same proportion as that between madrigal and motet styles, as indicated by C or ¢ and the appropriate note values.

Georg Quitschreiber offers a simpler interpretation of the relations of C to ¢. In chapter IV of his *Musikbüchlein für die Jugend* he states that C is the sign of the great *tact* of the *tempus*, frequently used by the previous generation and still in use in his time. In C there are two slow beats (*Schläge*), one down and one up. In ¢, the sign of the small or common *tact*, there is one complete beat (*Schlage*) or two half-beats that move quickly down and up. This was invented,

he says, for students who found it easier to beat ¢ with four one-quarter beats in a *tact* rather than eight in C. This indicates that the *tact* of C is twice the duration of that of ¢, but in chapter VII, Quitschreiber states that the beat of C is given "somewhat slower" than ¢, or by "singing" two beats (*Schläge*) instead of one in a *tact*. Perhaps different tempo relationships were observed in different circumstances.[36]

Most school manuals and books for the musical amateur in the seventeenth century are as brief as Quitschreiber's in their descriptions of the mensural or meter signs. They agree that, in general, the note values are twice as fast in ¢ as they are in C, and that the beat is faster in ¢.[37]

Near the end of the seventeenth century, Daniel Speer confirmed and expanded Praetorius's interpretation of the various speeds of the *tactus*. Speer gave three possible speeds for the *tactus* in ¢, with the proper one to be determined by the performer on the basis of the genre of the composition, the tempo words, and the note values. By using three different tempo words for "fast," Speer may be suggesting that these words now indicate different gradations of speed.

1. Ein ganz langsamer/ welcher zur gravität/ und zur jetzigen Manier geschwind gesetzten und schweren Sachen/ hochstnotig zu gebrauchen. 2. Ein mittelmässiger *Tact* der fast am gemeinstens üblich. 3. Ein geschwinder *Tact*, so zu langsamen gesetzten alten *Moteten*, und zu dem jetzt überschriebenen *alla breve, presto*, und *allegro* zu gebrauchen.[38]

1. It is very important to use quite a slow beat in slow, grave, and difficult pieces, that are written in fast notes, according to the present custom. 2. A moderate beat is the most commonly used today. 3. A faster beat is used for old motets written in slow notes, and for the modern designations of *alla breve, presto*, and *allegro*.

Daniel Merck states that ¢ is one-half faster than C, in the proportion of 3:2, rather than twice as fast.

Stehet das Zeichen wie Num. 1 (C) wird der *Tact* in 4. Theil langsam geschlagen. Wo das Zeichen Num. 2 (¢) sich findet noch so geschwind/ bey den Italianern stehet darbey *alla breve*, und wird der *Tact* mit Auf- und Niederschlag gegeben in zwey Theil/ da doch 4. Viertel können aussgetheilet werden. Ist das Zeichen Num. 3. befindlich/ so wird der *Tact* etwas langsamers geschlagen/ als bey Num. 2.[39]

If the sign C is used, the beat (*tact*) is given in four slow parts. If the sign ¢ is used, the beat is given in two parts, which may be divided into four quarters. It is faster by half, as the Italians perform *alla breve*. If the sign 2 is used, the beat is given somewhat slower than under ¢.

Merck describes the quarter notes of the *tact* as beats, and *tact* also describes their association in one unit. The word *tact* has therefore taken on the

meaning of "measure" rather than "beat," yet it is still used as if it meant a *tactus* that could be indicated with a down-and-up motion of the hand.

Some seventeenth-century theorists continue to define the relation of 𝐂 to 𝄵 as 2:1. Saint Lambert uses the phrase *une fois plus vîte* to describe the relation of 𝄵 to 𝐂 in a context that defines the relationship as "two in the time of one."

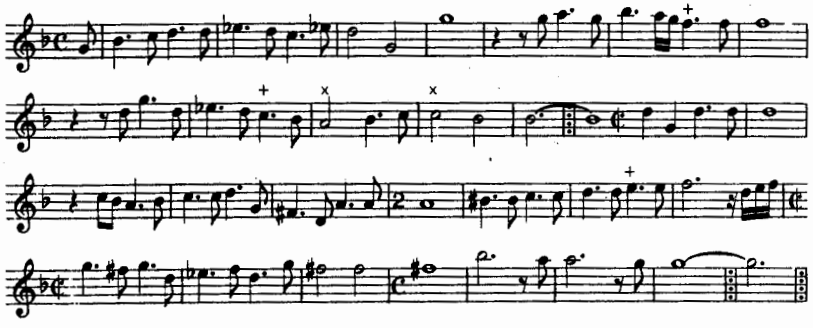
> Les deux mouvemens qu'on fait de la main en battant cette mesure [𝄵], doivent être dans leur duré pareils à ceux de la Mesure à quatre temps [𝐂]; c'est-à-dire, ny plus lents, ny plus pressez, & cecy doit faire comprendre que dans les Pieces marquées du Signe mineur, les notes vont une fois plus vîte que dans celles qui sont marquées du Signe majeur; puisque dans la même durée d'un temps, on met deux Noires au lieu d'une.
>
> The two movements of the hand made in beating this measure [𝄵] should be the same in their duration as those of the measure of four beats [𝐂]; that is, neither slower nor faster. This means that in pieces with the minor time signature [𝄵] the notes are twice as fast as those in the major time signature, since (in 𝄵) two quarter notes instead of one are put in the time of one beat.[40]

The sign of 2 was adopted from the diminution 2/1 by French musicians and was used primarily by them. When it is encountered outside of France, it identifies the French style. French signs that designate duple meters included 𝐂 and 𝄵 as well, the latter being explained by most writers as equivalent to 2. De LaVoye-Mignot in 1657 was the first to mention 2, but he gave no tempo indication for the sign. He stated that it could replace either 𝐂 or 𝄵.[41]

Antoine Du Cousu, a musical conservative, says that 2, *le binaire*, is a proportion indicating diminution in the ratio of 2:1. His examples show 𝄵 and 2 used simultaneously in counterpoint with another voice in 𝐂, a musical situation requiring all tempo relationships to be in the ratio of 2:1.[42] Thus he agrees with Saint Lambert's mensural interpretation of the sign.

The musical context of the third entrée from Lully's ballet *L'amour malade* (LWV 8/13), suggests that the three signs, 𝐂, 𝄵, and 2, must indicate three different tempos (Ex. 1.1).[43]

EX. 1.1. *L'amour malade*, 3ᵉ entrée, 2 chercheurs de trésors.



If a tempo relationship of 2:1 is adopted, the various sections contrast sharply. If "une fois plus vite" is taken to mean "once again as fast" (3:2), the contrasts between sections are reduced. Both interpretations are tenable according to theoretical evidence, but the artistic effect is strikingly different.

According to Jean Rousseau, 2 was marked with two quick strokes, down and up, and indicated a faster tempo than 𝄵.[44] Perrine identified 2 as a substitute for 𝄵 but not for 𝐂.[45] Etienne Loulié included 2 with 𝄵 and 2/4 as the only duple measures he discussed (𝐂 was defined as a quadruple measure), and he marked it with two pulses, down and up.[46] Masson said that it was used in bourées and rigaudons, "with a fast beat."[47] Georg Muffat stated that 2 was given "rather slowly" when used in "ouvertures, preludes and symphonies," but was faster when used in "balets," and generally it was to be taken slower than 𝄵.[48] This appears to be opposite to the usual French practice.

The doubling of tempo between 𝐂 and 𝄵, 𝄵 and 2, and 2 and 4/8, as defined by Saint Lambert, seems not to be in accord with these theorists. Etienne Loulié indicates that 𝄵 is twice as fast as 𝐂 and appears to equate the tempo of 2 with 𝄵.[49] Peter Wolf has shown that the notation of French recitatives, from those of Lully's *tragedies lyriques* to those of Rameau's operas, generally equates 𝄵 with 2.[50] Poetic diction is given an equivalent rhythm in music when the quarter note in 𝐂 equals the quarter note in 3 as well as the half note of both 𝄵 and 2. It appears that, at least in recitatives, this practice was established late in the seventeenth century.

Mensural signs are the most frequently used indications of duple meter in the seventeenth century, but some numerical duple proportions are also used. According to Georg Falck, in all duple proportions, such as 2/1, 4/2, and 8/4, the ratio of 2:1 is preserved in tempo relationships.[51]

As proportions, 2/1, 4/2, and 8/4 are alike, but according to Wolfgang Caspar Printz, the larger the number in the denominator of the sign, the faster the speed of the *tactus*.[52] Charles Masson confirms the quick speed of the *tactus* in 8/4: "Elle se bat fort vîte dans les autres marquez ainsi 8/4, come l'Entrée des Bergers & Bergères dans l'Opéra de Roland" (It is given very fast in the other [measures] marked 8/4, as in the Entrée des Bergers & Bergères in the opera *Roland*).[53]

In the seventeenth century duple meters were indicated by mensural signs, which kept much of their traditional significance, and some proportions. Because the *tactus* became slower, performance was regulated by subdivisions of the *tactus*-measure, that is, beats. The speed of various duple meters was indicated by measure signs, aided by the note values and the genre of the composition. Tempo words were used on occasion to supplement or clarify the meaning of mensural signs.

Signs for Triple Meter

Triple mensural proportion signs, while still used in both conservative and newer-style seventeenth-century notation, were gradually transformed into the fractional numbers of modern time signatures.

Pier Francesco Valentini devotes over 150 pages of closely written manuscript to proportions in his "Trattato del tempo, e del modo, e della prolatione."[54] His discussion is devoted largely to the theorists and composers of the sixteenth-century, although valuable insights into seventeenth-century practice can be found.

> La sesquialtera qui apparente 3/2 (la quale nel canto figurato per il 3 numero superiore non denota altro, che in luogo delle due note de egual quantità, indicato per il 2, numero inferiore, che andavano primo cantate nell'intervallo di una battuta; tre mandar se ne deuono) non dà, nè può perfectione ad alcuna nota, ancor che ella mandi tre note in luogo di due a battuta.
>
> The sesquialtera that is marked by 3/2 (the numerator 3 shows that instead of two notes of equal quantity, indicated by the denominator 2, three are required in the time of one *tactus*) does not confer perfection on any note, but places three notes instead of two to the *tactus*.

Whatever number and size of notes replace those previous to the proportion, they occupy the same amount of time. The proportions of 3/2 and 3/4 differ only in the size of the notes used, not in their speed.

One system of proportions is based on the equivalence of notes; in 3/2, three of any note value become equivalent to two. In ¢3/2, three semibreves become equivalent to two semibreves, and under C3/2, three minims to two minims. In another system, the *tactus* is the unit of equivalence: in 3/2, the note values of three halves of a *tactus* become equivalent to two halves. The results are not altered, but Dahlhaus points out that the second system is closer to establishing the semibreve as the "whole note," the equivalent of a measure.[55] Valentini combines these two views.

Valentini gives examples of many numerical proportions, both duple and triple, and shows the value of every note in relation to the *tactus*. Each proportion is preceded by a mensuration sign that allows the performer to know the relationship of notes to the *tactus* both before and after the proportional change.

Valentini explores every possible proportion regardless of whether or not it had any practical use. He discusses more numerical signs than any other theorist of the time, including superparticular proportions such as 5/4, 7/6, and 10/9, multiple proportions such as 5/1 and 7/1, and submultiple proportions such as 1/5 and 1/7.[56] Among the plethora of fractions cited are those that subsequently became time signatures.

The speed of notes in this mensural proportion system is dependent upon the mensural sign placed before the proportion. For example, the value of a minim under these different signs is as follows:

C3/2 = one-third *tactus*
C3/1 = one-sixth *tactus*
¢3/2 = one-sixth *tactus*
¢3/2 = one-twelfth *tactus*
O3/2 = one-third *tactus*
C = one *tactus* (if in counterpoint with parts under other signs)
C = one-third *tactus* (if in counterpoint with parts under dotted C)
C3/2 = one *tactus*
O3/2 = one *tactus*

Valentini considers 6/4, 12/8, and 24/16 to be equivalent to the proportion of 3/2.

Proportion signs were sometimes used alone, without the sanction of the established practice of mensural notation. Bononcini wrote: "Per ultimo si deue auuertire, che l'introdurre le proporzioni ne i canti, senza segno del Tempo e (come dice Valerio Bona nelle sue *Regole di musica*) come mettere i soldati in Campo senza Capitano" (Finally it must be said that to use the proportions without mensural signs is [as Valerio Bona says in his *Regole di musica*] like sending soldiers on the field without a captain).[57]

The speed of notes, therefore, was dependent upon the mensural *tempus* signs C and O, which governed the subdivision of the breve into either two or three semibreves. In Italian, *tempus* becomes *tempo*, a word that evolved in the seventeenth century from a mensural term to one meaning the speed of notes. It was subsequently accepted into English, as designating the speed of the musical beat.

Michael Praetorius explains "Signis proportionatis in Tactu Inaequali."[58] The *tactus inaequalis* is divided into *majore* ¢3/2, called "proportio tripla," and *minore* C3/2, called "proportio sesquialtera." In the works of "Orlando [di Lasso], Marentio, Fel. Anerio & aliis," the signs for "proportio tripla" include 3+, 3/1, ¢3, ϕ3+, ◇3/1, and ϕ3/2+. Under these signs three semibreves are equal to one *tactus*. The signs for sesquialtera include C3, O3, ϕ3, C3/2+, O3/2+, and Θ. Praetorius writes that under *tactus inaequalis minore*, three semibreves are equal to two *tactus*, and his musical example shows three minims equal to one *tactus*.

Tripla majore, ¢3/1, is used in slow and serious pieces, "Motetis & Concertis." *Tripla minore*, sesquialtera C3/2, is used in "Madrigalibus, praesertim autem in Galliardis, Courantis, Voltis & aliis id generis Cantionibus." Triplas

(3 and 3/1) that use breves and semibreves are performed with *tactus inaequalis tardior;* and sesquialteras (3/2) using semibreves and minims are performed with *tactus inaequalis celerior.*[59] Therefore, the use of ¢ to designate *tactus* speed is exactly reversed from that of duple notation. There ¢ was equated with *tactus celerior* and C with *tactus tardior.*

Carl Dahlhaus offers an explanation of this reversal:

> Die Tripla maior ¢3/1 setzt einen Tactus alla breve voraus und ist nach der Regel des Christoph Praetorius zu interpretieren, bedeudet also, dass drei Semibreven einen Tactus alla breve ausfüllen. Und da ein tactus ¢ alla breve um ungefähr die Hälfte langsamer ist als ein Tactus C alla semibreve, repräsentiert die Tripla maior ¢3/1 einen Tactus tardior und die Tripla minor C3/2 einen Tactus celerior. Dass das ¢ im zweizeitigen Tempus einen Tactus celerior, in der Proportion ¢3/1 dagegen einen Tactus tardior bezeichnet, ist im Wechsel zwischen Semibrevis und Brevis als Bezugseinheit begründet.[60]

> The *tripla maior* ¢3/1 presupposes a *tactus alla breve* and is to be interpreted according to the rule of Christoph Praetorius, therefore three semibreves are contained in one *tactus alla breve.* Since a *tactus* ¢ *alla breve* is about one-half slower than the *tactus* C *alla semibreve,* the *tripla maior* ¢3/1 represents a *tactus tardior* and the *tripla minor* C3/2 a *tactus celerior.* That the ¢ in duple tempus signifies a *tactus celerior,* but in the proportion ¢3/1 a *tactus tardior,* is founded on the change between semibrevis and brevis as the unit of reference.

¢ signifies a faster *tactus* (*celerior*) as a duple sign, but a slower one (¢3/1 *tardior*) as a triple sign; under ¢ large note values are used. Duple C *tardior* changes to C3/2 *celerior,* and under C small note values are used. Therefore under triple signs the large notes are slower and the small notes faster than they would be in a strict proportion. Perhaps the most important element in Praetorius's explanation is that the sign itself signifies the speed of the *tactus,* although the genre of composition and the size of the notes must also be considered.

Praetorius adds one more kind of triple meter, the "Sextupla, seu Tactu Trochaico Diminuta";[61] it is measured with a *tactus aequalis mediocris,* the ordinary duple *tactus.* The name "sextupla," Praetorius writes, means that there are six semiminims in one *tactus.* These are sometimes written with the number 3 over groups of three notes. The sextupla can be notated in three ways. (1) In *hemiolia minore* (all black notes under the sign ϕ), there are three black minims or "Semibrevis cum Minima" on the downstroke, and three on the upstroke. If the sign 6/1 is used for *hemiolia minore,* it indicates a proportion equating six semiminims or black minims with the *tactus.* (2) The second sextupla is used by the French and Italians in "Courranten, Sarabanden," and other similar pieces. Minims and semiminims are used in place of the semibreves and black minims of the first sextupla. The sign 6/4 indicates that six semiminims equal four of those before the sign. (3) The third way, Praetorius cautions, has proved so difficult for performers that he is uncertain whether it should be used. The sign sesquialtera, 3/2, is used with semibreves and minims,

but the *tactus* must be taken very fast, which often causes confusion. Therefore he has written a ϕ before the 3/2 proportion to indicate this fast speed.

Valentini would not approve of this third alternative, for the strict mensural interpretation of this sign, ϕ3/2, makes the minim one-twelfth of the *tactus,* not one-sixth; therefore, it is twice as fast as Praetorius tells us the notes should be taken in relation to the *tactus.* Perhaps this is why Praetorius's performers were puzzled by his use of the sign.

In the triple meter signatures of Giovanni Maria Bononcini and Lorenzo Penna, we begin to recognize the familiar time signatures of modern measures. Penna calls them signs of "tripola," not proportions.

According to Bononcini,[62] they are:

tripla maggiore: O3/1, C3/1, ϕ3/2, ¢3/2, with three semibreves to the *tactus,* two on the downstroke, one on the upstroke.

tripla minore: C3/2, O3/1, C3/1, C3/2, with two minims on the downstroke, one on the upstroke.

C3/4, *tripla di semiminime.*
C3/8, *tripla di crome.*
C6/4, *sestupla di semiminime.*
C6/8, *sestuple di crome.*
C12/8, *dodecupla di crome.*
C12/16, *dodecupla di semicrome.*

According to Penna,[63] they are:

3/1, *tripola maggiore,* formerly indicated by ϕ3/2, three semibreves to the *tactus,* two on the downstroke, one on the upstroke.

3/2, *tripola minore,* formerly indicated by O3/2, three minims to the *tactus,* two on the downstroke, one on the upstroke.

3/4, *la tripola picciola, ò quadrupla, ò semiminore, ò di semiminime,* semiminims and minims, two semiminims on the downstroke, one on the upstroke.

3/8, *la tripola crometta, ò ottina, ò di crome.*
3/16, *la semicrometta.*
6/4, *la sestupla maggiore.*
6/8, *la sestupla minore.*
12/8, *la dosdupla.*

Meter signatures with six in the numerator indicate three notes on the downstroke and three on the up; with twelve in the numerator, there are six on the downstroke and six on the upstroke.

The number of signs is small compared to those given by Valentini, and Penna mentions that he is explaining only those most frequently used. Penna includes a few additional proportions, the *hemiolia maggiore* and *minore,* that were "formerly used," and also the proportions 5/2 and 7/2, included as

"tripola." This seems to faintly echo Valentini's odd mensural proportions. Penna's explanation is brief, and he mentions that there "are others in other forms."

Penna explains some traditional uses of a proportional sign, for example, turning it upside-down signifies a return to the notation before the proportion was introduced.

> Tutte le Note delle data Tripole vanno cantate, come si è insegnato, sino al fine della Composizione, e nelli modi auisati in ciascheduna Tripola, douendosi poi per qualche accidente tornare à cantare frà la Composizione col valore ordinario nel Tempo, ini farà dato, e posto dal Compositore il segno, ò col porui il Tempo, ouero con riuoltare li numeri della Tripola corrente al rouerscio, come l'esempio.[64]
>
> All the notes under each triple sign should be sung according to their proper signs until the end of the composition in the way prescribed. Should it be necessary, in some circumstances, to sing the composition in the ordinary values of *tempo* [i.e., "common time" or C], the composer writes the sign for *Tempo*, or turns the numbers of the current tripola upside down, as in the example [Ex. 1.2].

EX. 1.2

Bononcini also comments on "turning the numbers contrary," for example, following 3/1 with 1/3, which "destroys" the first proportion. This remnant of the old-fashioned interpretation of proportions explains some signatures that are puzzling to musicians today, such as the 2/3 signature used by François Couperin in the second section of the "Grande Ritournéle" in the Huitiéme Concert of *Les goûts réunies*. It must be understood as a proportion, not a time signature (Ex. 1.3).

EX. 1.3

This unusual notation, in which the eighth notes are left white,[65] is mentioned by both Penna and Bononcini. The one-flagged or beamed "white" eighth notes replace ordinary quarter notes (semiminims) (Ex. 1.4).

EX. 1.4

Penna omits the mensural sign (*tempo*) before the numerical proportion in his signatures. He mentions its former use but gives no reason for its exclusion. In 1714, Printz comments on the omission of the mensural sign with a time signature:

> Wenn der Gesang mit einer *irrationalem Proportion* anfängt/ lassen die meisten neuen *Musici* das *Signum quantitatis mensuralis* weg/ und setzen unter die Zahlen/ so die *Proportion* andeuten/ allein: und zwar nicht ohne Ursache. Denn weil die untere Zahl der vorgeschriebenen *Irrationalen Proportion* schon die Krafft hat die Länge des Tactes anzudeuten/ so ist das *Signum quantitatis mensuralis* uberflüssig/ unnöthig/ und also/ vermöge . . . abzuschaffen.[66]
>
> If the music begins with an irrational proportion [3/1, 3/2, 3/4, 3/8], most of the new musicians omit the mensural sign, and use only the numbers that show the proportion. This is not without cause, as the denominator of the indicated proportion already has the ability to show the length of the *tactus:* therefore the mensural sign is superfluous, unnecessary, and should be abolished.

Even in 1714, the fractional number of the time signature is explained as a proportion, but the omission of the mensural sign is explained as if it did not affect the proportional interpretation of the signature.

Bononcini retains the mensural C. His general explanation of triple signs involves comparing the notes before with those after the proportion sign that changes their relation to the *tactus:* "De gli altri poi che seguono, per maggiore brevità si da questo regola generale, che il numero sotto posto denota quante figure andavano, ò s'intende, che andastero alla battuta, & il sopra posto, quante ne vadino per l'avenire" (Of the others indicated, for greater brevity, they follow this general rule: the lower number indicates which note values went or were understood to go to the beat, and the upper number how many notes will go in the future [i.e., after the sign]).[67]

It seems that the proportion sign is still recognized in its traditional meaning by Bononcini, but he has this to say about the beat that regulates the speed of notes according to the various meter signs:

> Si deue auuertire, che tutte le proporzione di battuta eguale, si deuono constituire sotto l'istessa battuta eguale, e tutte le proporzione di battuta ineguale si deuono anch'esse constituire sotto la medesima battuta ineguale, non variandosi altro che alle volte il moto in questa maniera, cioè facendolo hora ordinario, hora adagio; & hora presto, secondo il voler del Compositore; per il che si possono far composizione, nelle quali le parti siano segnate diuersamente, purche i segni possano essere gouernate facilmente da una istesia battuta, come in diuerse Opere de Frescobaldi, e di molt' altri dotti Compositore si può vedere, & eziando nella sesta mia opera.[68]
>
> It should be noted that all of the proportions corresponding to an equal beat are given by the same equal beat, and all the proportions of the unequal beat by the identical unequal beat. The motion does not vary except—occasionally—in speed, now an ordinary pace, now slow, and now fast, according to the wish of the composer, for this reason the parts of a composition are given different signs. Under these signs the same beat easily regulates [the music], as may be seen in the works of Frescobaldi and other learned composers, and in my own opera sesta.

Bononcini does not explain what signs these are, and the first to come in mind today, tempo words such as *allegro* and *adagio,* may not have been in his

mind. Frescobaldi was one of the first to specify that the "proportion" itself indicates the speed of the beat. The interpretation he offers contradicts mensural theory and practice: "E nelle trippole, ò sesquialtere, se saranno maggiori, si portino adagio, se/ minori alquâto più allegre, se di tre semiminime, più allegre se saranno sei per quattro si di/ a illor tempo con far caminare la battuta allegra" (In the triplas, or sesquialteras, if they are major let them be played slowly, if minor somewhat more quickly, if of three semiminims more rapidly, if 6/4, move the beat fast).[69]

Frescobaldi's interpretation of proportion signs is repeated by many performers and writers in the seventeenth century. The amount of tempo change is difficult to estimate, but following Praetorius's explanation of *tactus celerior* and *tardior* for duple meters, a slight variation from the norm seems to be what is intended. This would heighten the emotional quality of performance by the use of a mathematically more complex proportion than is usually specified in mensural notation.

Carissimi amplifies Frescobaldi's directions:

> Es befinden sich zwar nicht wenig/ welche in allen *triplis* ohne Unterschied einerley *Tact* und *Mensur* gebrauchen/ geben darbey vor/ die vilfältige Veränderung der Zahlen seye nur von den *Componisten* erfunden/ die *Musicos* dardurch zu vexiren/ aber weit gefehlt/ dass die *triplae* alle in der *Quantitaet* Ausstheilung oder *Proportion* überein kommen/ gestehet man gern/ aber in der *Qualitaet* Langsam- oder Geschwindigkeit/ oder wie es die Italiäner *Tempo*, und die Frantzosen *Mouvement* nennen/ wird *rorundè negirt*/ und gäntzlich widersprochen.[70]
>
> It is frequently thought that only one beat and measure, without any distinction, is used for all [simple] triples, and asserted at the same time that the many varieties of signs are invented by composers only to vex the performers. This is quite wrong. The triples all agree with regard to quantity, division and proportion, as everyone easily understands, but in the slow or fast quality, called *tempo* by the Italians and *mouvement* by the French, this agreement is roundly negated and contradicted.

Carissimi includes the numerical signature and the genre of the composition as determinants of the tempo. 3/1, for example, is used in "slow compositions and serious works in the *Stylo Ecclesiastico*"; 3/2 is "used somewhat more briskly than the former, particularly in the serious style, and therefore the beat must be given somewhat faster." 3/4 "requires a faster beat than the last as this tripla is used mostly in ariettes and happy pieces."[71]

Wolfgang Caspar Printz formulates a general rule to govern the speed of the *tactus* as indicated by proportional signatures:

> Die Länge des Trochaischen Tactes wird angedeutet durch die untere Zahl der vorgeschriebenen Proportion, davon diese Regul is Acht zu nehmen: Je kleiner die untere Zahl der Proportion ist/ je langsamer soll der Tact geschlagen werden; und je grösser dieselbe Zahl ist/ je geschwinder soll der Tact geschlagen werden.[72]

> The length of the trochaic beat is indicated by the lower number of the proportion, therefore this rule should be observed: the smaller the lower number of the proportion, the slower the beat; and the larger the number, the faster the beat.

Loulié agrees with this formulation.[73]

We can now return to Bononcini's statement that the composer's wishes about the speed of notes must guide the performer under all meter signs. Mensural signs, which formerly indicated the speed of notes only through their relation to the *tactus*, have come to indicate the speed of the *tactus* in themselves.

Printz did not approve of numerical signatures set in the middle of pieces to alter the tempo, and advocated the use of Italian terms instead:

> In der Mitte eines Gesanges/ damit die *Signa quantitatis mensuralis* nicht gar zu offt gesetzt werden dürffen/ werden gewisse Wörter unter oder uber die *Systemata* geschrieben/ und zwar *Adagio, lento,* oder *largo,* wenn der Tact langsam; *allegro* oder *vivace* wenn er lustig/ hurtig munter; *presto* wenn er sehr geschwinde soll geschlagen werden.[74]
>
> The *signa quantitatis mensuralis* should not be permitted to be set in the middle of a piece of music very often, instead, certain words should be written under or over the staff: *adagio, lento,* or *largo* if the beat is slow, *allegro* or *vivace* when it is merry, swift, and lively, and *presto* when the beat is very fast.

This statement is one of the first to make explicit comparison of the speed indicated by tempo words. Time signatures and tempo words have become equivalent ways of indicating the speed of the *tactus*.

Jean Rousseau derives the speed of some of his triple time-signatures from individual note values that are equivalent before and after the fractional sign. He explains first that there are six varieties of ordinary signs, i.e., 𝐂, 𝐂̷, 2, 𝐂3, 3, and 3/2; then that there are four more, 3/4, 3/8, 6/4, and 6/8, which are "new signs used for only a certain time." Later, he mentions the origin of the "new signs" when he states that "the Italians" also used 12/4, 12/8, 9/4, and 9/8, signs that he does not discuss.[75] French music of this period that is written in imitation of the Italian style often uses Italian meter signs.

> Au signe de Trois pour Quatre, ainsi nommé, parce qu'au lieu que la Mesure au signe Majeur [𝐂] est composée de quatre Noires, celle-cy n'en a que Trois, la Mesure se bat a trois temps plus vîtes que le Triple simple [3]; mais comme la vitesse de ces temps les rend difficiles a marquer, on le bat a deux temps inégaux; deux Noires pour le frappé & une Noire pour le levé. Au Signe de trois pour Huit composé de trois croches, au lieu que le Majeur en a Huit, la Mesure se bat comme au Trois pour Quatre, mais beaucoup plus Vîte.[76]
>
> Under the sign of 3/4 (called thus because in place of the four quarter notes of 𝐂 this measure has only three), the beat is given with three strokes, faster than under the *triple simple,* 3. As the quickness of these strokes makes them difficult to

beat, each gesture is made by two unequal strokes, two quarter notes on the down-, and one quarter on the upstroke. Under the sign of 3/8, there are three eighth notes instead of eight in C. The beat is given as it is under the sign of 3/4, but much faster.

Daniel Merck offers the same explanation of 3/4: "Die *Proportio Tripla* ist/ wann die Zeichen dess gewöhnlichen vier Viertel *Tactes* nicht gefunden werden/ und an statt deren vornen/ oder anderstwo/ Ziffern darfür gesetzt sind/ so verliehret der *Tact*-Schlag ein Theil/ also/ dass nur 3. Theil geschlagen werden" (The triple proportion is used when the sign of the usual four-quarter measure is not found, but in its place one or two figures are placed at the beginning or elsewhere; then, as the *tact*-beat loses a part, it is given in only three parts).[77]

But he also says that "tripla sesquialtera 6/4" is "mit dem 3. Viertel Tripel gantz gleich/ aussgenommen/ dass der Tact in 6. Theil eingetheilet wird" (entirely like the three-quarter triple except that the *tact* is divided into six parts). This statement seems to contradict the concept of note equivalence and to restate the proportional interpretation of subdividing equivalent *tactus* units. However, a change in the meaning of the word *tact* has occurred: It is no longer equivalent to *tactus*. Merck has previously shown that the *tact* C is to be considered four beats.[78] His description of the triple meters needs further translation in order to become entirely comprehensible: "*Tripla Major* wird diser genennet/ . . . in welchem drey gantze *Tact* erst einen *Tact* ausmachen" (Tripla Major, as it is called, . . . is when three whole notes make one measure).

The German sentence literally states that three whole *tact* make one *tact;* this is verbal nonsense. *Tact* traditionally means a semibreve, the note value equal to the *tact;* now it has come to mean a measure, a group of beats making a unit. Thus one whole note in 3/1 is equal to a beat, and three of these beats are equal to the measure. Merck's meaning was undoubtedly clear to his readers, as they were aware of the word's derivation from *tactus,* but it can now be clarified only by using two terms for the word *tact,* which encompasses the concepts of both *tactus* and measure.

In the second half of the seventeenth century, French musicians continued to use the combination of mensuration and proportion signs that we have seen in use by Italians and Germans (C, ¢, 3/1, and 3/2). The French also adopted the fractional numbers derived from proportion signs that Penna and Bononcini explained (3/4, 3/8, 3/16, 6/4, 6/8, 6/16, 9/4, 9/8, 9/16, 12/4, 12/8, and 12/16), but they did not use the accompanying mensural signs. In addition, they developed other signs that were used only in French music and were closely associated with French genres of composition, particularly dances.

The signs 3 (*Triple simple*) and 2 (*le Binaire*) are frequently used in tablatures to indicate a basic triple or duple metrical organization. 3 was conducted with two downbeats and one up for slow tempos, one downbeat of two pulses and an upbeat of one pulse for faster tempos, or one downbeat (or upbeat) of three pulses for very fast tempos.[79] Loulié states that 3 is the same as 3/4; Rousseau indicates that it is conducted by three quick strokes (*trois temps légers*), in contrast to C3, which is conducted by three slow strokes. Under all the meter signs of French notation, the genre of the piece determines the speed of the music. Georg Muffat remarks that "gigues and canaries need to be played the fastest of all, no matter what the time signature."[80]

However, there are problems in indicating the tempo of music through meter signs. Saint Lambert comments on the liberties taken by musicians contrary to the rules of tempo implied by meter signatures, and gives an example from the practice of the most eminent musician of the day:

> Often the same man marks two airs of completely differing tempo with the same time signature, as for example M. de Lully, who has the reprise of the overture to *Armide* played very fast and the air on page 93 of the same opera played very slowly, even though this air and the reprise of the overture are both marked with the time signature 6/4, and both have six quarter notes per measure distributed in the same way.[81]

Saint Lambert gives a number of other examples of the uncertainty of the tempo significance of meter signs, and comments that "musicians who recognize this drawback often add one of the following words to the time signature in the pieces they compose: *Lentement, Gravement, Légèrement, Gayement, Vîte, Fort Vîte,* and the like, in order to compensate for the inability of the time signatures to express their intention."[82]

Note values and time signatures often needed the help of tempo words in order to transmit fully the composer's choice of tempo to performers, but these words were still only secondary indications in the late seventeenth century.

Simplifications and Individual Interpretations

Notation in the early seventeenth century was a highly learned art, dependent on a complex tradition and governed by intricate rules. Expert knowledge of the system was part of the education of a complete musician. He or she would need to know historical as well as current interpretations of old notation. It is not surprising that method books offered simplifications as well as individual interpretations of notation to amateurs and beginners. Simplifications were also found in specialized notation, such as tablatures for the lute and the lyra viol.

William Bathe's *Briefe introduction,* published in the last decade of the sixteenth century, gives practical elementary instruction to performers. The *tactus* is reduced to a simple formula:

For Time, Cap. 3.

There be 2. kindes of time, Semibreefe time, and three minim time. Semibreefe time is the striking up and downe of the hand equally in length continuing. Three minim time is the striking downe and then up of the hand, equally in length, making each latter stroke, iust halfe the former [in time].

The marke of the former kinde of time is ¢

The marke of the latter is 𝔠

In tuning Songs of Semibreefe time, you must put of the notes, as much as maketh a minim length to euery moving of the hand, likewise in the minim time, saue that to euery stroke there goeth but a minim length.

Heere note that these two kindes of time, may be deuided into minim time by keeping all strokes equall in length, putting a minim length to euery whole stroke.[83]

The simplest system therefore required only two signs, one for the equal *tactus* and the other for the unequal *tactus*. There was one change of note value in relation to the *tactus* for each sign that was intended to indicate a change in the speed of the beat. An anonymous method book published in 1686 kept to this simplified scheme as its only explanation of "time."[84]

John Playford's *An introduction to the skill of musick* retained a version of mensural notation in the 1662 and 1674 editions, but the edition of 1697 abandoned the "four moods" in favor of only two:

> That there is but *two* Moods or *Characters* by which *Time* is distinguished, (Viz.) *Common-Time* and *Tripla-Time*, all other Variations and Distinctions of *Time* (like so many Rivulets) take their Original from these *Two;* the Marks of which are always placed at the beginning of your *Song* or *Lesson*.[85]

Thomas Mace used only two signs of "time" in *Musick's monument*, ¢ and 3, and explained neither. Tablatures for the lyra-viol are equally simple; for example, the "Manchester Gamba Book" uses only ¢ and 𝔠.[86]

Charles Butler uses the same simplified indications recognized by Bathe and Ravenscroft. His discussion of meter begins with duple "proportion," for which the sign is ¢, and triple "proportion," for which the sign is 𝔠. Butler was a man of an unusual turn of mind. He was a beekeeper who published a book about the lore of bees, *The feminine monarchie,* and an experimenter with the orthography of the English language—his book on music is printed in a combination of phonetic spelling plus special symbols. Butler's discussion of the time signatures proposes some novelties.

Using the semibreve as the "measure note" or unit of time to be subdivided in different manners, he invents new signs: 2.1 (duple), 6.1 (sextupla), 3.1 (triple), and 9.1 (noncupla). The number one (1) signifies the semibreve, and the first number of each sign declares the number of notes into which the semibreve is to be divided:

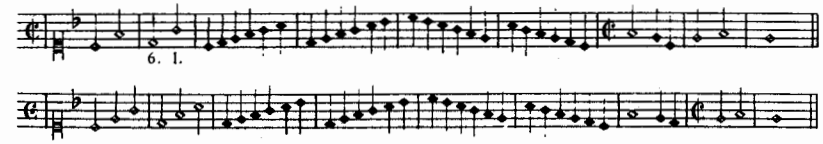
> *Sextupla* is đe *Triple* of đe Minim in *Duple* Proportion: Wen to eae Minim in *Duple* Tim^{c}, is sung 3 blak Minims [or a blak Sembrief and a Minim,] (and consequently 6 croeets, wie must hav^{c}, for differen^{c}, đe form of Qavers) 3 to đe Fall, and 3 to đe Ris^{c} of đe Hand [or if you will keep^{c} + Minim-Tim^{c}, 3 to on^{c} Strok^{c}, and 3 to an ođer:] wie *Triple* is đer^{c}for^{c} called *Sextupla;* becaus 6 of đes^{c} blak Minims go^{c} to on^{c} Sembrief-Tim^{c}.
>
> *Noncupla* is đe *Triple* of đe Minim in *Triple* Proportion: wen to eae Minim in *Triple* Tim^{c}, is sung 3 blak Minims, 6 to đe Fall, and 3 to đe Ris^{c} of đe Hand: wie *Triple* is đer^{c}for^{c} called *Noncupla;* becaus nin^{c} of đes^{c} blak Minims go^{c} to on^{c} Sembrief-tim^{c}.
>
> Đe Sign^{c} of *Sextupla* is, Wit đe blak Not^{c}s, his figured Number 6.1: and of đe *Noncupla,* it is wit đe lik^{c} blak not^{c}s, his figured Number 9.1.[87]

The signs 6.1 and 9.1 are neither proportions (in any conventional sense) nor modern time signatures, and are unique to Butler. Butler divided the minim into duple or triple parts, as if it were subject to mensuration.

One of Butler's most interesting statements occurs in the following paragraph.[88] It explains the relationship of notes in the various "proportions":

> Not^{c} heer^{c} đat đe blak Minim in *Sextupla* Proportion, beeing 1/2 of a *Duple* Minim, and đe Croeet in *Triple* Proportion, beeing 1/2 of a *Triple* Minim, are bod^{c}, as on^{c} form, so of on^{c} tim^{c}; đer going 6 of eae sort to a Sembrief-Strok^{c}: but đer is đis differenc^{c}, đat of đe six blak Minims, đe fowrt beginnet đe Ris^{c} of đe Hand, and is đer^{c}for^{c} mor^{c} notably accented; as đe First is, wie beginnet đe Fall: and of đe six croeets, đe First beginnet đe Ris^{c}, and is đer^{c}for^{c} mor^{c} notably accented: as lik^{c}wis^{c} đe First and third is: so đat đe blak Minims go^{c} jumping by Three's, and đe croeets by two^{c}'s: wer^{c}by đe Melodi of đe sam^{c} Not^{c}s becoomet divers: as in đis Example [Ex. 1.5].

EX. 1.5



This is the first mention, as far as I know, of how a performer or listener distinguishes groupings of notes in musical meter. It is one of very few seventeenth-century identifications of metrical grouping by "accent." It introduces a subject, to be fully discussed elsewhere in this study, that fascinated musicians in the later seventeenth and eighteenth centuries.

The division of *tactus* into duple and triple, or even and uneven strokes, became the basis of many explanations of "time signatures" in the eighteenth century, particularly for German writers. Subclassifications were added, but for both notation and conducting techniques the essential distinction remained that of duple or triple beats.

Summary

The origins of the modern measure are found in the changes that occurred in mensural notation in the seventeenth century. The speed of the *tactus* varied under different circumstances during the sixteenth century; however, variations of speed were systematically indicated in seventeenth-century notation by new interpretations of mensural signs and proportions. A new interpretation of mensural notation was made necessary by the increasing use of small note values that were not governed by mensuration.

The *tactus* was identified with the note value of the semibreve in mensural notation, and the *tactus* continued to be equated with the semibreve even when the musical beat came to be represented by smaller note values. The *tactus*-semibreve in the seventeenth century became a metrical unit containing either two or four beats. Although this change is evident in musical notation, it took place so gradually that we can perceive it only by viewing the notation and the theorists' comments within the time perspective of the entire century. In the lifetime of an individual musician, the speed of the ideal *tactus* probably was one element of musical performance that seemed quite stable.

A change of speed in the *tactus* in the ratio of 2:1 was usually accompanied by a change to larger or smaller note values; therefore, it was imperceptible to the listener. It would be perceptible only if the ratio of change were a little less (or more) than 2:1. Generally, seventeenth-century note values, in conjunction with their mensural and proportion signs, conveyed a reliable image of the speed of the music they represented, but the irrational changes of tempo associated with new signs and new interpretations of old ones began to shake this certainty.

The speed of the music could be determined by measuring note values against the *tactus*, keeping in mind that the *tactus* itself was sometimes altered to go faster or slower than the norm. Proportion signs altered note values in relation to the *tactus*, but they also indicated an increase or decrease in the speed of the *tactus*. From the great number of proportions theoretically possible in mensural notation, the few actually used in seventeenth-century notation became the basis of the fractional numbers of modern time signatures.

This system required composers to use meter signs uniformly to indicate both metrical structures and tempos, but sometimes compositions with the same metrical structure were not intended to be performed at the same tempo. This caused some uncertainty, which was resolved increasingly by the use of words such as *allegro, adagio, celerior,* and *tardior,* which first came into use early in the seventeenth century. Tempo words were also used to indicate changes of speed when the word-music relationship, note values, and the rate of harmonic change signaled a different genre of composition in the absence of a mensural sign or proportion. Irmgard Herrmann-Bengen's study of tempo indications shows that degrees of speed were seldom indicated, other than "fast" or "slow," before the middle of the seventeenth century.[89]

The vocabulary of tempo words gradually expanded to allow a comparison of speeds. Daniel Merck offers the following terms: "*Grave,* gravitätisch, . . . *Adagio, largo,* langsam; wie auch *lentement,* sanfft; *presto, allegro,* geschwind/ frölich; *vivace,* lebhaft; *prestissimo, viste,* gar geschwind; *più allegro, più adagio,* mehr hurtig/ oder mehr langsamer."[90] At the end of the seventeenth century most diminutives of tempo words and adjectives indicating an emotional character had not yet become popular.

The speed of a piece of music could not be judged solely by its time signature and tempo words, as it depended upon the note values and the genre of composition as well. The speed of dance music was necessarily determined by the dance, and the speed of motets by ecclesiastical musical tradition. Both the composer and the performer were aware of those requirements which overrode the indications of the notation itself.

The notation of meter in the seventeenth century is not yet that of measure notation, in which the speed of an individual note is largely dependent upon a tempo word. In modern notation relatively small note values may represent slow notes and large note values fast notes, although this is an apparent contradiction. It is only in the late seventeenth century that the concept of slow and fast movements emerges in musical forms.

"Slow movements" are fundamentally differentiated from "fast movements" not by the one being made up of slow notes and the other by fast notes, but rather by the listener's perception of metrical hierarchy. If quick notes are grouped in regular metrical units, which in turn are perceived as part of larger units, and so on to even larger ones, we recognize a "slow movement." The beat given to conduct such a piece may be faster or slower, in a proportion of 2:1, without changing our sense of the "tempo" of the music. Hierarchical metrical structure in a piece conveys peace and order through regularity.

If the beat does not arrange itself in a regular pattern but seems to shift in its groupings or to give rise to phrases of irregular length, we sense that we are hearing a "fast movement." Quick shifts of metrical grouping provide excitement and energy.

Modern notation visually represents a "slow movement" to a performer when small notes are written with flags or beams that show metrical grouping. The best notation uses the smallest size note values possible to convey many levels of meter in slow movements. In fast movements, large notes are used that are not visually subordinated to one another, and, being large, they claim our attention as being separate and individual. These qualities make slow movements in small notes and fast movements in large notes logical and useful to performers.

The convention of the mensural *tactus* was a very important guide to con-

ductors in the seventeenth and even the eighteenth century. The rise of the virtuoso conductor in the nineteenth century brought with it a technique far removed from the apparently simple down-and-up gesture of the *tactus* beater. The modern conductor has a powerful and efficient technique, commanding meter, rhythm, dynamics, accentuation, tempo, and nuances of performance that were formerly controlled only by individual performers. A *tactus* conductor is necessarily more of a coordinator or a colleague of the other musicians, rather than the commanding leader that the modern virtuoso conductor has become.

The *tactus* beat of a seventeenth-century conductor supported an awareness of a larger span of time than a conductor's gestures usually do today. Although many individual conductors today strive for this awareness, the basic technique of *tactus* beating in the seventeenth century was centered on it. Even if the *tactus* might be too slow-moving to be comfortably represented by a single down-and-up gesture, we know from theorists' detailed discussions that the conductor's beat was derived from the *tactus*. The modest alterations of the *tactus* suggested by Penna and Quirsfeld show that some slight adjustments were thought to be useful.

It would be interesting to hear fine musicians playing seventeenth-century music conducted according to techniques of that period. It is possible to imagine that the performers would be less rigorously controlled, and therefore more responsible for the metrical coherence of their own performances. We simply do not know what effect such a re-creation of conducting technique might have.

Seventeenth-century notation of meter modified mensural notation in important ways and signaled the shifts of movement, grouping, and speed typical of the music of the period. It is usually disastrous to disregard the original "time signatures" of seventeenth-century music, or to modify them according to a more modern idea of notation, as one loses the precise yet subtle meanings they are able to convey.

II

Time Signatures in the Eighteenth Century

TIME SIGNATURES in the eighteenth century were generally recognized as signifying how many notes of what value were included in a measure, although the signature sometimes indicated this information only indirectly. Signatures became associated with genres of music; for example, music in the *stile antico* used mensural signs, such as 𝄵 and 𝄶, and simple proportions, such as 3/1 and 3/2. Music in the theatrical style used the new Italian or French signs that were associated with particular dances, character pieces, or even emotional affects.

Theorists in the eighteenth century were concerned with logical classifications of time signatures—simple and compound duple and triple meters. The notational systems that they attempted to classify, however, challenged the logical mind, since mensural signs and proportions (reinterpreted as they were) were mixed with new time signatures (even though they were derived from proportions). Composers as well as performers needed to tread carefully between traditional and newly fashionable interpretations of notation.

Changes in notation in the eighteenth century stimulated some theorists to suggest additional innovations, in the hope that a logical system could be found. Reforms of notation were avidly discussed in eighteenth-century France; some theorists advocated note values as the best indicator of tempo, and others (Italianate, and perhaps more forward-looking) preferred the use of tempo words. Various reforms were proposed, but none were accepted in practice.

Theorists also discussed new techniques of conducting musical meter, and the relationship of time signatures to the expressive content of the music.