SIMPLE AND COMPOUND METER: AN HISTORICAL INVESTIGATION OF THEIR DIFFERENCES AND AN EXPERIMENTAL INVESTIGATION OF THEIR CURRENT SIGNIFICANCE

THESIS

Presented to the Graduate Council of the North Texas State Teachers College in Partial Fulfillment of the Requirements

For the Degree of

MASTER OF MUSIC

By

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CHAPTER I
INTRODUCTION

The over-all picture of the teaching of meter in schools in the United States today presents a scene of much confusion. The students are bewildered, either because their teachers are not clear and consistent in their own thinking and explanations, or because their various teachers have different ideas or theories about meter. This perplexity can be traced back to the so-called authorities on elementary theory and their text-books. Many theorists have not been at all clear and logical in their writings on meter. Several have actually contradicted themselves within a few short pages, thus indicating a certain amount of haziness in their conceptions of meter. As would naturally be expected, they also contradict each other. In fact, there is wide disagreement about many aspects of meter, and there does not seem to be complete agreement on any one.

Statement of the Problem

It has long been claimed by many authorities that simple meters can be distinguished from corresponding compound meters by the difference in accents. For example, two measures of 2/4 would not sound like one measure of 4/4 because the stress on the third beat in the 4/4 would not be so strong as the accent on the first beat of the second measure in 2/4 time. A similar variation would be found in 3/8 and 6/8 and 9/8, 3/4 and 6/4, 2/8 and 4/8, thus enabling the listener to perceive a difference in the various meters.
On the other hand, a few dissenters have stated their belief that, as far as the listener is concerned, there is no basic difference in a simple meter and its compound. It was this writer's problem to determine which of these two contentions is correct; i.e., to find out whether or not it is possible for a person to perceive a difference in 2/4 and 4/4 meters by listening to the accents. It was felt that a large group of college music students and faculty members should provide satisfactory subjects for this experiment. If, as a result of this experiment, it was found that these trained musicians could actually discriminate between the simple meter and its compound with any marked degree of consistency, it would then be admitted that the difference in the two meters is important. If, however, it was found that even musicians, who knew the technical distinctions between 2/4 and 4/4, could not really hear the difference in the two when the music was played by competent performers, it would then be contended that no important difference exists.

Value of This Study

Needless to say, the great diversity of opinion concerning meter among the musical theorists, has greatly affected the teaching of meter in schools and colleges. For many years, music teachers have complained that the time allotted for the music program in the schools is inadequate; therefore, the teacher must use what little time she is allowed to the best advantage possible. To do this, it is imperative for her to know what aspects of music are most important for her pupils to
learn. If it can be shown that the emphasis placed on the difference in simple and compound meters by many theorists is not justifiable, the music teacher could spend her time and her pupils' time more profitably in some other way.
CHAPTER II

HISTORICAL BACKGROUND OF THE THEORY OF SIMPLE AND COMPOUND METERS

In the first place, one might ask, "What is meter?" The Harvard Dictionary of Music defines meter as "the basic scheme of note values and accents which remains unaltered throughout a composition or a section thereof and which serves as a skeleton for the rhythm." McLaughlin simplifies and condenses the definition by saying that meter is "the divisibility of uniform movements into measures," and adds that the word time is commonly used to convey the same meaning.¹

Fundamental Meters

In the writer's research it has been assumed that simple meters are fundamental ones upon which all other meters are based. Theorists, however, differ in their conceptions of fundamental meters. There are, basically, two possibilities: one, that all music swings in either two's or three's; another, that it swings in two's, three's, or four's.² Fox-Strangeways³ goes to the extent of naming the prime numbers of two, three, five, seven, and even eleven, as basic meters. He admits, however, that the ear embraces immediately only two and three as unities.

¹James McLaughlin, Elements and Notation of Music, p. 20.


Conflicting opinions about fundamental meters.—The Harvard Dictionary of Music lists duple, triple, and quadruple as simple meters, as do Trontin,4 Wedge,5 and Jubb.6 On the other hand Boyd,7 Earhart,7 Moore,8 and Coon9 include only duple and triple as simple meters. Goetchns 10 is even more emphatic than the others, however, in stating that there are only two fundamental rhythms:

Of these beat-groups, there are only two kinds, the group of two units (called duple meter) and the groups of three beats (triple meter). There can be no other form; every conceivable variety of larger measure is simply compounded out of these two. They are analogous to the only two kinds of lines in nature, the straight line and the curved line; there are no other kinds.

Other authorities seem not to be able to come to a definite conclusion about the subject. McLaughlin,11 for example, states that rhythms may consist of two, three, or four beats, but then says that nearly all forms are derived from two kinds of meter, duple and triple. He immediately contradicts himself again by listing four-part measure as one of the three varieties of meter.

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4 Christine Trontin, Key to Musicianship, p. 31.
5 George A. Wedge, Rhythm in Music, p. 10.
8 Douglas Moore, Listening to Music, p. 57.
9 Oscar Coon, A New Catechism of Music, p. 43.
11 McLaughlin, op. cit., p. 21.
Smith and Krone\textsuperscript{12} allege that the two and three unit groups are fundamental in music. However, in the next paragraph they state that, for practical purposes—since the four-unit group is so common—the four-unit group will be considered as a type of grouping distinct from the two-unit and three-unit groups.

Another type of contradiction is found in the book, \textit{A Gateway to Music}.

The authors claim that almost universally the number of beats to a measure is either two or three, or else a multiple of two or three. They then proceed to list $2/2$, $2/4$, $2/8$, $4/4$, and $4/16$ as simple duple rhythms, but they insert a note to the effect that $4/4$ is technically a quadruple rhythm. Sutton\textsuperscript{14} agrees that there are only two kinds of rhythm—duple and triple—but he too lists $4/4$ as simple duple. It is obvious, however, that $4/4$ cannot logically be a simple meter if simple meters are considered as fundamental or basic (i.e., meters with 2 or 3 beats to a measure). Logically a simple duple meter could contain only two beats to a measure, whereas $4/4$ contains four.

\textbf{Problem of the classification of $4/4$ time.}—The chief difference of opinion about simple meters seems to concern $4/4$ time, i.e., whether it is one of the fundamental, basic rhythms or whether it must be accounted for in some other way. According to Grove's Dictionary\textsuperscript{15} in Germany simple times are divided into equal (duple) and unequal (triple), and all combinations of these are called compound (including $4/4$).

\textsuperscript{13} W. W. Blancke and Jay Speck, \textit{A Gateway to Music}, p. 15.
\textsuperscript{14} Robert Sutton, \textit{The Theory of Music}, p. 22.
\textsuperscript{15} Fox-Strangways, \textit{op. cit.}
In England, the practice has been to reserve the name compound to those times of which the numerator is a multiple of three (6, 9, 12, 15) and to call those which are multiples of two, but not of three, common (4, 8, 10, 14). The English division of meter into three types—simple, compound, and common—has not been widely accepted in America, although the use of the term "common time" has. It is usually employed, however, to designate only 4/4 time.

The English and German theories have, nevertheless, been at least partially responsible for the general confusion about meter in America. Here again the chief contention is about the classification of 4/4 time. Is it simple meter or compound meter? Is it quadruple or is it merely two measures of duple? The theory text books vary in their answers.

Simple and Compound Meters

If the American theorists could agree on a definition of compound time, there would probably be less dissension concerning the classification of 4/4 time. And if they could agree about simple meters, the problem of defining compound time would not be so difficult.

Definitions of simple and compound time. — Trontin\(^\text{16}\) explains the difference in compound and simple time in this way:

In compound time, the unit of beat is a dotted note (compound note) normally divisible by three.

Compound measures are a modification of the simple measures

\(^{16}\text{Trontin, op. cit., p. 32.}\)
with which they are closely connected; each compound measure derives from a certain simple measure and vice versa; both have the same number of beats and both have the same kind of note as the unit of beat. The only difference is that in the simple measure the note in question is simple (divisible by two), while in the compound measure that note is dotted and divisible by three, its qualification of compound being given to the measure.

Jubb, too, points out that the dotted note, or a group of three notes, in compound time is the equivalent of each beat of simple time. The Harvard Dictionary of Music, following the English practice, also defines compound meters as those which are multiples of three.

Sutton, who says that all compound rhythms are formed simply by combining simple, duple, and triple rhythms, presents the German view of the subject. Boyd and Earhart share this point of view. They say that a measure signature with a numerator larger than three indicates compound measure, which is made up of combinations of simple measure. For example, 4/4 equals 2/4 x 2; 6/8 equals 3/8 x 2; 9/8 equals 3/8 x 3. In other words, the numerator of the signature in compound time is always a multiple of two or three.

17 Jubb, op. cit., p. 6.
19 Sutton, op. cit., p. 22.
Oscar Coon\textsuperscript{21} indicates agreement with this theory by defining compound duple time as that in which two or more measures of simple duple are contracted into one as:

\begin{center}
\begin{tabular}{c|c|c|c|c|c}
\hline
\text{\textbf{\textlangle}} & \text{\textbf{\textrangle}} & \text{\textbf{\textrangle}} & \text{\textbf{\textrangle}} & \text{\textbf{\textrangle}} & \text{\textbf{\textrangle}} \\
\hline
\end{tabular}
\end{center}

\text{instead of } \begin{center}
\begin{tabular}{c|c|c|c|c|c}
\hline
\text{\textbf{\textlangle}} & \text{\textbf{\textrangle}} & \text{\textbf{\textrangle}} & \text{\textbf{\textrangle}} \\
\hline
\end{tabular}
\end{center}

Among all those who accept the German definition of compound time, \(4/4\) is immediately classified as compound duple without any question. Smith,\textsuperscript{22} Krone,\textsuperscript{22} Moore,\textsuperscript{23} Jousse,\textsuperscript{24} Bussler,\textsuperscript{25} and Goetschius\textsuperscript{26} as well as Boyd, Earhart, and Coon accept this classification.

On the other hand, we find those who accept the English definition—such as Jubb,\textsuperscript{27} McLaughlin,\textsuperscript{28} Wedge,\textsuperscript{29} and the \textit{Harvard Dictionary of Music}—calling \(4/4\) time a simple quadruple meter.

Goetschius, however, very emphatically states: "It is needless, even foolish, to speak of 'quadruple' meter, for the measure with four beats is simply the sum of two duple measures, the second bar line being omitted. . ."\textsuperscript{30}

\begin{small}
\textsuperscript{21}Oscar Coon, \textit{A New Catechism of Music}, p. 41.  \\
\textsuperscript{22}Smith and Krone, \textit{op. cit.}  \\
\textsuperscript{23}Douglas Moore, \textit{Listening to Music}, p. 67.  \\
\textsuperscript{24}J. Jousse, \textit{A Catechism of Music (Revised by Th. Baker)}, p. 36.  \\
\textsuperscript{25}Ludwig Bussler, \textit{Elements of Notation and Theory}, p. 64.  \\
\textsuperscript{26}Goetschius, \textit{op. cit.}  \\
\textsuperscript{27}Jubb, \textit{op. Cit.}  \\
\textsuperscript{28}McLaughlin, \textit{op. cit.}  \\
\textsuperscript{29}Wedge, \textit{op. cit.}  \\
\textsuperscript{30}Goetschius, \textit{op. cit.}, p. 78.
\end{small}
Difference in 2/4 and 4/4.—The next problem is that of distinguishing between 2/4 and 4/4. It is obvious that this distinction would involve primarily—and possible, wholly—the question of accents.

If 4/4 is a simple meter, one should naturally expect to find that each measure of 4/4 would have a system of natural accents differing in some noticeable way from two measures of 2/4. One system states that there is only one strong beat or accent to the measure in all simple times, including 4/4. Wedge\(^3\) is of this opinion, finding an analogous quadruple meter in poetry with one stressed and three relaxed syllables.

Ex.—Listen to the Indian Legend, to the tale of Hiawatha.

Hill and Searight,\(^3\) however, say that though quadruple meter implies one strong beat and three weak beats, it is often found that the third beat of the measure demands greater stress than the second and fourth, but not so much as the first beat. Many other theorists, who consider 4/4 as simple meter, agree with Hill and Searight in stating that there should be a primary accent on the first beat and a secondary accent on the third beat. Blitz\(^3\) explains in great detail just why there is a secondary accent on the third beat:

A piece of music is made up of many rhythmical cadences in which the concluding beat of the first group coincides with the initial beat of the second group and so on until the

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\(^3\)F. W. Hill and Roland Searight, *Elements of Music*, p. 17.

\(^3\)Julien P. Blitz, *Elementary Music on a French Basis*, p. 31.
final cadence. Hence two principal beats; one more emphatic than the other, (the initial beat, that of action), commonly called Strong, or Accented; the other (the beat of re-action), commonly called Weak or Unaccented. The strong beat is always placed at the beginning of the measure.

In the Binary rhythm the strong beat is separated from the following strong beat by only one weak beat . . . .

In the C, or common time, the first beat is strong, the third is not so marked, but is considered, however, as an accented beat. The 4/4 time associates two rhythmical groups of three beats, the first group is strong compared with the second; this is why the first beat of the second group, which is the third beat of a C measure, is less positive than the first beat of the first group, which is the first beat of the measure:

\[
\begin{array}{cccc}
\text{First Group:} & > & > & > \\
\text{Second Group:} & > & > & > \\
\end{array}
\]

The second and fourth beats are unaccented.

The same general idea is expressed in other music theory books by McLaughlin, Sutton, Trontin, Gehrkens, Jubb, Blanche, Speck, Swift, and Robinson. Some of the illustrations from the books are given below.


\[
\begin{array}{cccc}
\text{4/4:} & - & - & - \\
\end{array}
\]

\[
\text{sf, fz, rfz, fp}
\]

\[34\text{See the bibliography for the names of the books.}\]
It is not only those who classify 4/4 as simple meter who insist on a secondary accent on the third beat; many who say that 4/4 is compound—that it is made up of two measures of 2/4—also accept this rule of a difference in the accent of the first and third beats. They vary slightly, however, in their explanations of the reason. The following quotation is from Smith and Krone's Fundamentals of Musicianship, p. 16:

In the four-unit group it is more difficult to make one rhythmic impulse, or muscular effort, carry over all four units; there will be therefore a tendency to give a second or subsidiary impulse on the third unit, which will carry the fourth along with it. This brings out the 2-unit basis of the four-unit group. The greatest time accent, however, is felt between the fourth and the first units.
Bussler explains the stronger accent on the first beat in this way:

Compound measures are formed of 2 or 3 simple ones, and take, beside the accents belonging to the latter, a stronger accent on the first count, thus having a twofold accent.

Simple measures contained in compound ones form subdivisions of these latter.

Moore thinks that the use of two accents of different intensity within the measure is very important:

Traditionally there is only one strong accent in a bar. This comes directly after the bar-line. The inclusion of two or more measures in a single bar weakens the accents of the rhythm and may therefore be more accurately expressed in a compound meter.

The meter 4/4 calls for alternate strong and weak accents. We find it often used for lyric melodies in binary rhythm. An example of this is Loch Lomond. The effect of this melody as it would sound if written with 2/4 meter would be quite different. Try it and notice that there will be too many accents for the character of the melody. Remember that the meter is only an arbitrary framework for the recording of the fundamental rhythm. It provides a convenient pattern of accents. The composer chooses the meter which best suits the rhythm he has in mind.

Others, however, do not attach much importance to the use of primary and secondary stresses. Haddon and Walters do not even mention a difference in their book on Music Theory. On page 14 we find their rules for accent: "When there are four beats, the first and third are accented."

Goetschius says that when two duple measures are combined into a measure of four beats the second bar line, though omitted, is only

36 Ludwig Bussler, op. cit., p. 64.
37 Moore, op. cit., p. 67. 38 Goetschius, op. cit., p. 78.
disguised, not destroyed; and there is the inevitable accent on the third beat just as if a bar line preceded it.

2/4 and 4/4 Time as Taught in the Elementary School

With so much controversy among the writers of music theory books, how is the public school music teacher to know what she should tell her pupils about meter? Should she try to teach them to distinguish between 2/4 and 4/4 or merely teach them to hear both as duple meter?

McLaughlin, former director of music in the Boston Public Schools, in his book on Elements and Notation of Music, first gives a detailed discussion on accenting in different meters, and then admits that "it is seldom the case that in actual performance the accents which have been analyzed in all the foregoing species of rhythm are perceptible to the listener." If these differences in accent cannot be heard, why should the artificial difference in 2/4 and 4/4 receive so much emphasis in almost all of the theory books?

Yet it is found that the teachings of the elementary theory books are carried over into grade school music books. In the Modern Music Series, the following explanation of meter is given:

Every piece of music is divided into small sections of equal time-value, called Measures. This division is made audible by Accentuation. . . . Simple measures are those of two and of three counts; all the others are Compound (4 = 2x2, 6 = 2x3, etc.). . . . Accent is the stress or emphasis laid on special counts. Simple measures have but one accent, namely, on the first count:

McLaughlin, op. cit., p. 21.

Compound measures are formed of 2 or 3 simple measures, and thus have two accents, the first being the stronger.

\[ \frac{2}{2} \quad \frac{3}{4} \quad \text{etc.} \]

In the *Manual for First Grade Music* for Foresman's *Book of Songs*, the fundamental rhythms are described as follows:

The fundamental rhythms in music are two-part, with regularly alternating strong and weak impulses, strong, weak; strong, weak; and three-part—a strong impulse followed by two weak ones, strong, weak, weak; strong, weak, weak. Four-part rhythms, strong, weak, strong, weak; strong, weak, strong, weak, in which the third impulse is strong but of less intensity than the first, although derived from two-part rhythm, is so commonly employed as to deserve equal rank with the two fundamental rhythms.

Even the most modern study courses for public school music show evidence of the effort to get the children to distinguish between 2/4 and 4/4. The St. Louis study course published late in 1945 suggests that the teacher of third grade pupils exaggerates the emphasis on the measure accent in teaching the students to distinguish between 2/4, 3/4, and 4/4. These are suggested procedures:

1. With their eyes closed so that they can hear more plainly what the music says, tell the children to push the handle down each time the music tells them to do so.

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*Robert Foresman, Books of Songs, Manual for First Grade Music*, p. 11.
(2) When the entire class feels the measure accent, ask them to say "one" out loud each time they push their organ handles down.

(3) Tell them that if they listen carefully they can hear music say different things. Some music says "one-two," some "one-two-three," and other music says "one-two-three-four.""42

CHAPTER III

EXPERIMENTAL PROCEDURE

In order to find out whether it is possible for the listener to distinguish between simple and compound meters in music (Most theory books say this can be done.), it was decided to conduct at North Texas State College an experiment among the students and faculty members of the North Texas State College School of Music. To do so it was necessary to devise a brief test which would determine whether those tested could hear any difference in simple and compound meters. For the purpose of simplifying the experimental process, the writer decided to confine the test to duple meters; i.e., 2/4 or simple duple, which falls into measures of two beats, and 4/4 or compound duple, which falls into measures in which the number of beats is a multiple of two. ¹

Selection of Records for Test

It seemed advisable to use recorded music for the test, because it was readily available and would insure an identical performance each time. Another advantage was that, on records, professional musicians of outstanding ability could be heard, interpreting the music in a standard, authoritative manner; thus the accuracy and correctness of the performances could not be questioned.

¹See Chapter II, p. 7.
At first the possibility of using samples of both vocal and instrumental music was considered. There was also the problem of what degree of complexity should be represented in the music used. Of course, it was obvious that familiar numbers, such as Beethoven's Fifth Symphony or Tschaikowsky's None But the Lonely Heart, should be avoided, since many musicians would remember the time signatures. It was also felt that the music of orchestras would be of doubtful value to the test, because changes in orchestration and degrees of heaviness might somewhat obscure the accents and meter of the music.

It was finally decided that the best plan would be to have all factors in the music—except the meter, tempo, and rhythm—as nearly constant as possible. Thus it was felt that twenty-four records from the less well-known movements of Haydn's string quartets would furnish the best possible musical illustrations. Joseph Haydn is one of the recognized great composers, greatly influencing the music of other composers from his time on. He is almost always straightforward and direct in stating the rhythm and meter of his compositions. By using string quartet music, there would be comparatively little variation in texture, making the music seem even clearer rhythmically.

Since there are recordings of most of the Haydn Quartets, made by outstanding string quartets, in the record library of the North Texas State College, suitable illustrations were easily obtainable. A complete list of those actually played for the test is given in Table 1.
# TABLE 1

**STRING QUARTETS OF JOSEPH HAYDN USED ON THE METER-DISCRIMINATION TEST**

<table>
<thead>
<tr>
<th>No. on Test</th>
<th>Opus Number</th>
<th>Key</th>
<th>Movement</th>
<th>Time Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Op. 54, No. 3</td>
<td>E</td>
<td>4</td>
<td>2/4</td>
</tr>
<tr>
<td>2.</td>
<td>Op. 33, No. 2</td>
<td>E</td>
<td>1</td>
<td>4/4</td>
</tr>
<tr>
<td>3.</td>
<td>Op. 1, No. 5</td>
<td>C</td>
<td>3</td>
<td>2/4</td>
</tr>
<tr>
<td>4.</td>
<td>Op. 64, No. 3</td>
<td>B</td>
<td>4</td>
<td>2/4</td>
</tr>
<tr>
<td>5.</td>
<td>Op. 54, No. 1</td>
<td>G</td>
<td>1</td>
<td>4/4</td>
</tr>
<tr>
<td>6.</td>
<td>Op. 3, No. 5</td>
<td>F</td>
<td>2</td>
<td>4/4</td>
</tr>
<tr>
<td>7.</td>
<td>Op. 3, No. 5</td>
<td>F</td>
<td>4</td>
<td>2/4</td>
</tr>
<tr>
<td>8.</td>
<td>Op. 20, No. 5</td>
<td>F</td>
<td>1</td>
<td>4/4</td>
</tr>
<tr>
<td>9.</td>
<td>Op. 74, No. 2</td>
<td>F</td>
<td>2</td>
<td>2/4</td>
</tr>
<tr>
<td>10.</td>
<td>Op. 75, No. 4</td>
<td>B</td>
<td>1</td>
<td>4/4</td>
</tr>
<tr>
<td>12.</td>
<td>Op. 50, No. 6</td>
<td>D</td>
<td>1</td>
<td>4/4</td>
</tr>
<tr>
<td>13.</td>
<td>Op. 1, No. 1</td>
<td>B</td>
<td>3</td>
<td>4/4</td>
</tr>
<tr>
<td>14.</td>
<td>Op. 74, No. 1</td>
<td>C</td>
<td>4</td>
<td>2/4</td>
</tr>
<tr>
<td>15.</td>
<td>Op. 20, No. 1</td>
<td>E</td>
<td>1</td>
<td>4/4</td>
</tr>
<tr>
<td>17.</td>
<td>Op. 77, No. 2</td>
<td>F</td>
<td>1</td>
<td>4/4</td>
</tr>
<tr>
<td>18.</td>
<td>Op. 55, No. 1</td>
<td>A</td>
<td>2</td>
<td>2/4</td>
</tr>
<tr>
<td>19.</td>
<td>Op. 54, No. 1</td>
<td>G</td>
<td>4</td>
<td>2/4</td>
</tr>
<tr>
<td>20.</td>
<td>Op. 64, No. 4</td>
<td>G</td>
<td>3</td>
<td>2/4</td>
</tr>
</tbody>
</table>
TABLE 1—Continued

<table>
<thead>
<tr>
<th>No. on Test</th>
<th>Opus Number</th>
<th>Key</th>
<th>Movement</th>
<th>Time Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.</td>
<td>Op. 76, No. 3</td>
<td>C</td>
<td>1</td>
<td>4/4</td>
</tr>
<tr>
<td>22.</td>
<td>Op. 50, No. 6</td>
<td>D</td>
<td>4</td>
<td>2/4</td>
</tr>
<tr>
<td>23.</td>
<td>Op. 50, No. 3</td>
<td>E</td>
<td>2</td>
<td>2/4</td>
</tr>
<tr>
<td>24.</td>
<td>Op. 64, No. 5</td>
<td>E</td>
<td>1</td>
<td>4/4</td>
</tr>
</tbody>
</table>

Most of the records chosen were from the Haydn Quartet Society Albums, played by the Pro Arte Quartet. Table 2 gives a complete list of the records used.

TABLE 2

RECORDINGS USED ON THE METER DISCRIMINATION TEST

<table>
<thead>
<tr>
<th>No. on Test</th>
<th>No. of the Record Used</th>
<th>String Quartet Performing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Victor DM528-6</td>
<td>Pro Arte</td>
</tr>
<tr>
<td>2.</td>
<td>Victor M525-3</td>
<td>Pro Arte</td>
</tr>
<tr>
<td>3.</td>
<td>Victor DM528-1</td>
<td>Pro Arte</td>
</tr>
<tr>
<td>4.</td>
<td>Victor DM69-12</td>
<td>Pro Arte</td>
</tr>
<tr>
<td>5.</td>
<td>Victor DM69-1</td>
<td>Budapest</td>
</tr>
<tr>
<td>6.</td>
<td>Victor M525-1</td>
<td>Pro Arte</td>
</tr>
<tr>
<td>7.</td>
<td>Victor M525-2</td>
<td>Pro Arte</td>
</tr>
<tr>
<td>8.</td>
<td>Victor DM525-1</td>
<td>Pro Arte</td>
</tr>
<tr>
<td>9.</td>
<td>Victor M527-6</td>
<td>Pro Arte</td>
</tr>
<tr>
<td>10.</td>
<td>Victor DM535-11</td>
<td>Pro Arte</td>
</tr>
</tbody>
</table>
The Eulenburg complete scores\textsuperscript{2} of the Haydn string quartets, in the music library of N.T.S.T.C., provided a means of checking the meter of the various illustrations employed. Twelve examples in 2/4 meter and twelve in 4/4 were chosen. Tempo was also a factor in the selection of each movement. Finally, as shown in Table 3,

\textsuperscript{2}Sämtliche 33 Streichquartette von Joseph Haydn, Ernst Eulenburg, Leipzig.
five examples in fast 2/4 were balanced by five in fast 4/4, and these
were contrasted with seven examples in slow and moderate 2/4 and seven
in slow or moderate 4/4.

TABLE 3
CLASSIFICATION OF THE EXAMPLES ON THE TEST ACCORDING
TO TEMPO AND METER

<table>
<thead>
<tr>
<th>Tempo</th>
<th>2/4 Time</th>
<th>4/4 Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Illustrations Used</td>
<td>Examples on Test</td>
</tr>
<tr>
<td>Slow</td>
<td>4</td>
<td>3, 11, 18, 20</td>
</tr>
<tr>
<td>Moderate</td>
<td>3</td>
<td>7, 9, 23</td>
</tr>
<tr>
<td>Fast</td>
<td>5</td>
<td>1, 4, 14, 19, 22</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

Testing Procedure

The test was given to students and faculty members of the
School of Music at M.T.S.T.C. on two different occasions; it was
first given to one hundred forty-nine music majors during the first
part of the student recital hour on February 13, 1946. Later, on
July 2, 1946, a smaller group of summer school music students and
faculty members took the test.

The groups were furnished with pencils and mimeographed answer
sheets, and were given a short explanatory talk before they took the
test. The writer first briefly stated the purpose of the test: i.e., to determine whether trained musicians can distinguish the difference in 2/4 and 4/4 time when they hear a professional performance of music written in these meters. It was explained that most theory books say that the difference in 2/4 and 4/4 time is basically dependent upon the accents. In 2/4 time there is one strong beat, followed by a weak beat; in 4/4 time there is one strong beat, followed by a weak beat, and then a medium-strong beat and a weak beat.

The people in both groups were asked to put down their own, individual reactions as to whether each example was in 2/4 or 4/4. They were told to guess the answer if they were not sure, since a blank would necessarily be marked wrong. It was emphasized that they should not beat out the time, count aloud, or do anything to influence the opinions of others. Their attention was called to the fact that they were not required to sign their names, so that no one would be embarrassed about his grade.

Each of the twenty-four records was played somewhat less than a minute, the whole test consuming only about twenty-five minutes. Each example was played only one time.
CHAPTER IV

RESULTS OF THE EXPERIMENT

According to the law of averages, in a test in which a choice of only two answers to all questions is given, the persons taking it will get approximately half of the answers right by mere chance. Since exactly half of the examples on the experimental test described in Chapter III are in 2/4 meter and the other half in 4/4 meter, it is obvious that if the persons taking this test merely guessed the answers, they would be right an average of half of the time. This does not mean that each person would get twelve out of the twenty-four answers correct by guessing; however it does mean that if the scores of all the persons taking the test by guessing the answers were averaged together, the result would be a score of twelve wrong and twelve right.

Therefore, if one person makes a score of fifteen right and nine wrong, the result does not indicate that he has actually recognized five-eighths of the examples correctly. As a matter of fact, his score is only twenty-five per cent better than if he had arbitrarily marked down the answers without even hearing the music. Consequently, only test scores of less than twelve wrong can be considered to indicate any ability whatsoever to distinguish between 2/4 and 4/4 meter by listening to the music.

The Meter Discrimination Test was given to 168 music students and faculty members, who wrote down the wrong answers 1,376 times.
Thus the average score for the entire group was 11.167 or 46.53 per cent wrong. Since a score of twelve would indicate sheer guesswork, the average score of 11.167 reveals very little more than guesswork. The average score of the group of musicians tested denotes an ability to distinguish between 2/4 and 4/4 meter only 3.47 per cent of the time. In other words, they did only 3.47 per cent better than if they had taken the test at home without listening to the music or knowing anything about it at all.

Tabulation of Test Scores

All scores were tabulated according to the number of wrong answers; a person who put down the wrong answers to eleven of the twenty-four questions is considered to have made a score of eleven. The scores of the entire group ranged from five wrong to eighteen wrong. More people scored thirteen wrong than any other number. Fig. 2 shows the number of people making each score on the test. The majority of people (100 out of 168), as illustrated here, made scores ranging from ten to thirteen. This clustering of scores near the half-right, half-wrong mark shows very clearly the tendency of most of the people to fail to answer approximately half of the questions correctly.
Fig. 1.—Distribution of test scores (in terms of number wrong) among all people taking the test.

Although the average score of all the musicians taking the test was so close to the half-wrong mark, the writer thought it might prove to be of some interest to determine whether any one group or classification of persons showed any great departure from the average in ability to tell the difference in 2/4 and 4/4 time. Of course, one of the
difficulties encountered was the fact that a number of the classified groups were too small to make it possible to obtain a true conception of their abilities by averaging their scores. For instance, in a group of only four, if they make scores of eight, eight, ten, and twelve respectively, the group average would be 9.5. However, if four other people were added to the group, with scores of ten, twelve, fourteen, and sixteen, the group average would be altered to 11.25, which is a difference of 7.5. Obviously the latter score represents a more accurate picture of the people in that classification. The more scores that are available to average, the more nearly the average score will accurately represent the ability of all the people in that classification.

Tabulation by college classification.--All persons tested were first classified according to rank in college: i.e., freshman, sophomore, junior, senior, graduate, or faculty member. Their average scores are compared in Table 4.

TABLE 4

<table>
<thead>
<tr>
<th>Classification</th>
<th>Average Number of Wrong Answers on Test</th>
<th>Average Percentage of Wrong Answers on Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshmen</td>
<td>11.12</td>
<td>46.33%</td>
</tr>
</tbody>
</table>

1. The distribution of the scores of each of these groups can be found in Figs. 8, 9, 10, 11, 12, and 13 in the Appendix.
TABLE 4—Continued

<table>
<thead>
<tr>
<th>Classification</th>
<th>Average Number of Wrong Answers on Test</th>
<th>Average Percentage of Wrong Answers on Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sophomores</td>
<td>10.53</td>
<td>43.63</td>
</tr>
<tr>
<td>Juniors</td>
<td>11.58</td>
<td>48.20</td>
</tr>
<tr>
<td>Seniors</td>
<td>11.94</td>
<td>49.75</td>
</tr>
<tr>
<td>Graduates</td>
<td>11.61</td>
<td>48.58</td>
</tr>
<tr>
<td>Faculty</td>
<td>9.30</td>
<td>40.83</td>
</tr>
<tr>
<td>Entire Group</td>
<td>11.17</td>
<td>45.53%</td>
</tr>
</tbody>
</table>

There is a range in scores from 9.8 or 40.83 per cent to 11.941 or 49.75 per cent, a difference of almost nine per cent. However, it will be quickly evident that all scores are in the forty-to-fifty percentile bracket, indicating a certain amount of stability in the scores, even though the groups vary in size from ten persons to almost six times that number. The freshmen constitute the largest group tested; and it is found that the average score for the fifty-nine freshmen is 11.12 or 46.33 per cent, which is comparable to that for all the groups together: 11.167, or 46.53 per cent. The rather low score of the faculty members might be attributed at least partially to the comparatively small number tested, as might the high score of the seniors, in which case only seventeen were tested. From the lowest number wrong to the highest, the groups rank as follows: (1) faculty members, (2) sophomores, (3) freshmen, (4) juniors, (5) graduates, and (6) seniors. As can be seen from the foregoing list, there
is no logical order in the scores of these groups. The expected ranking would be (1) faculty members, (2) graduates, (3) seniors, (4) juniors, (5) sophomores, and (6) freshmen. Instead, the more advanced students did not do so well as the beginning students, although the faculty members (who, of course, were most advanced) did best of all.

Tabulation by amount of study.—The entire group taking the test was also divided according to the length of time they had devoted to serious music study. (See Table 5.)

<table>
<thead>
<tr>
<th>Amount of Serious Music Study</th>
<th>Average Number of Wrong Answers on Test</th>
<th>Average Percentage of Wrong Test Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than a year</td>
<td>10.79</td>
<td>44.94%</td>
</tr>
<tr>
<td>One year</td>
<td>10.81</td>
<td>45.05%</td>
</tr>
<tr>
<td>Two years</td>
<td>11.42</td>
<td>47.80%</td>
</tr>
<tr>
<td>Three years</td>
<td>10.77</td>
<td>44.88%</td>
</tr>
<tr>
<td>Four years</td>
<td>11.33</td>
<td>47.22%</td>
</tr>
<tr>
<td>Five to ten years</td>
<td>11.26</td>
<td>46.93%</td>
</tr>
<tr>
<td>Ten or more years</td>
<td>10.52</td>
<td>43.83%</td>
</tr>
</tbody>
</table>

Seven different groupings were made: (1) those who had studied for less than a year, (2) those who had studied a year, (3) those who had studied
two years, (4) three years, (5) four years, (6) from five to ten years, and (7) those who had studied ten years or more. It was found that a majority of the people tested had studied music seriously (i.e., with intent to make music their profession) for four years or more. The largest group consisted of those who had devoted from five to ten years to serious music study. The number in each group is illustrated in Figs. 14, 15, 16, 17, 18, 19, and 20 in the Appendix.

The range of scores according to this classification is comparatively narrow. The lowest score made was 10.52 or 45.33 per cent and the highest was 11.42 or 47.6 per cent, a variation of less than four per cent. It might be concluded from this statement that the ability of these musicians to discriminate between 2/4 and 4/4 meter had been affected very little by the length of time they had studied music. At least their ability does not seem to improve with time and study, since it is shown that the people studying only one year made a better score than those studying four years. Another interesting fact is that those studying less than a year made almost the same score as those studying for three years. Also one may note, in Table 5, that there is a variation of only one per cent in the scores of those studying three years and those studying ten or more years.

From the lowest number wrong to the highest, the groups are ranked as follows, according to the amount of serious music study: (1) ten or more years, (2) three years, (3) less than a year, (4) one year, (5) five to ten years, (6) four years, (7) two years. Here again there is much inconsistency in the order of the scores. As would be expected,
those studying music for ten years or more got the lowest percentage of answers wrong; but the two groups ranking next highest in amount of study answered more test questions incorrectly than anyone else except those who had studied two years.

**Tabulation by field of music.**—Still another classification of those taking the Meter Discrimination Test was made by separating them into groups according to the field of music in which they had specialized. All except five persons were grouped in the following specialized fields of music: (1) Voice, (2) Piano, (3) String Instruments, (4) Woodwind and Brass Instruments, (5) Organ, and (6) Public School music. Of the five not placed in a group, one specialized in theory, two in harp, and two failed to fill out the questionnaire properly.

The scores of these groups ranged from ten or 41.67 per cent to twelve or fifty per cent. A majority of the musicians tested had specialized in voice or piano. There are such small numbers of people in the other groups that the average scores listed could not be considered as fair indexes of the ability of the persons who specialize in those fields. This is especially true of the score of the organists, which is the lowest of all the average group scores. Since there is no obvious explanation of the reason for the apparent superior ability of the organists to distinguish between 2/4 and 4/4 meter, it is supposed that their low score should be attributed to the fact that only seven organists took the test.
<table>
<thead>
<tr>
<th>Field of Music</th>
<th>Average Number of Wrong Answers on Test</th>
<th>Average Percentage of Wrong Answers on Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>11.62</td>
<td>48.40%</td>
</tr>
<tr>
<td>Piano</td>
<td>10.82</td>
<td>45.06</td>
</tr>
<tr>
<td>Strings</td>
<td>10.33</td>
<td>43.04</td>
</tr>
<tr>
<td>Woodwind and Brass Inst.</td>
<td>12.00</td>
<td>50.00</td>
</tr>
<tr>
<td>Organ</td>
<td>10.00</td>
<td>41.67</td>
</tr>
<tr>
<td>Public School Music</td>
<td>11.60</td>
<td>46.33%</td>
</tr>
</tbody>
</table>

The string instrument players also made a low score of number of wrong answers on the test. In this case, too, the explanation may be that only a small number of scores were available to average; however, there may be an additional explanation in this instance. It is possible that the string instrument players' greater familiarity with the string quartet music used on the test would enable them to get more of the answers right. Almost all string players have had some experience playing in string quartets, or at least become familiar with quartet literature by listening to performances given by other people or on records. It is improbable that anyone would know all of the Haydn string quartets very well, or even all those used on the
test; yet some string players might be familiar enough with a few of the Haydn quartets to be able to make a better score than otherwise on this particular Meter Discrimination Test. Even a general knowledge of the style of quartet playing might possibly give a string player somewhat of an advantage over other musicians on this test.

Nevertheless, the actual results of this experiment have not revealed that the string players are greatly superior to any other group in their scores on this test. The organists, in fact, made an even lower score, and the pianists were only two per cent higher. The woodwind and brass players made the worst score of twelve or fifty per cent wrong.

The singers and public school music majors were next in order with 48.40 per cent and 48.33 per cent wrong respectively.

In the classification of those tested according to the branch of music in which they had specialized, there is a wider variation in scores than in any other classification; however, this variation, even here, is not great enough to warrant the conclusion that any one of these groups is significantly better in meter discrimination ability than the others.

Tabulation by sex.—Only one more classification was made of the groups tested; this was according to sex. The test was given to fifty-one males and one hundred sixteen females. There was no significant difference in their scores. The average score for the males was 11.43 or 47.625 per cent wrong. The average score for the females was just slightly lower: 11.15 or 46.46 per cent wrong.
Tabulation of Frequency of Errors

As stated previously, 1,876 wrong answers to the test were given by 168 persons. It was thought advisable to determine which examples were marked incorrectly most frequently, and if possible to find the reason. Fig. 3 shows how many times each of the twenty-four examples was marked wrong by someone taking the test. No example was missed less than thirty-five times or more than 149 times. Example No. 8 was missed least often; it was marked wrong by only 20.34 per cent of the people. It was the second movement of Haydn's quartet, Op. 20, No. 5, in F minor, in moderate 4/4 meter. Next in order of number of times missed is example No. 6, which was marked wrong thirty-seven times. No. 6 is the second movement of Op. 3, No. 5, in F major and is also in 4/4 meter, slow tempo. Example No. 13, which is in slow 4/4, was erroneously marked down as 2/4 forty times; it is the third movement of Op. 1, No. 1 in B flat major. No. 14, the fourth movement of Op. 74, No. 1, in fast 2/4, was missed only forty-one times. Judging from the evidence presented here, there seems to have been a tendency for those taking the test to recognize slow or moderate 4/4 meter more easily than any other combination of tempo and meter.

Example No. 11, as can be seen in Fig. 5, was missed more frequently than any other; it was marked incorrectly 149 times, or 88.69 per cent of the time. It is the second movement of Haydn's Op. 55, No. 3, and is in slow 2/4 meter. (See Fig. 3)
Fig. 2.—Comparison of each example on the test according to number of times missed.
Fig. 3.—Opening measures of Haydn's String Quartet, Op. 55, No. 3, second movement.

Example No. 20 was missed next most often: 140 times, or 83.69 per cent; it is the third movement of Op. 64, No. 4, also in slow 2/4 meter. (See Fig. 4)

Fig. 4.—Opening measures of the third movement of Haydn's Op. 64, No. 4.

Example No. 23 was answered incorrectly 139 times, or 82.14 per cent; it is the second movement of Haydn's Op. 50, No. 3, and is in 2/4 with a moderately slow tempo. (See Fig. 5)
Andante piu tosto Allegretto

Fig. 5.—Four measures from the second movement of Haydn's Op. 50, No. 3.

No. 9, which is also in moderately slow 2/4 time, was marked as 4/4 meter 135 times or by 80.96 per cent of the persons tested; this example is the second movement of Op. 74, No. 2. (See Fig. 5)

Andante grazioso

Fig. 6.—Four measures from the second movement of Haydn's Op. 74, No. 2.

It will be noticed that all four of these most frequently missed examples are in 2/4 meter in either a slow or moderately slow tempo. No. 11 is marked Adagio ma non troppo; No. 20 is marked
Adagio; No. 23 is Andante _piu tosto_ Allegretto, and No. 9 is Andante _grazioso_. It is probably that those missing these examples were confused by the slow tempo. Apparently they mistook the eighth note for a quarter note, which was considered the unit of the beat, thus making four beats to a measure. It is also interesting to note that three of the four examples begin with eighth note up-beats, which of course might have been considered quarter note up-beats.
Summary of the Historical Investigation

It has been found by examining all available music theory books that there are many inconsistencies and contradictions among theorists concerning meter in music. Some authorities have stated that there are only two basic meters, while others have insisted that there are three or even more. The chief difference of opinion seems to concern 4/4 time: i.e., whether it is one of the fundamental simple rhythms or whether it is a compound of two measures of 2/4 time. However, almost all theorists insist that 4/4 time can be distinguished from 2/4 by merely listening to the accents. In most of the theory books the difference in the accents on the first and third beats of the measure in 4/4 time has been emphasized.

As would be expected, the teachings of the elementary theory books about meter have been carried over into grade school music books and courses of study. It is considered a matter of importance that the children in the music classes of the elementary schools be taught not merely to recognize 2/4 and 4/4 as duple meters but to discriminate between them by listening to the difference in the accents.

Summary of the Testing Procedure

In order to find out whether it is actually possible for the
listener to distinguish between 2/4, as a simple duple meter, and 4/4, as a compound duple meter, the Meter Discrimination Test was devised. This test consisted of the recorded music of twenty-four movements of Haydn’s string quartets, half of which were in 2/4 and half in 4/4 time. A short excerpt of each of these was played for 169 music students and faculty members, and they answered according to whether they thought each example was in 2/4 or 4/4 meter.

It would have been interesting to try the same experiment with some other meter and its compound, such as 3/8 and 6/8, or 3/4 and 6/4. Since, however, it was much easier to find records of music in the more commonly used meters of 2/4 and 4/4, it was deemed advisable to use only these two in the test.

Conclusions

According to the final tabulated results of this Meter Discrimination Test, there are no grounds at all for assuming that anyone, including trained musicians, can listen to music and tell whether it is in 2/4 or 4/4 time. Evidently any possible difference in accents of music in 2/4 and 4/4 time is not perceptible to most people, even when performed by excellent musicians; therefore, they are not able to distinguish between the two. Furthermore, no classification of persons seems to be able to discern a difference between the two meters a great deal better than any other. Among the people tested there was no group that showed any significant degree of superiority over the others. Even length or amount of music study had no
important effect on a person's ability to differentiate between 2/4 and 4/4. In other words, the study of music will not improve one's ability in this respect.

If it is not possible for college-trained musicians to distinguish between 2/4 and 4/4 meter, it seems very foolish to ask elementary school children to do so. In view of the foregoing facts, one might easily conclude that there is no important, fundamental difference between one measure of music in 4/4 and two measures of 2/4. At any rate, because of the results of the Meter Discrimination Test, the writer concludes that the effort to differentiate between 2/4 and 4/4 is unnecessary, impractical, and a waste of time.

If any person doubts these statements and thinks it is possible to distinguish between 2/4 and 4/4 time, he is invited to take the Meter Discrimination Test to see how well he can do himself.
APPENDIX
Fig. 7.—Sample mimeographed answer sheet for Meter Discrimination Test.
Fig. 8.--Distribution of scores (in terms of number wrong) made by freshmen music students on the test.

Fig. 9.--Distribution of scores (in terms of number wrong) made by sophomore music students on the test.
Fig. 10.—Distribution of scores (in terms of number wrong) made by junior music students on the test.

Fig. 11.—Distribution of scores (in terms of number wrong) made by senior music students on the test.

Fig. 12.—Distribution of scores (in terms of number wrong) made by graduate music students on the test.
Fig. 13.—Distribution of scores (in terms of number wrong) made by faculty members of the School of Music on the test.

Fig. 14.—Distribution of scores (in terms of number wrong) made by those studying music less than a year.

Fig. 15.—Distribution of scores (in terms of number wrong) made by those studying music for one year.
Fig. 16.—Distribution of scores (in terms of number wrong) made by those studying music for two years.

Fig. 17.—Distribution of scores (in terms of number wrong) made by those studying music for three years.

Fig. 18.—Distribution of scores (in terms of number wrong) made by those studying music for four years.
Fig. 19. — Distribution of scores (in terms of number wrong) made by those studying music from five to ten years.

Fig. 20. — Distribution of scores (in terms of number wrong) made by those studying music ten years or more.

Fig. 21. — Distribution of scores (in terms of number wrong) of those specializing in voice.
No. of Persons

Score

Fig. 22.—Distribution of scores (in terms of number wrong) of those specializing in piano.

No. of Persons

Score

Fig. 23.—Distribution of the scores (in terms of number wrong) of those playing string instruments.

No. of Persons

Score

Fig. 24.—Distribution of scores (in terms of number wrong) of those playing brass and woodwind instruments.
Fig. 25.---Distribution of scores (in terms of number wrong) of those specializing in organ.

Fig. 26.---Distribution of scores (in terms of number wrong) of those majoring in public school music.

Fig. 27.---Distribution of scores (in terms of number wrong) on the test of the males.
Fig. 28.—Distribution of scores (in terms of number wrong) on the test of the females.
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