...the music, however original and new, must be the result of the judicious use of the sound material that the instruments provide, as well as coming from a profound understanding of the phenomenon of common music making.

Extract from score Quartett für Streicher (1965) von Biel.

Bojan Bujic
Chapter Eight

RIGHT HAND TECHNIQUES

Expanding String Techniques and Notation

Early String Playing

The development of the violin family - from its origins to its emergence and dominance over the fretted viol family in the 17th century is well documented, particularly in Schlesinger’s book, The Precursors of the Violin Family, van der Straeten’s two volumes of detailed information on players and composers throughout the centuries, The History of the Violin, and The Book of the Violin, edited by Dominic Gill, as well as in various other publications.

The physical structure of both the instrument and bow, the techniques and the performance styles have all evolved over long periods of time. Performing ‘bowed’ instrumental music has always been considered to involve complicated procedures, consequently numerous violinists and composers throughout the ages have written treatises to explain the technical and stylistic characteristics of their times. David Boyden writes:

The most direct access to information of this sort is through the violin ‘methods’ of the time. Although the music of the period often reflects more advanced practices than the methods, the printed notes of the scores merely furnish the skeleton of that music. The clue to the music’s true physiognomy, which is revealed largely through the details of performance, lies concealed in the methods.

Altogether, these 18th century methods furnish technical information concerning:

- the physical construction of the instrument
- holding the instrument

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• holding the bow
• the bow stroke
• finger technique of left hand
• ornaments including vibrato and unwritten embellishments
• more general matters, such as notation, the history of music, expression
• taste and aesthetics

The transition stages of the instruments' shapes and bow structures as well as a variety of their respective 'holding' positions that exist at any particular time,\textsuperscript{341} are shown in contemporary pictures, paintings, stained glass and painted windows and friezes.

\textbf{Idiomatic Compositions}

Composers began to develop idiomatic compositional styles, away from vocal dependency, around the start of the 17\textsuperscript{th} century. The first known sonata for violin solo and bass, composed by Giovanni Paolo Cima, organist at Milan, and published in 1610 as "Concerto Eccelesiastici", comprised one work expressly for violin and violine.\textsuperscript{342} Later, around 1615, Giovanni Gabrieli's (1557-1612 or 1613) sonatas for three violins and bass, composed appeared after his death. Subsequently, within each successive stylistic period, technique and notation both evolved from and built on what had previously existed. For the violin in particular, the developmental path - systematically described in the early chapters of van der Straeten's book\textsuperscript{343} - continued steadily until, at the turn of the 18\textsuperscript{th} and early 19\textsuperscript{th} centuries, the Italian violinist Niccolò Paganini (1782-1840) contributed to a spectacular development of purely virtuoso technique that completely revolutionised violin playing. He went far beyond the orthodox rules of his predecessors and while incorporating into his compositions extensions of technical features used previously, others like '.... the accompaniment of a melody by left-hand pizzicato, the chromatic glides with one finger, and the guitar-like treatment, used by Sarasate [1844-1908, Spanish violinist and composer] with so much effect, must be credited entirely to him.'\textsuperscript{344} However, there is no real consensus on this matter and the debate continues today as to whether Paganini devised techniques that increased the instrument's capabilities or, as suggested by David Boyden,\textsuperscript{345} he did not, in fact, invent any new techniques. Boyden suggests, rather, that Paganini improved on what he had learned from his predecessors, adding his own variants, combining and heightening the effect with a kind of playing hitherto unknown for technical perfection and verve.

\begin{footnotesize}
\begin{itemize}
\item van der Straeten, \textit{History of Violin}. Vol. 1, p. 48.
\item ibid., Vol. 1.
\item ibid., Vol 11, p. 350.
\end{itemize}
\end{footnotesize}
Paganini received little rudimentary teaching and despite some hints from the Polish born violinist Auguste Frédéric Durand (real name Duranowski) (c.1770 - unknown), he had no master and left no 'school', yet the impact of his virtuoso playing was so strong that it has had a vast influence on all subsequent aspects of violin playing, and it also influenced pianists such as Liszt and Chopin.

After Paganini’s death the ‘Italian School’ practically ceased, supplanted in the ensuing decades by many violinists of great importance, particularly from countries such as Belgium, Hungary, Czechoslovakia and Germany and later, from the so called ‘Russian School’. By the end of the 19th century a variety of performers, composers, and pedagogues from all over the Continent wrote treatises to develop left and right hand techniques which were continued, expanded and extended into the string quartets of the 20th century. In addition, all manner of exaggerated effects, techniques and sounds emerged to extend the potential compass of stringed instruments far beyond the singing qualities and contrasting brilliance of previous centuries.

**Contemporary String Quartet Playing**

Music was chaste and modest so long as it was played on simpler instruments, but since it has come to be played in a variety of manners and confusedly, it has lost the mode of gravity and virtue and fallen almost to baseness.

Boethius (c. 480-524)

In the *genre* of the string quartet the make-up of the ensemble has, uniquely in the history of music, not changed. Stylistically, however, there have been considerable changes. In contrast to the 19th century use of melody against a background of harmonic colour and direction, of atmosphere and mood, the 20th century objective sought a fresh and pungent sound to match the developments of the new age. Unusual *timbral* effects and techniques began to be used as integral parts of a composition and the result constituted a vital development away from anything previously understood as quartet texture.

String quartet music post-war is, to a large extent, marked by a disregard for the idiomatic capabilities and limitations, the character of and qualities inherent in the instruments. In the early decades of the century the Serialists conceived a specific compositional process, based on abstract laws, which bore

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no relationship to the particular technical possibilities of the instruments. Further, composers attempted to distort many aspects of historical development through the eradication of established sound qualities built up over the centuries, and avant-garde musicians of the time shared a common conviction that 'progress' could only be attained by a rejection - either wholly or partially - of traditional instrumental techniques, sound and performance styles.

Despite the interesting results of this 'progress' Klaus Hübler (1956-), (composer of String Quartet No. 3 (1982-4) listed in the quartets under discussion), writes that these tendencies give rise to dissatisfaction. Instead of seeking to create a series of instruments suited to the new demands, classical instruments continue to be used, while simply ignoring their historical implications. Hübler says further:

Our purpose here is to plead for a compositorial writing adapted to the instrument in question. This in no way implies a return to a simplistic pseudo-naïveté; rather, it should promote an expansion of sound and technique which takes its roots in the specific resources of the instrument and in its manner of performance. 347

Instrumental techniques have become more conscious and, proportionately, less systematised with an abounding number developing post-war. The following section, explores the contemporary use of the bow in the string quartets under discussion.
Right Hand Techniques: Bowing
Tone Colour

In music of previous centuries the qualities of sound, shading and dynamics were produced by placing the bow consistently somewhere between the end of the fingerboard and the bridge. Expression, in the subtle use of dynamics, was regulated by speed and pressure changes, all of which were closely linked to the complex interrelationship of melody, harmony, texture and form of the stylistic period of the time. One of the greatest modern differences in bow technique from the traditional, is that any area within the physical scope of the instrument is acceptable as a bowing position. The resultant tone production is expanded to include a whole range of new colours, creating distinctive tonal palettes through the use of individually conceived, contemporary notation symbols.

*Sul Ponticello*

Bowing: On or Near the Bridge

*Sul ponticello*, derived from the Italian *sul pont* (on the bridge) is the tonal effect realised by playing near or on the bridge. The closer the bow hair is to the bridge the more nasal and rustling the quality of sound, as the fundamental pitch is weakened by the stopping of the string's vibrations and results in a tone dominated by the high upper partials. The device is not new to the 20th century, but composers have taken over this particular technique and expanded it in search of new tone colours peculiar to the 20th century.

New Notation

Some composers are more precise than others in notating their intentions for *sul ponticello* and through this impreciseness certain confusion arises. An important consideration when playing an imprecise *sul ponticello* instruction is to assess, if possible, the specific tone colour required, as this not only influences the placing of the bow in relation to the bridge but also affects how much the overtone strength and domination is intended over the pitched note.

Hugo Risatti, in his guide to notational signs for contemporary music, *New Music Vocabulary*, makes a distinction between two bowing positions using different designations: Near the Bridge - *sul ponticello*, and On the Bridge - *ponticello*, but these terms are not necessarily recognised as a

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standard instruction since composers continue to use a variety of signs to indicate their intentions - some clearer and more specific than others, as will be shown in the following examples. At the International Conference on New Musical Notation, (1974)\textsuperscript{34}, the recommended abbreviation for *sul ponticello* was s.p. with a further recommendation for clear distinction between the signs or words used for bowing on the bridge as opposed to next to the bridge.

\textit{20\textsuperscript{th} Century use of Sul Ponticello: Positions Around the Bridge}

\textbf{Traditional Sul Ponticello: 1900-1959}

In the early decades of this century when *sul ponticello* was required, the customary words or abbreviations in Italian - or in another language - were placed below or above the relevant passages. Random examples, taken from quartets from 1900s-1950s are as follows:

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
<th>Movement/Bars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schoenberg</td>
<td>No. II, Op. 10</td>
<td>1907-8</td>
<td><em>steig</em></td>
<td>I : bars 90-91</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>used intermittently in four of the five movements with or without <em>tremolo</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>used intermittently in all of the movements with or without <em>tremolo</em></td>
</tr>
<tr>
<td>Bartók</td>
<td>Op. 28</td>
<td>1939</td>
<td><em>sul ponticello</em></td>
<td>Not found</td>
</tr>
<tr>
<td></td>
<td>No. 3</td>
<td>1927</td>
<td><em>sul ponticello</em></td>
<td>I : Part 2 at 35</td>
</tr>
<tr>
<td></td>
<td>No. 4</td>
<td>1928</td>
<td><em>sul ponticello</em></td>
<td>II : 243-246</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>sul pont</em></td>
<td>In Movement III</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>various</td>
</tr>
</tbody>
</table>

\textsuperscript{34} Interface, p.91
### Pousseur: Qualitative Notation

Before proceeding to a detailed examination of developments in the *sul ponticello* technique post 1960, a brief digression on the very individualistic notation of Henri Pousseur is necessary. In order to understand the examples showing his use *sul ponticello*, it is important to understand the basis on which he develops his notation symbols.

Pousseur uses an innovative notation termed ‘*qualitative notation*’, which he first explained to contemporary musicians at the 1964 Congress on the Notation of New Music, at Darmstadt. The work is divided into ‘bars’ of various lengths, each called ‘a unit’ and determined by an allocated number written above the stave - the lowest number being $2\frac{1}{2}$ and the highest 15. The important points of these sub-divisions is that they are quantitative units of relative value, with the basic values approximately notated. These form groups which are determined at the outset of the composition by...
the interpreter, controlled by certain limits. One such limit imposed is, for example, that all durations are set from the speed of the most difficult passages and subsequently derived and maintained qualitatively from this point of reference. Another limit stated by Pousseur in the preface to the score, explains: ‘...it is important that the proportion be sensed in a qualitative way (shorter, somewhat shorter, much longer. etc.).’

In proportional notation, despite the imprecise relationships and the resultant freedom of interpretation, certain technical and tempi stipulations nevertheless arise - not from doing what one likes, but from mastering the rules. This point applies resolutely to Pousseur’s notation which is used exclusively throughout the composition, creating an unusual 20th century extension to the genre through the first and exclusive use of a completely new notation. An example follows:

**Example 209. Qualitative Notation**

*Pousseur, Ode : Pour Quatuor a Cordes* (1960), p. 72

The proportional units above occur in the following order and relationship:

- 2 : 2.5 : 3 : 4 : 5 :

Examples 210-220 which follow, taken from Pousseur’s single quartet, *Ode pour quatuor à cordes* (1960-61), illustrate the various symbols and their meanings found in association with the instruction *sul ponticello*.
Example 210. *Sul Ponticello*

Composer  | String Quartet | Date  
--- | --- | ---  
Pousseur | *Ode* | 1960-1  

Sign/Explanation

*al ponticello*: The thick lines indicate a *glissando*: The progress [of which] between the pitches is not strictly presented and remains for the most part the prerogative of the performer.352

The jagged lines placed through the *glissando* lines represent: bow tremolo (as thick as possible).353

Ex. p. 21, Cello

Example 211. *Sul Ponticello*

Composer  | String Quartet | Date  
--- | --- | ---  
Pousseur | *Ode* | 1960-1  

Sign/Explanation

*al ponticello*: The thick line represents an angular *glissando* between the first and last of two given pitches ascending and descending to indefinite pitches

Ex. p. 21, Violin 1.
Example 212. *Sul Ponticello*

Composer: Pousseur

String Quartet: *Ode*

Date: 1960-1

**Sign/Explanation**

*leggero sul ponticello*: A series of three and four note-groupings joined at the outer stems by horizontal cross bars, represent the following technique:
draw the bow as quickly as possible over the strings so that it is always on two strings (even on three at higher dynamic levels).\(^{354}\)

Ex. p. 38, all instruments

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Example 213. *Sul Ponticello*

Composer: Pousseur

String Quartet: *Ode*

Date: 1960-1

**Sign/Explanation**

*sul ponticello*: Two different string techniques are used:
Firstly, the symbols at the beginning and end represent: drawn bow. The small vertical line attached to the first note denotes: pitch raised half a tone.
Secondly, the jagged lines attached to the two centre notes require a: bow tremolo (as thick as possible).

Ex. p. 33, Cello.
**Example 214. Sul Ponticello**

**Composer**  String Quartet  **Date**
Pousseur  *Ode*  1960-1

**Sign/Explanation**
sul ponticello: the width of the jagged line attached to the double stopping does not affect the speed of the *tremolos* or the quality of sound but requires that both notes be in *tremolo*:
(as thick as possible)
Ex. p. 34, Violin 1.

**Example 215. Sul Ponticello**

**Composer**  String Quartet  **Date**
Pousseur  *Ode*  1960-1

**Sign/Explanation**
sul ponticello: Two joined notes represent straightforward *glissandi* between the definite pitches played at the bridge.
Ex. p. 46, Violin 2.

**Note:** The symbol resembling the double ‘quaver’ has nothing to do with the note’s relationship within the overall rhythmic content of a traditional composition. Here, it is placed proportionally within a ‘unit’ based on a scale of relationships between the different bar lengths which operate ‘logarithmically’ for purposes of *tempo* perception. Within this background it relates more specifically to the articulation described above.
Example 216. *Sul Ponticello*

Composer: Pousseur  
String Quartet: Ode  
Date: 1960-1

**Sign/Explanation**

*sul ponticello*: The succession of stemless notes, linked together by small lines represent: the notes [to] follow one another as quickly as possible, without interruption (especially without lifting the bow), but changing the direction of the bow at each new note at a speed as close as possible to that of a tremolo.

Ex. p. 48, Violin, Viola & Cello

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Example 217. *Sul Ponticello*

Composer: Pousseur  
String Quartet: Ode  
Date: 1960-1

**Sign/Explanation**

*sul ponticello*: The two joined notes - one white and the other black - signify the use of the bow. The enclosed separated white notes require that each note be held ....[with the] duration dependent on the (fully notated) bowing.

Ex. p. 59, Viola
Example 218. Sul Ponticello

Composer: Pousseur
String Quartet: Ode
Date: 1960-1

Sign/Explanation

sul ponticello and al ponticello: Two different types of ponticelli are used equally throughout the different instruments:

As Pousseur makes no mention of this distinction it is presumed that sul ponticello means: near the bridge and al ponticello: on the bridge.

The example (left) shows the use of the different words within three successive ‘units’:

Violin 1: al ponticello followed by sul ponticello
Violin 2: al ponticello
Viola: sul ponticello
Cello: al ponticello

each exacting an independent string technique, of which all - with the exception of the second violin symbol: (struck with bow) - have been discussed in previous examples of this section.

Ex. p. 72, units 2: 2 ½: 3
Example 219. *Sul Ponticello*

Composer | String Quartet | Date
--- | --- | ---
Pousseur | *Ode* | 1960-1

**Sign/Explanation**

*sul ponticello*: The two horizontal lines - one bracketed - placed above the stave relate specifically to speed of execution: periodically, either as quickly as possible (thus determined by the most difficult passage) or divided over an otherwise fixed length of time (beats).

Ex. p. 84, Viola & Cello

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Example 220. *Sul Ponticello*

Composer | String Quartet | Date
--- | --- | ---
Pousseur | *Ode* | 1960-1

**Sign/Explanation**

*sul ponticello*: The rising arrow placed through the bracket above the stave signifies: accelerate to as quickly as possible.

Ex. p. 85, Violin 1, unit 5

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**Note:** Pousseur has incorporated the *ponticello* effect into a variety of different groupings, each explained in the introductory *Explanation of Symbols and Instructions for Performance*. These new notational symbols are not, however, confined to the technique of *sul ponticello*, but include many other fundamentally new symbols which Pousseur developed in order to give expression to a whole new sound concept in the genre - no matter what string technique is required.
Ponticello: New Sounds and Symbols

New Symbols Near and On the Bridge

In the early decades of this century, as shown in the preceding list of quartets, the ponticello was incorporated into traditional string techniques in conjunction with the use of the relevant Italian or German words. Consequently no new signs were needed to indicate its use.

In the klangfarbenmelodie (timbre melody) compositions of Schoenberg and Webern, melody was defined by changes of timbre and played an integral part in the construction of the works, but up to and including the 1950s colour and timbre were not the dominant considerations in many quartet compositions and some contemporary composers continued to write for the genre without making any new demands in this area. Despite Pousseur’s entirely new 1960s notation, he continued to use the standard words sul ponticello, but introduced, however, a single new bow position associated with word (al), designating - on the bridge.

From the 1960s onwards, fresh treatments of traditional sounds as well as newly devised sound sources found their way into quartet scores and with them arose a diversity of string techniques and symbols which, by virtue of the bow’s new relationships to the bridge, created novel timbral effects.

Below is a selection of new symbols and techniques found in the quartets from 1960:
Example 221. *Sul Ponticello*
New Symbol
New Symbol without Accompanying words

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartolozzi</td>
<td><em>Qtto per Archi</em></td>
<td>1960</td>
</tr>
</tbody>
</table>

Sign/Explanation

- poncicello
- cessazione (cease)

without accompanying words

Ex. bar 27, Violin 1 & 2, Viola

**Note:** In the *Spiegazione Dei Simboli* Bartolozzi assigns a similar symbol for the technique of striking the bow on the bridge with the heel (\[\text{\textcircled{h}}\]).

Example 222. *Sul Ponticello*
Capitals: SP without Accompanying words

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kopolent</td>
<td><em>Qtto 3</em></td>
<td>1963</td>
</tr>
</tbody>
</table>

Sign/Explanation

- Capitals: SP

without accompanying words

Ex. p. 10, Violin1 & Viola
Note: It is interesting to note that Kopolent uses the abbreviation (SP) in the quartet of 1963, before the lower cased letters (s.p.) were adopted by the members of the International Conference on New Musical Notation at the end of 1974\textsuperscript{356} as a timbral specification for \textit{sul ponticello}. The letters “n” or “ord.” are recommended to indicate a cancellation. However, this last point is not always applied in contemporary scores.

**Example 223. \textit{Sul Ponticello}**

Near the Bridge

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berio</td>
<td>\textit{Sincronie}</td>
<td>1963-4</td>
<td>nahe dem Steg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>near the bridge</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>auf dem Steg (bzw., falls mit Dämpfer, den Bogen gegen den Dämpfer drücken) = over the bridge (or pressing against the mute, when mute is on)</td>
</tr>
</tbody>
</table>

Ex. p. 1, line 2, all four instruments

Note: In the exaggerated \textit{pont.} position more harmonics than normal are produced, almost totally obscuring the pitch. Berio is the first composer in this investigation to make a clear distinction between the symbols representing \textit{near the bridge} and \textit{over the bridge}.\textsuperscript{357}

**Example 224. \textit{Sul Ponticello}**

Use of Letter and words

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mayuzumi</td>
<td>\textit{Prelude}</td>
<td>1964</td>
<td>Mayuzumi generally interchanges the words: \textit{sul pont} and \textit{sul ponticello}, without specific reason, but when a change from a \textit{pizz.} to an \textit{arco} occurs, he specifies the use of the letters (s.p.) after the \textit{arco} : e.g. \textit{arco} (s.p.)</td>
</tr>
</tbody>
</table>

Ex. p. 3, line 3, Violin 2

Note: In using the abbreviated letters (s.p.) to indicate \textit{sul pont} in his 1964 quartet, Mayuzumi anticipated the 1974 recommendation of the Interface Committee.

\textsuperscript{356} \textit{Interface}, pp. 91-92

\textsuperscript{357} \textit{Lachenmann, Große Torso 1971-76-78, Notation and Performing Techniques}
Example 225. *Sul Ponticello*
Abbreviated *Sul Ponticello*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervetti</td>
<td>Zinctum</td>
<td>1967</td>
</tr>
</tbody>
</table>

Sign/Explanation

`s.p.` The abbreviation *s.p.* is used to indicate all *sul ponticelli* no matter what the technique it accompanies. An \(N = \) *(naturale, ordinario)* before the letters indicates a cancellation : \(N\ s.p.* In the example, left, different forms of the same basic *(tremolo)* technique appear.

: Violin 2, standard notation controlled

\(tremolo : N\ s.p.*

: Viola, new symbol (\(2\)) indicating:

\(nicht\ rhythmisiertes\ Tremolo\ -\ non-rhythmic\ \tremolo : s.p.*

Ex. bar 60, Violin 2 : \(N\ s.p.*

Viola : *s.p.*

Note: The \(N\) is not used exclusively for cancellation of *sul pont.* but is intended, to revert in all situations, to ‘normal’ playing after the utilisation of any specialised technical effect.

Example 226. *Sul Ponticello*
Abbreviated *Sul Ponticello*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penderecki</td>
<td><em>Otto per Archi</em></td>
<td>1968</td>
</tr>
</tbody>
</table>

Sign/Explanation

`s.p.*: The line of dashes and dots indicate a specific technique, *i.e.*: the repetition of the whole group; which in this case refers to a preceding series of contoured *glissandi* between two given pitches - at the bridge. Only the initials are used to indicated *sul ponticello.* The example, left, illustrates two different types of notation.

: contoured *glissandi* between two given pitches (\(c\) and \(c\))

: a line of dots and dashes indicating a repeat each required to be done : *s.p.*

\(sul\ ponticello\)

Ex. p. 6, line 3, Violin 1
Example 227. *Sul Ponticello*

Composer: Kelemen
String Quartet: *Motion für Stätt*
Date: 1968

**Sign/Explanation**

*s.p. = sul ponticello*, combines in this example with four new signs and meanings:
- diverging beams to indicated an *accel*
- *immer schnell werden* - faster and faster
- notes grouped spatially in accordance with the increasing speed: *i.e.* wider at the start narrowing towards the end
- grouped notes - across
- a dotted ‘barline’

Ex. bars 168-9, Violin 1

Note: The above is one of many examples in Kelemens’s quartet where playing near the bridge is used in conjunction with a variety of new techniques and symbols.

Example 228. *Sul Ponticello*

Various Positions

Composer: von Biel
String Quartet: *Qtt für Streicher*
Date: 1965

**Sign/Explanation**

\[\text{\textbullet} \quad \text{\textbullet} \quad \text{\textbullet} \quad \text{\textbullet} \]

- *Vor dem Steg am Steg streichen*
  Bow in front of the bridge next to the bridge
- *auf dem Steg streichen*
  Bow on the bridge

An example of each of the above symbols is demonstrated on the left:

Ex. p. 6, Violin 1

Note: von Biel’s uniquely devised notation uses a selection of unorthodox symbols to represent, amongst other techniques, the various bowing positions on and around the bridge. The remaining new symbols and techniques will be discussed under the relevant separate sub-headings.
Example 229. *Sul Ponticello*  
Exaggerated Position

**Composer** String Quartet  
Druckmann  
St. Qt. No 2  
1966

**Sign/Explanation**

- **ponticello**  
  near the bridge

exaggerated ponticello, pressing against mute  
(more harmonics than fundamental, pitch almost totally obscured).

Ex. p. 22, before 32, all instruments

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Example 230. *Sul Ponticello*  
in *Glissando*

**Composer** String Quartet  
Karkoschka  
Quattrologe  
1966

**Sign/Explanation**

- **sul ponticello**, in *glissando*

Ex. p. 3, line 3, Violin 1.
Example 231. *Sul Ponticello*

**Standard Abbreviations**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crumb</td>
<td>Black Angels</td>
<td>1970</td>
</tr>
</tbody>
</table>

*Sign/Explanation*

*sul pont.* Despite the textural complexity found throughout this quartet, the simple abbreviation *sul pont* is used for all techniques played near the bridge. It is consistently combined with an endless complexity of unusual and innovative tone colourings. The example left displays two of many different combinations - *tremolo* & a composite *tr. glissando*

Ex. 13. Threnody III, Bar 1

Example 232. *Sul Ponticello*

**with other Techniques**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holliger</td>
<td><em>Stqtt</em></td>
<td>1973</td>
</tr>
</tbody>
</table>

*Sign/Explanation*

No new specific symbol is found for playing near the bridge. *Pont sul pont* and *sul ponticello* are used in conjunction with many diverse techniques of extreme virtuosity. The acoustic results are important to the overall effect of this string quartet, extending the range and colour of the instruments by stretching technique into awkward territory. This example shows one of many novel sounds. Created by a series of half-filled diamond shaped notes, proportionally spaced, the special effect
of the: “semi-harmonic[s]”: [with] finger pressure slightly less than normal, is heightened by the combination of *sempre tremolo* and *sul ponticello* techniques, within a *poco a poco diminuendo*, and in (Violin 2) the contemporary sign indicating a *cresc.* to the widest part of the beamed notes

Ex. p. 10, line 1 at 13 all four instruments

The second example shows a *gliss.* rising against a succession of sustained notes within a *tempo* marking $\frac{4}{4} \cdot \frac{72}{72}$ to be played near the bridge

Ex. p. 32, at E17, Cello

**Note:** There are numerous examples in this quartet where dissimilar technical complexities are required to be played *sul ponticello.*

**Example 233. Sul Ponticello**

A-rhythmic Entries

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crosse</td>
<td>Studies</td>
<td>1976</td>
</tr>
</tbody>
</table>

**Sign/Explanation**

*sul pont*: Combined in this example of contemporary and traditional notation are: three separate a-rhythmic entries, spatially proportioned stemless notes, played *sul pont*

Ex. p. 2, at H, Violins 1 & 2, Cello

**Note:** Traditional and contemporary techniques are not an unusual combination in 20th century string quartets. The above example is another that illustrates a single distinctive age old technique associated with a new set of rhythmic criteria.
Note: Chronologically, Lachenmann is the first composer in this investigation to distinguish between, and apply, a great variety of colour through the different relationships of bow positions and bridge. These are made by different bow pressures, bowing on unconventional parts of the instruments and by producing both toneless and grinding sounds. All instructions are written into a manuscript where the notation is both traditional (if the inclusion of noteheads deems it so,) and contemporary. There is too, the introduction and modification of many revolutionary aspects of musical organisation - notational, rhythmical, textural, bowing and finger actions and *pizzicati* - techniques which press forward and result in a radical re-thinking of the 20th century concept of the string quartet. In the use of quasi-graphic symbols and the construction of partially fragmented parts, a whole new approach to the genre is opened up. The notation extends visually and technically outside what was thought to be the possible limits of performance.

The acceptance of these new and complex sounds relates aptly to Paul Griffiths comment, that 'the simplest possible response to these new riches is to use them as extensions of timbral resource, without letting them influence the premises of creative thought.'^358_

A significant innovation, to be mentioned at this point, is Lachenmann's *bridge clef* and its relationship to a diversity of bow positions, for all the instruments. An understanding of its function and purpose is particularly important to the overall content of the work, therefore an explanation from the composer's notes: *Notation and Performing Techniques*, is reproduced below:

---

Example 235. *Sul Ponticello*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td><em>Gran Torso</em></td>
<td>1971-6-8</td>
<td>Notation and Performing Techniques</td>
</tr>
</tbody>
</table>

**Clefs**

This piece makes use of the **bridge clef** besides the usual clefs. It schematically reproduces the front of the instrument between the tailpiece and the middle of the fingerboard (on page 23, up to the neck of the violin and viola) and allows the depiction of the point of contact of the bow on the instrument as well as its distance from the bridge. At the same time, it also illustrates the direction of the bowing between the bridge and the middle of the fingerboard.

Depending on the limits of the area in which such vertical motions are prescribed, the bridge clef can be given only in excerpt.

The excerpts occur in ad hoc shifted positions for the same reason. To facilitate the orientation, the position of the bridge is occasionally drawn through the score in the form of a broken horizontal line.

The string clef illustrates actions on the four strings below the bridge, between the bridge and tailpiece.

The string clef is sometimes reduced so as not to encumber the score.

---

Example 236. *Sul Ponticello*

Various Positions and Techniques

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferneyhough</td>
<td>2nd St. Qt.</td>
<td>1980</td>
<td></td>
</tr>
</tbody>
</table>

**Sign/Explanation**

Four different types of *sul ponticelli* are given: *sul pont. molto sul pont. poco sul pont.* and *sul pont. estr.* - bow as near to the bridge as practical (occasional distortion allowable) without, however, touching it. The *sul pont. estr.* is never found as a separate technique but always used in conjunction with one or other of the three listed above, with the bow starting further away from the bridge and moving *as near to the bridge as possible*, while the music is in progress. *Sul pont. estr.* also occurs with other bowing techniques. The example shows three different aspects of the *sul pont.* technique.

Ex. bar 139.

Viola:

Cello:
Example 237. *Sul Ponticello*
New Stave System

Composer  String Quartet  Date
Hübler  3 Stqtt  1982-4

Sign/Explanation

*sul pont*: The simplicity of this instruction belies its inclusion in a score of great complexity. The principal element of change is the stave - enlarged to include four extra sets of lines placed above the normal stave. A brief explanation of the five separate 'staves', structured within time units marked (\( \frac{3}{4} \text{ ca. 64} \)), is as follows:

No. 1. (standard stave): Here, the activities of the left hand are notated

No. 2. The four lines stand for the four strings of each instrument (from the bottom upwards g-d-a-e- ...)

No. 3. This line indicates the to and fro movement (\( \uparrow \downarrow \uparrow \downarrow \) ) of the bow

No. 4 contains information concerning the point where the bow touches the string (*sul tasto, sul pont, etc.*). Continual transitions are indicated by arrows. All other transitions should be executed as fast as possible.

No. 5 This line contains information concerning method of bowing (col legno).

In the example, left, the *sul pont* found on Line 4 relates specifically to where the bow touches the string

Ex. p. 1, line 1. Violin 1

Note: Hübler's newly devised set of staves is described in detail under the heading: Chapter 11, The Stave - A 20th Century Approach.
Example 238. *Sul Ponticello*
Including Noise Factor

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Globakar</td>
<td><em>Discours VI</em></td>
<td>1982</td>
</tr>
</tbody>
</table>

*Sign/Explanation*

$pont. sul pont.$: also the new symbol

~ = near or almost on the bridge

(mixture of noise and sound)

A distinction is made between the standard technique implied in the words and the demand made by the new sign. The example given contains, in association with the new symbol, a variety of different specific requirements.

Some are self explanatory, while others are clarified in the Preface to the score as follows:

The first block, left contains:

VI. II —
Vla —
Vc —

Coupled with the letter ④ below the requirement is: During the Vn 1 solos the other players act "theatrically". They are seated clearly in the manner of a traditional quartet. However, further, this symbol — = remain immobile, holding the bow downward with the instrument on your knees.

....and for the arrowed sign —- the viola player must pretend to play (silently), visually imitating the performance of Vn 1.

Violin 1: The single muted high B♭ placed above the stave is pitched constantly in a variety of rhythms and bowings, amongst which is the new symbol (~) indicating near or almost on the bridge (mixture of noise and tone). No stave is required.

Ex. p. 3, 'line 4, Violin 1.
Example 239. *Sul Ponticello*
With Overtones

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heyn</td>
<td><em>Sirènes für Stqt</em></td>
<td>1983</td>
</tr>
</tbody>
</table>

Sign/Explanation

\[\text{pont. : pont estremo} = \text{bow as close to the bridge; a large share of overtones is called for.}\]

This score uses two types of notation: normal noteheads and stemless, beamed notes, proportionally spaced within a time unit: \( \frac{j}{j} = 50 \). An example of each type is given: (Examples 239 and 240).

The first shows different aspects of *sul pont.* using noteheads: \(\text{ordin. pant. estr. : pont. estr. : ordin. pant. estr.}\)

changing in each instant because of either a *legno* or *legno batt.* intervening

Ex. bar 96, Violin 1.

Example 240. *Sul Ponticello*
New Stave System

The second demonstrates a new approach to the function of the stave with the presence of three five-line staves, functioning vertically. The staves are marked:

\( II \) string : \( III \) string : \( IV \) string each having pitches on different strings to create unusual *timbral* effects and show the use of the two different types of pont. described above:

\(\text{pont. and pont. estr. in conjunction with tremolo ord.}\)

The highest string in each instrument seldom used

Ex. bar 9, Violins 1 & 2, String \( II \)
Example 241. Sul Ponticello
Position Related to Dynamics

Composer       String Quartet       Date
Gielen                  Stätt                1983

The relationship of the bow to the bridge is determined by and associated with the dynamic markings described left. The dynamic levels change very slowly, each lasting for a number bars, thus maintaining the colour quality and intensity of the sul ponticello over a period of time. Separate from the above and not associated with a particular quality of dynamic shading, another type is found:

allmälch näher am Steg 63) = gradually closer to the bridge
Ex. 2. Satz “une charogne” bars 57-60.

p poco pont.

Note: Added into the score are instructions numbered from 1-186. Each number relates to a special effect. For example, Number 61, found in the above examples, relates to the qualities and degrees of playing sul ponticello - and is explained in both the text and the Performance Notes. The framework of the score is filled with a running commentary of instructions describing in great detail all sorts of...
extraordinary demands - musical and quasi-dramatic - made on the players. Further examples require the following: No. 43: Vn II kneels down; 104: Move soles of shoes softly, and continuously, on the ground, describing a circle. Almost like white noise, and 113: Stamp both feet loudly .... Sit frozen with arms outstretched, Grand gesture! all of which result in the composer communicating his fantasies through a complex relationship of gestures and music, placing this quartet into a category of mimed and spoken extensions - a novelty which, with the passing of time, has begun to lose its novelty!

**Example 243. Sul Ponticello**

*Tremolo and Sautille*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huber</td>
<td><em>Doubles .....</em></td>
<td>1987</td>
</tr>
</tbody>
</table>

**Sign/Explanation**

*am Steg* - at the bridge: *in Stegnähe* - near the bridge: *immer in Stegnähe* - always near the bridge.

The use of the words *sul ponticello* suggests a distinction between it and the technique for the other three instructions, found in the score, regarding the playing proximity to the bridge. The example contains two distinct types, each containing a contemporary aspect of notation:

Violin 1 - time unit: plays *sempre sul ponticello tremolo* for a time unit of 27"

Violin 2 - repeat sign: plays *immer in Stegnähe sautille*, each beat requiring a different number of *sautille*:

10 8 6 4 | repeated (ca. 13 Mal)

indicated by a repeat sign consisting of a series of ••••• following the initial bar.

Ex. bar 126, Violin 1 & 2
Comment

In the early decades of this century prominent composers of the period such as Bartók, Schoenberg and, to a lesser extent, Hindemith, used the words *sul ponticello* or *am Steg* to indicate the straightforward use of the bow positioned near the bridge, and Webern maintained the simple instruction - *am Steg* - for this timbral effect. Right up to the 1960s no extra attention or colouration was imposed on the implication of these simple words. After that time, in the many of the quartets investigated, despite the introduction of related symbols and abbreviations of one sort or another, the use of the words *sul ponticello* still persists.

At the 1974 International Conference on New Music Notation, the abbreviation (s.p.) for *sul ponticello* was adopted. However in 1963, almost a decade earlier, Kopolent had used the abbreviated letters (SP), (*Quartetto 3*) and nearly twenty-five years on, the American Roger Reynolds in (*Coconino - a shattered landscape 1989*) - followed Kopolent’s example. A modification of the recommended abbreviation is found in the Dutch composer Coeck’s use of (S.P.) in *Graphismes* (1983), while certain composers such as Mayuzumi (1964), Cervetti (1967), Penderecki (1968), and Kelemen (1968) had adopted the lower (s.p.) letters some years prior to the 1974 recommendation. Others, needing to be more explicit about the bow position and pressure, have extended the wording to introduce clarity and exactness. This is found, for example, in Lachenmann’s quartet *Gran Torso* (1971-76-78) where, using German terms, he distinguishes between eight different degrees of closeness to the bridge. Ferneyhough’s four areas of proximity to the bridge are given in Italian, *Second String Quartet* (1980) and in Heyn’s *Sirènes für Streichquartett* (1983), the words *pont. estremo* .... a large share of overtones require the same effect as Ferneyhough’s *sul pont. estr.* - bow as near to the bridge as practical (occasional distortion allowable). Gielen is the only composer to notate the ‘bow and bridge’ relationships in dynamic markings, and varies the degrees of closeness to the bridge using the *f-arco* ord as the normal position, through to *pp* for the position, *mollo pont.*

Symbols resembling the shape of the bridge have been devised by various composers but, as yet, are not standardised as demonstrated in the following examples:

---

*Tirftig, p. 91.*
Each symbol being different, with the exception of the one used by Berio and Druckmann, specifying:
play near the bridge, \( \bigcap \bigcup \).

The essential difference in the technique of *sul ponticello* in the second half of the century from that of the early decades, is that it has been expanded in such a way as to frequently create simultaneous polytimbral and polytechnical effects. In the quartets under discussion, the use of disparate techniques and new notational symbols demonstrate an unerring exploitation of the virtuosic capabilities of stringed instruments.

These are found for example in:
- Pousseur's combinations of newly defined symbols and techniques which include the addition of the playing position: *al ponticello*
- Kopolent's use of SP in spatial notation
- Cervetti's complex new notational approach where *sul ponticello* is used in conjunction with controlled and non-rhythmic *tremolos*
- Kelemen's incorporation of *sul pont* into the new symbol of diverging beams for *accel - immer schnell werden*
- Crumb's use of *sul pont* combined with an endless complexity of unusual tone colourings
- Penderecki's *sul pont* combined with contoured *glissandi*
- Hübler's and Heyn's multi-stave formula, Lachenmann's innovative *clef* system and Globakar's theatrical perspective - all include the use of *sul ponticello*

In previous periods, bowing near the bridge produced a few simple effects, but today it is accompanied by a complexity of traditional and contemporary techniques which create multi-faceted combinations. For this reason many composers from the 1970s up to the present have chosen to describe and convey these complexities in words rather than in a disparate selection of symbols.
Contemporary Bowing Techniques and Symbols

In avant-garde compositions string playing has been the focus of intensive sonoric experimentation and as such, bowing techniques in the genre of the string quartet have been expanded to include a variety of devices that exploit tone production outside the boundaries of true pitch or those of traditional instrumental movements. These effects are created by using the bow in many different ways and positions:

Position of Bow - Modern Innovations

Bowing : Behind Bridge

Pitches of one sort or another can be produced by bowing in the area of string between the bridge and the tailpiece. These pitches are of a high register and range from low to high in each of the instruments' four strings. The resultant sounds and timbre are dependent on various factors. For example:

- the length of the string between the bridge and tailpiece
  - not all like stringed instruments have exactly the same distance between the two fixtures
- differences in materials
  - type of strings and materials used, gauges and quality of tailpieces vary
- the speed and pressure of the bow
  - light pressure and fast bow speed produces a clearer pitch
  - heavy pressure and slow bow speed produces a rasping sound
- the proximity of the bow to either the bridge or tailpiece
  - playing closer to the bridge produces more surface noise

The sound produced is high pitched, thin, and of a fragile quality with each of the four strings yielding different pitches and different sound qualities dependent on the proximity of the bow to the bridge.

The above bowing position - behind the bridge - is not found in the quartets pre the 1960s and emerges chronologically in this investigation as follows:
Example 244. Bowing: Behind Bridge

Composer  String Quartet  Date
Kopolent  Otto 3  1963

Sign/Explanation

In the NOTES ON PERFORMANCE found at the beginning of the score, the composer employs a system of numbers ranging from 1-10, each relating to a specific instruction.

No. 6 specifies that the position of the bow be played on the D string or A string behind the bridge. The encircled numbers that appear in the score: \(\textcircled{1}-\textcircled{6}\) distinguish the technique (or any other stipulation) from the bracketed numbers e.g. \(11)-12\) placed above the stave that relate only to tempo measured in varying seconds per line. The bracketed tempo numbers are found mostly in aleatoric sections, otherwise they are generally without brackets. The number nought \(0\) which starts a line is never bracketed as is demonstrated in this example. The symbol \(x\), placed on the third space (up) indicates indeterminate pitch and is used initially in conjunction with the two symbols which imply the string and bow placement respectively.

\(\textcircled{6}\) = technique behind the bridge, 
\((D) = D\) string 
\(x = \) symbol of indeterminate pitch

Ex. p. 16, line 1, Violin 1.

Note: The relevant number and required string are shown initially and if no change occurs, any subsequent appearance of the symbol \(x\) carries the original instructions.
Example 245. Bowing: Behind Bridge

Composer: von Biel  
String Quartet: Qtt für Streicher  
Date: 1965

Sign/Explanation
von Biel uses two modified 'bridge shaped' symbols for different bowing positions behind the bridge:

\[ \overline{\text{Hinter dem Steg am streichen}} \] - bow behind and next to the bridge
\[ \overline{\text{Hinter dem Steg streichen}} \] - bow behind the bridge

Ex. p. 2, Violincello

Note: In von Biel’s notation, the two symbols in the above example represent the different bow positions behind the bridge and are used with other newly devised symbols, such as:

\[ K \]  
a wooden double bass mute is placed on the cello strings between the bridge and the end of the fingerboard

\[ K K = \]  
bow respectively between the end of the fingerboard and the double bass mute

\[ < = \]  
the action before this sign gradually changes to the action after this sign

which in this example requires that the bow move through three different placements - away from the initial position as the symbol \( K \) stipulates .... between the end of the fingerboard and double bass mute, to behind the bridge, and then further away towards the tailpiece.

Example 246. Bowing: Behind Bridge

Composer: Kelemen  
String Quartet: Motion für Stqt.  
Date: 1969

Sign/Explanation
b) Tremolo hinter dem Steg - Tremolo behind the bridge

Ex. p. 12, bar 123, Violin 2
Note: All general playing instructions involving Kelemen's individually devised symbols are placed on a separate page. However, where required, detailed performance instructions are found at the bottom of each page of the score in the form of a letter e.g. a) b) c) etc., attached to which are the precise instructions. Example 246 above illustrates this point clearly with the letter b) placed within the stave, with the full instructions appearing at the bottom. The x's replacing the noteheads in the Cello part indicate a striking or tapping instruction. Kelemen does not keep the same letter on each page for like instructions. On each page the instructions begin, at all times, with the letter a).

Example 247. Bowing: Behind Bridge

Composer  String Quartet  Date  Sign/Explanation
Crumb     Black Angels  1970  bow on 4 strings behind bridge

Ex. p. 8, Section 4, line 1
Devil Music
[Solo: Cadenza accompagnata]

Note: Crumb places the many and detailed performance instructions in the score without the added reference to a separate page of performance notes. While Crumb devises no new symbols which are exclusively his own, he nevertheless substantially modifies notehead notation to suit his 20th century approach to all musical parameters. The x symbol replacing noteheads, in the example above, signifies indeterminate pitch with each of the four strings given a separate note and place on the stave - played in tremolo.
Example 248. Bowing: Behind Bridge

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holliger</td>
<td>Stgqt</td>
<td>1973</td>
<td>hinter dem Steg - behind the bridge</td>
</tr>
</tbody>
</table>

| Ex. p. 24, D 4, Violin 1 |

Note: At the beginning of page 23, D1, Violins 1 and 2 are instructed to hold their instruments in-between their knees - *Violine zwischen die knie klemmen*. This instruction does not change and appears to be still relevant to the following section from which the above example is taken, requiring the 1st violin to play arpeggiated chords, on three strings, behind the bridge, holding the instrument in an upright position. The double up-and-down bow symbols represent: *Ab-Aufstrich/zuviel Bogendruck* - much bow pressure. 

Example 249. Bowing: Behind Bridge

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rihm</td>
<td>Drittes Stgqt</td>
<td>1976</td>
<td>hinter dem Steg - behind the bridge</td>
</tr>
</tbody>
</table>

| Ex. p. 10, Violin 1 & Cello |
Note: The downward and upward arrows refer to *arpeggiated* chords made in the direction indicated by the arrows - from highest to lowest note in the first instance and *vice versa* in the second. The xs indicate pitchless open strings played as instructed in the score - *hinter dem Steg* - behind the bridge.

Later, in Movement VI, Rihm uses the triangular symbols recommended for indicating the highest possible pitches, and accompanying words define the bowing position - bowing behind the bridge, demonstrated as follows:

\[
\begin{align*}
\text{Sul E} & \quad \text{und} \quad \text{Sul A hinter dem Steg} \\
\text{hinter dem Steg} & \quad \text{arco}
\end{align*}
\]

![Example 250. Bowing: Behind Bridge](image)

**Sign/Explanation**

Heyn gives instructions to bow behind the bridge in English: *arco behind bridge*:

: in the second section (bars 89-179) where standard (and not beamed) notation is used throughout.

Ex. p. 25, bar 96, Cello

---

Other Contemporary Bowing Positions

Example 251. Bowing: On Top of Bridge
Composer String Quartet Date
Kopolent Qtto 3 1963

Sign/Explanation
As previously explained in the Kopolent example: Behind the Bridge, the composer employs a system of numbers ranging from 1-10, each relating to a specific instruction. The encircled 7 in this example requires the bow to be played in tremolo on top of the bridge so that a buzz rather than a tone is produced.
Ex. p. 16, Violin 1

Example 252. Bowing: Behind Bridge
Composer String Quartet Date
Cervetti Zinctum 1967

Sign/Explanation
- am Steg (beleibige Saite)
- on the bridge (any string)

dto E-Saite - do e-string

dto E- und A Saite - do e- and a-string
Ex. bars 39 - 40, Viola

Note: The symbol ( Griff ) in the above example occurs on the viola A string (bar 39), changing to the D string in the following bar and demonstrates the position of the bow on the bridge. The Z placed through the stem of the symbol indicates the style of bowing which, in Cervetti's score, indicates a tremolo. The notes are beamed spatially and placed within a tempo of \[ \frac{1}{n} \] (= 1 second per bar).

The entire symbol requires the bow to be played on the bridge, as tremolo double stops. The strings are indicated by the positioning of the symbol on the stave.
Example 253. Bowing : Bouncing across Bridge : at Frog

Composer  String Quartet  Date  Sign/Explanation
Berio      Sincronie      1963-4  

This is yet another 'bridge shaped' symbol
Berio uses to signify the proximity of the bow to the bridge. The ascending arrow placed through the arch from left to right (→) indicates:
bouncing at the frog across the bridge.
The words (frog) accompany the symbol.
Ex. p. 3, between 7 & 8 all instruments

Note: In the above example, the fact that the bowing is done at the frog, with separate strokes made individually without any independent rapid repeating of the note, accompanied by a dynamic marking of ff, categorises the bowing movement as a *staccato*. Modifications are made to this standard technique and include: *sautille* - a short bow played in rapid tempo in the middle of the bow, *ricochet, jeté* or *getato* - done by throwing the bow on the string to produce a series of rapid bouncing notes in one bow. None of these techniques are new to the 20th century but playing *staccato across the bridge* is, and this places it firmly in the group of 20th century innovative bowing strokes which add fresh shades of string colour to the sound.

Example 254. Bowing : On the Bridge : Savagely

Composer  String Quartet  Date  Sign/Explanation
Ligeti      No. 2          1968  

wild, ganz auf dem Steg wie ein schriller Schrei- savagely, entirely on the bridge, like a shrill shriek
Ex. Mov. IV, bars 48-50. Violins 1 & 2
Note: Instructions for 20th century techniques, when required, are often written into a score using traditional notation. The example above demonstrates this point.

Example 255. On the Bridge: Toneless

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td>Gran Torso</td>
<td>1971-6-8</td>
<td>auf Steg tonlos - toneless at the bridge</td>
</tr>
</tbody>
</table>

Ex. p. 3, bar 23 - 24, Violin 2

Note: In bar 24, the position of the bow is indicated by both the words auf Steg tonlos - toneless at the bridge and by a symbol representing the bridge ( ). The beams attached to the notes regulate duration within the overall spatial relationship of the bar. Notice the absence of the stave for the toneless note and its reintroduction for the open strings (G & D) that follow. In the Viola part, the ‘bridge’ symbol is found appended to the note ( a ) which obligates the inclusion of the stave.

Lachenmann gives a general instruction when bowing either on the wood of the bridge, the side of the body or the tailpiece: .... kann und muss der Bogendruck eventuell doch wieder etwas intensiviert werden - the pressure can and must eventually be somewhat reinforced.
Example 256  Bowing : On the Side of Bridge
Composer  String Quartet  Date
von Biel  Qtt für Streicher  1965

Sign/Explanation

e  Auf der Seite des Stegs streichen
(Frosch und unteren Teil des Bogens)
Bow on the side of the bridge. (Use nut
and lower part the bridge)
Ex. p. 5, Cello ‘line’ 3, between 12 - 13

Note:  The third symbol in the example above relates to the position of the bow. The first two
instruct that the bow be played on the bridge.

Example 257.  Bowing : On the Side of Bridge
Composer  String Quartet  Date
Penderecki  Qtto per Archi  1968

Sign/Explanation

*) n n n n sim
Symbol and the explanation in the
score : *) mit den Bogen auf der rechten
Schmalseite des Steges spielen - bow right
narrow side of the bridge
Ex. p. 19, Cello

Note:  This is a typical example of a symbol not included in the composer’s Explanation of
Symbols page. When a specific technique is used sparingly, the instruction is given at the relevant
place in the score - as in this instance, playing the bow on the narrow side of the bridge is found only once.
Example 258. Bowing : Under the Strings

Composer   String Quartet   Date
Lachenmann  Gran Torso      1971-6-8

Sign/Explanation

Bogen unter Saiten vor dem Steg - bow under the string in front of the bridge.

Lachenmann explains: For the cello, the schematic representation of the flat surface of the bridge in bars 136-166 indicates the point of contact of the bow held under the strings. 361

This example gives a clear indication of the bow position. In bar 136, further signs and symbols such as, the muted note (muting sign ©), the words legno batt, and the rectangular open note head are played to the given instruction:

Where legno battuto is required, the contact point of the wood of the bow is also indicated as a pitch, in addition to the stop of the left hand, which is often a muting stop. This pitch, notated as a rectangular open note head, is to be understood as an approximate value ..., but in this case it should be made audible by hitting the string at this point as precisely as possible with the wood of the bow. 362

Ex. p. 14, bar 136, Cello

Note: The technique involved in the above example requires that the bow be placed under the bridge and with a vertical movement strike the A string legno batt, as indicated by the arrow on the stem of the note. The left hand plays the note (b) 2 okt in a position 2/3 rds up the fingerboard.
Example 259. Bowing : Under Bridge

Composer  String Quartet  Date
Coeck  *Graphimes I II III*  1983
voor *Strijkwartet*

Sign/Explanation

\[ \text{ onder de kam stryken -} \]  
bow under bridge

\[ \text{ op de klankast trommelen -} \]  
tap on the belly

\[ \text{ met linkerhand op desnaren slaan -} \]  
strike strings with the left hand

Ex. *Graphismes III*, Line 4, Violin 2, Viola and Cello

Note: The five stipulations for each instrument, shown below, are encased in a frame which, in contemporary terms, refers to possibilities of choice. Here requirements are fixed. In the example the technical requirements, set out for all three instruments, continue to be repeated until the horizontal lines of varying widths that appear after the block, end at the double bar.

The five stipulations are:

- c. l.  
  bow c. l. (*col legno*)

- \[ \text{ onder de kam stryken -} \]  
bow under the bridge

- \[ \text{ op de klankast trommelen -} \]  
tap on the belly

- \[ \text{ met linkerhand op desnaren slaan -} \]  
strike strings with the left hand

- x  
  strike strings with left hand

- \[ \text{ play on open strings} \]

The symbols for each instrument appear in different sequences, and are repeated in an a-synchronous manner, and thus constitute yet another unconventional element in the work.
Example 260. Bowing: Behind the Left Hand

Composer: Crumb
String Quartet: Black Angels
Date: 1970

Sign/Explanation:

***) The sound of viols is produced by bowing near pegs (on "wrong" side of left hand). All players should hold bows in the manner of viol players. Violin and viola should be held like viols. The fingering will naturally be reversed, but a little practice will ensure accuracy in pitch. The beginning pitch could be indicated by a chalk mark on the fingerboard.

Ex. 6. Pavana Lachrymae [Trio]
(Der Tod und das Mädelchen),
Bars 1-4, E. Cello, E. Viola II, Viola

The reference in the opening bars is based on a set of variations from the slow movement of Schubert's String Quartet No. 14 d minor (1826), (D 810), taken from an earlier song Der Tod und das Mädelchen (1817).

Note: The sound and timbre of 16th and 17th century viols was very delicate and soft, lacking the brilliance and versatility of the modern violin. The thinner strings were less tense and the wider, and less arched bridge, enabled the playing of full chords with a shorter bow, shaped with the stick curved outwards from the hair. The instrument was held either upright, resting on the player's lap (as is required in this example from the E. Violin II and the E. Viola) or in between the legs. Crumb's suggestion that the beginning pitch could be indicated by a chalk mark on the fingerboard reflects a further difference between the structure of the viol and the modern violin. The fingerboard of the older instrument generally had frets in the form of pieces of gut tied around it and therefore the pitch was more or less fixed by the fret and not, as in later string playing, only by the placement of the finger on the fingerboard. The instruction that players should hold bows in the manner of viol players indicates that the hand be held in then established way - palm up. In an Appendix to the score, Crumb gives an alternate version to 6. Pavana Lachrymae [Trio] where ....the instruments are played in the normal manner, using sul tasto and senza vibrato to simulate the sound of viols. The technique described in the original version of Pavana Lachrymae .... like a consort of viols, is again required in the Sarabanda de la Muerte Oscura [Trio].

---

On the bowing position described in the above example, Walter Mony, in his unpublished thesis: *Avant-garde String Techniques: 1950-1975*, comments that bowing behind the left hand ‘...creates some problems of logistics for the cellist. The slanting angle of the fingerboard and its length enforces a placement of the bow arm at chest or shoulder height which is constricted, especially for string crossing to the A.’ He says further that ‘Bertram Turetzky refers to the problem of rosin spreading over the strings in the lower positions, and that this tends to cause some reluctance in performers to use this technique.’

Lachenmann deliberates how, in his quartet *Gran Torso Musik für Streichquartett* (1971-76-78), players can cope when rosin is deposited on the ‘fingered’ part of the string. He writes:

\textit{vertical shifts of the pressed bow} before the bridge above the fingerboard, produce
a kind of buzzing ... [and ] is only effective on the part of the string which has
rosin on it and should be primarily performed there. (\textit{It is impossible to prevent rosin from ending up on the part of the string where the notes are stopped: however, this rosin can be easily removed with a cloth after the performance.})

He writes further:

What is more serious is - in the cello part - the obstruction of the bow hair by the stopping hand of the cellist; which has to reach to the fourth string in the immediate proximity of the bridge, or even finger into the bow hair itself at the end of the piece, so that particles of rosin can deposit themselves there. It might be a good idea to have a second bow ready for this passage.

**Bowing : In Relation to Tailpiece**

Bowing on the tailpiece of a stringed instrument is sometimes called for in modern quartet playing to produce a single tone and is best used as a sustained sound. The technique is to press and draw the bow perpendicularly and firmly on the tailpiece to set its vibrations in motion. The resultant sound is wooden and dull and adds an unexpected sonority to string quartet playing but, as such, has limited use in the overall colouristic palette of the modern quartet.
Example 261. Bowing : On Tailpiece
Composer  String Quartet  Date
von Biel   Qtt fur Streicher  1965

Sign/Explanation
▼ Auf Saitenhalter streichen -
play on the tailpiece
von Biel, in expanding the existing
symbols of music notation, has devised
the above sign to describe the tailpiece
and, in doing so, has succeeded in com­
municating, graphically, the complex­
ities of modern thought through a
symbol that relates his intentions
adequately to the players.
Ex. p. 2, Cello, at @.

Note: The first symbol ▼ in the above example - to bow on the tailpiece - is followed by another
requiring the cellist to play over the connecting point of the strings and tailpiece on strings III and IV. Added
to which directions stipulate that the white notes relate to the length of playing time - requiring at all
times a value of between 4,5 ± 1,0 seconds duration ; the direction of the bow is shown▼ with words
added for the intensity of sound : (SO LAUT WIE MöGLICH ) - AS LOUD AS POSSIBLE.

Example 262. Bowing : On Tailpiece
Composer  String Quartet  Date
Penderecki Qtto per Archi  1968

Sign/Explanation
→ mit dem Bogen auf dem Saitenhalter
spielen - bow upon the stringholder [tailpiece]
Ex. p. 9, line 3, Viola
Note: The instructions for the above symbol are placed at the bottom of the page and not, as in the case of most other requirements for new symbols, in the chart of Explanation of Symbols. The notation in this section is beamed and consists of proportionally spaced notes within bars of irregular lengths, set within a tempo marked Lento. No extra guide lines for speed are given throughout the quartet—no time units or metronome markings—and the players must, therefore, approximate the relative rhythmic tempo of each irregular ‘bar’, especially when notation other than traditional note groupings is used.

Example 263. Bowing : On Tailpiece

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holliger</td>
<td>Stqt</td>
<td>1973</td>
<td>arco auf Saitenhalter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>arco on tailpiece</td>
</tr>
</tbody>
</table>

Note: Holliger’s exacting and extensive instructions—both for notation and technique—are written in German at any and every point of this complex score. Detailed English explanations are given on separate pages at the end of the score. A page of Notes found at the beginning of the score details Holliger’s specially devised symbols for the many new techniques found of which the above example: arco on tailpiece, is one.

Lachenmann suggests that, when long bowed passages are performed on the tailpiece (Example 264. below: Cello : starting at bar 97-105 and Viola : at bar 104-128) the two instruments should have tailpieces of wood which allow a distinct rendition, and in the case of the Viola, a practically soloistic interpretation of the toneless espressivo sound.367

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367 Lachenmann, Gran Torso, 1971-76-78, Notation and Performing Techniques
Example 264. Bowing: On Tailpiece with Spherical Sound

Composer  String Quartet  Date  Sign/Explanation
Lachenmann  Gran Torso  1971-6-8  arco flaut. auf Saitenhalter (weit unten)

- arco flautato on tailpiece (far down)

sphärisches Geräusch, Bogendruck knapp unterhalb realer Tongebung - spherical sound, bow pressure not quite producing a real sound

Ex. p. 9, bar 95, Cello

Example 265.

Bogen auf Saitenhalter etwas verlagern
- shift bow on tailpiece somewhat

Ex. p. 11, bar 104, Viola

Note: In both examples above the stave is dispensed with and substituted by the bridge clef to locate the position of the bow and the square, white notes (□), represent a sound of indeterminate pitch.

Lachenmann uses the tailpiece area frequently and is very specific as to how and where the bow is to be placed. Some examples are:

nahe am Saitenhalter  near to the tailpiece  p. 9

auf Saitenhalter, intensiv streichen  on tailpiece, bow intensely  p. 10

(aber "Brümmtöne" vermeiden)  (but avoid "droning" sounds)

flaut. auf Saitenhalter wie zuvor  flautato on tailpiece like before  p. 12
Example 266. Bowing: Over Connection Point of Strings and Tailpiece

Composer: von Biel
String Quartet: Qtt für Streicher
Date: 1965

Sign/Explanation

\[ \text{Ober die Verknüpfungsstelle Saiten-} \]

\[ \text{Saitenhalter streichen} \]

Bowel over the connection point of the string on the tailpiece.

Ex. p. 7, Violin 2, between 23 - 24

Top line, symbol four

---

Example 267. Bowing: Between Bridge and Tailpiece

Composer: Cervetti
String Quartet: Zinctum
Date: 1967

Sign/Explanation

\[ \text{zwischen Steg und Saitenhalter} \]

\[ \text{(beliebige Saite)} \]

- between bridge and tailpiece (any string)

\[ \text{dito E Saite - do e string} \]

\[ \text{dito E- und A- Saite} \]

do e - and a - string

\[ \text{dto alle vier Saiten} \]

( arpeggio) - four strings

Ex. bars 361-363, all instruments

---

Note: In the above example the symbol \( \text{pizz. mit der Stellschraube (des Bogens) - pizz. with the nut} \) indicates the position of the bow - between bridge and tailpiece - to be played simultaneously on two strings in each instrument, respectively as follows:

As explained in an earlier example, the Z placed through the stem of the symbol indicates the style of bowing which in Cervetti’s score indicates a tremolo. The notes are beamed and spatially placed within a tempo of |---| (≈ 1 second per bar).

Therefore, the entire symbol requires the bow to be played between bridge and tailpiece, in tremolo, as double stops, on the strings as indicated by the position of the symbols on the stave.

Example 268. Bowing : Between Bridge and Tailpiece

Composer  String Quartet  Date
Penderecki  Qtto per Archi  1968

Sign/Explanation

zwischen Steg und Saitenhalter, auf zwei Saiten spielen - between bridge and tailpiece, on two strings.

zwischen Steg und Saitenhalter Arpeggio auf vier Saiten ausführen - between bridge and tailpiece arpeggio on four strings

Ex. p. 12, line 2, Violin and Cello

Note: The example illustrates both techniques described above: between bridge and tailpiece, on two strings and between bridge and tailpiece arpeggio on four strings, with an added requirement for the first in the repeated dots, placed above the sign, starting and finishing at either end of the solid line: ... The symbol indicates the quickest repetition of the note. At this point of bow and string contact, the pitch is indeterminate with the symbol being placed outside the stave - a position Penderecki uses consistently for this technique. The traditional arpeggio sign has an added arrowhead to signify the direction for the required bow movement across the four strings - in this case from lowest to highest.
Example 269. Bowing : Between Bridge and Tailpiece

Composer: Brown
String Quartet: St. Qt.
Date: 1970

Sign/Explanation:
"x" Pizz. arco batt.
using whichever technique "below the bridge" (between the bridge and the tail piece) indicated by an "x" placed on the line or space corresponding to the open string on the instrument. The pitch must be on that string and in the given rhythm.

Ex. last section, Violins 1 & 2
(Violin 1, line 2 ; Violin 2, line 3)

Note: The example above includes the symbol x for the pitchless sounds in both pizz. and arco placed in the relevant spaces for the open strings.

Example 270. Bowing : Between Bridge and Tailpiece

Composer: Sculthorpe
String Quartet: St. Qt. No. 8
Date: 1973

Sign/Explanation:
Harmonic, played between bridge and tailpiece on string indicated

Ex. Mov. II, p. 8, line 3, Cello
played col legno as double stop on strings D & A
played as double stops on strings A & E with the added instruction found at the start of the movement:

\textit{col legno} : hold instrument in vertical position which remains unchanged to the end of the movement.

\textbf{Ex. Mov. IV, p.14, line 2, Violin 1}

\textbf{Example 272. Bowing: Between Bridge and Tailpiece}

\begin{tabular}{|c|c|c|}
\hline
Composer & String Quartet & Date \\
\hline
Brandmüller & \textit{Zweites Stütt} & 1985-6 \\
\hline
\end{tabular}

\textbf{Sign/Explanation}

\textbullet zwischen Steg und 2 \textbullet \text{Saitenhalter}

\textbullet streichen (sehr Hoher Ton !)

\textbullet bow between 2 strings and bridge (very high pitch !)

\textbf{Ex. p. 19, bar 195, Violin 2}

\textbf{Note:} The graphic design showing the number of strings to be played, and all other explanations, are placed at the bottom of the page. All additional technical and colouristic requirements are explained in this way.

The added 20th century symbol is the heavy horizontal arrow $\rightarrow$ which, while it continues to be present, generally functions as a continuous repetition of a preceding item. In this section of the score it continues unbroken across twenty-three-and-a-half bars and refers, in this above example, to the (very high pitch\textit{ed} !) notes enclosed within the traditional repeat sign.
Example 273. Bowing : On Tailpiece
Composer  String Quartet  Date  Sign/Explanation
Brewaeys  St. Qt.  1989  aero on tailpiece no pressing
Ex. p. 17, bar 153, Viola

Note: Numerous playing instructions are written into Brewaeys’s score. The above is one example of many.

Example 274. Bowing : Between Pegs and the Fingerboard
Composer  String Quartet  Date  Sign/Explanation
Cervetti  Zinctum  1967  zwischen Wirbeln und Griffbrett
- between pegs and fingerboard
Ex. Bars 11-14, Viola and Cello

Note: The sound that arises from plucking the strings between the pegs and fingerboard is somewhat dull, of indeterminate pitch and without resonance. When bowing however, the sound is high pitched, resembling squeaks. The indeterminate aspect is confirmed by the fact that when the symbol appears, Cervetti dispenses with the stave. Added to the technique - as explained in an earlier example - the Z placed under the symbol indicates the style of bowing, which in Cervetti’s score indicates a non-rhythmic tremolo. The tempo is controlled by a time unit of \[ \frac{1}{1} \] (= 1 second per bar).

The entire symbol requires the bow to be played in a sustained non-rhythmic tremolo, between the pegs and the fingerboard, within the controlled speed of 1 second per bar.
Style of Bowing

Bowing: Pressure - Creating Noise factor

Example 275. Bowing: Pressure - Creating Noise factor

Composer | String Quartet | Date | Sign/Explanation
von Biel | Qtt. für Streicher | 1965 | 🎷

Geräuschfreie Tonhöhe -
noisy sound

Geräusch ohne erkennbare Tonhöhe.
Diese ergibt immer durch
übermäßigen Druck des Bogens).
Bogen viel am Frosch verwenden -
A noise without a recognisable pitch. This is
the result of much bow pressure. (Use bow
frequently near the frog).

Ex. p. 6, Violin 1, at 20.

Note: In the foregoing example both styles of bowing appear in a single line. The distinction
between the two is found in the positioning of the U shaped symbol relative to the note. When the first
sound quality is required - as seen in the second and sixth notes of the passage - the U is incorporated
into the note ( 🎷 ). When a more intense bow pressure is needed, rendering the note pitchless - as
seen in notes four and eight - then the U is placed above the note ( 🎷 ). Black harmonics have a
value of between $1.0 \pm 0.25$ seconds, while the white harmonics are given a duration of between $2.25 \pm
0.5$ seconds.
Example 276. Bowing: Pressure - Creating Noise factor
Composer: Hiller
String Quartet: No. 5
Date: 1962

Sign/Explanation:
△...△ indicates to the player that he should produce a rasping grating sound by slowly dragging his bow across the string while at the same time damping the string by pressing down on it so suppress its vibrations.
Ex. Variation 10 (Aria)

Example 277. Bowing: Pressure - Creating Noise factor
Composer: von Biel
String Quartet: Qtt. für Streicher
Date: 1965

Sign/Explanation:
Mit übermäßigem Druck langsam ziehen. Die dadurch entstehenden aufeinanderfolgenden Einzelimpulse sollen nicht durch ruckartige Bewegungen des Bogens entstehen, sondern durch die starke Reibung zwischen Saite und Haar - Using excessive pressure, pull the bow slowly. This results in consecutive impulses which should not be formed through jerky movements of the bow but through strong friction between string and bow hairs.
Ex. p. 4, Violin 1, between 10 and 11

Note:
In the above example both pitched and non-pitched notes are found. A stave is used for the first category and abandoned for the second. The three directives involved at this particular point are:
- the _OCC_ shaped symbol describes the style of bowing
- the Roman IV indicates the string and
- the diamond-shaped black note relates to the duration, i.e. between 2,25 ± 0,5 seconds.

The lack of stave implies a note of indeterminate pitch, induced by the pressure of the bow.
Example 278. Bowing: Pressure - Creating Noise factor

Composer: Druckman  
String Quartet: St. Qt. No. 2  
Date: 1966

Sign/Explanation:

\[ \frac{a}{b} \]  
choke by pressing bow too hard and pulling too slowly for normal sound.

Ex. p. 17, at 23, all instruments

Note: Nearly forty years ago Alban Berg indicated 1/4 and 3/4 microtonal pitch changes in the Chamber Concerto (1925) with the same symbol chosen by Druckman to represent a choking style of bowing. ( \( \geq \) ). The added indicators are the letter T (sul tasto), and a series of broken lines indicating the number and length of strokes to be chock[ed] by pressing bow too hard and pulling too slowly for normal sound.

Example 279. Bowing: Pressure - Creating Noise factor

Composer: Becker  
String Quartet: No. 2  
Date: 1967

Sign/Explanation:

\[ \times \]  
 abol Zeichen starker Bogendruck und übergehen in ein brutales Kratzen von ca. 30".
Danach wieder wie zuvor ... - At this sign forceful bow pressure and then change to one that is fierce and scratchy from ca. 30". Thereafter return as before ....

These instructions appear at the bottom of the page

Ex. 'bars' 128-129, all instruments.
Note: The duration of each bar is structured throughout in time units, consisting of an irregular number of seconds per bar. For example, the above example lasts for 32", while the previous bar (127) has a time span of 8" and the bar following (129), 4". The duration of the notes is shown either in conventional notation or, as in the above example, predominantly by the length of the beamed horizontal lines.

Example 280. Bowing: Pressure - Creating Noise factor

Composer | String Quartet | Date | Sign/Explanation
---|---|---|---
Penderecki | Otto per Archi | 1968 | >>>>>>>

---

Note: The duration of the notes in the foregoing example is shown in a series of horizontal lines and dots — · — ·· coupled with the accents placed above the stave, *

>>> , with the added dynamic requirement of fff, all of which combine to form the intensity and duration required for the grinding sound. As previously explained, this instruction is placed at the bottom of the page and not in the chart of Explanation of Symbols, as is generally the case for new symbols.
Example 281. Bowing : Pressure - Creating Noise factor

Composer: Ligeti
String Quartet: No. 2
Date: 1968

Sign/Explanation:
*allmählichen Ton mit Kratzgeräusch -
gradually : tone with scratching noise
Ex. Mov. II, at 19, Violin 1

Note: The scratching noise is found in several parts of the score and is used with a variety of different bowing actions, some of which are used throughout a movement.

The following instructions are found at the start of Movement IV:

Presto furioso, brutale, tumultoso
j= 160

The following instructions are found at the start of Movement V:

*) Diese Satz ist in übertriebener Hast, wie verrückt, zu spielen (mit Ausnahme von einigen pp -Stellen) stets mit äußerster Kraft : den Bogen stark auf die Saiten drücken (Kratzgeräusch) Richtig wurde gespielt, wenn zum Schluß viele Haare des Bogens lose geworden sind

This movement is to be played with exaggerated haste, as though crazy and (except for a few pp passages) with the utmost force. Press the bow strongly on the strings (scratching noise) If this movement is played properly, a lot of bow hair will be loose by the end

At the end of Movement IV, Ligeti advises the players to remove any hairs from the bow that might have broken as well issuing a further instruction:

(nicht stimmen, selbst wenn irgend eine Saite nachgelassen hätte .... ) - (do not tune, even through a string may have slackened)
To understand the reasoning behind Ligeti's direction not to retune the strings becomes clear in Movement V, which shows asymmetrical note groupings in all instruments that continue almost without interruption until the end - (81 bars) - played at an extreme *tempo* marking: *Prestissimo possible*. These requirements and the use of constant 'chromaticism', render obsolete any attention to accurate pitch.

Playing 'in tune' has been an accepted requirement for any string player, and playing 'out of tune' abhorrent and quite unacceptable. Leopold Mozart's 1756 publication cautiously reminds players 'that an instrument must be well in tune with others goes without saying ....' 368. As heard in the earliest recordings (1904) of the Hungarian Joseph Joachim (1831-1907) and the Spaniard Pablo Sarasate (1844-1908) - who came to the gramophone at the end of their careers - and the recordings or live performances of others such as the Hungarians Leopold Auer (1845-1930), Jenő Hubay (1858-1937), Carl Flesch (1873-1944) and Joseph Szigeti (1892-1973); the Czechoslovakian Otakar Sevcik (1852-1934), the Belgian Eugène Ysaÿe (1858-1931), the Romanian Georges Enescu (1881-1955), the Frenchman Jacques Thibaud (1880-1953), the Russians Jascha Heifitz (1902-1987), Nathan Milstein (1902-1992) and David Oistrakh (1908-1974); the Austrian Fritz Kreisler (1875-1962), the Russian/American Isaac Stern (1920-), the Americans Yehudi Menuhin (1916-1999), and Ruggiero Ricci (1918- ) and the Israeli Itzhak Perlman (1945- ) - all in this long list of international artists have exhibited, and still exhibit, integrity of intonation - if the work demands it!

Further, the contemporary refinement and modification within major and minor diatonicism, for example, raising the pitch of leading note and major third, or alternatively lowering the minor 3rd, - which Hindemith calls '.... the delights of pure intonation by the continual displacement of the comma in string-quartet playing ....' 369 - has resulted, up to now, in impeccable intonation being an essential component of string technique. However, the application of 'faultless' intonation in modern quartets post the 1950s has, for many reasons, become less of a priority despite the use of traditional noteheads and staves. Apt examples of a total disregard for pitch are, as shown earlier, in Movement V of the Ligeti quartet and in much of Holliger's, Lachenmann 's and Heyn's which state that absolute pitch is, for various reasons, not an important factor.

Lachenmann states that as a result of the previous section of "wild scordatura" - "wilden Scordatur" - the resultant pitches of the rectangular notes (white or black) towards the end of the quartet, are no longer predictable. In the above example, the further requirements: "f" tonios - "f" pitchless, reinforce the designated purpose of rectangular notes in this score.

The scordatura adjustment is given at the outset of the score.

Example 283. Bowing : with a Disregard for Pitch
Extreme Tempo and Chromaticism :

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ligeti</td>
<td>No. 2</td>
<td>1968</td>
</tr>
</tbody>
</table>

No perceptible metrical division or pulsation occurs in this movement

Ex. Mov. V, p. 26, line 3, all instruments
In a different way from the extreme aspects of chromaticism or bow pressure, Earle Brown in the use of graphic notation in the String Quartet (1970), (Example 284 below), requires the whole of the penultimate section, lasting about one minute, to be played in such a manner that the resultant sound totally disregards the pitch element. The quartet includes a number of specific techniques which are carefully written into the score. These are clearly demonstrated in the following example.

Example 284. Bowing : Inarticulate with a Disregard for Pitch :
Graphic Notation

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown</td>
<td>String Quartet</td>
<td>1970</td>
</tr>
</tbody>
</table>

Graphic notation - small, transient, inarticulate sounds : (last but one event in the work).
The entire section is to have the sound quality of the *) above “inarticulate” style; observing all the varieties of technique of (pizz., pont., nat., etc.) ....

Ex. penultimate section last page all instruments

Note: The *) refers to a recommendation made in the Programme Notes under the heading : Strings - abbreviations and unusual indications, where Brown qualifies and explains his techniques, included in which are the requirements for inarticulate sounds, played in a number of different ways as follows:

- Inart. Nat using whichever given technique in a kind of inarticulate bowing technique ;
- Pont. not giving full normal sounding value to the notes, a generally fast, random
- Tratt. slurring of bow action ; not full glissandi unless indicated, “gl” or “gliss”
- Tasto although short “bending” glissandi may be included as implied by the graphics.
- AFAP = As fast as possible

From this description, the (inart.) pont. found in the Violin 2 and Viola parts are to be played : not giving full normal sounding value to the notes, a generally fast, random slurring of bow action .... inarticulately, with the ‘pitch’ varying according to the graphic movements within the stave.

Brown makes further use of the inart. colouristic techniques in the last section of the score. However, the overall effect is far removed from that required in Ligeti’s Example 281, in that the outcome of Brown’s graphic notation is moderate, creating fleeting, mobile contours of sound.
Example 285. Bowing: Pressure - with a Disregard for Pitch:
Graphic Notation

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Henze</td>
<td>No. 5</td>
<td>1976-77</td>
<td>wild noch steigern</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>furious further increased</td>
</tr>
</tbody>
</table>

Ex. p. 28, Move. II, bar 130, all instruments

Note: At the start of bar 130, (not shown), an extreme dynamic marking of $ffff$ is given. From this point the instruction wild - furious, found above the stave, lasts for 20", after which the graphic notation outlines the sound in a variety of irregular rhythms and durations to be played with increased ferocity, thus creating a series of brusque, indeterminate pitches. Graphic notation is not used again in the any of the six movements of the quartet.

Another composer not specific about pitch is Volker Heyn who, in discussing his composition philosophy, remarks of his Sirènes für Streichquartett (1982):

> Amidst the great amount of special performance techniques ....there are cases where the pitch and the expected sound-result do not correspond to the notation ...the desired complex instruction of sound and noise contains a certain ratio of unpredictability within it. The chance factor of the sound is part of the compositional idea and thus a constituent element of the musical text.\(^{370}\)

\(^{370}\) Heyn, Sirènes für Streichquartett, (1982), Performance Instructions, Remarks
Example 286. Bowing: Pressure - Creating Noise factor

Composer  String Quartet  Date  Sign/Explanation
Crumb  Black Angels  1970  *) Gradually increase bow pressure until pitch becomes pure noise

Ex. 5. Danse Macabre [Duo]
13 times 7, p. 9, E. Violin 1

Note: All Crumb’s instructions are written into the score. At times they accompany the music at the relevant points and at other times asterisks (*), placed at the bottom of the page, define additional technical and colouristic requirements.

Example 287. Bowing: Pressure - Creating Noise factor
Double sets of Staves

Composer  String Quartet  Date  Sign/Explanation
Holliger  Statt  1973  [ ] Ab - Aufstrich/zuviel
V  Bogendruck - much bow pressure

Ex. p. 14, A 14, all instruments
Note: In much of the Holliger score a double set of staves is found. In the lower staves he places the notes and in the upper the technique as well as written instructions. In this example, however, only two of the upper four staves are used, with instructions for Viola and Violin 1 on the one stave and for Cello and Violin 2 on the other. The symbols of interlocking up and down bows, illustrated in the above example, are used for excessive bow pressure. The fact that notes appear in the lower set of staves gives the passage a degree of pitch, despite the use of much bow pressure. The composer’s instruction in the English translation of Notes, states that at A 14 the bowing of the Viola and Violin 1 must be: very noisy. Extensive use is made of this sound throughout the quartet.

Example 288. Bowing: Pressure - Creating Noise factor
New Symbol

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td>Gran Torso</td>
<td>1971-6-8</td>
<td></td>
</tr>
</tbody>
</table>

The above sign, for pressed bowing, devised by Lachenmann, is attached either to an additional graphic symbol or a note to indicate the different bow positions and techniques required. He is very specific about what is needed, and explains at length the exact requirements for the different bow positions.

The following examples (Examples 289-301), all taken from the quartet Gran Torso (1971-6-8), demonstrate Lachenmann’s use of a variety of effects and techniques that emanate from exerting an inordinate amount of bow pressure on different parts of the strings and instruments within the quartet.

In the notes on Notation and Performing Techniques he stipulates the following:

**Bowing pressure**

Besides the ‘normal’ bow pressure which is varied as usual by the indications of volume and intensity, the *flautando technique* and the *pressed bowing* also play an important role. To guarantee a better control of the bow, it is recommended to hold it in the fist wherever these two techniques are called for.⁷¹

Example 289. Bowing: Pressure - Creating Noise factor
Pressed Bowing: In Different Bow Positions

At the Frog

*pressed bowing*

\[\text{At the frog, maximal bow pressure with extremely restrained bowing which, however, should never falter unless this is expressly called for. The result should always be a dry, sharply perforated rattling except for imperfect intermediate levels at transitions from the flautato.} \]

⁷¹ Lachenmann, Gran Torso, *Notation and Performing Techniques*
This action should never be performed too closely to the bridge; exception: Violincello, bars 262-282.372

Example 290. Bowing: Pressure - Creating Noise factor

<table>
<thead>
<tr>
<th>T</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>

Sign/Explanation

Ex. p. 24, bars 262-264, Cello

The above example demonstrates various innovative aspects of 20th century technique and notation:

- dispensing of the stave (no pitch is required from the bow stroke)
- the use of the bridge clef to show the point of bow contact and the distance from the bridge
- the individually devised symbol for maximal pressed bowing, at the frog near the bridge, creating
- a noise factor resulting in a dry, sharply perforated rattling.....

Example 291. Bowing: Pressure - Creating Noise factor

Pressed Bowing: In Different Bow Positions

Execution before the Bridge

Execution before the bridge:

Over and near the edge of the fingerboard or - where indicated accordingly - at the neck.
The pressed bow functions simultaneously like a 'stop' which shortens the string and alters
the brightness or the pitch of the clattering sound by its shift. Occasionally, this brightness
or frequency of the clattering is then choked by a muting stop indicated at the left hand.373

Sign/Explanation

scharf gepreßt über Griffbrett-Kante -
incisively pressed above side of fingerboard

Ex. p. 18, bars 189-190, Viola

---

372 Ibid
373 Lachenmann, Grain Tones, Notation and Performing Techniques
Note: The O and \( \oplus \) signs at the bottom of the stave indicate the release of muted strings. The first O involves stop muting by pulling the hand away from the strings, and the second \( \oplus \): muting sign, generally to be executed by playing the hand lightly over strings ... and the audible release of the indicated and previously muted strings ....
This also produces the following 'wawa' effect.

Example 292. Bowing: Pressure - Creating a "Wawa" Effect
Incisively pressed over Edge of Fingerboard

A "wawa" effect

A "wawa" effect is produced starting at bar 188 in the Viola and at bar 225 in the other strings by the On-and-Off mute stop
(described above)

Example 293. Bowing: Pressure - Creating Noise Factor
Grinding Sound

Lachenmann points out:
In bars 1-22, the schematic distinction between light and dark indicates the point of contact of the bow “grinding” on the back of the instrument between the nut (“dark” grinding) and the middle of the bow or the lower part of the upper bow half (“light” grinding).374

The whole section, therefore, consists mostly of indeterminate pitches.

Grinding Technique: Lachenmann’s grinding technique, indicated by this symbol ( ), is used on different parts of the instruments and in various bowing positions. However, it is used, not only in isolation, but is often combined with added stipulations, indicated in graphic notation - the key to which is found in the Notation and Performing Notes - and is accompanied by written instructions, as demonstrated in the following two examples.

Example 294. Bowing: Pressure - Creating Noise Factor
Grinding Sound Tilting Bow Sideways

<table>
<thead>
<tr>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stange *) aufsetzen (Knirschen) strich</td>
</tr>
<tr>
<td>*) durch seitliches Abkippen (knirschen)</td>
</tr>
<tr>
<td>bow stroke with stick grinding</td>
</tr>
<tr>
<td>*) by tilting sideways (grinding)</td>
</tr>
</tbody>
</table>

Ex. p. 2, bar 20, Violin 1

374 Lachenmann, Notation and Performing Techniques
Note: The first symbol of bar 20 (né) is consistently used throughout the score to indicated the knirschen - grinding action of the bow added to which, into the space traditionally occupied by the clef, Lachenmann writes the following instructions:

\[ \text{Bogen} \quad \text{Bow} \]
\[ \text{mitte} \quad \text{middle} \]
\[ \text{Rückwand} \quad \text{at the back} \]

The instruction Rückwand - Back (of instrument) is placed in the 1st Violin ‘clef’ space at the start and continues until Bar 22.

Example 295.
Bowing : Pressure - Creating Noise Factor

Sign/Explanation

\( \text{(Knirschend auf Rückward)} \)

grinding on back

Ex. p. 2, bars 9-10

Note: When the instructions Bogen Mitte and Bogen nicht absetzen are added, the stroke is played in the middle of the bow and not lifted after the grinding action, indicated by this symbol (\( \)).

Another degree of grinding : scarf knirschend-sharply grinding is required at (p. 3 bar 27).

Example 296. Bowing : Pressure - Creating Indeterminate sound
On Cloth Binding of Strings

Execution behind the bridge

Pressed bowing, primarily near the tailpiece, on the cloth binding of the strings. The shift in toward the bridge is possible in order to reinforce the intensity of the sound and occasionally even called for. The sound result should recall a flutter-tongue placed by a muted trombone or trumpet. The dull, muffed grating or whining, whimpering sound which results from such a technique when it is performed too closely to the bridge is to be strictly avoided.
Note: The example above demonstrates the use of the following 20th century innovations:

- the string clef [which] illustrates actions on the four string below the bridge between the bridge and the tailpiece. Bar 16: III string - D string, Violin 2
- the technique of bowing behind the bridge *arco (auf umspinning)* - *arco* on the wrapping
- dispensing of the stave in certain parts
- specifically devised symbol for pressed bowing, behind the bridge.
  The sound result should recall a flutter-tongue placed by a muted trombone or trumpet.
- sounds of indeterminate pitch

**Conflict in Notational Symbols**: The string clef, found at the beginning of the line determines the string or strings on which any action takes place. In the example above, Violin 2, bar 17, there seems to be a contradiction between the location of the ‘pressing’ symbol placed on string II (representing the A string) and the given Roman symbol I (reflecting the E string) - they are not in agreement. The fact that in the Viola part of the same bar (17), the Roman II corresponds to the symbol’s location on string D seems to confirm that an error has occurred in either one or other symbol of Violin 2, bar 17.

**Pressed Bowing Technique**: Lachenmann uses the pressed bowing technique extensively and directs its use with varying degrees of intensity and a selection of different bow placements on the instruments, resulting in a number of distinct effects of indeterminate pitch as shown in the list following. In each case the pressed bowing symbol (*n n n n*) is accompanied by written instructions in the relevant part of the score, as demonstrated in the two examples following:
Example 297. Bowing: Pressure - Incisively Pressed

Sign/Explanation
pressed bowing and accompanying words
\textit{au\ss erst scharf gespreizt} very incisively pressed
Ex. p. 1, bar 7, Violin 2

Example 298. Bowing: Pressure - Pressed but Fluid

Sign/Explanation
\textit{gespreizt aber "fließend"} pressed but "fluid"
Ex. p. 20, bar 219, Cello
Varied Degrees and Positions of Pressed Bowing

- **scharf gespreßt**
  - incisively pressed  
  - p. 5
- **am Saitenhalter gespreßt**
  - pressed at the tailpiece  
  - p. 6
- **äußerst scharf gespreßt**
  - very incisively pressed  
  - p. 6
- **enge Ruckbewegungen**
  - short jerky motions  
  - p. 19
- **Bogenmitte steil Richtung Steg**
  - press middle of bow vertically 
  - p. 19
- **drückten**
  - toward the bridge  
  - p. 19
- **immer am Saitenhalter gespreßt**
  - always pressed at the tailpiece  
  - p. 20
- **scharf gespreßt am Saitenhalter**
  - sharply pressed at tailpiece  
  - p. 20
- **am Frosch gespreßt**
  - pressed at frog  
  - p. 20
- **am Saitenhalter scharf gespreßt**
  - at tailpiece incisively pressed  
  - p. 20
- **Bogen immer angedrückt lassen**
  - hold bow pressed down  
  - p. 20
- **gespreßt aber “fließend”**
  - pressed but “fluid”  
  - p. 20
- **ganz hart perforiert**
  - very strongly perforated  
  - p. 21
- **Bogen festgespreßt lassen**
  - keep bow pressed firmly  
  - p. 22
- **gespreßt am Hals**
  - pressed at the neck  
  - p. 22
- **äußerst eckige Bewegungen mit aufgepreßtem Bogen**
  - extremely angular motions with pressed bow  
  - p. 22

**Note:** Lachenmann is specific about the quality and requirements of pressed bowing. At the tailpiece, for example, he details a number of differences as follows:

- **gespreßt** - pressed: **immer gespreßt** - always pressed: **scharf gespreßt** - sharply pressed
- **scharf gespreßt** - incisively pressed:

An interesting example of the pressed notation is found in the Cello part at bars 71-72 where the graphics indicate the slowing down of the bow movement:
Example 299. Bowing: Pressure - Slowing Down

Sign/Explanation

*am Saitenhalter (Bogen verlangsamen)*
at the tailpiece (slow bow down)
*Rhythmus approximativ - approx.*
rhythm

Ex. p. 6, bars 71-72, Cello

Note: The pressing motion is approximate as explained in the score and shown in the irregularly spaced notation.

The action of pressing the bow does not continue in a single position and often moves from one area to another and, as demonstrated in the following Example 300, it moves from well over the fingerboard towards the bridge:

Example 300. Bowing: Pressed - Fingerboard to Bridge

Sign/Explanation

*gespreßt*
pressed

Ex. p. 20, Violin 1, bars 217-219
Note: The design of the bridge clef at bar 217 reproduces the front of the instrument between the tailpiece and the middle of the fingerboard, and allows the depiction of the point of contact of the bow on the instrument as well as its distance from the bridge. In addition, at bar 218, the graphic notation displays a continuous row of pressed bow symbols and a horizontal dotted line, in the upper part of the bar, to indicate the position of the bridge. The use of these two symbols, i.e., (bridge clef and the dotted horizontal line) determine the positions of the bow movement. Thus the bow starts well over the fingerboard and moves towards the bridge. In bar 219 the bow position remains constant, pressed nearer the bridge. This point is determined by the symbol’s unchanging relationship to the horizontal dotted ‘bridge’ line. The bow moves from the A string II to E string I and then finally on the G string IV.

Lachenmann is consistent with his choice of symbols as in the later quartet II. Streichquartett “Reigen seliger Geister” (1989), the same symbol for pressed bowing is used. He stipulates particularly that the bow must be held in the fist: Bogen in Faust in the pages of Hints on Notation and Performance.

Luc Brewaeys in the String Quartet (1988-89) chooses the same symbol as Lachenmann to show the Pressed drawing of the bow so that a dry rattling of the string is heard (never a scratching sound!) - The bow is drawn across the end of the finger board, thus away from the bridge! The difference in notation is that Brewaeys attaches the symbol to a square note: 

Nicolaus Huber in his quartet Doubles, mit einem beweglichen Ton für Streichquartett (1987) makes far less use of pressed bowing and occasionally includes the following instructions written into the score at the relevant bars: Bogen etwas gepreßt

Example 301. Bowing: Pressure - Creating Noise factor

Rattling Sound

Lachenmann uses two different German words interchangeably when requiring a ‘rattling’ sound: schnarchend - snoring and ratternd - rattling. For example, klingt ab hier “schnarchend” - sounds “rattling” from here on: etwas flüssiger ratternd - rattling somewhat more fluidly: “mühselig” ratternd - weary rattling: stockend ratternd über Griffbrett-Vorderkante - faltering rattling over front edge of fingerboard, all appear on the same page (p. 20). Further, on page 22, “schnarchend” again appears, but this time the English translation is given another meaning - grating, which leads to the conclusion that the original use of the word schnarchend should be accepted as generally requiring a bow technique that produces a “rattling” or “grating” sound.

The Example below reveals two of the above instructions etwas flüssiger ratternd - rattling somewhat more fluidly and “mühselig” ratternd - weary rattling.

On p. 22, Cello, the words weich knatternd - softly rattling [crackling], accompany the symbol for pressed notation.
etwas flüssiger ratternd - rattling somewhat more fluidly:
"mühselig" ratternd - weary rattling
Ex. p. 20, bars 214-215, Violin 2

Note: The bridge clef at the start of the line locates the playing position of the bow, which in the above example is just over the fingerboard. The added vertical strokes appearing at various intervals above the pressed bowing symbol (\(\text{\textbullet}\)) indicate, in conjunction with the traditional use of Roman numerals, the various string changes. No new notation for the "rattling" technique emerges and instructions for the execution of this technique is found under the heading: pressed bowing as follows:377

at the frog, maximal bow pressure with extremely restrained bowing .... The result should always be a dry, sharply perforated rattling (except for imperfect intermediate levels at transitions from the flautato). This action should never be performed too closely to the bridge; exception: Violincello, bars 262 - 268.378

Example 302. Bowing : Pressure - Creating Indeterminate Sound
Words and Symbol

Composer    String Quartet      Date
Rihm        Drittes Stqt.        1975

\(\text{\textbullet}\) This sign, representing a strong, scratchy sound is accompanied by the words: \(\text{immer weniger Kratztöne, immer}\)
\(\text{\textbullet}\) - less and less scratchy tone, still \(\text{\textbullet}\), and becomes increasingly less effective to the end of the movement within a molto ritardando
Ex. Part VI, last 5 bars

377 Ibid.
378 Lachenmann, Grup Turbo 1971-76-78, Notation and Performing Techniques
Note: At the start of the last passage the explanation under the stave is more explicit:

x) extrem starker Druck .... erklingt ein stark geräuschhafter Kratzton - the sound to be vigorous and frenzied, thus producing, in the upper two instruments, a type of noise that obliterates pitch.

Example 303. Bowing : Pressure - At Frog : Creating Noise Factor
Symbol
Composer  String Quartet  Date  Sign/Explanation
Globokar  Discours VI  1982  
| mit großem Druck auf der Saite, am  
Frosch (Geräusch) -
with heavy pressure on the string, at the frog of
the bow (noise)
Ex. p. 10, Viola

Note: The graphic design clearly explains the contact part of the bow and the added instruction to bow mit großem Druck - with heavy pressure, results in an intense sound of indeterminate pitch. An added peculiarity, of many in this quartet, is that in the single line from which the example above is taken, almost every note-grouping of ones, twos and threes, totalling 37 notes, is played with a different technique and at a different point on the string.

Example 304. Bowing : Pressure - Creating Grinding Noise Factor
Symbol : Beamed Notation : in Tremolo
Composer  String Quartet  Date  Sign/Explanation
Heyn  Sirènes für Stätt  1983  
| Am Ende der Tondauer kommt der  
Bogen quasi knarrend zum Stehen,  
wobei der Klang jäh abgebrochen  
wird -
bow at the end of tone-duration comes to a  
quasi grinding halt, whereby all sound is  
abruptly broken off
Ex. p. 44, bars 64-65, all instruments
Note: The example, taken from Violin 1 & 2, has the same requirements for all the players: 1/4 tone tremolos, within beamed notation, gradually slowing down until the symbol at the end of the beam which indicates that the bow come to a quasi grinding halt, whereby all sound is abruptly broken off. Heyn devises many symbols for specially devised techniques.

Example 305. Bowing: Pressure - Creating Noise Factor
Symbol and Words
Composer    String Quartet    Date
Gielen       Stqtt.           1983

\[
\begin{align*}
\text{Sign/Explanation} \\
\square\square\square \text{ Square notes in double stops} \\
\text{abgewandt}! \text{ asynchron \textit{forte, knarrend, durch \textit{überdruck zerstörter Ton.} Tonhöhen fast unkenntlich. Dazu Stimme tief knurren (auch in den Pausen)} - \text{turning their backs to each other! asynchronous, forte, creaking, tone destroyed by pressure of bow} \\
\text{Ex. 5. Satz, lines 1 and 2, all instruments}
\end{align*}
\]

At various times, described below, Gielen requires different forms of 'pressure' bowing within traditional notation, which result in powerful, indistinct sounds

Streichquartett (1983)

(no examples given)

Example 306. Bowing: Pressure - Crunching Accent
Symbol
Composer    String Quartet    Date
Coeck       Graphismes I-III  1983

\[
\begin{align*}
\text{Sign/Explanation} \\
\wedge \text{ knarsend accent} \\
\wedge \text{ crunching accent} \\
\text{Ex. Graphismes II, last bar, all instruments}
\end{align*}
\]
Note: Dependent on many factors, contemporary composers vary the intensity of accents and as such modify the traditional symbol. In the example above it is modified to point upwards ^ and not sideways >, for the stipulated crunching accent. Initially, as a result of the bow pressure, the sound is indeterminate but ends dissonantly in a chord of definite pitches:

- Violin 1 - f# : Violin 2 - flattened verlaging 1/4 tone, dg : Viola - sharpened verhoging 1/4, ff :
  Cello - middle C:

Example 307. Bowing: Pressure - Scratching Sound
Symbol and Words: Ambiguous Instruction

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brewaeys</td>
<td>String Quartet</td>
<td>1988-89</td>
<td>scratch on backside</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ex. p. 1, Bar 1, Violin 1</td>
</tr>
</tbody>
</table>

Note: The Belgian composer Luc Brewaeys lists and explains specific notation and technical requirements on the page titled: Remarks for Performance and, where relevant, also in the score. In the example above, Brewaeys has been ‘bold’ enough to ask the player to: scratch on backside. This term conjures up a somewhat disturbing picture and, if taken literally, presents a type of radicalism that supersedes the wealth of contemporary technical inventions that explore and uncover new experiences to promote the evolution of the genre!

However, on a more serious note, a question mark hangs over what is wanted by such a stipulation, as certain ambiguities exist as to how and where the ‘scratching’ is to take place. The accompanying irregular line following the note $\text{fffffff}$ does not clarify the point beyond indicating a scratchy motion. Questions arise as follows. Is the movement made:

- on the string with the back of the bow?
- with the bow on the back of the violin?
- with the back of the bow on the back of the violin?
- with the back of the bow under the bridge?
- without the bow?
In answer to the above points, deductions from the notation and the use of terms in other parts of the score can be made to either strengthen or eliminate some of the suggestions. These are:

- the term *col legno* is used when the wood of the bow is wanted
- in the example above, a diamond-shaped note is placed on a stave: note (e) and represents harmonics ..., always written as they are performed
- the term *arco norm III* appears in bar 3

Therefore, the fact that a note is present on the stave suggests a movement on the string, but from thereon it is still unclear as to exactly how and where the "scratch[ing] on backside" takes place. This requirement appears a further nine times, on various instruments, again without clarification.

**Example 308. Bowing - Pressure**

Multi-Purpose Symbol: Exaggerated Bow Pressure within a *Crescendo*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willem Jeths</td>
<td>Arcate</td>
<td>1990</td>
<td><img src="attachment" alt="Exaggerated bow pressure" /></td>
</tr>
</tbody>
</table>

Note: At bar 58 a type of composite symbol clearly demonstrates the composer's intentions. In the first instance a modification to the traditional *crescendo* sign in the use of a short black sign seems to suggest the required increase in sound while the second, in the form of a downward pointing arrow, indicates the exact point where the bow is to be stopped in a specific manner, *i.e.* stuck on the string.
Bowing: Transition - from One Manner of Playing to Another

Gradual Transition or Immediate Change

Tone colour and quality of sound are acutely affected by the placement of the bow in relation to the bridge and are varied in the three basic positions, *i.e.* sul ponticello, normal and sul tasto, added to which, both speed and pressure have a profound effect on the quality of both dynamics and pitch.

Composers post 1945 have discovered ways of extending the three basic positions, thereby accomplishing tone colour changes by moving the bow in different ways as for example:

- both towards and away from the bridge
- either in sudden movements or with a gradual sliding of the bow
- parallel to the bridge or with diagonal movements

On these points Galamian makes the following observations:

One method of varying the point of contact is to glide the bow away from the bridge or to pull it toward the bridge in such a way that it never relinquishes its right angle relationship to the string. A second method makes use of the fact that a stroke that is moving slightly nonparallel to the bridge will permit the bow to slide toward or away from the fingerboard, depending upon the oblique direction it assumes.379

Galamian explains the results of the particular bow movements:

On the down-bow, a turning of the point of the bow away from the bridge will cause the bow to slide toward the fingerboard, whereas turning in the opposite direction will cause the bow to slide toward the bridge. This applies to the down-bow stroke only, The reverse is true on the up-bow.380

Transition from one playing manner to another features prominently in the string quartets post 1945. It is customary to cancel special techniques and the return to the normal method of playing with words or letters as follows: normal: *normale*: norm: n: ord. These cancellation “signs” should follow after instructions such as *sul pont., sul tasto, col legno, col legno tratto* and *col legno battuto*, but not after either *arco* and *pizz.*, which are understood to be mutually cancelling signs.

---

380 Ibid., p. 59.
Example 309. Bowing: Transition - from One Manner of Playing to Another
Gradual Transition or Immediate Change
Gradual Transition

Composer  String Quartet  Date
Fisher       No. 1         1961-2

Sign/Explanation
Gradual transition within a bar - Words and arrow
An arrow between *sul ponticello* and *pos. nat.* indicates a gradual transition from one mode of playing to another.

Example 310. Immediate Change

Sudden change within a bar - Words and vertical arrow
Sudden changes are indicated in words (*e.g.* *s.p.* | *sub. pos. nat.*) with the vertical arrow indicating the exact point of the change in bowing position.

Ex. p. 4, bar 12, Violin 2

Composers Directing Transitions from One Bowing Position to Another
with the Use of An Arrow

Other composers directing the transition from one bowing position to another with the use of an arrow in between the starting and finishing points are:

- Kelemen  *Motion für Streichquartett* (1968)
- Rihm    *Drittes Streichquartett* (1975)
- Gielen  *Streichquartett* (1983)
- Dillon  *String Quartet* (1985)
- Reynolds Coconini .... (1989)
Example 311. Bowing : Transition *Sul pont. estr.* - Near Bridge
Producing a High Squeaking

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dillon</td>
<td>String Qt.</td>
<td>1985</td>
<td>(* sul pont estr. - near the bridge, producing a high squeaking)</td>
</tr>
</tbody>
</table>

Ex. bar 142, Violin 1 & 2

---

Example 312. Bowing : Transition - from One Manner of Playing to Another
Gradual Transition

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiller</td>
<td>No. 5 in $\frac{3}{4}$ Tones</td>
<td>1962</td>
<td>Transition in words within a bar:</td>
</tr>
</tbody>
</table>

*Sul pont. poco arco mod. ord.*

Ex. p. 18, bars 153 -155, Violins 1 & 2
Example 313. Immediate Change

(145)

Sudden change in alternating words:
Sul pont. modo ord. Sul pont. modo ord.

Ex. p. 18, bars 146-147, Violin 2 & Viola

Example 314. Bowing : Transition - Gradual and/or Immediate Changes
Connecting Line and Words

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferneyhough</td>
<td>Sonatas ....</td>
<td>1967</td>
<td>immediate within single bar</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>tasto sul pont. Sul tasto sul pont.</td>
</tr>
</tbody>
</table>

Ex. p. 39, Violin 1 & 2

Note: The upward slanting line immediately before the sul pont indicates a sudden change from the sul tasto to the sul pont. These changes are found extensively in one or other combination throughout the score.
Example 315. Bowing: Transition - Gradual and/or Immediate Changes
Connecting Line and Words

Composer: Rihm
String Quartet: Drittes Stqt
Date: 1976

Sign/Explanation:
A line and the relevant words direct the transition from one playing position of the bow to another.
sul tasto

Ex. p. 5, line 2, Violin 1

Example 316. Bowing: Transition - from One Manner of Playing to Another
Gradual Transition from sul ponticello to sul tasto: Symbol and Words
Proportional Notation

Composer: Powell
String Quartet: Filigree
Date: 1965

Sign/Explanation:
calls for the very tip of the bow to be bounced along the length of a (specified) single string. Here, too, the fingers damp the strings. Sets of numbers placed beneath these symbols ... represent relative durational values, with a value chosen in each case by the individual player.

Ex. p. 16, Cello

*tenuto duration: Length of time taken to draw bow from middle to point at moderate rate of speed.
Note: This example is found within a section where traditional notation as well as fragmentary, non-metric sets of new symbols are mixed together. The player has to move the bouncing bow as stipulated from the: [bridge — neck] in proportionate duration, according to both the spacing of the notes and the numbers placed beneath which, as explained earlier, are sets of numbers representing relative durational values, with a value chosen in each case by the individual player of which the longest is the number 4. Thus, in the example above, the relative speed of the bow is controlled by the different numbers placed under the notes.

Example 316. Bowing: Transition - from One Manner of Playing to Another
Gradual Transition from sul ponticello to sul tasto: Symbol and Words

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ligeti</td>
<td>St. Qt. No. 2</td>
<td>1968</td>
</tr>
</tbody>
</table>

Note: In the first instance the bowing moves directly from ord. to sul punt., following which there is a gradual movement from ord. — sul tasto through the use of the relevant symbol. Ligeti changes the bowing qualities and positions extensively and the entire score is scattered with all manner of specific instructions.
Example 318. Bowing: Transition - from One Manner of Playing to Another
Gradual Transition from *sul ponticello* to *sul tasto*: Symbols

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karkoschka</td>
<td><em>Quattrologe</em></td>
<td>1967</td>
<td>Use of symbols:</td>
</tr>
</tbody>
</table>

\[ \text{\(\text{\textbullet}\)}\text{\(\text{sul pont.}\)} : \text{\(\text{\textbullet}\)}\text{\(\text{sul tasto}\)} \]

\[ \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow: \text{allmählicher übergang, z.b. von sul pont. zu sul tasto} - \text{gradual transition e.g. from sul pont. to sul tasto} \]

Ex. p. 4, bar before 4, Violin 1

**Note:** The first symbol \(\text{\(\text{\textbullet}\)}\) depicts *sul ponticello* and the second \(\text{\(\text{\textbullet}\)}\) *sul tasto*, with the arrowhead broken line \(\rightarrow \rightarrow \rightarrow \rightarrow \rightarrow\) requiring the bow to move gradually from one position to another - in this example from the bridge to the fingerboard. Karkoschka makes extensive use of gradual changes throughout the quartet and, in each case, this symbol \(\rightarrow \rightarrow \rightarrow \rightarrow \rightarrow\) (with or without the initial arrow) is found within a variety of separate techniques and is not applied, exclusively, only to bowing movements. This point is confirmed by a selection of random examples below, taken from the score that incorporate words or symbols or both:

\[ \text{nat} \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow 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\rightarrow \rightarrow \right...
Example 319. Bowing: Transition - from One Playing Position to Another
Gradual Transition from sul ponticello to NAT.: Within Beaming

Composer  String Quartet  Date  Sign/Explanation
Brown        String Quartet  1970  PONT. TO NAT.

Words and beaming

Ex. Final section, line 2, Violin 2

Note: In the last section of the score the bowing positions vary rapidly for all the instruments, as in Violin 2 of the above example, where the position moves in a diverse number of ways. The focal point here is found in the centre of the line where, after the fermata, the movement from the PONT. to NAT. is related to a beam where the pitches are relative. Generally, the duration beams are organised visually and are in precise relation to the space-time of the score. The beam between the pitches in the example above is longer than the beams used generally throughout the quartet. Thus, the space of time allowed for the movement from the point to the natural bowing position is very short.

The final section of the work is scored for between 1 and 2 minutes. There are eight separate "events" for each musician, separated from one another by vertical dotted lines in "open-form". Brown stipulates that each musician may play any of his events at any time, in any order and at any speed and it is, in effect, a free coda to be assembled spontaneously by the players. He states further that the "ordering" should come about in an intuitive-conscious manner spontaneously during each performance. He rejects assembling a pre-performance order of the materials as it would eliminate the possibility of the intense, immediate communication of ensemble collaboration which is an extremely important aspect of "music-making". All the material found in this final section has appeared previously in other parts of the score.

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381 Brown, String Quartet, 1970, Programme Notes, Specific Notations, (e)
Brown's quartet is yet another example in the 20th century where innovative compositional techniques extend the genre beyond the 'normal precision goal' of what was previously considered to be chamber music. The work moves into an area of technique Brown terms "action-reaction" which, with flexibility, nevertheless still maintains the basic shape and character conceived by the composer. The performance is not expected to be a precise translation of the spatial relationships but a relative realisation made more spontaneous through the involvement of the performers' subtly changing perceptions of the spatial relationships. For these and many other reasons it belongs strictly to the period of the second half of this century.

Example 320. Bowing : Transition - from One Manner of Playing to Another
Gradual Transition from *sul tasto* to *sul ponticello*: Words and Symbol

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schmidt</td>
<td>Zweites Stqt</td>
<td>1979</td>
<td>In letters and words: <em>s.p. poco a poco</em> ---</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>s.t.</em> accompanied by this sign</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>🎵 = unrhythmisches Tremolo</em> - unrhythmic tremolo</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ex. Mov. I, bars 43-46-47, Violin 2</td>
</tr>
</tbody>
</table>

Note: This sign *🎵* with a Z through the stem of the note is also used by Cervetti to indicate a *tremolo*, but is unlike the earlier quarter-tone meaning for the same symbol used by Alban Berg. Kurt Stone, in his book on 20th century notation, recommends that if a 'tremolo continues without a break from note to note within a measure or across a barline, broken ties should be used.' 382 Schmidt's notation in the above example demonstrates adherence to Stone's suggestion as is clearly shown in the broken ties joining the repeated note A (Violin 2).
Example 321. Bowing : Transition - from One Manner of Playing to Another
Gradual Transition from *sul tasto* to *sul ponticello* : Words and Arrows

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>___________</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>= gradual transition between one state and another</td>
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<td></td>
<td></td>
<td>___________</td>
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<td></td>
<td></td>
<td></td>
<td>= continuous transition</td>
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<td></td>
<td></td>
<td>poco sul tasto --&gt; sul pont estr.</td>
</tr>
</tbody>
</table>

Ex. p. 14, bar 130, Violin 2

Note: The English words, *continuous transition*, are placed in between the traditional Italian words: *poco sul tasto* --> *sul pont estr.* and occur within a passage containing symbols of single and double reversed flats: d, db representing lowered 1/4 tones.

Example 322. Bowing : Transition - from One Manner of Playing to Another
Gradual Transition from *sul tasto* to *sul ponticello* : Curved Line and Words

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brandmüller</td>
<td>Zweites Stqt.</td>
<td>1985</td>
<td>~</td>
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</tbody>
</table>

Ex. p. 21, 214-216 Viola
Note: The curved line placed before the enclosed words signifies a gradual change from one specified bowing position to another which, in the Viola part of the above example, is from *sul tasto* to *sul ponticello*. When an immediate change is wanted, the curved line is absent and does not precede the enclosed words $\uparrow$ *sul tasto* $\uparrow$

**Bowing : Unusual Movements**

**Example 323 Bowing : Unusual Movements:**
Transitions - from One Position to Another : Symbol
Bow : Moving Diagonally Across The Strings

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>von Biel</td>
<td><em>Qt. für Streicher</em></td>
<td>1965</td>
</tr>
</tbody>
</table>

Note: As with previous von Biel examples, the above is taken from one of many sections of the quartet where pitch is secondary to technique, resulting in the abandonment of the stave. However, when a particular string is required, the composer indicates it in the traditional way - with a Roman numeral. In addition to this practice, he uses a completely new 20th century concept for notating indeterminate sounds by placing the notes consistently on a single horizontal level. Their purpose is to function solely as rhythm indicators. The note values are stipulated by their colour and shape on a separate page titled: *Erläuterungen - Explanations*.

In the above example three determining factors are found:
- the bow technique - in the symbol of a double-headed slanting arrow describing the diagonal motion of the bow which creates a variety of noise elements.
- the string - represented by the Roman IV placed on top of the imagined stave and
- the time span - in the single notes, each indicating a designated time span in seconds.

Sign/Explanation

\[ \text{Diagonal über die Saiten streichen.} \]
\[ \text{Dieses erfolgt immer auf leeren Saiten; es ist jedoch zu beachten daß die Saiten niemals leer klingen} - \text{Bow diagonally across the strings. This is always done on open strings which should never sound.} \]

The open string is the low C

Ex. p. 3, Cello, between 5 and 6
Example 324. Bowing: Unusual Movements
Transitions - from One Position to Another
Longitudinally and Transversely Across The Strings: Symbol

Composer       String Quartet       Date
Hiller          No. 5               1962

Sign/Explanation
\[ \square \ldots \] indicates to the player that he should
produce a squeaking sound by sliding
his bow roughly and carelessly longitudinally
along the string as well as transversely across it.

Ex. Variation Ten, (Aria), bar 43, all instruments.

Note: The downward pointing arrow placed to the right of a note \( \uparrow \) is an added contemporary
symbol which, in this score, indicates: ....play the note shown a quarter-tone flat.

Example 325. Bowing: Unusual Movements
Transitions - from One Position to Another
Vertical or Oblique Shift of the Bow

Composer       String Quartet       Date
Lachenmann      Gran Torso         1971-6-8

Sign/Explanation
Score not relevant.

Note: Lachenmann is specific about the actions of the right hand and under Bowing Directions he sets
out the following instructions:

Bowing Directions
Wherever the bridge clef is indicated, other directions for the bowing on the string are also called for
besides the usual horizontal bowing manner. Since the horizontal reading of the score corresponds to
a chronological progression, the shifts of the bow between the bridge and fingerboard are always
notated with oblique lines.\[ \text{383} \]

\[ \text{383} \] Lachenmann, Gran Torso 1971 - 76 - 78, Notation and Performing Techniques.
Example 326. Bowing: Unusual Movements
Transitions - from One Position to Another
Vertical Shifts with Bow in Both Hands

Composer     String Quartet       Date
Lachenmann   Gran Torso           1971-6-8

**Sign/Explanation**
Vertical shifts of the bow at an angle of 90° to
the usual horizontal motion occur only where
an arrow pointed upwards or downwards is
drawn into the first note tail of such a passage.

In addition to the above stipulations
there are the following requirements:
*Bogenmitte steil Richtung Steg drücken* - Press
middle of bow vertically toward the bridge:
*) *Bogen in beide Hände* - bow in both hands

Ex. p. 20, bar 210, Cello

---

Example 327. Bowing: Unusual Movements
Transitions - from One Position to Another
Oblique Shift with Bow in Fist

Composer     String Quartet       Date
Lachenmann   Gran Torso           1971-6-8

**Sign/Explanation**
All other shifts of the bow on the surface of the
string are *oblique*, that is they always contain
an up bow or down bow motion which is then
also given in addition. \(^{384}\)

In the given example, added to the
oblique lines, Viola and Cello have the
same instructions: *legno schräg gewischt* -
*legno* whisked obliquely: *(Bogen in Faust)* -
Bow in fist

Ex. p. 1, bar 2, Viola and Cello
Note: Whenever the bridge clef is indicated in the score ..., other directions for the bowing on the string ... besides the usual horizontal bowing manner ... are required, such as ... the shifts of the bow between the bridge and fingerboard [which] are always notated with oblique lines. These oblique shifts occur on strings III and IV in both instruments with Cello moving later in the same bar to strings II and III. The upward or downward direction in the Viola part regulates the bow movement on the fingerboard to and from the bridge. The sign $\Theta$, as explained earlier, represents the muting sign with the left fingers lightly placed on given strings. (Violin III & IV : Cello III & IV and II & III)

Example 328. Bowing: Unusual Movements
Transitions - from One Position to Another Variation : Oblique Shift Along Fingerboard

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td>Gran Torso</td>
<td>1971-6-8</td>
<td></td>
</tr>
</tbody>
</table>

Note: Lachenmann makes a distinction between oblique and gliding movements and notates them differently. As explained earlier, the oblique shift is represented by straight lines and the gliding path of the bow, as in this example, by two graphically designed curved lines, played on two particular strings: II and III. The bridge clef with its special function regulates the starting and finishing points of the movement, i.e. from just in front of the bridge towards the pegs. The muting sign $\Theta$ achieves a pitchless - tonlos effect by lightly placing a finger on the stipulated strings: II and III. Lachenmann uses vertical and oblique movements extensively in a variety of different techniques throughout the quartet and applies the relevant notation in each case. Some examples - used either briefly or at length - are found in the Gran Torso quartet, as follows:

- legno schräg gewischt - legno whisked obliquely  
- arco steil heranziehen - pull arco vertically

Lachenmann, Gran Torso 1971-76-78, Notation and Performing Techniques
In each case, either the oblique or vertical movement of the bow is indicated through the use of the specific symbols prescribed in the pages: Notation and Performing Techniques i.e. either a slanting line for the oblique movement, or an arrow placed in the tail of the first note of a passage to indicate the vertical movement.

Example 329. Bowing: Unusual Movements
Transitions - from One Position to Another Slides Gradually over Bridge
Words and Symbol

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holliger</td>
<td>Stätt</td>
<td>1973</td>
<td>Bogen rutscht allmählich, ohne unterbrechung, über → über den Steg hinüber - Bow slides gradually, without interruption over the bridge</td>
</tr>
</tbody>
</table>

Ex. p. 15, A18, all instruments
Note: The written instructions are given above the staves. In the above example the bow moves from an ordinary position (*ord.*) towards the → *pont* → over the bridge *auf dem Steg* to → *hinter dem Steg* while, at the same time, the left hand plays the a-rhythmic, ‘chromatic’ notation *Aufschlaggeräusche der Fingerkuppen crescendo sempre* - [with a ] striking noise on the fingerboard *cres. sempre*, creating a low variation of *timbral* colour. Generally, Holliger exploits and explores the colouristic potential of the instruments by requiring the bow to be played on various parts of the instruments, resulting in a selection of colour fluctuations - no matter how slight.

Example 330. Bowing : Unusual Movements
Transition - from One Manner of Playing to Another
Lengthy Transition over many Bars : *sul tasto* to *col leg. tratt.*

**Composer**  | **String Quartet** | **Date** | **Sign/Explanation**
--- | --- | --- | ---
Ferneyhough | Second St. Qt. | 1980 | N.B. From bar 156 onward begin all lower-string, double-stop glissandi *"sul tasto"*; thereafter make a continuous transition to *"col leg. tratt."* whilst remaining *"sul tasto"* - "pure wood" (*no hairs!* ) is reached at the moment this type of material ceases.

Ex. p. 17, bar 156, all instruments

Note: The transition from *sul tasto* to *col legno tratt.* begins at bar 156 and lasts for nine bars, until the end of the quartet - bar 164. The *col legno tratt.* - stroke with the wood of bow requires special attention and is the intermediate stage between using the hair of the bow and the wood, as Ferneyhough requires that a very small portion of hair should be retained by all *"col legno trattuto"* actions, especially in the upper register, resulting, in this example, in a combination of string colours, arising from initially bowing with the hair on the strings, changing gradually to a mixture of hair and wood, to the final stroking of the notes solely with the wood of the bow.

Ferneyhough requires all the players to finish so that *"sul pont. Estremeo"* is reached exactly synchronous with the end of last bar.
Example 331. Bowing: Unusual Movements
Transitions: Between Edge of Fingerboard and "Finger Position" against Scroll
Bowing: Stir Bow: Circular Movement: *Legno*: Symbol and Words

Composer  String Quartet  Date  Sign/Explanation
Heyn  *Sirènes für Stqtt*  1983

Note: In addition to the symbol \[\] representing: *Saite innerhalb von 5 cm von der Griffstelle streichen (meist legno)* - bowing (mostly legno) ... executed within 2 inches from the point of fingering, the playing position of the bow is well over the fingerboard. In the above example, the first finger G\# , string IV, is right up against the scroll end. The other requirement written into the score is to: stir bow in a circular movement \[\] and vice versa, applying less pressure on \[\], thus creating a series of transitions on two different parts of the fingerboard. i.e. initially at the 'finger placement position' and then a movement towards the edge of the fingerboard within each 'quaver' grouping of notes.

Example 332. Bowing: Movements
Multi Transitions - Constant Change from One Manner of Playing to Another
Words: Symbol and Number

Composer  String Quartet  Date  Sign/Explanation
Globokar  *Discours VI*  1982

Note: \[\] - with heavy pressure on the string, at the frog of the bow (noise)

Ex. p. 4, Violin II
Note: The extraordinary requirement of the many different bow positions and frequent technique changes is that they have to be done silently. Almost every note, or grouping of twos or threes in the single line, is given an altered instruction either in words or by symbol. Three directions appear at the outset of the line to indicate the composer’s intentions:

- the word MUET
- framed instruction for Violin II
- the Number 6:

MUTE

Spielen stilschweigend vortäuschen, dabei die Vn. 1 visuell nachahmen - pretend to play (silently), visually imitating the performance of Vn 1.

Preface (Performing Instructions)

The requirements of this quartet do not meet the objectives set by the avant-garde composers of the 1950s where the focus was generally on the restructuring of musical fundamentals. Globokar’s compositional approach seems to indicate that nothing learned or inherited within the genre matters, and his inclusion of movements - given in the above example - as well as many contrasting language utterances, demonstrate a liberation from the traditions of the genre. At the same time the work is reactionary to the point where it stands outside acceptable limits of what are considered to be the basic principles of the string quartet. Even in the post-modern stage of the genre’s development, this quartet is far from representing the visions of musical development in either the intellectual or technical spirit of the discipline. The plethora of instructions - theatrical, verbal and nonsensical - defy acceptance, and despite being of paramount importance to the work, inhibit the musical content which emerges as being fractured and mostly meaningless, remaining a poor second to the theatrical antics. Illogical actions given to the Viola, amongst a whole series of additional requirements for all players, are:

Va = “I am putting my foot under her skirt and lift it”
Va = “I am licking her backbone with a very long tongue”
Va = “I am looking for keys in my pockets, then for a billfold, and perhaps a handkerchief”
**Example 333. Bowing : Movements**  
Transition - from One Manner of Playing to Another  
Modern Use of Arrows on Multi Stave Lines

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hübler</td>
<td>3 Stgtt</td>
<td>1982-84</td>
</tr>
</tbody>
</table>

**Sign/Explanation**

(4) Auf dieser Zeile findet man Angaben über den Bogenort (sul tasto, sul pont. etc.). Kontinuierliche Übergänge werden durch Pfeile angedeutet: alle anderen sollen so schnell wie möglich erfolgen.

(5) Hier werden Angaben über die Bogenart (col legno) gemacht. Eine Zickzacklinie (-----) fordert einen permanenten schnellen Wechsel zwischen c.l. und ord. (quasi trillo)

Ex. p. 1, bar 1, Violin II

**Note:** For an explanation of Hübler’s multi line stave system see Chapter 11, *The Stave: A 20th Century Approach*. However, at this point of the investigation the two upper lines, (4) and (5), are significant as they show, respectively, the bow’s point of contact on the string and the method of bowing, while the addition of the arrow ➔ signifies a transition between the different bow types.

Together this notation relays the following information to the player:

**Line (5) - Method of Playing - (How)**

ordinary col legno ➔ ordinary col legno

**Line (4) - Bow Contact on the String - (Where)**

ordinary sul pont ➔ sul tasto ➔

Notice that the changes in line (5) *(i.e. how the strokes are made)* do not necessarily synchronise with changes in line (4) *(i.e. where the strokes are made).* Hübler applies this specially devised stave system throughout the quartet.
Another composer to use an extensive range of changes in almost every bar of the second section of the quartet, is Volker Heyn in his *Sirènes für Streichquartett* (1983) (bars 89-179). The purpose and content of the changes, however, differ greatly from those of Globokar in that, while exploring the possibilities of the strings through a language of extreme registers and various instrumental techniques, the contents of Heyn’s particular quartet demonstrate a cohesive utterance that disregards instrumental theatricals and concentrates rather on a declaration of musical structure and content to further the purity and advancement of the genre. A random example, and one of many, is given below:

**Example 334. Bowing : Unusual Movements**
Immediate Transition - from One Manner of Playing to Another

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heyn</td>
<td><em>Sirènes für Stqtt</em></td>
<td>1983</td>
<td>Words in score</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>Ex. p. 28, bar 105, Viola and Cello</em></td>
</tr>
</tbody>
</table>

**Note:** In the second section of this quartet (bars 89-179), from which the above example is taken, traditional notation is found in the use of staves, metronome markings (above at $j = 43$), time signatures (above at $\frac{3}{4}$), standard noteheads and rests, rhythmic groupings and standard Italian terms, all of which combine with a selection of specific contemporary symbols to represent newly devised string techniques. The three new signs in the example above describe, firstly, a percussive sound on the Viola $\downarrow$; secondly, the playing position of the *legno* bowing $\uparrow$; and finally, this sign $\downarrow$, symbolising an abrupt breaking of the sound in a *quasi* grinding halt.

Viola $\downarrow$ Fingerspitze der linken Hand (bzw. zwei Finger zusammen) schlägt perkussiv senkrecht auf die Saite - left-hand fingertip (or two fingers combined) strikes down vertically on string in
As discussed previously, certain problems arise with regard to rosin being deposited high up the 'finger-playing-portion' of the strings. (See Example 260)

**Example 335. Bowing: Unusual Movements**

Transitions - from One Manner of Playing to Another

Circled Numbers

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td>II Stgttt</td>
<td>1989</td>
<td>obere</td>
</tr>
</tbody>
</table>

*Die Zahlen im Kreis bezeichnen die Strichstelle des Bogenhaars zwischen Frosch und Bogenspitze*.

upper lower half of bow

The circled numbers indicate the position of the bow between frog and point.

Ex. p. 1, bars 1 & 2, Violin II

**Note:** Another Lachenmann innovation relates circled numbers, ranging from to positions between the upper and lower halves of the bow. In the above example, the numbers require the bow to be moved on a single pitch in three different positions: from the initial position near the frog, further away and then again back towards the frog.

---

Heyn, V., *Stimmen für Streichquartett*, Performance Notes, Symbols
Example 336. Bowing: Unusual Movements:
Immediate Transition - from One Manner of Playing to Another
From Pressing to No Pressing and Vice Versa

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brewaeys</td>
<td>St. Qt.</td>
<td>1989</td>
<td>No pressing --------&gt; pressing</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ex. p. 11, bar 106, Violin 2</td>
</tr>
</tbody>
</table>

Note: Brewaeys makes frequent use of the transition between normal bowing changing immediately, at the given arrow, to pressed bowing.

Example 337. Bowing: Unusual Movements
Rotation

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>von Biel</td>
<td>Qt. für Streicher</td>
<td>1965</td>
<td>Langsame Rotation des Bogens auf allen vier Seiten die liecht gegriffen werden -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Slow rotation of the bow on all four strings while the fingers are in a relaxed position on all four strings</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ex. p. 3, Cello between 5 and 6</td>
</tr>
</tbody>
</table>

Note: In this quartet the circular movement is always used with lightly tipped fingers over four strings and accompanied, in each case, by four diamond shaped harmonic notes placed one on top of the other, as shown in the above example.
Example 338. Bowing : Unusual Movements
Tremolo on Body of Instrument

Composer  String Quartet  Date
Penderecki  *Otto per Archi*  1968

sign/Explanation

Instructions as a fn:

*) *Tremolo auf dem Resonanzkörper (arco)*

**) *tremolo on the resonant-body (arco)*

Ex. p. 9, Violin 1

Note: The 'whispering' sound of the *tremolo* bowing in Violin 1 is played against the tapping of Violin 2 **) with the instruction *mit der Fingerkuppe die Decke des Resonanzkörpers anschlagen - tap with fingertip on sound-board while, earlier, the Viola player is instructed to ***) *mit dem Bogen auf dem Saitenhalter spielen play with the bow upon the stringholder [tailpiece] and the Cello trills a semitone from the open string C, all creating a low dynamic multiplicity of pitched and unpitched sounds.

Example 339. Bowing : Unusual Movements
Lightly Rubbing Bow Up and Down on Open Strings

Composer  String Quartet  Date
Sculthorpe  St. Qt. No. 8  1970

sign/Explanation

\[ \text{Whispering sound, produced by lightly rubbing bow up and down on open strings.} \]

Ex. Mov IV, p. 13, line 2, Violin 2

Note: The *arpeggio* bow movement on four open strings is indicated by the arrows, and the duration by the wavy line placed above the stave. In this example the specific technique lasts for six bars (5-10) at a tempo of \( \frac{j}{=c.152} \), however, the example shows only bars 5 & 6.
Example 340. Bowing : Unusual Movements
Lightly Rubbing Bow Up and Down on Strings

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holliger</td>
<td>Stqt</td>
<td>1973</td>
</tr>
</tbody>
</table>

**Sign/Explanation**

während der leichten Auf- und Abstriche mit Bogen längs der Saiten hin (↑) und her (↓) wischen: lieses Rauschen, quasi Verstärkung des Atmens. Jeder Spieler wählt eigenes Tempo zwischen $\text{J ca 52}$ und $\text{J ca 76}$ - During the light up and down bows, let the bow slide back (↑) and forth (↓) along the string: soft rustling, as if amplifying the breath. Each player chooses own tempo between $J = \text{ca 52}$ and 76

Ex. p. 40, at G5, Cello

**Note:** Holliger’s alternating upward and downward arrows indicate the movement of the bow and the added instruction gives the players a choice of *tempo* between the designated metronome markings. As explained previously, in much of Holliger’s score each part has a double set of staves. The notes are placed in the lower stave and the required technique and written instructions in the upper stave. In this example only the Cello staves are used: the upper for the bowing instructions and the lower for the placement of the finger - starting on B₃, steadily moving in a *glissando* to various positions in the following bars. The arrows used by Holliger and Sculthorpe are one of many symbols from both composers that belong solely to 20th century notation. Despite the two composers using the same symbols for alternating movements of the bow, the overall effect of Hollinger’s soft rustling (*fast tonlos*) - (fast toneless) differs greatly from Sculthorpe’s *arpeggiated* whispering sound, produced by lightly rubbing bow up and down on open strings. Despite Holliger’s use of staves, noteheads and rhythm groupings in many parts of the score he has, nevertheless, an unconventional approach to these standard aspects of notation. As shown briefly in the example above, the Cello plays alone - without the three upper instruments - for an extended number of ‘bars’.

This is yet another example of how, in the exploration of new sound-production techniques on traditional instruments, 20th century notation - even in the use of the same symbol, in the same *genre* - produces different effects, thereby proliferating the problems of interpretation within each composition. A particular symbol or set of symbols in traditional notation have, inherently and stylistically, a universally accepted meaning and, being familiar, allow performers to communicate composers’ ideas more precisely.
Example 341. Bowing: Unusual Movements
Cracking Noise by Twisting Bow Slightly to Left and Right

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holliger</td>
<td><em>Sta†t</em></td>
<td>1973</td>
</tr>
</tbody>
</table>

Sign/Explanation

*) Bogenharen mit Stange an Zarge drücken.
(Frosch gegen Körper). Knackgeräusche durch kleine Drehung des Bogens:

durch links ~ durch rechts →

*) Press bow hair and stick against bouts [rib]
(frog against players body) cracking noise by twisting bow slightly:

to left ↔ to right →

Ex. p. 25, D 7, Violin 1 & Cello

Note: In this section of the score Holliger uses a double set of staves for each instrument, marked by the letters *r.h.* and *l.h.* respectively, each requiring separate, independent movements specified either by symbols or written instructions. The graphic symbol in the upper stave (Violin 1 & Cello) resembles the movement required by the right hand which is made by twisting bow slightly from left and right while the left is simultaneously required to pizz with 3 fingers near the bridge.

Much of Holliger’s quartet requires the players to produce various degrees of instrumental noise. Instructions with words such as: grating, jerky (p. 23 at D3); creaking, jerky, (p. 25 at D8); very slow, even bowing; (jerky/even); very noisy (p. 14 at A 15); bow as slowly as possible; grating, halting (rhythm derived from jerky bow movements) (p. 21 at C5); are found frequently.

Lachenmann: Unusual Bowing Movements and Holding Positions

The following examples (Ex. 342-352) of unusual bowing movements and holding positions are taken from Lachenmann’s string quartet Gran Torso Musik für Streichquartett (1971-76-78). Clarity on the full range of graphic symbols relating to specific techniques can be found in the English translation, (from the German) on the instruction pages Notation and Performing Techniques. Lachenmann’s notation and string techniques are directly linked to his modification of the clef’s function, in what he calls a ‘bridge clef’. These are described and illustrated more fully in: Chapter 11, The Stave: A 20th Century Approach. Lachenmann instructions are also written into the relevant bars of the score.

---

1811 Holliger, Streichquartett, (1973), Translation of German Notes in the Score.
Example 342. Bowing: Unusual Movements
On Back of Instrument- Instrument Held on Knees

Composer String Quartet Date
Lachenmann Gran Torso .... 1971-6-8

Sign/Explanation
instrument auf Knie gestellt, mit nach innen
gedrehter Faust gehalten, Rückwand nach
außen gekerbt - instrument placed on knee, held
with the closed hand facing inwards, the back
of the instrument turned outwards.

Instruction written above stave
Bogen liegt auf Instrument-Rückwand, Stange
Gegen ins Haar gedrückt - Bow lies on back of
instrument, stick pressed into hair
Ex. bar 2, Violin 1, occurs at a rest

The following are examples found in Lachenmann's scores that negate the established holding
positions of both the instrument and the bow.

Example 343. Bowing: Unusual Movements
Loose Circular Motions on Back with Stick

Composer String Quartet Date
Lachenmann Gran Torso .... 1971-6-8

Sign/Explanation
(Γ) (v) (Γ) (v) (Γ)

Stange locker auf Rückwand kreisend -
Loose circular motions on back with stick. (legno)
Ex. p. 2, bars 21-22, Violin 1
**Example 344. Bowing: Unusual Movements**
Rolling Motion of the Wood of the Bow: Tilting Sideways

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td>Gran Torso ....</td>
<td>1971-6-8</td>
<td><em>Stange ins Bogenhaar gedrückt (langsamer Rollbewegung)</em> - stick pressed in hair (rolling motion)</td>
</tr>
</tbody>
</table>

Ex. p. 2, bar 18, Violin 2, Viola & Cello

---

**Example 345. Bowing: Unusual Movements**
Graphic Direction: Six Irregular Motions

- Irregular Motion in Form of an “Eight”
- Irregular Circular Motion
- Oblique (“windshield-wiper”-like) Motion Back and Forth
- Vertical Motion: Backwards and Forwards
- A Horizontal Arrow Signifies: Gradually Merge into the Prescribed Motion
- A Plus Sign indicates that the Indicated Direction does not annul the previous motion, but Increases it.

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td>Gran Torso ....</td>
<td>1971-6-8</td>
<td>The appropriate motion is illustrated by the corresponding graphics below</td>
</tr>
</tbody>
</table>

- in the form of an eight
- circular motion
- oblique back and forth
Example 346. Bowing : Unusual Movements

Graphic Direction : Irregular Motions

Composer    String Quartet    Date
Lachenmann   Gran Torso ....   1971-6-8

Sign/Explanation
Three of the six irregular motion are found in this order:

- vertical motion
- circular motion
- gradually merge

Note: The bridge clef, not shown at the start as well as the dotted line in the upper part of the bar, both align the position of the bridge in relation to the fingerboard. The angular movements of the bow, i.e. over varying parts of the fingerboard - are directed by the solid line which is not a glissando movement of the finger. A ‘chord’ of notes added below the bridge clef and positioned in the stave indicates the stopping and muting signs of the left hand. Their special significance is to ... show the fingering which is to be prepared .... 389. In this section the Viola fingerings are positioned to the notes (\( \frac{5}{6} A_1 - e_s - \))

---

389 Lachenmann, Gran Torso 1971-76.78, Notation and Performing Techniques
b, - f) on strings which remain constantly tuned from the outset in scordatura to the following pitches - lowest to highest: (Eb - G - d, - a).

Lachenmann: Unusual Bowing Movements
Graphic Direction: Irregular Motions

Lachenmann also uses graphic designs to illustrate the appropriate motions where more complex bowing is required. In the two examples following, the new symbol attached to rhythmic groupings in the place of noteheads, \( \text{\_\_\_\_\_\_\_\_} \), represents a combination of successive horizontal and vertical motions [which] yields more or less “rectangular” forms of motions\(^{390}\) and the accompanying ‘boxed’ graphics make the required direction and motion of the bow easier to recognise.

Example 347. Bowing: Unusual Movements
Graphic Direction: Irregular Motions

Composer String Quartet Date
Lachenmann \( \text{Gran Torso...} \) 1971-6-8

Sign/Explanation
\( \text{\_\_\_\_\_\_\_\_} \) combination of successive horizontal and vertical motions yields more or less “rectangular” forms of motions
Ex. p. 22, bar 239, Violin 1 & Cello

\(^{390}\) Ibid., Notation and Performing Techniques
five boxed graphics are given to make the action and direction of the bow motion easier to recognise.

Ex. p. 22, bars 237-238, Cello

Note: Numerous graphics, all varied in design and relating to the actions and directions of the bow, are found throughout the score. In the above examples they are used in conjunction with two different clefs: firstly, the bridge clef (shown at bar 239) which regulates the playing position of the bow over various parts of the fingerboard and secondly, the string clef (shown) illustrates the actions on the four strings below the bridge, between the bridge and tailpiece, thus making the technique required quite explicit through the use of the accompanying graphics.

Example 349. Bowing : Unusual Movements
Written Directions : Irregular Motions

Composer | String Quartet | Date
----------|----------------|------
Lachenmann | Gran Torso .... | 1971-6-8

Sign/Explanation
flaut "screiben" auf Saitenoberfläche zw. Steg und Griff-Finger- on the surface of the strings between bridge and stopping finger,

Ex. p. 3, bar 25, Viola

Lachenmann, Gran Torso 1971-76, Notation and Performing Techniques
Note: There are two important aspects to the execution of the bow in example above. Firstly, the contact points for the *flautato* movement are explained by Lachemann in the score as being: *auf Saitenoberfläche zw. Steg und Griff* - on the surface of the strings between bridge and stopping finger, and secondly, the direction of the required hand movement between the two points is given as a boxed graphic. The boxed graphics, containing varying patterns, occur in many places in the score, with each individual pattern denoting a distinct bow movement.

Example 350. Bowing : Unusual Movements
On Various Parts of the Instrument
On Left Side of the Body (Rib) or at Scroll (if more clearly gradable)

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td>Gran Torso ..</td>
<td>1971-6-8</td>
<td>Corpuskante (Zarge) links oder (falls deut-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>licher abstufbar) auf Schnecke - on left side of</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the body (rib) or at scroll (if more clearly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>gradable)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>arco batt.</em> &quot;f&quot; deutlich - clearly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ex. p. 3, bar 35, Violin 1</td>
</tr>
</tbody>
</table>

Note: There are specific instructions for *arco batt.* : *battuto*, A simple, lightly tossed stroke or ‘jab’ of the bow hair, which in the above example indicates that each tap be executed in different places on the left side of the violin, starting near the bridge and moving progressively well over the fingerboard. The accented ‘notes’ reinforce an added quality of sound marked: ‘deutlich’ - ‘clearly’. The bridge clef, located at the beginning of the line, when encountered, is always used as a substitute for the traditional clef and stave, and it’s design schematically reproduces the front of the instrument between the tailpiece and the middle of the fingerboard which, in conjunction with the dotted ‘bridge’ line, directs the position of the ‘jabs’ of the bow, resulting in indeterminate pitch. Generally, the dynamic markings in inverted commas (as in the “f” shown above) are ... to be understood in a relative context; they refer to the intensity of a performance technique which does not actually allow a true forte, let alone fortissimo. Playing on various parts of the instruments features prominently in Lachenmann’s colouristic approach to sound, and a further example, not illustrated, is as follows :

*über Zarge bei I* - above rib at 1 : p. 2

---

62 Lachenmann, Gran Torso 1971-76, Notation and Performing Techniques
63 Ibid.
64 Ibid.
Example 351. Unusual Movements
Selection of Toneless Requirements

Composer  String Quartet  Date
Lachenmann  Grand Torso ....  1971-6-8

Sign/Explanation
Toneless movements when required on the wood of the bridge or the side of the body or the tailpiece are shown by the graphic design in the clef space giving the bow contact positions as follows:

- arco tonlos
- Corpus-Rand - side of body
- (Zarge) - rib

Violins 1 & 2, Cello

Note: Three directions - the graphic design in the 'clef' space, the arrow and the written instructions - alert the players to the composers intentions.

Example 352. Bowing: Unusual Movements
Assortment of Bowing Positions and Techniques:
On Right Rib: Movement of Wrist Contrary to Bow:
am Steg Flautando, auf Steg Tonlos : Bridge Clef

Composer  String Quartet  Date
Lachenmann  Grand Torso ....  1971-6-8

Sign/Explanation
rechte Zarge - right rib

written in clef space Violins 1 & 2, Viola
Ex. p. 3, bar 23

*) Viol I:
Durch Handgelenk Instrument drehen (entgegen der Bogen bewegung), Saiten sind gedämpft bzw. ad lib. verkürzt durch den Griff am Hals des Instruments - Turn instrument with wrist (opposite to bow motion), strings muted or shortened ad lib. by stopping at neck of the instrument.
am Steg flaut. - at the bridge flaut. - Violin 2
auf Steg tonlos - Cello
Note: The explanations for the various techniques (p. 3, Bar 23) are as follows:

1. playing position of bow is directed by the instructions in the 'clef' space
   Violins 1 & 2, Viola: rechte Zarge - on right rib
   Cello: bridge clef

2. initial bowing directions
   Violin 1 \((\text{legno})\)
   Violin 2 \(\text{arco "f"}\)
   Viola \(\text{arco}\)
   Cello \(\text{arco auf Steg} - \text{arco on bridge}\)

3. second instructions - playing and bowing methods
   Violin 1 \(\text{Durch Handgelenk Instrument drehen}....\)
   Turn instrument with wrist (opposite to bow motion)....

In Violin 1 a hand/wrist movement causes the instrument to move contrary to the upward or downward direction of the bow, i.e. when a down bow is made an inward wrist movement turns the instrument to the left - and vice versa for the up bow - graphically described as:

\[
\begin{align*}
\text{down bow} & \quad \text{move wrist to the left} & \leftarrow \\
\text{up bow move} & \quad \text{wrist to the right} & \rightarrow \\
\end{align*}
\]

Violin 1 \(\text{Pitches in brackets}\) show the appropriate string or stop which is not to be heard as a pitch, but which serves to prepare or clarify another effect which in this case is indicated by the \(\text{muting sign} +\) which is executed by playing the [unpitched notes] lightly

Violin 2 \(\text{am Steg flaut. - on bridge flaut.}\)

The diamond-shaped noteheads - the \(\text{half harmonic stop}\) .... (as in Violin 2) are found in various parts of this quartet and play an important colouristic role in the work as a whole.

It .... is black like a quarter note and it can be recognised by the horizontal beam which shows its duration .... the result should be veiled .... the stopped string .... only lightly touched, in conjunction with the "flautato" bowing.

The "flautato" bowing needs special attention when used with a \(\text{half-harmonic stop}\). It is a hasty bowing with extremely light bow pressure. The dead weight of the bow must be neutralised by opposing it with the pressure of the wrist. A minimal emergence of the stopped pitches should produce a maximal audibility of the bowing sound ....

Viola \(\text{am Steg} - \text{on bridge}\)

The directions are as above for Violin 2 except that the half harmonic stop is not played \(\text{flautato}\) but with an ordinary bow stroke \(\text{am Steg} - \text{on bridge}\)

Cello \(\text{aug Steg tonlos} - \text{toneless on the bridge}\)

---

\[1\] Lachenmann, Notation and Performing Techniques
In the three upper parts the extended beams show the relative duration of each note as no time signature is provided.

Example 353. Bowing : Unusual Movements
Assortment of Bowing Positions and Techniques : Bow Near Positioned Finger

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td>\textit{II Stqtt}</td>
<td>1989</td>
<td>The instruction (\textit{al dito}), placed at the clef space in the stave, refers to a specific technique :</td>
</tr>
</tbody>
</table>

\textit{al dito} ("am Finger") : Streichen mit dem Bogen so nahe am Griff-Finger wie nur irgend möglich. Die Bogenhaare sollen den Griff-Finger streifen. Diese Spielweise ist nur \textit{flautando}, möglich, d.h. weder darf Bogendruck auf die Saite (allenfalls gegen den Griff-Finger selbst) ausgeübt werden, noch darf der Griff-Finger die Saite herunterdrücken. \textit{Al dito} ("at the finger") : playing with the bow as near as absolutely possible to the positioned finger. The bow hair should touch the positioned finger. This way of playing is only possible as \textit{flautando}, i.e. no bow pressure on the string is allowed (except against the positioned finger itself), nor may the finger press down the string. Ex. p. 1, Violin 1 & 2

Note: Lachenmann again uses a multi-stave score with a two-stave system for each instrument. In the upper stave, the five spaces - including the one above the stave - reveal five different bow functions and techniques, as well as added requirements for the right hand. The separate \textit{al dito} instruction refers to a specific contact point for the bow (i.e. where the bow is to be played) shown in diamond-shaped notes, while the notes placed in the upper stave, refer to a particular bowing technique (i.e. how the bow is to be played). Each type of bowing (listed below) is allocated a space and is gauged from bottom to top on the stave and, depending where the notes are placed, reflects a distinct predetermined technique. Therefore, the position of the note in the upper stave refers to any one of the following bowmovements which are explained in the Hints on Notation and Performance in letters marked, \textit{a) b} \textit{c) d} \textit{e}) as follows :

\begin{itemize}
  \item[a)] \textit{sul ponticello (über dem oberen Funfliniensystem notiert) : Streichen}
  \item[a)] \textit{Sul Ponticello} (inserted above the upper staff five line system) - play
\end{itemize}

mit dem Bogen auf dem Stehholz evtl.  
in schräger Richtung, um nicht abzurutschen.  
b) al Ponticello - c) normal  
d) al tasto - entsprechen den bekannten  
Spielweisen (wenngleich deren Ausführung  
hier meistens "flautando" vorgesehen ist  
e) as explained in the example above

with the bow on the bridge - possible in  
slanting direction, in order not to slip off  
b) al Ponticello - c) normal  
d) al tasto - corresponds to the usual ways  
of playing (even if the performance here  
is usually indicated as "flautando")  
e) as explained in the example above

In the example above, Violin 1 & 2 are required to play \textit{flautando} but different bowing for each is indicated as follows:

- Upper Stave: Violin 1 - note A represents - \textit{al ponticello}
- Upper Stave: Violin 2 - note F represents - \textit{sul ponticello}

This unique method of using a stave as an indicator for different bow techniques is a compositional feature of the Lachenmann quartet \textit{II Streichquartett 'Reigen Seliger Geister'} (1989).

\textbf{Bowing: Sul Tasto}

\textit{Sul Tasto}, \textit{tastiera} or \textit{sulla tastiera} (Italian) and \textit{sur la touche} (French) are the equivalent of the German term \textit{am Griffbrett} or the English \textit{over the fingerboard}, all of which are used traditionally to indicate the requirement of a special tone colour - thin, airy, distant (or floating for the word \textit{flautando}). This particular sound results from the loss of many of the richer overtones as there is less string tension away from the bridge. To accomplish the sound necessitates the use of a lighter stroke of the bow.

\textit{Sul tasto} bowing was seldom used in the early quartets of the 20\textsuperscript{th} century and, when found, was indicated in traditional terms. Differentiation of tone quality, other than the simple, straightforward use of playing over the bridge, had not yet been developed beyond the standard technique. The following list, taken from the quartets of the early decades of this century, shows scant use of the \textit{sul tasto} positioning of the bow:

\textbf{Bowing: Sul Tasto: Use of Words}

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ives</td>
<td>No. 2</td>
<td>1907-13</td>
<td>not used</td>
</tr>
<tr>
<td>Bartók</td>
<td>Nos.1 &amp; 2</td>
<td>1908-1915 &amp; 1917</td>
<td>not used</td>
</tr>
<tr>
<td></td>
<td>No. 3</td>
<td>1927</td>
<td>\textit{sulla tastiera} Part 2, at 30, once only</td>
</tr>
<tr>
<td></td>
<td>Nos. 4 &amp; 5</td>
<td>1929-1943</td>
<td>not used</td>
</tr>
<tr>
<td>Hindemith</td>
<td>Nos. 1-6</td>
<td>1909-1945</td>
<td>not used</td>
</tr>
<tr>
<td>Schoenberg</td>
<td>No. 1</td>
<td>1905</td>
<td>\textit{am Griffbrett} Mov. 1, bar 15</td>
</tr>
<tr>
<td>Webern</td>
<td></td>
<td>1905</td>
<td>not used</td>
</tr>
</tbody>
</table>
After the 1960s, the words *sul tasto* proved to be inadequate to describe the developing techniques over the fingerboard and composers added, or substituted, a whole variety of symbols to indicate the wider range of more specific requirements. It is these innovative symbols, as well as instructions requiring special attention, that are illustrated and discussed below:

**Bowing: Sul Tasto: New Sounds and/or Symbols**

Example 354. Bowing: *Sul Tasto: New Sounds and/or Symbols*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartolozzi</td>
<td><em>Qtto per Archi</em></td>
<td>1960</td>
<td></td>
</tr>
</tbody>
</table>

![Music notation](music notation image)

**tastiera** - on the fingerboard

Only the symbol is used in the score

Ex. Mov. IV, bars 1 & 2. Violins 1 and 2

Note: Bartolozzi uses the same shape, unfilled, for a cessation of the *sul tasto* technique.

Example 355. Bowing: *Sul Tasto: New Sounds and/or Symbols*

Beamed Notation

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kopolent</td>
<td><em>Qtto 3</em></td>
<td>1963</td>
<td></td>
</tr>
</tbody>
</table>

![Music notation](music notation image)

*ST*  

Ex. p. 15 Violin 1, Viola & Cello
Note: As explained in the section *Sul Ponticello*, Kopolent's abbreviated letters (SP) for *sul pont*, (1963), anticipated the use of the lower case letters (s.p.), adopted for general use by the members of the International Conference on New Musical Notation at the end of 1974. The same is true of Kopolent's letters ST, which are similar to (s.t.), the suggested standard abbreviation adopted for the technique of *sul tasto* at the same meeting. Cervetti, on the other hand, anticipated the recommendation of the members of the above Committee exactly, by using the lower case letters (s.t.) for *sul tasto* in his quartet *Zinctum* (1966) as shown in the following example.

Example 356. Bowing: *Sul Tasto* : New Sounds and/or Symbols

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervetti</td>
<td><em>Zinctum</em></td>
<td>1967</td>
<td>s.t. <em>sul tasto</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>letters only</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ex. Bars 281-284, all instruments</td>
</tr>
</tbody>
</table>

Example 357. Bowing: *Sul Tasto* : New Sounds and/or Symbols

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berio</td>
<td><em>Sincronie</em></td>
<td>1963-4</td>
<td><em>Tam Griffbrett - sul tasto</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Only the symbol is used</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ex. p. 7, at 19, Violin 1</td>
</tr>
</tbody>
</table>

[458] Interface, pp 91-92.
Example 358. Bowing: *Sul Tasto*: New Sounds and/or Symbols

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Druckmann</td>
<td>No. 2</td>
<td>1966</td>
<td>$\uparrow$ = <em>sul tasto</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Only symbol is used</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ex. p. 18, before 24, Violin 1 &amp; 2</td>
</tr>
</tbody>
</table>

Note: The note to note *glissando* is played *sul tasto* - (sign $\uparrow$) - within two rhythmic groupings of notes placed in a *tempo* of equally spaced time units of: $\uparrow \uparrow$ = 1 Sekunde = ♩

Example 359. Bowing: *Sul Tasto*: New Sounds and/or Symbols

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karkoschka</td>
<td><em>Quattrologe</em></td>
<td>1966</td>
<td>$\downarrow$ <em>sul tasto</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>only the sign is used</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ex. p. 8, line 3, Violin 2</td>
</tr>
</tbody>
</table>

Note: The note to note *glissando* is played *sul tasto* - (sign $\downarrow$) - within two rhythmic groupings of notes placed in a *tempo* of equally spaced time units of: $\downarrow \downarrow$ = 1 Sekunde = ♩
Example 360. Bowing: *Sul Tasto*: New Sounds and/or Symbols

Composer String Quartet Date Sign/Explanation
Ligeti No. 2 1968 *sul tasto* *flautando* *sempre ppp*

Ex. Mov. 1, bars 22-23, all instruments

Note: At the outset, on the page of Instructions For Performance, Ligeti stipulates: *Flautando* is always played *senza vibrato*, *sul tasto*, with a quick and lightly drawn bow (little pressure). In the above example the bow moves from *ord* to *sul tasto* and continues over the fingerboard in accordance with the *Flautando* instruction. As with all aspects of interpretation throughout the composition Ligeti is absolutely specific about the sound quality requirements, as well as the positions and movements of bow. Copious instructions are written into the score in minute detail explaining exactly what is required by the composer - nothing is left to chance.

Example 361. Bowing: *Sul Tasto*: New Sounds and/or Symbols

Composer String Quartet Date Sign/Explanation
Kelemen *Motion für Sqtt* 1969 *s.t. arco*

Ex. bar 148, Violin 1
Note: In the foregoing example, the traditional *s.t. arco (sul tasto)* is incorporated into a number of 20th century notation innovations relating to the general speed per bar which, at bar 130, marked $J = 58$, are as follows:

- the subdivision and number of beats per bar is shown by the 5 placed above the stave and small vertical markings which indicate the number of beats in a bar- these vary throughout the score
- the distinctive symbol of wavy lines connected to the grouping of stemless notes show they are to be play[ed] very rapidly - *sehr schnell spielen*
- and finally
- the proportional spacing of the notes in the bar

The traditional metronome mark is connected to a variety of 20th century concepts and demonstrates once again how contemporary composers utilise notation combinations in different ways that best express their individual musical ‘requirements’.

**Example 362. Bowing: *Sul Tasto* : New Sounds and/or Symbols**  
*Tasto* within Proportional Spacing

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown</td>
<td>St. Qt.</td>
<td>1970</td>
<td><em>Tasto</em></td>
</tr>
</tbody>
</table>

Ex. [p. 2] line 2, Violins 1 and 2

Note: In the above example, the *Tasto* is placed amongst a variety of bowing positions and techniques - none of which are new to the 20th century. However, *sul tasto* played within proportionally spaced notes in a time unit of 10" combines a standard technique with notation that belongs strictly to the second half of this century.
Example 363. Bowing: *Sul Tasto*: New Sounds and/or Symbols

*Flautando* within Proportional Spacing

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crosse</td>
<td>Studies for St. Qt.</td>
<td>1976</td>
<td><em>flaut.</em></td>
</tr>
</tbody>
</table>

Note: While the floating quality has long been used as colouristic addition to sound, the above example combines *flautando* with two practices distinguishable in the 20th century - the nonsynchronisation of the note-to-note *glissandi* and proportional spacing.

Example 364. Bowing: *Molto Sul Tasto*: New Sounds and/or Symbols

Extreme Use in *Tremolo*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferneyhough</td>
<td>Second St. Qt.</td>
<td>1980</td>
<td><em>molto sul tasto</em></td>
</tr>
</tbody>
</table>

Note: In the example above, the instruction *molto sul tasto* requires the player to - bow or pluck as near the fingers of the left hand as seems practical. Thus the contact position of the Viola bow on the string is governed by the exact location of the fingers of the left hand in the 3rd position: (§)

- firstly note g: 1st finger placed on String II (D string)
- secondly note f: 3rd finger, String I, (A string)
The passage is marked: \( \text{\textit{rapido poss.}} \) and it is therefore not practical for the bow to be moved between the two different positions of the fingers. As a result, the above instruction most practically fixes the bow as close as possible to the higher finger (on the A string) - and not below it - as at that speed, the bow could not be reasonably expected to move between the two positions.

### Example 365. Bowing: *Sul Tasto*: New Sounds and/or Symbols
Within Contemporary Stave System

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hübler</td>
<td>3. Stqt.</td>
<td>1982-84</td>
<td><em>Sul Tasto</em> within Contemporary Stave System</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(No score example necessary)</td>
</tr>
</tbody>
</table>

Note: Hübler's new approach to the function of the stave relates, amongst other features as explained in the *Sul Ponticello* section, to the point where the bow touches the string. The new system includes the use of *sul tasto*.

### Example 366. Bowing: *Sul Tasto*: New Sounds and/or Symbols
Within Contemporary Stave System and Square-shaped Noteheads

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brewaeys</td>
<td>St. Qt.</td>
<td>1989</td>
<td>pressed <em>arco sul tasto</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Square-shaped Noteheads</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ex. p. 28, bar 268, Violin 2</td>
</tr>
</tbody>
</table>

Note: Indeterminate pitch is indicated by the square-shaped noteheads, and the quality of bowing by words.
Example 367. Bowing: *Sul Tasto*: New Sounds and/or Symbols  
*Flautando*: *al dito* (am finger)

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td><em>II Sqt</em></td>
<td>1989</td>
</tr>
</tbody>
</table>

**Sign/Explanation**


*al dito* (at the finger): playing with the bow as near as absolutely possible to the positioned finger. The bow hair should touch the positioned finger. This way of playing is only possible as *flautando*, i.e., no bow pressure on the string is allowed (except against the positioned finger itself), nor may the positioned finger press down the string. To prevent contact with the bow, it may instead be necessary to press the strings sideways down on both sides of the positioned finger.

*Ex. p. 1, Violin 1 & 2*

Note: Lachenmann’s instructions for the extensive use of new sounds and notation are found on separate sheets headed: *Hints on Notation and Performance*. For a detailed explanation of this technique see Ex. 353.

Example 368. Bowing: *Sul Tasto*: New Sounds and/or Symbols  
*Sul Tasto*: Extreme use of

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reynolds</td>
<td>Coconino</td>
<td>1989</td>
</tr>
</tbody>
</table>

**Sign/Explanation**

*sul tasto* as usual but extreme

(No score example necessary)

Note: Reynolds’ requirement is that all *sul tasto* and *sul pont.* movements be done as usual, but in extreme positions.
Comment

*Sul tasto* was seldom used as a colour variant in the early decades of the 20th century. Even Webern - with his inordinate sensitivity to and concentration on the sound of every individual note - did not stipulate the *sul tasto* bowing position in his string quartets. However, in the second half of the 20th century, composers concentrated on extending the fabric of sound in more energetic and forceful ways, often resulting in sounds that extended beyond the limits of musical tones. Noise, instead, replaced pitch and quality of sound. Thus, as shown below, the list of composers applying *sul tasto* in their compositions is far less extensive than those engaging in a more aggressive approach to sound.

**Bowing Sul Tasto - 20th Century Composers**

<table>
<thead>
<tr>
<th>Composer</th>
<th>Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartolozzi</td>
<td><em>Qtto Per Archi</em></td>
<td>1960</td>
<td><em>tastiera</em> - on the fingerboard</td>
</tr>
<tr>
<td>Kopolent</td>
<td><em>Qtto 3</em></td>
<td>1963</td>
<td><em>ST</em></td>
</tr>
<tr>
<td>Cervetti</td>
<td><em>Zinctum</em></td>
<td>1967</td>
<td><em>s.t. sul tasto</em></td>
</tr>
<tr>
<td>Berio</td>
<td><em>Sincronie</em></td>
<td>1963-4</td>
<td><em>T am Griffbrett - sul tasto</em></td>
</tr>
<tr>
<td>Karkoschka</td>
<td><em>Quattrologie</em></td>
<td>1966</td>
<td><em>sul tasto</em></td>
</tr>
<tr>
<td>Kelemen</td>
<td><em>Motion für Stqt</em></td>
<td>1969</td>
<td><em>Symbol alone</em></td>
</tr>
<tr>
<td>Brown</td>
<td>St. Qt.</td>
<td>1970</td>
<td></td>
</tr>
<tr>
<td>Crosse</td>
<td>Studies for St. Qt.</td>
<td>1976</td>
<td></td>
</tr>
<tr>
<td>Ferneyhough</td>
<td>Second St. QT.</td>
<td>1980</td>
<td></td>
</tr>
<tr>
<td>Lachenmann</td>
<td><em>II.Stqt</em></td>
<td>1989</td>
<td></td>
</tr>
</tbody>
</table>

*al dito (am finger): Streichen mit dem Bogen so nahe am Griff-Finger wie nur irgend möglich. Die Bogenhaare sollen den Griff-Finger streifen .... al dito (at the finger): playing with the bow as near as absolutely possible to the positioned finger.*
Percussive Effects

New sonorities have emerged from traditional instruments in the second half of this century. The wide range of technical and musical requirements constituting percussive sounds in the contemporary string quartet testify to the ability of both players and instruments to cope with seemingly limitless demands. Composers require unconventional movements of both hand and fingers, as well as striking actions with different parts of the bow, the results of which, until the 1960s, were considered to be outside the fabric of sound. These new techniques produce every possible audible effect - both stringed and non-stringed - and continue to be incorporated into scores with undiminishing originality.

On the last point John Cage writes:

Paul Zukovsky .... asked whether I would consider making him a .... work for the violin. I am now engaged in that work. But in order to do it, I study under Zukovsky’s patient tutelage, not how to play the violin, but how to become even more baffled by its almost unlimited flexibility.398

These possibilities are only limited by the composer’s imagination.

Penderecki: Threnody to the Victims of Hiroshima (1961)

Percussive Effects

Early in the 1960s, Penderecki’s Threnody to the Victims of Hiroshima (1961), scored for an ensemble of 52 strings: (24 violins, 10 violas, 10 cellos and 8 double basses) contained, amongst other special techniques, a selection of percussive effects which powerfully conveyed the uniquely horrible deaths of the victims of the Hiroshima bombing (1945). Happenings, such as this, put human beings in an extreme situation and any artistic response to such a catastrophic event calls for extreme means to convey the expression required. For this reason, Penderecki rejected conventional syntax and turned, instead, to innovative techniques and graphic notation to convey the content of the work. Dramatic use of dynamics, cluster chords, microtones, unusual sound effects, made partly by bowing on areas other than the strings, all contributed to the widely varying sonorous effects which illustrate the enormity of grief and horror caused by the terrible holocaust. These effects are reinforced with various imaginative percussive sounds, demonstrating that new timbral effects were no longer restricted to the medium of electronics.

Use of Percussive Sounds: Early decades of 20th Century

In the early decades of the century, percussive bow sounds were generated strictly by the use of *col legno* - found briefly in Webern's *Fünf Sätze für Streichquartett*, Op. 5, (1909) but not in any further quartets and used only sparingly in Bartók's later quartets. Schoenberg, while making little use of the sound, nevertheless distinguishes between *col legno battuto*: struck with strike of bow and *col legno trattuto*: drawn with stick of bow in the *Explanatory Notes* of the *Fourth Quartet*, (1939). He is the only composer, pre-World War 2, to include explanatory notes in the score for newly devised symbols. Composers of the 1950s, such as the Americans Cage, Carter, Babbitt and Rochberg, found themselves in the middle of a new movement with ideals that compelled them to proceed in certain directions by actively challenging all traditional elements of musical syntax. This was done, however, with individuality and in contrasting styles. For example, in the *String Quartet in Four Parts* (1949-50), Cage marked the first three movements: Gently Flowing Along, Slowly Rocking and Nearly Stationary; Carter in the first string quartet, *Fantasia* (1951), emphasised melodic modulation; Feldman in *Structures for String Quartet* (1951) composed in delicate, often detached, repetitive ‘motivic’ units. These composers were all committed to exploring and pursuing different paths but, in their common goal to express a musical language of the time, they found scant use for percussive techniques.

Percussive Sounds: Contemporary Extensions

In string playing, the character of the percussive sound is largely dependent on three aspects which contribute to the *timbral* colour currently adopted in contemporary string quartet writing:

- the nature of the device used to make the sound: (hand, finger, fingernail, knuckle, bow or unconventional devices)
- the manner in which the sound is made: (tapping, slapping, striking, knocking etc., singly or in combination)
- the ‘playing’ area on the instrument

The examples illustrated below are not intended to be a complete catalogue of percussive sounds within the *genre* of the string quartet, but rather a selection of new sounds and symbols which expand the range of the original *col legno* effect. Each percussive technique produces variations of pitch and density of sound which are dependent on the area, the device and the method used in making the sounds.
The three main techniques are as follows:

- percussive effects with bow
- percussive effects with hand or finger
- percussive effects by other sources

**Percussive Effects: Produced with the Bow**

The most common striking technique is *col legno battuto* - with the wood of the bow, (not *col legno trattuto* - stroking with the wood of the bow) executed usually between the bridge and the fingerboard. However, when struck at other points, various timbral changes occur as follows.

<table>
<thead>
<tr>
<th>Method Implemented</th>
<th>Location</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tapping Bow</td>
<td>On Strings</td>
<td>clear percussive</td>
</tr>
<tr>
<td><em>(col legno battuto)</em></td>
<td>near peg box</td>
<td>open strings louder than stopped notes</td>
</tr>
<tr>
<td></td>
<td>over fingerboard</td>
<td>less sound and loss of pitch</td>
</tr>
<tr>
<td></td>
<td>on top of bridge</td>
<td>indeterminate high and low pitches</td>
</tr>
<tr>
<td></td>
<td>behind bridge</td>
<td>depending on choice of string</td>
</tr>
<tr>
<td></td>
<td>bouncing</td>
<td>two frequencies are attack and release</td>
</tr>
<tr>
<td></td>
<td>length of string</td>
<td>the pitch is regulated by length of the stopped string</td>
</tr>
<tr>
<td></td>
<td>tailpiece</td>
<td>clear rapping sound</td>
</tr>
</tbody>
</table>

**Percussive Effects: Produced with the Hands**

Although the right hand is most often required, the left is also effectively called upon to create special effects which, in general, require imaginative and creative experimentation to determine the most efficacious results, within the uniqueness of each composition.
### Method

<table>
<thead>
<tr>
<th>Method</th>
<th>Implemented</th>
<th>Location</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tapping</td>
<td>Knuckles</td>
<td>body</td>
<td>depending on strength and location, changes in resonance and slight pitch variations occur: near f-holes - most resonant top or bottom - less resonant ribs - least resonant</td>
</tr>
<tr>
<td></td>
<td>Fingertips</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knocking</td>
<td>Knuckles</td>
<td>body</td>
<td>woody sound</td>
</tr>
<tr>
<td></td>
<td>Fingertips</td>
<td>tailpiece</td>
<td>soft drum-like sound</td>
</tr>
<tr>
<td>Slapping</td>
<td>Flat Hand</td>
<td>body</td>
<td>generally softer percussive effect</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fingerboard</td>
<td>pitched percussive sounds usually dampened after use</td>
</tr>
</tbody>
</table>

Apart from using the bow, hands or fingers to generate percussive sounds, other means include foot stamping, tapping and knocking which may all be incorporated, for additional effect.

### Example 369. Percussive - Bow: New Notation Symbols: No Specific Area

With New Notation

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pousseur</td>
<td>Ode : Pour</td>
<td>1960-61</td>
<td>b struck with bow</td>
</tr>
</tbody>
</table>

Ex. p. 67, Violin1 & Viola
Example 370. Strike Bow on Strings

\[ \begin{align*}
3 & \quad 2 & \quad 2 \\
\end{align*} \]

\textit{punta battuto} - strike with wood at point

\( \bullet \) = as short as possible. Such notes appearing unconnected next to one another are staccato. The manner of playing as often clarified (pizz., \textit{punta battuta}, \textit{col legno}, etc.).

\( \bullet \) (also S, especially in chords) = note with sharp sign, that is, pitch raised half a tone

\( \mathcal{N} \) (also \( \mathcal{N} \)) = note with flat sign (half a tone lower)

Ex. p. 39.

Note: The techniques in both the examples above are not new, but the manner in which they are notated belongs to Pousseur's unique design and use of contemporary symbols. In the first example the specific 'white-note-head' symbol indicates: struck with bow. The percussive requirement is shown with a white note. However, a quick look at the Violin 2 and Cello parts could mislead players into mistakenly thinking that the notation requires \textit{col legno battuto}, whereas a careful inspection reveals that this is not so - the reason is that the notes are black and not white and the stems are also incorrectly located.

In the second example Pousseur writes the words: \textit{punta battuta}. The additional considerations are:

- the separate black notes \( \bullet \) are altered and are to be played \textit{staccato}
- the bracket and line under each stave refers to the rhythm of the \textit{staccato} passages: \[ \text{periodically, either as quickly as possible (thus determined by the most difficult passage) or divided over an otherwise fixed length of time (beats).} \]
- the comma, which signifies a pause, as short as possible, but perceptible (for example, dependent on the bowing), which in this example reflects a short break from a bow \textit{tremolo} indicated by the jagged line.

Both of the above examples display a selection of standard techniques, scored in a language that is quite revolutionary in every way, whether it represents pitch, rhythm, articulation or additional musical indications. While the percussive requirements, in particular, are not original, the set of symbols which represent them are unique and, as such, the context in which they are placed should also be explained fully in any given example, (as above). Shown in isolation, these symbols are meaningless.
Pousseur's notation demonstrates the complexities of modern musical thought which result in a detachment from all known frames of musical reference and, as such, revolve around a whole new order of uniquely devised symbols demanding understanding and careful application.

Example 371. Percussive - Bow : New Notation Symbols : No Specific Area
With Time Units
Strike Bow on Strings

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kopolent</td>
<td>Qtto 3</td>
<td>1963</td>
</tr>
</tbody>
</table>

Sign/Explanation
In the NOTES ON PERFORMANCE found at the beginning of the score, the composer employs a system of numbers ranging from 1-10, each relating to a specific instruction. No. 4 in the example refers:

4 heftiger Schlag col legno auf die Saiten
4 sharp impact col legno on the strings
Ex. p. 12, Cello

Note: The following unique symbols are used by Kopolent in the example above:

- numbers relate to instructions
- number 4, accompanied by the letters CL and an arrow, shows the exact point at which the impact with the back of the bow is to be made
- number 3, indicated earlier in the bar, but not visible in the example above, stipulates: very quick movement at highest extremity. The requirements of the number 3 exclude the need for symbols or notes
- the 'frame', which in this example is empty, is generally accepted to contain repeated material.
- the end of the descending arrow indicates the point of cessation of repeats
- the downward pointing arrow shows that the col legno is to be made on the Cello's lowest open string. The arrow replaces a pitched note
- tempo, not shown in the example, is indicated in time units of seconds which require the repeated notes to last for approximately 10-17 seconds

Kopolent, Quartetto 3 Notes on Performance

Traditional Notation Within Time Units

Stroke Bow on Strings: Half \textit{Col Legno} - Half Bow Hair

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karkoschka</td>
<td>\textit{Quattrologe}</td>
<td>1966</td>
</tr>
</tbody>
</table>

\textbf{Sign/Explanation}

\[\rightarrow\textit{mit dem bogenholz gestrichen} - \textit{immer}
\textit{mit geringem anteil der bogenhaare}\]

\[\rightarrow\textit{stroke with wood of bow} - \textit{always with}
\textit{a small portion of hair}\]

\textit{Ex. p. 3. Line 3, Violin 1}\]

\begin{align*}
\rightarrow & \textit{mit dem bogenholz geschlagen} - \textit{immer} \\
& \textit{mit geringem anteil der bogenhaare} \\
\rightarrow & \textit{stroke with wood of bow} - \textit{always with a small} \\
& \textit{portion of hair} \\
\rightarrow & \textit{sul ponticello} \\
\& & \textit{pizzicato} \\
\& & \textit{pizzicato mit aufschlag der saite auf das} \\
& \textit{griffbrett} \\
\rightarrow & \textit{pizzicato the strings over the fingerboard}\]

\textbf{Note:} This line contains a selection of new symbols within traditional notation. Violin 1 sign represents \textit{mit dem bogenholz gestrichen} - strike with wood of bow. Other 20\textsuperscript{th} century symbols represent the following:

\begin{itemize}
\item tempo is controlled by and marked throughout in time units of: \[\frac{1}{\text{Sekunde}} = \frac{1}{J}\]
\end{itemize}
**Example 373. Percussive - Bow: New Notation Symbols: Specific Area**

**Strike Bow on Strings: Half Col Legno - Half Bow Hair**

**Composer**  
Henze

**String Quartet**  
5. Stqtt

**Date**  
1976-7

**Sign/Explanation**

\[
\text{\textit{halb mit dem bogenholz, halb mit dem bogenhaar auf die saiten klopfen, während die linke hand die vorgeschriebenen töne greift -}}
\]

Tap on strings, half with bow-stick and half with hair of bow whilst left hand stops given notes

Ex. p. 24, bar 98, Violin I & Viola

---

**Example 374. Percussive - Bow: Words in Traditional Notation: Specific Area**

**Strike Bow on Strings: Half Col Legno - Half Bow Hair**

**Composer**  
Ferneyhough

**String Quartet**  
Second St. Qt.

**Date**  
1980

**Sign/Explanation**

\[
\text{\textit{$1\frac{1}{2}$ col leg. batt. (tratt.) - turn so that string is set in motion partly by hairs, partly by wood of bow}}
\]

Ex. p. 11, bar 107, Violin I

---

**Note:** Henze's traditional notation is interspersed with individually devised symbols of which the 'arrowed-stemmed' note in the example above is one of many listed on a page of Zeichenerklärung - Explanation of Symbols.
Note: Femeyhough, in the above example asks for \( \frac{1}{2} \) *col leg. batt.* which produces a less percussive sound than the \( \frac{3}{4} \) *col leg. batt.* as there is less contact with the wood of the bow.

In each of the three examples given above, the percussive *col leg. batt.* sound is naturally lessened when a portion of hair as well as the wood of the bow strikes the string.

**Example 375. Percussive - Bow : New Symbol within Tradition Notation : Specific Area**

Strike Bow on Strings : Half *Col Legno* - Half Bow Hair

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heyn</td>
<td><em>Sirènes</em></td>
<td>1983</td>
</tr>
</tbody>
</table>

**Sign/Explanation**

\[ \begin{array}{c} 
\text{Die Bogenstange (legno) muß gleichzeitig die Satie und das Griffbrett innerhalb von 5 cm von der Griffstelle teils schlagen, teils streichen; die Tonhöhe muß deutlich hörbar sein} \\
\text{wooden part of the bow (legno) half strikes the string and the fingerboard at the same time within 5 cms from the fingering; height and pitch of tone clearly audible} \\
\end{array} \]

Ex. p. 32, *bar 121, Violin 1*

Note: The percussive sounds will be clear but soft as the striking position of the bow will be well over the fingerboard - very near to the pegs - as the stopped note : B\( \flat \) /G string, is played with the 2nd finger in 1st position and gives ample room to be played within 5 cms from the fingering. Heyn makes use of this particular technique many times in the various instruments. * The bar marked 21 is, in fact, number 121 as, after marking the one-hundredth bar, Heyn dispenses with the hundreds digit.
Example 376. Percussive - Bow: New Notation Symbols: Specific Area
Strike Bow on Strings

Composer | String Quartet | Date | Sign/Explanation
--- | --- | --- | ---
von Biel | Qtt für Streicher | 1965 |  

\[
\begin{array}{c}
\text{Ex. p. 7, at 23, Violin 2}
\end{array}
\]

Note: There is no mention of using the wood of the bow to make the sound. However, the fact that von Biel requires the string to be \textit{Schnelles Schlagen mit der Mitte des Bogens auf gegriffene Saiten mit geringen Vor- und Rückwärtsbewegungen des Bogens}: Hit at speed with the middle of the bow in slight backward and forward movements, \textit{Doppelgriffe}: Double handed, to accommodate the four open strings marked I+II+III+IV, suggests a percussive effect. The letters B.v.G are explained in the page titled \textit{Erläuterungen: Explanations}, as: \textit{Tonhöhe wird am breiten Ende des Griffbrettes gegriffen}: Note to be played at the wide end of the fingerboard. The black notes represent a specific time span and therefore, the particular movement above is required to last between \( J = 1.0 \pm 0.25 \) seconds.

All the symbols in the score are uniquely devised and represent the following in order of appearance:

\[
\begin{align*}
\text{Glissandi innerhalb einer großen Sekund, sehr dicht und schnell} & = \text{Glissandi played within a long second, very close and fast} \\
\text{B.v.G} & = \text{A note which is higher than one that is played at the wide end of the fingerboard}
\end{align*}
\]
Note: As shown in the above example, the symbols are frequently combined to form a compound set of technical requirements in many parts of the score.

Example 377. Percussive - Bow : New Notation Symbols : Specific Area
Strike Bow on Strings

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferneyhough</td>
<td>Sonatas ....</td>
<td>1967</td>
<td>( \downarrow ) = bring bow heel down on to string</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>from a distance</td>
</tr>
</tbody>
</table>

Note: This special sign appears only at this point in a score of 616 bars. The instruction, bring bow heel down on to string from a distance, is unclear. For example:

- exactly which string is to be struck from a distance with the heel of the bow, as no note is given directly underneath the arrow?
- may any string, chosen at random, be struck and then released?
- this is suggested by the fact that a rest and a pitched note follow the symbol
- does the instruction apply only to the 1st Violin?
- may one conclude that the bow has merely to be brought down strongly on any string and released immediately at the point indicated by the arrow?

Ferneyhough is generally most meticulous about marking, in detail, every kind of instruction wherever necessary, so as to leave absolutely nothing either to chance or to a player's judgement. The lack of clarity in this sign is uncharacteristic of his compositional procedures.
Perhaps, as a final conclusion, the last suggestion offered above is best, as it refers to the most straightforward deduction. However, that a query exists is not unfounded.

Example 378. Percussive - Bow : New Notation Symbols : Specific Area
Strike Bow on Strings : *Arco battuto*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hübler</td>
<td>3. Stqtt</td>
<td>1982-4</td>
<td>Arco battuto wird durch keilförmige Notenköpfe gefordert -</td>
</tr>
</tbody>
</table>

*Arco battuto* is specified by wedge-shaped noteheads

Ex. p. 17, Violin 1

Note: (For an explanation of Hübler’s stave see: Chapter 11, Stave : 20th Century Approach). On the four-line stave (representing the four strings of the instrument) the specifically devised wedge-shaped noteheads indicate the percussive sound of the *battuto* technique. The top-line single stave - containing information concerning the method of bowing - has the instruction *c.l. (col legno)* placed above it while the single-line stave below it - representing information concerning the point where the bow touches the string - is marked *s.p. (sul pont.)*, and these bow techniques continue for the next three-and-half ‘bars’. With regard to the rhythmic notation, a careful study of the placement of the noteheads shows that the beamed note-groupings do not correlate with the marked time units of: (\(\downarrow\) = ca. 64), but are spaced proportionally for a total of 24 ‘beats’ per line.(\(\downarrow\) = ca. 64). The number of ‘beats’ per line is, however, not constant and varies from line to line.

Example 379. Percussive - Bow : New Notation Symbols : Specific Area
Strike Bow on Strings

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heyn</td>
<td>Sirenes</td>
<td>1983</td>
<td>sehr kräftiger, perkussiver Abstrich nahe am Steg</td>
</tr>
</tbody>
</table>

extremely forceful, percussive downstroke near bridge

Ex. p. 32, bar 123, Viola & Cello
Note: The strength of the percussive sound is conditioned by the dynamic markings. The Viola sffz is more intense than the ff played by the Cello.

Example 380. Percussive - Bow : New Notation Symbols : Specific Area
Strike Bow on Strings : Transition Along String

Composer     String Quartet     Date     Sign/Explanation
Powell       Filigree           1965     calls for the wood of the bow to be bounced freely along the lengths of a specific pair of damped strings, thus engaging pitches in the course of its trajectory. On the violin or viola, the motion of the bow is directed from the bridge to the damping fingers near the nut. (Fingers rest in low first position, touching lightly as in the production of harmonics.) On the cello, the direction in which the bow is to be moved is specified in each instance.

Note: The first explanation is illustrated in the example above. The bow remains unaltered on the D and G strings while moving from the [very end of the fingerboard ———> bridge], presto, accel. al prestiss. This movement, executed through the use of new symbols, is played against traditional notation in the three upper parts.

Example 381. Percussive - Bow : New Notation Symbols : Specific Area
Strike Bow with Heel : On Bridge (Listed but not practised)

Composer     String Quartet     Date     Sign/Explanation
Bartolozzi  Otto per Archi     1960     percussione col tallone dell’arco sul ponticello - strike with heel on bridge

(No score illustration)

Note: The symbol above is listed in the Spiegazione Dei Simboli but is not found in the quartet. It would appear that standard symbols are set out for all Bartolozzi’s works whether used in a particular score or not.
Example 382. Percussive - Bow: New Notation Symbols: Specific Area
Strike with Heel: On Side of Fingerboard

Composer  String Quartet  Date  Sign/Explanation
Heyn       Sirenes        1983  mit dem massiven Teil der Bogen-
genau die Seite des Griffbretts - in hoher Lage - schlagen -

massive part of bow strikes the side of finger-
board in high-up position

Ex. p. 30, bar 112, Cello

Note: On the page headed Symbole: Symbols, an additional illustration is given below the striking symbol - not included in the score - showing the point where the bow makes contact with the fingerboard. This technique is shown in conjunction with the wedge-shaped notes:

Throughout the score the striking technique is found only in the Cello part. However the movement is probably not feasible for either the Violin or Viola, as the proximity of the nut of the bow to the body of the instrument could, if used indiscriminately, damage the belly.

In the example above, three specific symbols, are found each signifying a distinct percussive sound:

\[
\text{fff} \quad Fingerspitze der linken Hand .... \quad \text{left-hand-fingertip .... strikes down}
\]
\[
\text{schlägt perkussiv senkrecht auf die Saite} \quad \text{vertically on string in a percussive manner}
\]
\[
\text{legno batt. behind bridge (in score)} \quad \text{legno batt. behind bridge}
\]
The score contains a large number of newly devised symbols relating to complex percussive and non-percussive sounds, occurring simultaneously and in succession within both traditional and proportional notation. The interpretation of the required techniques is complex and innovative as the music generates a genuinely contemporary concept of the **genre** with an ever increasing density and multiplicity of sound.

### Example 383. Percussive - Bow : New Notation Symbols : Specific Area

**Strike with Heel : On Side of Fingerboard**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td><em>Gran Torso</em></td>
<td>1971-6-8</td>
<td>Schlag mit der Spannschraube,</td>
</tr>
</tbody>
</table>

- je nach notierter Position
- auf das nackte Holz des Griffbretts oder des Saitenhalters (evtl. auch Kinnhalter) -
  Rap the tension-screw on the wood of the fingerboard or the tailpiece (or possibly the chin-rest) according to the notated position

- auf Griffbrettholz bei IV -on wood of fingerboard next to string IV

- Pizzicato durch Anreifen der Saite mit der Spannschraube bei steil aufrechtgehaltenem Bogen.
  Die Spannschraube streift hart die Saite und schlägt unmittelbar danach aufs Griffbrettholz -
  Pizzicato by pulling at the string with the tension-screw while the bow is held upright. The tension-screw brushes roughly against the string and hits the wood of the fingerboard immediately thereafter.

*(Spannschraube)* *(Tension Screw)*

---

Ex. p. 4, bar 40, Violin2 & Cello

---

Note: This example has a variety of new symbols, four of which are described above, each signifying a specific technique. The different symbols are as follows:
- an white triangular 'notehead' (>v)
- a black triangular 'notehead' (▼)
- a black inverted triangle with a stem (▼)
- a small white square (o)

all representing a percussive sound of one sort or another.

At bar 40 Violin 1, the white 'notehead' (▼) followed by the black notehead (▼) generates a double sound - a metallic pluck succeeded by a wooden thud - as the tension screw brushes roughly against the string before hitting the wood of the fingerboard immediately thereafter. This in turn is followed by a tapping sound on the fingerboard, notated by the third symbol described above (▼). In Violin 2 of the same bar the symbols are reversed, as are the sounds, while at bar 39 the white square (o) refers to a pizzicato with the tension screw.

Example 384. Percussive - Bow : Verbal Instructions : Specific Area
Tap Bow on Tailpiece - Revised

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
</table>
| Fermeyhough | Sonatas       | 1967  | □ = percussive attack either: a) on edge of table [belly] with side of nut, or: b) on table with fleshy part of finger-tip. (Final choice between the two is indicated in the individual context.)(Ex. p. 20, line 3, Viola)

Note: The original performance instructions relating to this example, and quoted above, were subsequently amended by Fermeyhough and replaced with the single new direction: (with heel of bow on tailpiece). The inclusion of the abbreviated batt. clearly indicates the method of the strike.
Example 385. Percussive - Bow : Specific Area
Tap Tailpiece with Stick of Bow

Composer    String Quartet    Date
Cervetti    Zinctum        1967

Sign/Explanation
\( \text{mit der Bogenstange auf den Saitenhalter klopfen} \)
tap tailpiece with stick of bow
Ex. p. 3, Cello

Example 386. Percussive - Bow : Specific Area
Strike Col Legno battuto near Pegs

Composer    String Quartet    Date
Crumb    Black Angels        1970

Sign/Explanation
\( \text{****) Strike with bow near pegs for a more percussive effect} \)
Ex. 4, Devil Music, p. 8, line 1.
E. Violin II & Cello

Note: The percussive chord effect in Violin II and in the Cello is heard against pizzicato arpeggiated chords in the direction of the upward pointing arrow \( \uparrow \) of the Viola part. Notice the incomplete staves at the end of the bar and also the joining of the non-existent chords by beams and vertical lines in the two upper parts. As shown in the example, the termination of the stave and the vertical lines together replace the function of the rests of traditional notation. Crumb’s score is full of fragmented and unconventional staves, discussed later, in Chapter 11, The Stave: A 20th Century Approach.
Example 387. Percussive - Bow : New Symbol : Specific Area
Tap Bow on Tailpiece : Holding Instrument in Unusual Position

Composer  String Quartet  Date
Sculthorpe  No. 8  1970

Sign/Explanation
- Percussive sound, produced by tapping *col legno* tailpiece

Ex. p. 13, Mov. IV, bar 13, Violin 1

Note: The 1st Violin is instructed to hold the instrument as a Cello for almost the entire movement. The percussive sounds above also include: *pizz.*, *col legno*, and a specially devised sign for playing .... between bridge and tailpiece on string indicated, indicated by a symbol in the form of a semi-circle on the stem of the note ▼.

Example 388. Percussive - Bow : Transitional
Striking String at Varying Distance from Bridge

Composer  String Quartet  Date
Crumb  Black Angels  1970

Sign/Explanation
*) touch string lightly with second partial node throughout passage. The pitch element is obtained by striking string at varying distance from the bridge. The bars marked "*col legno ord." are to be played in conventional manner....

Ex. 2. Sounds of Bones and Flutes [Trio], p. 6, line 1, E. Cello

Note: At the beginning of the *) *col legno battuto* bars Crumb places the required partial (or harmonic) at the beginning of the Cello stave. ▂. The notes to be struck are staveless but nevertheless have a pitch contour which is obtained by striking string at varying distance from the bridge. It can be presumed that the centre line represents the bridge and, therefore, the notes placed further from the line are struck *col legno battuto* at a greater distance from the bridge.
The constant note is .... the 2nd partial node throughout passage with the string touched lightly. Although the terms harmonics and partials are frequently used as if interchangeable, the latter is explained by Apel as having '.... in scientific studies a wider significance, since it also includes nonharmonic overtones like those that occur in bells and in the complex sounds called noises.' Nodes are the points of rest between two wave motions of a vibrating string, where the displacement is always zero - such as the fixed ends. Several nodes occur along the length of a string and the distance from one node to the next is found at the halfway point in each separate wavelength.

Battuto - Uninterrupted Transition Along String
Composer String Quartet Date
Holliger St. Qt. 1973

Sign/Explanation
Nach Beginn Vl Einsatzstände von 1" bis 3" in beliegender Reihenfolge c.l. batt. aug beliebiger Saite. Aufschlagstelle längs der Saite verschieben .... After V1 begins, free order of entries at intervals of 1" - 3" c.l. batt. on any string. Point of contact to be shifted along string (uninterrupted transition)
Ex. p. 19, at B5, all instruments

Note: The col legno batt. is done on any string chosen by the player in a series of asymmetrical entries at intervals of between 1" - 3". The notation exhibits many 20th century innovations:
- no stave
- no clef: playing instructions in clef space - c.l. batt.
- time units per seconds
- graphic notation
- toneless
The 'bar' is played with constantly moving bowing positions

---

Example 390. Percussive - Bow: New Notation Symbols
Strike Bow on Strings: Within Traditional Notation

Composer  String Quartet  Date  Sign/Explanation
Bartolozzi  *Ottò per Archi*  1960  

\[\text{Ex. p. 3, Mov. II, bars 8-9, Violin 2 & Viola}\]

**Note:** Bartolozzi, unlike Pousseur who uses new notation throughout his quartet, has added new symbols to his general use of traditional notation as is shown above in the new percussive symbol.

Example 391. Percussive - Bow: On the Sides of the Bridge
Left Side Above Slit

Composer  String Quartet  Date  Sign/Explanation
Lachenmann  *Gran Torso*  1971-6-8  

\[\text{linke Stegkante oberhalb Schlitz - left side of bridge above slit}\]

Ex. p. 14, bar 138-139, Cello

**Note:** The graphic design shows exactly where the bow is to be played and how it is to be executed. The *ricochet* technique is effected on the side of the bridge and not in the traditional manner - on the string - thus producing a percussive, pitchless effect.
Example 392. Percussive - Hand
Rapping with Knuckles

Composer | String Quartet | Date
-----------|---------------|------
Hiller     | No. 5.        | 1962

Sign/Explanation

\[
\text{indicates to the player that he should rap the body of the instrument with his knuckles.}
\]

Ex. p. 9, at C, bars 39-40 Violin 2 & Cello

Note: The x-shaped note-heads generally indicate a sound of indeterminate pitch. The symbol is also found for tapping, rapping or striking the instrument, with or without the bow. Kurt Stone recommends that the 'note' be placed on an extra line below the staff and that the manner in which the sound is to be made be added in words e.g. knuckles, fingertips etc.\(^{401}\)

\[
\text{However, the placement of the 'note' in the above example deviates from Stone's recommended placing below the stave and is found instead on the middle line. For a straightforward col legno battuto, Hiller uses the x-shaped-note accompanied by words in the relevant bars.}
\]

\[
\text{col legno battuto}
\]

In certain scores only the exact location as to where the 'tapping' is to take place is explained, but in this instance Hiller's instructions are supplied in paragraph (b) of the Forward.
Example 393. Percussive-Hand
Rapping with Knuckles/Fingers

Composer  String Quartet  Date  Sign/Explanation
Holliger    Statt          1973  mit Fingerkuppe auf Korpus klopfen - tap sounding body with fingertips

Ex. p. 23, at D2, Violins 1 & 2, Viola

Note: The percussive signs explained above are in the Violin 2 and Viola parts. The violinist is required to mit Fingerkuppe auf Korpus klopfen - tap sounding body with fingertips with the right hand, after arpeggiated pizzicati on four strings behind the bridge (as indicated by the arrows), followed alternately by a Bartók snap pizzicato. The larger sign for the viola player represents: mit Handfläche auf 4, 3, 2 Saiten schlagen - strike 4, 3, 2 string with palm.

The example illustrates the complexity of Holliger’s notation, as every symbol is precisely devised for a specific technique. Copious notes are provided for every line of the quartet and infinitesimal instructions are given to each player which, when used in conjunction with graphic notation, seems to contradict the very essence for which that particular notation was devised - an emphasis on indeterminacy.

Example 394. Percussive - Hand
Finger Drumming: Using Fingernail, Thumb or All Fingers Specific Requirements

Composer  String Quartet  Date  Sign/Explanation
Powell    Filigree        1965  Finger drumming (on rib, table, etc.) is represented on one-or-more-lined staffs as in the conventional notation of indeterminately pitched sound.
to which Powell adds the following symbols for specific percussive effects:

* calls for drumming with fingernail *
T stands for thumb
F all fingers

* To protect varnish, strips of thin tape or cellophane, adhesive though dry, may cover points at which fingernails otherwise would contact the wood.

Example 395.

Fingernails on Right Rib

Example 396.

Specific Fingers: 1 & 2 & Thumb

Note: The drumming of the rhythmic groupings within a time signature 3/8 is specified as follows:

- Fingers 1 & 2, on Table [belly]: T on Rib, creating two different *timbral* colours.
Example 397.
Thumb and All Fingers: T & F

Note: The ff rap on the belly of the Cello is made with all the fingers and alternates with a p tap of the thumb. The placing of the individual notes, unlike the example above where the notes are arranged uniformly, appears above and below the line, and relates to the striking position of both the fingers and the thumb, i.e. the fingers nearer the bridge and the thumb closer to the scroll. (The explanatory graphic below shows the initial position of the thumb, prior to its movement towards the scroll when striking the belly of the Cello.)

bridge

all fingers UPPER NOTES F

thumb

LOWER NOTES T

scroll

Example 398.
On Various Parts of Instrument

Ex. p. 3, Cello
Note: The lines represent indeterminate pitch, while the numbers placed underneath indicate duration and are explained as follows:

Sets of numbers placed beneath ....
represent relative durational values, with a unit value chosen by the individual player.

The number 5 represents the longest duration. A careful study and measurement will reveal that the spacing between the noteheads is proportional in a diminishing series of millimetres:

\[ 5 = 7\text{mm} : 4 = 5\text{mm} : 3 = 4\text{mm} \]
ending in a pause.

Technically all the percussive requirements cannot be done with one hand, as the continuous trill with occasional fingernail clicks throughout (without the accompanying designated symbol) - requires that the hand remain on the left rib of the instrument, while the right hand moves from the Table [belly] : right to the Table : left and finally to the Rib : right.

Example 399.
Percussive Transition:

Rib - Back - Table [Belly]: Tablature Notation

Note: Tabulature notation in string playing is shown mostly as a four-line stave which represents the strings of an instrument and not, as in a conventional stave, the pitches. It is particularly important that the lines are clearly separated, particularly when both types of staves are used in a score. In the example above, the widely drawn three lines of the unconventional ‘stave’ are marked at their

---

\footnote{Apé, *Harvard Dictionary*, p. 829.}
beginning in the three positions shown above, and direct the viola player to trill - with fingernail - from the rib across the back of the instrument, and finally to the belly, where the trilling is done without the percussive click of the fingernail.

**Example 400. Percussive - Hand**

Finger Drumming : Using Fingernail : Specific Requirements

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holliger</td>
<td>Stqtt</td>
<td>1973</td>
<td>mit Fingernägel leise auf Korpus trommeln.</td>
</tr>
</tbody>
</table>

Violine zwischen die Knie Klemmen -
drum lightly on body with fingernails. Hold violin between knees

Ex. p. 23, at D. Violin 1

Note: Holliger's requirement of fingernail drumming on the body of the instrument differs from that of Kelemen (Example 410.), in that he later instructs that the violin zwischen die Knie Klemmen - be held between knees. At the same time the violinist's right hand is directed to strike the string: c.l. batt. (aufschlagstelle längs der Saite verändern) - c.l. batt. (position of strike to change along the string) according to the movement of the graphic symbols. Each instrument is allocated a double set of staves and the above example shows the staves of Violins 1 & 2.

The following are a selection of additional percussive directions written into the score:

- Daumennägel längs der Saite (Plektren) - thumbnail (plectrum) along the string

- mit Fingerkuppen kontinuierlich auf korpus trommeln - drum continuously on sounding body with fingers

- I.h.: Aufschlaggeräusche der Fingerkuppen crescendo sempre - striking noise with the finger crescendo sempre
Example 401. Percussive - Hand  
Finger Striking : Specific Requirements

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hertel</td>
<td><em>Imitationen</em></td>
<td>1975</td>
<td><em>Mit der Hand (besser zwei Fingern) auf den Korpus (Decke) schlagen</em> - strike the hand on the body (better with two fingers)</td>
</tr>
</tbody>
</table>

Ex. p. 18, line 3, All Instruments  

Note: Only in this bar, and nowhere else in the score, is this particular percussive technique adopted.

Example 402. Percussive - Hand  
Finger Striking : Specific Requirements

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hübler</td>
<td>3. Stqtt.</td>
<td>1982-4</td>
<td><em>Tonerzeugung durch Fingerkuppenschlag</em> - sound production by means of percussive finger action on string</td>
</tr>
</tbody>
</table>

Ex. p. 4, Violin 2.  

Note: The use of the ‘diamond-shaped’ note refers, in traditional notation, to an harmonic, but Hübler’s addition of an x and the fact that the note is placed in the lower of the two positions, directs the players to a modified technique whereby the: *Tonerzeugung durch Fingerkuppenschlag* - sound production [is made] by means of percussive finger action on string. Hübler remarks further on the page *Anmerkungen zur Notation - Remarks on Notation* that these notes be played as:
Half harmonic (always as for "natural harmonics"), whose employment is independent of whether it corresponds to a nodal point or not. Correspondingly, the result fluctuates between a "dead tone" and (due to too much or too little pressure) a harmonic mingled with noise.

Thus, the resultant sound is unusual, being created from two distinct techniques:

- harmonic mingled with noise
- by means of percussive finger action on string.

**Example 403. Percussive - Hand**

Finger Striking: Specific Requirements

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heyn</td>
<td>Sirènes</td>
<td>1983</td>
</tr>
</tbody>
</table>

**Sign/Explanation**

- $\downarrow$ Fingerspitze der linken
- $s$f$f$ Hand (bzw. zwei Finger zusammen) schlägt
- perkussiv senkrecht auf die Saite - left-hand-fingertip (or two fingers combined) strikes down vertically on string in a percussive manner

Ex. p. 23, bar 89, Viola

**Note:** In addition to the innovative 20th century percussive technique explained above and shown by the composite symbol $\downarrow s$f$f$ $f$, Heyn also incorporates the traditional percussive technique of battuto legno - strike with the wood of the bow.
A further 20th century innovation is the use of the following non-percussive technique:

[glissando] legno rising from a determinate pitch - through a suggested pitch - ending on an indeterminate note

Heyn extends the finger action above to include a double action with the left and right hands simultaneously, thereby making a composite percussive sound.

Example 404. Percussive - Hand
Finger Drumming: Specific Requirements Acciaccatura with Fingernail and Thumb

Composer | String Quartet | Date | Sign/Explanation
Powell | Filigree | 1965 | Ex. p. 19, bar 141, Viola

Note: Two contrasting timbral percussive colours are produced on two different parts of the instrument: Rib and Back.

Powell makes widespread use of various combinations of percussive sounds using the fingernails, the thumb, all the fingers and the bow, which operate on various parts of the instrument. In each case, where relevant, the notes are positioned on one or more lines to indicate indeterminacy of pitch. These percussive sounds are found in traditional notation as well as in pages where mixed sets of fragmented new symbols and disconnected ‘bars’ of traditional notes are combined. Example 404, above, is a random example taken from Powell’s score to demonstrate an aspect of his approach to notation.
Example 405. Pecussive - Hand
Finger Tapping: Specific Requirements: Transition to over Fingerboard

Composer: Ligeti
String Quartet: No. 2
Date: 1968

Sign/Explanation:

*) mit der Fingerkuppe auf die Saite aufklopfen, allmählich ganz auf dem Griffbrett

**) tap the string with the finger-tip gradually moving over the fingerboard

Ex. Mov. III, bars 27-28

Note: The finger tapping produces soft, pitched notes with the finger-tip strokes becoming gradually faster while moving over the fingerboard, and ceasing at the end of Bar 29. As a result of the accelerando, the rhythmic pattern and simultaneity between the instruments gradually disappears.

Example 406. Percussive - Hand
Finger trilling: On Body of instrument - Tablature Notation

Composer: Powell
String Quartet: Filigree
Date: 1965

Sign/Explanation:

Ex. p. 19, Viola
Note: The percussive finger sound on the body of the Viola is given in tablature notation while Violin 1 & 2 are in traditional notation.

Example 407. Percussive - Hand
Finger Striking or Drumming in Tremolo: On Body of Instrument with Dynamic Variations

Composer: Druckman
String Quartet: No. 2
Date: 1966

Sign/Explanation
\( \rightarrow \) strike or drum on body of instrument with fingers
Ex. p. 12, Violins 1 & 2, Cello

Example 408. Percussive - Hand
Striking with Left or Right Hand or Fingertips: On Body of Instrument

Composer: Karkoschka
String Quartet: Quattrologe
Date: 1966

Sign/Explanation
\( \rightarrow \) schlageffekt; mit linker oder rechter hand oder mit fingerspitzen auf die decke schlagen
percussive effect; with either left or right hand or with fingertips on the belly
Ex. metamorphose III und destruktion
p. 23, line 1, Violin 2

Note: The fact that the notes are placed at specific pitches on the stave means that the percussive sounds are executed with the fingers of either the left hand or right and sound, but only barely, at the given pitches.
Example 409. Percussive - Hand
Tap with Fingertips: On Body of Instrument

Composer: Penderecki  
String Quartet: Quo per Archi  
Date: 1968

Sign/Explanation
* *) mit der Fingerkuppe die Decke des Resonanzkörpers anschlagen  
 tether with finger-tip on sound-board

Ex. p. 9, Violin 2

Example 410. Percussive - Hand
Tap with Fingertips: On Body of Instrument

Composer: Kelemen  
String Quartet: Motion für Stätt  
Date: 1969

Sign/Explanation
* *) Mit Finger auf das Corpus klopfen  
c) tap finger on body

Ex. p. 12, bar 124, Violin 2

Note: All general playing instructions involving Kelemen's individually devised symbols are placed on a separate page. However, where required, more detailed performance instructions are found at the bottom of each page of the score, itemised as a) b) c) etc., in the order of play; thus, for instance, an instruction a) may vary from page to page. The example above illustrates this method clearly with the letter c) placed in the stave and the full instructions appearing at the bottom of the page. The x 'notehead' at c) symbolises a pitchless sound.
The bar shown above further exhibits a selection of new notation symbols and are explained as follows:

Violin1

\[ \begin{align*}
\text{Wiederholen eines} \\
\text{Tones sehr schnell} \\
\text{spielen}
\end{align*} \]

repetition of a tone play very rapidly

Note: The symbol of the 1st Violin is a combination of two symbols showing repetition $\cdots \cdots$ and speed $\ldots$ 

Viola

\[ \begin{align*}
\text{a) c.l.b. aperiodische Tonfolge}
\end{align*} \]
aperiodic sequence of tones

With a fn stating:

a) \text{Intonation ungefâhre}

intonation approximate

Note: The strokes are headless as the pitch is both approximate and the technique applied is \textit{col legno battuto}.

Cello

\[ \begin{align*}
\text{Dauer eines Tones}
\end{align*} \]
duration of tone

Example 411. Percussive - Hand
Tap with Fingertips : on the Bridge

Composer String Quartet Date
Penderecki \textit{Otto per Archi} 1968

Sign/Explanation

* \) \text{mit der Fingerkuppe auf den Steg Schlagen}
* \) tap with finger-tip on the bridge

Ex. p. 13, line 2, Violin 1 & 2
Example 412. Percussive - Hand
New Symbol: Rapping or Tapping with Knuckles

Composer | String Quartet | Date
--- | --- | ---
Cervetti | Zinctum | 1967

Sign/Explanation

\[ \text{\textit{mit den Knocheln auf den Resonanzbode klopfen}} \]
tap belly with knuckles

\text{Ex. p. 3, Violins 1 & 2}

Note: The above example again shows the uniqueness of Cervetti’s musical syntax. Four new percussive signs form a multiplicity of composite sounds used in conjunction with a variety of distinctly different percussive and non-percussive techniques. These are described below:

percussive symbols:

\[ \text{\textit{mit den Knocheln auf den Resonanzbode klopfen}} \]
tap belly with knuckles

Violins 1 & 2

\[ \text{\textit{mit offener Hand auf die Saiten schlagen}} \]
strike string with open hand

Violins 1 & 2

\[ \text{\textit{mit der Bogenstange auf den Saitenhalter klopfen}} \]
tap tailpiece with stick of bow

Cello

\[ \text{\textit{zwischen Steg und Saitenhalter mit liege dem Bogen (Schlageffekt)}} \]
between bridge and tailpiece, bow stick and hair touching the string simultaneously (percussive effect)
non percussive symbols:

\[ \text{höchstmöglich Ton auf der d Saite}
\]
\[ \text{nicht rhythmisiertes tremolo}
\]

highest possible sound on d string
non-rhythmic tremolo

Viola

\[ \text{am Steg (beliebe Saite) nicht rhythmisiertes tremolo}
\]
on bridge (any string) non-rhythmic tremolo

Viola

**Example 413. Percussive - Hand**
Knuckles on Wood : Specific Requirements

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crumb</td>
<td>Black Angels</td>
<td>1970</td>
</tr>
</tbody>
</table>

**Sign/Explanation**

Knuckles on wood (or fingertips)

*Ex. 5. Dans Macabre, p. 8 line 1*

Electric Viola

---

**Note:** The viola player is required to knock knuckles on wood with the right hand while, in between the knocking, the left hand executes a *glissando* finger *pizzicato*. The xs placed below the stave indicate a striking or tapping movement, producing a sound of indeterminate pitch. Crumb uses this particular combination of percussive techniques in other parts of this movement.
Example 414. Percussive - Hand
New Symbol: Striking with Open Hand

Composer: Cervetti
String Quartet: Zinectum
Date: 1967

Sign/Explanation:

\[ \text{mit offener Hand auf die Saiten schlagen - strike string with open hand} \]
Ex. p. 3, Violins 1 & 2

Note: The stave and noteheads are dispensed with and replaced by a single line and symbols to denote sounds of indeterminate pitch.

Example 415. Percussive - Hand
Striking with Open Hand

Composer: Kelemen
String Quartet: Motion für Stätt
Date: 1969

Sign/Explanation:

g) \text{Mit flachet Hand auf Saiten schlagen} 
Ex. p. 20, line 1, Violin 2 & Cello

Note: As explained earlier, Kelemen does not keep the same letter for similar instructions and varies them on each page according to their order of appearance within the score. For example: p. 17, Bar 181, Cello, the instruction b) \text{Mit flachet Hand auf Saiten schlagen} - b) strike string with flat [open] hand is the
second command and is prefixed with the letter b) whereas, in the above example, the same direction - appearing after six other requirements - is prefixed accordingly with the letter g). The x placed below the stave indicates a striking or tapping instruction. This section consists of two barless lines, structured in proportionate spacing, to be played in a time-unit of 15 sek.

The other letters found in the example above, which include both percussive and non-percussive sounds, are explained as follows:

- a) Mit Bogen auf Saitenhalter  
  a) with bow on tailpiece
- b) Mit Finger auf das Corpus klopfen  
  b) strike with finger on body of instrument
- c) Perkussion mit linker Hand auf Saite  
  c) percussively on string with left hand
- e) Pizz., Griffinger nur leicht niederdriicken  
  e) pizz., finger only lightly plucked
- f) Tremolo am Steg  
  f) tremolo on bridge

* denotes non_percussive sounds

With regard to footnote instructions, another contemporary composer, Schmidt, in the score Zweites Streichquartett 1979, numbers the specific symbols and explanations from 1-6. These appear at the bottom of the first page only and thereafter the player is expected to retain the meaning of the symbols.

Example 416. Percussive - Hand
New Symbol : Striking with Open Hand

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hertel</td>
<td>Imitationen für Stiqt</td>
<td>1975</td>
<td>Mit der Hand auf die Saiten</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Griffrett) schlagen</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>strike hand on string (fingerboard)</td>
</tr>
</tbody>
</table>

Ex. p. 18, line 3, all instruments

Note: In the score as a whole, this particular percussive technique is used in only the above two bars.
Percussive Effects - Composite Sounds

Example 417 - Percussive - Composite Sounds
Action of Finger and Bow

Composer  String Quartet  Date
Heyn  Sirénes

Sign/Explanation

\[ \text{sffz} \rightarrow \quad \text{Doppel-Aktion: linke Hand wie oben, rechte Hand streicht (sempre legno) gleichzeitig} \]

\[ \text{Das Klang-Resultat ist ein kurzer }, \frac{3}{4}, \text{ perkussiver Knall (linke Hand)} \]

\[ \text{zusammen mit einem deutlich hörbaren Schnarrgeräusch von der gestrichenen Saite (legno); Bogenstange (legno)} \]

\[ \text{muß während des Aufschlags der linken Hand auf der Saite liegenbleiben - a double-action: left hand proceeds as above while right hand simultaneously bows (always legno); this should sound as follows: a short }, \frac{3}{4}, \text{ percussive crack caused by the left hand; in unison with a quite audible snare-like sound of string as bow (legno) is drawn; bow (legno) must rest on string when left hand strikes} \]

Ex. p. 25, bar 95, Cello

Note: The double percussive action initially creates a harsh, explosive sound through the action exerted by both bow and finger movements. This is followed each time by glissandi of determinate pitches indicated by the small notes in parenthesis, i.e. B\(\text{\textsc{b}}\) - F\(\text{\textsc{b}}\) and D\(\text{\textsc{b}}\) - A \(\text{\textsc{b}}\).
Example 418. Percussive - Composite Sounds
Combined Hand and Bow: Finger Drumming and Bow Tapping: Specific Requirements: Tablature Notation

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Femeyhough</td>
<td>Sonatas ....</td>
<td>1967</td>
<td>*</td>
</tr>
</tbody>
</table>

* Tap edge of tailpiece with nut of bow

** Tap with fingertip on table

Ex. p. 37, bar 387, Viola & Cello

Note: Femeyhough’s two-lined tablature stave incorporates two separate percussive requirements—one for the Viola and a different one for the Cello—notated with the same symbol ⊕, thus alternating two unlike percussive sounds in the lower instruments against the two upper voices scored in traditional notation.

Percussive Effects: Use of Unorthodox Items

Composers use a variety of items, made from a range of materials, to produce percussive sounds. These ‘tools’ are dependent on the sound required. The effects and choices are limitless.

Example 419. Percussive - Unorthodox
Glass Rod

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crumb</td>
<td>Black Angels</td>
<td>1970</td>
<td>****</td>
</tr>
</tbody>
</table>

****) This effect is produced by striking string with glass rod (by left hand in approx. normal position) at points marked ↓. Open string sounds automatically as rod rebounds from string

Ex. 11. Ancient Voices, p. 16,
Electric Violin II
Note: The second violin player strikes the string with a glass rod at the arrowed notes while holding the violin .... like a mandoline. The sound effects of this striking movement are two fold - an A is heard when the rod hits the string and the given open string ( E ) sounds automatically as rod rebounds from [the] string. However, special care must be taken in the execution of the movement as each note of the passage - marked throughout in p -should sound with equal amplitude. A further requirement is:-

Glass Rod & Metal Plectrum "bottle neck" technique

***) With a glass rod (held in left hand) and metal plectrum (e.g. metal clip). Pluck string only at points marked +. Slide rod along string to produce pitches

(See Example 419)

Note: These requirements are complicated and not easy to execute. Holding the violin .... like a mandolin, the player then uses the left hand to strike the glass rod along the E string to produce different pitches. The string is plucked only at points marked +. The plucking movement is done with a metal plectrum (e.g. metal clip) at the point where the fingers would normally be placed to produce the pitch of the note, for example : A/ E string. The semitone variation - from A - B½ - A - is effected by Slid[ing] rod along string to produce pitches.

Crumb describes himself as having 'an urge to fuse unrelated elements and juxtapose the seemingly incongruous'\(^{403}\) and in the string quartet Black Angels he does just this by extending the concept of the genre in unexpected ways, for example - as an electric fusion of sound. Crumb achieves this effect by adding to the sanctity of the traditional ‘tools’ all manner of ‘ ... unrelated elements’ such as a glass rod in the place of a bow, paper clips in place of plectrums, tam-tams struck with contrabass bows, maracas, thimble-capped fingers, a selection of crystal glasses tuned to various given pitches, voice sounds in different languages and phonetic whispers. He requires, as well, unusual holding positions for the instruments - like a mandoline or viol. The structure of the work is fragmented; the formation of the stave is often unconventional; the score is littered with dynamic and technical directions; contemporary techniques are used for expressive ends, and all are notated in a script exhibiting imagination through an amalgamation of 20\(^{th}\) century musical concepts - concepts which are interwoven with fragments of the Russian Orthodox funeral mass, an Elizabethan madrigal and Schubert’s Death and the Maiden. In Black Angels, Crumb conceived a personal range of sonorities to express his despair at the state of America during the Vietnam War; the result indubitably transcends absurdity in the pursuit of sustaining and extending the concept of the genre in the 20\(^{th}\) century.

\(^{403}\) Crumb, Note from Electra Nonesuch 79241 (Kronos)
Comment

The foregoing examples of Percussive Effects with Hand or Bow clearly demonstrate that almost no correlation exists between the techniques used to produce these effects and their notation. A variety of symbols are employed for the same technique and, conversely, identical symbols may represent quite different techniques.

For instance, in their quartets of the period 1965-66 the Americans Druckman and Powell, the German Karkoschka and the Englishman Femeyhough all use this symbol ® to denote indeterminate percussive pitches, although two quite different techniques are required. Druckman, Karkoschka and Femeyhough instruct a drumming of the fingers (in Karkoschka's case with either hand) somewhere on the instrument, while Powell directs that the bow bounce on the string to produce the sound.

Kurt Stone, in association with the members of the Committee of the Ghent International Convention, recommend the sign ® be used above the stave of traditional notation to designate percussive fingered notes played without a bow. This recommendation is not always conscientiously followed in contemporary quartets. Karkoschka, for example, places the sign ® in the stave in place of the pitched notehed; i.e. this sign ® replaces this j within a traditional stave. Powell, on the other hand, uses the percussive symbol within a bowing movement, while Druckman places the symbol consistently in a single space within the stave, but is not specific about the quality of sound nor where the tremolo fingered drumming is to take place, except to state that it must be done: ...on the body of the instrument. Druckman and Karkoschka structure the symbols in standard notation, while both Powell and Femeyhough use tablature lines.

While it could perhaps be argued that the use of the same symbol ® by a number of composers to indicate a percussive sound is a unifying factor - irrespective of whether it is made with either the fingers or the bow - other composers such as Penderecki, Cervetti and Honneger each use individually devised symbols for tapping on the body of the instrument.

As demonstrated in the preceding investigation of percussive sounds, many modern experimental notations lean heavily on graphic symbols. The closer these symbols relate to the required playing action and its position, the more quickly the player is able to assimilate the composers intentions. Often, for further clarity, the symbols are explained on a separate sheet of performance instructions.

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Interface, p. 84.
Stone, Music Notation in the Twentieth Century, p. 311.
or in footnotes, or they are explained by instructions written directly in the relevant bars of the score.

The efforts of contemporary composers to translate specific percussive sounds into related signs may be seen as being analogous to the conducting technique of Pierre Boulez in which he has ‘developed an elaborate, highly efficient system without a baton involving a direct translation of the music into a hand or finger movement ... in which every gesture ... is particularly apt for the specific sound desired.’

**General Comment**

The spectacular developments of purely virtuoso techniques, particularly right hand bowing techniques, devised by Paganini in the late 18th and early 19th centuries, raised the instrument’s capabilities to heights of unparalleled technical brilliance for that time. These techniques continued to be incorporated into string playing, almost unchanged, until developments of the 20th century brought about the exploration and expansion of new and different tone colours. Contemporary composers have added entirely new and unique sounds to the tonal palette of string playing. Many of these innovations were, in the past, not ever considered to fall into the range of musical sounds, with the most important difference in modern bowing techniques being the acceptability of playing on any part of the instrument. Today string players, as demonstrated in this chapter, play with the bow behind the bridge, on the bridge, at the side of the bridge, on all possible areas between the scroll and the bridge, on the tailpiece, behind the left hand near the peg box - indeed on all parts of the instrument, including the back. A whole variety of different new sounds have arisen from the complicated technical developments of such techniques as string crossings, extreme speed and pressure and irregular bowing patterns. Similarly the inordinate requirements of bowing struck, for example, with the wood, the hair or both wood and hair, with loosened hair, with pressure applied for noise and scratching sounds, and gliding the bow all over the strings, all these have added to this variety of sounds. The hands and fingers are now also included in the making of new *pizzicati* sounds and thus not only is a new approach to right hand techniques required by players, but also an understanding of the new and diverse selection of notation symbols adopted by the composers to indicate their intentions.

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*McLeod, J. Composer 13, Winter 1965*
It should be remembered that what people regard as natural laws are in fact quite artificial laws that have come to seem natural through centuries of acceptance and use.
Chapter Nine

PIZZICATO

A Brief History

The term *pizzicato* is used for plucking stringed instruments. The technique was taught on the viol by the Venetian Sylvestro di Ganassi (1492-mid 16th century) as early as 1543, as *percolere la corde* - (striking the string), (*Regola Rubertina*, Part II, as Lettione seconda, Venice, 1543, Ch. II).\(^{407}\) Its earliest known use for the violin family occurs in Monteverdi’s [opera] *Combattimento di Tancredi e Corinda* (1624), where the effect is used symbolically to portray the clashing of swords and is indicated by the remark: “*Qui si lascia l’arco e si strappano le corde con duoi ditti*” (Here the bow is laid aside and the strings are plucked with two fingers).\(^{408}\) The technique is later found in Handel’s operas *Aggrippina* (1709) and *Ill Pastor fido* (1712).\(^{409}\)

In the 1800s Paganini, once again, contributed an important extension to violin technique in the left hand *pizzicato* effect - a device he developed to the highest degree of virtuosity. This left hand technique (marked + above or below the note) is achieved by depressing the indicated note with one finger of the left hand while another of the same hand plucks the string, and eliminates the use of the bow to produce the sound. It is found in certain of Paganini’s own compositions; for example, intermittently throughout the third movement of the *Concerto No. 2 in B minor*, Op. 7 (1826) and in a small duo for solo violin entitled *Adagio and Allegro Moltot* which presents extreme difficulty, since the *arco* melody is played with the left hand while, at the same time, the accompaniment is done as a left hand *pizzicato*. In the *Caprice XXIV - Variation 9*, shown in the example below, Paganini combined the bow with the left hand *pizzicati*. This variation is very brief and contains twelve bars with the first four repeated. He did not, however, write extensive passages for the exclusive use of right hand *pizzicato* into any of his pieces.

**Example 420.** *Arco and Left Hand Pizzicato*

Paganini, *Caprice XXIV, - Variation 9*, bars 1-4, (published 1820)

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\(^{407}\) Donington, Baroque Music., p. 92.
\(^{408}\) Apel, Harvard, p. 680.
\(^{409}\) Ibid., p. 680.
In Western string playing the *pizzicato* has been used as a special colouristic effect from at least the early 17th century. Up until the middle of the 18th century the right thumb was commonly used, but Leopold Mozart (1719 - 1787) preferred the plucking to be done with the first finger:

.... the strings being plucked with the tip of the index-finger, and the thumb only used when whole *chords* are to be taken in one. Many pluck always with the thumb, but the index-finger is better for the purpose, because the thumb, by reason of its fleshiness, damps the tone. Just make the experiment yourself.\(^{410}\)

The technique is included in the compositions of composers such as Antonio Vivaldi (1675 - 1741), Joseph Haydn (1732 - 1809) and Wolfgang A. Mozart (1752 - 1791). Ludwig von Beethoven (1770 - 1827) used *pizzicato* in works such as: the *String Quartet No. 10, E\(_b\) major* (1809) nicknamed the *Harp Quartet*, referring to the *pizzicato arpeggios* in the 1st movement, the *String Quartet No. 14, C\(_\sharp\) minor*, Op. 131 (1826) - 5th Mov., Bars 161-176 and 327-334, and in the final coda of the last movement of quartet No. 16, *F major*, Op. 135 (1826) where the theme is plucked by each of the four instruments. *Pizzicato* in early Romantic chamber music is demonstrated in the *canzonetta* of the first of Felix Mendelssohn's (1809 - 1847) six string quartets, *No. 1, E\(_b\) Major*, Op. 12 (1826), and later in the period *pizzicato* was extended to create a range of *timbral* subtleties and effects. In the 20th century, however, the technique has taken on a whole new dimension.

**Contemporary use of *Pizzicato*: 1900 - 1950**

In the early decades of this century when *pizzicato* was required, the customary word or abbreviation, in Italian, was placed below or above the relevant passages. Random examples, below, taken from the string quartets of the 1900s - 1950s, show the consistent use of the conventional word and technique.

**Table : Contemporary use of *Pizzicato*: 1900 - 1950**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Pizzicato/Pizz</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schoenberg</td>
<td>No. 1 Op. 7</td>
<td>1904-5</td>
<td>✓</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>No. 2 Op. 10</td>
<td>1907-8</td>
<td>✓</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>No. 3 Op. 30</td>
<td>1927</td>
<td>✓</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>No. 4 Op. 27</td>
<td>1936</td>
<td>✓</td>
<td>No</td>
</tr>
</tbody>
</table>

Bartók invented two unusual *pizzicato* effects with correlative symbols, which have become standard practice and continue to be found extensively in contemporary string notation. They were introduced, together with other percussive effects, into his compositional string quartet vocabulary to emphasise the mixing of Eastern, Western, Folk and Art Music. The so-called ‘snap pizzicato’ notated: \( \text{\textit{\textdia{\textcircled{\textbullet}}} \text{\textdia{\textcircled{\textbullet}}} \text{\textdia{\textcircled{\textbullet}}}} \) (and as modified by other composers in later use \( \varphi - \varepsilon \)), required the player to pluck the string with such force that it rebounded off the fingerboard with a loud snap. This technique first emerged in the *String
Quartet No. 4 (1928), Mov. IV, Bar 37, Viola, and was subsequently used in the last two quartets: No. 5 (1934) and No. 6 (1939). The second percussive device - the ‘nail pizzicato’ - notated: ○, is translated and explained in a footnote to the score No. 5 (1943) Mov. II. as follows: ‘With the nail of the 1st finger at the upper end of the string, resulting in a peculiarly metallic sound. To Leopold Mozart such a method would have been quite abhorrent; in his pedagogic work: Versuch einer gründlichen Violinschule (Augsburg, 1756) - A Treatise On The Fundamental Principles Of Violin Playing, he describes the technique and quality required for an acceptable pizzicato of his time:

Pizzicato : be it written before a piece, or only against several notes, means that the whole piece or the same notes are to be played without using the bow .... The strings must never be plucked from underneath but always pulled sideways; as otherwise they will strike the finger-board in the rebound and rattle, and so at once lose their tone.

The pizzicato technique of the previous centuries - and up to the time of Bartók’s introduction of the snap and fingernail pizzicati effects, (1928 : 1943 respectively) - was simple and straightforward. Leopold Auer’s 1921 publication endorses this point. He states:

The right hand pizzicato is produced by the first finger of the right hand, the thumb supporting itself on the corner of the fingerboard, and the first finger plucking or ‘pinching’ the string with the flesh of the fingertip and not with the nail. The string should not be jarred while pinching it, since this develops a disagreeable quality of sound.

Traditionally, the pizzicato is positioned away from the bridge, just over the fingerboard, according to the Hungarian pedagogue and violinist Carl Flesch (1873 - 1944), and the ‘.... most favourable point of contact between string and finger .... is about 2.364 inches distant from the bridge. Galamian (1903 - 1981), however, makes no mention of specific positions in his detailed 1962 publication Principles of Violin Playing & Teaching.
Factors Common to Traditional and Contemporary *Pizzicato*

**Traditional Execution**

Listed below are the traditional approaches to plucking the strings:

The *pizzicato* is executed in two basic ways:

- with the finger, on the string
  which has the advantage of controlling the intensity of attack and the dynamic levels
- with the finger, from above the string
  which gives a certain freedom of movement, more string resonance and the facility of greater speed. Chord playing is best started with a movement above the string.

**General Categories**

The *pizzicato*, falls broadly into the following categories:

- location - contact point
- mode of attack
- direction
- duration

Contemporary techniques have extended the straightforward finger movement - made at the middle of the string (or nearer the bridge) - to include a whole range of movements and colouristic sounds. The most significant are noted, illustrated and explained later in this chapter.

The basic factors common to both traditional and contemporary *pizzicato* are shown below.

**Location : Contact Point**

The quality and volume of sound is determined by the plucking point between the bridge and pegs. These contact points are crucial to the final tone.\(^{416}\)

**Traditional :**

**Middle of String** : The fullest and most rounded tone is produced when the string is plucked midway between the two anchor points - the bridge and pegs - as the travelling time of the wave is equidistant. At this point the ‘pull’ away from the fingerboard - before release - is at its widest resulting in the fullest vibrating amplitude.

Over the Fingerboard: This is the traditional point of contact and produces a brighter sound capable of nearly as much volume as a *pizzicato* in the middle of the string.

Mode of Attack:
The way in which the *pizzicato* is accomplished affects the duration, the quality and the intensity of sound.

Traditional:
Right Hand: The *pizzicato* was generally made with a finger pad of the right hand, over the fingerboard and within a predictable dynamic range.
Left Hand: As explained earlier, Paganini was the first to intersperse left hand *pizzicato* with *arco* - commonly found alternately in a single passage. The traditional symbol for this *pizzicato* is a cross + placed above or below the note J. The left hand *pizzicato* is done on both open strings and stopped notes. Any conveniently placed finger may pluck the open string but a stopped string is best plucked with the finger furthest away from the note to increase the strength of the sound - the latter requirement is limited to the interval of a 4th.

Direction:
Traditional:
Simple Movement: The traditional direction for a *pizzicato* was simply to move the finger either perpendicularly or obliquely across a string, or strings.

Duration:
Traditional:
All *pizzicati* techniques involve duration and are dependent on certain factors. These include the strength of the pull, the thickness of the strings and the point of contact between the fixed points. The string, however, vibrates for only a limited time span.

*Pizzicato*: Contemporary Extensions

The examples of contemporary extensions, given below, do not fall exclusively under a single heading, as the interaction between the categories that constitute the technique excludes such an approach. In each example the dominant factor, new in the 20th century, takes precedence and is appropriately placed under one of four heading - Mode of Attack, Direction, Duration and Contact Point - which comprise the components of a *pizzicato*. Only a single example of a new technique will be given, but should exactly the same symbol and technique occur in the score of another composer, then the name and quartet will be listed at the end of the chapter.
Pizzicato : Mode of Attack : Bartók Snap

Example 421. Pizzicato : Mode of Attack
Bartók Snap

Composer  String Quartet  Date  Sign/Explanation
Bartók     No. 4          1928

Note: The explosive Bartók snap pizzicato illustrates the integration of the four separate components that constitute a pizzicato: mode of attack, dynamics, duration and contact point. It is placed in the first category, as the strength with which the string is pulled was, when it appeared in the Bartók score, new to string playing. The dynamic is a loud rebound off the fingerboard and the resonance short. At the first appearance of the snap pizzicato, no explanation for the contact point - which is crucial to the duration and timbre - was given in the footnote. The customary plucking position, just over the fingerboard, was then taken for granted.

Example 422. Pizzicato : Mode of Attack
Bartók Snap

Composer  String Quartet  Date  Sign/Explanation
Becker    No. 2           1967

Sign/Explanation
\( \text{ Mit Daumen und Zeigefinger die Saite so weit wie möglich anheben und peitschend
rück­schnellen lassen (gr. pizz.) - }

Ex. p. 3, at 1, Viola
Note: Becker’s unique symbol: *gr. pizz.*, is in fact the Bartók ‘snap’ *pizzicato*. He makes extensive use of this particular technique throughout the quartet.

Example 423. *Pizzicato*: Mode of Attack
Bartók Snap

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelemen</td>
<td><em>Motion für Stqt.</em></td>
<td>1968</td>
</tr>
</tbody>
</table>

Sign/Explanation

e) *Saite gegen das Griffbrett schnellen lassen* - let the string snap back onto fingerboard
Ex. p. 13, line 4, ‘bar’ 141

Note: This technique is in effect a Bartók snap *pizzicato* unaccompanied by the accepted symbol.

Example 424. *Pizzicato*: Mode of Attack
Bartók Snap (Modified)

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dillon</td>
<td><em>St. Qt.</em></td>
<td>1985</td>
</tr>
</tbody>
</table>

Sign/Explanation

* Bartók ‘snap’ *pizz.*, but without the heavy rebounding.)
Ex. p. 9, bars 72-74, Violin 2
Note: Each note of Bars (part) 74-76 is played as a modified Bartók 'Snap' pizzicato, with an instruction that the resounding 'snap' be absent. However, technically, this is not easy to accomplish as there is little control once the string has been plucked with the force required to produce the initial effect of a Bartók pizzicato.

Example 425. *Pizzicato* : Mode of Attack
Bartók Snap (Modified)

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td><em>Gran Torso</em></td>
<td>1971-6-8</td>
<td><em>pizz</em></td>
</tr>
</tbody>
</table>

Bartók-Pizzicato bei völlig erstickter Saite. Es darf nur der Saitenknall gegen das Griffbrettholz zu hören sein. Durch den Dämpfgriff sollen auch alle anderen Saiten erstickt gehalten werden, es sei denn, ein eingeklammerter Nachhall bogen zeigt as, daß ein solches Nachklingen erwünscht ist - Bartók-Pizzicato with completely choked strings. Only the rebound of the string on the wood of the fingerboard should be heard. All the other strings should be muffled by the mute stop, [Ø], unless an echo slur in parentheses indicates that such an echo effect is intended.

Ex. p. 18, bar 189 - 190, Cello

Note: In bar 190 above, the absence of the ‘echo slur’ means that all strings must be muted Ø. This neutralises the strings’ vibrations. The *pizzicati* effect is one where: *Es darf nur der Saitenknall gegen das Griffbrettholz zu hören sein* - Only the rebound of the string on the wood of the fingerboard should be heard.
Example 426. *Pizzicato* : Mode of Attack
Bartók Snap (Modified)

**Composer**  | **String Quartet** | **Date**
---|---|---
Lachenmann | *Gran Torso* | 1971-6-8

**Sign/Explanation**

Ex. p. 25, bar 274, All Instruments

------

Note: This example reveals an extension of the Bartók *pizzicato* explained in the previous example, in that Lachenmann requires an additional echo effect after the *pizzicato* has been made. This additional sound is indicated by this symbol (--) which represents *ein eingeklammeter Nachhallbogen zeigt an* ... an echo slur in parenthesis after the note.

Example 427. *Pizzicato* : Mode of Attack
Combined Bartók "Snap" and Percussive Sound

**Composer**  | **String Quartet** | **Date**
---|---|---
Holliger | *Stätt.* | 1973

**Sign/Explanation**

Ex. p. 23, D2, Violin 2
Note: As explained earlier the two staves represent techniques of the left and right hand respectively. Two percussive symbols are given: in the upper stave the Bartók pizzicati,notated $\phi$, are sounded on the open G string with fingers of the right hand, while at the same time the larger symbol $\Phi$ in the lower stave represents *mit Fingerkuppe auf Korpus klopfen* - tap body [of instrument] with fingertips - effected with the left hand.

**Example 428. Pizzicato: Mode of Attack**

Bartók “Snap” in Proportional Notation

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rihm</td>
<td>Drittes Stqt.</td>
<td>1976</td>
<td><em>dicht, prasselnd</em> - dense, rattling Pizz. Sempre</td>
</tr>
</tbody>
</table>

Note: The strong rattling Bartók pizzicati - reinforced by the extreme *sforzando* signs - begin together in all the instruments, but from that point onwards the irregular note groupings enter asymmetrically and are repeated until the end of the bar. The repetition is initiated through the use of the word *etc.*
Example 429. *Pizzicato : Mode of Attack*
Bartók *Glissando : Within New Notational Symbols*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervetti</td>
<td>Zincum</td>
<td>1967</td>
<td>pizz.</td>
</tr>
</tbody>
</table>

Note: The standard Bartók *pizzicato* symbol and technique are incorporated into a descending *glissando*. This technique is often found in conjunction with a variety of Cervetti's individually devised symbols, with each discussed in the relevant sections.

Example 430. *Pizzicato : Mode of Attack*
Bartók *Glissando : Graphic Notational Symbols*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
<td>sempre gr. pizz.</td>
</tr>
</tbody>
</table>

Note: In all four instruments, the Bartók snap *pizzicati* are combined with *glissandi* that move in the direction indicated by the arrows, and include other 20th century concepts as follows:
proportional notation
a time unit of 15'
rhythmic asymmetry
disparate stopping points for each instrument at the instruction: *Bogen nehmen*
without staves but with an accurate representation of starting pitch
indeterminate ending to each *glissandi*

Becker uses curved ‘arrows’ to represent the direction of the *pizzicati glissandi* described above and is insistent that: *Die Bewegungsrichtung muß eingehalten werden* - [the] direction of movement must be observed.

**Pizzicato : Mode of Attack : With Fingernail**

No matter where a fingernail *pizzicato* is made on the string, the resultant sound is harsh and brittle. The contrasting effects between finger pad and fingernail *pizzicati* vary at the different contact points, as discussed below:

- **between fingerboard and bridge**: This is traditionally the designated position for the bow but when used as a contact point for *pizzicato* it produces a harsh, brittle sound and especially so when done the fingernail
- **on the bridge**: The volume of a finger *pizzicato* in this area is soft and the sound quality somewhat nasal and brittle, but when the *pizzicato* is made with the fingernail the sound is brighter
- **behind the bridge**: The volume of a finger *pizzicato* here is even softer than when plucked on the bridge as the available vibration length of the string is minimal. A fingernail *pizzicato* will give a louder more metallic sound of a single high indeterminate pitch, depending on the thickness of the plucked string

**Example 431. Pizzicato : Mode of Attack**

**Fingernail : Contemporary Symbol**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fisher</td>
<td>No. 1</td>
<td>1961-2</td>
<td><em>pizz. v = pluck with fingernail</em></td>
</tr>
</tbody>
</table>

Ex. p. 34, bar 274, Violin 2
Note: Fisher’s symbol \( \triangledown \) (Violin 2) requiring a fingernail *pizzicato* differs from Bartók’s original but, conversely, his symbol for the “snap” *pizzicato* (Violin 1) is as originally devised by Bartók in his Quartet No. 4 (1928). The added signs placed above the ‘fingernail symbols’ affect the intensity of the *pizzicati* as follows: The sign / indicates, as in poetic scanning, a stress or as a strong beat or downbeat; \( \cup \) as a slack or as a weak beat or upbeat. 417

**Example 432. Pizzicato: Mode of Attack**

Fingernail: Contemporary Symbol: Unexplained

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kopolent</td>
<td>Otto 3</td>
<td>1963</td>
<td><em>pizz</em></td>
</tr>
</tbody>
</table>

Ex. p. 17, Violin 2

Note: There is no explanation for this particular symbol in the Notes On Performance. The fact that the term *pizz.* is attached to a small curve which graphically resembles a fingernail, infers that the string is plucked with the fingernail. Kurt Stone’s 1980 publication recommends that these symbols be used for such a *pizzicato*: either (\( \sim \)) or (\( -\sim \)). 418

---

417 Fisher’s italics

418 Stone, Music Notation in Twentieth Century, p. 313.
Example 433. *Pizzicato*: Mode of Attack
Fingernail: No Symbol: Words in Score

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powell</td>
<td>Filigree</td>
<td>1965</td>
</tr>
</tbody>
</table>

Sign/Explanation

*Pizzicato* with fingernail

Ex. p. 4, line 3, bar 7, Violin 2

Note: The written instruction for the fingernail *pizzicato*: *pizz.* with fingernail is not accompanied by a symbol.

Example 434. *Pizzicato*: Mode of Attack
Fingernail: Contemporary Symbol

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td>II. Stadt.</td>
<td>1989</td>
</tr>
</tbody>
</table>

Sign/Explanation

*Pizzicato mit Fingernagel* -

*Pizzicato* with finger nail

Ex. p. 40, bar 228, Violin 1 & 2
**Pizzicato Chords : Mode of Attack : ‘Buzz’ Pizzicato :**

The ‘buzz’ or ‘rattling’ *pizzicato* requires the fingernail to be placed parallel to the vibrating string resulting in a distorted rattling sound in that, after being plucked, the string rebounds against the fingernail.

**Example 435. Pizzicato : Mode of Attack**

**Rattling Pizzicato**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ligeti</td>
<td>No. 2</td>
<td>1968</td>
<td><strong>(\text{****} \rightarrow \text{\text{-o}}) = \text{schnarrendes pizz : Saite gegen den Fingernagel des seitlich daneben-gestellten Griff-Fingers schnellen lassen - rattling pizz : let the string strike the fingernail of the left-hand fingers, which is placed beside the string}</strong></td>
</tr>
</tbody>
</table>

Ex. p. 15, at 32, Violin I, Viola & Cello

Note : The explanation described above is placed under the relevant bars in the score

**Pizzicato Chords : Mode of Attack : Using a Plectrum**

A *pizzicato* chord struck with a plectrum is a novel *pizzicato* introduced to the genre of the string quartet post the 1950s and may be placed in one of two categories: either under **Mode of Attack** or **Direction**. The former has been chosen as this mode of attack is particularly new and significant in contemporary quartet playing. Composers either use the words *alla chitarra* or *alla mandolin* in the score for this requirement and, at times, the word ‘plectrum’ (or the equivalent in the language of the composer) accompanies the direction. Occasionally a graphic design resembling a plectrum ( V ) or the strumming movement is found. If the instruction *alla chitarra* or *alla mandolin* requires the instruments to be held in the established position without any indication as to which fingers are to do the strumming, then it is easier to control the *pizzicati* by using the thumb. Apart from the technical advantage this arrangement presents the desirable visual effect.
**Example 436. Pizzicato: Mode of Attack**
*Alla Chitarra* - like a guitar: Within New Notational System

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pousseur</td>
<td>Ode ...</td>
<td>1960-1</td>
<td><em>Alla Chitarra</em> : put down the bow and pluck the string with several fingers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>Ex. p. 18. Viola</em></td>
</tr>
</tbody>
</table>

**Note:** For the instruction plucking *alla mandolin* (see Ex. 438) Pousseur requires the player to hold the instrument like a mandoline, but for the *alla chitarra pizzicato*, described above, he does not require a change of the instrument's standard holding position. The plucking is done ... with several fingers, in conjunction with a double line symbol, found under the stave, which denotes speed and represents the instruction: periodically, either as quickly as possible. The modification of the notehead - in the short lines attached to the notes - represents either the raising or lowering of the pitch by half a tone as no accidentals as used throughout the score to represent 'diatonic' or 'chromatic' changes in the pitch a note.

**Example 437. Pizzicato: Mode of Attack**
*Alla Chitarra* - like a guitar

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penderecki</td>
<td>Qito</td>
<td>1968</td>
<td><em>pizz. alla cht</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>Ex. p. 14. line 1, Violin1, 2 &amp; Viola</em></td>
</tr>
</tbody>
</table>
Note: Penderecki's notation for the *pizz. alla cht.* is quite different from Pousseur's, in that:

- the notes are replaced by the symbol x
- the plucking/strumming starts on open strings and then ascends as beamed *glissandi* pitched chords
- the time allocation is beamed proportionally, in irregularly beamed 'bar' lengths, within a section marked *Vivace*, without any further indications of speed
- Pousseur's proportional representation is based on a qualitative rhythmic concept

Example 438. *Pizzicato*: Mode of Attack

*Al Mandolino*- like a mandolin: *Tremolo*: Played with a Plectrum

Graphic Notation

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pousseur</td>
<td><em>Ode ....</em></td>
<td>1960-1</td>
<td><em>Al Mandolino</em>: mostly <em>tremolo pizzicato</em>. Ad <em>Lib.</em>, the violin may be held like a mandolin and played with a plectra. Ex. p. 65, Violin 1</td>
</tr>
</tbody>
</table>

Note: The strokes placed across the *glissandi* lines between notes relate, graphically, to the plectrum movement which creates the *pizzicato tremolo*. 
Example 439. *Pizzicato*: Mode of Attack
"Mandolinato": Played with a Plectrum

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brandmüller</td>
<td>Zweites Qtmt.</td>
<td>1985-6</td>
<td>$\odot \mathbf{V} = \text{Pizzicato mit Plektron} (&quot;\text{mandolinato}&quot;)$</td>
</tr>
</tbody>
</table>

Note: Brandmüller and Lachenmann (1989) are the only two composers in this investigation to use a graphic triangular $\mathbf{V}$ in the shape of a plectrum to illustrate and clarify the technique of the pizz. chords. In the example above, the symbol and words at $\mathbf{V}$ *Pizz. mit Plektron* - bar 199 - are given again at the bottom of the page with the added instruction - "mandolinato" - as follows:

$\odot \mathbf{V} = \text{Pizzicato mit Plektron} ("\text{mandolinato}")$

Example 440. *Pizzicato*: Mode of Attack
Played with a Plectrum: Within Time Unit: New Notation

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
<td>alle Spieler nehmen Plektron - all players to use a plectrum</td>
</tr>
</tbody>
</table>

Ex. p. 7, between 23-24, All Instruments
Note: The notation for the plectrum *pizzicato*, illustrated above, is basically a *glissando*, repeated in a series of different pitches within irregular rhythmic groupings, lasting for a stipulated time unit of 20". The additional instruction: *sehr rasch und mit äußerster Wildheit* - very fast and with additional frenzy somewhat negates a player’s ability to control - even in a small way - either the pitch or rhythmic variation suggested by the notation.

Example 441. *Pizzicato*: Mode of Attack
Played with a Plectrum: New Symbol: Proportional *Ritardando*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
<td><em>rit</em> ----------- <em>plektron weg</em></td>
</tr>
</tbody>
</table>

Ex. p. 8, at 25, All Instruments

Note: The ‘plectrum’ notation, in proportional spacing, indicates a clear slowing down of speed between all the instruments, each stopping at different points within the 14" time unit, creating an asymmetrical thinning out of the intensity of sound.

Example 442. *Pizzicato*: Mode of Attack
Played with a Plectrum

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelemen</td>
<td><em>Motions für Stätt.</em></td>
<td>1969</td>
<td><em>b) Mit Plettron</em> - with plectrum</td>
</tr>
</tbody>
</table>

Ex. p. 15, line 2, ‘bar’ 156, Violin, Viola & Cello
Note: As stated earlier, Kelemen's instructions are placed as a footnote with a letter attached to the explanations e.g. a), b), c), etc. These relate to specific requirements in the score. Only the letter is placed in the relevant bar. As the reader may recall, Kelemen does not consistently keep the same letter for specific instructions. The instructions begin on each page with the letter a) and any subsequent directions follow alphabetically. In this instance the letter b) and the upward/downward arrows refer to *arpeggio* chords plucked from lowest to highest note - and *vice versa* - *Mit Plektron* - with a plectrum.

**Example 443. Pizzicato: Mode of Attack**
Chord Sequences over All Strings: Played with a Plectrum

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td><em>II. Stqtt.</em></td>
<td>1989</td>
</tr>
</tbody>
</table>

**Sign/Explanation**

Zur Pizzicato-Sequenz (Takt 279ff). Alle Vier- und Dreiklänge mit Plektron scharf gerissen - *Pizzicato-sequences (Bar 279ff)*. All four-note and three-note chords must be sharply struck with the plectrum.

**Note:** In the *Hinweise zu Notation und Ausführung* - *Hints on Notation and Performance* Lachenmann lists five categories to indicate the different *plectrum plucked* techniques: a), b), c), d), e), each with corresponding notation. They are listed and explained below with relevant examples:

\[
\text{Ex. p. 53, bar 309, Violin 1 & 2, Viola}
\]

**Note:** The example above illustrates chords 'struck' with a plectrum a).... *hintern Steg* - .... behind the bridge. The chords - the third in each instrument in the example above - are identified from their position in the additional top-most stave where, in the middle of the bar, the clef is dispensed with and replaced by the Roman numerals I: II: III: IV which nullify the clefs used thus far. These numerals are placed on the spaces of the stave and correspond to the four strings of the *pizzicato*. This example, however, does not require the strings to be dampened as instructed above, as the *dämpfgriff* - mute sign Θ is absent.
Example 444. *Pizzicato*: Mode of Attack
Chord Sequences over All Strings: Played with a Plectrum

Note: b) is represented in the above example as follows:
- Violin 1 chord three
- Violin 2 chord five

c) is represented in the above example as follows:
- Violin 1 chord two
- Violin 2 chords one, two and four

d) *Pizzicato* over all four strings with (relatively high) harmonic positioning ad lib., which through timely release, the sound of the strings must linger on. Here the harmonic positioning should be tried at random.

Ex. p. 55, bar 321, Cello
Note: d) - is represented in the above example as follows:
- Cello chords two, three and four

Example 445. *Pizzicato : Mode of Attack*
Chord Sequences over All Strings : Played with a Plectrum

![Example notation](image)

Note : e) - is represented in the above example as follows:
- Violin 2 - all three chords
- Viola - all three chords

A word of caution is issued in reading the notation in the hand-written score, particularly in the use of the plectrum in four and three string chords. Although precisely notated and explained it is, at the same time, confusing if each aspect of the composite symbol is not carefully observed. It is not easy to discern between diamond-shaped notes of (d) - (.... *(relativ hohem)* Flageolet-Griff ad lib. .... : .... (relatively high) harmonic positioning *ad lib.* ....) and the crosses forming the chords in both e) - (.... *mit vollig unkenntlichen Tonhöhen* .... : completely unrecognisable pitches ....) and e) - (Zwischengrad von Dämpfg riff *mit unkenntlichen Tonhöhenresultat* .... ...: unrecognisable pitch resulting from an in between mute positioning ....). An added requirement for careful observation is the shape of the additional attachments - each specifying significant requirements for both left and right hands.

*Pizzicato : Mode of Attack : Left Hand*

Words or abbreviated letters in the appropriate language e.g. *(English)* L.H.= left hand or *(Italian)* *m.s.* = *mano sinistra*, accompanied - but not always - either by the traditional symbol + or its modified version x.
Example 446. *Pizzicato* : Mode of Attack : Left Hand

*Pizzicato mit linker hand* : Modification of Traditional Symbol in New Notation System

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karkoschka</td>
<td>Quattrologe</td>
<td>1966</td>
<td>pizzicato mit linker hand</td>
</tr>
</tbody>
</table>

Ex. p. 19, bars 63-66, Cello

Note: Karkoschka’s modification of the standard left hand *pizzicato* sign from this (+) to this (†) as shown above, is found as a solitary example of this technique in the score.

Example 447. *Pizzicato* : Mode of Attack : Left Hand

*Pizzicato mit linken hand* : Modification of Traditional Symbol : Separate Stave

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heyn</td>
<td>Sirenes</td>
<td>1983</td>
<td>Pizz. mit der linken Hand - left hand <em>pizz.</em></td>
</tr>
</tbody>
</table>

Ex. p. 26, bar 99, Violin 1 & Cello
Note: Heyn's modification of the standard left hand *pizzicato* sign is the same as Karkoschka's, i.e. from this (+) to this (⁺). The left hand *pizzicati* are done simultaneously in Violin 1 and Cello against two different techniques and occur as follows:

- Violin 1- open string (a), left hand *pizzicato* against a falling *glissando* from note (e) to an indeterminate pitch, *legno pont. est.*
- Cello - open string (A), left hand *pizzicato* on string I (A string) against an *arco* note (A) played high up on the *sulla IV* - the C string, placed below on an additional stave to clarify the simultaneous use of two separate techniques.

*Pizzicato*: Mode of Attack: Left Hand

Change in Function of Symbol

A departure from the standard meaning of the cross symbol + (traditionally understood to indicate a *pizzicato* with the left hand) is made by Henze who, in the score of the *String Quartet No. 5* (1976-77), explains on the page Zeichenerklärung - Explanation of Symbols that a cross represents a *pizzicato* (+ = *pizzicato*). In no other score in this investigation is the standard symbol of a cross - representing a left hand *pizzicato* - used as a substitute for the standard *pizzicato* technique.

Example 448. *Pizzicato*: Mode of Attack: Left Hand

Simultaneous: *Pizzicato* Against Beamed *Arco* Note

Proportionally: Time Unit in Seconds: Separate Stave

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sculthorpe</td>
<td>No. 8</td>
<td>1970</td>
<td><em>arco</em></td>
</tr>
</tbody>
</table>

Ex. Mov. V, p. 18, line 1, Cello

Note: In the cello part, the simultaneous use of *pizzicati* notes (E₂ and C♯₂) against a single *arco* beamed note (open D -) are placed on two separate staves so as to clarify the rhythm of each part, which in this score is structured in time units of 3".
Example 449. *Pizzicato*: Mode of Attack: Left Hand
Simultaneous: *Pizzicato Against Arco Note*

Proportionally: Time Unit in Seconds: Separate Stave

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heyn</td>
<td><em>Sirènes</em></td>
<td>1983</td>
<td>L-Hand- <em>pizz.</em> while string is being bowed</td>
</tr>
</tbody>
</table>

Ex. p. 40, bar 52, All Instruments

Note: The simultaneous use of left hand *pizz.* and *arco* occurs in all the instruments and, although not shown in the above example, the same instruction is given (bar 51) to Violin 1. This technique continues similarly until Bar 59.

**Pizzicato:** Mode of Attack: with Nut of Bow

Plucking the string with the nut of the bow produces a hard metallic sound and is a new technique found occasionally in contemporary quartets.
Example 450. *Pizzicato*: Mode of Attack - With Nut of Bow

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervetti</td>
<td>Zinctum</td>
<td>1966</td>
<td>*) pizz</td>
</tr>
</tbody>
</table>

pizz. mit der Stellschraube (des Bogens) - pizz. with the nut [of bow]


All Instruments

Note: For the *pizzicato* with the nut of the bow a written instruction, without a special symbol attached, is placed in the score at the appropriate place and not, as is Cervetti’s custom, on the page of Abbreviations and Symbols. The probable reason for this change is that the technique appears as an isolated occurrence in the score and, as the technique required is straightforward, Cervetti has chosen to identify it in words only. The inclusion of an isolated, unusual technique is, as Cervetti has done, generally best written into the score. However, the more complicated symbols (of his invention) and their relevant techniques are all included in a table of symbols.
Example 451. Pizzicato: Mode of Attack - With Nut of Bow in Glissando:

Composer  String Quartet       Date
Lachenmann  Gran Torso ....     1971-76-78

Sign/Explanation
See Chapter 11. for explanation of Lachenmann's Stave system

Pizzicato fluido wird ebenfalls mit der linken Hand ausgeführt. Zuvor bzw. unmittelbar nach dem Anzupfen der Saite wird mit der rechten Hand die Spannschraube - in einigen Fällen durch die Bogenstange - quasi wie ein Gleistahl bei der Gitarre auf die Saite aufgesetzt und verschoben. Durch solche Teilung der Saite ergibt sich eine neue, approximativ angedeutete Tonhöhe und durch anschließende Verlagerung resultiert ein glissando -

Pizzicato fluido, also performed with the left hand. Before resp. immediately after the string has been plucked, the tension-screw - in some cases the wood of the bow too - is to be set on the string and pushed, with the right hand, just like a bottle neck on the guitar. A distinct glissando results from this division of the string and the subsequent shift.

Ex. p. 19, bar 200-201, Cello

Note: At bar 201, Cello, two unusual pizzicati glissandi movements occur forming a composite movement.

Firstly, a pizzicato (on the last beat of bar 200) is made with the left hand - L.H. pizz + - and continues immediately in bar 201 as an ascending glissando, through the black, stemless note of a designated pitch, to descend and end approximately at the pitch on which it started. At the same time the upper white square note □ indicates that with a choice of using either the nut or stick of the bow, as described above: spannschraube (oder Stange) .... tension-screw (or stick), the player sets either one or other on the string and immediately pushes up the string with the right hand. Lachenmann terms this composite movement 'pizzicato fluido'.
Example 452. *Pizzicato*: Mode of Attack - With Nut of Bow

New Stave System

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td><em>II. Stqtt.</em></td>
<td>1989</td>
</tr>
</tbody>
</table>

Sign/Explanation

See Chapter 11 for an explanation of Lachenmann's Stave system

Note: Lachenmann gives copious written instructions for specially devised techniques, each accompanied by specific notational symbols. When a *pizzicato* with the nut of the bow is required, an abbreviation of the word *Spannschraube - Spannchr.* appears in the score in conjunction with a square-notehead. In bar 60 of the example, the note would normally be played high up the E string but, as instructed, that particular position is not the finger position, but the plucking position with the nut of the bow. The symbol below the stave: θ --- *dämpffgriff*: bedeutet lockeres Auflegen der Griff-Hand oder eines Fingers in (meist) beliebiger Höhe, um Saiten am Schwingen zu hindern bzw. bereits klingende Saiten abzudämpfen - mute position .... means loose positioning of hand or of one finger at any height, to prevent strings from vibrating, i.e. to mute already sounding strings. In this example the *pizzicato* would be dampened immediately after sounding.

Lachenmann makes extensive use of the particular *pizzicato* described above throughout the score, as well as in his earlier quartet: *Gran Torso* (1971-76-78).
Example 453. **Pizzicato : Mode of Attack - With Nut of Bow**
Composite Symbol : in *Scordatura*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td><em>Gran Torso</em>...</td>
<td>1971-76-78</td>
<td>See Chapter 11 for explanation of Lachenmann's Stave system</td>
</tr>
</tbody>
</table>

Note: The composite symbol is translated into the following *pizzicato* requirement:

- The square note and the words *pizz. m.* refer specifically to the use of the nut of the bow.
- The triangular note represents a *pizzicato durch Anreißen der Saite mit der Spannschraube bei steil aufrechtgehaltenem Bogen*:

The result of the composite symbol is a *pizzicato* plucked with the nut of the bow at approximately the finger position, as designated by the triangular note on the stave. For example:

- Violin 1 - the *pizzicati* occurs on open strings IV - III - II - I in *scordatura*. The pitches C# - A - F - C#, are shown at the start of the line, after the treble clef sign (\( \frac{5}{4} \)).

**Pizzicato : Mode of Attack : New Symbol/New Notational System**

In the use of a *pizzicato*, contemporary composers continue to use:

- the standard *pizz.* term which provides clarity when it occurs in a mass of radically new, individualistic, unfamiliar signs.
- a distinctive symbol - either as recommended at the Ghent Convention or one specifically designed.
Example 454. *Pizzicato* : New Symbols

New Symbols

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartolozzi</td>
<td><em>Otto per Archi</em></td>
<td>1960</td>
</tr>
</tbody>
</table>

Sign/Explanation

- \( pizzicato \)
- \( cessazione \)

Ex. p. 4, bars 14 - 15, Violin 1

Additional Symbols

- \( pizz. \) col polpastrello
- \( pizz. \) percosso
- \( pizz. \) pont.
- \( pizz. \) tast.
- \( pizz. \) trem.
- \( pizz. \) armonico
- \( pizz. \) con portamento

**Note:** In the *Spiegazione Dei Simboli* Bartolozzi lists a number of different symbols representing various types of *pizzicati*. However, only the traditional technique, described above, and the *pizz. pont* (\( \text{\textcopyright} \)) derived from the combination of two specific symbols \( = \) ponticello and \( = \) *pizzicato* are found in the score. The cessation of the *pizzicato* is demonstrated, in the above example, by the unfilled sign. All specially devised techniques are shown similarly as black symbols, with the white version representing the point of cessation.
Example 455. Pizzicato: New Notation
Traditional Within Contemporary Rhythmic Time Units: Proportional Notation

Composer | String Quartet | Date | Sign/Explanation
---|---|---|---
Kopolent | Qtto 3 | 1963 | \(\text{pizz.} \quad \cdots \quad \cdots \quad \cdots \quad \cdot\) Ex. p. 9, Viola

Note: Kopolent uses an age old technique within a contemporary 'time' concept. The traditional pizzicati, in this example (Viola), are spaced proportionally and regulated by a time unit of 12 seconds. Each 'section' or 'bar' lasts for an irregular number of seconds, the duration of which varies constantly throughout the score.

Example 456. Pizzicato: New Notation
Traditional Within Contemporary Beaming

Composer | String Quartet | Date | Sign/Explanation
---|---|---|---
Berio | Sincronie | 1963-4 | \(\text{pizz.}\) Ex. p. 2 line 3, after 6. All Instruments

Note: Generally, but not always consistently, Berio deviates from traditional notation by joining all the notes of each stave with a single vertical line when all the instruments play the same technique and rhythm simultaneously. This point is aptly demonstrated for the \(\text{pizz.}\) technique in the last chord of the example above.
Example 457. *Pizzicato* : New Notation
Contemporary Beaming : Time Units

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
</tr>
</tbody>
</table>

**Sign/Explanation**

*semper pizz.*

Ex. p. 5, between 15-16. All Instruments

---

**Note:** The *pizzicato* and *arco* notes are structured in a time unit of 7" and are distinguished in each instrument by the upper and lower horizontal beams joining the notes into separate independent groupings. The upper beam, in each case, refers to the *pizzicato* while the lower beam refers to the *arco*. Each beam joins irregular groupings of notes played alternately, either *pizzicato* or *arco*. Further instructions describe the quality and intensity of both techniques as being: *ad lib., jedoch rasch : hart - ad lib.*, but swiftly : intense

---

Example 458. *Pizzicato* : New Notation
Radically New System

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>von Biel</td>
<td>Qtf für Streicher</td>
<td>1965</td>
</tr>
</tbody>
</table>

**Sign/Explanation**

For explanation of von Biel’s notational system see Chapter 11.

Ex. p. 2, between 2 & 3, Cello

**IV**

IV = c string

* = *Die Saite wird unterhalb der Grießhand gestrichen oder gezupft* -

While the fingers are positioned on the strings, the string is plucked or played below the left hand

pizz. = plucking
Note: The traditional *pizzicato* is encountered within an entirely new approach to notation. The symbols, specifically devised by von Biel, are listed separately and are as extensive as they are radical. The *pizzicato*, executed on the open string - C (IV), is indicated by a composite of individual signs, each with a specific instruction. However, in this instance, the fact that the *pizzicato* is done on an open string negates the instruction for a specific position which is to be plucked or played below the left hand as no fingers are involved. However, this instruction does not only apply to *pizzicati* but is found involving finger placement coupled in a variety of different techniques.

**Example 459 Pizzicato: New Notation**

New Notation System: Equitone

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karkoschka</td>
<td><em>Quattrologe</em></td>
<td>1966</td>
<td>$\text{\LaTeX}$ pizzicato</td>
</tr>
</tbody>
</table>

Ex. p. 21, bars 112-116,
Example 460. *Pizzicato* : New Notation
Extended Stave Structure

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hertel</td>
<td><em>Imitationen</em></td>
<td>1975</td>
</tr>
</tbody>
</table>

Sign/Explanation

*pizz.*

Ex. p. 5, line 3, 'bar' 9, All Instruments

Note: The traditional *pizzicati* are found in two unusual approaches to notation. Firstly, Hertel uses a double stave throughout the score for each instrument instead of the standard stave construction and secondly, the vertical stems of the notes are joined in pairs of instruments i.e. the upper two and lower two are respectively joined together as a unit. He does not explain these aspects of his notation on the page *Notationhinweise* - *Notation Reference* despite providing detailed examples and explanations for the new symbols used within the score.

Example 461. *Pizzicato* - New Notation
New Stave Structure

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heyn</td>
<td><em>Sirènes</em></td>
<td>1983</td>
</tr>
</tbody>
</table>

Sign/Explanation

*pizz.*

Ex. p. 10, bar 37 - 38, Violin 2
Note: The three staves of Violin 2 represent three strings:
- \( II = \) A string, \( III = \) D string, \( IV = \) G string.

The music moves from left to right in a mixture of beamed and standard notation. The notes and articulation are placed on a specific string in each stave for the chosen timbre effect. The \( \text{pizz.} \), shown in bar 37, is played in a position high on the G string (\( IV \)) and involves a quarter microtonal raising of the note g. ≪

This quartet is divided into two sections. In the first eighty bars of a total of 179 bars, three staves are generally used throughout, representing:
- Violins 1 & 2: \( II = \) A string, \( III = \) D string, \( IV = \) G string
- Viola & Cello: \( I = \) A string, \( II = \) D string, \( III = \) G string

When either the highest or lowest string is needed an extra stave is added, either above or below the existing three. The following example demonstrates Heyn’s use of the extra stave.

Example 462. *Pizzicato* : New Notation
New Stave Structure

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heyn</td>
<td><em>Sirènes</em></td>
<td>1983</td>
<td>( 8va ) sempre</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>( \text{pizz} )</td>
</tr>
</tbody>
</table>

Ex. p. 11, bars 43 - 44, Violin 1

Note: At bar 44, the \( \text{pizz.} \) notes are placed in an added stave, located above the three sets of lines. The \( 8va \) sempre represents the positioning of the fingers on a lowered quarter tone note A, played an octave higher on the (E) string - Violin 1.
Pizzicato: Direction

Pizzicato Chords: Direction - Arpeggio

There are three possible directions for pizzicato chords: bottom to top - top to bottom - simultaneously. If a chord is marked pizz., the players generally understand it to be an arpeggiated chord with the arrows showing the direction of the notes (↓ ↑) or (↑ ↓).

If a fast succession of chords is wanted then the player will arpeggiate them alternately up and down. Composers mark this technique either with alternate arrows (↑↓↑↓) or with a succession of down and up bows (/vndv). This movement translates into a pizzicato tremolo.

Example 463. Pizzicato: Direction - Arpeggio
Within Radically New Notational System

Composer | String Quartet | Date | Sign/Explanation
---|---|---|---
Pousseur | Ode | 1960-1 | For an explanation of Qualitative Notation System see Chapter 11.

Arpeggio pizzicato is executed as follows:

- = in a single motion
- = with each note just distinguishable
- = the finger stretches each string before letting it loose

Ex. p. 18, Violin 1 & Cello

Note: To distinguish the difference between the various arpeggiated pizz. chords is generally not an easy task as the angle at which the notes of the chords fall off to the right is only marginally different in each instance. In the example above the three-note chords in Violin 1 (last chord) and Cello (second and last chords) represent arpeggiated pizz. chords made in a single motion. The important distinguishing factor is the angle at which the notes deviate from the vertical. The greater the notes fall away from the vertical, the longer the plucking time between the individual notes. It is the distinctive angle of the notes that defines the speed of the notes within the arpeggio.
Example 464. *Pizzicato : Direction - Arpeggio*  
Over Fingerboard

**Composer**  | **String Quartet** | **Date**  | **Sign/Explanation**  
--- | --- | --- | ---  
Sculthorpe No. 8 | 1970 |  

### Note:

The two *arpeggii pizzicati* chords played in the direction indicated by the arrows in Violin 2 and Cello, are repeated for the duration of the wavy line above the stave. The term *liberamente* is explained in the Directions For Performance page as representing: ..... that players should be rhythmically independent of each other.

**Pizzicato : Direction and Mode of Attack : Arpeggio with Thumb Nail**

Plucking the string with the right thumb or thumb nail, rather than with the finger or fingernail, produces a bigger sound with more depth. For better control when plucking, the first finger of the right hand may be curved and placed firmly against the fingerboard and the pull made at an angle away from the bridge with the underside of the thumb. The same movement applies in the use of the thumb nail. As discussed earlier, the thumb *pizzicato* was prevalent in the time of Leopold Mozart but was new to the 20th century string quartet when introduced by Bartók into the *String Quartet No. 6, Burletta*, Movement III (1939), Bar 98.
Example 465. *Pizzicato : Arpeggio : Direction and Mode of Attack* with Thumb Nail

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td><em>Gran Torso</em> ....</td>
<td>1971-6-8</td>
<td><em>pizz. arpeggio</em></td>
</tr>
</tbody>
</table>

Ex. p. 18, bar 183-184, Violin 1 & 2. *Viola*  

**Note**: Each of the upper three instruments have *arpeggi pizzicati*, but it is the graphic sign resembling a fingernail *pizzicato* that is most relevant here. At bar 183, Viola, the fingernail *pizzicato* is made *m. Daumen f quasi erstickt* - with thumb almost strangled.

The other *pizzicati* are explained as follows:

- **Bar 184 Violin 1** - *Pizz. arpeggio* two groups of pitched notes  
- **Bar 184 Violin 2** - *Pizz. arpeggio ff* two groups of pitched notes  
- **Bar 184 Viola** - as explained above for Violin 1, string *clef*
**Pizzicato** : Direction and Tempo

**Example 466. Pizzicato : Arpeggio : Direction and Tempo :**

Accelerando - New Notational Symbol

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hertel</td>
<td><em>Imitationen</em></td>
<td>1975</td>
<td><strong>Beschleunigung</strong> <em>(accelerando)</em></td>
</tr>
</tbody>
</table>

* schneller Dauern
  * hasten speed *(accelerando)* faster
duration

Ex. p. 22, line 3, Cello

Note: The instruction for the *arpeggio pizz.* is given to the Cello in an earlier 'bar' and continues, as shown in the example, from the lowest to the highest string forming firstly, four-part chords, then three-part chords, followed by two-part chords and ending on repeated single notes. The added beams above the notes - from a single line, then two lines and ending with three - could be mistaken for a modified dynamic marking indicating a *crescendo* but this is, in fact, not so. In the Hertel score it signifies a changes of speed within an *accelerando*. As explained earlier the stave has been enlarged to a double stave for each instrument.

Beaming, as shown in Chapter 5, Accelerando and Ritardando, is often found in contemporary notation to indicate gradual changes of speed.

**Pizzicato** : Direction : Strumming *Pizzicato* Chords

There are two angles for strumming *pizzicato* chords, perpendicular → : and oblique \→ \. Chords with notes that are placed in the same area on the fingerboard are best done with a perpendicular hand movement. An oblique, or slanting motion, is best for chords that have intervals fingered wider apart:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Perpendicular</td>
<td>Oblique</td>
<td>Oblique</td>
</tr>
<tr>
<td>towards scroll</td>
<td>towards bridge</td>
<td></td>
</tr>
</tbody>
</table>


**Pizzicato : Direction : Pizzicato - Alternating Arpeggio**

Bartók introduced alternating strumming *pizzicato* chords in the *String Quartet No. 4*, (1928), Movement IV, *Allegretto pizzicato*, (Violin I), bars 78-79, with the instruction: *pizz (l1) sempre.* Alternating chords in back and forth directions require the use of different parts of the same finger - the lower under part of a firmly stretched first finger strums in one direction and, on the return, the upper part (finger nail) automatically makes the *pizzicato*. The thumb nail may also be used to *pizzicato arpeggiated* strumming chords, and is steadied by the first finger of the ‘palmed’ bow hand against the fingerboard for better control. Strumming may also be done from above which produces a less attacking chord than if steadied against the fingerboard.

**Example 467. Pizzicato : Strumming Pizzicato Chords - Alternating Arpeggio**

**Composer**  
Ligeti

**String Quartet**  
No. 2

**Date**  
1968

**Sign/Explanation**

- **(* *)** *pizz. arpeggiato - rauf und runter alternierend (l2) - pizz. arpeggiato - alternately up and down*
- Ex. p. 20, at 37, Violin 1 & 2, Viola

**Note** : The arrows referring to the alternate strumming of the *arpeggio pizzicati* over the fingerboard (*sul tasto*), are accompanied by an instruction to *vibrato*. In this particular case the *pizzicati* are best done in an oblique manner. Ligeti distinguishes between *arpeggio pizzicato* chords and non *arpeggio* chords with this instruction: *pizz. ord. (non arpegg.)*

**Pizzicato : Duration**

Only moderate control can be effected in increasing or diminishing the duration of the plucking sound. The following contemporary extensions demand separate approaches, each affecting in some small manner the duration of the vibrating string.
**Pizzicato : Duration : Glissando : Portamento**

The *glissando* and *portamento pizzicati* are played by firmly sliding a finger either up or down the string immediately after the plucking action. The intervallic range of the *glissando* varies between small intervals and much larger intervals and may move up to the highest possible note on the string. Generally the slide is either to or from a given pitch to an indeterminate pitch, or *vice versa*, but seldom between two indefinite pitches.

**Example 468. Pizzicato : Duration - Glissando**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kopolent</td>
<td>Otto 3</td>
<td>1963</td>
<td><em>pizz. filsim.</em></td>
</tr>
</tbody>
</table>

Ex. p. 12, Cello

Note: The *glissando* *pizz.* contains a three-note grouping of determinate pitches. By using the word *sim.* and a four-note pattern (*...,*) representing notes 1 2 3 1) above the stave, Kopolent has indicated, in the form of a long, narrow, rectangular 'box' found at the bottom of the stave, that the notes be repeated in a similar pattern for the duration of the line. The inclusion of material in a 'box' or frame is one of many ways contemporary composers indicate a repetition. The elements contained within the 'frame' may consist of a selection of pitches, rhythms, articulation signs, dynamic or *tempi* that are required to be repeated, either in an improvisational manner chosen by the performers, or as selected by the composer. In the example above, Kopolent has given the elements of pitch and articulation in the form of three *pizzicato* notes which are repeated until the closing of the frame at the end of the line. *pizz.*
Example 469. *Pizzicato* : Duration - *Glissando*
Ending Indeterminate Pitch

Composer | String Quartet | Date | Sign/Explanation
---|---|---|---
Kopolent | Qtto 3 | 1963 | *pizz. gliss.*

Ex. p. 16, Cello

Note: The line indicating the *pizz. gliss.* ends as an indeterminate pitch.

Example 470. *Pizzicato* : Duration - *Glissando*
New Notational Symbols

Composer | String Quartet | Date | Sign/Explanation
---|---|---|---
Kopolent | Qtto 3 | 1963 | Ex. p. 16, Cello

Note: The white, square-shaped noteheads are reminiscent of the 15th century notes indicating the rhythm of the *Maxima, Longa and Brevis*. However, in Kopolent’s score they represent a specific technique, that of the finger of the left hand striking the strings at the touch point for the tones c - a - e. Thus the striking of the left fingers on the strings, coupled with the right hand *pizzicati*, creates a simultaneous double percussive sound. The explanations in the *Notes On Performance* are generally attached to numbers and the number ® - found in relation to the *pizz.* and *gliss.* - refers to the percussive instruction above.
Example 471. *Pizzicato* : Duration - *Glissando*
Rhythmically Asymmetrical

**Composer**  | **String Quartet**  | **Date**
--- | --- | ---
Ligeti | No. 2 | 1968

\[\text{Example 471. Pizzicato : Duration - Glissando} \]
\[\text{Rhythmically Asymmetrical} \]

\[\text{Composer} \quad \text{String Quartet} \quad \text{Date} \]
\[\text{Ligeti} \quad \text{No. 2} \quad 1968 \]

\[\text{Sign/Explanation} \]
\[\text{gliss. (sempre pizz.)} \]
\[\text{Ex. p. 20, Mov. III, bars 40-41, Violin 1 & 2, Viola} \]

\[\text{Note: At bar 40, the pizzicati glissandi:} \]
\[\begin{itemize}
\item begin asymmetrically starting : Violin 1, Violin 2, Viola
\item ascend from given pitches, through headless notes
\item end on given pitches in reverse order : Viola, Violin 2 and finally Violin 1
\item are assembled in irregular rhythmic groupings in descending order:
\end{itemize} \]
\[\text{Violin 1 = 2 x 10 : Violin 2 = 2 x 9 : Viola = 2 x 8 : Cello = 1 x 8 : 1 x 7 (non pizz.)} \]

Example 472. *Pizzicato* : Duration - *Glissando*
New Notation : Proportional Spacing in Time Units per Seconds

**Composer**  | **String Quartet**  | **Date**
--- | --- | ---
Brown | St. Qt. | 1970

\[\text{Example 472. Pizzicato : Duration - Glissando} \]
\[\text{New Notation : Proportional Spacing in Time Units per Seconds} \]

\[\text{Composer} \quad \text{String Quartet} \quad \text{Date} \]
\[\text{Brown} \quad \text{St. Qt.} \quad 1970 \]

\[\text{Sign/Explanation} \]
\[\text{PIZZ} \]
\[\text{.... short "bending" gliss. as implied by the graphics} \]
\[\text{Ex. last section, last line, Cello, Time Unit 1' - 2'} \]
Note: The *pizz. glissandi* move from definite to indeterminate pitches, indicated by the upward curve of the arrow attached to a stemless 'note'. This occurs in a section played in a time unit of between 1' and 2' that combines both proportional stemless, beamed notation as well as graphic indicators of arrows to represent the required short "bending" gliss.

Example 473. *Pizzicato* : Duration - *Glissando*
Graphic Notation

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown</td>
<td>St. Qt.</td>
<td>1970</td>
</tr>
</tbody>
</table>

Sign/Explanation

Small, transient, inarticulate sounds.... The entire section [requires] a kind of inarticulate bowing technique not giving full normal sounding value to the notes, a generally fast, random slurring of bow action; *not* full *glissandi* unless indicated, "gl" or "gliss" although short "bending" *glissandi* may be included as implied by the graphics

Ex. penultimate section, Violin 1 & 2

Note: The instructions given above apply to the *PIZZ* of Violin 1 & 2 and are, in effect, *pizzicati* *glissandi* contoured in graphic notation.

Example 474. *Pizzicato* : Duration - *Glissando*
New Stave System

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crumb</td>
<td>Black Angels</td>
<td>1970</td>
</tr>
</tbody>
</table>

Sign/Explanation

*pizz*

ffz

Ex. p. 12, line 2, Violin 1 & 2, Viola
Note: The standard *pizz.* notes of the three upper parts are joined by the contemporary use of a single vertical line and are found in Crumb's unique stave arrangements as follows:

- Violins 1,2 & Viola - Fragmented stave

The three upper parts are played against the trilled series of *glissandi* in the continuous Cello stave, after which the stave merges into a single line in *unisono*. Similar fragmented and compressed stave arrangements occur throughout the score.

**Pizzicato : Tremolo**

The technique used to create the *tremolo* is made by plucking the string rapidly with the first and second fingers, (or less effectively, with added fingers) thus adding a strumming sound to the *pizzicato*. It is notated either as a 'measured' *tremolo* where the notes are clearly perceived as a rhythmic pattern or 'unmeasured', without the demands of specific note values. The latter occurs mostly in either proportional notation or within defined time units. Two fingers are used to play a double-stopping and the resultant dynamic is conditioned, primarily, by the location of the *pizzicato*. This technique is used mostly when a dramatic, accented sound is required.

Example 475. **Pizzicato : Tremolo**
Individually devised Symbol

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berio</td>
<td><em>Sincronie</em></td>
<td>1963-4</td>
<td><em>pizz.</em></td>
</tr>
</tbody>
</table>

Ex. p. 18, line 2, All Instruments

Note: Bartók's notation for a *tremolo pizzicato*, in the *String Quartet No. 4* (1928) Mov. IV, bars 78-79, Violin 1, is placed above the stave as follows: *pizz.* ([`|`]) *sempre* while the notes in the stave reflect the standard symbol for the *tremolo* ([`maybe a note symbol here`]). Berio, without explanation of any sort, either in the page
Explanation of Symbols or at the relevant place in the score, disposes of the standard tremolo symbol and notates something quite different: \textit{pizz. \textendash \textendash \textendash \textendash \textendash \textendash}. The graphic realisation of the technique and the term \textit{pizz.} seem to indicate a \textit{tremolo pizzicato} of only the upper notes of the chord for a period of 3" respectively in each instrument. Despite occurring within a given time unit, they are structured in a traditional time signature.

**Example 476. Pizzicato : Tremolo**

\textit{Mano Sinistra}

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervetti</td>
<td>Zinctum</td>
<td>1967</td>
<td>\textit{pizz. (mano sinistra)}</td>
</tr>
</tbody>
</table>

Ex. p. 6, bars 146 -149, Cello

\begin{center}
\includegraphics[width=0.5\textwidth]{example.png}
\end{center}

\textbf{Note:} At bars 148 - 149 the \textit{tremolo pizzicato} is executed as stipulated - with the left hand, \textit{(mano sinistra)} - using the first finger in conjunction with the open G string in a fast, rhythmically controlled \textit{tremolo} motion.\(\text{open G: 1}\text{st finger: open G: 1st finger: etc.}\). The sign \(Z\), used customarily by Cervetti for an non-rhythmic \textit{tremolo} is absent.

**Pizzicato : Tremolo : Composite symbol - Combined with Glissando**

The examples below demonstrate the use of \textit{pizzicato tremolo} combined with a \textit{glissando}, where the finger starts a slide up and/or down the string at the same time as a \textit{pizzicato tremolo} is played.
Example 477. *Pizzicato : Tremolo Glissando*

Individually devised Symbol with Metronome mark \( \downarrow = 72 \)

**Composer**  
Berio  

**String Quartet**  
Sincronie  

**Date**  
1963-4

---

**Sign/Explanation**

\[ \text{pizz} \]

Ex. p.15, line 2, bars 37-38  
All Instruments

---

**Note**: Bars 37 - 38: The double stops require two distinctly separate techniques:

- *tremolo pizzicato* are played with the fingers of the left hand in the upper notes of the double stops (Violins 1 & 2) and in the lower notes (Viola & Cello) respectively.
- *glissandi* are executed between two definite pitches (Violin 1, Viola & Cello) and as a double stop (Violin 2).

Accomplishing these two separate finger movements simultaneously presents great difficulty for all the players. For example, the cellist would have to position his hand as follows: Notes E\# / F\# : Vth ‘thumb’ position on the D string, using the 2nd and 3rd fingers for the *pizzicato tremolo* while, at the same time, moving the thumb down the string to bring about the *glissando*. These stipulations are equally difficult to perform in the upper strings. The *tremolo* occurs within a structured \( \frac{3}{4} \) time signature.
Example 478. **Pizzicato : Tremolo Glissando**
Non-rhythmic

Composer | String Quartet | Date |
---|---|---|
Cervetti | Zinctum | 1967 |

**Sign/Explanation**

*) pizz.-----

*) pizz.-Tremolo, glissando: auf der-selben Saite gleichzeitig col legno battuto - pizz.-Tremolo, glissando, accompanied by col legno battuto on the same string

*znicht rhythmisiertes Tremolo - non-rhythmic tremolo

Ex. p. 7, 'bar'159-163

**Note:** Cello, bar 160: The pizz.-Tremolo, glissando starts on the open G string and is played as a non-rhythmic (unmeasured) tremolo movement of the 1st and 2nd fingers of the left hand moving up the string in a pizzicato glissando and ending at a symbol representing the highest note on the A string - (in bar 163, not shown). The movement described above is .... accompanied by col legno battuto on the same string .... striking the string with the wood of the bow as the tremolo, glissando movement progresses, thus combining a new set of diversely different techniques simultaneously, in both the left and right hands.

Example 479. **Pizzicato : Glissando Tremolo**
Suggesting a Glissando Tremolo structured within Time Unit

Composer | String Quartet | Date |
---|---|---|
Karkoschka | Quattrologe | 1966 |

**Sign/Explanation**

Ex. p. 6. line 3, All Instruments
Note: This sign \( \varphi \) instructs the player to *pizzicato mit aufschlag der saite auf das griffbrett - pizzicato* at the fingerboard and is followed by another sign representing a *glissando* \(~\) which moves from a ‘fingered’ pitch to a harmonic note in all the instruments. This notation \(~\) suggests a type of *tremolo* movement but, on the page of instructions *Verwendete Zeichen - Use of Signs*, the explanation is given simply as: \(~\) *glissando*. At this sign \(~\) the players revert back to *arco*. The *glissandi* are structured in a time unit: \( \frac{1}{\text{Sekunde}} = \frac{1}{j} \) that is used consistently throughout the quartet.

Example 480. *Pizzicato: Tremolo*

*Alla Mandolino* - like a mandolin: Played without a Plectrum

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gielen</td>
<td>St. Qt.</td>
<td>1983</td>
<td>Ex. p. 24, bars 426 - 427, Violin1 &amp; 2</td>
</tr>
</tbody>
</table>

Note: The graphic design, attached to the beams, gives an indication of the *tremolo* effect required for the *pizz. alla mandolina*. The length of the horizontal strokes across the first portion of the beam suggest that the required dynamic levels, which start as a *pp*, gradually die away. No plectrum is called for, therefore the *pizzicato* is best effected by a rapid two-finger movement in the right hand. As the beam is attached only to the uppermost note of each chord, the *pizzicato tremolo* continues only on that note and is not played as an strummed, *arpeggiated* chord.

*Pizzicato: Duration: Acciaccatura: Appoggiatura: Pizzicato Damping the Strings*

Both the *Acciaccatura* and *Appoggiatura pizzicato* techniques involve duration. After the initial *pizzicato*, a short, sliding movement is made - up or down the string - to the pitch of the attached note, after which the string’s initial vibration is checked through the sliding finger movement. Damping the vibrations is generally made by the fingers of either hand, resting lightly on the strings.
Example 481. Pizzicato: Duration
acciaccatura Glissando

Composer  String Quartet  Date  Sign/Explanation
Mayuzumi  Prelude  1964  pizz.

Ex. p. 4, line 3. Violin 1 & 2

Note: Mayuzumi reinforces the use of the Bartók snap pizzicato by including the word (slap) above, or below, the symbol to accentuate the explosive effect of the acciaccatura left hand glissando/portamento moving from and to a given pitch.
Example 483. *Pizzicato : Portamento*
Between given Pitches

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powell</td>
<td>Filigree</td>
<td>1965</td>
<td><em>pizz. portamento</em></td>
</tr>
</tbody>
</table>

Ex. p. 16, bar 138, Viola

Note: Each note of the accented *portamento* - in *pizz* - is made with the first finger of the left hand sliding up different strings to form the *portamenti*.

Example 484. *Pizzicato : Damping Vibrations*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Druckmann</td>
<td>No. 2</td>
<td>1966</td>
<td>θ = stop reverberation of string either</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>with next highest left-hand finger or by</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>releasing left-hand pressure and touching string</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>lightly as in harmonics</td>
</tr>
</tbody>
</table>

Ex. p. 19, line 3, Violin2 & Viola

Note: In the above example, it is irrelevant how the reverberating string is stopped as either of the following means are applicable: .... with next highest left-hand finger or by releasing left-hand pressure and touching string lightly as in harmonics. Druckmann makes ample use of this technique throughout the score.
Example 485. *Pizzicato* : Damping Vibrations
Behind Bridge

Composer: Ferneyhough  
String Quartet: Sonatas  
Date: 1967

**Sign/Explanation**

\( x \) = *pizzicato* behind bridge on string indicated. (Damp string above bridge with L.H. to prevent reverberation)

Ex. p. 44, line 1, bar 461 - 462, Violin 1 & 2, Viola

**Note:** At bar 461, the four-line tablature, placed below the stave and marked 1.2.3.4., represents the four strings of each instrument from the highest to the lowest respectively. The \( x \) symbol - describing sounds of unpredictable, indeterminate pitch - also indicates the location of the *pizzicati* behind bridge on string indicated, as follows:

- Violin 1 - G and A strings
- Violin 2 - D and E strings
- Viola - C and A strings

**Pizzicato** : Contact Point:

Example 486. *Pizzicato* : Contact Point
Behind Bridge

Composer: Kelemen  
String Quartet: *Motion für Stqt.*  
Date: 1969

**Sign/Explanation**

\( a) x \) *Hinter dem Steg*

*behind the bridge*

Ex. p. 8, bar 71, Cello
Note: The x symbol for the pizz. is placed within the stave, (Cello), and signifies that the location point is: a) Hinter dem Steg - behind the bridge, on the D string. As stated earlier, Kelemen does not consistently keep the same letter for each specific instruction as the instructions begin on each page with a letter a) and any subsequent directions follow alphabetically. Kelemen's use of notation symbols is also inconsistent. The x symbol, shown above for a pizz. behind the bridge, is used later for different techniques, for example: a) Mit Finger auf des Corpus klopfen - strike body of instrument with finger (p. 13, line 3, Viola) and a) Mit Bogen auf Saitenhalter - with bow on string (p. 20, line 1, Violin 1).

Example 487. Pizzicato: Contact Point

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown</td>
<td>St. Qt.</td>
<td>1970</td>
</tr>
</tbody>
</table>

Sign/Explanation

B.B Pizz. x using whatever technique "below the bridge" (between the bridge and the tail piece) indicated by an "x" placed on the line or space corresponding to the open string on the instrument. The pitch must be on that string and in the given rhythm.

Ex. p. 1, Section 3. Time Unit. 45°, Violin 1 & 2, Viola

Note: At the start of the section the proportionately spaced x symbols, accompanied by the letters B.B (Violin 1 & 2 and Viola), require the plucking to be done (between the bridge and the tail piece) indicated by an "x" placed on the line or space corresponding to the open string on the instrument, and is shown as a portion of a 45° time unit. Brown emphasises that the x symbol refers to the same point of contact (between the bridge and the tail piece) in both arco and batt.
Example 488. *Pizzicato*: Contact Point
Behind Bridge - *Arpeggio*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holliger</td>
<td><em>Stqtt.</em></td>
<td>1973</td>
<td><em>pizz. arp. hinter Steg</em></td>
</tr>
</tbody>
</table>

Ex. p. 23, D 2, Violin 2

**Note**: This symbol →∥∥∥ (the lower stave Violin 2) - is specifically Holliger’s and is used consistently for playing *hinter dem Steg* - behind the bridge. Vertical arrows are generally understood, in contemporary notation, to designate *arpeggiated* chords in the direction indicated by the arrow. In this example, the first three chords are played *pizz. Hinter Steg* - *pizz.arp* behind the bridge on all four strings. The notes do not represent exact pitches but refer to the strings of each instrument indicated by arrows placed in the spaces of the stave. The traditional clefs are absent.

Holliger uses the same symbol for the contact position behind the bridge and combines it with words to clarify the different types of *pizzicati*, for example:

→∥∥∥ *Nagel pizz. hinter dem Steg* : nail pizz. behind the bridge
Example 489. *Pizzicato*: Contact Point
Behind Bridge: With Nail

Composer  String Quartet  Date
Braeways  St. Qt.  1989

Sign/Explanation

\[\textit{\small pizz. at right side of bridge (with nail)}\]

Ex. p. 5, bar 43 - 45, Violin 1 & Viola

Note: The slanted line through the note accompanied by written instruction requires a *pizzicato* at right side of bridge with [finger]nail. In the above example the technique is stipulated for Violin 1 and, from an earlier instruction, also applies to the Viola. It is not altogether clear just which point of contact is indicated by the instruction at right side of bridge. Braeways makes extensive use of the fingernail *pizzicato* throughout the score.

In addition to the finger nail *pizzicato*, the example above reveals two further types of *pizzicati*:

- Bar 43 - Violin 2  \[\textit{\small pizz. pont} = \textit{\small pizz. on bridge}\]
- Bar 44 - Cello  \[\textit{\small pizz. quasi chit.} = \textit{\small pizz. as a guitar}\]

Example 490. *Pizzicato*: Contact Point
Behind Bridge: (Always with Fingernail)

Composer  String Quartet  Date
Lachenmann  II. Stgtt.  1989

Sign/Explanation

\[\textit{\small Pizzicato hintern Steg (stets mit Fingernagel)}\]

\[\textit{\small Pizzicato behind bridge (always with fingernail)}\]

Ex. p. 41, bars 236-7, Violins 1 & 2

For an explanation of Lachenmann’s stave
See Chapter 11.
Note: In the example above each instrument is allocated a double stave. The two-note grouping in the upper stave of each part is done alternately arco and pizzicato, or vice versa, a pizzicato followed by an arco. The first or second note of each duplet is either pitched or marked with a symbol that clearly shows the use of the fingernail as the plucking ‘tool’. The new clef is marked in Roman numerals at the beginning of the bar and directs the plucking position to a specific string behind the bridge. Lachenmann explains: *Wo es sich hierbei um Saiteangaben hiner dem Steg handelt (in ersten Teil, und vor allem ab Takt 236ff.), wurden diese der Einfachheit halber ins obere System eingetragen - Any information or detail concerning the string part behind the bridge (in the first part, and especially from bar 236), is registered in the upper system (to simplify matters). Thus the notes plucked are reliant on two factors i.e. their position on the stave and the Roman numerals which direct the plucking onto a particular string, for example:

- Violin 1: Bar 236 III = D string - positioned as note A
  Bar 237 II = A string - positioned as note C:
  IV = G string - positioned as note F
- Violin 2: Bar 236 III = D string - positioned as note A
  Bar 237 II = A string - positioned as note C

**Pizzicato: Contact Point: Over the Fingerboard**

Plucking just over the fingerboard produces the fullest tone as it takes place almost midway between two fixed points of the string - the bridge at one end and the peg-box at the other - where the string can be pulled out the greatest distance before release, thereby causing vibrations of the largest amplitude. This contact point is standard and has been used for centuries. However, the relevance of the examples below is to show that each composer has taken the simple straightforward technique, notated it within an individual notation system, and instructed that the *pizzicato* be plucked ... over the fingerboard. The uniqueness of the specific notation, in each respective quartet, places these *pizzicati* firmly in the second half of the 20th century.
Example 491. *Pizzicato*: Contact Point: Over Fingerboard

New Notation! System

Composer  String Quartet  Date
von Biel  Qtt. für Streicher  1965

Sign/Explanation

For an explanation of von Biel's notation see Chapter 11.

Ex. p. 8, at 27, Cello

IV  = c string
pizz.  = plucking
B.v.G  = *Tonzüng wird am breiten Ende des Griffbrettes gegriffen*

Note is played at the wide end of the fingerboard

*  = *Die Saite wird unterhalb der Gliedhand gestrichen oder gezupft*

While the fingers are positioned on the strings, the string is plucked or played below the left hand

0  = 1.0 ± 0,25 s. dauer 1.0 ± 0,25 s. duration

()  = *Material zwischen Klammern wird innerhalb der Dauer der links vor der Klammer angegebenen Aktion interpretiert*

All material in brackets is interpreted within the duration indicated on the left of the bracket

Note: Here, the traditional *pizzicato* is encountered in a score that has an entirely new approach to notation. The symbols, specifically devised by von Biel, are listed prior to the beginning of the score and are as extensive as they are radical. In this example three *pizzicati* are required in succession. All three, plucked on the open string - C - have the instruction indicating the point of contact: *B.v.G. .... am breiten Ende des Griffbrettes gegriffen* - .... played at the wide end of the fingerboard.
Example 492. *Pizzicato*: Contact Point - Over Fingerboard
New Symbol

**Composer**  
Karkoschka

**String Quartet**  
Quattrologie

**Date**  
1966

**Sign/Explanation**

\[\text{pizzicato mit aufschlag der saite auf das griffrett -} \]

\[\text{pizzicato strike the string over the fingerboard} \]

Ex. p. 6, line 2, All Instruments

---

**Note:** In each instrument the single *pizzicato* over the fingerboard - designated by this sign \[\text{\textbullet}\] - is followed by a *glissando* indicated by this symbol "~~~" which, in turn, ends at these two signs, "\text{\textdagger}\text{\textdagger}" and \[\text{\textbullet}\text{\textbullet}\], which represent, respectively: \text{area oder auch nat. - arco or normal and sul ponticello}, as explained on the page titled *Verwendete Zeichen - Use of Symbols.*

---

Example 493. *Pizzicato*: Contact Point - Over Fingerboard
New Technique

**Composer**  
Heyn

**String Quartet**  
Sirenes

**Date**  
1983

**Sign/Explanation**

\[\text{pizz. and pull string across edge of f-board} \]

Ex. p. 46, bar 74, Violin 2
Note: Certain instructions referring to specific string techniques are given, as demonstrated above, in English. However, at the same time, Heyn uses an extensive number of new symbols which are explained on the page titled Notation - Notation.

**Pizzicato : Changing Position**

**Example 494. Pizzicato : Changing Position**  
From Fingerboard to Bridge

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rihm</td>
<td>Stqtt.</td>
<td>1976</td>
<td>alle : vom Griffbrett zum Stieg (pizz :)</td>
</tr>
</tbody>
</table>

Note: The example is taken from a facsimile of the composer's handwritten score. Certain problems could arise with the interpretation of the *pizzicati* notes from one bar to another, as their spacing is clearly irregular. The question is whether the *tempo* of the *pizzicati* of these bars continues as set on the previous page at: \( J = 100 \), despite the notation displaying proportionate spacing, or does the steady pulse fall away as the contact point moves from over the fingerboard towards the bridge? The answer lies in the fact that the whole score - as clearly demonstrated in the bar preceding the *pizzicati* notes - is written in standard notation with its associated barlines, tempo markings, changing time signatures and the relevant rhythmic groupings. These aspects of standard notation point conclusively to the fact that, in the irregular spacing of the *pizzicati* crotchet notes, proportionate notation is not intended.

**Pizzicato : Harmonics**

The technique for a *pizzicato* harmonic is basically the same as for an *arco*, requiring a light finger placement on the selected node which, to obtain the desired effect, must be lifted quickly after a firm bowing or plucking of the string.

In the following examples Ligeti and Crumb each call for a separate unique *pizzicato* sound effect.
Example 495. *Pizzicato: Harmonic*  
Specific Tone Quality - Hollow Wooden Sound

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ligeti</td>
<td>No. 2</td>
<td>1968</td>
</tr>
</tbody>
</table>

Sign/Explanation

\[**\text{pizz.} = \text{pizz., Griff-Finger leicht aufsetzen (wie bei Flag.) Dumpfer, hölzerner Klang - pizz., place the left-hand finger lightly on the string (as for a harmonic); hollow, wooden sound.} \]

Ex. p. 15, at 32, Violin 1 & 2, Cello

Note: In the example, Ligeti has either modified acknowledged contemporary symbols or devised specific symbols for the various *pizzicati* found in his score. However, when a new symbol does not fall into a category of symbols generally accepted in contemporary use, composers add written instructions either in a table of instructions or, as Ligeti has done, at the appropriate place in the score to affirm proper execution. Under discussion here is the instruction and symbol relating to bar 32, where a hollow, wooden sound is required. At bars 36-37 (Mov. III), a different instruction is given with regard to the specific requirement for an harmonic *pizzicato* as follows:

\[**) \text{Vin 2, Takte 36, 37} \]
\[\text{Flageolett-pizz. nachklingen lassen (l.H.-Finger heben harfenähnlicher Klang -} \]
\[**) \text{Vin 2, bars 36,37} \]

let the harmonic *pizzicato* resound (raise the left-hand finger, producing a harp-like sound)

(Score example not given)

Ligeti adopts the above procedure throughout the score as well as providing a page for *Hinweise zu Notation und Ausführung - Hints on Notation and Performance.*

In the following example George Crumb (as Ligeti has done in the previous example) explains both the required manner of playing and the resultant harmonic effect: play[ed] like guitar harmonics; tones should ring like tiny bells.
Example 496. *Pizzicato*: Harmonics

Speed Variation - *(poco accel. --- rit. ---)*: Specific Tone Quality - like tiny bells

**Composer**  **String Quartet**  **Date**  **Sign/Explanation**

Crumb  Black Angels  1970  \( \text{j} = 60 \)  play like guitar

\( \text{pizz.} \)  harmonics; tones should ring like tiny bells

\( \text{(poco accel. --- rit. ---)} \)

Ex. p. 14. (*Lost Bells (Echo)*) [Duo], line 2, E. Violin II

---

**Note**: The speed variation in the *poco accel* and *rit.* is shown in the proportional spacing of the *pizzicato* notes - wider apart, they are played at a slower pace and *vice versa*.

**Pizzicato**: Highest Possible Note

A *pizzicato* made at the highest possible point on any given string produces notes of indefinite pitch, and with little resonance due to the position of the left finger which curtails the vibrating length of the string.
Example 497. *Pizzicato*: Highest Note
New Notation Symbol

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervetti</td>
<td>Zinctum</td>
<td>1966</td>
</tr>
</tbody>
</table>

**Sign/Explanation**

- **höchstmöglicher Ton** -
  - highest possible sound
  
Ex. p. 4, bar 66, Violin 2

Note: Cervetti uses this symbol ▲ to represent the highest possible sound on any string. In the first bar of the example, the symbol rests in the top space of the treble clef, (Violin 2), thus the *pizzicato* is played at the highest possible point on the E string. Cervetti often pitches notes at the highest positions on the strings and uses them in a variety of different techniques. In the following example they are used as double *pizzicati*.

Example 498. *Pizzicato*: Highest Notes
Double Stops - New Notation Symbol

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervetti</td>
<td>Zinctum</td>
<td>1966</td>
</tr>
</tbody>
</table>

**Sign/Explanation**

- **höchstmöglicher Ton** -
  - highest possible sound
  
Ex. p. 8, ‘bar’ 220, All Instruments
Note: In the last bar of the example, the double-stopped *pizzicati* in all four instruments are indicated by a double symbol ▲ which refer to the highest positions on the following strings:

- Violin 1: G & D strings: Violin 2: A & D strings
- Viola: D & G strings: Cello: A & D strings

**Example 499. Pizzicato: Highest Note**

**New Notation Symbol**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penderecki</td>
<td><em>Qtto per Archi</em></td>
<td>1968</td>
<td><em>pizz.</em></td>
</tr>
</tbody>
</table>

Ex. p. 12, line 2, Violin 1 & Cello

Note: This sign ▲, and its related contact point on the string, is adopted many times in Penderecki's score. It is the same symbol used by Cervetti, and the same recommended by the members of the Ghent Convention (October 1974). The difference is that Cervetti is more specific in directing the player to the appropriate strings of each instrument by placing the symbols in the required spaces of the stave, while Penderecki, generally, uses the symbol outside the stave, to indicate the highest position on each instrument - no specific string is given. On the page *Zeichenerklärung - Explanation of Symbols* Penderecki states: *höchstmöglicher Ton (unbestimmte Tonhöhe)* - the highest note possible (indeterminate pitch) ↑.
### Example 500. *Pizzicato* : Unusual Aspects
Repeated: New Notation - Density of Dots Analogous to Printed Text

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
<td>pizz. sord. . .</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>muted plucking</td>
</tr>
</tbody>
</table>

*Example 500. Pizzicato: Unusual Aspects
Repeated: New Notation - Density of Dots Analogous to Printed Text

Composer: Becker

String Quartet: No. 2

Date: 1967

Sign/Explanation:

- *pizz. sord.* . . .
- muted plucking

Ex. p. 14, line 2, All Instruments

---

*Note:* The notes *pizz. sord.* - muted plucking, are shown in the stave at the start of the line, after which dots replace the notes and signify the density of the inexact repetition of the given notes within the groupings. The effect is: *Hauchzartes, diffuses und außerst rasches pizzicato con sord.* Dichte analog grafischer Aufzeichnung - Very light and fast muted *pizzicato.* Density analogous to the printed text.

### Example 501. *Pizzicato* : Unusual Aspects
Repeated: Beamed Notation

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crosse</td>
<td>Studies</td>
<td>1976</td>
<td><em>Pizz</em> . . .</td>
</tr>
</tbody>
</table>

*Example 501. Pizzicato: Unusual Aspects
Repeated: Beamed Notation

Composer: Crosse

String Quartet: Studies

Date: 1976

Sign/Explanation:

- *Pizz* . . .

Ex. p. 3, line 1, All Instruments
Note: The *pizzicati*, indicated by three dots above the beamed notes, are repeated within a time unit of 10 crotchets for the duration of the beam in a tempo marked: \( \text{\textit{ca}} \ 60, \) starting *sforzando* - *ffz*, and decrease at the barline to a *piano* - *p*.

**Example 502. Pizzicato: Unusual Aspects**
in Quarter Tones

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelemen</td>
<td><em>Motion für Stqt.</em></td>
<td>1969</td>
</tr>
</tbody>
</table>

Sign/Explanation

\[ \text{\textit{pizz.}} \]

\[ \text{\textit{Viertelton höher}} \]

quarter tone higher

Ex. p.11, line 1, ‘bar’ 106-107, Violin 1

Note: Arrows adjacent to notes signify the raising or lowering of the note by a quarter tone, as shown alongside the *pizz.* (Bar 107 Violin 1- second note G), which indicates: *Viertelton höher* - quarter tone higher. The rhythmic units are regulated by the short vertical strokes placed in the staves to represent the subdivisions of the bars while the *tempi* are given in variable metronome markings which, at bar 101 is \( J = 126 \).

**Example 503. Pizzicato: Unusual Aspects**
Beamed Across Barline - Aperiodic Sequence of Tones

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelemen</td>
<td><em>Motion für Stqtt.</em></td>
<td>1969</td>
</tr>
</tbody>
</table>

Sign/Explanation

Ex. p.13, line 4, ‘bars’ 140-141, Cello
Note: In this score the zigzag line has a special significance and denotes an *aperiodische Tonfolge* - aperiodic sequence of tones and is incorporated into many different techniques. In this example it relates specifically to the first *pizzicati* grouping and to the grouping which is beamed across the barline from bars 140-141.

**Example 504. Pizzicato: Unusual Aspects**
Proportionally in Given Time Unit - Aperiodic Sequence of Tones

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelemen</td>
<td><em>Sirènes</em></td>
<td>1969</td>
<td><em>improvisieren</em> (graphische Proportionen berücksichtigen) - improvisatory (take into consideration the graphic proportions)</td>
</tr>
</tbody>
</table>

Ex. p. 19, line 4, Cello

Note: A number of different techniques - both *pizzicato* and *non-pizzicato* are represented by new symbols in the Cello part and all are played *improvisieren* (graphische Proportionen berücksichtigen) - improvised (consider as being in graphic proportion) as follows:

- **group 1**
- **groups 1 and 2** - the zigzag lines represent:
  - **group 2**
  - **group 3** - the wavy line above notes represents:
  - **note 4**
  - **group 5**

- *pizz* - plucking
- *aperiodische Tonfolge* - aperiodic sequence of tones
- *c.l.b - col legno battuto* - strike with wood of bow
- *sehr schnell spielen* - play very quickly
- *arco s.p.* - with bow at the point
- *a) Saite gegen das Griffbrett schnellen lassen* - a) Let strings snap back onto fingerboard quickly (Bartók snap *pizzicato*)
- as group 3 but staccato
Line 4, (Cello) in the example above is played within a stipulated time unit of 19 sek - 19 seconds with each group in proportional spacing. Two significant pizzicati are firstly, an aperiodische Tonfolge - aperiodic sequence of tones and secondly, the single note which is, in effect, a Bartók snap pizzicato.

Comment

In the string quartets from the beginning of the 20th century up to the 1950s, composers - with the exception of Bartók - found little reason to pursue and extend the colouristic palette through exploring the possibilities of the pizzicato technique. Avant-garde composers in the first half of this century concentrated their interests mostly on finding a new musical syntax away from tonality, and composed music aligned to their respective philosophies or ideologies. Each felt compelled to move in a certain direction in revolt against the principles of the past. Therefore, at that time, radical string techniques were not a dominant compositional ingredient. However, after the 1950s emphasis was placed on progressive musical content and contemporary composers expanded the technical and notation structures of the string quartet in every way possible. In the 1960s the simple pizzicato broke through the traditional boundaries set earlier, and emerged as a whole new technique consisting of a wide range of effects: from the short and percussive to the long and resonant; from the soft gentle plucking to the vibrant strumming of guitars or the jangling quality of mandolins which, with the interplay of various contact points, positions, dynamic levels and directions resulted in a broad spectrum of timbral vibrations unexplored in previous centuries. For these new techniques, new symbols were devised.

Pizzicato: Mode of Attack: The Bartók Snap and Fingernail

Requirements for the “snap” pizzicato are conveyed in various ways; either in separate performance notes, by instructions written directly into the score or merely by notation of the accepted symbol. The following lists demonstrate the extensive use of the Bartók “snap” pizzicato and, to a lesser extent, the “fingernail” pizzicato as found in the quartets under investigation. As the pizzicati, their variants and their use as composite techniques are so widely found, the manner in which the pizzicati requirements are given is stated.

Pizzicato: Bartók “Snap”: Original or Modified Symbol and Technique

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartók</td>
<td>No. 4</td>
<td>1928</td>
<td>_bullet</td>
</tr>
<tr>
<td>Kelemen</td>
<td>Motion</td>
<td>1969</td>
<td>Saite gegen das Griffbrett schnellen lassen - let the string snap back onto finger-board</td>
</tr>
</tbody>
</table>
Fisher No. 1 1961-2  
Hiller No. 5 1962  
Berio Sincronie 1963-4  
Mayuzumi Prelude 1964  
Cervetti Zinctum 1967  
Ferneyhough Sonatas. 1967  
Ligeti No. 2 1968  
Crumb Black Angels 1970  
Sculthorpe No. 8 1970  
Lachenmann Gran Torso 1971-76-78

\[ \text{pizz.} \delta = \text{"Bartók-pizz." (Saite anheben und gegen das Griffbrett schnellen lassen.) -} \]
\[ \text{(Lift the string and let it strike the fingerboard)} \]
\[ \text{\"Bartók-Pizzicato bei festgegriffener Tonhöhe -} \]

\[ \text{Bartók-Pizzicato with normally stopped pitch} \]

\[ \text{\"Bartók-pizz., Saite auf Griffbrett ausagehagen lassen} \]

\[ \text{\"Bartók-pizz., Saite prallt auf Griffbrett auf} \]

\[ \text{\"Pizzicati marked 'o' (Movement II) are to be struck against the fingerboard} \]

\[ \text{\"Bartók 'snap' pizz., but without the heavy rebounding} \]

\[ \text{\"Bartók-pizzicato} \]
**Pizzicato**: Bartók “Snap”: Modified Technique and/or New Symbol

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becker</td>
<td>No.2</td>
<td>1967</td>
<td>(&lt;) gr. pizz</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mit Daumen und Zeigefinger die Saite so weit wie möglich anheben und peitschend zurück-schnellen lassen (gr. pizz.) - lift the string as far as possible between the thumb and index finger and release with a snap as quickly as possible (intense <em>pizz.</em>)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>pizz</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Bartók-Pizzicato bei völlige erstickter Saite - Bartók pizz. with completely choked strings</td>
</tr>
<tr>
<td>Lachenmann</td>
<td><em>Gran Torso</em> ....</td>
<td>1971-76-78</td>
<td></td>
</tr>
<tr>
<td>Henze</td>
<td>No. 5</td>
<td>1976-77</td>
<td>j</td>
</tr>
</tbody>
</table>

**Pizzicato**: Bartók “Snap” Two or Three Fingers:

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td><em>Gran Torso</em> ....</td>
<td>1971-76-78</td>
<td>Saiten zwischen zwei Finger geklemmt, etwas hochgezogen - string pinched between two fingers and lifted (written instruction only)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Pizzicato**: Bartók “Snap” in *Glissando*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervetti</td>
<td><em>Zinctum</em></td>
<td>1967</td>
<td>⬇️ within radically new symbols</td>
</tr>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
<td>sempre pizz. gr. glissandi arrows in graphic notation</td>
</tr>
<tr>
<td>Heyn</td>
<td><em>Sirènes</em> ....</td>
<td>1983</td>
<td>⬇️ Bartók- pizz. in new notation and stave</td>
</tr>
</tbody>
</table>

**Pizzicato**: Combined Bartók “Snap” and added Percussive Sound

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holliger</td>
<td><em>Stätt</em></td>
<td>1973</td>
<td>⬇️ sign only</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mit Fingerkuppe auf Korpus klopfen-tap body [of instrument] with fingertips</td>
</tr>
</tbody>
</table>

*Note: Special symbols and Latin characters are used to represent musical instructions and symbols.*
**Pizzicato** : Bartók “Snap” in Proportional Notation

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
<td>self explanatory</td>
</tr>
<tr>
<td>Rihm</td>
<td><em>Drittes Stqtt.</em></td>
<td>1976</td>
<td>self explanatory</td>
</tr>
</tbody>
</table>

**Pizzicato** : Fingernail

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fisher</td>
<td>No. 1</td>
<td>1961-2</td>
<td>self explanatory</td>
</tr>
<tr>
<td>Kopolent</td>
<td>Qtto. 3</td>
<td>1963</td>
<td>unexplained symbol</td>
</tr>
<tr>
<td>Powell</td>
<td>Filigree</td>
<td>1965</td>
<td>words : pizz. with fingernail</td>
</tr>
<tr>
<td>Lachenmann</td>
<td><em>Gran Torso</em></td>
<td>1971-76-78</td>
<td>pizz. m. Fingernagel</td>
</tr>
<tr>
<td>Lachenmann</td>
<td><em>II. Stqtt.</em></td>
<td>1989</td>
<td>pizz. m. Fingernagel</td>
</tr>
</tbody>
</table>

**Lists of Contemporary Innovations**

The following composers have utilized particular *pizzicato* techniques, whether or not examples have been given in the foregoing investigation. Certain categories below contain explanations, where pertinent, but no individual symbols are given.

‘Buzz’ or ‘Rattling’ *Pizzicato*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ligeti</td>
<td>No. 2</td>
<td>1968</td>
</tr>
<tr>
<td>Rihm</td>
<td><em>Drittes Stqtt.</em></td>
<td>1976</td>
</tr>
</tbody>
</table>

**Pizzicato** : alla chitarra : alla mandolin - With/Without Plectrum

**Pizzicato** : With Plectrum

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pousseur</td>
<td><em>Ode</em> : ....</td>
<td>1960-61</td>
<td><em>alla chitarra</em> - put down the bow and pluck with several fingers, no plectrum</td>
</tr>
<tr>
<td>Pousseur</td>
<td><em>Ode</em> : ....</td>
<td>1960-61</td>
<td><em>alla mandolin</em> - with plectrum</td>
</tr>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
<td><em>alle Spieler nehmen Plektron</em> - all players to use a plectrum</td>
</tr>
</tbody>
</table>
Penderecki  Qtto per Archi  1968  
Kelemen  Motions für Stqt.  1969  
Henze  No. 5  1976-77  
Brandmüller  I.Stqtt.  1983  
Brewaeys  St. Qt.  1989  

Contemporary Scores: *Pizzicato Arpeggio* - Various Aspects

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pousseur</td>
<td>Ode ....</td>
<td>1960-1</td>
<td>- Within a radically new notation system</td>
</tr>
<tr>
<td>Kelemen</td>
<td>Motion ....</td>
<td>1969</td>
<td>mit plektron - with plectrum</td>
</tr>
<tr>
<td>Sculthorpe</td>
<td>No. 8</td>
<td>1970</td>
<td>pizz. ~~~~~</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>↑↓ liberamente</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>über fingerboard</td>
</tr>
<tr>
<td></td>
<td>Gran Torso ....</td>
<td>1971-6-8</td>
<td>m. Daumen quasi erstickt - with thumb almost strangled</td>
</tr>
<tr>
<td></td>
<td>Imitationen ....</td>
<td>1975</td>
<td>Beschleunigung (accelerando) schneller Dauern</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>hasten speed (accelerando) faster</td>
</tr>
<tr>
<td></td>
<td>II. Stqtt.</td>
<td>1989</td>
<td>Pizzicato über alle vier Saiten hinterm Steg -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pizzicato on all four strings behind bridge</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pizzicato über alle vier Saiten vor dem Steg bei extrem hohem ad lib. - Pizzicato on all four strings in front of bridge extremely high position</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pizzicato über alle vier Saiten hinterm Steg mit völlig unkenntlichen Tonhöhen - Pizzicato on all four strings behind bridge completely unrecognisable pitch</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pizzicato über alle vier Saiten bei  (relativ hohem) Flageolet - Griff ad.lib. - Pizzicato on all four strings with (relatively high) Harmonic positioning ad. lib.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Zwischengrad von Dämpfgriff mit unkenntlichen Tonhöhenresultat und Flageolet-Nachhallgriff - inbetween degree of mute positioning with an unrecognizable result of tone pitch and positioning of harmonic echo.</td>
</tr>
</tbody>
</table>
### Pizzicato: Left Hand

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karkoschka</td>
<td>Quattroleum</td>
<td>1966</td>
<td>ò modified symbol</td>
</tr>
<tr>
<td>Cervetti</td>
<td>Zinctum</td>
<td>1967</td>
<td>pizz. (mano sinistra)</td>
</tr>
<tr>
<td>Heyn</td>
<td>Sirènes ....</td>
<td>1983</td>
<td>ò modified symbol</td>
</tr>
</tbody>
</table>

### Pizzicato/Arco: Simultaneous use

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sculthorpe</td>
<td>No. 8</td>
<td>1970</td>
<td></td>
</tr>
<tr>
<td>Hertel</td>
<td>Imitationen</td>
<td>1975</td>
<td></td>
</tr>
<tr>
<td>Heyn</td>
<td>Sirènes</td>
<td>1983</td>
<td></td>
</tr>
</tbody>
</table>

### Pizzicato: With Nut of Bow

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervetti</td>
<td>Zinctum</td>
<td>1966</td>
<td>*) pizz</td>
</tr>
<tr>
<td>Lachenmann</td>
<td>Gran Torso ....</td>
<td>1971-76-78</td>
<td>composite symbol</td>
</tr>
<tr>
<td>Lachenmann</td>
<td>Gran Torso ....</td>
<td>1971-76-78</td>
<td>in glissando</td>
</tr>
<tr>
<td>Lachenmann</td>
<td>II. Stätz.</td>
<td>1989</td>
<td>new stave system</td>
</tr>
</tbody>
</table>

### Pizzicato: Traditional Technique - New Symbol/New Notational System

### Pizzicato: New Symbols

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartolozzi</td>
<td>Qtto per Archi</td>
<td>1960</td>
<td>Selection of new different signs</td>
</tr>
</tbody>
</table>

### Pizzicato: New Notational System and/or Modified Stave

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poussuer</td>
<td>Ode. Pour .....</td>
<td>1960-1</td>
<td>Qualitative system</td>
</tr>
<tr>
<td>von Biel</td>
<td>Qt. für Streicher</td>
<td>1965</td>
<td>Radically New Individual system</td>
</tr>
<tr>
<td>Karkoschka</td>
<td>Quattroleum</td>
<td>1966</td>
<td>Equitone</td>
</tr>
<tr>
<td>Kelemen</td>
<td>Motion</td>
<td>1969</td>
<td>Double stave per instrument</td>
</tr>
<tr>
<td>Sculthorpe</td>
<td>No. 8</td>
<td>1970</td>
<td>Single separate stave</td>
</tr>
<tr>
<td>Lachenmann</td>
<td>Gran Torso ....</td>
<td>1971-76-78</td>
<td>Fragmented stave</td>
</tr>
</tbody>
</table>
**Pizzicato** : Within Proportional and/or Time Units

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kopolent</td>
<td>Qtto 3</td>
<td>1963</td>
<td>Proportional Notation/Time Units</td>
</tr>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
<td>Proportional Notation/Time Units</td>
</tr>
<tr>
<td>Kelemen</td>
<td>Motion für .....</td>
<td>1969</td>
<td>Proportional Notation/Time Units</td>
</tr>
<tr>
<td>Rihm</td>
<td>Drittes Stqtt.</td>
<td>1975</td>
<td>Proportional Notation</td>
</tr>
</tbody>
</table>

**Pizzicato** : Vertical Beaming or Horizontal Beaming

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berio</td>
<td>Sincronie ....</td>
<td>1963-4</td>
<td>All notes joined vertically</td>
</tr>
<tr>
<td>Kelemen</td>
<td>Motion für ....</td>
<td>1969</td>
<td>All notes joined vertically &amp; horizontal across barline</td>
</tr>
<tr>
<td>Crosse</td>
<td>Studies ....</td>
<td>1976</td>
<td>Single horizontal beaming</td>
</tr>
</tbody>
</table>

**Direction** :

**Pizzicato Arpeggios**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pousseur</td>
<td>Ode : ....</td>
<td>1960</td>
<td>radically new system</td>
</tr>
<tr>
<td>Sculthorpe</td>
<td>No. 8</td>
<td>1970</td>
<td>over fingerboard</td>
</tr>
<tr>
<td>Lachenmann</td>
<td>Gran Torso</td>
<td>1971</td>
<td>with thumb nail</td>
</tr>
<tr>
<td>Hertel</td>
<td>Imitationen ....</td>
<td>1975</td>
<td>new symbol in accel.</td>
</tr>
</tbody>
</table>

**Pizzicato Arpeggio Chords Arrows** : in a Single Direction(↑ or ↓) : Alternately up and down (↑↓)

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ligeti</td>
<td>No. 2</td>
<td>1968</td>
</tr>
<tr>
<td>Crumb</td>
<td>Black Angels</td>
<td>1970</td>
</tr>
<tr>
<td>Tchaikowsky</td>
<td>St. Qt.</td>
<td>1971</td>
</tr>
<tr>
<td>Hertel</td>
<td>Imitationen</td>
<td>1975</td>
</tr>
<tr>
<td>Crosse</td>
<td>Studies ....</td>
<td>1976</td>
</tr>
<tr>
<td>Globakar</td>
<td>Discours VI</td>
<td>1982</td>
</tr>
<tr>
<td>Gielen</td>
<td>St. Qt.</td>
<td>1985</td>
</tr>
<tr>
<td>Yun</td>
<td>Stqtt. IV</td>
<td>1988</td>
</tr>
</tbody>
</table>
### Pizzicato: Strumming

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ligeti</td>
<td>No. 2</td>
<td>1968</td>
</tr>
<tr>
<td>Dillon</td>
<td>St. Qt.</td>
<td>1985</td>
</tr>
</tbody>
</table>

* *strum ...*

* *a la chitarra (pizz. arp.)*

### Duration:

**Pizzicato**: Various aspects of Duration

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kopolent</td>
<td><em>Stt 3</em></td>
<td>1963</td>
</tr>
<tr>
<td>Ligeti</td>
<td>No. 2</td>
<td>1968</td>
</tr>
<tr>
<td>Brown</td>
<td>St. Qt.</td>
<td>1970</td>
</tr>
</tbody>
</table>

### Pizzicato Tremolo

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berio</td>
<td><em>Sincronie</em></td>
<td>1963-64</td>
<td><em>Tremolo/glissando</em> as a composite symbol</td>
</tr>
<tr>
<td>Cervetti</td>
<td><em>Zinctum</em></td>
<td>1967</td>
<td><em>mana sinistra</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>non-rhythmic : new symbol</td>
</tr>
<tr>
<td>Karkoschka</td>
<td><em>Quattrologe</em></td>
<td>1966</td>
<td><em>Tremolo/glissando</em> in time units</td>
</tr>
<tr>
<td>Gielen</td>
<td>St. Qt.</td>
<td>1983</td>
<td><em>alla mandolino tremolo</em> - without plectrum</td>
</tr>
</tbody>
</table>

### Pizzicato: Acciaccatura : Appoggiatura : Pizzicato Damping the Strings

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mayuzumi</td>
<td>Prelude</td>
<td>1964</td>
<td><em>Acciaccatura &amp; Glissando</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>Acciaccatura &amp; Bartók Snap</em></td>
</tr>
<tr>
<td>Druckmann</td>
<td>No. 2</td>
<td>1966</td>
<td>Damping</td>
</tr>
<tr>
<td>Ferneyhough</td>
<td>Sonatas ...</td>
<td>1967</td>
<td>Damping behind bridge</td>
</tr>
</tbody>
</table>
Contact Point:

**Pizzicato : Behind Bridge**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelemen</td>
<td><em>Motion für Stqtt.</em></td>
<td>1969</td>
</tr>
<tr>
<td>Ferneyhough</td>
<td>Sonatas ....</td>
<td>1967</td>
</tr>
<tr>
<td>Brown</td>
<td><em>St. Qt.</em></td>
<td>1970</td>
</tr>
<tr>
<td>Holliger</td>
<td><em>Stqtt.</em></td>
<td>1973</td>
</tr>
<tr>
<td>Brewaeyes</td>
<td><em>St. Qt.</em></td>
<td>1989</td>
</tr>
<tr>
<td>Lachenmann</td>
<td><em>II.Stqtt.</em></td>
<td>1989</td>
</tr>
</tbody>
</table>

**Sign/Explanation**

- **pizzicato**
- **damping**
- **arpeggio**
- **with fingernail**

**Pizzicato : Over Fingerboard**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>von Biel</td>
<td><em>Qt. für Streicher</em></td>
<td>1965</td>
</tr>
<tr>
<td>Karkoschka</td>
<td><em>Quattrologe</em></td>
<td>1966</td>
</tr>
<tr>
<td>Hertel</td>
<td><em>Imitationen ....</em></td>
<td>1975</td>
</tr>
<tr>
<td>Lachenmann</td>
<td><em>II.Stqtt.</em></td>
<td>1989</td>
</tr>
</tbody>
</table>

**Sign/Explanation**

- Radically new notation
- Equitone
- Pulled out from fingerboard
- In between degree of mute positioning with an unrecognizable result of tone pitch and positioning of harmonic echo.

**Pizzicato : Changing positions**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rihm</td>
<td><em>Drittes Sqtt.</em></td>
<td>1976</td>
</tr>
</tbody>
</table>

**Sign/Explanation**

- From fingerboard to bridge

**Pizzicato : Harmonics - Specific Sound**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ligeti</td>
<td>No. 2</td>
<td>1968</td>
</tr>
<tr>
<td>Crumb</td>
<td>Black Angels</td>
<td>1970</td>
</tr>
</tbody>
</table>

**Sign/Explanation**

- $***$ = pizz., Griff-Finger leicht aufsetzen
  - (wie bei Flag.) Dumpfer, hölzerner Klang - pizz., place the left-hand finger lightly on the string (as for a harmonic); hollow, wooden sound
  - $j=60$ play like guitar
  - pizz. harmonics; tones should ring like tiny bells
  - (poco accel. --- rit. ---)
Many composers use harmonics in *pizzicato* but none, other than Ligeti and Crumb, direct a specific tone colour.

**Pizzicato : Highest Possible Note/s :**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervetti</td>
<td>Zinctum</td>
<td>1967</td>
<td>hochstmöglicher Ton - highest possible sound</td>
</tr>
<tr>
<td>Penderecki</td>
<td>Qtto. per Archi</td>
<td>1968</td>
<td>pizz.</td>
</tr>
<tr>
<td>Schmidt</td>
<td>Zweites Stqtt.</td>
<td>1979</td>
<td>pizz.</td>
</tr>
</tbody>
</table>

**Pizzicato : Unusual Aspects**

**Pizzicato : Repeated**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
<td>Pizzicati repeats in dots - not notes</td>
</tr>
</tbody>
</table>

**Pizzicato : Beamed**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crosse</td>
<td>Studies for St. Qt.</td>
<td>1976</td>
<td>Pizzicati repeats in dots and beamed notation</td>
</tr>
</tbody>
</table>

**Pizzicato : Aperiodic Sequences**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelemen</td>
<td>Motion für Stqtt.</td>
<td>1969</td>
<td>Pizzicato across barline within irregularly beamed proportional spacing</td>
</tr>
</tbody>
</table>

**Pizzicato : Quarter Tones/Microtones : Higher and Lower (see Chapter Six Microtones )**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelemen</td>
<td>Motion für Stqtt.</td>
<td>1969</td>
<td></td>
</tr>
<tr>
<td>Pousseur</td>
<td>Ode : ....</td>
<td>1960-61</td>
<td></td>
</tr>
<tr>
<td>Hiller</td>
<td>No. 5</td>
<td>1962</td>
<td></td>
</tr>
<tr>
<td>Ligeti</td>
<td>No. 2</td>
<td>1968</td>
<td></td>
</tr>
<tr>
<td>Ferneyhough</td>
<td>No. 2</td>
<td>1980</td>
<td></td>
</tr>
<tr>
<td>Heyn</td>
<td>Sirènes ....</td>
<td>1983</td>
<td></td>
</tr>
<tr>
<td>Reynolds</td>
<td>Coconino ....</td>
<td>1989</td>
<td></td>
</tr>
<tr>
<td>Dillon</td>
<td>St. Qt.</td>
<td>1985</td>
<td></td>
</tr>
</tbody>
</table>
Comment

The various 20th century developments which have occurred in the use of *pizzicato* arise from new approaches to the major aspects of the technique - modes of attack, direction, duration and points of contact. The outcome of these new approaches may be summarised as follows:

In the use of a traditional *pizzicato*, composers use one or both of two approaches:

- The standard *pizz.* term which provides clarity when it occurs in a mass of radically new, individualistic, unfamiliar signs
- A distinctive new symbol - either as recommended at the Ghent Convention or as specifically designed by the composer

In examining the new approaches to the many modes of attack, the various points of contact, duration and direction in the *pizzicato* technique, the following observations emerge:

**Mode of Attack**

- Bartók's snap *pizzicato* revolutionised the mode of attack in the early decades of the 20th century in that the string was pulled vertically upward between two fingers before the quick release that snapped the string onto the fingerboard. The symbol for the technique is either that as originally designed by Bartók in 1928, or a slight modification of the same symbol. In a single instance, a new symbol is used. Composers, particularly from the 1960s onwards, have extended the *pizzicato* and used it in association with a number of other techniques. Technically the *pizzicato* requirements have been modified to extend the intensity, the points of contact and duration far beyond those initiated by Bartók, but the intrinsic "snap" remains an inherent part of the sound. As can be seen from the foregoing lists, it is the most widely used *pizzicato* in contemporary quartets.

- Other modes of attack include fingernail plucking and its extension, the 'buzz' or 'rattling' *pizzicato* - the latter so called due to the resultant buzzing sound made by the fingernail vibrating against the string after being plucked. The most common contemporary notation for the fingernail effect is a graphic design of a 'nail': "_/", or in some cases a modified version of this symbol. The 'buzz' or 'rattling' *pizzicato* is found only once in this investigation.

- Another innovative mode of attack, found in only two instances, is the use of the nut of the bow. A specific symbol for the effect - accompanied by written instructions - is given in one instance and written instructions, without a specific symbol, in the other instance.
Guitar and mandolin effects appear as early as 1960 and are used extensively, either with or without a plectrum in *arpeggio pizzicato* chords or, alternatively, as single notes which are generally found associated with the *tremolo*. To indicate the use of a plectrum the notation is often designed as a graphic of vertical strokes attached to the note, or beam of the note, reflecting the intensity and speed of the plectrum’s up and down movements, or a symbol in the shape of a plectrum ▽ is used. These indicators are sometimes accompanied by the word *plectrum*, or its equivalent in the particular language of the composer, or alternatively, by the words - *alla mandolino* and *alla chittara*.

Pizzicati with the left hand are generally made in the traditional way but, very occasionally, the standard symbol + is replaced by an x placed either above or below the note, or substituted for the notehead. In one quartet, the symbol + represents, unusually, a standard right hand *pizzicato*.

The modes of attack incorporate a variety of composite techniques.

**Direction**

*Arpeggio* and strummed chords involve two different directions for the strumming effect - perpendicular and oblique. They can be played in a variety of ways, either over the fingerboard, with either the thumb or forefinger and with or without a plectrum. The chords are played as rhythmic and non-rhythmic *pizzicato tremolo* and are often incorporated into other techniques such as *glissando* and *accelerando*. At times the *arpeggio* strummed chords have the instruction for the instruments to be held *alla mandolino* or *alla chittara*. The notation is either graphic, standard with arrows alongside the chords showing the direction of the strumming or, as explained above, given in words alone.

**Duration**

Duration is an inherent part of the *pizzicato* but the vibration time of the strings may be curtailed considerably when the *pizzicato* is incorporated with other specific requirements such as the *acciaccatura*, *portamento* and *glissando*, and damping the strings or plucking behind the bridge. The notation for damping the string is often given as a written instruction but there are composers who use the accepted contemporary symbol Ø, for muting the string’s vibrations.

**Contact Points**

The contact points, such as the use of harmonics and plucking at the highest parts of the string, plucking on or behind the bridge, or plucking well over the fingerboard, each produce special effects. The symbols for these various contact points are generally individually devised, with the exception of plucking at the highest part of a string where the symbol ▲ is most commonly found. When especially distinctive effects are required, specific symbols and explicit
instructions are given at the relevant place in the score or on a separate page of notes attached to the score.

The lists above show that the simple traditional *pizzicato* - within a limited dynamic range, just over the fingerboard - has not only lost its limited area of contact but has gained greater extension of the dynamic, duration and direction levels. These extensions are found within both traditional notation and within radically new notation systems employing a variety of new graphic symbols. The modern *pizzicato* techniques generally have Bartók as their ancestor. As with all string techniques, unexplored *pizzicato* possibilities have no limitations, but this freedom of extending the sound palette should, perhaps, be contained in a search for such new possibilities as will continuously evolve the spirit of the genre.
In my sketchbook I wrote out the chromatic scale and crossed off the individual notes. Why? Because I had convinced myself “This note has been there already”. In short, a rule of law emerged; until all twelve notes have occurred, none of them may occur again.
Chapter Ten

REPETITION SIGNS

Function of the Repeat: 20th Century Innovations

Traditionally, there were only a few limited ways of indicating a repetition. These included the use of two double bars with accompanying dots encompassing a section (||:||), while another way was the use of '1st and 2nd' time bars, each structured in such that the melodic and harmonic implications either directed the player back to the beginning - after finishing the 1st time bar - or on to the following section at the '2nd' bar. Added to these two methods was the use of this sign (Segno §) combined, if necessary, with explanatory words. Two examples of this latter method are:

- Dal Segno al Fine = From the sign § to the word Fine
- Da Capo al Segno = From the beginning to the sign §

A series of repeated bars are generally indicated by a heavy slanted stroke flanked by two dots, and if more than four bars are to be repeated then a number, placed in parenthesis above the stave, indicates the total bars required for repetition.

As demonstrated by the list below, these concise and undeviating ways of indicating a repetition were not generally carried over into the early string quartets of this century, and what may appear to be a minor observation is nevertheless very important, as the function of the repeat in Western music, up to the turn of the century, was analogous, in some ways, to the compositional form. The organisation of materials into a meaningful whole was relevant to the music of each particular period and designed in such a way that the sum of the disparate parts formed an aesthetically satisfying structure. The specific 'forms' that arose over the centuries often contained repeats which were an indispensable underlying factor to the form of the music. Take for example the dance movements and suites of the Baroque period where the repeat was an integral part of the musical organisation. Another structural approach which included the sum of the sections to make up the whole, was the architectonic design which contributed to many of the greatest works in Western music. In these, composers such as Haydn, Mozart, Beethoven and Brahms used the sectional tools of statement, restatement, variation and contrast - all of which could include the repeat sign - as invaluable procedures to structure the architectural plan of the composition.

In the 20th century, however, the traditional concept of form began to change, and composers such as Varèse looked on form as being a process from which the consequences of the interaction of opposing forces created a resultant pattern of parts. Bartók, Schoenberg and Webern, each for
different reasons, found no logic for the use of a repeat of any sort in their string quartets and only Hindemith - in the second of his six quartets - employed a single repeated figuration in, what was then, a completely new way of designating a repetition, as shown in the example below.

**Example 505. Repetition : Figuration**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindemith</td>
<td>No. 2</td>
<td>1922</td>
</tr>
</tbody>
</table>

---

Note: The repeated figuration occurs (for 53 bars) from bar 458 - 511 in a section that accelerates from a *Presto* at bar 463 to *molto accel.*, to a *Prestissimo hinabstürzen*, on to the instruction *Sehr Wild*. This repeat in Violin 2 continues without regard for the music of the other three parts, as written into the score at the relevant bars.

The list below demonstrates that well into the 1950s many string quartets were scored without repeats of any sort.
<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Repeats</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schoenberg</td>
<td>No. 1 Op. 7</td>
<td>1904-5</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 2 Op. 10</td>
<td>1907-8</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 3 Op. 30</td>
<td>1927</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 4 Op. 27</td>
<td>1936</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Webern</td>
<td>Op. 5</td>
<td>1909</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Op. 9</td>
<td>1924</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Op. 28</td>
<td>1939</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Bartók</td>
<td>No. 1</td>
<td>1908</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>1915-17</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 3</td>
<td>1927</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 4</td>
<td>1928</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 5</td>
<td>1934</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 6</td>
<td>1939</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Hindemith</td>
<td>No. 1 Op. 10</td>
<td>1921</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 2. Op. 16</td>
<td>1922</td>
<td>figuration repeat</td>
<td>Yes - Mov. III</td>
</tr>
<tr>
<td></td>
<td>No. 3 Op. 22</td>
<td>1923</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 5 in E Flat</td>
<td>1943</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 6</td>
<td>1945</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Ives</td>
<td>No. 2</td>
<td>1907-13</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Cowell</td>
<td>Mov. for St. Qt.</td>
<td>1934</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Prokofiev</td>
<td>No. 2 Op. 92</td>
<td>1948</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Cage</td>
<td>St. Qt.</td>
<td>1949-</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Carter</td>
<td>Fantasia</td>
<td>1951</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Feldman</td>
<td>Structures</td>
<td>1951</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Rochberg</td>
<td>St. Qt.</td>
<td>1957</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Despite the lack of repetitions in the list of quartets above from 1904 - 1957, the D.S. - Dal Segno sign (§) is found as late as 1962 in Henry Cowell’s String Quartet No. 5, in bar 117, which, on the return, proceeds from the sign straight to the coda. and not to a second time bar.
Repetition : New Signs and Indicators

Following on the revised musical thinking in the early decades of this century, a general disintegration of numerous aspects of traditional notation occurred during the remaining decades and, in the matter of repeats, modern ideas emerged to accommodate the relationships and combinations of contemporary material. Inevitably, repeats of sections, rhythmic figures, melodic or technical patterns or even a single note, carry a series of different functions from those of earlier times and may be found at any point of a score, in any parameter, with a variety of attendant new symbols to illustrate the new vocabulary. Thus, in contemporary scores the repeat of any parameter (rhythm, pitch, duration, dynamics and timbre) can have a formative function in the evolving of new sub-divisions within the structural process as a whole.

The significant innovations are:

- 'frame notation'
- a selection of other indicators

accommodated in both traditional and proportionate notation, in either determinate or indeterminate notation and within traditional time signatures or contemporary time units.

The following examples, taken from string quartets post 1960, show the diversity of new indicators found in contemporary quartets.

Repetition : Frame Notation

The term "frame notation" originated in the Preface to the Polish composer Boguslaw Schäffer’s (1929 - ) composition Topofonica (for forty instruments), 1960. The purpose of the frame allows for the possibilities of choice within fixed limits. Karkoschka calls this ‘the first step away from notation that is as precise as possible: only the frame surrounding the scattered contents is fixed but it is fixed exactly.’ 419 Thus the elements of choice within the frame can be rhythmic, pitched, of varied technical requirement and affect aspects of tempo, articulation, degrees of dynamic and so forth. The repeats can be ordered, i.e. designated by the composer, or played in an unsystematic way, i.e. chosen by the performer within given stipulations.

419 Karkoschka, Notation in New Music, p. 55.
Example 506. Repetition: Frame Notation: Controlled Elements
Determined by Composer - Pitch and Technique
Highest Note in Tremolo: within Time Units

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kopolent</td>
<td>Otto 3</td>
<td>1963</td>
<td>Frame</td>
</tr>
</tbody>
</table>

\( \textsuperscript{3} \) - sehr schnelle Bewegung in maximaler Höhe - very quick movement at highest extremity

Ex. p. 12, Violin 1, Viola & Cello

Note: The repeats, in the form of bow technique and pitch - tremolo and the highest possible note - are determined by the composer and indicated by the number \( \textsuperscript{3} \) placed, as shown above, in the relevant place in the score. As explained earlier, the numbers \( \textsuperscript{1} - \textsuperscript{6} \) in Kopolent’s score each represent a specific technique. The requirements for the number \( \textsuperscript{3} \), described above, are repeated for a time unit of 18” within the rectangular frames.
Example 507. Repetition : Frame Notation : Controlled Elements
Determined by Composer - Pitch and Technique

Composer | String Quartet | Date | New Symbol
----------|----------------|------|------------------------
Cervetti  | Zinctum        | 1967 | * Das eingerahmte Tonschema innerhalb der gegebenen Zeitdauer mindestens einmal so schnell wie möglich wiederholen - Repeat pattern under [within] the square at least once as fast as possible

Ex. p. 12, line 2, bars 321 - 328.
All Instruments

Note: The asymmetrical entries of all four instruments, starting with 1st Violin (bar 321) and ending with the cello entry (bar 329 not shown), are contained in a 'barless' frame and include three types of pizzicati:

- traditional pizz : Bartók pizz. δ : highest possible notes on given strings ▲

Only a single dynamic sign is given (f), and the individual stemless notes are in proportional spacing.

Compared to Cervetti’s limited use of frame notation - of which the above is the single example in the score - Lutoslawski makes extensive use of frame notation. Within the frame he writes specific instructions regarding the nature of the repetition and, depending on the characteristics of the repeats, varies the repeat symbols accordingly. The examples below, all taken from Lutoslawski String Quartet (1964), include three illustrations of the most representative examples in the score. Other instances are noted, but without further illustrations.
Example 508. Repetition : Frame Notation : Controlled Elements
Frame Notation and Written Explanations
Beamed Three-Note Figuration

Composer  String Quartet  Date  New Symbol
Lutoslawski  St. Qt.  1964  Frame

\[ \text{etc.} \]

- Break immediately after the viola's two octaves

Ex. p. 11, Cello (\&)

Note: The repeated three-note figuration is contained in a frame, and continues for the length of the beam, accompanied by the word etc. which, in turn, is followed by the instruction - Break immediately after the viola's two octaves. Thus the number of Cello repeats is controlled by the material contained in the Viola part and ceases only after the two octaves are played. Lutoslawski consistently places the framed repeats for each instrument in separate frames.

Lutoslawski also makes use of the traditional double bar repeat signs, within contemporary frames, accompanied by written instructions. Four examples follow, of which only the first is illustrated.
Example 509. Repetition : Frame Notation : Controlled Elements
Traditional Double Bar Signs within Frames

Frame
|| :|| ~~~~repeat until you see the signal from the 1st violin, then play up to the :|| and stop

Ex. p. 32. Cello

Note: Lutoslawski regularly instructs that the repeats in one instrument be controlled by the playing of another, as shown above, where the number of Cello repeats, contained within the double bar, are determined by the written instructions contained within the frame: || :|| ~~~~repeat until you see the signal from the 1st violin, then play up to the :|| and stop.

The traditional repeated double bar signs, within contemporary frames, are all accompanied by written instructions. (No illustrations given)

Frame
|| :|| repeat three times and then make a sign to the others

Ex. p. 32. Violin 1

Frame
|| :|| *) play twice the passage between the repeat marks

Ex. p. 43. Cello

Without double bars

Frame and written instructions
go on after you are sure that the cello has stopped

Ex. p. 42. Viola
Example 510. Repetition : Frame Notation : Controlled Elements
Repeated Single Notes

Frame
Violin 2 : begin 25 together with the 1st violin
Ex. p. 33, at 24, Violin 1 & 2

Note: The repeated note is given initially as a single determined pitch and continues to be repeated in the irregular groupings of headless notes - all contained within a frame. The repetitions are controlled by three factors:

- pitch - given : rhythm - specific groupings : time factor - in the 'lead' directed through the 1st violin to all the instruments which reads : begin 25 together with the 1st violin

Lutoslawski makes considerable use of frame notation for repeated rhythmic groupings.

The above examples illustrate the diversity of repeated signs found in Lutoslawski's String Quartet (1964). He is very specific about what is wanted and accompanies all symbols with attendant written instructions. Generally, all repetitions are contained within frames although, at times, single headless notes are repeated in rhythmic groupings. The standard repetition double bar sign is associated with a number of new symbols, accompanied by written instructions, each in their own way indicating a repeat of one sort or another. Importantly, Lutoslawski leaves no choice to the players - each block of notes contains specific instructions and the repetitions are not improvisational.
Example 511. Repetition: Frame Notation: Controlled Elements
Grouping Single Stemless Notes: Proportional Spacing

Composer: Gisterlinck  
String Quartet: Strijkkt.  
Date: 1966

New Symbol
Frame
Violin 2, Viola & Cello

Con tutta la lunghezza sull'arco

Note: The whole of the first movement is written in frame notation and as no further indications are given, either in the score or as performance notes, the requirements of the notation within the frame are somewhat ambiguous.

It is generally understood that, within 20th notation, material contained in a frame suggests a repeat of certain elements. (Explained earlier in this section). Therefore, the frame of the above example could be interpreted in two ways. Firstly, that while Violin I continues to play the full complement of given notes, Violin 2, Viola and Cello continue to repeat the selection of framed single, stemless notes until Violin 1 arrives at the last note in the frame. Secondly, the alternate interpretation could be that the three lower parts cease playing after finishing the required notes and merely rest while Violin 1 continues to play the allotted selection of notes. However, as no rests are given to the three lower parts, the first suggestion is the most probable. The section is played Zeev snel - ff sempre: Very fast - ff sempre.
Example 512. Repetition : Frame Notation
Controlled Elements Repeated in any Order

Composer  String Quartet  Date  New Symbol
Druckman  No. 2  1966  Frame

New Symbol

Frame
play through once, then repeat elements separated by rests in any order until end of time span indicated by length of box

Ex. p. 10, Violin 1

Note: The following important factors control the length of the repetition within the frame:

- the tempo, which is set in a barless section at \( \text{\textit{J}} = 60 \)
- the bracketed section enclosing the Violin 2, Viola and Cello which indicates some points of reference for the repeated notes in Violin 1
- the reintroduction of the bar line which designates the simultaneous arrival of all instruments at the start of the bar following the framed material

These together act as a guide to direct the repetitions in Violin 1 as no time unit is given.

In the separate sheet of Performance Instructions, Druckman explains that for all frame notation the player must play through once, then repeat elements separated by rests in any order until end of time span indicated by length of box which, in the above example, requires the repetition - in any order - of the small collection of notes, separated by the rests.(Violin 1).
Example 513. Repetition: Frame Notation
Improvisation of any Elements within a Section

Composer  String Quartet  Date
Karkoschka  Quattrologe  1966

New Symbol

Note: The material to be repeated contains a variety of new string techniques and is taken from the previous four bars, marked as boxed numbers - 4,5,6, (not shown). The techniques include: sul ponti, glissandi, beat or stroke with wood of bow: molto and senza vibrato: pizzicati at various stipulated parts of the string and bowing behind the bridge, which are mentioned and explained separately in the relevant sections of this investigation. All the new techniques have accompanying symbols specifically devised by Karkoschka. In the bars to be repeated, the staves are blank but contain small vertical markings displaying the individual time units, each relating to: _______ = 1 Sekunde = J.

As shown above, a certain control is exhibited by the composer who designates the initial material to be repeated is between the numbers 4-6. In the subsequent ‘bars’, a random choice of techniques, rhythms, dynamics, or groupings of any other stated material requires that all players to improvise elements from 4 to 6 irregularly and fast within a time of 8 seconds. Through the choice of data - which is initially controlled by the composer and subsequently chosen by each player separately - an improvisational, arhythmic, asymmetrical texture is unreservedly varied with each performance.
Repetition: Other Indicators
Modified use of Traditional Double Bars

Example 514. Repetition: Other Indicators
Modified Use of Traditional Double Bars: Specific Instruction in \( \frac{fn}{f} \)

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lutoslawski</td>
<td>St. Qt.</td>
<td>1964</td>
<td>( \frac{</td>
</tr>
</tbody>
</table>

*\( \frac{||}{:\text{\textsecurityintring} \text{etnew}} \): Repeat the phrase between repeat marks until you see the audience has become completely quiet

Ex. p. 1, bar 1, Violin 1

Note: Lutoslawski uses the traditional double bar repetition sign in a novel way. In the first bar the three separate short notes, played in hushed tones \( \text{pp} \text{eexpresstive}, \text{eloquente} \), by Violin 1, are interspersed with two pauses (ca 2") and a rest. This initial segment, lasting ca 5\( \frac{1}{2} \) sec., is repeated many times as an introduction which serves to elicit audience attention - they must be completely quiet before the designated start of the quartet.

Example 515. Repetition: Other Indicators
Modified Use Traditional Double Bars: \( \text{Ad Lib.} \) Elements

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bredemeyer</td>
<td>Stqtt.</td>
<td>1969</td>
<td>( \frac{</td>
</tr>
</tbody>
</table>

Ex. p. 2, part line 1 & 2, Violin 1 & 2, Viola
Note: After the initial playing - in the three upper instruments - of the proportionally placed asymmetrical notes, they are to be repeated in any order for the duration of the ‘trilled pause note’ in the Cello part. The repeats are indicated in both traditional and contemporary symbols, in that the conventional double bar repeat sign $||:||$, is extended by the words, $ad lib$, followed by a horizontal arrow →, thus - $||:|| ad lib →$ - giving the players the choice of repeating the specified notes in any order.

The initial material of asymmetrical rhythmic entries for each instrument is determined by a selection of different notes per part as follows:

- **Violin 1** - 7 x minims $||: \cdot \cdot \cdot \cdot \cdot \cdot \cdot :|| ad lib →$
- **Violin 2** - 6 x dotted minims $||: \cdot \cdot \cdot \cdot \cdot \cdot \cdot :|| ad lib →$
- **Viola** - 4 x double dotted minims $||: \cdot . \cdot . \cdot :|| ad lib →$

Nevertheless, on repetition, the implementation of the exact notation fails to be relevant.

Kurt Stone’s recommendations for patterns of both ordered and unordered material are:

If the elements are ordered, such as given succession of pitches and/or short rhythms, repeat signs are used. If the material is unordered, i.e. the performer must make his own choices from within a given pitch range and/or from a selection of note-values or rhythms, dynamic degrees etc. these basic ingredients are placed in a heavy box followed by the usual durational line .... 420

Bredemeyer’s notation differs from the method suggested above, in that the use of the words $ad lib$, after the repeat sign, replaces the need for the ‘heavy box’ frame and thus, in either repetition, there is an improvised effect.

**Repetition: Other Indicators**

**Modified Use of Traditional Double Bars**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crosse</td>
<td>Studies</td>
<td>1976</td>
<td>$</td>
</tr>
</tbody>
</table>

(No example given)

---

Example 516. Repetition: Other Indicators
Modified Use of Traditional Double Bars: Repeats Controlled by Numbers

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hertel</td>
<td><em>Imitationen</em></td>
<td>1975</td>
<td></td>
</tr>
</tbody>
</table>

Ex. p. 17, line 1, Violin 1 & 2, Viola

Note: The repeated bars are notated with the conventional double bars, followed by a figure placed above the stave to indicate the number of repeats. These two symbols, together with the 'wavy lines' of variable lengths, form the following composite symbol ||:|| 4 x ~~~~ || to represent the duration of the repeats. (Violin 1 & 2, and Viola). Unlike the control executed by the composer for the 4 x repeated segments of the upper parts, the Cello repeats continue to a given sign, unregulated by a number. The composite 'repeat' symbol is used consistently throughout the score.

Example 517. Repetition: Other Indicators
Modified use of Traditional Double Bars
Repeats Controlled by Numbers

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huber</td>
<td><em>Doubles</em></td>
<td>1987</td>
<td></td>
</tr>
</tbody>
</table>

Angegebenes Tonmodell 2x 5x etc. spielen -
Play given pattern 2x 5x etc

Ex. p. 6, line 2, Violin 1 & 2, Cello
Example 518. Repetition: Other Indicators
Repeat Sign: Multiple use of Traditional Double Bars - with Beam and Arrow

Composer  String Quartet  Date  New Symbol
Brandmüller  Erstes Stqt.  1983  || :|| %

Ex. p. 21, line 1, bar 140, Violin 1 & 2

Note: The composer has combined four symbols to effect the repeat of the notes contained in the double bars. Two are traditional and two are contemporary:

- traditional : || :|| and %
- contemporary: the beam to which an arrow is attached at its end signifies a continuation of the repeat onto the following line

The arrow falls away if a continuation onto the next line is not required.

Brandmüller uses the above signs exclusively to indicate repeats throughout this quartet and also in the score of his later quartet: Zweites Streichquartett, "Le jardin suspendu" 1985-86.

Becker, in the quartet No. 2 (1967), indicates the repetition in different ways, three of which are illustrated and explained in the following examples. (Examples 519 - 521)
Note: The instruction at 23, prior to the repeats, is as follows: alle Spieler nehmen Plektron - all players to use a plectrum, motivating the composer to use graphic notation to best convey the repeated series of headless irregular rhythmic patterns. The horizontal arrow → , followed by the word simile, indicates continuous rhythmic repetition for a time unit of 20” (not shown but marked at the bottom of the set of staves). The passage has no determined pitch and the speed at which the designated patterns are to be repeated: sehr rasch und mit äußerster Wildheit - very quick and with abandonment, results in an overall effect of randomly improvised percussive rhythmic patterns.
Example 520. Repetition: Other Indicators  
Graphic Arrows in Glissando

Composer | String Quartet | Date |
---|---|---|
Becker | No. 2 | 1967

New Symbol

Kurze, sehr rasch aufeinanderfolgende Glissandi. Die Ausgangstöne sind ad libitum im jeweils angegebenen Tonraum zu spielen. Die Bewegungsrichtung muß eingehalten werden. Dichte analog grafischer Aufzeichnung

- Short, very fast after one another. *Glissandi.* The starting tones *ad libitum* in the given frame work as printed. Movement of direction must be observed.

Ex. p. 13, between 53 and 54

All Instruments

Note: The two controlling aspects of the repeated *glissandi* are, firstly, the direction and number of the graphic arrows and secondly, the time unit of 15". In the matter of the *glissandi*’s initial and final pitches the players have some choice but, if the length of the arrows is taken into consideration, then the intervallic distance between the two points will be limited.
Repetition : Other Indicators
Dot Notation Analogous to Density

Example 521 Repetition : Other Indicators
Dot Notation Analogous to Density

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
<td>pizz. sord. :..:..</td>
</tr>
</tbody>
</table>

muted plucking
Ex. p. 14, line 2, All Instruments

Note: The notes to be repeated *pizz. sord.* - muted plucking, are shown in the stave at the start of the line, after which dots replace the notes and signify the density of the inexact repetition of the initial groups of notes. The effect is indicated by the instruction: *Hauchzartes, diffuses und äußerst rasches pizzicato con sord.* *Dichte analog grafischer Aufzeichnung* - Very light and fast muted *pizzicato.* Density analogous to the printed text. The repeated segments are placed in a time unit of 25".
Repetition: Other Indicators

Series of Dots and Dashes

Example 522. Repetition: Other Indicators
Repetition of Whole Group: Series of Dots and Dashes

Composer | String Quartet | Date | New Symbol
--- | --- | --- | ---
Penderecki | Qtto per Archi | 1968 | Wiederholung der ganzen Gruppe

Note: Penderecki notates repeats in various ways. (see Examples 526, 529, 531). In the above example, alternating dots and dashes represent a repetition of the irregularly numbered groupings of harmonics in each part respectively. The word *fischio*, placed below each stave, represents: *Den unteren, gehaltenen Ton mit pfeifen, pp non vibrato* - Whistle the lower, sustained note simultaneously, *pp non vibrato*, and provides a 'chord of pedal notes' to the repeated harmonics.

Repetition: Other Indicators

Wavy Lines

Example 523. Repetition: Other Indicators
Repetition Tremolo/Glissando Figuration: 'Wavy Line' within Time Unit

Composer | String Quartet | Date | New Symbol
--- | --- | --- | ---
Crumb | Black Angels | 1970 | (sempre sul pont. e glissando.)

Ex. p. 4, line 1, All Instruments
Note: Crumb’s applies a wavy line ~~~~~~~~~~ consistently throughout the score for all repeats. The repeated tremolo/glissando groupings above last for a time unit of 7". The first use of a wavy line to signify a repeated figuration in the quartets of the 20th century was used by Hindemith in his String Quartet No. 2 (1922). See Example 505.

Repetition : Composers Using Wavy Line

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holliger</td>
<td>Stqtt.</td>
<td>1973</td>
<td>Tremolo Sempre~~~~~~~~~~</td>
</tr>
<tr>
<td>Britten</td>
<td>No. 3</td>
<td>1973</td>
<td>various figurations~~~~~~</td>
</tr>
</tbody>
</table>

Repetition : Other Indicators

Repeated Elements in Words

Example 524. Repetition : Other Indicators
Repeated Elements in Words

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rihm</td>
<td>Drittes Stqtt.</td>
<td>1976</td>
<td>asynchronous etc--------</td>
</tr>
</tbody>
</table>

Ex. p. 33, All Instruments

Note: The initial synchronous two-note figuration - in all the parts - is then repeated as per the instruction asynchronous etc ~~~~~~. The number of repeats is governed by the given time, set by the composer at: Dauer : ca 1' -' 1'30" : Time : ca 1' -' 1'30", and thus the players have to gauge just how often the duplet is to be repeated within the allocated time.
Generally, in this investigation, 'headless notes' are most commonly found for repeated notes in *legno battuto*, as illustrated in the following example:

**Example 525. Repetition : Other Indicators**
Controlled Elements : *Legno Battuto*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
<td>legno battuto</td>
</tr>
</tbody>
</table>

Ex. p. 4. All Instruments

Note: The initial two notes given in the irregular, asymmetrical rhythmic groupings are followed by stems representing their repetition *legno battuto*, and are clearly arranged in proportional spacing for a time unit of 4".
Repetition : Other Indicators

Repeated Headless Notes

Example 526. Repetition : Other Indicators
Controlled : Repeated Headless Notes

Composer: Schmidt
String Quartet: Zweites Stätt.
Date: 1979

New Symbol
figuration of headless notes
Ex. p. 21, bars 221-224
Violin 2, Viola and Cello

Note: The note to be repeated is given at the beginning of each grouping, after which the composer refrains from adding either the pitches or ‘heads’ to the notes. It is a simple and direct way of indicating controlled repeated notes. However, the bars above are an example of notation that does not represent - as shown in the preceding example - repeated notes bowed legno battuto but describes, rather, a series of notes played in the normal manner.

Repetition : Composer Using Controlled Repeated Headless Notes

Composer: Gielen
String Quartet: Stätt.
Date: 1983

New Symbol
repeated headless notes
(No score given)
**Repetition: Other Indicators**

**Dots/Dots and Dashes**

**Example 527. Repetition: Other Indicators**
Partial Control: Dots indicating Single Notes

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penderecki</td>
<td><em>Qtto per Archi</em></td>
<td>1968</td>
</tr>
</tbody>
</table>

New Symbol

\[\textit{m"oglichst schnelle Tonwiederholung} \ldots .\]

the quickest possible repetition of the note

Ex. p. 13, line 3, Violin 1 & Cello

---

Note: The repeated notes of indefinite pitch are indicated by a composite symbol of a beam and a series of dots placed either under the ‘slur’, if the notes are to be played in a single bow, or, without the slur if they are to be played in separated bows. The first repeats shown above (Violin 1 and Cello) are executed as quickly as possible within a single down bow (\(\Pi\)) at the contact point \(\text{zwischen Steg und Saitenhalter, auf zwei Saiten spielen}\) - between bridge and tailpiece, on two strings, indicated by this symbol (\(\uparrow\)) and, in the second repeat, with separate bows in all instruments. The repeated dots assigned for each instrument are both asynchronous and irregular in number.

**Example 528. Repetition: Other Indicators**
Partial Control: Dots indicating Single Notes in *Ritardando* - Proportional Spacing

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelemen</td>
<td><em>Motion für Stutt.</em></td>
<td>1969</td>
</tr>
</tbody>
</table>

New Symbol

\[\textit{immer langsamer werden} -\]

slower and slower

Ex. p. 16, line 2, bars 167-168.

Violin 1, Viola, Cello
Note: The repeat symbol - indicated by the dots and a double beam - is in fact not a series of repeated notes in *decrescendo* as is traditionally accepted by two converging lines, but represents: *immer langsamer werden* - slower and slower, as explained in the preface page, *VORBEMERKING / NOTE*. In both the Violin 1 and Cello parts, the players could possibly misinterpret the two signs found in bar 167 as being a *decrescendo*. This brings to the fore, two important 20th century considerations:

- the need for the players to be familiar with the meaning of individually devised symbols
- the need for players to ascertain any re-definition of standard symbols

The slowing down of the repeated note is controlled, to a certain extent, by the proportional spacing of the dots within the vertical time markings which regulate the *tempo* to a metronome marking of: \( J = 58 \). The large figure above the stave at the start of each bar indicates a change in the number of beats per bar. In the example above the units change from 4 to 5 as follows:

- bar 167 - the number of time units in indicated by the number 4
- bar 166 - the number changes to 5

**Example 529. Repetition: Other Indicators**

Dashes indicating Single Notes: Beamed and Proportional Notation

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heyn</td>
<td><em>Sirènes</em></td>
<td>1983</td>
<td>irregular beamed lengths</td>
</tr>
</tbody>
</table>

Ex. p. 5, bar 17, Violin 1 & 2

Note: The repeated notes are indicated by a series of short beams, played on separate strings. To determine just how the repeated notes are executed, it is important to understand Heyn’s stave construction. (see *Chapter 11. The Stave: A 20th Century Approach*).

Briefly, however, and for purposes of examining the requirements of the example above, the quartet
is divided into two parts where, in the first 86 bars (out of a total of 179) three staves are allocated to each instrument, with each set representing either the lower or upper three of the four strings. In the example, the beamed pitches of Violins 1 & 2 are located on the three staves as follows:

- \(II\) - A string
- \(III\) - D string
- \(IV\) - G string

The length of each repeated note is beamed proportionally and occurs on separate staves. Thus the player has to play the repeated notes as indicated - \(i.e.\) on different strings. For example, Violin 2 plays microtonal double stops on the 1/4 tones of \(B\# / D\) string and \(G\# / G\) string, in the Vth position. In Violin 1 the same microtonal double stops are played alternately with the A string. As continuously demanded in the first part of this quartet, the technique - that of playing the same pitched notes across various string alternately - makes undeniable demands on the players, despite what the composer calls the ....chance factor of sound. Heyn explains: ....Tonhöhe und erwartetes klangliches Resultat nicht der Notation entsprechen .... die hier gewollte komplexe Klangund Geräuschgestalt trägt in sich Werte der Unberechenbarkeit .... [und] der Zufälligkeitsfaktor des Klanges ist hier Teil der kompositorischen Idee und damit konstitutiver Bestandteil des musikalischen Textes .....there are cases where the pitch and the expected sound-result do not correspond to the notation ..... [and that] the desired complex structure of sound and noise contains a certain ratio of unpredictability within it ..... The chance factor of the sound is a part of the compositional idea and thus a constituent element of the musical text.

The slow tempo, which is set at \(J = 54\), moderates the difficulty of execution. Each beat of the 4/4 time signature is represented by a dotted vertical line.

Repetition : Other Indicators

Extended Beam

Example 530. Repetition : Other Indicators
Controlled Elements : Extended Beamed Line

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penderecki</td>
<td>Qtto per Archi</td>
<td>1968</td>
<td>(\text{n n n n sim.})</td>
</tr>
</tbody>
</table>

\(\text{Ex. p. 19, line 2, Cello}\)
Note: In the example above, the repeated down bows $\uparrow \uparrow \uparrow \uparrow$ sim. in the Cello are played as instructed: *) mit dem Bogen auf der techten Schmalseite des Steges spielen - bow [at] the right narrow side of the bridge, and continue for the length of the extended beam which lasts until the end of the bar. In the same example the three upper parts - Violins 1 and 2, and Viola - continue the repeated down bows $\uparrow \uparrow \uparrow$ sim. at a different contact point i.e. zwischen Steg und Saitenhalter, auf zwei Saiten sielen - between bridge and tailpiece, on two strings for the duration indicated by the extended beam. Penderecki makes extensive use of the extended beams for repeats of one kind or another which, in the above example, indicate a continuation of the repeated down bows at two different contact points.

Replication: Composers Using Other Indicators

Composers Using Controlled Elements: Extended Line

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coeck</td>
<td>Graphismes</td>
<td>1983</td>
<td>Extended Line</td>
</tr>
<tr>
<td>Reynolds</td>
<td>Coconino</td>
<td>1989</td>
<td>Extended Line</td>
</tr>
</tbody>
</table>

Example 531. Repetition: Other Indicators

Figuration: Extended Line

Continuation from One Line to Another

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pousseur</td>
<td>Ode</td>
<td>1960-61</td>
<td>$\text{Ex. p. 7. (rhythmic portion 3)}$</td>
</tr>
</tbody>
</table>

$2 \quad 3 \quad 4$

Violin 1 & Cello
Note: Pousseur indicates all repeats, as shown above, with a single extended horizontal line following on from the five-line stave, $\frac{1}{2}$-----$. In this example, the last note of each grouping (Violin 1 & Cello), indicated by the ‘zig-zag’ line, is repeated as a bow tremolo (as thick as possible). Another of Pousseur’s individualistic compositional procedures is to replace the clef only when the repeat is complete and this can occur at any point on the stave - at the beginning or in the middle of a line, for example $\frac{1}{2}$----. Repeats that continue from one page to another are notated as described above, however, Pousseur marks the beginning of the stave of the following page with a square bracket and not a clef. $\frac{1}{2}$-----.

Example 532. Repetition : Other Indicators
Controlled Elements : Extended Line
Arrows indicating Continuation from One Line to Another

Composer     String Quartet       Date         New Symbol
Penderecki   Qtto per Archi      1968         $\gg\gg\gg\gg \sim$

Ex. p. 19, line 2, Violin 1 & 2, Viola

Note: The arrows attached to the beams at the end of a line generally indicate, within 20th century notation, the continuation of a specific instruction which, in the above example, represents a series of repeated accent notes.
Example 532. Repetition : Other Indicators
Absolute Control ? : Traditional Grouping of Repeated Notes

Composer  String Quartet  Date  New Symbol
Ligeti     No. 2         1968  No new symbol

Ex. p. 18, Mov. III, line 3, part 23-24
All Instruments

Note: The above example has been included in this section to show that Ligeti has opted for
standard notation in all the 47 bars of the 3rd movement of the String Quartet No. 2 (1968), instead
of an easier and less exacting way of notating the repeated irregular note groupings (or patterns). The
repeated notes of dissimilar rhythmic groupings - as a series of repeated patterns contained within the
whole - are specific and exact with the number of notes and time value per instrument varying in all
four instruments as follows:

- Violin 1  3 x groupings each of 16 demi-semi-quavers
- Violin 2  1 x grouping of 15 semi-quavers
             2 x groupings of 16 demi-semi-quavers
- Viola    1 x groupings each of 14 semi-quavers
             1 x groupings of 15 semi-quavers
             1 x grouping of 16 demi-semi-quavers
- Cello    1 x groupings 13 semi-quaver notes
             1 x groupings each of 14 semi-quavers
             1 x groupings of 15 semi-quavers
From the notation, Ligeti appears to have exercised complete control over the number of repetitions per grouping with the players being left no choice; however, this is not the case. The instruction which appears at the outset of the movement clarifies this point: *Gruppen sind ganz ohne Alzente zu spielen* .... *der notierte rhythmus muß nicht unbedingt wörtlich genommen werden* - the groups must be played with no accents whatever, .... the notated rhythm need not be taken literally. Therefore, the preciseness of notation of both the time values and group numbers seems to be somewhat unnecessary. Unlike the rhythmic structures in traditional music of the 17th to the early 20th centuries where players are expected to conform strictly to what is written, Ligeti, in the true spirit of notating the complexities of 20th century patterns, gives an example of the flexibility of interpreting contemporary rhythms.

Kevin Volans, by contrast, leaves no interpretative freedom to the players and is absolutely specific about the quality and number of notes to be repeated in his *II. String Quartet - Hunting : Gathering* (1987) as illustrated in the example below:

**Example 534. Repetition : Other Indicators**  
Absolute Control : Single Repeated Notes in Numbers - Stipulated

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volans</td>
<td>II. St. Qt.</td>
<td>1987</td>
<td>x5</td>
</tr>
</tbody>
</table>

| | \[\[| J J J J J J J J J J J |\]| Ex. p. 1, line 1, Violin 1 & 2, Cello |
|---|---|

**Note:** The repeated notes are scored in this precise manner throughout the quartet. They appear in variable time signatures, without accents where, for example, on the first page bars 1-10 every bar (Violins 1 & 2, Cello) contains a series of repeated notes as follows:

- Introductory repeated bar - without time signature - 10 repeated notes : x5
- Bar 1 5/4 - 5 separate repeated notes
- Bar 2 3/4 - 3 separate repeated notes
- Bar 3 5/4 - 5 separate repeated notes
- Bar 4 3/4 - 3 separate repeated notes
- Bar 5 5/4 - 5 separate repeated notes
Bar 6  6/4 - 6  separate repeated notes
Bar 7 - 10  3/4 - 3  separate repeated notes

In the introductory bar, Volans' use of two separate symbols for the repeats - that of the traditional double bar and the contemporary figure x5 - is clear and concise. This clarity is characteristic of the notation in the quartet, generally, which reflects his detachment from the complexities of music after studying with Stockhausen (1928 - ) and Kagel (1931 - ) in Cologne for eight years. Interest in the native music of his homeland, South Africa, resulted in two quartets: White Man Sleeps (1986) and Hunting: Gathering (1987) with music that is rooted in African cries and songs. The repetitiveness of the second quartet - from which the above example is taken - is aligned to the minimalist approach of fragmentary repetitions contained in constantly changing melodic material within a taut framework.

Example 535. Repetition : Other Indicators
Single Repeated Notes: Headless : Single Vertical Line Through all four Staves

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huber</td>
<td>Doubles</td>
<td>1987</td>
<td>headless notes joined through all stave</td>
</tr>
</tbody>
</table>

Note: The synchronous, repeated, notes are joined vertically with a single beam throughout the four staves. After the initial pitch is given, the heads of the notes are dispensed with for the repeated patterns. Huber uses this method frequently, but not exclusively, for repetitions. Shown in the example below is another of Huber’s approaches to repetition in proportionally spaced, repeated notes in accelerando and rallentando:
Example 536. Repetition : Other Indicators
Headless Single Repeated Notes : in Controlled *Accelerando* and *Rallentando*
Proportional Spacing

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huber</td>
<td>Doubles</td>
<td>1987</td>
<td>repeated headless notes</td>
</tr>
</tbody>
</table>

Ex. p. 16, line 1, bar 203, Violin 1

Note: In Violin 1, after the initial triplet at the given pitch (\(\#g\)), the repeated, headless, *pizzicato* notes create an *accelerando* and a *rallentando* with *tempo* markings fluctuating for a time unit of 6" from : \(J = 100 \ldots \text{ accel} \ldots J = 300 \ldots \text{ rall} \ldots J = 100\). The density of the strokes is indicative in proportional notation of the increased speed while, similarly, the wider spaced notes relate to a slowing down. However, when not applying proportional notation Huber indicates a *rallentando* in a different way, an illustration of which is given in the next example:

Example 537. Repetition : Other Indicators
Decreasing Metronome Markings

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huber</td>
<td>Doubles</td>
<td>1987</td>
<td>(J = 80 = 69 = 60 = 50 = 40)</td>
</tr>
</tbody>
</table>

Ex. p. 17, line 1, bars 215-216,

All Instruments
Note: At the relevant bar the composer indicates that each of the five chords are to be accented: *Akzente für alle!* - accents for all! These accents are indicated by written instructions and a new symbol, made up of the traditional accent attached to a stem >. Each of these signs has a rhythmic value attached to the stem - representing either a quaver \( \frac{1}{4} \) or a semiquaver \( \frac{1}{8} \). The slurs of the notation contradict the fact that the chords, contained within a single bar, are in effect heard as detached and separate with each successive accent. *A rallentando* in all parts is controlled by metronome markings placed above the stave, decreasing each successive repeat from a starting speed of \( j = 80 \) to \( j = 40 \) for the final chord. The effect of the five different *tempi* markings for each chord creates a ‘controlled’ rapid decrease in speed.

**Example 538. Repetition : Other Indicators**

*Headless Single Repeated Notes : Obscure Contact Point*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brewaeys</td>
<td>St. Qt.</td>
<td>1989</td>
<td>( \frac{1}{4} ) ( \frac{1}{8} ) scratch on backside</td>
</tr>
</tbody>
</table>

Ex. p. 3, line 2, bars 21-23, Viola

Note: The repeated notes are headless and the specific technique: scratch on backside, is indicated by a graphic ‘scratchy’ line representing a contact point which is not clearly stated. The fact that a note is pitched on the stave negates a ‘scratching’ on the back of the instrument. It is presumed that the bow is used *col legno*. However, Brewaeys, in other parts of the score, uses the term *legno arco* (without hair!) whenever the wood of the bow is specifically required. (see p. 6). The instruction is, as stated in an earlier section, somewhat obscure.
Example 539. Repetition: Other Indicators
Repeated Notes Placed in Angular Brackets

Composer  String Quartet  Date
Lachenmann  Ill. Qt.  1989

New Symbol

Die in eckige Klammern gesetzten Griffe dienen zur Vorbereitung der folgenden, al dito zu streichenden bzw. dort anzusetzenden Töne, auf allen vier Saiten nacheinander -

The notated position in angular brackets serves as a preparation to the following notes which are sequentially repeated on all four strings.

Ex. p. 22, bar 118, Violin 1

Note: In the example above the fingers are placed on the preparation notes - shown as open diamond notes at the beginning of the line - and maintained there for the duration of the beam representing the repeated notes. A further instruction in the Hinweise zu Notation und Ausführung - Hints on Notation and Performance relating to the notes contained in square brackets is that they are to be .... sequentially repeated on all four strings. However, on first sight some confusion could arise as it appears, from the arrangement of notes in the score, that the single note specified by the composer is to be repeated and not a sequence of notes. The requirements for the example above may be explained as follows: ( bar 118)

- Violin 1 - from the four notes in brackets, the single note shown (in the fingered position of the note b, 8va .......) is repeated in the initial position and then .... sequentially .... on all four strings in the rhythm of the headless notes for the duration of the bar

Therefore, the implication is that the notes in brackets lie in preparation to be played and repeated as instructed .... sequentially repeated on all four strings. A further remark by the composer seems to clarify the interruption of the sequences: Da inzwischen durch spätere Einfügungen die so vorzubereitenden Streichsequenzen unterbrochen worden sind, haben diese Griff-Vorbereitungen teilweise ihren Sinn verloren - Due to later insertions, these sequences are interrupted and the preparation of the positions has partially lost its purpose. The bracketed notes do not remain at a constant pitch and are changed intermittently. A further point for observation is that the sounded notes are not pitched as indicated on the stave, as the whole score is in scordatura. ( Chapter 7, Pitch Extensions.)
Comment

In the second half of the 20th century, repetition is indicated by adaptations and extensions to the traditional signs, as well as being incorporated into and used in conjunction with many new symbols commonly found in contemporary scores. Repetitions fall basically into three broad categories:

- ordered elements
- elements of choice
- numbered repeats

These can be notated in many different ways.

Repetitions are not related to structure in the traditional sense of a compositional process and no meaningful generalisations can be made as to where and why they occur. Contemporary composers deliberately explore new organisational 'procedures' and, as such, repetitions are not incorporated into structures that are representative of a category of accepted forms and have, therefore, long lost their customary function.

The list below summarises a variety of individual ways by which composers indicate repeats.

Repetition: Frames

The most radical indication for repetition is the use of the 'frame' or heavy box, drawn around a selection of elements from which the player has either a choice of repeating all the material contained therein or only certain elements, depending on the instructions given by the composer. The following composers have used a variety of repeated elements within a frame:

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol - Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kopolent</td>
<td>Qtto 3</td>
<td>1963</td>
<td>time unit: highest note in <em>tremolo</em></td>
</tr>
<tr>
<td>Lutoslawski</td>
<td>St. Qt.</td>
<td>1964</td>
<td>repeated segments within double bars</td>
</tr>
<tr>
<td>Gisterlinck</td>
<td>St. Qt.</td>
<td>1966</td>
<td>grouping of single stemless notes</td>
</tr>
<tr>
<td>Druckman</td>
<td>No. 2</td>
<td>1966</td>
<td>given elements in any order</td>
</tr>
<tr>
<td>Karkoschka</td>
<td>Quattrologe</td>
<td>1966</td>
<td>improvisation of techniques within a given number of bars</td>
</tr>
<tr>
<td>Cervetti</td>
<td>Zinctum</td>
<td>1967</td>
<td>structured repeat of given techniques</td>
</tr>
</tbody>
</table>
Repetition: Modified use of Double Bars $\|:\|$.

The following repeated elements are found within modifications to the traditional double bar sign:

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol - Modified Double Bar $|:|$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lutoslawski</td>
<td>St. Qt.</td>
<td>1964</td>
<td>repeats, as an introduction to the performance <em>ad lib.</em> single notes in proportional notation</td>
</tr>
<tr>
<td>Crosse</td>
<td>Studies</td>
<td>1976</td>
<td>given elements</td>
</tr>
<tr>
<td>Hertel</td>
<td><em>Imitationen</em></td>
<td>1975</td>
<td>controlled by figures above stave</td>
</tr>
</tbody>
</table>

Repetition: Use of Multiple Signs $\|:\|$ \%---\>\>

Many composers combine two signs or annotate a sign and words to indicate a repetition. However, Brandmüller uses four symbols (double bar, repeat sign, extended beam and an arrow) in both traditional and contemporary notation to indicate a lengthy repeat of a given bar or bars that continue from one line to the next.

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New and Modified Symbol $|:|$ %---&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brandmüller</td>
<td><em>Erstes Stqtt.</em></td>
<td>1983</td>
<td>%%---&gt;</td>
</tr>
</tbody>
</table>

Repetition: Arrows

Horizontal Arrows and Words

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol and Words $\rightarrow simile$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
<td>$\rightarrow simile$</td>
</tr>
</tbody>
</table>

Repetition: Arrows

Graphic Arrows

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
<td>$\rightarrow simile$</td>
</tr>
</tbody>
</table>

Repetition: Words

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Word</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rihm</td>
<td><em>Drittes Stqtt.</em></td>
<td>1976</td>
<td>etc.</td>
</tr>
</tbody>
</table>

Repetition : Dots/Dashes

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
<td>dots analogous to density</td>
</tr>
<tr>
<td>Penderecki</td>
<td>Qtto per Archi</td>
<td>1968</td>
<td>dots and dashes</td>
</tr>
<tr>
<td>Penderecki</td>
<td>Qtto per Archi</td>
<td>1968</td>
<td>for single notes</td>
</tr>
<tr>
<td>Kelemen</td>
<td>Motion für Stqt.</td>
<td>1969</td>
<td>for single notes</td>
</tr>
</tbody>
</table>

Repetition : Wavy Line

In the early quartets of the century, Hindemith was the first composer to use the 'wavy' line to represent a repeat. This symbol has been adopted by the contemporary composers shown below:

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindemith</td>
<td>No. 2</td>
<td>1922</td>
<td>wavy line</td>
</tr>
<tr>
<td>Crumb</td>
<td>Black Angels</td>
<td>1970</td>
<td>wavy line in time unit</td>
</tr>
<tr>
<td>Holliger</td>
<td>Stqt.</td>
<td>1973</td>
<td>wavy line</td>
</tr>
<tr>
<td>Britten</td>
<td>No. 3</td>
<td>1975</td>
<td>wavy line</td>
</tr>
<tr>
<td>Crosse</td>
<td>Studies</td>
<td>1976</td>
<td>double bar and wavy line</td>
</tr>
</tbody>
</table>

Repetition : Headless Notes

Repeated notes are often written headless and are used by the following composers:

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
<td>headless col battuto</td>
</tr>
<tr>
<td>Schmidt</td>
<td>Zweites Stqt.</td>
<td>1979</td>
<td>controlled headless rhythmic patterns</td>
</tr>
<tr>
<td>Gielen</td>
<td>St. Qt.</td>
<td>1985</td>
<td>repeated headless notes</td>
</tr>
<tr>
<td>Huber</td>
<td>Doubles</td>
<td>1987</td>
<td>headless notes, proportional notation in accel. and rall.</td>
</tr>
</tbody>
</table>

Repetition : Headless Notes Joined Through All Staves by Single Vertical Lines

Repeated notes are often written without heads which, when played simultaneously in all instruments, are sometimes joined together by a single vertical line:

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huber</td>
<td>Doubles</td>
<td>1987</td>
<td>all parts joined with a single vertical line</td>
</tr>
</tbody>
</table>
Repetition : Beamed

Beams are often placed after a repeated note or figuration and are used by the following composers:

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pousseur</td>
<td>Ode</td>
<td>1960-1</td>
<td>extended line following stave</td>
</tr>
<tr>
<td>Penderecki</td>
<td>Qtto per Archi</td>
<td>1968</td>
<td>repeat of bowing shown by a line attached to symbol with \n\n\n\nsim placed above stave</td>
</tr>
<tr>
<td>Coeck</td>
<td>Graphismes</td>
<td>1983</td>
<td>extended line</td>
</tr>
<tr>
<td>Heyn</td>
<td>Sirènes</td>
<td>1983</td>
<td>irregular beamed lengths proportional notation</td>
</tr>
<tr>
<td>Reynolds</td>
<td>Coconino</td>
<td>1989</td>
<td>extended line</td>
</tr>
</tbody>
</table>

Repetition : Extended Lines and Arrows to Following Line

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penderecki</td>
<td>Qtto per Archi</td>
<td>1968</td>
<td>&gt;&gt;&gt;&gt; sim.</td>
</tr>
</tbody>
</table>

Repetition : Traditional Notation - Inexact

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ligeti</td>
<td>No. 2</td>
<td>1968</td>
<td>traditional notation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>semi - quaver and demi-semi-quaver</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>groupings</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>flexibility of interpretation</td>
</tr>
</tbody>
</table>

Repetition : by Numbers (for example x 2)

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hertel</td>
<td>Imitationen</td>
<td>1975</td>
<td>controlled by numbers above stave</td>
</tr>
<tr>
<td>Volans</td>
<td>II.St. Qt.</td>
<td>1987</td>
<td>single detached notes controlled by numbers above stave</td>
</tr>
</tbody>
</table>
Repetition: Ritardando: Controlled Metronome Markings

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huber</td>
<td>Doubles</td>
<td>1987</td>
<td>in a single bar repeated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>notes with consecutive</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>metronome markings effect a rit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>( \frac{j}{80} = \frac{j}{69} = \frac{j}{60} = \frac{j}{50} = \frac{j}{40} )</td>
</tr>
</tbody>
</table>

Repetition: Obscure Instructions

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>New Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brewaeys</td>
<td>St. Qt.</td>
<td>1989</td>
<td>( \uparrow \downarrow ) scratch on backside</td>
</tr>
</tbody>
</table>

Comment

The above list of contemporary repeat symbols and signs demonstrates that, while the choice is not wide, the array is nevertheless mostly of individualistic design to suit the specific needs of the composer. Repeat signs are placed within time units; in proportional notation; in contemporary and traditional notation; and with both exactness and inexactness of interpretation. The signs refer to single notes; larger sections; rhythmic figurations; tempo; dynamics and include a variety of string techniques. Certain repetitions offer a freedom that leads to spontaneous improvisation at the time of a performance, creating a work that embodies never-to-be-repeated elements - a concept that is totally new to the second half of this century. Often the repeated sections are played independently of each other and the results of such performances are in the words of Earle Brown: "... a "process" which intentionally transforms the disparate independent entities into one particular integral identity...." \(^{421}\)

\(^{421}\) Delone, \textit{et al.}, \textit{Aspects of 20thCentury Music}, p. 63.
The five-line staff with sharps and flats is utterly fallacious, inappropriate, inadequate, and unsatisfactory in recording duodecuple music of either strictly serial or atonally free compositional procedures.
Chapter Eleven

STAVE

From 9th century - A Brief History

The series of horizontal lines containing musical notes representing pitch is preserved in the earliest part-music documents of the 9th century, where parallel organum is shown in two manuscripts: 'Musica Enchiriades (GS1, 152) and the Scholia Enchiriadis (GS1, 173)' with the staff lines varying from four to eighteen as shown in the facsimiles below:

Example 540. a) Parallel Organum (9th Century)
   b) Facsimile from Musica Enchiriadis

In Example 540 a) the words are written on nine lines while those in Example 540 b) show seventeen. The symbols in the left column correspond to what is termed the 'Dasia Notation' - a mediaeval imitation of a notation used in ancient Greece. It was originally attributed to Hucbaldis (c 849 - 930) a monk of St. Amand, near Tournai, Belgium who, early in the 10th century invented a
stave consisting of an indefinite number of lines between which were written the words intended to be sung. Only the spaces were used and the principle of this notation was applied without neumatic symbols. However, the Dasian system is now possibly credited to ‘Hoger of Werden (d. 915) or Otger of St. Pons (d. 940).”

In this notation the pitch is clarified through the use of four basic signs for the tones of the tetrachord: (d-e-f-g). Other pitches were derived from these basic signs, notated either horizontally or by having their direction changed from left to right. In the example below each tetrachord is shown as an exact transposition at the interval of a 5th, which results in a scale that contains augmented intervals.

Example 541. Dasian Notation

The Dasian system ultimately fell into disuse. Until the appearance of rudimentary staff lines, around 900, Neumes were written above the sung text to which they corresponded, and in positions which vaguely indicated the comparative gravity or acuteness of the sounds. However the clarity of these signs was not sufficient for singers to read the chant accurately and, at that time, all singers had to be taught the ascending and descending nature of the text - which in effect meant learning by ‘ear’.

In about the year 900 a single horizontal red line appeared across the parchment to serve as a guide for the written Neumes. These positions of either on, below or above the line represented respectively the note F, the note E and the note G. It follows that the symbols representing Neumes written at greater distances from the line had less certain pitches but were nevertheless more intelligible than under previous systems. Subsequently a yellow line, representing the note ‘C,’ was added a little distance above the red and the positions of all seven signs were fixed with tolerable clearness as the example below demonstrates:

---

Rowen, Music Through Sources & Documents, p.74
As a result of the added yellow line, carefully written manuscripts of the period left little doubt as to the relative pitch of the sung text. Early in the 11\textsuperscript{th} century two more black lines were added to the stave, one above the yellow line and another between the yellow and the red. Gradually during the 15\textsuperscript{th} and 16\textsuperscript{th} centuries these variable forms of multi-lined staves were relinquished. The use of four lines was adopted primarily for Plainchant and is retained for this purpose today; six lines were used for organ music, while the five lined stave was used for Vocal Music (except-Plain Chant). After the invention of printing - attributed around 1450 in the West to a German nobleman, Johann Guttenberg b.c 1398-1468, - the five line stave was employed for music of every kind.

\textbf{Clefs: Guido d'Arezzo (c995 - 1050)}

It was Guido d'Arezzo who brought the various experiments with notation and pitch into focus by recommending that a staff be used with spaces as well as lines, and that at least one line be identified by a pitch letter which, in practice, was related to a clef. By this means the notes received a definite pitch meaning. The letters initially selected for this purpose referred to the notes that marked the place of the semitones in the fundamental scale \textit{i.e.} 'f' clef (e-f) : 'c' clef (b-c) : and in order to emphasise the semi-tone position, the lines representing the clefs were coloured: red for 'f' and yellow for 'c'. Later, in the 13\textsuperscript{th} century, the 'G' clef appeared, and Riemann mentions that, in fact, it was only from the 15\textsuperscript{th} century that the 'G' clef became more frequently used, and related to the older meaning of the clef sign: \textit{i.e.} representing a transposition of the Church modes into the upper fifth.\textsuperscript{625} These early transpositions, and the introduction of \textit{musica ficta}, emphasised the gaining in significance of the

\textsuperscript{625} Riemann, \textit{Dictionary of Music}, p. 149.
rising half step, used initially at cadence points, which led eventually to the important establishment of the leading note/tonic relationship and weakening of the dominance of the mode.

In the 16th century, the practice known as *chiavette* referred to a system, used primarily in vocal music, of transposing all clefs from their normal position either up or down a 3\textsuperscript{rd}. In practice, for example, the 'f' clef would appear on line four of the stave but if used for the baritone clef would shift down a 3\textsuperscript{rd}, to line three, and then variably up to line five for a clef then in use, called the sub-bass clef.

Apel explains that the significance of *chiavette* among musicologists has raised considerable controversy over time and there was an interpretation, around 1850, that suggested these signs acted as transposing instruments notated in one key and heard in another. Apel points out the erroneous supposition of these conclusions.\textsuperscript{426}

In the 20th century only four clefs survive: Treble, Alto, Tenor and Bass. Generally, no vocal parts are notated in either the alto or tenor clefs and only certain instruments make use of these clefs, with the viola being the only instrument to have music consistently scored in the alto clef. Instruments that have a range combining treble and bass employ the tenor clef at the appropriate place. For example, music for the bassoon, cello, tenor trombone and, occasionally, the double bass is scored in the tenor clef, but never exclusively so. The other identifying pitch factor, the stave, has remained constant as a 5-line symbol for over 500 years, from the middle of the 15th century until the second half of this century.

**The Stave - A 20th Century Approach**

The five-line staff with sharps and flats is utterly fallacious, inappropriate, inadequate, and unsatisfactory in recording duodecuple music of either strictly serial or atonally free compositional procedures.\textsuperscript{427}

The need to modify the standard five-line stave has occurred throughout the centuries and the many additions and alterations to it are not new to the 20th century. The stave has been consistently of paramount importance in Western music as it directly affects all aspects of musical syntax including, amongst others, clef signs, time signatures, positions of note heads, ledger lines, accidentals, and

\textsuperscript{426} Apel, *Dictionary of Music*, p. 149.
\textsuperscript{427} Bailey, *Duodecuple Notation*, p. 12.
rhythm, all of which all relate to the stave in one function or another. However, in the early decades
of the 20th century many of the established musical practices were constantly revised, and early in the
1920s the most significant factor, relating indirectly to the stave, was the initial dissolution of tonality
and the introduction of the 12-tone technique which resulted in the cancellation of key signatures and
‘double’ accidentals. Later, in the second half of the century, a mixture of experimental and divergent
materials developed which resulted in a completely fresh look at the stave and its function due to the
compositional complexities which extended musical sound outside the limits of the five-line system.
The list below demonstrates that in many string quartets well into the 1950s - with the exception of
Carter’s Fantasia (1951) which briefly reveals extra staves to accommodate widely spread intervallic
chords - stave deviations of any sort are absent.

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Additional Staves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schoenberg</td>
<td>No. 1 Op. 7</td>
<td>1904-5</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 2 Op. 10</td>
<td>1907-8</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 3 Op. 30</td>
<td>1927</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 4 Op. 27</td>
<td>1936</td>
<td>None</td>
</tr>
<tr>
<td>Webern</td>
<td>Op. 5</td>
<td>1909</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Op. 9</td>
<td>1924</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Op. 28</td>
<td>1939</td>
<td>None</td>
</tr>
<tr>
<td>Bartók</td>
<td>No. 1</td>
<td>1908</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 2</td>
<td>1915-17</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 3</td>
<td>1927</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 4</td>
<td>1928</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 5</td>
<td>1934</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 6</td>
<td>1939</td>
<td>None</td>
</tr>
<tr>
<td>Hindemith</td>
<td>No. 1 Op. 10</td>
<td>1921</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 2. Op. 16</td>
<td>1922</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 3 Op. 22</td>
<td>1923</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 5 in E Flat</td>
<td>1943</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No. 6</td>
<td>1945</td>
<td>None</td>
</tr>
<tr>
<td>Ives</td>
<td>No. 2</td>
<td>1907-13</td>
<td>None</td>
</tr>
</tbody>
</table>
Example 543. Brief Use of Additional Staves
Two separate staves and clefs for a single four-part chord

Additional Staves

Two separate staves and clefs for a single four-part chord

Ex. p. 66, Mov. II, bar 150, Viola and Cello

Note: An extra stave and clef is added to accommodate the wide intervallic range of both the Viola and Cello chords which, in bar 150, are as follows:

- Viola - alto and treble clefs interval of 2 octaves + 6th
- Cello - bass and treble clefs interval of 3 octaves + 4th

The adjusted staves simplify the note-reading.

The notation used in relating two different clefs to one staff appeared in the early 17th century organ works of the Italian composer Girolamo Frescobaldi (1583-1643), but in the 20th century multiple clef signs have a different meaning as in Carter's quartet use of additional clefs, explained above, which facilitate easier reading of the extended chords in the two lower parts.
Modification of Staves - post 1950s

In the string quartets post the 1950s, composers have modified the stave into three main categories:

- fragmented - for clarification of a part or a technique
  - individualistic use
- adjusted - modified arrangement of the number of lines either for additional technical and dynamic instructions, or as a totally new system
- no stave - individual compositional procedure

As this discussion relates basically to the modification of the stave in the second half of the 20th century, the format of examples is arranged as follows:

Composer - Quartet - Date - Stave - Clef

Only scores that make use of modified staves (or associated factors) will be illustrated or mentioned. Relevant examples and explanations will clarify the particular unorthodox use of the stave and associated symbols. In certain cases the new organisation of staves is limited to a few bars, while at other times it is introduced as a totally new contemporary system which remains effective throughout the score.

Analogous aspects such as pitch and key signatures, as well as other important indications will be included, when relevant, at the end of each example under the following headings

- Unique noteheads - relating to pitch/rhythm/other factors
- Key signatures - where relevant to reform
- Other - unusual indications for performance relating to clef

Standard Five-line Stave

In contemporary scores the standard five-line stave is often found in conjunction with contemporary developments in the use of noteheads, key signatures and other unusual indications. The most radical of these is Kopolent's notation, contained within the five-line stave and standard clefs. He nevertheless dispenses with the conventional function of barlines, and demonstrates the new function of noteheads as follows: (No score given)

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kopolent</td>
<td>Qtto 3</td>
<td>1963</td>
<td>Standard</td>
<td>Traditional</td>
</tr>
</tbody>
</table>
Unique noteheads
Percussive finger technique
Square white notes represent: \( \square = \text{mit einem Finger der linken Hand wird die Saite an der für die einzelnen Töne - c, a, e - bestimmten Griffstelle angeschlagen} \) - the finger of the left hand strikes the strings at the touch points for the tones c-a-e. This technique, in effect, translates into being a type of percussive harmonic.

Key signatures - where relevant to reform
Absent

Other - unusual indications for performance relating to clef
None

**Fragmented Stave**

In contemporary quartets, the fragmented stave is used either intermittently or throughout an entire score. Apart from being an aspect of the composers’ compositional style, the fragmented stave arrangements also clarify the reading of rhythmic and technical innovations.

The following composers use fragmented staves which are individualistic in structure.

**Example 544. Fragmented Stave : Clefs**
Linked to Repeats

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pousseur</td>
<td>Ode : ....</td>
<td>1960-1</td>
<td>Fragmented</td>
<td>Traditional/Modified</td>
</tr>
</tbody>
</table>

Note: The purpose of Pousseur's use of the fragmented stave is to indicate all repeats in conjunction with a single extended horizontal line which follows on from the five-line stave

\[ \text{Ex. p. 7, All Instruments} \]
Another of his individualistic notations is to routinely replace the clef only when the repeat is complete - whether it be at the beginning or, unconventionally, in the middle of a line. Repeats that continue from one page to another are treated in the same way but a square bracket starts the new page in place of a clef.

**Unique noteheads relating pitch or rhythm**

Changes in pitch

- • = normal note without accidental
- • = note with sharp sign, that is pitch raised half a tone
- • = note with flat sign (half a tone lower)
- ○ = harmonic

The pitch indications should not be considered as absolutely tempered, but rather as approximate mean values.

**Key signatures - where relevant to reform**

Absent

**Other - unusual indications for performance relating to clef**

No clefs appear at the beginning of lines when continued repeated figurations continue from one line to another. Clefs reappear at any point in the stave where changes in notation occur, and after repeats.

Pousseur's notation is unique and could equally be placed later in the section **New Notation** as the noteheads have a radically new function from the traditional. However, the examples above are placed in the section **Fragmented Staves** as they illustrate that after the 1950s the stave took on a radically new look - Pousseur's 1960 quartet is an early example that aptly demonstrates this point.

**Example 545. Fragmented Stave**

Linked to Repeats - within Frame

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lutoslawski</td>
<td>St. Qt.</td>
<td>1964</td>
<td>Standard &amp; Fragmented</td>
<td>Ex. p. 29, Mov. II, Viola &amp; Cello</td>
</tr>
</tbody>
</table>

![Fragmented Stave Example]
Note: Lutoslawski makes extensive use of stave fragmentation almost exclusively for asynchronous repeats between all the parts, but unlike the system used by Pousseur, the stave is generally (but not always) fragmented within a frame, from which the repeats emanate. In the above example, only two instruments (Viola & Cello) illustrate the curtailment of the stave which occurs in all the parts.

Unique noteheads relating to pitch or rhythm
Absent

Key signatures - where relevant to reform
Absent

Other - unusual indications for performance relating to clef
None

Example 546. Fragmented Stave
Linked to Rests
Composer          String Quartet   Date   Staves           Clefs
Bartolozzi       Quoto per Archi  1960   Standard &      Traditional
                  Fragmented

Ex. p. 21, at 92, All Instruments

Note: In a total of 117 bars of conventional notation, fragmentation of the stave is found very briefly in one section only - in the extended bar 92 where, when the rests appear, a break in the stave occurs. The stave is present for pitched notes and dispensed with for rests. As a result of dispensing with the time signature and resultant sub-division of the bar, the rhythmic arrangement of notes and rests is non-metric.

Unique noteheads relating to pitch or rhythm
Absent
Key signatures - where relevant to reform
Absent

Other - unusual indications for performance relating to clef
None

Composer using Fragmented Stave

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crumb</td>
<td>Black Angels</td>
<td>1970</td>
<td>Fragmented</td>
<td>Traditional</td>
</tr>
</tbody>
</table>

Combination of Fragmented and Discontinued Staves: Theatrical Additions

The combining of fragmented and discontinued staves appears in contemporary quartets for a variety of reasons dependent on the composer's style; but in only the Globokar score do words - without musical accompaniment - replace the stave.

Example 547. Combination: Fragmented and Discontinued Staves
Theatrical Additions

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Globokar</td>
<td>Discours VI</td>
<td>1982</td>
<td>Fragmented</td>
<td>Modified</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Discontinued</td>
</tr>
</tbody>
</table>

Ex. p. 7, line 1, All Instruments

Note: In Globokar's quartet the stave is structured around theatrical additions to the music, an example of which is shown above. The stave is only present when pitched notes are scored (Violin 1 and Viola). It is abandoned when words are spoken either alone (Violin 2) or when words are accompanied by music where, in the (Cello), the dotted lines represent a repetition of a grouping of notes given on the previous page of the score. (not shown).

Unique noteheads relating to pitch or rhythm
Absent

Key signatures - where relevant to reform
Combined flats and sharps are inserted into the stave sporadically and without consistency and are placed in unorthodox positions. (See score p.1, line 4)
Other - unusual indications for performance relating to clef

The arrangement of clef insertions is irregular but, generally, they are fixed at the beginning of sections, for different instruments at dissimilar times; otherwise they are absent.

Assortment of Staves

In certain contemporary scores a variety of staves evolve within a single score as a result of many factors which may include a composite of new string techniques, rhythms and individualistic notation symbols. The staves are structured either in long barless lines, in short fragmented sections, abandoned altogether, or in tablature form. They are found in contemporary time units - both regular or irregular - within metronome markings and with tempo related words.

The five examples below illustrate a selection of disparate stave arrangements, each contained within individual quartets. Examples 548 to 552.

Example 548. Fragmented Stave : Linked to String Techniques
Asynchronous Rhythmic Entries

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
<td>Fragmented</td>
<td>Traditional</td>
</tr>
</tbody>
</table>

Ex. p. 18, at 93. All Instruments

Note: The asynchronous pizzicato chords are played in all parts within a time unit of 10". The entries are marked quasi ad lib. and, as a result, Becker finds no justification for using a continuous stave, as the separate entries relate to one another within the specified time unit without further reference points. Becker's preference, here, for the use of a fragmented stave assists in clarifying the separate rhythmic entries within the 10" time span.
Example 549. Brief use of Stave : Linked to String Techniques
Use of Plectrum - Graphic Notation

Composer  String Quartet  Date  Staves  Clefs
Becker    No. 2        1967  Brief /  Traditional

Note: At the end of the previous bar (bar 23 not shown), the instruction: *alle spieler nehmen Plettron,* - all players take plectrum, applies to the bars that follow - illustrated above. At the start of the line the given material is placed in a brief stave, after which the stave is abandoned and replaced by a single line to which are attached graphically notated groupings of irregular vertical strokes representing the rhythmic strokes of the plectrum. The specified time unit is 20" seconds.

Example 550. No Stave : Linked to String Techniques
*Glissandi* - Graphic Notation

Composer  String Quartet  Date  Staves  Clefs
Becker    No. 2        1967  No staves  Traditional

Note: The graphically designed arrows represent the direction of separate, approximately pitched *glissandi* which make the presence of a stave irrelevant.
Note: The fragmented staves contain brief portions of asynchronous pitched notes while the synchronous rests have no staves. Becker's discontinuation and reinstatement of the stave seems to aid clarity of execution within the time unit of 5".

Throughout the quartet Becker arranges the five-line stave in either a selection of different lengths or he discards it altogether. The purpose for any particular choice depends, generally, on whether technical and structural clarity is intended. As demonstrated above, the stave is abandoned when graphic notation is used for a specific technique of indeterminate pitch and is reinstated, in a fragmentary or barless way, for segments containing pitched notes. The quartet is structured throughout in a series of irregular time units.

Unique noteheads relating to pitch or rhythm
Absent

Key signatures - where relevant to reform
Absent

Other - unusual indications for performance relating to clef
None
Example 552. Assortment of Staves
Linked to Selection of String Techniques

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powell</td>
<td>Filigree Setting</td>
<td>1965</td>
<td>Standard</td>
<td>Traditional/Absent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fragmented</td>
<td>Ex. p. 2 'line' 2,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Single line</td>
<td>All Instruments</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No staves</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tablature</td>
<td></td>
</tr>
</tbody>
</table>

![Notation Example]

Note: In the above example, the mixture of stave and clef notation is as follows:

- Violin 1 - absence of both stave and clef at the point where the specific bowing technique requires no identifiable pitch or rhythm, and appears as an isolated occurrence in relation to the other parts. The instruction reads: .... the same bow stroke [the wood of the bow to be bounced freely along the lengths of a specified pair of damped strings, thus engaging pitches in the course of its trajectory] with the bow crossing over at about the middle of the fingerboard from one pair of strings to another, as specified in each case - (here, strings D and G). Consequently, the presence of either stave or clef is superfluous.

- Violin 2 - silent

- Viola - a type of tablature staff notation consisting of three lines used to identify the percussive contact points made on the instrument. These are:

<table>
<thead>
<tr>
<th>Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rib</td>
</tr>
<tr>
<td>Back</td>
</tr>
</tbody>
</table>

Each line represents a different part of the viola.
The main movement of the quartet is in standard notation, but Powell uses some form of tablature notation whenever sounds and techniques outside the traditional are wanted, and this arrangement appears as a substitute stave for the instrument requiring alternate notation.

- Cello - standard stave and clef

Modified staves are found only at the beginning and end of the quartet. With the exception of selected bars notated in tabulature, the score is composed in straightforward traditional notation.

**Unique noteheads**

Specific bow technique

- Cross-filled notes are found briefly at the beginning and end of the score and denote a special technique: calls for the very tip of the bow to be bounced along the length of a (specified) single string. Sets of numbers placed beneath these symbols represent relative durational values, with a unit value chosen in each case by the individual player.

**Key signatures - where relevant to reform**

Absent

**Other - unusual indications for performance relating to clef**

Clef dispensed with in tablature notation

---

**Composer Using Modified Tablature Notation**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crumb</td>
<td>Black Angels</td>
<td>1970</td>
<td>Two-line</td>
<td>Absent</td>
</tr>
</tbody>
</table>

---

**Example 553. Single Line Stave**

Linked to Selection of String Techniques

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervetti</td>
<td>Zinctum</td>
<td>1967</td>
<td>Single line</td>
<td>Traditional</td>
</tr>
</tbody>
</table>

New symbols: Ex. p. 3, line 2, bars 41-44.
Note: Cervetti dispenses with the 5 line stave and replaces it with a single line to notate specially devised symbols of indefinite pitch. In the above example single lines occur in all the parts and relate to the following techniques:

- Violin 1 - ▲  ▲  
  - höchstmögliecher Ton
  - highest possible sound

- Violin 2 - ▲  
  - höchstmögliecher Ton
  - highest possible sound

- Viola - ▲  
  - mit offener Hand auf die Saiten schlagen
  - strike strings with open hand

- Cello - ▲
  - nicht rhythmisiertes Tremolo
  - non-rhythmic Tremolo
  - zwischen Steg und Seitenhalter mit liegenden dem Bogen
  - touching the string simultaneously (percussive effect)

Cervetti uses a single line stave consistently throughout the quartet for any sound of indefinite pitch, as for example:

- Zwischen Wirbeln und Griffbrett - between pegs and fingerboard

Unique noteheads
Relating to string technique
Key signatures - where relevant to reform
Absent
Other - unusual indications for performance relating to clef
None

Example 554. Converging Staves
Converging into Single Five-Line Stave and Vice Versa

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crumb</td>
<td>Black Angels</td>
<td>1970</td>
<td>Unique</td>
<td>Traditional</td>
</tr>
</tbody>
</table>

Converting: Ex. p. 12, lines 1 & 3, All Instruments
Note: Crumb has a unique way of compressing all four staves into one five-line stave when all players are in unison. In the first example, the lines of the upper three staves move into a single cello stave for all parts to play in unison - notated in the treble clef. Similarly, in the second example, the single stave fans out into four separate parts. Crumb makes extensive use of this idiosyncratic method of stave modification.

Unique noteheads relating to pitch or rhythm
Absents

Key signatures - where relevant to reform
Absents

Other - unusual indications for performance relating to clef
None

New Notation System

Radical Approach to Stave and Clef

von Biel in (1) Quartett für Streicher (1965) and Lachenmann, in the quartet Gran Torso, Musik für Streichquartett (1971-76/78), both depart radically from traditional notation in every respect. The notation and performing techniques present a unique set of symbols in every category of musical notation. Many of the symbols relating to specific methods of technical execution have been discussed earlier, therefore in this section the emphasis will be placed predominantly on the modification of staves, clefs and any other relevant matters.
Example 555. New Notation
Radical Approach to Stave and Clef

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>von Biel</td>
<td>Stqt</td>
<td>1965</td>
<td>Erratic</td>
<td>Only for pitched notes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Generally</td>
<td>abandoned</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: von Biel has devised a radically new notation system to convey his particular compositional approach to the string quartet. His structure, incorporating a series of new techniques and a wide palette of unfamiliar sounds, relies on a complex interaction between *timbre*, *resonance*, *vibration* and *noise* factors. Every aspect of this quartet is unique!

Explanations for von Biel’s specific, radically devised symbols encompassing various aspects of technique in his quartet, as well as explanations relating to his approach to rhythm and duration, have been given previously in the relevant chapters. With regard to staves and clefs von Biel uses them only erratically to indicate a note of specific pitch, otherwise they are stringently avoided.

**Score Structure**

When the stave is absent it is replaced by a composite of four rows of different symbols, each indicating a separate aspect of playing instructions. With reference to the example above, Violin 1, these are as follows:

- **1st row** - indicates the strings in Roman numerals: e.g. III + IV (D & G)
- **2nd row & 3rd row** - refer to the positions and styles of bowing indicated by fragmented staves, indeterminate pitches and new symbols:
  - e.g. composite symbols of one sort or another which represent -
  - *Ort des Bogens - Position of the Bow*
  - *Hinter dem Steg streichen - Bow behind bridge*
Auf dem Steg streichen - Bow on the bridge

e.g. pitched notes within a fragmented stave and black and white notes incorporated in, or attached, to a heavy U-shaped symbol which represent:

Streichen - Styles of Bowing

- Noisy tone

Geräuschhafte Tonhöhe

- A noise without a recognisable pitch.

Geräusch ohne erkennbare Tonhöhe

Diese erfolgt immer durch übermäßigen

Druck des Bogens. (Bogen viel am Frosch verwenden).

4th row dynamic indicators
e.g. \( \textit{f ff ff} \)

Another important playing instruction - not directly associated with staves - relates the instruments annotated in a frame at the beginning of each 'bar' called Zeitblöcke - Time Blocks and refers to a specific instruction which indicates that the given instrument klingt bis Anfang des nächsten Blocks; .... Das jewells an dem Block links angegebene Instrument beginnt diesen Block sobald es den vorigen durchspielt hat - sounds until the beginning of the next block.... The instrument which is indicated on the left of the block starts playing this block as soon as it finishes playing through the previous block. This requirement is indicated by both the name of the instrument placed at the start of the bar and a slurred note that continues across the vertical line of the time block into the following bar. A further instruction requires all remaining instruments (even if they have not played through a previous time block ) to follow on immediately from the given instrument.

The quartet is scored throughout in the format described above.

Unique noteheads Representing : Specific Durations

\( \textit{\textbullet} = \textit{Minimal-Dauer} \quad \textit{Minimum duration} \)

\( \textit{\textbullet} = 1,0 \pm 0,25 \textit{Dauer} \quad \textit{Duration [in seconds]}^* \)

\( \textit{\textbullet} = 1,0 \pm 0,25 \textit{Dauer} \quad \textit{Duration [in seconds]} \)

\( a = 4,5 \pm 1,0 \textit{Dauer} \quad \textit{Duration [in seconds]} \)

* between the given numbers

Diese Zeichen bedeuten Tonhöhe und Dauer .. These signs signify pitch and duration ..

\( \textit{\textbullet} \textit{\textbullet} = \textit{Einstazabstand kurz} 1,0 \pm 0,25 \textit{Dauer} \quad \text{Played at a short distance} 1,0 \pm 0,25 \)

\( \textit{\textbullet} \textit{\textbullet} = \textit{Dauer der Einzeltöne} 1,0 \pm 0,25 \textit{Dauer} \quad \text{Duration of single notes} \)
Unique noteheads Representing : Finger Positioning

> \( \text{\textcopyright } = \text{\textcopyright } \text{Saite wird leicht gegriffen} . . . ) \) Light positioning of fingers on the strings ....

> \( \text{\textcopyright } \text{Tonhöhe höher als am breiten Ende des Griffbrettes gegriffen} \) A note higher than one played at the wide end of the fingerboard

\( \text{\textcopyright } \text{Glissandi innerhalb einer großen Sekund, sehr dicht und schnell} \) Glissandi played within a reasonable second - very dense and fast

While the score contains a host of unique symbols relating to various styles of bowing and technique, only those applicable to the noteheads are listed immediately above.

Key signatures - where relevant to reform

Absent

Other - unusual indications for performance relating to clef

The quartet starts with a traditional stave for Violin 1 & 2 and Viola, and exists asymmetrically for an average of 4” (seconds) otherwise, as stated earlier, clefs appear briefly only when pitched notes are scored in staves.

Example 556. Radical Approach to Stave and Clef

Fragmented or Absent

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td>Gran Torso</td>
<td>1970-6-8</td>
<td>Fragmented</td>
<td>Unique selection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No stave</td>
<td>Ex. p. 2, bars 8-10,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Graphic</td>
<td>All Instruments</td>
</tr>
</tbody>
</table>

Note: In the above example, the pitched notes (\( B \) & \( F\# \): Cello - bar 8) require a five-line stave and clef as do the beamed notes of the Viola part (bars 9 - 10). Throughout, the stave is either fragmented or nonexistent and staves and clefs are automatically absent for the indeterminate sounds.
Unique noteheads
Relating to string technique
Key signatures - where relevant to reform
Absent
Other - unusual indications for performance relating to clef
Scordatura
The pitches associated with standard clefs are adjusted as all the strings are tuned at the outset in scordatura to a series of given pitches - as explained in Chapter 7: under Scordatura.

Clefs
The score makes use of four different clefs:
- traditional
- bridge clef
- string clef
- schematic representation

Traditional Clef
Found in association with a traditional stave representing pitched notes.

Bridge Clef
The bridge clef reproduces the front of the instrument - in the case of the cello between the tailpiece and middle of the fingerboard, or up to the neck of the violin and viola. Its purpose is twofold: to depict the point of contact of the bow on the instrument relative to the distance from the bridge, and to show the direction of the bow between the bridge and the middle of the fingerboard.

The bridge clef is often curtailed, as shown in this illustration, if the contact area is limited to a smaller distance between the tailpiece and fingerboard.

To facilitate orientation in ad hoc shifting - vertical or oblique shifts - the position of the bridge is drawn as a broken horizontal line.

String Clef
The string clef illustrates assorted techniques played on any of the four strings below between the bridge and tailpiece.

The string clef is sometimes reduced so as not to encumber the score.

Schematic Representation
When the position of the bow is to be played under the bridge, a schematic representation of the flat surface of the bridge indicates the point of contact.
Example 557. Clefs
New Clef Symbols

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td><em>Gran Torso</em> ....</td>
<td>1970-6-8</td>
<td>Fragmented</td>
<td>Bridge/String</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No stave</td>
<td>Ex. p. 5, bars 59-60.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>All Instruments</td>
</tr>
</tbody>
</table>

Note: The clefs in bar 59 of the above example are as follows:

- Violin 1 - curtailed bridge clef and traditional treble clef
- Violin 2 - string clef and traditional treble clef
- Viola   - bridge clef with horizontal line for bridge orientation
- Cello   - the string clef

In the viola part the bridge clef, with an horizontal line for bridge orientation, shows the contact position of the obliquely sliding bow, directed by the contoured line, away from the ‘bridge line’ over the fingerboard.

New Notation

Equitone

Karkoschka adopts the Equitone system in two movements of his quartet: *Quattrologe* (1966) *streitgespräch* and *pathetische serenade*.428

---

428 Absence of capital letters as per Karkoschka's movement titles
Example 558. Equitone System
Two-line Stave

Composer  String Quartet  Date  Staves  Clefs
Karkoschka  Quattrologe  1966  Modified - two lines  Section II
represent  streitgespräch
octaves  Ex. p. 12, line 1.
All Instruments

Note: The Equitone system was proposed by Rodney Fawcett and published privately in Zurich in 1958, under the title: Equiton. The essence of this system is the structuring of notes on and between two lines that represent chromatic steps within the interval of an octave. (see explanation Ex. 559)

Example 559. Equitone System
Pitch - The Octave

The important points of the Equitone system are:

Noteheads: Stave: Pitch Representation

- the number of lines in the stave depends on the range of music i.e. one octave is contained between two lines, and further octave lines can be repeated as often as required
- the relative positions of the notes remain the same - they are just transposed up or down into space allotted to the next octave
- only octave notes intersect the stave lines, e.g. C - C
the notes that make-up the chromatic scale are white and black and are used
alternatively for each semitone of the octave
no accidentals signs are used
enharmonic notes, i.e. D♯ E♭, as shown above, remain a constant colour
- there is no interchange between black and white
the short line attached to the notes E : F : G♯ : A or the enharmonic equivalent
E : F : A♭ : A, is an element of the notation and is not a leger line
between each line, no more than six (6) black and six (6) white notes can be notated
noteheads coloured black or white differentiate the pitches

In the Karkoschka example above, the pitch of the five (5) notes in Violin 2 reads:

Violin 2 A: C: a: d : C :

Duration
the notes are placed proportionally between measured barlines
no symbols are used for durational values
sub-divisions of the bar are shown where necessary by vertical dotted lines
the notes are sustained until the appearance of the following note or pause sign
rests are indicated by the traditional symbol - they apply until the entry of the
following sound

Key signatures - where relevant to reform
Absent
Other - unusual indications for performance relating to clef
Clefs absent

Note: Karkoschka states the following requirements as being advantageous in the Equitone system
- Equitone makes octave-identical tones optically identical
- All tones are unambiguous, without accidentals
- The pitch and duration structures are graphically precise and can be read directly

He justifies this system as fulfilling the requirement that new notation must be ‘efficient for the
present and, as far as can be foreseen, the future.’ 429 He qualifies this further by referring to point (8)
of his stipulations for the success of any new notation
8) What the ear hears must be presented to the eye in such a way that two basic characteristics are
taken into consideration:

429 Karkoschka, Notation in New Music, p. 10.
a) the visual event must be apparent as a direct translation of the auditory event, requiring as few additional thought processes as possible

b) the individual symbols and the totality of symbols must be formed on an optical basis; they must be 'correct' in the visual-psychological sense.\(^{430}\)

Gardner Read points out that despite Karkoschka's acceptance of the Equitone system and his stating that it has more interest and potential for the contemporary composer than Klavaskribo, it has nevertheless not enjoyed the success of the latter. Read sees patent drawbacks to this reform and remarks that the symbology in Equitone cannot portray subtle differences between the visual representations of meters having the same numerators and completely different denominators. For example, '3/16, 3/8, 3/4 and 3/2 are notated precisely alike, with no possibility of demonstrating the psychological distinctions inherent in the four meters.'\(^{431}\)

**Graphic Notation**

**Example 560. Graphic Notation**

**Graphic Notation in Traditional Staves**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown</td>
<td>St. Qt.</td>
<td>1970</td>
<td>Standard</td>
<td>Traditional</td>
</tr>
</tbody>
</table>

Ex. last page, penultimate section

**All Instruments**

Note: For the whole penultimate section of the quartet, lasting 60 seconds, Brown uses graphic notation of finely drawn squiggles to indicate the contours of pitch in: Small, transient, inarticulate sounds. These incorporate a selection of different techniques, each defined above the stave.


Unique noteheads
Beamed/graphic

Key signatures - where relevant to reform
Absent

Other - unusual indications for performance relating to clef
None

Composer Using Graphic Notation in Traditional Staves

Composer | String Quartet | Date | Staves | Clefs
---|---|---|---|---
Henze | No. 5 | 1976-77 | Standard | Traditional

Individual Approach to Stave Modification

Example 561. Individual Approach to Stave Modification
Brief use of Additional Stave: For Clarity

Composer | String Quartet | Date | Staves | Clefs
---|---|---|---|---
Sculthorpe | No. 8 | 1970 | Standard | Traditional

\[
\begin{align*}
\text{Ex. p. 18, line 2, Cello} & \\
\end{align*}
\]

Note: Sculthorpe makes extensive use of short extra staves, placed outside the traditional five-line stave to clarify the positioning of additional notes within proportional spacing. In the example above, the cello \textit{pizzicato} (E\textsc{b}), placed on an additional stave, is heard against a beamed sustained note (D) and, as such, provides clarity to the simultaneous use of two separate techniques.
Note: The two extra lines added to the bass stave are there to accommodate the sustained double 'pedal notes' on the two lowest open strings (G and C) against the upper double stops glissando notes. Although the added lines clarify the additional requirement they, nevertheless, contribute to the existing density of notes which is an inherent aspect of Ferneyhough’s compositional ‘style’ in this quartet.

Unique noteheads relating to pitch or rhythm
None

Key signatures - where relevant to reform
Absent

Other - unusual indications for performance relating to clef
None
Example 563. Individual Approach to Stave Modification
Brief use of Additional Lines: Action Outside String Playing

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gielen</td>
<td>Stqt. 'un vieux ..</td>
<td>1983</td>
<td>Standard</td>
<td>Traditional</td>
</tr>
</tbody>
</table>

Added line
Ex. p. 12, bars 198-201

```
mit einem Fuß aufstampfen (f) - stamp with foot
```

Note: The additional horizontal line placed at the bottom of each five-line stave represents the stamping of the foot at the given sign (*) - bar 199. This addition to the stave clearly shows the point at which the stamping takes place within the rhythmic structure of constantly changing time signatures which continue throughout the movement. For example, bar 199 starts: 5/16 and the changes are as follows: (bar 201 - 7/16 : bar 203 - 9/16 : bar 204 - 5/16), thus the extra line provides clarity and identification for an additional effect.

Unique noteheads relating to pitch or rhythm
None

Key signatures - where relevant to reform
Absent

Other - unusual indications for performance relating to clef
None

Additional Five-line Staves Above or Below
Different Functions
In Holliger's score, below, extra five-line staves appear for a variety of different reasons.
Example 564. Additional Five-line Stave Relating to Right and Left Hand Technique

Composer: Holliger
String Quartet: St. Qt.
Date: 1973
Staves: Double set
Clefs: Traditional and Contemporary

Note: This section has a double stave for each instrument. The purpose is to separate left and right hand instructions. In the top stave of each instrument are placed instructions on how to use the bow, while the bottom stave contains independent instructions for the left hand. The explanation for the viola part, for example, is as follows:

The bow operates as instructed in the upper stave - : ponticello → : auf dem Steg → : über dem Steg : hinter dem Steg, while, at the same time, the left hand is performing a series of different techniques referred to on a page of explanations. For instance, the first action for the left hand is indicated in words: Fingerspiel auf Korpus - Drum fingers on belly; and the second by an oval symbol indicating the striking of the palm on a selected number of strings. (Explained previously in relevant sections on percussive string techniques).

Unique noteheads relating to pitch or rhythm
New symbols
Key signatures - where relevant to reform
Absent
Other - unusual indications for performance relating to clef
String Clef
Note: The instruction at the bottom of p. 25 states \textit{l.h. unregelmässig, unabhängig von r.h.} - l.h. irregular and independent of r.h.. This instruction requires that the players read the functions of the double stave on two levels. A further instruction, referring specifically to the line E1, requires that the l.h. tempo [must be] uneven (rubato) independent of bow rhythm. In the example the left hand (lower stave) plays a continuous series of chromatic notes while the bow plays the rhythmic patterns in the upper stave. The traditional clef is automatically abandoned in the upper 'rhythmic' stave. Notice that rests occur despite the fact that the left hand continues to do finger work.

Unique noteheads
Graphic
Key signatures - where relevant to reform
Absent
Other - unusual indications for performance relating to clef
In certain instances traditional clefs are found while at other times these are replaced by Roman numerals placed in the spaces of the stave indicating the strings of each instrument respectively, shown below:

\begin{center}
\begin{tabular}{cccc}
\textbf{on} & \textbf{IV.} & \textbf{III.} & \textbf{II.} & \textbf{I.} \\
\hline
I & II & III & IV & \textbf{strings}
\end{tabular}
\end{center}
Generally, the 'string clef' occurs in places where techniques involving indeterminate pitches arise, and is found regularly throughout the quartet. The following example shows Holliger’s different approach to clefs contained within a single line.

**Example 566. Clefs**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holliger</td>
<td>St. Qt.</td>
<td>1973</td>
<td>Double set</td>
<td>Traditional and Unique</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ex. p. 23, at D3, line 2, All Instruments</td>
</tr>
</tbody>
</table>

Note: Both traditional and unique clefs found are:

- **Violin 1** - unique string clef and traditional clef: indeterminate pitches in both staves changing to treble clef $\hat{\text{f}}$ in lower stave for snap pizzicati

- **Violin 2** - unique string clef and traditional clef: change from string clef given in previous line to treble clef $\hat{\text{f}}$ for snap pizzicati in upper stave (the location of the note under the stave does not represent a pitch within the standard compass of the violin as it occurs hinter Steg - behind bridge)

- **Viola** - unique string clef: indeterminate and determinate pitches both staves

- **Cello** - traditional clef: the traditional bass clef $\hat{\text{f}}$, upper stave, represents different points of contact along IV string and thus sound as pitched notes

Holliger uses additional five-line staves for two different purposes:

- to accommodate separate techniques in left and right hands
- to indicate rhythm

and a specifically devised clef to indicate the four strings of each instrument.
Unique noteheads relating to pitch or rhythm
Absent
Key signatures - where relevant to reform
None
Other - unusual indications for performance relating to clef
None

Example 567. Additional Five-line Stave
Relating to Pitch on Separate Strings

Composer | String Quartet | Date | Staves | Clefs
---|---|---|---|---
Heyn | Sirènes für Stqtt. | 1983 | Unique | Traditional

Ex. p. 5, bar 17. All Instruments

Note: In the score of 179 bars, the first 89 have the stave extended by four extra sets of lines, with each group representing a specific string. These are identified by a Roman numeral placed at the beginning of each extra stave, as follows:

- Violins 1 & 2 - x3 sets of five lines representing
  - II string - A
  - III string - D
  - IV string - G

- Viola & Cello - x3 sets of five lines representing
  - I string - A
  - II string - D
  - III string - G
  - IV string - G

Although not illustrated in the example above, the beamed notes played at a given pitch often occur successively on different strings as indicated by the Roman numerals of the stave structure. The aural effect of the same pitch played on different strings creates a subtle *timbre* variation of tone as the
quality of each string and the different positioning of the fingers produces a variety of altered sonorities. This distinct sound requirement, however small, cannot be notated on a single stave.

**Unique noteheads**
Beamed notes

**Key signatures - where relevant to reform**
Absent

**Other - unusual indications for performance relating to clef**
None

### Additions to Five-line Stave: 1-5 Set System

Hübner, in his article *Expanding the String Technique*\(^{432}\), explains the reasons for composing in an enlarged stave which is structured in five separate sets of lines. As is traditional, the enlarged stave is joined as a composite whole by a vertical line. These sets are numbered from 1-5 only in the performance notes where they are explained. An example of the organisation is given below:

Several examples are given below to illustrate the purpose of each line as a single example is not representative of the dissimilar functions each holds.\(^{(Examples 568 a,b,c)}\)

---

Example 568a. Additions to Five-line Stave

(1) Five Stave
1-5 Set System

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hübler</td>
<td>3 Stqt.</td>
<td>1982-4</td>
<td>Unique</td>
<td>Traditional</td>
</tr>
</tbody>
</table>

Ex. p. 3. Viola & Violin 2

Note: In the five-line stave various shaped noteheads appear, each performing a different function. In the example above they are explained as follows:

(1) Five-line stave

- normal noteheads - represent left and right hands moving simultaneously (Viola)
- diagonal noteheads - represent independent movement of the left and right hands (Violin 2 - first group)
- crossed noteheads (x) - represent a percussive finger action on the string (Violin 2 - third group)
- open diamond shape noteheads - represent half harmonics with the sound fluctuating between a ‘dead tone’ and an harmonic mingled with noise, depending on the amount of bow pressure applied. (see Example 568b)

(2) Four-line stave

- each of the four lines - represents a string of an instrument from the bottom upwards - e.g.: Violin G-D-A-E : Viola C-G-D-A
- the notes - represent contact points of the fingers on the respective strings and the rhythmic groupings
Example 568b
(3) Single-line stave

- the single line (No 3) represents the movement of the bow (\( \frac{\pi}{3} V \)) which can be coordinated with the rhythmic movement on different strings, or be rhythmically independent
- the way the stems of the notes on the four-line stave (No 2) are written depends on whether there is rhythmic co-ordination of the bow movement or not. If co-ordinated, then the stems on the four-line stave (No 2) continue vertically up into the single line above (No 3). However, if the rhythm is independent this does not occur and each set of notes operates independently of each other set on their respective ‘staves’.

In his article, Hübler states:

In traditional performance practice, the rhythm of the bow and the motion of the finger of the left hand are generally co-ordinated. However, this co-ordination is not necessary. A rhythmically independent treatment of both activities permits a distinctly audible polyphonic articulation of the melodic line and the use of all known bowing types.433

---

433 Hübler, Expanding The String Technique, p. 189.
Example 568c.

(4) Single line stave
(5) Single-line stave

Ex. p. 22, Violin 1

On the matter of bow contact and types of bowing, Hübner justifies the use of an additional line as follows:

It is well known that the tone quality can be decisively influenced by the point of contact of the bow. What has been missing up to now has been a really original manner of using these components of tonal production. A first step in this direction could be seen in the independent rhythmically precise, lightning-fast change of the point of contact of the bow, which could eventually be notated on a ledger line. Analogously, the type of bowing could also be treated in a similar manner and be notated on an additional staff.\(^{434}\)

Tablature Notation

- dashes (-) represent the finger placement on the string and the dots (.) the modifiable half-tone distances. (no illustration given)

---

\(^{434}\) Hübner, Expanding The String Technique, pp. 190-191.
Hübner writes: ‘This disposition of the fingering is possible with every initial tone desired....’

Finally, the composer sums up his use of the multi-line stave by stating that ‘each compositorial decision must be conveyed down to the last details including the selection of fingering etc.; ... [and] a lack of cunning on the composer’s part can very quickly distort his musical intentions so as to make them unrecognisable’ - a far cry indeed from the philosophy of John Cage’s disregard for control in the 1950s and 60s.

**Unique noteheads**

**New symbols**

**Key signatures - where relevant to reform**

Absent

**Other - unusual indications for performance relating to clef**

Described

**Additional Five-line Staves**

**Double Staves applying to Players**

In his second quartet, *II. Streichquartett - “Reigen seliger Geister”* (1989), Lachenmann uses a double set of staves for each instrument throughout the work (425 bars). The lower stave has three functions:

- to be read as a traditional notation system when the upper stave is free
- to show the positioning of the fingers
- to indicate the precise rhythms

The upper stave has a single function:

- to show the movements of the right hand (to indicate changing bow positions, and special degrees of bow pressure with specially devised symbols)

For the first 284 bars there is also the so called ‘border’ five-line stave, placed detached at the top of each page. This acts for purposes of composer orientation in the compositional process but serves no purpose for the players. An example of the ‘border stave’ and its relationship to the players’ double stave is given below.

---


Ibid., p. 188.
Additional Five-line Staves

Border Staves for Composer

Example 569. Separate Five-Line ‘Border’ Stave
For Orientation within Compositional Whole

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td>IL.Statt.</td>
<td>1989</td>
<td>Added set</td>
<td>Traditional Unique</td>
</tr>
</tbody>
</table>

Note: The uppermost stave is marked with small subdivision strokes and single notes which are used as orientation marks for the composer within the compositional whole. These markings are also often in the form of notes in rhythmic groupings.

As the music is structured in traditional changing time signatures assisted by metronome markings, Lachenmann uses a further set of three five-line staves, placed at the bottom of each page, to indicate the comprehensive rhythmic structure of each bar as well as the actual sounding results due to the use of scordatura. An example is given below:
Example 570. Separate Composite Set of Three Five-Line Staves
Indicates Sounding Pitch of Scordatuna

Composer  String Quartet  Date  Staves  Clefs
Lachenmann  IL.Stqtt.  1989  Addition  Traditional

![Composite set of five-line staves](image)

**Note:** The composite set of three five-line staves, situated at the bottom of the page, clearly demonstrates the usefulness of this arrangement as all the notes played individually, by each separate instrument, are found collectively in the bottom stave. In this example the time signature is 3/8. However, the primary objective of this composite set of staves is to demonstrate the actual sounding pitches in each instrument which differ from the pitches shown on the standard 'playing' stave due, as explained earlier, to the use of scordatura. The square note shapes, in all parts, do not relate to time but to the technique of using the nut of the bow.

**Unique noteheads**
Relate to techniques

**Key signatures - where relevant to reform**
None

**Other - unusual indications for performance relating to clef**

Scordatura

*Scordatura* is given at the outset of the score and lasts throughout the 425 bars. The pitches of the notes, therefore, do not relate to those indicated by the traditional key signature.
Double Stave: Upper Stave as Substitute Clef

Within the double stave, the upper set of lines is used predominantly to indicate the techniques and positions of the bow. In the example below the traditional clef is absent and substituted by a string clef, marked by Roman numerals \((I : II : III : IV)\) placed in the spaces to indicate the four strings of each instrument respectively, thus directing the bow on to a specific string as indicated by either the position of the notehead or a symbol indicating the use of a special technique.

**Example 571. Unique Bowing Symbols**

Upper Set of Double Five-line Staves

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td>II Stqtt.</td>
<td>1989</td>
<td>Addition</td>
<td>String clef, Roman numerals (I : II : III : IV)</td>
</tr>
</tbody>
</table>

Ex. p. 40, bar 228, Violin 1 & 2

Note: The symbol \(\overline{\text{\textdagger}}\) placed in the string clef indicates pressed bowing. In the example the double symbol represents the A & D strings of both instruments.\(\text{\textdagger}\)

**Comment**

The stave as a means of reflecting pitch and rhythm is, of all the elements of music notation, the most basic. It has undergone a variety of modifications in the string quartets of the 20\(^{th}\) century and, as evident from the list below, fragmentation is the stave's most common adaptation. Certain composers briefly extend the range by inserting an extra stave, above or below the traditional lines and spaces, for the sole purpose of clarifying transient added techniques that cannot normally be accommodated within the standard stave. Others have devised new formats by supplementing the standard stave, above or below, either with a single stave, a composite set of five-line staves or by adjusting the line system into a totally new structure. One composer has adopted a recently published
staff proposal and another has invented a radically new system. Compositions showing these variations are listed below.

The key signature, which prior to the early decades of the century was an integral part of tonal music, has now become obsolete as its function in music has become redundant.

The clef, while predominantly still in use, operates in distinctively different ways from its traditional treatment. It is often absent at the start of a line as it is deemed to be self evident and understood within the context of the medium. When the standard clef is substituted for the individually devised clef of a particular composer, it functions to meet the needs of specific technical or timbral requirements. However, in all the areas of contemporary notation the clef, while being subject to certain modifications in the string quartet of the 20th century, remains a significant component of modern notation.

**List of Stave and Clef Modifications : Post 1950s**

<table>
<thead>
<tr>
<th>Fragmented Stave</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Composer</strong></td>
</tr>
<tr>
<td>Pousseur</td>
</tr>
<tr>
<td>Lutoslawski</td>
</tr>
<tr>
<td>Bartolozzi</td>
</tr>
<tr>
<td>Crumb</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Combination of Fragmented and Discontinued Staves : Theatrical Additions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Composer</strong></td>
</tr>
<tr>
<td>Globokar</td>
</tr>
</tbody>
</table>

**Assortment of Staves**

<table>
<thead>
<tr>
<th><strong>Composer</strong></th>
<th><strong>String Quartet</strong></th>
<th><strong>Date</strong></th>
<th><strong>Staves</strong></th>
<th><strong>Clefs</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Becker</td>
<td>No. 2</td>
<td>1967</td>
<td>Fragmented</td>
<td>Traditional Discontinued Alternate Fragmented No Stave</td>
</tr>
<tr>
<td>Composer</td>
<td>String Quartet</td>
<td>Date</td>
<td>Staves</td>
<td>Clefs</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------</td>
<td>---------</td>
<td>---------</td>
<td>----------------</td>
</tr>
<tr>
<td>Powell</td>
<td>Filigree Setting</td>
<td>1965</td>
<td>Standard</td>
<td>Traditional/Absent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fragmented</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Single line</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Staveless</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tablature</td>
<td></td>
</tr>
</tbody>
</table>

**Single Line Stave**

Linked to Selection of String Techniques

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervetti</td>
<td>Zinctum</td>
<td>1967</td>
<td>Single line/Traditional</td>
<td>new techniques</td>
</tr>
</tbody>
</table>

Converging into Single Five-Line Stave and *Vice Versa*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crumb</td>
<td>Black Angels</td>
<td>1970</td>
<td>Converging</td>
<td>Traditional</td>
</tr>
</tbody>
</table>

**New Notation**

Radical Approach to Stave and Clef

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>von Biel</td>
<td>Stglt</td>
<td>1965</td>
<td>Erratic/only for pitched notes generally abandoned</td>
<td></td>
</tr>
</tbody>
</table>

Radical Approach to Stave and Clef

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td><em>Gran Torso</em></td>
<td>1970-6-8</td>
<td>Fragmented</td>
<td>Unique selection -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No staves</td>
<td>String clef</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Graphic</td>
<td>Bridge clef</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Schematic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>representation</td>
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</table>

**New Notation**

EQUITONE

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karkoschka</td>
<td><em>Quattrologe</em></td>
<td>1966</td>
<td>Modified</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Two lined</td>
<td>Section II streitgespräich</td>
</tr>
</tbody>
</table>
### Graphic Notation

#### Graphic Notation in Traditional Staves

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown</td>
<td>St. Qt.</td>
<td>1970</td>
<td>Standard</td>
<td>Traditional</td>
</tr>
<tr>
<td>Henze</td>
<td>No. 5</td>
<td>1976-77</td>
<td>Standard</td>
<td>Traditional</td>
</tr>
</tbody>
</table>

#### Brief use of Additional Lines: Clarity

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferneyhough</td>
<td>Second St. Qt.</td>
<td>1982</td>
<td>Standard</td>
<td>Traditional</td>
</tr>
</tbody>
</table>

#### Brief use of Additional Stave

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sculthorpe</td>
<td>No. 8</td>
<td>1970</td>
<td>Standard</td>
<td>Traditional</td>
</tr>
</tbody>
</table>

#### Brief use of Additional Lines: Action Outside String Playing

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gielen</td>
<td>Stqtt.</td>
<td>1983</td>
<td>Standard</td>
<td>Traditional</td>
</tr>
</tbody>
</table>

#### Additional Five-line Staves Above or Below: Different Functions

##### Additional Five-line Stave Above: Relating to Right and Left Hand Technique

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holliger</td>
<td>St. Qt.</td>
<td>1973</td>
<td>Additional  set</td>
<td>Traditional</td>
</tr>
</tbody>
</table>

##### Additional Five-line Stave: Relating to Pitch on Separate Strings

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heyn</td>
<td>Sirènes für Stqtt.</td>
<td>1983</td>
<td>Unique</td>
<td>Traditional</td>
</tr>
</tbody>
</table>

#### Additions to Five-line Stave: 1-5 Set System

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hübler</td>
<td>3 Stqtt.</td>
<td>1982-4</td>
<td>Unique</td>
<td>Traditional</td>
</tr>
</tbody>
</table>
Additional Five-line ‘Border’ and Staves: Relating to Composer and Players Respectively

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td><em>Il.Stqtt.</em></td>
<td>1989</td>
<td>Additional</td>
<td>Traditional</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>staves</td>
<td>Unique</td>
</tr>
</tbody>
</table>

Unique Bowing Symbols in Upper Set of Double Five-line Staves

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Staves</th>
<th>Clefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachenmann</td>
<td><em>Il.Stqtt.</em></td>
<td>1989</td>
<td>Additional</td>
<td>string clef</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>staves</td>
<td>Roman numerals</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(I : II : III : IV)</td>
</tr>
</tbody>
</table>

Tablature or Modification of Tablature Notation

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powell</td>
<td>Filigree ....</td>
<td>1965</td>
</tr>
<tr>
<td>Crumb</td>
<td>Black Angels</td>
<td>1970</td>
</tr>
<tr>
<td>Hübler</td>
<td><em>3 Stqtt.</em></td>
<td>1982-4</td>
</tr>
</tbody>
</table>
12

VIBRATO

.... the use of a pictorial representation of sound that functions as notation and not calligraphy is unprecedented in musical history.

Krzysztof Penderecki (1933 - )

Sylvia Smith : Stuart Smith
Chapter Twelve
VIBRATO

A Brief Discussion

_Vibrato_ : 18th & 19th Centuries

_Vibrato_ in stringed instruments is produced by a controlled oscillating movement of the tip of a left hand finger. Until the middle of the 18th century _vibrato_ was treated and classified as a special ornament and described by Leopold Mozart in the following manner:

The Tremolo\(^{437}\) is an ornamentation which arises from Nature herself and which can be used charmingly on a long note. .... if we strike .... a bell sharply, we hear after the stroke a certain wave-like undulation _ondeggiamento_ of the struck note. ....Take pains to imitate this natural quivering on the violin, when the finger is pressed strongly down on the string, and one makes a small movement with the whole hand; ..... by the movement of the hand forward and backward must you endeavour to imitate exactly the swaying of these intermediate tones.\(^{438}\)

He also writes amusingly of ‘performers who tremble consistently on each note as if they had the palsy....’, and describes further, ‘.... a closing note or any other sustained note may be decorated with a tremolo [vibrato].’\(^{439}\) Leopold Mozart describes three speeds: ‘....a slow, an increasing, and a rapid oscillation .... distinguished by the following signs.’ The example below is taken from the Mozart publication\(^{440}\) _Principles of Violin Playing._

Example 572. Oscillations for _Vibrato_
Leopold Mozart’s Illustration (c1757)

\[\text{The slow.} \quad \begin{array}{cccccccc}
\text{uuuu} \\
\end{array}\]

\[\text{The increasing.} \quad \begin{array}{cccccccc}
\text{uukukuku} \\
\end{array}\]

\[\text{The rapid.} \quad \begin{array}{cccccccc}
\text{uuuuuuuu} \\
\end{array}\]

\(^{437}\) In the 1787 edition there is a footnote here as follows: ‘I do not mean Tremulant as it is used in organ-works, but an oscillation (Tremoleto)’

\(^{438}\)  _Mozart, Principles of Violin Playing_, Chapter XI, p. 203.

\(^{439}\) Ibid, pp. 203-204.

\(^{440}\) Ibid, p. 204.
Francesco Geminiani (1687-1762), as was common at the time, classifies the vibrato under 'tremolo' or 'close shake', but differs from Leopold Mozart's recommendation by proposing a continuous vibrato for both long and short notes. He writes: 'When it is made on short notes, it only contributes to make their sound more agreeable, and for this reason, it should be made use of as often as possible.' 441 In the Romantic period, Auer says: '.... [the] purpose of the vibrato .... is to lend more expressive quality to a musical phrase and even to a single note of a phrase' and is '....primarily a means used to heighten effect, to embellish and beautify a singing passage or tone.' 442 A common objection by theorists from the 1750s through the centuries was its indiscriminate use. Early in the 1920s Auer cautioned:

.... both singers and players of string instruments frequently abuse this effect .... and by so doing they have called into being a plague of the most inartistic nature, one to which ninety out of every hundred vocal and instrumental soloists fall victim. 443

Auer warns against the excessive use of vibrato and in his teaching explains:

As a rule I forbid my students using the vibrato at all on notes which are not sustained, and I earnestly advise them not to abuse it even in the case of sustained notes which succeed each other in a phrase.444

Today, vibrato is accepted as being a necessary ingredient of the string sound and the resultant singing quality is infused into all manner of compositions, be it classical or romantic chamber music, sonatas or solo concerti, and including most of the string quartets of this century. The romantic solo concerti for violin and orchestra of Brahms, Tschaikowsky, de Sarasate, Lalo, Wieniawski, Sibelius, and Glazunov to name a few, would be impoverished without the use of vibrato. However, in its use, one of Mozart's caveats continues to apply: '.... in a word, whatever belongs to tasteful performance of a piece, which can only be learnt from sound judgement and long experience.' 445

**Vibrato : 20th Century**

Technically the main elements of vibrato are speed and width. Yehudi Menuhin explains that the difference between the wide and narrow vibrato is '.... the relative firmness or softness of the finger

442 Auer, *Violin Playing*, p. 47.
443 Ibid., p. 47.
444 Ibid., p. 51.
joints. When they are soft (though always rounded) they release and encourage a wider sweep in the wrist and arm. When they are firm they prevent this freer movement. Earlier, in 1962, Ivan Galamian wrote that each of the three types of *vibrato* - arm, hand and fingers - has its own characteristic and different colour possibilities and with each of these types, speed, width and intensity can be varied to a considerable extent. He states further that the player should be capable of controlling all these components of the *vibrato* and that within each type - the slowing down, the speeding up, the stopping of the *vibrato* at will, the making of the *vibrato* wider or narrower, the gradual transition of one type of *vibrato* to another with subtlety or smoothness - must all part of the contemporary players accomplishment. Another factor listed is an element which he terms 'intensity'. He says that changing the pressure of the finger and its angle with the string enables the player to control the intensity of the *vibrato*, which in turn controls, amongst other aspects, the range of dynamics.

*Vibrato* is also used in conjunction with other techniques and Galamian's recommendations for the many and varied types of *vibrati* correspond accurately to the colouristic use of the technique found in contemporary scores.

**Written Instructions in the Score**

For many centuries of Western music, the text was left incomplete and the exact intentions of the composer were not written into the score. Generally, only limited instructions were given and the players were expected to perform the works within a broad but not unlimited range of possibilities, set within the boundaries of the period, to create authentic and individual styles. However, in the earlier decades of the 20th century, contrary to practice in former times, Schoenberg and Bartók introduced precise instructions into the scores of their compositions - both written and by use of new symbols. What had previously been left to the discretion of the performer was no longer acceptable in certain instances and it was Bartók who, once again, introduced into quartet playing directions to regulate the amount of *vibrato* desired within a passage. The first two examples below illustrate such directions written into the score as follows: *molto vibrato* and *non vibrato vibrato*:

---


Example 573. *Vibrato: Molto Vibrato*
Composer: Bartók  
String Quartet: No. 3  
Date: 1927

**Sign/Explanation**

*Seconda Parte: Allegro*  
*molto vibrato ~ ~ ~ ~ ~*

*Ex. p. 133, line 2, before 49.*

*All Instruments*

---

**Example 574. Vibrato: Non-Vibrato [Senza Vibrato]**
Composer: Bartók  
String Quartet: No. 4  
Date: 1928

**Sign/Explanation**

*non vibr. vibrato*

*Ex. p. 174, Mov. III, line 3*

*bars 13-16, Violin 1 & 2, Viola*

---

**Note:** The designation *non vibr.* (for the first double stopping) and *vibrato* (for the following sustained portion of the notes) is an early example of negating the player's discretion as to when and where to use the technique. On the same page the term *(sempre vibr.)* requires a continuous *vibrato.*
**Vibrato: Contemporary Usage and Notation**

In 1949-50 John Cage wrote the following instructions as a preface to his *String Quartet in Four Parts*: ‘PLAY WITHOUT Vibrato AND WITH ONLY MINIMUM WEIGHT ON THE BOW,’ and was the first and only post-war (1945) composer to specifically exclude the use of vibrato throughout the composition. Generally, contemporary composers indicate the intensity of sound by varying the contour of the wavy lines, while execution is controlled by the speed of either a finger or arm movement.

The following examples show a range of new vibrato signs and/or symbols found in contemporary quartets. The explanations for the type of vibrato required appears either at the relevant part in the score or is explained separately on the sheet of performance notes. Variations within each category of symbol are generally minimal, thus only typical examples are given.

**Example 575. Vibrato**

*Speed Indicator: Use of Symbol*

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartolozzi</td>
<td>Qtto</td>
<td>1960</td>
<td>non vibrare</td>
</tr>
</tbody>
</table>


Note: Bartolozzi lists the symbols and explanations for the vibrati on the page *Spiegazione Dei Symboli - Explanation for Symbols*. This example displays Bartolozzi’s symbol for *vibrati progressivi* which is clearly indicated by the changing intensity of the wavy line of pattern.
Example 576. Vibrato
Frequency Difference up to 1/4 Tone: Rapid and Intensive: Changing Speed

Composer  String Quartet  Date  Sign/Explanation
Cervetti  Zincum  1967  ❄️ langsame Vibrato (bis zu
einem Viertel ton Frequenz-
differenz) - slow vibrato (frequency difference up to
one quarter tone)

Note: Cervetti lists the symbols and explanations for the vibrati on the page Abkürzungen und
Symbole - Abbreviations and Symbols. In the above example, the vibrato is indicated as changing
from either slow to rapid (Violin 1 & 2) or maintaining a constant rapid speed (Viola and Cello):

- bars 54/53-57  Violin 1 & 2 start with a slow 1/4 tone frequency difference
   changing suddenly to a normal rapid vibrato, pitched at a 1/4
tone above the notes (A) and (G) respectively
- bars 52-57 Viola  constant rapid vibrato pitched a 3/4 tone higher (G)
- bars 52-57 Cello  constant rapid vibrato on the upper note (F#)

Henze in the String Quartet No. 5 (1975) instructs in the Zeichenerklärung - Explanation of Symbols
that a wavy line represents:

= normales viertelton-vibrato - normal quarter tone vibrato
Example 577. *Vibrato*  
Symbol and Words Changing Speeds: Within Time Unit  

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
</table>
| Becker   | No. 2          | 1967 | *von non vibrato allmählich zu vibrato molto*  
- gradually from a non to an intense *vibrato*.

Ex. p. 1, line 1, Cello

---

**Note:** Becker, unlike the composers in the two previous examples, indicates the *vibrato* requirements in both wavy lines and accompanying written instructions at the relevant bar of the score. In the example above, the words *von non vibrato allmählich zu vibrato molto* - gradually from a non to an intense *vibrato*, appear above the Cello stave at the start of the bar. The solid horizontal line represents *non vibrato* and the changing thickness of the wavy line indicates the intensity of the *vibrato*. These bars are structured in a series of different time units starting with a unit for the *non-vibrato* equal to (2 x 3") and on to an ever increasing intensity *vibrato molto* for further time units of 3" : 4" : 4": respectively. Becker makes use of various speeds of *vibrati* throughout the score.
Example 578. *Vibrato*
Symbol and Words with Constantly Changing Speeds

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penderecki</td>
<td><em>Qtto per Archi</em></td>
<td>1968</td>
<td><em>s. vibr.</em> and changing wavy lines</td>
</tr>
</tbody>
</table>

Ex. p. 6, line 2, All Instruments

The wavy line symbol, although generally used to represent a *vibrato* is found, in certain quartets, for different requirements. Example 579 below, illustrates the wavy line symbol used to indicate a series of repeats given notes which do not indicate *vibrato*.

Example 579. *Non-Vibrato*
Represented by Wavy line

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hertel</td>
<td><em>Imitationen</em></td>
<td>1975</td>
<td>~~~~~~ wavy line</td>
</tr>
</tbody>
</table>

Ex. p. 18, line 1, All Instruments
An innovative type of vibrato is introduced into string quartet playing with the use of a bow vibrato in Gielen’s Streichquartett: “Un vieux souvenir” (1983). Apart from placing the words Bogen vibr. in the score, as shown in the example below, (bar 93), there is no further explanation as to exactly what is meant by this term. No references have been found as to the manner of executing the technique. If by Bogen vibr. the tremolo or any other similar recognised bow technique is required, then the given instruction would be superfluous and replaced, instead, by an accepted contemporary symbol or word. Bogen vibr is an isolated term found only in the Gielen quartet and, without further explanation from the composer, its implementation remains obscure. The number 132 placed above the stave does not shed further light on the matter as it is listed on the page: English Translation of Instructions as follows: 132) Take lots of time! The process of disintegration must be in proportion to the lengths of the movements.

Example 580. Vibrato : With Bow
Unexplained Technique

Composer | String Quartet | Date | Sign/Explanation
---|---|---|---
Gielen | Stqtt. | 1983 | Bogen vibr.

Ex. p. 6, line 1, bar 93, Violin 1 & 2, Viola

Vibrato : 20th Century Categories

From the 18th century onwards the vibrato has been used by string players to heighten and beautify the expressive quality of a single note or musical phrase; when, where, and how to play the vibrato was left to the discretion of the player. Particularly in the second half of the 20th century, however, the performer has often been left with little or no choice as to the quality and intensity of vibrato
required as many composers, displaying a heightened interest in achieving a variety of different *timbre* effects, direct added requirements to this standard technique. The exact instructions - either written or by graphic design - include differences of speed and width, as well as changes in dynamics. These are categorised below:

**Vibrato**: Written Speed Indicators - without Accompanying Symbols

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fisher</td>
<td>No. 1</td>
<td>1961-62</td>
<td>v. = vibrato</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>n.v. = non vibrato</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>m.v = molto vibrato</td>
</tr>
<tr>
<td>Hiller</td>
<td>No. 5</td>
<td>1962</td>
<td>senza vibrato</td>
</tr>
<tr>
<td>Shifrin</td>
<td>No. 3</td>
<td>1965-66</td>
<td>poco a poco non vib.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>non vib.</td>
</tr>
<tr>
<td>Karkoschka</td>
<td>Quatrologe</td>
<td>1966</td>
<td>molto vibrato</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>poco a poco senza vibrato</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>poco a poco con molto vibrato</td>
</tr>
<tr>
<td>Ferneyhough</td>
<td>Sonatas</td>
<td>1967</td>
<td>non vib.</td>
</tr>
<tr>
<td>Ligeti</td>
<td>No. 2</td>
<td>1968</td>
<td><em>Flautando</em> is always played non vibrato.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(only instruction regarding <em>vibrato</em>)</td>
</tr>
<tr>
<td>Crumb</td>
<td>Black Angels</td>
<td>1970</td>
<td>ppp non vib. (found only once)</td>
</tr>
<tr>
<td>Sculthorpe</td>
<td>No. 8</td>
<td>1970</td>
<td>senza vibr.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>vibr</em> (Proportional notation)</td>
</tr>
<tr>
<td>Hertel</td>
<td>Imitationen</td>
<td>1975</td>
<td><em>vibr</em> = <em>vibrato</em></td>
</tr>
<tr>
<td>Rihm</td>
<td>Drittes Stqtt.</td>
<td>1976</td>
<td><em>vibr</em>.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>non vibr.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>poco vibr.</td>
</tr>
</tbody>
</table>
Schmidt  Zweites Stqt.  1979  *Alle 4 Instrumente den gesamten Satz sul tasto un senza vibrato - all 4 instruments together sul tasto and senza vibrato (found only once as a fn)

Vibrato : Word/Initial Speed Indicators - without Accompanying Symbols

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferneyhough</td>
<td>2nd St. Qt.</td>
<td>1980</td>
<td>V.M. - Vibrato Molto (rapid, not necessarily much wider than normal)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N.V. - Non Vibrato (assoluto!)</td>
</tr>
<tr>
<td>Hübler</td>
<td>3 Stqt.</td>
<td>1982-4</td>
<td>vibr! molto vibr. ord.</td>
</tr>
<tr>
<td>Huber</td>
<td>Doubles</td>
<td>1987</td>
<td>c. vib. s. vib.</td>
</tr>
<tr>
<td>Sculthorpe</td>
<td>Coconino</td>
<td>1989</td>
<td>NV non vibrato</td>
</tr>
<tr>
<td>Cerha</td>
<td>II.Stqt.</td>
<td>1989-90</td>
<td>senza vibr.</td>
</tr>
</tbody>
</table>

Vibrato : Wavy Symbol and Words

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brandmüller</td>
<td>Ertes Stqt.</td>
<td>1983</td>
<td>molto vibrato</td>
</tr>
<tr>
<td></td>
<td>Zweites Stqt.</td>
<td>1985-6</td>
<td>senza vibrato</td>
</tr>
</tbody>
</table>

Vibrato : Symbol and Words

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matthews</td>
<td>No. 1</td>
<td>1983</td>
<td>*Bar 1-14 : minimum vibrato, increasing to warm, fast vibrato in creas/descresc. sign</td>
</tr>
</tbody>
</table>

Vibrato Symbol - Indicating another Instruction

Contrary to the general use of the wavy line to symbolise different widths and intensities of vibrato, certain composers make use of it to represent other techniques. For example, as illustrated earlier
Hertel employs the wavy line to indicate repeats, Matthews uses an increasingly wider undulating line to represent a crescendo within a vibrato, whereas Coeck, in *Graphismes pour Quatuor à cordes* (1983), uses the same type of wavy line to indicate a note of undulating pitch, but without indicating a vibrato of any sort.

**Vibrato : Various Widths of Wavy Symbol indicating Changing Speeds**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartolozzi</td>
<td>Qtto</td>
<td>1960</td>
<td>increase degree of vibrato (both speed and width)</td>
</tr>
<tr>
<td>Cervetti</td>
<td>Zinctum</td>
<td>1967</td>
<td></td>
</tr>
<tr>
<td>Becker</td>
<td>No.2</td>
<td>1967</td>
<td></td>
</tr>
<tr>
<td>Penderecki</td>
<td>Qtto. per Archi</td>
<td>1968</td>
<td></td>
</tr>
<tr>
<td>Kelemen</td>
<td>Motion</td>
<td>1969</td>
<td></td>
</tr>
<tr>
<td>Ferneyhough</td>
<td>2nd St. Qt.</td>
<td>1980</td>
<td></td>
</tr>
</tbody>
</table>

**Vibrato : Senza vibrato - Throughout the Whole Score**

<table>
<thead>
<tr>
<th>Composer</th>
<th>String Quartet</th>
<th>Date</th>
<th>Sign/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cage</td>
<td>String Quartet in Four Parts</td>
<td>1949-1950</td>
<td>PLAY WITHOUT VIBRATO....</td>
</tr>
</tbody>
</table>

**Comment**

As discussed earlier - with the exception of Bartók’s specifications in earlier string quartets *Nos. 3 (1927) & 4 (1928)* - the prerogative of when and where to use vibrato in quartets of the early decades of this century, was the left to the performer. However, after the 1950s composers became more specific about where vibrato was wanted and, in certain instances, aspects of intensity and speed became important as an exact colouristic requirement. Thus, from about the 1950s in the ±65 quartets under investigation from that time, various symbols accompanied by other indicators were introduced to indicate vibrato. These may be summarised as follows:

**Vibrato :** Words or Initials as Indicators - without Accompanying Symbols

- Words or Initials as Indicators - without Accompanying Symbols

18

**Vibrato :** ‘Wavy’ Symbol and Words

- ‘Wavy’ Symbol and Words

1

**Vibrato :** Various Widths of ‘Wavy’ Symbol : as indications for Changing Speeds
Vibrato: Explanations in Footnotes

1 Vibrato: 1/4 tone Frequency Difference

2 The following unusual examples are also found

Vibrato: With Bow

1 Vibrato: Explicitly without

1 ‘Wavy’ Symbol: Represents technique other than vibrato

2 Senza Vibrato: Scored without vibrato

1 Vibrato Symbol - Indicating Other Instructions

3 Thus about half the composers of the contemporary quartets listed in this thesis specify the use of vibrato with words or initials in preference to symbols. The ‘wavy’ line is a useful way of indicating varying speeds and intensities within both proportional and standard notation, as well as being an adaptable symbol for indicating changing aspects of a continued vibrato effect.
A critical examination of the instrument and a restriction of the innovative imagination to the instrument's actual potential can lead to rewarding results by opening up a completely new perspective on the instrument.

Klaus-K. Hubler
Chapter Thirteen

SUMMARY AND CONCLUSION

Quae visa, vera; quae non, veriora
(What you see is true; what you do not see is more true).
Latin proverb

Introduction

Throughout the history of Western music no notation systems have provided a totally unambiguous summary of the final musical experience at any particular time, and they have, generally, never been more than an approximation of composers’ intentions. From the introduction of symbols representing neumes, (c 800), notation has been adjusted, extended and renewed to accommodate the musical expansion of each specific period. This has occurred whenever notation has been inadequate to express the ideas and aspirations of composers seeking to introduce into music innovative techniques that were not synonymous with current practice. Documentation of notation extensions in the Medieval, Renaissance and early Baroque periods testifies to the difficulties of interpreting the diverse selection of symbols and systems.

After the relative stability of music notation from about the 17th century to the early decades of the 20th century, more contemporary compositional attitudes, particularly after the 1950s, have generated and continue to produce a variety of notational symbols that are both complete and incomplete, standard and irregular, shared and peculiarly individualistic. This has arisen by reason of different stylistic approaches, electronic influences and the introduction, in composition and performance, of a new type of virtuosity.

Correlations Between Early Notation and 20th Century Usage

In the chronological practice of Western notation, certain correlations between the customs of early notation and those of the 20th century can be itemised. For example:

- The irregular use of bar lines in the very early periods, which served primarily as a means of orientation, are sometimes used today for that same purpose, particularly in contemporary scores of highly complex rhythm.
- The medieval barring of lines scored vertically through all the parts is, once again, reintroduced in 20th century post-War scores.
The inconsistent and irregular nature of adding accidentals to raise notes in *musica ficta* correlates with the present custom of randomly adding and disposing of accidentals.

The adjusting of notes to correct the key of *musica recta* has a slender relationship to the irregular and inconsistent use of key signatures today.

The many complex functions of time signatures in the early systems compare to the present structures where rhythm and beat are shown, either as a multiple selection of new composite arrangements, or completely abandoned or replaced with a selection of different time indicators.

The grouping of *neumes* in early music that initially excluded the use of rests, equates to the implementation of the contemporary practice of proportional spacing that has led to the total abandonment of rests.

A tenuous comparison can be made between the ‘beaming’ in early rhythmic ligatures, which consisted of groups of two or more notes joined together to form a single symbol - dependent on their grouping according to different rhythmic modes - and the beaming of contemporary rhythmic groupings which function independently of pulse tied to the ‘bar’.

A similarity exists between the early use of ‘canons’, explaining the meaning of notes in the music considered to be ‘*sub obscuritate quadam*’, and the contemporary use of explanatory notes to clarify the execution of new and complex symbols.

**Comment**

Today, as indicated in the string quartets under investigation in this thesis, certain associations can be reclaimed from early notational meanings and functions and made analogous to those of the 20th century. Two further points demonstrated are, firstly, that as with any music expansion, an adjustment to notation has had to take place when the existing system has failed to accommodate new and innovative ideas and, secondly, that symbols from the earliest systems have proceeded from vague and inexact presentation of the composer’s intent, through ceaseless renewal and constant change to ever clearer and more exact representation, only to disintegrate again in the post-War period, often into an assortment of inexact symbols.

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Notational Changes c1900 - 1990

An opinion held at the end of the 19th century expressed the following belief:

"... our present system of Notation leaves little to be desired, for it is difficult to conceive any combination of sounds ..., which it is not capable of expressing."

In the early decades of the 20th century, however, this opinion proved inaccurate as there were, once again, general stirring of discontentment among composers about the limitations imposed by the traditional notational system and its inability to express ideas outside the standard fabric of sound. As early as 1895, over two decades before the systematic changing of musical styles by the Europeans - Schoenberg, Bartók and Varèse - the Mexican composer Julian Carillo’s (1875-1965) interest in microtonality and his experiments with microtonal sub-divisions of the chromatic scale, added another dimension to pitch and notation, a dimension that continues in contemporary quartet writing amongst composers who seek to enlarge the tonal resources of the genre. In Germany, Schoenberg’s 12-tone compositional method of the 1920s introduced changes to the function of traditional accidentals, with the diatonic relationships being completely abandoned and, in their place, the introduction of an enharmonic and interchangeable use of either sharps or flats. This resulted in a confusing array of accidentals. Karkoschka explains:

When Arnold Schoenberg places an accidental in front of each note it often suggests a complication which the content, [when] regarded with modern eyes, does not have at all. Thus from the beginning our notation transforms this music into a contradiction.

In the expanded tonality of the neo-Classicists the function of accidentals changed, producing such practices as double-degree chords. However, the early important difference in the use of accidentals in tonal music compared to their use in 12-tone music was the continued relationship to a central tonality.

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450 Groves, 4th edition p. 478
451 Karkoschka, Notation in New Music, p. 2
In America in 1927, the composer Henry Cowell's dissatisfaction with conventional notation was shown in a different way when he wrote that, at that time, pitch and rhythmic notation gave only bare details of conventional modes and little else - '.... it cannot convey a subtle tone of any description.'\(^\text{452}\)

Contrary to this view, though, the cross rhythms and syncopated patterns of the European and Russian music of Bartók and Stravinsky respectively presented no difficulties of being represented in standard notation, and even the complexity and irregularities of polyrhythms and rapid changes of time signatures could easily be identified and recognised using traditional symbols.

A crucial consideration amongst many composers, post 1945, was the pursuit of a new language to express contemporary musical ideas. The inherited notation symbols, which had generally served the composers of the early decades of the century adequately, were now proving deficient in defining the newly discovered universe of acoustic phenomena, which included an unlimited spectrum of sound and noise. The paucity of basic symbols in the traditional system, and their incompatibility in representing modernistic sounds, created a new struggle between the idea born in the composer's imagination and the material at hand. The composer now had to battle with concepts of diatonic and metric principles which were no longer part of musical inventiveness. Around the 1950s an eruption of stylistic changes incorporating the two main streams, categorised as determinate and aleatory approaches, contributed to the modification and - in some instances - the erosion of many of the accepted definitions and meanings of traditional syntax, which included:

- staves
- key signatures
- accidentals
- dynamic markings
- verbal instructions
- rest signs
- ledger lines
- clefs
- barlines
- time signatures
- tempo indications
- rhythmic groupings

\(^{452}\) Cowell, Inadequate Notation, p. 29
Thus in the early 1960s and ’70s the expansion of new musical concepts, with the attendant new notation and new performance techniques, created a flood of individual symbols. No one system emerged from either of the two important compositional streams to structure new and lasting symbols that could follow successfully in the wake of the traditional syntax. Added to this lack of agreement and standardisation of symbols to signify specific new techniques, there also existed differences of opinion amongst contemporary composers as to the most effective way of establishing a logical and representative notation. The continued use of traditional syntax created a general sense of dissatisfaction. For example, in 12-tone compositions chromatic alteration was, according to Marshall Bailey in 1962, the first shortcoming because of an inability to differentiate between chromaticism and twelvetonism ;\(^453\) Earle Brown writes in 1986 of his early discontentment with the rhythmic fragmentation and fractioning of the beat of total serialism where ‘the development of precision in notation has contradicted itself,’\(^454\) and suggested a more functional and less self-defeating and more realistic graphic suggestion. A contrary opinion was held by Peter Yates who, in 1967, in his article *The Proof of Notation*,\(^455\) stated resolutely:

Most of the notational systems which are being devised and experimentally tried today are too complex to be practical, too individual or specialised to be of general application, and inadequate to serve the composers’ needs.

In Darmstadt in 1972, Siegfried Palm confirmed that, in his opinion, [standard] notation still had ample sources to write down ‘yet unheard of sounds’,\(^456\) echoing Lukas Foss’ 1963 view that traditional notation should be expanded and not replaced.\(^457\) Karkoschka postulated in 1966 that standard notation had survived centuries of attempts at reform but, ‘... in spite of certain inadequacies it has supported a many-sided musical culture ...’\(^458\) He justifiably added that the present confusion about notation was highly welcome, since it showed clearly that conventional methods of notation were no longer adequate, and said further: ‘... we do not intend to reject this notation lightly, but rather to increase its capabilities - which indeed, we *must* do.’\(^459\)

An analysis of selected string quartets from the 1900s onwards, exhibits the following modifications and innovations in the sub-divisions of music syntax. - rhythm, duration and tempo

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\(^453\) Bailey, *Duodecuple Notation*, p. 12
\(^454\) Brown, *The Notation and Performance of New Music*, p. 193
\(^456\) *Notation Strings*, p. 65
\(^457\) Foss, *The Changing Composer-Performing Relationship*, p. 49
\(^458\) Karkoschk, *Notation in New Music*, p. 15
\(^459\) *Ibid.*, p 15
Rhythm : Duration : Tempo

Twentieth century composers, in their desire to escape the rhythmic attitudes of earlier centuries, began to draw on nationalistic and ethnic practices to avoid the predictable and unadventurous patterns that became standardised in the Classical and Romantic periods. This fresh approach to rhythm was impregnated with the spirit of the age, resulting in the injection of a new and vital rhythmic sense into Western music which, in turn, affected many of the traditional structures of rhythm notation. In particular, divisions and multiplications of note values were set free from the traditional constraints of the pulse within the bar line.

Solutions to notating the new complex rhythmic structures are found early in the 20th century in the string quartets of Bartók and Hindemith, and continued with further adjustments, mutations and radical changes in the quartets post 1950. These include:

- Numerous modifications and additions to the arrangement of the traditional time signature such as, variable meter : compound meter : alternating meter : mixed meter : polymeter : fractional meter.
- A dispensing of time signature denominators with the single figure specifying the numerator.
- The absence of time signatures in standard, proportionate and time notation.
- The introduction of beamed notes across bar lines to show support for a diversity of functions.
- The use of small figures or number ratios to lend clarity to complex irregular note groupings.
- The arrangement of proportionate and spatial notation, either with or without traditional noteheads or stems, or with the use of extended beams of various lengths to regulate duration.
- The dispensing of rests in proportionate notation.
- The rearrangement of the function of the bar line and, at times, the complete dispensing of the bar line in spatial notation.
- The introduction of metric modulation, where a given rhythmic value performs a pivotal function in both the old and new time structures.
- *Tempi* indicators which extend beyond the single use of the standard metronome marking include a new method structured in time units of seconds, related either to single bars, lines or blocks of notation, or given at the beginning of a composition as a set tempo based on a unit of one second per.
• Accelerandi and ritardandi instructions have added indicators to the standard use of words where, for example, notes or groupings are spaced accordingly in proportional notation. Other indicators are given by arrows, which show the momentary speeding up or slowing down within a group of notes or a selection of 'bars', or are given in a series of metronomic indications to control the rate of speed change throughout the course of extended accelerandi and ritardandi.

• The duration of the standard fermata being extended by a variety of new shapes to indicate the relative length of the pause which is, at times, allocated an exact duration in seconds.

• In a single instance, the functions of the standard notes shapes being allocated time units in seconds or sub-divisions thereof and not being related to time values of pulse.

Comment

Not all composers, though, subscribe to the regulations that formulate clear principles on notating rhythm, duration and tempo, although, certain symbols - such as the new fermati signs - are used more commonly and consistently than others. While many composers subscribe to particular principles of 20th century composition, these are more often than not represented in diverse and individualistic ways. The important change in the broad category of rhythmic notation is that the new systems transcend the limitations imposed by the bipartite and tripartite system of traditional notation, and accommodate any arrangements of rhythmic structure - both exact and inexact. In this, the significant innovation of proportionate spacing and time units, that encompasses all variants of conventional symbolic representation - in the use or dispensing of noteheads, stems, rests or the invention of new beaming methods to indicate durations - has had a profound effect on the indicating of new rhythmic concepts. As has been found in the quartets under investigation in this thesis, any conceivable rhythmic pattern or grouping envisaged by a composer is able to be accommodated in the additions to and modifications of traditional symbols as well as the introduction of innovative symbols presently accepted into contemporary notation.

Pitch and Pitch Extensions

Key Signatures: Accidentals: Staves and other Related Aspects

In the matter of representing the parameters of pitch in the 20th century, the standard five-line stave, the key signature and the chromaticism of added sharps and flats, proved to be inappropriate for new methods of composition. Pitch notation took radically different directions from those traditionally
followed in the previous three centuries. Different symbols had to be devised to accommodate the new composition structures and the quartets under investigation show the following changes:

- **Key signatures** were disposed of in some of the early quartets of the century but in quartets post 1950 they are generally totally abandoned.

- **Microtones**, as an added colouration to pitch, feature in the early quartets of this century as well as in some quartets post 1950, where, in the later works a wider variety of different symbols occur to indicate the sub-dividing of the octave into smaller divisions which, in these quartets, is generally in quarter-tones. Nevertheless, microtonal notation is by no means standard and requires practice for a creditable performance, as many variants of the traditional sharps and flats are adopted.

- **Accidentals**, after the 1950s, tend toward being notated only when required for a particular note, however, some composers prefer to mark every note requiring an accidental, leaving nothing to chance. Certain regulations formulated in the early 1970s at the Ghent Convention clarified the use of accidentals by providing guidelines for composers from that time onwards. However, composers of the 1960s and early '70s generally used a variety of individual schemes to indicate additions to, and cancellation of, accidentals. Even today, no one system is found that consistently suits the needs of the divergent compositional 'styles'.

- **Five-line staves**, as a restriction, did not present a problem to composers pre-1950 and in these respective quartets, no adjustments were found to the standard five-line structure. However, in the quartets post-1950 many stave modifications and additions have been made to accommodate the specific compositional needs of the composers, and are found as follows: in combinations of fragmented and traditional staves: as a series of fragmented staves: with an erratic use of segments of staves in a score where they are generally abandoned: where selected segments of a composition are without staves: and with a limited use of graphic notation.

- **Additional sets of staves** are placed above or below the five lines, either intermittently or to function throughout the whole score, for a particular purpose. There are, too, a unique assortment of staves, for example, the two-lined stave of the Equitone system, and an individually devised system combining a set of a variable number of lines that constitute the stave as a whole. Only one quartet uses converging lines where the four parts alternately meet to become a single stave and then revert back to the standard format. Tablature notation has re-emerged and the number of lines found are readjusted to suit the individual needs of composers to indicate non-pitched, percussive requirements.

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*Interface, Journal of New Music (1974)*
Clefs are still an integral part of music notation but, at times, in contemporary scores they operate in distinctly different ways from the traditional practice. A rare example (Heyn, *Sirènes für Streichquartett* 1983) dispenses of the clef signs altogether and substitutes them by a ‘string clef,’ with Roman numerals (*I : II : III : IV*) placed in the spaces of the stave to indicate the four strings of each instrument respectively. The reasoning behind this format is that there are many complex requirements in the score and the ‘string clef’ is used, particularly, to direct the bow onto a specific string, as indicated by the respective positions of the noteheads. A single example (Lachenmann, *Gran Torso* .... 1971-76-78) regularly substitutes the traditional clef for different clefs, each with a schematic drawing and a given set of instructions, as follows: ‘bridge clef’ - reproduces the front of the instruments between the tailpiece and the middle of the fingerboard; ‘string clef’ - illustrates actions on the four strings below the bridge, between the bridge and tailpiece.

The range of sounds has been extended outside those of identifiable pitch and includes noise of every description, often notated with uniquely designed symbols to represent the large selection of unconventional sounds.

The highest indeterminate tone - a pitch not used before the 1950s - is found in many contemporary compositions and is generally notated by the new symbol commonly accepted as representing the highest indeterminate result.

Noteheads - a significant change in the representation of pitch is made in the introduction of beams to replace noteheads and which appear on the lines or spaces as in traditional notation. The function of noteheads, in certain quartets, changes from reflecting pitch to being indicators for different factors. These include modifications to the standard meaning and design of a diamond-shaped notes to represent firstly, either a change of pressure for the accepted use as a natural harmonic or secondly, for duration. New noteheads in the shape of accents, either in this form < or that > (with or without stems) appear and, depending on the instructions set out by the composers, represent different types of articulation. Notes often appear without staves and as such relinquish any reference to pitch.

Scordatura, while not being a new technique in the 20th century, is found not only as an instruction at the start of a composition but within the body of the score. Pitch adjustment by the use of *scordatura* is also used momentarily in association with a number of specific techniques. This latter use belongs specifically to the quartets of the second half of this century but, in either case, *scordatura* is used sparingly in the quartets under investigation.
The simple *glissando* has been extended both in technique and notation to include the following broad categories: ascending and descending; attached to notes, harmonics, definite and indefinite pitches; in straight, curved or angular graphic lines; in conjunction with variable dynamics, rhythmic or *tempi* instructions; placed in a time unit; combined with trills or *tremolos*. The *glissando* is found frequently in both traditional and spatial notation.

Comment

This investigation has shown that key signatures and accidentals were components of diatonicism that have lost their functions in contemporary compositional attitudes. Accidentals now function independently of tonal chromaticism and with key signatures being generally abandoned. The concept of the semitone subdivision of the scale was divided further when microtones were used - towards the end 19th century - as an extension to pitch.

The stave in its standard format has proven, in certain circumstances, to be restrictive and has been adapted in various ways to assist in clarifying added techniques which are unable to be accommodated in the standard structure. Apart from the mixing of fragmented and standard staves and the use of no staves, modifications include the use of tablature notation formulated into varying sets of lines, specifically to accommodate indeterminate sounds.

Other notation systems adopted fall outside modifications of extensions or additions to standard structures, and include the uniquely devised Qualitative Notation, implemented in a single quartet (Pousseur), and Rodney Fawcett’s 1958 Equitone system (Karkoschka), as well as a selection of stave systems designed primarily to suit the composer’s particular compositional style. For example (Lachenmann’s) ‘border’ five line stave, placed at the top of each page, acts only to orientate the composer and serves no purpose for the players. Amongst others, there is Hübler’s enlarged stave structured in five separate lines of diminishing numbers, each representing a function relating to different aspects of rhythm, articulation and point of contact. Generally, however, when the clef is substituted, it is done to function for specific technical or *timbral* requirements.

Perhaps the two most innovative aspects of the *glissando* have been the development of graphically designed contours that extend the limited movement of the original design, and the movement to and from indefinite pitches which, with the contoured actions, did not appear until after the 1950s.
In the early decades of this century when *pizzicato* was required, the customary word or abbreviation in Italian was placed below or above the relevant notes or sections. It was in the first half of this century that Bartók invented two unusual *pizzicati* effects with correlative symbols, found in the following quartets: the *String Quartet No. 4* (1928) and the *String Quartet No. 5*, (1943). The first was the snap *pizzicato* notated as $\phi$, which required the player to pluck the string with such force that it rebounded off the fingerboard with a loud snap; and the later addition of the nail *pizzicato* notated as $\odot$, introduced a second percussive *pizzicato* device. These *pizzicati* are widely used in the string quartets post 1950 with only slight modifications being made to the original symbols and sounds.

Modern techniques introduced into contemporary scores have extended all aspects of the plucking movement for example: at the points of contact: in virtually any direction: extension of the dynamic range: with duration combined with different techniques. Instructions given are either in words alone, by new symbols or in a combination of both. Graphic representation is also used.

The simple *pizzicato* which, traditionally, was positioned away from the bridge and plucked generally with either the 2nd or 3rd finger of the right hand or with the left hand, is now found in many different modes of attack, with a wide range of contact points, directions and durations, some of which include:

- *Pizzicato* is used in various *modes of attack* and can be executed either on the string or from above and performed as follows: as a Bartók snap, alone or combined with added percussive sounds notated with the original symbols or slight modifications thereof: with the fingernail: with the buzz or rattling effect created by the vibration of the string against the nail, shown generally by a graphic design of a fingernail: with the two finger technique: with alternating fingers: with the thumb: with or without a plectrum, indicated either in words or as a graphic representation of a plectrum: with the nut of the bow, also shown as a graphic representation of the nut: in rhythmic or non-rhythmic *tremolos*: at the highest note of a selected string, indicated by the corresponding contemporary symbol indicating indeterminate pitch.

- A range of *plucking positions* - (points of contact) - are given either in words or with newly invented symbols, with some used more consistently than others. The range is from behind the bridge, over the fingerboard and up to the pegs and is widely practised in all of the positions.
Direction of the pizzicato can be either perpendicular or oblique: arpeggiated across the string as indicated by the slant of the arrows; alla chitarra or alla Mandolino, either in the normal string position or in the guitar position, given generally in words: strumming in various directions indicated by an instruction in words combined with the slant of the arrows. The traditional holding position of the instrument is often adjusted and held as either a mandolin or guitar for plucking arpeggiated chords.

Duration of the pizzicato is always relatively short. In contemporary scores it is found in combination with glissandi, portamenti or acciaccaturi (less so in the latter two categories). Damping the strings stops the vibrations while the sound of a pizzicato behind the bridge is very short lived.

Comment

The plucking technique has been extended far beyond the simple contact point of just over the fingerboard, and composers have devised a whole assortment of new plucking areas, modes of attack, directions and durations, all used in conjunction with various standard techniques. These innovations are widely found and notated either in words, with arrows or, in the case of unusual points of contact, with uniquely devised symbols accompanied by the word pizz. and explanations, either in the score or in a page of explanatory notes. The most prolific pizzicato technique used is the Bartók 'snap', with composers from the 1960s-1990s making extensive use of it.

Modern Bowing Techniques

Modern bowing techniques have extended the timbral effects of sul ponticello and sul tasto to include a vast array of new sounds and related symbols. In previous centuries various qualities of sound, shading and dynamics were produced by placing the bow consistently somewhere between the end of the fingerboard and the bridge. Contemporary practices show that one of the greatest differences in modern bowing compared to attitudes of the past is that any area, within the physical scope of the instrument, is acceptable as a bowing position. While some innovative and energetic bowing techniques were used in quartets pre-1950 by Bartók, and to a lesser extent by Hindemith, the instructions given never deviated from the accepted wording indicating positions near the bridge or over the fingerboard. By contrast, in the post-1950 quartets a whole range of new and individualistic colours have been added to the tonal palette.
The following are selected contemporary modifications and additions to bowing techniques:

- The words *Sul ponticello* and accepted abbreviations are still used, but a variety of German or English words are also given. In the 1950s and ‘60s instructions included the added distinction of playing either ‘near’ ‘on’ or ‘around’ the bridge. The early 1970s saw the introduction of a great variety of different bow placings. It is in the German composer Lachenmann’s string quartet, *Gran Torso Musiek für Streichquartett* (1971-76-78), that an explosion of different instructions for playing around the bridge is first given. These include: *Steg* - bridge; *am Steg* - at the bridge; *Bogen am Steg* - bow at the bridge; *fast auf Steg* - almost on the bridge; *Richtung Steg* - toward the bridge; *nicht zu nah am Steg* - not too close to the bridge; *scharf am Steg* - extremely close to the bridge; *direkt am Steg* - directly at the bridge. Many quartets direct the player to different bow positions, for example: behind the bridge; on the tailpiece; on the side of the bridge; under the strings; on the body of the instrument and between the bridge and tailpiece. The position of *sul ponticello* is also found in conjunction with a variety of techniques, including: controlled and non-rhythmic *tremolos*; in *glissando*; in *accelerando* indicated by a new symbol of diverging beams. All these instructions are given either in words alone or accompanied by uniquely devised symbols, some of which graphically illustrate the point of contact.

- The extension of *Sul tasto* to various parts up the fingerboard is far less extensive than those emanating from the simple instruction, *sul ponticello*. Generally there are a limited number of innovative examples. Two are as follows: between the pegs and fingerboard; behind the left hand. Other movements are found using the whole length between the bridge and fingerboard and include instructions such as: Keep bow shifting between bridge and middle of the fingerboard; oblique brushing movements; from fingerboard to bridge; vertically towards bridge.

- **Pressure Bowing Creating Noise** ranges in intensity and includes such instructions as: fierce; scratchy; grinding sound; as though crazy; with the utmost force - all done with such strength that the pitch is indefinable. These movements are executed on any part of the string or instrument, and graphic notation generally best demonstrates the required direction and intensity of movement. It is imperative for the composer to provide a list of explanations for the specific symbols as the movements are often complex and individualistic. In most contemporary quartets these lists are provided.
• Percussive Sounds play a large part in contemporary scores and include: slapping, rubbing, tapping and knocking with the wood of the bow, with the hand, fingers, fingernails or knuckles, on any part of the instrument. There are also finger tremolos played either on the belly or back of the instrument, tremolos done with the fingernails and a whole host of unlike sound combinations. Each of these actions mentioned produces a different sound, and this distinction is further emphasised by the exact location of the point of contact - for example, a sharper percussive sound results from a fingernail tapping on the belly of the instrument than when done with the fleshy part of the fingertip.

• Col legno battuto - striking the string with the wood of the bow - has been extended to include a large selection of percussive sounds generated with the use of different parts of the instrument, say, on the back, the belly, tailpiece, bridge, pegs or scroll, with each producing a characteristic sound. Contemporary quartets make extensive use of the percussive technique and use graphic notation, special symbols found in the explanatory notes, or words in the score to clarify what is wanted. Perhaps not surprisingly, there is at times, a resistance on the part of many string players to use percussive techniques, as the process of ‘striking’ may damage the instrument or bow. Various suggestions have been made from time to time to alleviate this problem - such as the use of a second inferior quality instrument or bow - but generally, in the quartets under investigation composers appear to ignore this difficulty as no restrictions seem to have been placed on the range of percussive sounds required.

Comment

Composers have sought ways to enlarge the sound palette of an anachronous group of chamber instruments influenced by, amongst others factors, contemporary electronic and environmental sounds. They have expanded both bowing and right hand techniques to include an unparalleled variety of different effects. Emanating from the simple use of sul ponticello, sul tasto, glissando and col legno a large variety of different sounds and actions have erupted into string quartet writing and have extended the range of pitch, sound quality and 'expressiveness' of the instruments. These extensions of sound - never considered before the 1950s to be credible - now relate not only to the electronic medium, but to the long established conservative instruments that make up the genre of the string quartet.
General Aspects of Notation

In addition to the specific extensions to notation found in the string quartets under review, and already discussed, there are the following additional aspects of notation for consideration:

- In **Determinate and Indeterminate** notation there is general interchange between concepts of both rhythm and pitch.
- **Proportional spacing** is used in both traditional and the newly devised notation.
- A **Page of Instructions** is often attached to a score that includes unconventional notation for either a specific new technique, an aspect of musical syntax or an unorthodox movement of one sort or another.
- **Written instructions** are added to new symbols as a convenient way of explaining individualistic techniques and movements that cannot be accommodated in a single sign or represented by a graphic alone. These, however, are not always understood if a common language does not exist between performer and composer. Generally, the instructions are written in either the conventional Italian, German, French or English depending on the choice of the composer. Many critics caution against the use of too many instructions in the score so as not to conflict with the notation.
- **Theatrical gestures** combined with string playing are found, but rarely.
- In **Contemporary scores**, the autograph concept counts very strongly in the publication of works, and the introduction of a myriad of notational symbols has made it impractical for publishers to type-set and print the scores in the traditional manner; rather, they distribute an autographed copy of the work. In the Table of Quartets researched, all the quartets before the 1950s - with the exception of Cage’s **String Quartet in Four Parts** 1949 - have been printed and published in the conventional manner. By the start of the 1960s, however, many scores such as Pousseur’s 1960 quartet, **Ode : Pour Quatuor à Cordes**, are published as autograph copies, as are those of Kopolenl **Quartetto 3** 1963, Lutoslawski **String Quartet** 1964, von Biel **Quartet für Streicher**, 1965, Gisterlinck **Quartet with Tenor** 1966, Bennett **String Quartet No. 4**, 1966, Ferneyhough **Sonatas for String Quartet** 1967 and many more. This practice has continued well in the 1980s. However, certain quartets of the 1960s were printed and published in the conventional manner such as Karkoschka’s **Quattrologue** 1966 and Penderecki’s **Quartetto per Archi** 1968. Holliger’s **Streichquartett** 1973 is so complex and contains such a wide variety of new and individualistic symbols that it could only be published as an autograph score. Ferneyhough’s **Second String Quartet** 1980, on the other hand is written in conventional notation and while the pages are filled with unorthodox note groupings and techniques, it is nevertheless published in the conventional manner.
Concluding Comment

An investigation into selected string quartets of the 20th century affirms the principle that notation and composition determine each other. This is particularly significant in the quartets post 1950, where the revolution in performance practice was expressed, initially, by extending the capabilities of standard notation. However, these expansions did not satisfy the multifarious outpourings of contemporary musical thought, and new individualistic symbols appeared to reflect the diversity and multiplicity of modern composition. Furthermore, in the words of the English composer Cornelius Cardew (1936-1981), the syntax of these contemporary quartets particularly underlines the viewpoint that '... a musical notation is a language which determines what you can say, what you want to say determines your language.\(^\text{461}\)

In the light of the dilemma regarding the use and standardisation of new notation, an international congress was held at the State University, Ghent, from 22-25 October 1974, to formulate a guide in this matter. Based on a Notation Questionnaire of fifty-nine items, distributed to over one thousand participants, a committee of some eighty-four members was required to analyse and endorse symbols presented in answer to the eight page questionnaire The final endorsements had to fulfil all the requirements for establishing notational standards and provision was made for a set of recommended proposals that might be considered as examples of tentative solutions of 'non-exclusive possibilities'. This important gathering included, amongst others, renowned composers such as the Americans George Crumb, Earle Brown, Elliot Schwartz, Roger Reynolds and Charles Wuorinen, and the Europeans Erhard Karkoschka and Roman Raubenstock-Ramati. The final report of the congress, *Interface, Journal of New Music Research* (1974), \(^\text{462}\) had as its editors, Herman Sabba, Musicologist, State University Ghent; Kurt Stone Editor and Author and Gerald Warfield, Associate Director, both of the *Index of New Musical Notation*, New York City. The report included, as basic recommendations, the following:

- the adoption of any signs that are already in such wide use that they have almost automatically reached standard status by now [1974]
- signs that possess qualities which make them more efficient than other means to achieve the same results \(^\text{463}\)

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\(^{461}\) Cardew, *Notation - Interpretation, Etc.*

\(^{462}\) Stone, *Interface*

\(^{463}\) Ibid., p. 21
The above criteria set a standard for the evaluation of all aspects of notation found in music from the 1950s onwards and included signs which evolved before 1974.

The 1974 ‘Ghent’ attempt at codifying notation symbols was not the first, as in 1847 a similar endeavour had occurred in the Fine Arts section of the Belgian Royal Academy of the Sciences. In 1856, Joseph Raymondi, a participant of the 1847 survey, published what he considered to be the ten primary criteria for any notation reform. Listed below are seven of these criteria which could form a dictum for any would-be reformist today, whether in the matter of compiling a completely new system, radically changing parts of musical syntax, or merely adding new symbols:

- Make clearer the function of the staff lines and spaces
- Abolish the profusion of clef signs
- Improve the visual aspects of duration
- Regulate the indications of measure
- Improve the notation of irregular rhythmic values
- Facilitate the writing down of music
- Make musical typography easier to print and to read

Erhard Karkoschka’s survey on 20th century notation: Notation in New Music (1966), adds a contemporary set of suggestions, listed below, which relate specifically to the design and application of new symbols:

- The same symbol must not appear with a different meaning
- The outward appearance of a symbol must not resemble too closely that of another
- A symbol with a traditionally familiar meaning can only acquire a new one in an entirely new context
- A sensible balance of symbols and verbal instruction is to be preferred
- As far as possible, a symbol should be able to indicate its meaning directly and without explanation
- Abstract symbols and illustrations should be selected according to function, and should never be mixed.

Keeping in mind the set of suggestions given above, it can be said that after examining and analysing the new notation and related technical aspects in the selected string quartet scores of the 20th century, evaluations can be made as follows:

464 Read, Source Book of Proposed Notation, p. 4
465 Karkoschka, Notation in New Music, p. 3
Many scores contain a mixture of traditional notation intermingled with a selection of new symbols. Composers have relinquished traditional notation in favour of newly devised systems. Ambiguity of notation and unexplained signs are uncommon. Generally the outward appearance of a selected symbol does not resemble that of another but an occasional interchange between the same symbol and different techniques is found. Uniformity in new signs - even for the same technique - is irregular, as many of the new symbols are devised independently as best determined by each composer. As far as possible symbols indicate meanings directly, but generally not without some explanation as to their exact meaning given either in a page of instructions as a preface to the score, or on the relevant page of the score. A sensible balance of symbols and verbal instruction is generally maintained. Details and articulation in graphic suggestions are found, but are not common. Tablature notation clarifies the use of percussive sounds. Abstract signs in the form of graphics are found, but those intended as indications for approximate interpretation through the imagination of the player are not.

The quartets under investigation convey methods of thinking about the relevance and place of the traditional concept of the genre in a contemporary world that is subject to continual change. In the modern string quartet, composers combine references to the traditional and the contemporary in ways that emphasize the unsettling discontinuities between tradition and modernity and, in so doing, examine critically a fusion of customary and contemporary techniques and notation which assist in exploring and maintaining the richness and complexity of the genre. In spite of every best endeavour by composers and musicologists to codify contemporary notation, a modern score is itself such an enigmatic phenomenon, however detailed, or precise, or illuminating the instructions for playing it. It is difficult to focus on it; its features are so elusive. Juries leafing through a modern score say 'nothing seems to happen in it', forgetting that it consists of notes which must be read and heard. The modern score has a concentration that defies lecture.466

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466 Cardew, Notation - Interpretation Etc., p. 21
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SCORES
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Powell, Mel (1923 - ) : American

- Filigree Setting for String Quartet, New York : G. Schirmer, Inc., MCMLXV.
Prokofiev, Sergey (1891 - 1953) : Russian
Reynolds, Roger (1934 - ) : American
Rihm, Wolfgang (1952 - ) : German
Rochberg, George (1918 - ) : American
----- String Quartet No. 1, USA : The Society for the Publication of American Music, Inc., 1957
Schoenberg, Arnold (1874 - 1952) : Austrian
----- String Quartet No. 4, Op. 37, USA : G. Schirmer Ltd., copyright, 1939.
Sculthorpe, Peter (1929 - ) : Australian
Shifrin, Seymour (1926 - ) : American
Skalkottas, Nikos (1904 - 1949) : Greek
Schmidt, Hansjürgen (1935 - ) : German
Szokolay, Sándor (1931 - ) : Hungarian
Tschaikowsky, André (1935 - 1982) :
Tippett, Michael (1905 - 1998) : English
Volans, Kevin (1949 - ) : South African
Webern, von Anton (1883 - 1945) : Austrian
Wolff, Christian (1934 - ) : French
Wuurinen, Charles (1938 - ) : American
Wyschnegradsky, Ivan (1893 - 1979) : Russian
Xenakis, Iannis (1922 - ) : Greek - French
----- ST/4 - 1, 080262, (String Quartet, No. 1), London : Boosey & Hawkes, 1966.
Yun, Isang (1917 - ) : Korean - German
SCORES

Secondary Scores
Composer: Dates:

Bach, Johann, Sebastian (1685 - 1750)
----- Preludes and Fugues, Well Tempered Klavier, Urtext, Vols. 1 & 2, London: Boosey & Hawkes

Beethoven, Ludwig, van (1770 - 1827)

Boulez, Pierre (1925 -)
----- Le marteau sans maître, for contralto, alto flute, viola, guitar, vibraphone, xylophone and percussion, London: Universal, 1953 - 55, revised.

Brown, Earle (1926 -)

Carrillo, Julian (1875 - 1965)
----- Preludio a Cristobal Colón, USA: Theodote Presser Co., New Music, copyright 1944.

Feldmann, Morton (1926 - 1987)

Milhaud, Darius (1892 - 1974)

Mozart, Wolfgang, Amadeus (1750-1791)

Nono, Luigi (1924 - 1990)
----- La tena e la Compagna, Mainz: B. Schott Söhne, 1958.

Schoenberg, Arnold (1874 - 1951)

Stockhausen, Karlheinz (1928 -)

Stravinsky, Igor (1882 - 1971)
----- Le Sacre du printemps, (The Rite of Spring: pictures pagan Russia), London: Boosey & Hawkes, 1921.

Webern, Anton, von (1883 - 1945)

Wolff, Christian (1934 -)
SCORES
String Quartets Including Performance Instructions
Composer : Dates : Quartet

Bartolozzi, Bruno (1911 - 1980)

Berio, Luciano (1925 -)

Biel, Michael, von (1937 -)

Brown, Earle (1926 -)

Cerha, Frederich (1926 -)

Cervetti, Sergio (1941 -)

Coeck, Jan, L (19? -)
----- Graphismes, for String Quartet, Brussels : CeBeDeM, copyright, 1988.

Danielpour, Richard (1940 -)

Dillon, James (1950 -)

Druckman, Jacob (1928 -)
----- String Quartet No. 2, New York : MCA Music, MCMLVXII.

Fisher, Stephen (1940 -)

Gielen, Michael (1927 -)

Globokar, Vinko (1934 -)

Henze, Werner, Hans (1926 -)
----- String Quartet No. 5, Mainz : B. Schott’s Söhne, 1977.

Hertel, Thomas (1951 -)

Heyn, Volker (1938 -)

Hiller, Lejaren (1924 -)
Holliger, Heinz (1939 - )
----- Streichquartett, Mainz : Schott's Söhne, 1974.
Huber, Nicolaus, A. (1939 - )
Hübler, Klaus, K. (1956 - )

Jeths, Willem (197 - )
----- Arcate, for String Quartet, Amsterdam : Donemus, 1990.
Karkoschka, Erhard (1923 - )
Kelemen, Milko (1924 - )
Kochan, Günther (1930 - )
Kopolent, Marek (1932 - )
Lachenmann, Helmut (1935 - )
----- Gran Torso, Musik für Streichquartett, Weisbaden : Breitkopf & Härtel, assigned to 1980.
Penderecki, Kryzstof (1933 - )
----- Quaretto per Archi, No. 2, Mainz : B. Schott’s Söhne, 1971.
Pousseur, Henri (1929 - )
Powell, Mel (1923 - )
----- Filigree Setting for String Quartet, New York : G. Schirmer, Inc., MCMLXV.
Reynolds, Roger (1934)
Schoenberg, Arnold (1874 - 1952)
----- String Quartet No. 4, Op. 37, USA : G. Schirmer Ltd., copyright, 1939.
Sculthorpe, Peter (1929 - )
Shifrin, Seymour (1926 - )

* The dates and origins for composers Brewaeys, Brandmüller, Coeck, Jeths not traced.
SELECTIVE DISCOGRAPHY

Research for this thesis suggests that not all the string quartets under investigation, nor certain of the contemporary works mentioned, have been commercially recorded. Therefore, the list below is not a comprehensive selection but a guide to some of the relevant recordings, generally found in standard catalogues. LP refers to black vinyl records otherwise CDs are presumed.

Bartók, Béla
String Quartets, Nos. 1 - 6, Quatuor Vegh (Audvidis Valois V 4809 - 3 CDs)

Boulez, Pierre
Le Marteau sans maître, (LP Vega C35 A67 332)
Sonatina, (LP Vega C30 A139)
Parts of the Livre pour Quatuor is available on (LP Erato STU 70580)

Brown, Earle
Folio, a group of seven works including December 1952, Ensemble Musica Negativa, (LP EMI IC 165 954/57Y)

Cage, John
String Quartet in Four Parts, Arditti Quartet, (DG 423 245)
String Quartet in Four Parts, LaSalle Quartet, (DG 423 245)
---- with quartets by Lutoslawski, Mayusumi and Penderecki
Sonatas and Interludes for Prepared Piano, American Festival of Microtonal Music Ensemble, (Newport Classic NPD 85526)
---- with music by Ives Charles

Carter, Elliott
String Quartet, Nos 1 - 4, Juillard String Quartet, (Sony S2K 47229, 2 CDs)
---- with Duo, for Violin and Piano

Cowell, Henry
Cowell Piano Works, (Smithsonian-Folkways 40801)
---- Henry Cowell (piano), recorded in 1958 with Cowell’s commentary

Crumb, George
String Quartet, Black Angels, Kronos Quartet, (Elektra Nonesuch 79242-2)

Debussy, Claude
String Quartet, Melos Quartet, (DG 419 750 - 2GH)
---- with Ravel String Quartet, transfer from the original analogue recording of 1979

Feldmann, Morton
String Quartet, Structures, Arditti Quartet, (U.S.A. Arditti Quartet, Disques Montaigne F I 782010)
---- with String Quartet No. 1, Nancarrow; Elegy, Carter: et al

Ferneyhough, Brian
String Quartet, Nos. 1, 2, 3, & Adagissimo, Arditti Quartet, (Montaigne 789 002)

Henze, Hans Werner
String Quartet, Nos. 1 - 5, Arditti Quartet, (Wergo 60114/5-50, 2CDs)

Holliger, Heinz
String Quartet, (Wergo 6084)
---- with Chaconne for cello

Ives, Charles
String Quartet, Nos. 1 & 2, Emerson Quartet, (Deutsche Gramophone 435864-2)

Lachenmann, Helmut
String Quartet, Gran Torso, Berne Quartet, (Col Legno 0647 277)
String Quartet, Reigen seliger Geister, Artitti Quartet, (Montaigne 782 019)

Hindemith, Paul
String Quartet, Nos. 1 & 5, Sonore Quartet, (CPO 999001/2)
String Quartet, Nos. 1, 2 & 6, Kocian Quartet, (Prago PR 2500 88)
String Quartet, No. 3, Hollywood String Quartet, (Testament SBT 1052)
String Quartet, No. 4, Philharmonia String Quartet, (Thorophone CTH 2273)

Ligeti, György
String Quartet, Nos. 1 & 2, Arditti Quartet, (Wergo 60079)

Lutoslawski, Witold
String Quartet, Kronos Quartet, (Elektra Nonesuch 79255) : Arditti Quartet, (Montaigne 789 007) : LaSalle Quartet, (DG 423 245)
---- with quartets by Cage, Penderecki and Mayuzumi

Mayuzumi, Toshiro
Prelude For String Quartet, LaSalle Quartet, (DG 423 245)

Penderecki, Krzysztof
String Quartet, No. 1, LaSalle Quartet, (DG 423 245)
---- with quartets by Cage, Lutoslawski, and Mayuzumi
String Quartet, Nos. 1 & 2, Tale Quartet, (Fröst BIS CD - 625)
Threnody for the Victims of Hiroshima, Polish Radio National Symphony Orchestra, (EMI CDM5 65077 0)

Prokofiev, Sergey
String Quartet, Nos. 1 & 2, Emerson Quartet, (DG 431 - 772 - 2 GH)

Rihm, Wolfgang
String Quartet, No. 3, (5 & 8), Arditti Quartet, (Montaigne 782001)

Schoenberg, Arnold
String Quartet, Nos. 1 - 4, Arditti Quartet, (Auvidis Montaigne MO 782024, 2 CDs)

Shostakovich, Dimitri
String Quartet, Complete Set, Fitzwilliam String Quartet, (Decca 43 078-2, 6 CDs)

Stockhausen, Karlheinz
Elektronische Musik 1952-1960 - Etude; Studie 1 & 11; Gesang der Jünglinge; Kontakte, (Stockhausen - Verlag 3)

Stravinsky, Igor
Three Pieces for String Quartet, Brodsky Quartet, (Silva Classics D31203)
The Stravinsky Edition, (Sony SX22K 46 290, 22 CDs)
---- a set of 22 CDs, or as 12 separate volumes of all Stravinsky's performances of his own music, supplemented by recordings of those pieces he did not conduct himself

Varèse, Edgard
Déserts, Intégrales, Ionisation, Poème électrique, ASKO Ensemble, (Attacca/Babel 9263-2)

Volans, Kevin
String Quartet, White Man Sleeps, Kronos Quartet, (Elektra Nonesuch 79163)
String Quartet, Hunter : Gathering, Kronos Quartet, (Elektra Nonesuch 79253)

Webern, Anton von
String Quartet, Complete Trios and String Quartets, Arditti Quartet, (Auvidis Montaigne MO 789008)

Wuorinen, Charles
String Quartet, No. 1, Fine Arts Quartet, (Turnabout TV345155)

Xenakis, Iannis
String Quartet, S7/4-1,080262, Arditti Quartet, (Montaigne 782 005)
# 20th CENTURY COMPOSERS : CHRONOLOGICAL LIST

Composers mentioned in this thesis

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GLOSSARY OF CONTEMPORARY MUSIC TERMS

A.

aggregate - 1. Collection of notes in a composition representing every pitch class just once. 2. In Cage's terminology, a collection of sounds heard at the same instant. The idea grew out of his work with the prepared piano where in certain instances the pressing of a key produced not a single sound but an aggregate of 2 or 3 sounds separately discernible. He worked with aggregates in his String Quartet in Four Parts (1949).

aleatory - (from Latin alea: dice). A concept of chance occurrences in performance that is not new to the 20th century, as improvisation was well established in the cadenzas and alternate versions (ossia), as well as in the 'dice music' of the 18th century. In the second half of this century, the terms aleatoric, chance music and music of indeterminacy have been applied to many works created since 1945 where the methods for completeness is based on a process of random selection. Chance may be involved in the process of composition, in performance or in both. The chance factors for the various parameters of the composition may be executed in various ways, for example, dice throwing - Cage, Music of Changes (1951) or according to mathematical laws of chance - Xenakis with the assistance of computers, ST/10-1, 080202 (1962); or in performance, as in Stockhausen's Klavierstück XI (1956), with nineteen sections to be played in any order with the pianist choosing from six different tempos, dynamics and kinds of touch.

ametric - Lacking a stable meter or alternatively an absence of pulse.

athematic - Lacking a melodic theme, as in the first atonal instrumental works of Schoenberg and his pupils known as the Second Viennese School.

atonality - A term embracing all music that is not tonal. More commonly restricted to music that is not serial. Schoenberg disliked the word, feeling that the stated absence of tonality implied an absence of music: he preferred 'pantonality'.

avant garde - The French term for vanguard. In a musical context, representing composers from 1945-1970, including Boulez, Stockhausen, Berio and Nono amongst others, who were in the forefront of presenting ideas and compositions well in advance of the prevailing musical climate.

B.

beaming - 1. Contemporary term for the horizontal line grouping together stemmed notes. In the 20th century context beamed groupings of notes do not necessarily relate to the rhythmic pulse of the bar and are joined contrary to it in order to emphasise other musical aspects. 2. Horizontal lines extending from noteheads or found in isolation, representing duration in proportional notation.

bitonality - see polytonality

C.

cluster - The cluster refers to a number of adjacent notes played simultaneously. Cowell is attributed to be the first composer to have included them in a composition - The Tides of Manaunaun (1912). On the piano, consecutive keys may be depressed with the hand, the forearm or any other part of the body.

colour - Synonymous with the French term timbre which implies sound quality - a creative source of great importance to certain contemporary composers.

constructivism - A style of painting in simple geometric shapes associated with artists from Russian and the Netherlands and associated in musical terms with a composition with a high degree of structure such as is found in Webern's works.
Darmstadt - Town in Germany where Wolfgang Steinecke started in 1946 the Internationale Ferienkurse für Neue Musik (International Summer courses for New Music). Since 1958 the proceedings and findings at the courses are published annually as Darmstädter Beiträge zur Neuen Musik.

dodecaphony - A term used synonymously, but imprecisely to cover atonality, serialism and 12-tone composition.

dominant - modified dominants and modified tonics - Found in contemporary tonal music where the function of the tonic/dominant relationship stays intact within a cadence but with the modification of the either the structure within each chord or their respective diatonic relationships to one another.

duodecople scale - All inclusive scale of twelve notes within the octave with equal status. A designation more appropriate than a chromatic scale as it does not carry with it the connotations of altered or secondary notes.

duration - Within the rhythmic context of 20th century music, a length of time measured either as a notational value with a metronome marking or in time units per seconds.

electronic music - Music played by electronic means. Originally associated solely with sounds on tape as presented in 1948 by Pierre Schaeffer’s Musique concrète. Later, in the early 1950s Stockhausen and Eimert used the term ‘Electronische Musik’ for taped music created without natural sounds to distinguish their work from Musique concrète.

Equitone - A notation devised in 1958 by Rodney Fawcett containing a staff of two lines that occur at the intervals of an octave, which can be repeated as often as required. All identical octaves are merely transposed an octave. Stemless notes are placed between the lines in contrasting colours of black and white to differentiate the chromatic inflections. No ledger lines are required. An example of the equitone system is found in Karkoschka’s quartet: Quattro/age (1966).

experimental music - A term coined in the second half of the 20th century to signify music that departed from the expectations of style, form and genre. Composers of the late 1960s and early 1970s, working outside traditional syntax and the accepted channels of communication were known as experimentalists.

Expressionism - Taken from the visual arts and first applied to the paintings of Kandinsky and others in 1910-1911 which expressed extreme and intense emotion. It is used analogously in musical terms for compositions of the first two decades of this century, written in a deeply subjective and introspective style which rejected in essence all traditional forms and techniques. Composers first identified as ‘Expressionists’, are Schoenberg for his works: Verklärte Nacht, Pierre Lunaire and Erwartung, and Berg for his operas Wozzeck and Lulu.

formalism - Term used by authorities in the USSR to discredit the music of Shostakovich, Prokofiev and others in the 1930s and 1940s with the implication that such music was artificial and offensive.

graphic notation - Various types of notation, found under the umbrella name of graphic notation, devised to express specific compositional needs not accommodated by traditional notation. Considered to be the first of their kind in contemporary music include Feldman’s system of squares releasing him from preciseness of pitch: Projection Series, 1950-51, and the graphic notation found in Brown’s December 1952 of the same period which is intended to stimulate and not necessarily symbolise. Certain types of graphic notation display a correlation between the look of the score and the sound of the music.
I.

I Ching - A method of composition used by John Cage in his piano work *Music of Changes* (1951) where the various musical elements were determined by the tossing of marked sticks (or coins) on to a chart containing hexagrams of thirty-two or sixty-four numbers.

Indeterminacy - All notations carry a notation of indeterminacy in so far as they fail to give a complete specification. In the 20th century, the term indeterminacy was introduced by John Cage as a preferred description for aleatory compositions and referred to those indeterminate aspects of the score which leave a lot of decisions to the performer resulting in a leaning towards performance rather than prescription. Certain fixed elements are arranged and calculated in advance are combined with others of chance and improvisation. Works are indeterminate in composition when the process of creating them is left to chance operations as in the *I Ching* method used by Cage.

K.

Klangfarbenmelodie - timbre melody. Term introduced by Schoenberg in his *Harmonielehre* (1911) to define a melody which established timbre as a structural element comparable with pitch and duration etc. This method of composition was explored by Webern, initially, in the *Five Pieces for Orchestra*, Op. 10, 1913, where successive notes were given different tone colouring to emphasise the melodic line.

L.

Linear cadence - a cadence where the structure is created through the primary importance of the progression of the linear movement of the individual voices which takes precedence over the harmonic function.

M.


Metre - Pattern of regular pulses called beats, and the arrangement of the constituent parts of a piece by which a piece is measured in relation to a time span. In the 20th century many variations of metre are found:

- *Alternating metre* - double or triple time combinations where the time signatures are placed at the beginning of the movement or phrase, indicating a continuation of a pattern of consecutive alternating meters per bar.
- *Fractional meter* - time signature that involves the use of fractions in the numerator over a denominator.
- *Mixed meter* - selection of mixed time signatures used when the beats, within the bars, consist of unequal groups of successive units.
- *Polymeter* - combination time signatures for two or more simultaneous patterns of regular rhythms occurring within the bar.
- *Variable meter* - systematic change of metre requiring a new time signatures to be placed at the start of a bar each time the beat of the ensuing bar changes.

Metric modulation - Term introduced by the American composer Elliot Carter for a technique by which changing time signatures effect two modifications: a transition from one pulse to another and a change of metre. This is done by introducing a new rhythmic character as a cross rhythm within the old.

Minimal music - Term applied to works based on the following: the repetition of a short figure in static harmony, the overlapping of small tonal motifs, or effecting gradual change within *ostinato* textures. It is highly repetitive drone-based music using carefully chosen frequencies in simple ratios. Created initially by the American composers La Monte Young (1935-) and Terry Riley (1935-). Among Young's the early works are: *Keyboard Studies* (1963) and *In C* (1964).
microtone - Any interval smaller than a semitone. Such intervals have long been found in Asian musical culture, but their use in Western music is a phenomenon of the 20th century. Alois Hába the Czech composer and the Mexican Julian Carrillo were among the prominent composers to introduce microtones into their music. The American Harry Partch arrived at smaller intervals through the pursuit of just intonation.

mobile form - A term in music associated with the American sculptor Alexander Calder’s mobiles. Relating to the form of the aleatory works of European composers practised notably by Boulez, Stockhausen, Berio and others dating from around the 1950s and 1960s.

musique concrète - A technique invented by Pierre Schaeffer and his associated in Paris, in 1948, which consisted of music created on tape by simple techniques of editing, reversal and speed-changing, either with natural, instrumental and vocal sounds.

N.

neo-Classicism - In music, a revival in the 20th century context of musical principles from the 18th century.

noise - Associated with both electronic and ordinary sound without definite pitch. Electronically the sound of ‘white noise’ contains an even distribution of all frequencies while ‘coloured noise’ is filtered.

O.

organised sound - Term preferred by Varèse when referring to the avoidance of ‘traditional’ music implications.

P.

pandiatonicism - Term coined by Nicholas Slonimsky to describe music which, in reaction to excessive tonal chromaticism and atonality, reverts to the resources of the diatonic scale as a basis for composition. The absence of melodic and harmonic functions sets it apart from conventional diatonic music. It became established about 1925 and is associated with the neo-Classical movement of the time.

parameter - A parameter is any property whose value, when specified, characterises the phenomenon exhibiting that property. In mathematics, a parameter is any arbitrary constant that, when assigned fixed values, will generate a mathematical system. Musically, a term which gained acceptance with the advent of total serialism in Europe in the 1950s when all aspects of sound were subjected to separate serial control.

polymeter - A term used for 14th -16th century vocal music in which the barlines are placed at irregular intervals to accommodate both the musical and textural phrases occurring simultaneously resulting in a succession of different meters. The practice largely disappeared, until the 20th century when it returned, practiced in a selection of ways.

polyrhythm - The simultaneous use of at least two strikingly different rhythms.

polytonality - The use of two distinct - and often remote - tonal centres at the same time

prepared piano - A technique introduced by John Cage of inserting objects between the strings of a piano. This procedure allows the composer to experiment with sound depending on the nature of the objects used. Although normal notation is used for the prepared piano, the expected equivalent pitch for any given note is lost as, depending on the texture of the inserted object, the resultant sound may be completely different.

proportional notation - Simplified rhythmic notation introduced by Earle Brown in 1953 where the durations are indicated, not by the use of traditional symbols but by horizontal lines according to given specifications in time units of seconds. Time and tempo is also indicated in metronome markings or in any other formula devised by the individual composer. Duration in general is not expected to be entirely accurate.
Q.

**Qualitative notation** - An experiment in notehead symbology devised by Henri Pousseur and applied to only one composition, the string quartet *Qde: Pour Quatuor à Cordes* (1960). The notation is experimental in every aspect except in the use of standard clefs and the five line stave. Pitch is shown in single noteheads without stems, and small thick strokes either vertically or obliquely attached to the note, represent chromaticism. Duration is approximate and shown proportionally within variable dotted barlines. The qualitative aspect of the notation is derived from a strict quantification of the groups of note values that form durations which the interpreter can place in certain limits, according to his own judgement. Once the durations are set they remain constant, and the groupings relate to one another within different length-sets throughout the piece, annotated in large numerals above the staves.

S.

**Serialism** - Compositional technique in which the 12 notes of the chromatic scale are arranged in any fixed order to generate melody and harmony which normally remain binding for the whole work. The term also refers to a series of musical elements other than pitch.

**Sine tone** - Sound of one pure frequency

**Sprechgesang** - (German 'speech song') - A type of voice production between speech and song. In the preface to Schoenberg's composition *Pierre Lunaire* (1912) - scored for reciting voice and instrumental quintet - he states precisely that the voice should 'give the pitch exactly, but then immediately leave it in a fall or rise'. The sign used for this technique is an x attached to the stem of the note.

T.

**Timbre** - Quality of sound referring to tone colour which is distinguishable from pitch, duration and dynamics. In the 20th century the range of the tonal palette has been greatly enlarged and is more extensively emphasised than in works of previous centuries.

**Time notation** - A notation whereby duration is prescribed by the length of a straight line on the staff instead of by a symbol. It was introduced originally by Earle Brown in the collection of seven pieces called *Folio 1952-3*, which explored a whole range of indeterminate procedures.

**Time signature** - Sign placed at the start of a piece of music or during the course of it, indicating the metre of the music. It normally consists of two numbers - one placed above (numerator) and the other placed below (denominator). In the 20th century this format has been modified to include a number of different structures, often changed to suit the individual whims of composers. The function of the time signature has undergone many changes and, in certain compositions where the rhythmic beat is irregular or where notation proportional is encountered, its use has become redundant.

**Tonics** - modified tonics and modified dominants - Found in contemporary tonal music where the function of the tonic/dominant relationship stays intact within a cadence but with the modification of the structure within each chord or their respective diatonic relationships to one another.

**Total serialism** - The organisation of all possible musical parameters according to the rules of 12-tone composition.

V.

**Vibraphone** - A percussion instrument originating in the United States. Constructed with metal bars with resonating tubes having lids that open and close with electrically driven rotating propellers under each bar, causing a vibrato sound. Originally used in dance bands but occasionally incorporated into art music. Berg first used the instrument in his unfinished opera *Lulu* (1937) after Wedekind's plays *Erdgeist* (1895).
Appendix One

MUSIC IN THE TWENTIETH CENTURY - A BRIEF HISTORY

Romanticism

The stylistic relationship that existed between Classicism and Romanticism continued as an organic and logical
development from the one period into the next. This continuity of development was in great contrast to the divergent
styles that emerged in the music of the 20th century. Blume says:

The Romantic era never coined a divergent and independent style; ... it remodelled
and developed the Classic style... Only in the fundamental unity of Classicism and
Romanticism can be perceived the fundamental unity of the historical period that
lasted from about the 1760's ... until the first decades of the 20th century.1

During the latter half of the nineteenth century there were isolated stirrings of discontentment with Romanticism, but not
until the early 1900s did the disillusionment with the ideals and characteristics of Romanticism become widespread,
which, when generalised, include the following:

- an interest in the strange and mysterious
- an emphasis on enthusiasm and emotion
- an emphasis on faith rather than on pure reason
- an emphasis on the idea of the artist
  as a genius set apart from the rest of society,
rather than as a mere craftsman 2

In the early 1900s the idea of Man as a splendid creature who loved, suffered, struggled, triumphed gloriously over
adversity and retained his nobility, even in defeat, was regarded with scepticism.3

The Austrian physician and founder of psychoanalysis, Sigmund Freud (1856-1939), created an entirely new approach
to the understanding of human personality by his demonstration of the existence and force of the unconscious.
According to Freud's psychological theory, the 'splendid creature' was helpless in the clutch of his anxieties and
subservient to the animalistic demands of his id. Thus shorn of his dignity and nobility, man was but a species of animal,
with only the saving grace of intellect to recommend him. There was no place for subjectivity in the new thinking
processes and objective evidence largely outweighed passionate, emotional openness, and for music to enter the
mainstream of 20th century philosophies, it had to renounce Romantic ideals. The period of musical Romanticism was
nearing its end. And, as always, when a period of art approaches its end, there are the symptoms: lassitude or exhaustion,
and exaggeration.4

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2 The Open University Romanticism Course 202 Units 33-34, Buckinghamshire: The Open University, p. 18 (Hereafter, The Open University Romanticism)
In 1914 Arnaldo Bonaventura said in his Introduction to the *Manuele di storia della musica* (1914): 'The study of the history of music, to be truly profitable, and successful, cannot remain isolated, but must be correlated with history in general, and the other arts in particular ....'\(^5\)

At the beginning of the 20th century numerous composers - as well as thinkers in other art disciplines- questioned the fundamental art language of the West and experimented with many different innovations with a realisation that the continued use of redundant romantic techniques would lead only to stagnation. Artists and musicians thought alike, and members of *Der Blaue Reiter* group, such as the Russian/German artist Vasily Kandinsky (1866-1944) and contemporary musicians of the 2nd Viennese School - Arnold Schoenberg (1874-1951), his pupils Anton Webern (1883-1945) and Alban Berg (1885-1935), determined that the creative artist renounce personal gratification and devote himself to the expression of higher truths.

The predicament of where to go, and how to go on, forced the major composers in the first twenty-five years of the 20th century to evolve styles and procedures that worked in different ways from those of the 18th and 19th centuries and thus express the 20th century idiom of meaningful music. These composers included, amongst others, Paul Hindemith (1895-1964), Béla Bartók (1881-1945), Igor Stravinsky (1881-1971) and Edgard Varèse (1883-1935), and the above mentioned members of the 2nd Viennese School.

**Extension Process of Traditional Syntax**

To understand the accelerating awareness of the limitations of the basic materials of Western music and its notation, post-World War II, it is important to explore the syntactical 'extension' process to music which took place in the early decades of the 20th century. These extensions, says the anthropologist Edward T. Hall in *Beyond Culture*, '.... often permit man to solve problems in satisfying ways, to evolve and adapt at great speed ... it permits man to examine and perfect that which is inside his head.'\(^6\)

An examination of the developmental extensions to sound from the 19th century through to the last decades of this century will show that the systematic dissolution and decline of the traditional components - functional harmony; rhythm; timbre; texture and form of the language of music - led irrevocably to the emergence of a new approach to sound and silence. The following styles all had a profound effect on changing the traditional concept of the *genre* of the string quartet.

**Impressionism**

At the end of the 19th century the French composer Claude Debussy (1862-1918) devised an alternative style to the emotional intensity of the Germanic chromatic harmonies and luscious legato melodies. He desired that music 'be simple enough to adapt itself to the lyrical effusiveness of the soul and the fantasy of dreams!'

Debussy placed emphasis on tone colour, on subtle treatment of vertical chord sonorities without linear implications. He weakened tonality but never abandoned the underlying tonal centre. His influence was incalculable. He broke new ground in his revolt against Romanticism, and he anticipated most of the vocabulary and techniques of composition that attracted composers during the first half of the 20th century.

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He used:
- harmonic colour and instability
- modes and exotic scale patterns
- parallel chordal writing
- non-resolution of the seventh chord
- melodic phrase fragmentation

A further influence that Debussy had, especially on modern composers, was to underline the individuality of each piece of music he composed. He repeatedly questioned the structural aspects of 'form' in his compositions. His comments about the unfinished state of an early setting for a play, *Diane du Bois* by Théodore de Baulville (1823–1891), are important: 'I had undertaken a task which was perhaps beyond my powers. It has no precedent and I am obliged to invent new forms.' A similar attitude is prevalent among composers today whose approach to musical form echoes Debussy's comment: '... for I think it altogether disastrous to repeat oneself.' His single quartet Op. 10 in G minor was written in 1893.

Debussy's music is central to the Impressionist movement and his musical language was, at that time, startlingly original - his music is without antecedents.

**Futurism**

I need an entirely new medium of expression: a sound-producing machine (not a sound-reproducing one)

Edgard Varèse (1882–1965) trained in Paris, emigrated to America in 1915 and died in New York city at the age of 82. With the development of electronic music, Varèse is considered in certain circles, to be one of the truly original spirits in the music of our time. Unlike the neo-Classicists - Stravinsky, Bartók and Hindemith - whose innovations unfolded within the framework of a traditional musical syntax, Varèse rejected many of the standard elements of sound and structure altogether and stated: 'I refuse to submit myself only to sounds that have already been heard.' He adopted an experimental approach to instrumentation and his works display a distinct dislike for strings. He anticipated many of the stylistic developments in music that appear after World War II - harmony and melody had no traditional meaning; and the use of sound masses created a static-like effect with subtle dynamic variation created by rhythmic and colour changes. As early as 1917 Varèse said his path to new music lay in a world '... of instruments obedient to my thoughts ... to a whole new world of unsuspected sounds.'

Varèse's formal concepts of harmony showed radical treatment for the early 1920s and his melody (such as it is) is shrill, dissonant and fragmented and moves, together with a static sound of fluctuating waves, without any relationship to harmonic progression. The irrelevance of melody and harmony and the prominence of timbre, density and time relationships foreshadowed the developments in electronic music which arrived too late to be used as a significant tool in Varèse's early and lasting concept of new music extending beyond traditional sounds and instruments. However, Varèse was indifferent to the genre of the string quartet and as a result it was, for him, a medium of the past.

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1 Lockspeiser, E., Debussy: His Life and Mind, Cassell, 1962, Vol I p.76. (Henceforth, Lockspeiser, Debussy)
2 Austin, W. Music in the twentieth century. London: Dent, 1966 p.4. (Henceforth, Austin, Music)
5 Ibid., p.9.
Comment

What concerned Varèse most, was the inclusion of all audible phenomena as usable compositional material. He anticipated electronic sound possibilities using traditional instruments to generate timbre, density, attack, duration and layers of sound superimposition, all of which created a musical syntax that bore little or no resemblance to the central position that harmony and melody held in pre-20th century music.

Serialism

I am being forced in this direction .... I am obeying an inner compulsion that is stronger than any upbringing.\(^1\)

Most radical of the new music iconoclasts was the Viennese composer Arnold Schoenberg (1874-1951) who, with his pupils of the Second Viennese School, Anton von Webern (1883-1945) and Alban Berg (1885-1935), became convinced that the triadic tonal system was not viable for the composition of new music.

Webern wrote in his series of lectures, The Path of a 12-tone Composition, given in 1932-1933, about the state of tonality and composition around 1910:

> The substitute became so predominant that the need to return to the main key disappeared ... We don't need the relationships anymore, our ear is satisfied without tonality too... I want to prove to you that tonality is dead.\(^1\)

The art historian Sir Herbert Read wrote in 1948: ‘A tradition in art is not a body of beliefs : it is a knowledge of techniques’,\(^1\) and it was the existing techniques that the composers of the early 20th century found inadequate to express, successfully, music relevant to the historical developments of their time.

The Expressionist movement retained certain attitudes inherited from the 19th century, but these concepts manifested themselves as a suppressed, agonised romanticism with an anti-romantic slant of distortion and intensity. The strong alliance between the composers of the 2nd Viennese School and artists of Die Blaue Reiter group emerged as a movement that was concerned with the ruthless expression of disturbing emotion. Both music and art was characterised by an intense examination and deep penetration of psychological issues that exposed feelings of longing and abandonment, stretching the concepts of stylistic violence to its extreme. In music, this was effected by heightened tension using harmonic dissonance, extreme registers and wide melodic leaps - all of which aspired to maximum intensity at all times.

Webern's Six Orchestral Pieces, Op. 6 (1910), performed at a Viennese concert of 1913, caused bewilderment. This was indeed challenging music for the audience as it consisted of:

- only the barest suggestion of a melodic line constructed of inordinately wide leaps
- an austere harmonic language
- a surprising brevity of compositional whole - the five movements lasting, in all, only ten minutes
- a starkness of design

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\(^{11}\) Rosen, C., Schoenberg, Glasgow William Collins & Son & Co. Ltd, c1976, p.15. (Hereafter, Rosen, Schoenberg)

\(^{12}\) Webern, A. von Webern, The Path to New Music (ed.) W.Rich, translated by L. Black, Presser, c1965, p. 44. (Hereafter, Webern, Path)

- the avoidance of repetition
- no thematic development
- an accent on fragmentation of texture
- isolation of melody through the use of motivic cells

all of which clearly stated that functional harmony ceased to be a viable necessity in musical composition.

The parameters of musical syntax were radically changed. Webern said of his 1911 Bagatelles for String Quartet Op. 9

'... all very short pieces, lasting a couple of minutes - perhaps the shortest music so far. Here I had the feeling, "When all twelve notes have gone by, the piece is over" ... In my sketchbook I wrote out the chromatic scale and crossed off the individual notes. Why? Because I had convinced myself "This note has been there already" ... In short, a rule of law emerged; until all twelve notes have occurred, none of them may occur again.'

Schoenberg (1874-1951): 12-Tone Method

By 1923, after six years during which he published no music, Schoenberg formulated a method of composing with twelve tones which related only with one another. This music emphasised both the '.... emancipation of the dissonance...' and the absence of a tonal centre.

The revolutionary nature of atonality and the twelve-tone method has been both praised as the only valid contemporary idiom and condemned as sterile and a mechanistic substitute for creativity. The eventual status of the 12-tone method in the history of music is yet to be determined, but since its exposure to musicians post 1945 by Rene Leibowitz, (1913-1972), the Polish born musician who studied with Webern in the early 1930s and went to Paris is 1945, its influence on the music of the past fifty years has been enormous.

Expressionist compositions of the first decades of the 20th century precipitated a crisis, resulting in audience alienation that has plagued new music throughout the this century.

Comment

Schoenberg's influence on contemporary music was not immediate. Berg and Webern were his devoted disciples and together with Schoenberg wrote string quartets in the 12 tone method. The full impact of his theories on the future of music was not felt until after the Second World War (1939-1945), when composers of the younger generation embraced the twelve-tone concept as the principal organising factor in their music. Most contemporaries of Schoenberg, however, preferred to travel other roads away from Romanticism.

16 Reich, W., Arnold Schoenberg: a critical biography, translated, L. Black, Longman, c1971, p.73 (Hereafter Reich, Schoenberg)
Nationalism : neo-Classicism

Bartók (1881-1945): Stravinsky (1882-1971) and Hindemith (1895-1963)

Bartók

'... folk music will have significance for art only when it can permeate and influence art-music through a shaping genius'.

Nationalism in music was used as a powerful current in the 19th century to exploit the Romantic need for individualism and align itself with the social and political movements of the time. However, in the 20th century, music nationalism took on a fresh decisive approach as the need arose for truth and simplicity as an escape from the musical and spiritual exhaustion arising from the excesses of late 19th century European society. This truth and simplicity meant preserving folk music as accurately as possible and not, as was the 19th century practice, of 'correcting' irregularities that departed from the major/minor scale forms or from the accepted rhythm patterns. ‘The attitude of Liszt (1811-1886) toward the music of the peasants was that of musicians in general; the peasant tunes were considered crude ....’, and thus the Romantics regarded the folk song as exotic material to be used and moulded to the particular formulae of their compositional demands.

Twentieth century composers, on the other hand, took care to retain the essential and inherent qualities of the modal melodies when incorporating folk material into their works.

Fusion : neo-Classicism and Nationalism

The Hungarian born Béla Bartók inherited music that contained elements of an ancient strata of folk music from the Asiatic migration period, as well as a blending of Balkan characteristics, which he and his friend Zoltán Kodály (1882-1967) discovered in their extensive research excursions into Hungary and her neighbouring countries. The folk music Bartók uncovered was far different from 18th and 19th century music derived from the verbunkos - a music with a type of gypsy accompaniment used for recruiting soldiers - or the csárdás, a rapid dance in 2/4 time considerably faster than the friss (or fast) sections of the verbunkos, or the gypsy melodies that had been exploited as authentic Hungarian music from such composers as Liszt (Hungarian Rhapsodies) and Brahms (Hungarian Dances). The songs that Bartók and Kodály unearthed on their visits to remote corners - from Western Slovakia to the Black Sea, from the Carpathian mountains to the Adriatic - were the authentic folk songs belonging to the past, handed down unchanged over many centuries. This music was harder in texture, cruder in technique, incorporating the exotic characteristics of modal melodies and broken, abrupt rhythmic figurations. ‘Our folk songs’, said Bartók ‘... are one and all veritable models of the highest artistic perfection.’

The discovery of folk music led to a radical alteration in Bartók’s concept, not only of music, but of the world and his aesthetic attitudes generally. It affected his compositional technique and he never tried to conceal that the derivation of the basic elements of his music depended on Magyar and other folk influences.

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19 Szabó, Bence, Béla Bartók. His Life in Pictures. London : Boosey and Hawkes, 1964, p.64. (Hereafter, Szabó, Béla Bartók)
Taking care to retain the essential musical syntax of the folk music, Bartók synthesised these elements with his 20th century compositions. He gradually evolved an idiom of his own, and in the music of his string quartets included the rugged elements of the peasant music as part of his 'mission to reconcile the folk melodies and rhythms of his native land with the main concepts in contemporary music.' 20 This he did by the use of the old scale systems - modal and pentatonic - which led to a liberation from the rigidity of the major / minor diatonic scale, and finally to the free availability of every single note in the chromatic twelve tone system. From the integration of these folk elements Bartók evolved a style that incorporated alien folk-features into 20th century art music and the following elements are prevalent in all six of his string quartets (1908-1939)

- asymmetrical and percussive rhythmic patterns
- modal characteristics

Comment

An authentic modal melody contains certain vital factors that include the importance of the primary and pivotal notes, and in Bartók's compositions the modal dependence on certain pitches, within the structure as a whole, is never obscure. This fact defied Bartók from moving his music into the 12-tone language of Schoenberg. Instead, he was inspired to revive music from the over-refinement of German Romanticism by the integration of the unspoiled, vigorous elements of folk music found in the countries around him, and his approach to expanded tonality contributed successfully to loosen music, in the early decades of the century, from the exclusive, binding concepts of composing within the functional structures of the major and minor tonalities.

Neo-Classicism: Igor Stravinsky (1882-1971)

Pulcinella [begun in 1919] was my discovery of the past, the epiphany through which the whole of my late work became possible. It was a backward look, of course - the first of many love affairs in that direction - but it was a look in the mirror too. 21

The two giants of early 20th century music - Schoenberg and Stravinsky - were not only recipients of altogether different national characteristics and artistic gifts; they also were strikingly different men.

Unlike Schoenberg's Austria, with its centuries old tradition of Western art music, Stravinsky was born into a Russian world rich and varied in folk idiom and liturgical song. He used both his folk heritage and the language of Western art music as an uncommitted theoretician - composing instantly, free of the traditions that encompassed many of his contemporaries and, unlike Schoenberg, his compositional process did not lead him to an ultimate answer. It is said that Stravinsky is "... the representative musician of our time," 22 but his single excursion into the genre of the string quartet: Three Pieces for String Quartet, written in 1914, was, for the first time in history determinedly not a 'string quartet' but as the title implies, a set of pieces to be played by four strings.

20 Machlis, Contemporary Music, p.182.
22 Machlis, Contemporary Music, p. 173
Stravinsky’s compositional approach was strongly opposed to the extreme chromaticism of the Post-Romantic era and he found the antidote in the use of a diatonic tonal framework into which he injected the spirit of barbarism, nationalism, neo-Classicism and his own adaptation of the 12-tone method. Thus, in Stravinsky’s long life, his compositions show an expansive series of differing approaches to stylistic experimentation.

Paul Hindemith

Just as Schönberg returned to strict classic form to give a fixed framework to his nebulous polychromaticism, so did Hindemith seek order by going back to eighteenth century formalism. 23

Artistic relations between the nations were shattered by the 1914-1918 war, and when the first international post-war music timidly came into existence, there was musical confusion.

The bewildered musician was confronted with a complete chaos of voices. Each man shouted his own, deep, personal anguish into the world, and was astounded to hear how feebly his voice carried. 24

In an article on Young Germany, 1930 Hans Gutman said that German musicians, at that time, were left entirely to their own resources; precluded from the influences of French musicians such as Satie and Debussy and also the new Stravinsky - all these influences were ‘.... at best only by report.’ 25 It was at this time that Paul Hindemith - born in 1895, at Hanau am Main - found himself as a member of a generation of musicians who needed to respond and adapt to the social and practical conditions of the early decades of the 20th century.

Much has been written about the atonal aspect of Hindemith’s music despite his steadfast adherence to the principle of tonality. It was his fundamental belief that ‘.... in music tonality was a physical law, as inescapable as the force of gravity’, 26 and he did not share the view of the composers of the Second Viennese School that tonality was dead.

In the 20th century tonality emerged, not as an absolute, but was employed by composers with various new compositional devices to determine the central tonal areas. Vincent Persichetti says: ‘Twentieth-century music makes use of many degrees of tonality and employs many means for establishing them’. 27

Bartók and Hindemith, in their desire to create a meaningful language for the aesthetic needs of the 20th century, continued to exploit the free use of all twelve tones, resulting in an expanded tonality. Leon Dallin, in his book Techniques of Twentieth Century Composition, comments: ‘.... contemporary techniques represent additions to and expansions of previous practices and not replacements for them.’ 28

19 Schönberg, spelling used in Brown’s article.
20 Gutman, Hans, Young Germany, 1929, in Modern Music, VII, No.1, 1930, p.9. (Hereafter, Gutman, Modern Music)
21 Ibid, p.9
23 Perichetti, V., Twentieth Century Harmony, Creative Aspects and Practice, London: Faber and Faber, 1942, p.248. (Hereafter, Perichetti, Harmony)
24 Ibid, p.249.
In Hindemith's 'second period' (1924-1934) and on to his death in 1963, he moved from the early exploration of stylistic experimentation to a mature neo-Baroque style. In 1933 he adopted a new and explicitly tonal style for Classical sonata forms and conventional genre.  

Hindemith's particular additions to the neo-Classical and neo-Baroque ideals are boldly set out in his compositions:

- rejection of functional harmony and the use of an expanded tonality
- the use of the twelve semitones of the scale in a dissonant texture that fluctuate freely on and around the tonality defining key-notes, and areas of tonal ambiguity
- interplay of keys within a movement that use tonal relationships between any one degree of the scale to any other
- use of non-triadic structures that create sections of indeterminate tonality
- alternation of sections of tonal clarity with those of tonal ambiguity
- preference for the horizontal over the vertical resulting in a texture of dissonant counterpoint emphasising the individuality of the line in contrapuntal combinations
- the use of vertical similarities that depart from triadic structures
- the freeing of the melodic line from harmonic associations

Hindemith chose chamber music as a medium for expressing his new compositional attitudes, as demonstrated by the fact that a large portion of his early works are scored for small ensembles and include a variety of instrumental combinations.

Of his Six String Quartets - published between 1921-1949 - Ian Kemp says in the New Grove:

His output, if not his style, represented a new attitude no less significant historically for deriving from the practising musician's natural interest in the genre than deriving from a considered artistic standpoint. The centre of his output remained the string quartet.  

Comment

The early decades of the 20th century had been a period '.... full of madness of various kinds as it was of new orders' and these 'new orders' were in the process of being formulated. Composers of this period, Schoenberg, Stravinsky and Varèse amongst them, who had roots in Romanticism, felt compelled, in various ways, to break down the basic elements of melody, harmony, tonality, rhythm, texture, form and orchestration, resulting in no one movement being acknowledged as a single central authority. There existed in an overlap of time, music that included traces of Romanticism, Impressionism, Expressionism, Primitivism, Atonality and neo-Classicism, all of which are reflected in the string quartets of the early decades of the century.

The fact that the neo-Classicists' influence diminished as soon as serial composition became more fashionable and that the many virtues they preached - craftsmanship, discipline, clarity and avoidance of excesses - found little sympathy with
the avant-garde attitudes of the day, they are, nevertheless, too important to be simply dismissed. With the post-war development of total serialism, electronic technology, chance music and Pierre Boulez’ zeal for establishing a new musical ‘language - projecting music .... to discover yet undreamed of territories,’ there is little wonder that the synthesis of neo-Baroque/neo-Classic ideals with contemporary syntax has fallen into disrepute.

**Post-war Serialism**

The year 1945 provides a convenient starting-point for the discussion of musical attitudes and developments at the end of World War II. No composer at this time had a complete picture of what his colleagues were doing; communications had been disrupted by war, and concert life and the publishing industry had been severely impeded. The Nazi cultural policy had prohibited almost every kind of musical innovation and had driven many prominent musicians of Europe to seek refuge in America, leaving Schoenberg, at this time, as the sole surviving member of the ‘Second Viennese School’. Of the composers who had a part in the century’s earlier musical revolution, Berg had been dead a decade, both Webern and Bartók had died in 1945. Varese had been silent since the early 1930s. Only Schoenberg - who had a few years to live, and Stravinsky remained.

Musical composition from the early decades of the 20th century had been advanced by Debussy, Schoenberg, Webern, Varese, Bartók, Hindemith and Stravinsky with each producing their many significant innovations pre-1920. The exception was Schoenberg’s later invention of the 12-tone Method. It was a momentous contribution but he was later accused of having ‘....compromised with history by using the ‘method’ to shore up the outdated forms of tradition, the outworn aesthetics of German Romanticism.’

Of Stravinsky’s later compositions, new composers and musical innovators said he had failed to pursue the new rhythmic vitality of the ballet Rite of Spring (1913) and had become a pasticheur and assembler of musical curios.

**Critical Assessment and Advancement - Post 1945**

The ‘new’ school of young iconoclasts shaped music history along diverse paths that eventually resulted in a plurality of styles and structures - a distinctive feature of contemporary music - and the early pioneers of 20th century musical innovation soon found themselves victims of the explosive reaction to any historical references and associations. Aroused particularly by the zeal of their young contemporary, the French composer Pierre Boulez (1925-), who found himself in fiery contradiction to all music of the immediate past centuries, the important composers in the early years post 1945 - Carl Heinz Stockhausen (1928-), Luciano Berio(1925-), Luigi Nono (1924-) and György Ligeti (1923-) -, all composed significant works in the early post war years. In Paris at about the same time (1948), the French musician Pierre Schaeffer (1910-1996) tape -recorded and electronically modified man-made sounds and sounds that originated in nature, calling the process musique concrète.
Across the Pacific ocean, in New York at this time, the experiments of an older John Cage (1912-1992) continued the radical ideas of earlier American composers such as Charles Ives (1874-1954). Ives had used polyrhythms, polymeters, tone clusters, polytonality and atonality in his compositions - all in the 1890s and the early decades of the 1900s. He wrote the String Quartet No.1 in 1896 and his second quartet from 1907-13. Considering Ives’ isolation from the main developments of the European stream of western music, it is interesting to consider that the many and varied techniques he used in his compositions were left unheeded, only to resurface post-war in the music of the so called avant-garde composers.

Cage was influenced too by the agglomeration of sounds produced in the piano works of Henry Cowell (1897-1965), where for example, in two of his best known works - Aeolian Harp (1923) and The Banshee (1925) - he explored, what was then, a new world of pianistic sound.

Cage had from his earliest composition found inspirations in Oriental music and his interest in Hindu philosophy and Zen Buddhism led to this statement: ‘my purpose is to eliminate purpose’. His preoccupation with the overall structuring of time was summed up thus: ‘I devise a rhythmic structure based on the duration, not of notes, but of spaces of time.’ and his single quartet: String Quartet in Four Parts, (1949-51) reflects the elimination of purpose and arrival.

Pierre Boulez (1925-): Academic: Influences Towards Total Serialism

In 1952 Boulez, musician, mathematician, intellectual, composer and iconoclast wrote of his dilemma in associating with the status quo of pre-war musical developments and the need for the interaction of ideas between composers in the forefront of the European dilemma - a dilemma that engulfed musicians of the post-war Western world: ‘.... the direction of John Cage’s research is too close to our own for us not to take account of it’. But Cage’s retreat from Western concepts - both musical and philosophical - had at this time already set him on a very different path - a path along objective indeterminacy where the creative decisions were made by chance as well as by the performer. Significantly, in the matter of the interchange of ideas between the Americans and the Europeans, the fact that Cage took his cues from the musical attitudes of French composer Erik Satie (1886-1925) - with his anti-academic, anti-romantic approach - and those of the Europeans came from Webern, should have served as sufficient for them both to realise that sooner or later their paths would diverge radically.

Boulez’ path, on the other hand, lead directly from Olivier Messiaen’s (1908-1992) harmony classes in Paris of 1944 - which Boulez attended at the early the age of nineteen - a path that was to reveal radical ideas of total serialism. He felt an urgent need to lay new foundations and construct a musical ‘language’ from the revolution of the early part of the 20th century which had, according to his particular musical philosophies, ended without prospects of further development.

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* Ibid., p. 499.
In his search for '... a grammatical expression which would fix the language [of music] in precise ways, and which would fix it for a long time to come,' Boulez was both purposeful and single-minded. Messiaen outlived his value when the younger composer heard René Liebowitz - a disciple of Schoenberg and promoter of dodecaphony post-war - perform Schoenberg's Woodwind Quintet, (1923-4), consisting of four movements, in chamber-music tradition with the use of titles: sonata, scherzo and trio, ternary slow movement and rondo finale. It is not clear whether Boulez heard the original performance of the broadcast, but the piece seemed to answer all his dissatisfactions: 'It was a revelation to me. It obeyed no tonal laws .... and a consequent ability to develop, extend and vary ideas, that I had not found anywhere else. I wanted, above all to know how it was written,' said Boulez who felt, instinctively, the necessity for atonality in his own compositions, even prior to the first hearing of Schoenberg. Boulez took himself and other students from Messian's class to that of Liebowitz. Soon, however, Boulez was to distance himself from yet another teacher, as he came to the conclusion in 1949, that Schoenberg's use of classical and pre-classical forms in serial music was '.... the most perfect misdirection that could have been offered in contemporary music.'

Thus Boulez, in the search for a new directive in musical thinking and the establishment of a new grammatic base, restlessly moved from Messiaen and his modes to Leibowitz; from Schoenberg's atonality to Webern in whom he found the very basis of modernism. This switch resulted from Boulez' concern that a cult had arisen around Schoenberg that was as repulsive to him as was the neo-Classical cult for Stravinsky. Leibowitz was now being labelled as narrow and pedantic and was resented for 'being imprisoned by academic techniques.' Boulez' obituary on Schoenberg's death (1951), 'Schönberg is Dead', soundly condemned the defunct forms and other legacies of the past used by Schoenberg, and turned Boulez towards Webern, of whom he wrote: 'Webern alone had recognised the need to deduce the structure of a work from contrapuntal functions and from them alone.'

Yet, despite Boulez' eventual disenchantment with Schoenberg's approach, he nevertheless drew tremendously from it in his early compositions. For example, in his Sonatina for Flute and Piano (1946), he used the same '.... metamorphosis of a single theme' as Schoenberg had done in his work Chamber Symphony Op.9 (1906) and he later admitted explicitly that he was in fact influenced by '... what's most German in German music - the continuity, the proliferation of material from a small musical cell,' as found in the serial idea which, for Boulez, was based on a universe that finds itself in perpetual expansion. In his Sonatina he has developed his own expansion based, not on the serial logic of the kind of Schoenberg or Webern, but on an initial five-note fragment which, in the flute part functions in the important aspect of a 'cell' - not as a row, but as intervals chosen for manipulation. Here, the tritone is followed or preceded by a fourth or fifth, and Boulez' synthesis of the Webern technique of '.... the series to engender all the melodic and harmonic features of the work' achieved just this.

Boulez was basically impatient and ever suspicious of utilizing past material as he set out '.... to strip music of its accumulated dirt and give it a structure it had lacked since the Renaissance.'

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39 Peyser, Boulez, p.72.
40 Griffiths, Boulez, pp.7-8.
41 Peyser, Boulez, p.79.
42 Griffiths, Modern Music, p.46.
43 "Ibid., p.45.
44 Peyser, Boulez, p.37.
45 "Ibid., p.43.
46 Griffiths, Boulez, p.9.
47 Peyser, Boulez, p.63.
Total Serialism - the answer?

Boulez’ developmental search for a new grammatical syntax incorporated a synthesis of Messiaen’s use of rhythmic cells, Schoenberg’s melodic row and Webern’s contrapuntal use of small cell-development. These he pushed towards the ultimate path of total serialism. The 2nd Piano Sonata (1947-1948) pays attention to the ‘... lack of cohesion between the elaboration of the polyphony itself and that of the rhythm’, with the need for a coherence between pitch organisation and rhythm. Boulez now concentrated his efforts to show that a deeper involvement of rhythm as a functional part of the fabric-whole called for it to obey the rules set for the melodic/harmonic line - laws of instability and non-repetition.

It was, as Boulez wrote ‘... the principle of variation and constant renewal ...’ that eventually led him to seek a unified technique for handling the constituents of music - pitch, rhythm/duration, loudness and timbre - in the way in which the 12 tones of the chromatic scale had been used. In Messiaen’s *Mode de valeurs d’intensités* (1949) for piano, modes of twelve chromatic pitches, twelve durations, twelve methods of attack and seven intensities were used and opened up the possibility for a generalised serial technique in Boulez’ *Structures Ia*, (1951), for two pianos - thus Boulez arrived at total serialism. The main reason for the flourishing of this method of composition was the urgent need for the composers of the period - amongst them the Europeans Nono, Maderna, Krenek and particularly Boulez - to create the *tabula rasa* on which completely new edifices could be constructed.

The serial elements, now called parameters (a term borrowed from mathematics), included varying degrees of rhythm (duration), *tempo* (speed level), dynamics (degree of loudness), articulation (modes of attack), density (number of parts), and spacing (octave displacement). These parameters, in theory at least, comprised a system of composition that obliged composers to think objectively, obliterating musical memory and inheritance; thus creating a completely new music. The most significant parameter which could not blot-out references from the past was that of rhythm, and so a completely new set of rhythmic shapes/patterns had to be formulated - with no resemblance and no reference to any music of the past. In arriving at this end product, so to speak, of his searching for ‘... a grammatical expression which would fix the language in precise ways, and which would fix it for a long time to come’, Boulez moved to an unknown point in musical composition, a type of impersonal totality and complicity through the perpetual transformation of each element. In practise, there was no re-occurrence of a pitch at the same duration, the same intensity or attack, resulting in a staggering multiplicity of combinations.

Boulez’ composition illustrates clearly not only the complexity of the synthesis of this method of total serialism, but also the enormous technical difficulties entailed for the performer. The synthesising of music and mathematical proportions for conventional instruments was soon to be superseded by the control which the electronic medium was to exercise in the compositional structures of total serialism. For Boulez, it seemed that the emphasis he placed on objectivity and memory elimination in the syntax of post war musical composition, which resulted in total serialism, was to move inexorably into the realm of electronic music composition - a combination that complimented both the medium and the method.

But not all composers were using the approach of complete definition in all musical parameters. This excessively complex language of the '50s contained within itself seeds of self-destruction, particularly with regard to performance where the efforts needed were not proportionate to the expressive returns. There arose, particularly in America, an approach to composition that was totally alien to integral serialism - the concept of indeterminacy.

**Indeterminacy: Chance and Aleatory Music**

At the same time as Boulez and his 1950s European contemporaries were evolving the system of total serialism, John Cage (1908-1992) as the senior member of a group of American exponents of pure chance, found younger composers in Morton Feldmann (1926-1987), Earle Brown (1926- ) and Christian Wolff (1934- ) who were willing to join his pursuit of non-intention. They developed a way of musical composition that was influenced by a number of different factors, which included an indeterminate way of composition in a variety of approaches - from complete random operations, to music well defined with some freedom in one particular parameter, or where the indeterminacy affected only small areas of a whole composition, all of which were to impact lastingly on all parameters of post-war music.

**Temporary Synthesis of Compositional Techniques**

In 1946 at Darmstadt, Germany, summer courses in composition were founded by a young musicologist Wolfgang Steinecke. Their purpose was for the discovery of contemporary music between young composers whose creative endeavours had been suppressed during the Hitler years. Musicians met there to learn from the influences of such composers as the young Hans Werner Henze (from 1946-1950), and Rene Liebowitz (1948) who replaced Paul Hindemith’s neo-classical techniques with those of Schoenberg’s serialism. It was at Darmstadt in 1949 that Messiaen composed *Mode de valeurs et d’intensités*, which became a powerful force, influencing a younger generation who took the whole development of European serial music into the phase of total serialism and beyond.

Cage’s exploration of new sound sources was soon to gain the attention of Boulez particularly, as Cage, like Boulez, was interested in casting off the responsibility of creative decisions using instead charts of numbers as a compositional procedure. Cage had composed *Music of Changes* (1951) for piano employing the *I Ching* method of determining various musical elements with the tossing of marked sticks (or coins) onto a chart containing hexagrams of thirty-two or sixty-four numbers. Boulez, however, was unsympathetic to the idea of Cage’s coin-tossing ‘Magic Square’ which determined all the elements of every note played. Although working in squares, they both sought an impersonal aspect to the composition of music, but into his squares Boulez put numbers and corresponding musical criteria whereas Cage ‘.... put in aggregates of sounds. They had no relation to harmony. They had no necessary direction. Each was a musical fact, without any implication at all.’ Cage pressed his negation of structure to the limit by the ultimate overturning of the traditional difference between sound and silence in the composition of the piece he called *4’33”* (1952), where his friend and pianist David Tudor - whose formidable technique and stamina allowed him to tackle Boulez’ difficult piano composition - was required to sit silently at the piano for the time specified in the title, raising and lowering his arms to define the three movement structure of the piece. The main purpose for this performance procedure was to awaken audience awareness to the random sounds floating around them.
Cage consistently worked towards giving up the desire to control sound to 'clear his mind of music and set about discovering means to let sounds be themselves rather than vehicles for man-made theories or expressions of human sentiments.'\(^{55}\) On the way toward his rejection of composing and in his use of 'indeterminate' music - by eliminating purpose and letting things happen - he eventually found exploring more rewarding than composing. Boulez' disenchantment with the randomness of Cage's approach was voiced in an article on the aesthetics of chance, *Alea*, when he wrote: 'Despairingly one tries to dominate one's own material by an arduous, sustained, vigilant effort, and despairingly chance persists, slips in through unstoppable loopholes.'\(^{56}\) The unpredictability of Cage - his most consistent trait - led to the eventual termination of the correspondence and interchange of ideas between Boulez and Cage.


**Morton Feldman**

Certain American composers embraced indeterminacy to encourage greater spontaneity through performer participation in determining the course of events and content within a composition. This reaction was, in part, a repudiation of the restrictiveness imposed by the method of total serialism. It was now both possible and permissible to create indeterminate areas of pitch, note-duration, form, sound material, dynamics and timbre, and as a result there arose the necessity for the use of different notational techniques. An unconventional notation appeared early in the 1950s and came from the American Morton Feldman who, shaped by the aesthetics that revolved around Cage during that period, developed a type of graphic notation that was strongly influenced by the visual art of Jackson Pollock and Alexander Calder in whom Feldman admired 'that complete independence from other art....'\(^{57}\) - an independence which was shown specifically in Feldman's approach to notation.

In the early 1950s, music symbols which had been in use for over 300 years, were now becoming inadequate to express the intent of certain composers. Feldman's graphic notation, i.e. music notated with implicit graphics, differed fundamentally from all other forms of notation because it deliberately set out to provide performers with abstract symbols, '.... intended to spark their imagination and inspire them to express in sound, their reactions to what they see in front of them.'\(^{58}\) The resultant 'sound' differs from performance-to-performance and no two interpretations can ever be the same. This notation was a radical development in the use of new music symbols, far extending those of earlier developments such as: the snap-pizzicato (\(\phi\)) for strings used by Bartók in his string quartets; or the *sprechstemme* sign (\(\psi\)) used by Schoenberg in his poem cycles *Pierre Lunaire* (1912) for voice and instruments; or even the quarter-tone *Zwischentone* (\(\xi\)) used by Berg in the violin solo of the *Chamber Concerto* (1925); or those of Alois Haber (1883-1973); or Charles Ives' *Three Quarter-tone Pieces* for two pianos (1923); or the use of parallel quarter-tone ornaments found in Bartók's *Sixth String Quartet* (1939); or those of the many compositions that used relatively simple new symbols depicting pitches outside the tone and semi-tone. The development of graphic notation manifests itself in many different signs and symbols, and the underlying importance is that these symbols arose, amongst other influences, out of a need for composers to free themselves from the discipline imposed by the stave - in this case, a new freedom completely away from the 'accepted' notational system.


The following example of Feldman's *Projection I* (1950) for solo cello shows a work that is indeterminate in several parameters and precise in others.

**Example 1.**  
Indeterminate and precise parameters  

Example 1 above is explained in the following way:

- **Timbre**: (○ = harmonic : P = pizzicato : A = arco)
- **Pitch**: is relative, shown as a large square or oblong box placed at three levels to represent high, medium, low
- **Duration**: indicated by the amount of space taken up by the small square or rectangle between the dotted lines  
  - the spacing between the dotted lines represents four beats to a tempo of ±72

Thus the indeterminate parameters are:

- pitch within each of the three registers, with
- dynamics and expression more variable and subjective in choice than those shown in conventional notation

The instructions given by Feldman for the graphic scoring in another work - his orchestral piece *Intersection I* (1951) - show the indeterminate parameters where the performers are instructed:

- enter on or within each time duration
- pitch is relative and is indicated by the squares or oblongs within the larger boxes  
  - High : Middle : Low:
- any note may be used within the given ranges with the limits of each range chosen by the performer
- the pulse is played at a tempo of ±72
- in each box (□) the duration is indicated by the amount of space given to a square or oblong
- dynamics are freely chosen by each performer but must be sustained to the end of the given time duration.
- a minimum of vibrato is to be used.
- for strings: P = point; Pz = pizz
- and the absence of symbols indicates arco

Brindle comments that all fifteen pages of the score are 'bound to sound very much the same [and] this music, in spite of its adventurous conception, offers little variety of sound texture, musical event or emotive expression.’

Feldman produced graphic symbols that were both simple and effective with the overall sound-output having generally low density, slow speed and a soft level dynamic range producing purposeless, delicate, fragile pieces.
The music of Earle Brown (1926-) "... paralleled an historical precedent in the visual arts", and was also influenced by "... the integral but unpredictable "floating" variations of a Calder mobile and the contextual rightness of Pollack's spontaneity and the directness in relation to the material and his particular image of the work." His use of graphic notation, shown in the following example, takes the indeterminate parameters further than those of Feldman in that the score of November 1952, written on a staff of 50 lines, with conventional note symbols scattered over the page, may be performed by any instrument or ensemble and interpreted in any way whatsoever. It has no clefs, no tempo, dynamic or articulation markings; in fact no orders of any description are given to the performer.

Example 2. Staff of Fifty Lines
Earle Brown, November 1952, (1952)

The score of December 1952, shown below, is also one of the earliest examples of musical graphics where the player - visually stimulated by the symbols - may interpret the score in any way he chooses. This early graphic score is the most enigmatic of its time as it has no instructions about how these shapes are to be realised in sound, and presents the point that the more indeterminate the notation, the more visual the identity of the piece has to be.

Example 3. Early Graphic Score
Earle Brown, December 1952, (1952)

Griffiths, Modern Music After 1945, p. 72.
Erhard Karkoschka explains: '.... anything goes. For instance, not only can any side be the lower edge, the sheet can also be placed crookedly....'63. This is a demonstration of one of the earliest graphic scores to cast off all links with traditional notation. Brown’s innovative ideas are especially significant in that he pioneered the concept of 'open form' allowing players to choose the sequence of events with no specified order of performance. There is also a new contemporary use of proportional notation with time/duration suggested by the spacing of the signs. In his String Quartet (1970), Brown demonstrates the use of graphic notation, sectionalised divisions in time units and an assortment of new symbols, but the 'open form' structure is not applied.

Christian Wolff and Minimalism

Christian Wolff (1934-) completed the 'set of young' American composers influenced by Cage in the early 1950s. Like the older Cage, and like Feldman and his contemporary Brown, Wolff felt no ties to European music history and tradition. Wolff's pieces encouraged an intimacy aptly displayed in the fully notated score Duo for Violins (1950), where, for example, he uses only the three chromatic pitches of a minor 2nd. This music preceded a movement that reacted against indeterminacy with an approach that cut down the area of sound to a minimum. The compositional approach of such composers as Terry Riley (1935-), Steve Reich (1936-) and Phil Glass (1937-) which is mainly tonal, uses selective small motifs that develop the changing sound tapestry through repetitiveness, combined with almost imperceptible changes of time, texture and notation all within a context of harmonic stasis.

Comment

In the 1950s, Cage, Feldman, Brown and Wolff had a common ideal toward composition, with an approach that gave function to ideas that made music purposeless, thereby destroying musical continuity and liberating sound by getting '.... rid of the glue so that sounds would be themselves.'64 They explored the use of indeterminate parameters in pitch, duration and timbre, used open forms and created graphic notation, all of which was to take music vocabulary and techniques to areas that, at that time, had no precedent.

However, the gulf between the American composers and their European counterparts of the 1950s and '60s was such that the Europeans use of the ultra-precision of total serialism coupled with a tradition and principle of precise sounds, made the random compositions of the Americans, at this time, quite unacceptable in Europe. Further, the exploration of the Musique concrète of Pierre Schaeffer drew Messiaen and his students to the Paris studios in 1952. Suddenly a whole new world of sound was opened up.

Musique Concrète: Electronic Music

Pierre Schaeffer (1910-1996): Karlheinz Stockhausen (1928-)

Pierre Schaeffer: Musique Concrète

The developments of sound manipulation and transformation techniques used by Schaeffer in Paris around 1948, attracted young composers anxious to use the possibilities of the new medium for serial manipulation - particularly in the
parameters of *timbre* and duration. Messiaen, Boulez, the German Karlheinz Stockhausen and another pupil of Messiaen - the Frenchman, Jean Barraqué (1928-1973) - all produced short studies in the new medium and were excited by the ability of electronic techniques to generate serial structures of pitch, rhythm, *timbre* and volume which differed radically from the moulded, prepared sound material of *musique concrète*.

In electronic-serial music ... everything, to the last element of the single note, is subjected to serial permutation, resulting in a completely new way of composing sound - the poetics in sound, as the medieval theorist would have called it. 65

Boulez and his French contemporary Barraqué soon became dissatisfied with the primitiveness of the Parisian equipment, and it was left to Stockhausen to commit himself enthusiastically to composing in this new technique - a technique termed 'Elektronische Musik' to distinguish it from the *Musique Concrète* procedures of their Parisian contemporaries. 66

**Karlheinz Stockhausen (1928 - )**

Stockhausen had been a student of phonetics and information theory under Werner Mayer-Eppler at the University of Bonn, and in his first composition for synthesised electronic and human components - *Gesang der Jünglinge* (1956), (Song of the Youths) - he analysed and classified all the phonetic properties and colour components of the sung or spoken words, which resulted in the total serializing of the pitch levels, durations, dynamics and densities. Griffiths comments that the deeply significant lesson of *Gesang der Jünglinge*, - the recording of a twelve year old boy's voice with singing and speaking brought together - is that the synthesis of electronic music and performed music transformed the electronic medium through projecting a work of powerful sound imagery onto a plateau of high artistic achievement. Stockhausen had a desire to humanise synthetic sounds with live ones as he did not consider the two sound types to be irreconcilably opposed, and in this synthesis he transformed two opposite elements into a 'union of opposites', and ‘.... there existed musical aspects, particularly concerning degrees of likeness between unlike phenomena, which could not be quantified, and which therefore demanded something other than the precise pre-compositional schemes of total serialism for their effective use.’ 67

The important contributions made by Stockhausen at this time were numerous and include one of the first European pieces in open structure - *Klavierstück XI* (1956), comprising nineteen sections of music - some long, some short - scattered over a large sheet. The players select any piece at random, choosing their own tempo. When that section is completed, they then read the tempo, dynamics and attack that follows and choose another section to play in accordance with the former instructions.

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Stockhausen used aleatory principles for the purpose of encouraging his performers to become involved in and extend their capacity for ‘instinctive’ music making, and many of his compositions contain diverse aleatory innovations. In many of his compositions, Stockhausen’s own performing ensemble were offered varying degrees of unique improvisational group experiments through the use of both conventional instruments and electronic combinations, thus coupling modern technology as a quite natural part of the process of composition.

Stockhausen insists that his continued contribution to 20th century musical development, starting in the early 1950s and into the 1970s, does not represent a break with the serial approach but is, rather, an extension of the process. He writes: ‘Composition with series of proportions has now for many years been applied not only to individual tones, to their individual attributes, but also to group and collectives. What was one hierarchical thought at every level of music has been expanded to serial thought and will now remain authoritative for many centuries.’

Using a wide combination of scientific, electronic and natural parameters in his attempts to come to grips with the complexities and problems of the diverse musical developments in the second half of the 20th century, Stockhausen is one of the most important musical figures to have emerged from post-war Germany, but with his interests focussing particularly on electronic music it is noteworthy that a commitment to the genre of the string quartet is absent.

In music of the 20th century, emerging importantly is the coexisting plurality of many opposing musical developments which reflect the philosophies, aesthetics and social circumstances surrounding them. Throughout the decades of this century the explosive extensions of new ideas places the language of music as it really exists - as an instrument for the communication of the aesthetic and philosophical articulation of the individual composer. This approach continues to influence the objectives of the significant composers of the 20th century.

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Debussy's Impressionistic approach to composition, as discussed briefly earlier in this section, and the approaches of the new-Classicists, Stravinsky, Bartók and Hindemith in particular, show a reorganisation of the elements of music to develop a language that extended tonality where '... contemporary techniques represent additions to and expansions of previous practices and not replacements for them.' Thus the role of tonality changed radically in the 1920s, and it's once dominant unifying force diminished. Many influences led to the gradual weakening of the major/minor tonal system and the breakdown manifests itself in various ways, including:

- traditional syntax loosely applied
- revived emphasis on contrapuntal procedures resulting in a freedom in forming vertical and linear simultaneities
- contrasts between stability and tension obscured as the 'decorative' dissonances of previous centuries now became consonances
- the melodic line not controlled by harmonic chord functions
- each voice in a texture functioning without reference to other voices
- preference for the horizontal over the vertical resulting in a texture of dissonant counterpoint
- use of non-triadic structures

Functional harmony ceased to be the only factor to determine tonality and there emerged a *dictum* that any pitch, chord or key structure could follow any other and the relatively predictable syntax of the past went through a process of dissolution.

Schoenberg: Webern: Berg

Schoenberg's 12-tone system probably had the greatest impact on musical organisation of all the 20th century innovations from 1920s up to the present time, as it constituted a basically new approach to composition. At first it attracted composers within Schoenberg's immediate sphere of influence - mainly Webern and Berg - and was, after 1945, to become the most important compositional technique used by younger composers who found it impossible to ignore, but almost invariably sought to adapt the 'method' to their own purposes. These adaptations of the late 1950s onwards led to the period known as Post-Serialist.

While the neo-Classicist's approach was to loosen the grip tonality held within the formal structure of a composition, Schoenberg's 12-tone revolutionary method arose from a situation in which tonal structures - the relationships between keys and the harmony which expressed them - no longer seemed to him to represent the living language of music. By 'rescuing' music from 19th century 'stagnation' in devising the 12-tone method, Schoenberg found that with the loss of tonality came the loss of the means through which musical forms were defined - tonality, modulation and resolution. The loss of this structural organisation remained a constant difficulty for Schoenberg as form was for him, basically, what it had been for the 19th century composers - an ideal set of proportions and shapes which transcended style and language.

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This later raised the critical disapproval of the post-war serialists, in particular Boulez, who remained ever critical that Schoenberg applied new rules to the construction of forms and textures in the old manner.

Naturally, conflicts arose particularly in the continuing analogous associations of the 12-tone method with 1st-movement-sonata-form. Any attempt to apply the tonal principles of this structure to the 12-tone method was severely criticised and justifiably seen, by Boulez, to be a self-destructive endeavour. Furthermore, Schoenberg’s strongly held views about the lack of harmonic function and negation of chord progression in 12-tone music strengthened the futility of such an association when he wrote: ‘.... such progressions do not derive from roots, harmony is not under discussion and evaluation of structural functions cannot be considered. They are vertical projections of the basic set, or parts of it, and their combination is justified by its logic,’ - a principle that particularly negates the sonata-form structure. This denial of the principle of tonality is the quintessential difference between the musical philosophy of the neo-classicists and that of the serialists.

Varèse

Varèse’ music is characterised by its sound masses in which rhythm, timbre, and dynamic intensity are the focal points - the ‘harmony’ remains static and ‘melody’ has no traditional meaning. Whittall calls Varèse ‘ .... a poet of the Wasteland, the pioneer who, of all modern masters, now seems most significantly to bridge the gap between Debussy and Stockhausen himself.’ He comments further, ‘ .... his ultimate pessimism reflect[ed] the turmoil and tragedy inherent in the civilised life during the first half of the century.’

Boulez: Stockhausen: Cage

The post war avant-garde styles have only tenuous connections with historical precedents and, in some cases, depart radically from the basic concepts of the past. Electronic technology made available all manner of extraordinary, new and unfamiliar sound sources which gave rise to a range of compositional approaches; from the extremes of total organisation found in Boulez’ Structures I to the opposing, unpredictable aleatoric writing of relaxed or relinquished control; of chance and random selection or of total non-intention as invoked in Cage’s piano work 4’33''. These post-war techniques radically changed the composer’s role and thus redefined it, with the Europeans of the early 1950s (Boulez and Stockhausen in particular) and the American Cage (and his followers) playing a dynamic role in creating the far-reaching and rapid musical developments post 1945. Stockhausen learned from his experience with musique concrète that he would need means other than the mere transformation of electronic sound to develop a new musical architecture, without recourse to or the refashioning of the old. This demanded new material, and it was in the synthesis of electronic waves and sine tones that he found his way. His composition Gesang der Jünglinge (1956) was a solution to the particular problem of synthesising electronic and man made sounds, and in so doing he achieved a compelling unity of material and design that reflected the ideals of that time in music history.

The categorising of 20th century techniques that are designated ‘avant-garde’, ‘aleatory’, ‘experimental’, ‘post-serial’ or ‘minimalist’, act only as signposts, as contemporary borders have become less defined and musical composition now exists in a vast multi-dimensional space of infinite possibilities. This plurality can be seen today to perpetuate the

Ibid., p. 263.
endeavours of the 1920s composers, who needed to create a ‘new order’ from the chaotic transition of the years between
1907-1923. Gutman wrote in 1930:

The bewildered musician was contracted with a complete chaos of voices. Each man
shouted his own, deep, personal anguish into the world, and was astounded to hear
how feebly his voice carried. 73

Post 1945 Onwards

What were considered in the late 1940s and early 1950s to be the shared aims and objectives of post-war music
developed by both the European and American composers, were in the 1960s soon discarded for a situation of differences
and complexities of all kinds:

- density
- events
- relationships among the sounds of a composition
- successiveness and simultaneity
- interpretation
- exactness and ambiguity

Thus the sentiment expressed by Gutman, of the 1930s ‘musicians’ being ‘confronted with a complete chaos of voices,’ 74
was again evident.

The extraordinary fact is, that in almost all instances (with the exception of Bartók’s modified rhythmic and new timbral
symbols) the complexities of pre-electronic music were achieved with the use of conventional notation. However,
inordinate and diverse developments were soon to create new and different problems - not only in the performance of
music but in the need, as an urgent necessity, for a radically new approach to notational symbols to extend the sound
possibilities opened up by electronic experimentation. In the 1960s composers were anxious to extend the parameters
of sound, both electronically and on conventional instruments, and for the latter, they found many gifted performers
willing to use their instruments in unprecedented ways. New instrumental techniques emerged and a large variety of new
notational symbols unfolded to describe them. Included in these adaptations are the graphic notations of Feldman and
Brown which were to loom significantly in the ensuing musical decades as notational inventions commanding widespread
attention and support.

A whole new array of sounds, techniques and symbols confront musicians today and this thesis proposes to examine,
in a selection of 20th century compositions in the genre of the string quartet, the resultant separate and individualistic
characteristics that continue to transcend what are thought to be the limits of musical expression.

73 Gutman, Hans, Modern Music, p.3.
74 Ibid., p.3.