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A SURVEY OF
BRASS ORCHESTRATION
IN FOUR TWENTIETH CENTURY
COMPOSITIONS

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INTRODUCTION

This thesis is a survey of the brass orchestration in representative works of Igor Stravinsky, Paul Hindemith, Bela Bartok and Elliott Carter. The first part of the paper presents background material to the survey. This includes a brief history of the orchestra, a history of the development of the orchestral brasses, and a summary of the style characteristics of each of the four composers.

The following compositions are examined in the second part of the paper: Stravinsky's Rite of Spring, Hindemith's Mathis der Maler, Bartok's Concerto for Orchestra, and Variations for Orchestra by Carter. These particular works were chosen because they are generally well known, they are scored for complete brass sections, and they represent a variety of musical styles. The specific factors isolated and examined include, (1) scoring for the individual sections and solo instruments, (2) the instrumentation and function of brass combinations, (3) the nature of the doublings, and (4) the special effects and unusual technical demands. Although each of the factors is examined separately, it must be noted that they all function as part of an over-all orchestral timbre at any given instant.

Part III, following the survey, contains comparisons of the four works examined. Common situations which arise in each of the works are noted, as well as cases of scoring for brass which are unique to a particular work.

A table appears at the end of each chapter in the survey to help place the discussion of the separate factors in proper perspective.

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PART I: GENERAL BACKGROUND

CHAPTER 1

THE HISTORY OF THE ORCHESTRAL BRASSES

The orchestral brasses include French horns, trumpets, trombones and tubas, all in various keys, and exclude such non-orchestral instruments as bugles, flugelhorns and baritone horns. The term "orchestra" is used today to describe a large ensemble of instruments, as opposed to small ensembles used for chamber music, or bands and other ensembles of special instruments. The strings are generally the backbone of the orchestra, with the woodwinds and brass producing color effects imposed upon the basic string sound. The percussion instruments are vital to the rhythmic life of the orchestra and for special effects.¹

The history of European brass instruments relates the process by which men have adapted the mellow herdsman's horn and the martial blasts of the trumpet to music of all types. It is the evolution of signaling devices to musical instruments. The process began in the Middle Ages and continues today in the experiments of instrument manufacturers.² Of these brasses, the horns are similar

¹Willi Apel, Harvard Dictionary of Music (Cambridge, Harvard University Press, 1961), p. 519.

²Christopher W. Monk, "The Older Brass Instruments," in Musical Instruments Through the Ages, ed. by Anthony Baines (Baltimore, Penguin Books, 1961), p. 277.

in character and use to the woodwinds, and were often doubled with oboes in the early symphonies of Haydn and Mozart. The trumpet, trombone and tuba came to be used mainly for reinforcement of the climaxes of massed sound, as well as in solo capacities and for certain soft effects.³

From the 14th century to about 1800, the trumpet existed only in the form of the natural trumpet. It became associated with military and ceremonial functions and was a carefully guarded privilege of the nobility. Only an official Feldtrompeter (court trumpeter) was authorized to play it. After 1600, the trumpet began to be used in art music (Monteverdi's Orfeo, 1607) in its clarino register where the harmonics form a full scale.⁴ Kammertrompeter (chamber trumpeter) guilds were formed in which clarino playing was highly developed and was a closely guarded art. The French Revolution destroyed the courts which employed the small chamber ensembles, and with the courts the guilds were broken up. The players who were masters of the clarino technique were disbursed and became, for the most part, lost to the music world. The destruction of the guilds had another, more positive effect. In France, it permitted free experimentation to make the trumpet a chromatic instrument.⁵

Some of the many systems to make the trumpet more

³Apel, op. cit., p. 519.

⁴Ibid., p. 771.

⁵Monk, op. cit., p. 288.

versatile included the introduction of crooks during the 18th century to make different harmonic series available on the same instrument. Bach scored for an instrument called Tromba da tirarsi which referred to a trumpet with a slide mechanism at the mouthpiece. In 1770, the key trumpet was invented by Kolbel of St. Petersburg. Although side holes were successful on conical instruments such as the cornet and bugle, their use on the cylindrical trumpet was quickly abandoned. Another attempt to make the trumpet chromatic occurred at the end of the 18th century in England. The U of the first coil was made into a slide and provided with a spring to make it return to normal position. This mechanism continued in use in England throughout the 19th century.⁶

It was not until around 1813 to 1815 that chromatic brass instruments, other than the trombone, became possible. It was during this time that the valve mechanism was invented by Stölzel and almost immediately improved upon by Blühmel. The valve had the effect of building all of the necessary crooks on to the instrument to be engaged simply by pressing a valvestem or a combination of stems.

Both rotary and piston valves create a problem in intonation when used in combination, that has existed since their invention. A great variety of compensating valves and a system of ascending valves has been employed

⁶Apel, op. cit., pp. 771-772.

to solve this problem, but to date the brass performer must still make embouchure adjustments to keep his instrument in tune.⁷

The trombone, like the trumpet, has a cylindrical bore. It was the first of the orchestral brass instruments to appear in its present shape, developing out of a large trumpet with the addition of a slide in the late 15th century. Paintings of the period show the instrument with all of the essentials of the present day trombone. The slide made the trombone suitable for art music when horns and trumpets were still being used for military signals.⁸

The first slide experiments were with a telescopic mouthpiece. The player used one hand to press the mouthpiece against his lips and the other to slide the instrument along the mouthpiece shaft. This could be accomplished rapidly enough to manage the slow tenor and contratenor parts.⁹

Among the earliest compositions for trombones is G. Gabrieli's Sacrae symphoniae (c. 1600). Gluck was perhaps the first to make effective use of trombones for accompanying chords in his opera Alceste, and Mozart gave them a prominent place in The Magic Flute and Don Giovanni.¹⁰

⁷Ibid., p. 781.

⁸Ibid., p. 767.

⁹Monk, op. cit., p. 283.

¹⁰Apel, op. cit., p. 767.

Beethoven introduced trombones to symphonic music in his 5th Symphony, but it was not until after 1850 and the precedents set by Berlioz and Wagner, that the trombone was firmly established as an orchestral instrument.¹¹

The character of trombone playing underwent a great change from the Middle Ages to the present. In the 16th 17th centuries the instrument was commonly used with viols, recorders, organ and voices and was expected to blend with these sounds. Mersenne stressed that the temptation to play the trombone like a trumpet had to be resisted and the manner of the human voice cultivated. This idea was lost, so that by the 19th century Berlioz described the instrument as "menacing and formidable," able to "break forth into frantic cries or sound its dread flourish to awaken the dead or doom the living."¹²

Throughout the first half of the 18th century, the horn still had a trumpet-like sound and was often objected to as being coarse and vulgar.¹³ The origin of the instrument was in either France or Germany, a point still under discussion by historians. Although the English used it, in the form of a hunting horn, in the early 1700's in orchestral music as a novelty, it was not accepted into French orchestras until after 1750 when the mellow sound

¹¹Donald J. Grout, A History of Western Music (New York, W. W. Norton and Co., Inc., 1960), p. 482.

¹²Monk, op. cit., p. 285.

¹³Apel, op. cit., p. 341.

associated with the modern horn became a characteristic of the instrument.¹⁴

Several attempts were made to make the horn a chromatic instrument before the invention of the valve. Around 1760 the horn player K lbel built the Amorschall, a horn with a modified bell and lateral holes covered by keys, the first instance of the use of keyed brass instruments. About 1770, Hampl of Dresden discovered the possibilities of altering the tones of the natural horn by inserting the open hand in the bell. This technique partially solved the problem of the gaps between the natural tones. Natural horns played in this manner were called "hand horns."¹⁵ The late 18th century saw the rise of the horn virtuoso soloist. Some of the very popular performers included: Giovanni Punto, for whom Beethoven wrote his horn sonata; Rodolphe in Paris; Spandau who played in London; and Leutgeb, for whom Mozart wrote four horn concertos. In their time, these hand horn virtuosos rivaled the popularity of the violin virtuosos.¹⁶

Crooks were common by the late 18th century. At first they were straight sections of tubing inserted under the mouthpiece. This was inconvenient and became impractical

¹⁴R. Morley Pegge, "The Horn and Later Brass," in Musical Instruments Through the Ages, ed. by Anthony Baines (Baltimore, Penguin Books, 1961), p. 298.

¹⁵Apel, op. cit., p. 341.

¹⁶Pegge, op. cit., p. 299.

because the longer crooks moved the instrument too far from the body. Hampl is credited with the invention of curved crooks which were inserted into the body of the horn making the application of the hand to the bell easier.

By utilizing crooks and stopped notes, the horn was an almost completely chromatic instrument, but the timbre change caused by stopping, and the time needed to change crooks were factors seriously limiting the horn's usage.¹⁷

These problems were finally solved by the invention of the valve. The early valve horn players used their valves as substitutes for crook changes and continued to use the hand horn technique.¹⁸ Because of the more brilliant tone of the hand horn, its use was continued beside the more modern valved horn well into the 19th century.¹⁹

The modern horn is usually a double horn (F and B-flat), making the upper register easier to play. The hand is used in the bell today to insure perfect intonation and for special horn effects.²⁰

The tuba as it is known today did not exist until the late 19th century. Its function was filled by instruments which have since gone out of use (the serpent,

¹⁷Apel, op. cit., p. 341.

¹⁸Pegge, op. cit., p. 300.

¹⁹Apel, op. cit., p. 341.

²⁰Pegge, op. cit., p. 302.

and bass keyed bugles), and were never really part of the orchestra. Modern usage of the term "tuba" seems to apply to any bass brass instrument other than the trombone, with a conical bore and often played with a cup mouthpiece similar to the trumpet. Tubas are built with four or five valves and in three general sizes: (1) tenor in B-flat (a 5th below the horn), (2) bass in E-flat or F, and (3) double-bass (an octave below the tenor tuba).

The tuba designed by Wagner for his Ring has been given his name. Wagner tubas have a narrower bore and a mouthpiece similar to the horn. Wagner used two tenors and two basses with a normal double-bass. The advantage of these instruments was in their agility.²¹

Instruments were probably always played together, but up to about 1700, concern over balance, capabilities, and individual characteristics in combinations of instruments was very slow in developing. Most of the music of the Middle Ages and the Renaissance which is instrumental is chamber rather than orchestral music. Larger ensembles existed, however, for ceremonial purposes. Giovanni Gabrieli was the first to utilize orchestral resources in Venice at a time when ceremonial receptions were almost everyday occurrences. Sacrae symphoniae by Gabrieli (c. 1600) are the first compositions to use a specific instrument for each part. Little distinction was made

²¹Apel, op. cit., p. 772.

between the capabilities of the various instruments. Monteverdi's Orfeo (1607) is a landmark in the history of orchestration as it contains individual treatment of the instruments and special orchestral effects. Although Monteverdi's individual use of instruments was probably an innovation, his emphasis was on wind instruments and strongly contrasting groups. These are characteristics of a Renaissance rather than a Baroque orchestra. This perhaps explains why this arrangement never became a precedent. Throughout the 17th century the emphasis on bowed instruments and the practice of thorough-bass scoring did not provide an ideal situation for progress in the use of orchestral resources.²²

Organization of the orchestra in groups of strings, woodwinds and brass instruments had a tentative beginning with Lulli. His methods were an advance in orchestration because he used woodwinds and brass (trumpets) in conjunction with a foundation of strings, and not instead of strings for whole movements.²³

By the time of Bach, instruments and performance techniques had progressed, and various effective combinations had become common. Bach's orchestration consisted of an impartial distribution of interchangeable parts between strings and these wind combinations. Each contrapuntal

²²Ibid., pp. 519-520.

²³Adam Carse, The History of Orchestration (New York, E. P. Dutton and Company, 1925), p. 77.

line was treated independently and conceived in general instrumental terms rather than for a specific instrument. Doubling of any of the lines by different instruments was common.²⁴

Handel used a style of broad contrasts more than Bach, but did not depart from the contrapuntal orchestration. Trumpets alone, trumpets and oboes, and trumpets and percussion were favority combinations of Purcell and Scarlatti, and Scarlatti added horns to the combinations.²⁵

The orchestra remained unchanged in the 18th century, but Rameau introduced a factor in its treatment. He was probably the first to consistently provide each instrument with a part of its own and began the line of development to the coloristic treatment of the modern orchestra.

During the time of Haydn and Mozart the strings assumed the role as the foundation of the orchestra, and the number of strings grew larger in proportion to the rest of the ensemble. Also during this time, orchestral color became subject to change on a moment to moment basis rather than from movement to movement as was the Baroque practice. The instrumental group became standardized, including two horns and two trumpets as the brass section.²⁶ The brass was now treated as capable of sustaining

²⁴Apel, op. cit., p. 520.

²⁵Carse, op. cit., p. 98.

²⁶Apel, op. cit., p. 521.

harmonic progressions, rather than merely supporting the resonance of the strings.²⁷

Berlioz did much to establish the use of instruments for their particular tone quality. In his orchestration he drew heavily from the coloristic effects created in the works of such composers as Gluck, Cherubini, and Weber. Liszt, Wagner and Strauss were influenced by the work of Berlioz in the 1830's, and especially by his use of a huge, expanded orchestra.²⁸

The highest point as well as the end of the 19th century development of the orchestra can be seen in the work of Mahler whose 8th Symphony, for example, calls for a very large woodwind section as well as eight horns, four trumpets, four trombones and tubas, and in addition, a fanfare section of four trumpets and three trombones.

Twentieth-century developments in orchestration have included Debussy's "orchestral palette" technique, and the use of small ensembles (Stravinsky's Histoire du Soldat) where the tendency has been to score for the musical requirements rather than for a standardized orchestra. Another development has been the Stravinsky "perverted orchestration," in which the brass and percussion play a melodic role and the strings are scored percussively.²⁹

²⁷ Louis A. Coerne, The Evolution of the Modern Orchestra (New York, Macmillan Company, 1908), p. 68.

²⁸ Grout, op. cit., p. 508.

²⁹ Apel, op. cit., p. 521.

CHAPTER 2

ORCHESTRATION AS PART OF STYLE

Orchestration is as much of a style factor in any composer's music as the basic elements of music. Since there is this relationship between style and orchestration, it is necessary to explore briefly the style of each of the composers involved in this survey.

It is said of Stravinsky that "none of his works introduces the next one or prefigures it."³⁰ This is probably true if one views only the mood and scope of each work, but there are style factors which tie the Rite of Spring to those works which precede and follow it.

Stravinsky's basic approach is contrapuntal with a great deal of rhythmic complication. Rhythmic interest is generated and tension is created by the introduction of an irregular pattern after a regular one has been established, and the return to the regular pattern from time to time. Polyrhythmic sections occur with a regular rhythm against an irregular pattern in another part. Rhythmic motives are often shifted from place to place in the measure. Stravinsky's use of silence is also important to the over-all rhythmic drive. The use of silence between chords, on normally accented beats, and before a climax generates much of the tension in the Rite of Spring.³¹

³⁰Paul Collaer, A History of Modern Music (New York, Grosset and Dunlap, 1961), p. 122.

³¹Grout, op. cit., p. 634.

Harmonically, Stravinsky organizes his music around tonal centers (except for some of the late works) and uses such devices as bitonality, pandiatonicism and modality. In the Rite of Spring, his harmonic vocabulary includes sequences of 9th and 11th chords, melodic passages set in parallel 7th and 9th chords, and polytonal clusters.³²

Stravinsky tends to use unusual or non-traditional combinations of instruments. The peculiar timbres produced by these combinations are part of his original conception of the music and are style factors, not simply techniques of orchestration employed after the music was composed.³³

Hindemith's music, including Mathis der Maler, is tonal with major and minor parallelism, and orchestration techniques reminiscent of Brahms. A contrapuntal texture is common to the style. In the contrapuntal passages, the orchestration often is the "contrapuntal orchestration" of Baroque composers where each line of the texture is doubled by different instruments (i.e. oboes and horns, cellos and bassoons, violins and flutes, etc.).

With a traditional harmonic style, Hindemith demands only conservative technical capacities of his performers. The brass ranges are all within conservative bounds, and rhythmic complexity which might tax the performers is not present. Unlike Stravinsky and Bartok, who let the demands

³²Homer Ulrich, Symphonic Music (New York, Columbia University Press, 1952), p. 284.

³³Grout, op. cit., p. 639.

of the music determine the instrumentation, Hindemith tends to view the orchestra as a standardized group of instruments for which music is written.

Bartok is said to have studied Stravinsky, and was particularly interested in Stravinsky's rich metric system.³⁴ Bartok's music contains an element of "primitivism," the stylized imitation of primitive music by means of pounding frenetic rhythms, limited melodic ranges, much repetition of motives, and percussive harmonies. In this aspect, Bartok's work resembles Stravinsky's style in the Rite of Spring.³⁵

Bartok's textures are usually either homophonic or contrapuntal. The contrapuntal textures embody free use of imitative, fugal, and canonic techniques, and are often doubled by voices moving in parallel chords. Basso ostinato figures and double and triple pedal points are used. These devices give rise to polytonal passages and other areas of obscure tonality, but Bartok's music is not atonal.³⁶

Elliott Carter's style makes less use of massive sounds than the other three composers in this survey. In homophonic textures, Carter uses constantly changing timbres as chords are sounded by different groups of instruments. Melodic material in a contrapuntal texture is usually

³⁴Collaer, op. cit., p. 345.

³⁵Grout, op. cit., p. 613.

³⁶Ulrich, op. cit., p. 289.

distributed among several instruments so that the timbre of each contrapuntal line is always changing. This technique causes the part for any individual instrument to be fragmented, a series of short utterances, which must in performance sound as part of a whole line sweeping through the full range of the orchestra.

Carter's music is not serial music, but tonal centers are not established in the traditional sense. His rhythmic concepts are as subtle as the effect of his constantly changing timbres.

The individual styles which have been briefly outlined, dictate certain orchestrational techniques. In the following section, the individual techniques in different situations are isolated and identified. A comparison of these techniques and conclusions drawn from this comparison is presented in the last section.

PART II: A SURVEY OF BRASS ORCHESTRATION

CHAPTER 3

THE RITE OF SPRING

by
Igor Stravinsky

A. SCORING FOR THE INDIVIDUAL SECTIONS AND SOLO INSTRUMENTS

A feature of the brass solos in the Stravinsky work is the repetition of a rhythmic figure, most often in a percussive manner. Solos are either very short, or involve many repetitions of a single, short rhythmic motive. Several of the solo passages are used in more than one brass instrument as well as being written for woodwinds and strings (see Ex. 1 and 2),



and some of the solos are broken melodic lines, where the solo line is divided between two or more different instru-

ments of the orchestra (see Ex. 3 and 4).



Solos for brass instruments occur most commonly with woodwind and string accompaniment, but other combinations of instruments are also used in this capacity. For example, three horns in triads are supported by a sustained chord in flute harmonics in Example 5,



and in Example 6 a tuba solo is accompanied by trombone and percussion.



The character of the brass solo lines is most often staccato, but some lyrical treatment does occur (see Ex. 7).



In addition to such melodic material as may be provided by solo lines and melodic doubling, the brass instruments are used for other functions as well. These include sustained notes, punctuation in combination with other instruments (short percussive chords, see Ex. 8),

Ex. 8 (strav. meas. 348)

Ob. 1-2

Hr. 1-2

Tr. in B

Tr. in C

Trb. 1-3

sff

gliss.

sff

rapidly repeated notes for the trumpet (see Ex. 9),

Ex. 9 (strav. meas. 268)

Ob. 1-3

Tr. in C

p

p

and repeated rhythmic patterns (see Ex. 10).



B. SCORING FOR BRASS COMBINATIONS

In the Rite of Spring, the brass instruments are employed in twelve different combinations which serve five functions. In addition to combining two or more horns to serve one of the five functions, two or more trumpets and two or more tubas are used in the same manner. Combinations of horns alone serve all five of the functions.

The functions of the combinations, the manner in which they are employed include: (1) sustained notes and chords, (2) repetition of rhythmic patterns, (3) punctuation,

(4) melodic material (brass melody), and (5) melodic doubling.

Some of the combinations are naturally used with greater frequency than others. The most important combinations from this aspect are two or more horns; trumpets and horns; two or more trumpets; and horns, trumpets and trombones. The other combinations are infrequently used and serve only one or two of the functions.

The brass is orchestrated in combinations most frequently to serve a melodic function, other than melodic doubling, which will be discussed separately. The melodic function of the combinations is divided into two types of textures, homophonic and contrapuntal. Example 11 shows a brass combination with melodic material in a homophonic texture (see Ex. 11).

Ex. 11 (Strav. meas. 391)

The musical score for Example 11, titled "(Strav. meas. 391)", is presented on five staves. The top four staves are for Horns (Hr.) and the bottom staff is for Trombones (Tuba). The Horns are divided into four groups: Hr. 1-2, Hr. 3-4, Hr. 5-6, and Hr. 7-8. The Trombone staff is labeled "Tuba" and "1-2". The music is in 4/4 time and features a melodic line in the horns and a supporting line in the trombones. The key signature has one sharp (F#) and the time signature is 4/4. The notation includes various musical symbols such as notes, rests, and accidentals.

A brass combination with a melodic function in a contrapuntal texture is illustrated by Example 12, a case of seven horns in counterpoint (see Ex. 12).

Ex. 12 (Strav. meas. 525)

The image shows a handwritten musical score for seven horns, labeled 'Ex. 12 (Strav. meas. 525)'. The score is written on six staves, each labeled 'Hr.' with a number 1 through 6. The notation is in treble clef with a key signature of one flat (B-flat). The music is written in a contrapuntal style, with each horn part having its own melodic line. The notation includes various note values, rests, and accidentals (sharps, flats, and naturals). The background of the manuscript is aged and yellowed.

Another frequent function of the brass combinations is punctuation. In Example 13, the brass combination is used to punctuate material in the strings.

Ex. 13
(Strav. meas. 107)

The driving rhythmic force of this work as a whole makes the repetition of chords in rhythmic patterns an important factor in the music (see Ex. 14). Sustaining notes and chords is also a frequent function of the brass combinations (see Ex. 15).

Ex. 14 (Strav. meas. 793)

fff pavillon en l'air

4 Hr.

3 Tr. in C

5 Trb.

2 Tubas

4 Timp

Vln. 1

Vln. 2

Ex. 15 (Strav. meas. 535)

2 Ob.

2 Cl. in Bb

5 Hr.

The over-all orchestral texture at the moment the combinations are used is most frequently that of melody and accompaniment. Contrapuntal, homophonic, and textures of a single element (usually chords or one rhythmic pattern) occur with much less frequency.

The instrumentation used to create these textures is commonly strings, woodwinds and brass. Combinations of strings, woodwinds, brass and percussion, and tutti orchestration are infrequent, as are combinations of strings and brass. One of the even more rare instrumentations of the various textures includes woodwinds and brass in a melody and accompaniment texture (see Ex. 16).



C. DOUBLING

Doublings in the Rite of Spring serve four functions; melodic doubling, punctuation, sustained chords, and the repetition of rhythmic patterns including ostinato patterns. The most common occurrence of doubling is the case of melodic doubling, as shown in Example 17, an interesting case of four trumpets doubling a line in parallel 7th chords, and trumpet I is doubled by three celli (see Ex. 17).

Ex. 17

Tr. in C 1-2 *mp* (strav. meas. 194)

Tr. in C 3-4 *mp*

Vln. 2 *marc.*

Solo Coll. *marc.*

The other functions of doubling are less frequently used. Punctuating chords doubled by strings, woodwinds and brass are seen in Example 18.

Ex. 18

Wwd. *sff*

Hr. *sf*

Tr. in C *sf*

Trom. *sf*

Tuba *sf*

Str. *sff*

(strav. meas. 360)

The repetition of chords in a rhythmic pattern is shown in Example 19, where an ostinato pattern in the horns is doubled by the low woodwinds and strings (see Ex. 19).

Ex. 19

ff (Strav. meas. 345)

ff

arco pizz. arco pizz.

ff pesante

Doublings may involve only like brass instruments. Four horns in unison, or two trumpets in octaves would be an example of this. Two or more different brass instruments are often used (i.e. two trumpets doubling two horns), and the possibilities of different combinations of brasses doubled with other instruments are thoroughly exploited in this work. Combinations of brass and strings, and brass and woodwinds each serve all of the functions, brass and woodwinds being used more often than any other combination (see Ex. 20).

Ex. 20 (Strav. meas. 229)

3 Clar. Bb

4 Tr.

The over-all orchestral texture at the moment these doublings are used is most frequently melody and accompaniment. Contrapuntal textures are also frequent, but the other textures (one element, and homophonic) are infrequent.

D. SPECIAL EFFECTS AND UNUSUAL TECHNICAL DEMANDS

Stravinsky makes extensive use of eleven different classifications of special effects including those produced by various types of technical demands upon the musicians. The most frequent effect is muting. Most often horns or trumpets are muted in a melodic capacity and in a few cases they are combined in this function. Many of the examples cited before have illustrated the use of muted brass, often only for dynamic reasons, but Example 21 shows a use of the mute for variation of tone color (see Ex. 21).

Ex. 21

The musical score for Example 21 consists of three staves. The top staff is for Horns 1-2, the middle for Horns 3-4, and the bottom for Trombone. The time signature is 2/8. The key signature has one flat (B-flat). The score includes a 'sord.' (sordina) marking above the Trombone staff and a 'f marc.' (forte marcato) dynamic marking below the Trombone staff. A bracket above the Horns 1-2 staff indicates a melodic line. A note below the Horns 3-4 staff reads '(Strav. meas. 589)'. The score shows various musical notations including eighth notes, quarter notes, and rests.

11

Trills are written frequently for horns and trumpets on sustained notes and chords. In Example 22, a chord is trilled by three trombones in addition to horns and trumpets, while trumpet I and the D trumpet perform an ascending line of consecutive quarter note leaps which are trilled (see Ex. 22).

Ex. 22

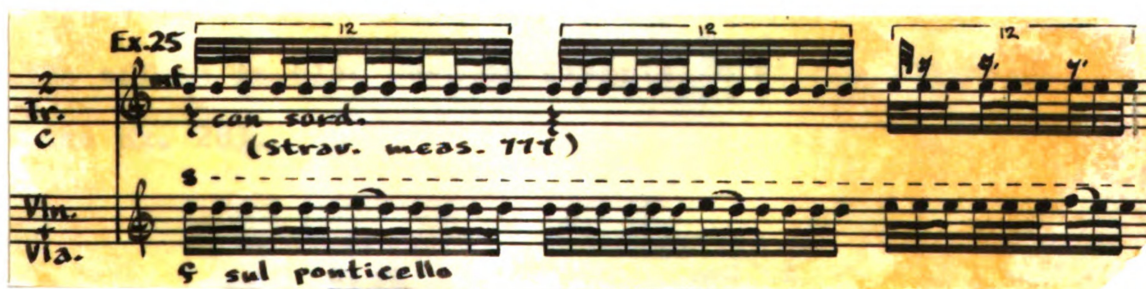
Glissandos are written for the horns and trombones. In Example 23, both horns and trombones use this effect, however the notes of the trombone glissando are not written out as the strict definition of the term requires (see Ex. 23).

Ex. 23

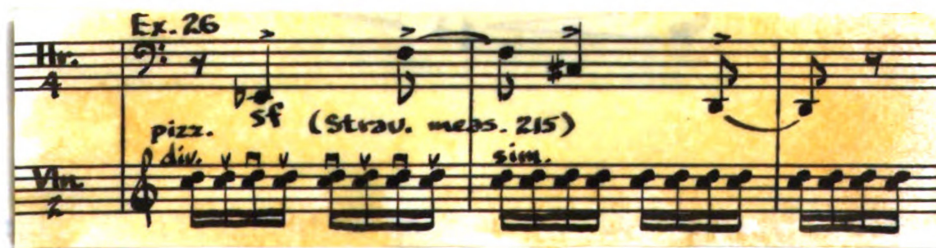
Rapidly repeated notes are used in Example 24 in the horns and trumpets. The brasses are doubling tremolo in the strings and woodwinds which are also engaged in rapid tonguing. This gives the whole texture a shimmering effect at this point (see Ex. 24).



Two muted trumpets alternate rapid tonguing passages in Example 25, doubling the violins and violas (see Ex. 25).



Some of the unusual technical demands involve wide leaps in extreme registers (see Ex. 26).



The eighth-note figure for the tubas, as shown in Example 27, is repeated sixteen times in the upper register of the instrument (see Ex. 27).



The two tubas alternate every two measures of this ostinato pattern. Two trombones also engage in the same pattern, but in a manner different from the tubas, each trombone having only two notes of the pattern.

The remaining special effects used by Stravinsky are those which can only be produced by horns. The effect Les pavillons en l'air (bells in air) is used where great horn volume is needed, such as was seen in Example 24. The effect is also used in Example 28 with a glissando (see Ex. 28).



Example 29 illustrates the use of the cuivré (brassy)

effect for horns (see Ex. 29).

Ex. 29

Hr. 1-3

Hr. 6-8

Soli (cuivrez)

f

(Strav. meas. 403)

Horn VIII produces a secco (dry) effect with its one note punctuations doubled with the timpani in Example 30 (see Ex. 30).

Ex. 30

Ban. 1-3

f

(Strav. meas. 265)

Hr. 8

f secco

Timp.

Stopped horns (bouché) are used in Example 31 for the horn chord (see Ex. 31).

Ex. 31

Hr. 1-2

Hr. 3-4

sf

(Strav. meas. 637)

TABLE I. A COMPARATIVE LIST OF FURTHER EXAMPLES FROM
THE RITE OF SPRING BY IGOR STRAVINSKY

A. THE FUNCTIONS OF INDIVIDUAL SECTIONS AND INSTRUMENTS

HORNS

1. Melodic Material,
Conjunct: Meas. 164, 255, 333, 346, 388, 441, 544,
556, 579, 587, 591, 599
Disjunct: Meas. 182, 216, 259, 267, 275, 363, 379,
392, 403, 415, 419, 481, 488
2. Sustained Notes
and Chords: Meas. 20, 22, 25, 248, 290, 444, 447,
451, 530, 601
3. Punctuation: Meas. 112, 202, 247, 358, 361, 367, 418,
654, 679
4. Rapidly Repeated Notes: Meas. 101, 288
5. Repeated Rhythmic Patterns: Meas. 62, 224, 364, 633,
649, 754, 852

TRUMPETS

1. Melodic Material,
Conjunct: Meas. 194, 351, 406, 536, 556, 772
Disjunct: Meas. 61, 147, 153, 268, 277, 292, 363
381, 415, 447, 457, 685, 692
2. Sustained Notes
and Chords: Meas. 248, 418, 420, 601
3. Punctuation: Meas. 108, 311, 349, 361, 367, 413, 421,
428, 457, 472, 488, 524, 654, 679
4. Rapidly Repeated Notes: Meas. 101, 259, 270, 283,
500, 783
5. Repeated Rhythmic Patterns: Meas. 224, 230, 482, 633,
648, 804

TROMBONES

1. Melodic Material;
Conjunct: Meas. 125, 140, 362, 692, 786
Disjunct: Meas. 148, 256, 268, 377

2. Sustained Notes
and Chords: Meas. 381, 536
3. Punctuation: Meas. 145, 311, 349, 361, 367, 369, 382,
428, 447, 457, 472, 488, 524, 661.
4. Rapidly Repeated Notes: Meas. 277, 475
5. Repeated Rhythmic Patterns: Meas. 190, 236, 482

TUBAS

1. Melodic Material,
Conjunct: Meas. 388, 437, 447, 451, 524
Disjunct: Meas. 267, 377, 395, 528
2. Sustained Notes
and Chords: Meas. 146
3. Punctuation: Meas. 346, 361, 363, 367, 369, 381, 654
697
4. Rapidly Repeated Notes: Meas. 392
5. Repeated Rhythmic Patterns: Meas. 234, 377, 482

B. THE FUNCTIONS OF THE BRASS COMBINATIONS

	Melodic Material	Sustained Chords	Punct- uation	Rhythmic Patterns
Horns and Trumpets		248 250 601	413	101 633
Horns and Trombones		835		
Horns and Tubas	388			
Horns, Trumpets and Trombones		436	349 353 355 482	715
Horns, Trumpets, Trombones and Tubas	697		358 367 361 369 661	
Trumpets and Trombones	692		428	
Trumpets, Trombones and Tubas			798	799
Trombones and Tubas	377	536		
Horns, Trumpets and Tubas				679 909
Horns, Trombones and Tubas		536	784	

C. THE FUNCTIONS OF THE VARIOUS DOUBLINGS

	Melodic Material	Sustained Chords	Punct- uation	Rhythmic Patterns
Brass Sections Alone	101 528			
Two or More Different Brasses with other Instruments	697	431 436 536	457 798	633 715 830
A Single Brass Instrument with Strings	419	327	78 108	346
A Single Brass Instrument with Woodwinds	61 250 349 406 432 441 457 692 699 886	532	457 525	62 230
A Single Brass Instrument with non-brasses	349 377 395 403 544		346 352 654	

D. THE USE OF SPECIAL EFFECTS

	Horns	Trumpets	Trombones	Tubas
Muted	73 101 579 627 633 587	61 93 101 179 381 406 531 556 772 861	536 652 865	536
Glissando	244 471 652 660 674 978		353 674 968	
Stopped	259 643 784			
Bell in Air	652 669 696 799			
Trills	431 436	436		
Brassy	485 791			

CHAPTER 4

SYMPHONIE MATHIS DER MALER

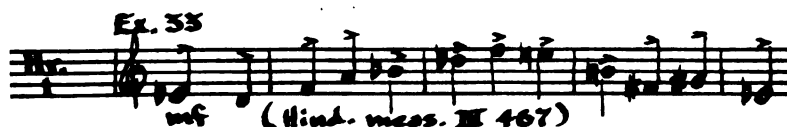
by
Paul Hindemith

A. SCORING FOR THE INDIVIDUAL SECTIONS AND SOLO INSTRUMENTS

Hindemith, in Mathis der Maler, generally tended to use a full orchestration, making more use of combinations of brass timbres than of the timbre variations possible by shifting from one solo instrument to another. When solo brasses are used in this work, the material is usually lyrical in nature and often conjunct in melodic motion (see Ex. 32).



The less common marcato solos are for horn. One of these is interesting for what is an excessive length of a solo in this style (see Ex. 33).



The statement is four bars long and is repeated 13 times for a total of 52 measures.

One rare example of a non-melodic solo is for the

trumpet, featuring rapidly repeated notes in a tutti orchestra passage (see Ex. 34).

Ex. 34

Hr.
2/4

Tr.
2/2

ff (Hind. meas. III 178)

and the individual sections are used for the repetition of rhythmic patterns (see Ex. 36).



B. SCORING FOR BRASS COMBINATIONS

Hindemith, as did Stravinsky, used 12 different combinations of brass instruments to serve five functions. Groups of horns alone, trumpets alone and trombones alone were used as combinations of like instruments. Unlike the horns in the Stravinsky work, none of these brass groups performs all five of the functions. The most versatile of the groupings, the ones which serve the most functions, are horns, trumpets and trombones as one combination; and the tutti brass section as the second combination. Other combinations important to the Hindemith brass orchestration are combinations of horns alone, and combinations of horns and trumpets. The remaining combinations are used only incidentally and serve only one or two of the functions.

In Mathis der Maler, the brass combinations serve the same functions as were used in the Rite of Spring, but with differences in frequency and style. The melodic functions of the brass combinations are the most important to the orchestration. The melodic material for the brass groupings is divided into two textures, homophonic (see Ex. 37)

Ex. 37 (Hind. meas. 323)

The musical score for Ex. 37 consists of three staves. The top staff is for Horns (Hr.), the middle for Trumpets (Tr.), and the bottom for Trombones/Tubas (Trb. Tuba). The music is in 2/2 time and features a homophonic texture with a forte (ff) dynamic marking. The notes are primarily quarter and half notes, with some rests.

and contrapuntal (see Ex. 38).

Ex. 38

The musical score for Ex. 38 consists of three staves. The top staff is for Horns (Hr.), the middle for Trumpets (Tr.), and the bottom for Trombones/Tubas (Trb. Tuba). The music is in 2/2 time and features a contrapuntal texture with a decrescendo (dim.) dynamic marking. The notes are primarily quarter and half notes, with some rests.

Besides scoring brass melodically, another common use of the brass combinations is for sustaining chords (see Ex. 39).

Ex. 39

(Hind. meas. III 188)

Trb. tuba

Str.

Example 40 illustrates the use of punctuating chords by Hindemith as a frequent function of the brass combinations (see Ex. 40).

Ex. 40 (Hind. meas. I 210)

dim.

Trb. tuba

The rarest of the functions is repetition of chords in a rhythmic pattern (see Ex. 41).

Ex. 41

2 Bsn. f (Hind. meas. III 19)

4 Hr. mf

2 Tr. mf

The over-all orchestral texture at the moment the combinations are used is most frequently melody and accompaniment, and contrapuntal. Homophonic textures and textures of a single element are only rarely used.

The instrumentation used to create these textures is usually strings, woodwinds and brass. Also frequently used for this purpose is the instrumentation including strings, woodwinds, brass and percussion, and the tutti orchestra. The infrequent instrumentations include an unaccompanied brass chorale (see Ex. 42),

Ex. 42

4 Hr.

2 Tr.

3 Trb.

2 Tuba

(Hind. meas. III 519)

strings and brass (see Ex. 43),

Ex. 43

Ex. 43 is a musical score for four parts: Horns 1-3, Trumpets 1-2, Tuba, and Violins 1-2. The music is in 3/4 time. The Horns and Trumpets parts are marked *mf*. The Tuba part is also marked *mf*. The Violins part is marked *mf*. The score includes a reference to *Hind. meas. III 159*.

and woodwinds and brass (see Ex. 44).

Ex. 44

Ex. 44 is a musical score for five parts: Flute, Clarinet (C), Horns 1-2, Trumpets 1-2, and Tuba. The music is in 3/4 time. The Flute and Clarinet parts are marked *mf*. The Horns and Trumpets parts are marked *p*. The Tuba part is marked *p*. The score includes a reference to *Hind. meas. I 260* and dynamic markings *dim.* for the Horns, Trumpets, and Tuba.

C. DOUBLING

Doublings in the Hindemith work serve the same functions as was the case in the Rite of Spring, but the frequency of each function is different. Melodic doubling is a very important factor in the orchestration of this piece. The following examples illustrate this device as it occurs in a variety of situations (see Ex. 45 through 49). Examples 46 and 47 illustrate the same line with different doublings in two separate situations. An unusual doubling of trumpets, woodwinds and percussion occurs in Example 49.

Ex. 45

4 Hr. *ff* (Hind. meas. III 59)

1 Tr. *ff*

3 Trb. Tuba *ff*

Str. *ff*

Ex. 46

2 Clar. *f* (Hind. meas. I 133)

2 Bsn. *f* (Hind. meas. I 133)

1 Hr. *f*

Vln. 1-2 *mf*

Ex. 47

Handwritten musical score for Ex. 47. The score is for four instruments: Clarinet in Bb (Clar. 2 Bb), Horn (Hr.), Violin (Vln.), and Viola (Vla.). The key signature has one sharp (F#) and the time signature is 3/4. The music is marked *mf* (mezzo-forte). A note in the Clarinet part is marked with a 'v' (accendo). A bracketed note in the Horn part is labeled "(Hind. meas. I III)".

Ex. 48

Handwritten musical score for Ex. 48. The score is for four instruments: Trombone (Trom.), Horn (Hr.), Tuba (Tu.), and Double Bass (Vcl. D.B.). The key signature has one sharp (F#) and the time signature is 3/4. The music is marked *mf* (mezzo-forte). A note in the Trombone part is marked with a 'v' (accendo). A bracketed note in the Horn part is labeled "(Hind. meas. III 76)".

Ex. 49

Handwritten musical score for Ex. 49. The score is for five instruments: Oboe (Ob.), Clarinet in C (Clon. (C)), Trumpet (Tr.), Glockenspiel (Glock.), and Violin (Vln. 1-2). The key signature has one sharp (F#) and the time signature is 3/4. The music is marked *mf* (mezzo-forte). A note in the Oboe part is marked with a 'v' (accendo). A bracketed note in the Clarinet part is labeled "(Hind. meas. I 25)".

Doubling for punctuating effects is incidental, but it does occur very clearly in Example 50 where the tutti orchestra executes two sharp chords of punctuation (see Ex. 50).

Ex. 50

The musical score for Example 50 consists of five staves, each representing a different instrument: W.W. (Woodwind), Hr. (Horn), Tr. (Trumpet), Trb. (Trombone), and Str. (String). The notation includes various musical symbols such as notes, rests, and dynamic markings. A specific instruction "(Hind. meas. III 5)" is written above the Tr. staff. The score illustrates two sharp chords of punctuation, with dynamic markings like *ff* (fortissimo) indicating the intensity of the sound.

Doubling involving the repetition of chords in rhythmic patterns is very rare. Example 41, cited before, was an illustration of this type of doubling.

The over-all orchestral texture at the moment of these doublings is usually contrapuntal. Melody and accompaniment is frequent, with homophonic and textures of chords being rare.

TABLE II. A COMPARATIVE LIST OF FURTHER EXAMPLES FROM
MATHIS DER MALER BY PAUL HINDEMITH

A. THE FUNCTIONS OF INDIVIDUAL SECTIONS AND INSTRUMENTS*

HORNS

1. Melodic Material,
Conjunct: Meas. I-15, I-25, I-46, I-58, I-183, I-203,
I-234, I-291, II-23, III-51, III-59,
III-72, III-134, III-145, III-171
Disjunct: Meas. I-111, I-183, I-197, III-12, III-235,
III-372, III-454
2. Sustained Notes
and Chords: Meas. I-1, I-42, I-55, I-85, I-107, I-258,
I-299, I-308, II-44, III-141
3. Punctuation: Meas. I-49, I-61, I-206, III-5, III-14
4. Repeated Rhythmic Patterns: Meas. III-19, III-76

TRUMPETS

1. Melodic Material,
Conjunct: Meas. I-23, I-250, I-299, II-24, II-30,
III-59, III-72, III-134, III-145
Disjunct: Meas. I-212, III-235
2. Sustained Notes
and Chords: Meas. I-55, I-258, I-308, III-141,
III-188
3. Punctuation: Meas. I-49, III-5, III-14, III-151
4. Rapidly Repeated Notes: Meas. III-174
5. Repeated Rhythmic Patterns: Meas. III-19, III-76

TROMBONES

1. Melodic Material,
Conjunct: Meas. I-8, I-15, I-25, I-214, I-221,
I-234, II-23, III-59, III-72, III-145
III-135

*The measure numbers throughout this table are composed of Roman numerals, which indicate the movement of the work, and Arabic numerals, which indicate the measure of the movement.

Disjunct: Meas. I-115, III-12, III-235

2. Sustained Notes and
Chords: Meas. I-25, I-55, I-246, I-251, I-302,
III-141, III-165, III-178, III-188
3. Punctuation: Meas. I-49, I-61, I-206, III-5, III-14,
III-70
4. Repeated Rhythmic Patterns: Meas. III-26, III-76

TUBA

1. Melodic Material,
Conjunct: Meas. I-23, I-214, II-23, III-59, III-75,
III-145, III-155
2. Sustained Notes: Meas. I-25, I-55, I-246, I-251,
I-308, III-36, III-141,
III-165, III-178, III-188
3. Punctuation: Meas. I-49, I-206, III-5, III-14, III-170

B. THE FUNCTIONS OF THE BRASS COMBINATIONS

	Melodic Material	Sustained Chords	Punct- uation	Rhythmic Patterns
Horns and Trumpets	I-29 III-383			III-19
Horns and Trombones	I-16 I-120			
Horns, Trumpets and Trombones	III-72 III-235 III-287		III-16	III-32
Horns, Trumpets, Trombones and Tuba	II-26 III-59 III-145 III-295 III-519	I-32 I-55 I-243 I-308 I-323 III-141 III-188	I-49 III-5 III-14	
Trumpets, Trombones and Tuba	I-251			
Trombones and Tuba			I-211	
Horns, Trumpets and Tuba		I-258		
Horns, Trombones and Tuba	I-215		I-61 I-206	

C. THE FUNCTIONS OF THE VARIOUS DOUBLINGS

	Melodic Material	Sustained Chords	Punct- uation	Rhythmic Patterns
Brass Sections Alone	I-123 III-59 III-72 III-372			
Two or More Different Brasses with other Instruments	I-216 I-246 I-252 II-26 III-12 III-75 III-148 III-153 III-376	I-58 I-246 I-251 III-36 III-165	I-61 III-5 III-16 III-151	III-19
A Single Brass Instrument with Strings	III-156 III-326	I-29 III-10		
A Single Brass Instrument with Woodwinds	I-207 I-212 I-299 I-302 II-24 II-30 III-51 III-454	I-1 III-181		
A Single Brass Instrument with non-brasses	I-111 I-183			

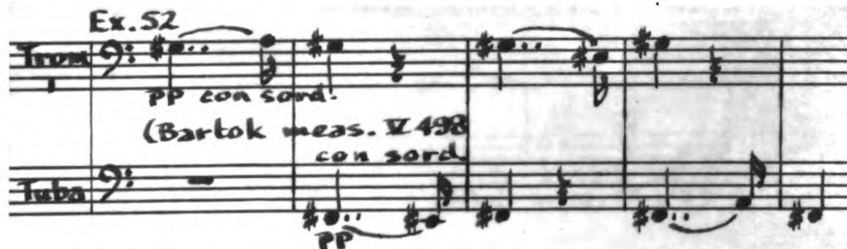
CHAPTER 5
CONCERTO FOR ORCHESTRA
by
Bela Bartok

A. SCORING FOR THE INDIVIDUAL SECTIONS AND SOLO INSTRUMENTS

The solos in the Concerto for Orchestra are well diversified in character. Some are lyrical, but disjunct in melodic motion (see Ex. 51).



Other of the lyrical solos have a conjunct melodic motion (see Ex. 52).



Another common characteristic of a solo in this work is a bold, marcato statement (see Ex. 53).



Some of the brass solos make use of special effects. The horn solo note in Example 54 is a soft, punctuating tone preceded by a grace note (see Ex. 54).

Ex. 54

(Bartok meas. III 119)

A trill by two trumpets in seconds comprises the solo in Example 55 (see Ex. 55).

Ex. 55

con sord. ff (Bartok meas. II 103)

Two trombones are used in Example 56 in a solo passage consisting of unaccompanied glissandos (see Ex. 56).

Ex. 56

(Bartok meas. II 90)

Two of the trumpet solos are notable for their length. The passage as shown in Example 57 is a solo for two trumpets in seconds which features repeated, staccato notes and continues for 30 measures accompanied only by strings (see Ex. 57).

Ex. 57

Tr. 1
Tr. 2
Vin.

sord.
P
pp

(Bartok meas. I 90)

The other trumpet solo as shown in Example 58 is a statement of a theme, which is then inverted, and finally appears in an inverted canon with the horn. The whole passage is underlain by a static harmony in the strings and woodwinds (see Ex. 58).

Ex. 58

Tr. 1
Tr. 2
Hr.
Tr. 3

ORIGINAL
INVERSION
CANON

(Bartok meas. I 201)

The solos for brass in the Bartok work are likely to appear in a texture of melody and accompaniment, or counterpoint, but there are some examples of unaccompanied solos (see Ex. 59).



Strings and woodwinds are usually used for the instrumentation of the accompaniment to these solos, but other orchestrations are used occasionally. In addition to the trumpet solo accompanied only by strings (seen in Ex. 57), there is a horn solo accompanied by woodwinds and harp (see Ex. 60).

Ex. 60 (Bartok meas. II 349)

Generally, the solo passages for trumpet have the greatest variance in the instrumentation of the accompaniment.

Other functions served by individual brass sections include sustained notes, punctuation effects (see Ex. 61),



and repeated rhythmic figures (see Ex. 62).



B. SCORING FOR BRASS COMBINATIONS

Bartok combined the brass in eleven different groupings to serve the same five functions as were stated for Stravinsky and Hindemith. The combination of horns alone, and the combination of horns, trumpets and trombones each serve all five of the functions, being the most versatile of the combinations. The combination of horns, trumpets, trombones and tuba is also frequently used. The remaining brass groups are used much less and serve only a few functions.

The combinations are most often used for melodic material. Again, the melodic function is divided between two types of textures, homophonic and contrapuntal. A

brass group serving a melodic function in a homophonic texture is seen in Example 63 (see Ex. 63).

Ex. 63

Tr. 1-2 mp

Trb. 1-2 mp

(Bartok meas. II 129)

Tuba mp

S.Dr. P

without snares

Brass instruments in counterpoint with each other are seen in Example 64 where the brass combination is unaccompanied throughout most of the contrapuntal section (see Ex. 64).

Ex. 64 (Bartok meas. I 365)

Tr. 1 f marc.

Tr. 2 f marc.

Tr. 3 f marc.

Trb. 1 f marc.

Trb. 2 f marc.

Trb. 3 f marc.

f marc.

The sustaining of notes and chords is also an important function of the brasses (see Ex. 65),

Ex. 65 (Bartok meas. I 232)

The musical score for Ex. 65, Bartok meas. I 232, shows four staves. The top staff is for Horns (Hr.), the second for Trumpets (Tr.), the third for Trombones (Trb.), and the fourth for Tuba. The Horns and Trombones play sustained chords. The Trumpets play a melodic line starting with a forte (f) dynamic. The Tuba plays a sustained chord. The Snare Drum (Str.) plays a rhythmic pattern.

and the repetition of rhythmic patterns and chords is common (see Ex. 66).

Ex. 66 (Bartok meas. II 249)

The musical score for Ex. 66, Bartok meas. II 249, shows four staves. The top staff is for Horns (Hr.), the second for Trumpets (Tr.), the third for Trombones (Trb.), and the fourth for Tuba. The Horns and Trombones play sustained chords. The Trumpets play a melodic line starting with a forte (f) dynamic. The Tuba plays a sustained chord. The Snare Drum (Str.) plays a rhythmic pattern.

An illustration of the brass combinations used for punctuation may be seen in Example 67 (see Ex. 67).



The over-all orchestral texture at the moment the combinations are presented is most frequently melody and accompaniment, with contrapuntal textures being almost equally important. Much less frequently, textures of chords and homophonic textures are used.

The primary instrumentation of these textures is strings, woodwinds, brass in the cases of melody and accompaniment and homophonic textures. The texture of chords appears with strings and brass, and avoids the use of woodwinds. The instrumentation of the instances of the homophonic texture is exclusively brass alone. The rarest instrumentations are brass and percussion (see Ex. 68),

Ex. 68

Tr. 1-2 *mp* (Bartok meas. II 120)

Trb. 1-2 *mp*

Tuba *mp*

S. Dr. *p* without snares

and strings, woodwinds, brass and harp (see Ex. 69).

Ex. 69 (Bartok meas. I 462)

B. Cl. *con sord.*

Tr. 3

Harp

Vln.

C. DOUBLING

As in the Stravinsky and Hindemith works, the doubling possibilities are divided into two general categories: One or more of a like brass instrument with orchestra, or two or more unlike brass instruments with orchestra. Doubling, however, is not an important factor in the Concerto for Orchestra. The doubled lines tend to be short, and the extensive use of this device which was common to Hindemith is not present.

The same functions are served by doublings as in the two previous works, but with different frequency. The most frequent function of doubling is sustained notes and chords (see Ex. 70), but the other functions are represented.



The repetition of notes and chords in rhythmic patterns is very rare in this style.

Instances of melodic doubling are illustrated by Examples 71 through 73. In Example 71, a line is doubled by three trumpets creating parallel major triads in second inversion, and in addition, Trumpet I is doubled

by the harp (see Ex. 71 through 73).

Ex. 71

Tr. *con sord.*

(Bartok meas. I 462)

Harp

Vln.

This handwritten musical score for Ex. 71 consists of three staves. The top staff is for Trombone (Tr.) in G-clef, marked 'con sord.' (con sordina). The middle staff is for Harp in C-clef. The bottom staff is for Violin (Vln.) in C-clef. The music is in 3/4 time and features a series of chords and single notes across the measures.

Ex. 72

Bsn. *az*

(Bartok meas. V 426)

Hr. *az*

Vln.

This handwritten musical score for Ex. 72 consists of three staves. The top staff is for Bassoon (Bsn.) in B-flat-clef, marked 'az'. The middle staff is for Harp (Hr.) in C-clef, also marked 'az'. The bottom staff is for Violin (Vln.) in C-clef. The music is in 4/4 time and features a series of chords and single notes across the measures.

Ex. 73

(Bartok meas. I 519)

Hr. *az ff*

Tr. *az ff*

Trb. *az ff*

This handwritten musical score for Ex. 73 consists of three staves. The top staff is for Harp (Hr.) in C-clef, marked 'az ff'. The middle staff is for Trombone (Tr.) in G-clef, marked 'az ff'. The bottom staff is for Trombone (Trb.) in F-clef, marked 'az ff'. The music is in 4/4 time and features a series of chords and single notes across the measures.

Doubling for reasons of punctuation is a common use of this device of orchestration. All of the Bartok combinations used for doubling perform this function at least once (see Ex. 74).

Ex. 74

f (Bartok mcz. I 17)

One of the rare occurrences of the repetition of a rhythmic pattern is illustrated by Example 75 (see Ex. 75).

Ex. 75

f (Bartok mcz. IV 92)

Combinations of instruments involved in doubling which perform all of the functions are those including brass and strings, brass and woodwinds, and groups of brass instruments alone. The rarest of the combinations used for doubling is brass, woodwinds and strings (see Ex. 76).



The over-all orchestral texture at the moment these doublings occur is most often melody and accompaniment, but the contrapuntal texture is also important in the doublings.

D. SPECIAL EFFECTS AND TECHNICAL DEMANDS

Bartok used eight different special effects in this work, but only muted, sustained notes and chords with frequency. Example 77 illustrates a more uncommon use of the mute for horns. After the punctuating chord is struck, the mute is rapidly inserted (see Ex. 77).



Combinations of special effects are used in Example 78. The muted trumpets have a duet in seconds, accompanied by tremolo in the strings (see Ex. 78).



Example 79 shows trills scored for the trumpets. Three muted trumpets trill a second inversion triad. This device is usually used with mute in the Bartok work (see Ex. 79).



A use of glissando in the trombones appears in Example 80 where the trombones are unaccompanied. It must be noted here that Bartok scored the first glissando in the example for bass trombone (Trombone III in this work is a bass trombone). The glissando, as written, is impossible to perform on the bass trombone (see Ex. 80).



There is a notable technical demand made upon the second trumpet player in Example 81. The entrance of the line is in the extremely low register, muted and dynamically marked *ppp* (see Ex. 81).



The remaining special effects all include horns. The sustained chord in Example 82 is scored for four stopped horns, and is to be played fortissimo (see Ex. 82).



The 32nd-notes for horns and trumpets in Example 83 create the effect of accented grace notes (see Ex. 83).



An unusual effect is created by the accents within the sustained chord in Example 84 (see Ex. 84).



TABLE III. A COMPARATIVE LIST OF FURTHER EXAMPLES FROM
THE CONCERTO FOR ORCHESTRA BY BELA BARTOK

A. THE FUNCTIONS OF INDIVIDUAL SECTIONS AND INSTRUMENTS*

HORNS

1. Melodic Material,
Conjunct: Meas. I-342, I-462, I-514, II-147,
III-46, III-119, IV-27, V-184,
V-349, V-469
Disjunct: Meas. III-32, V-1
2. Sustained Notes
and Chords: Meas. I-86, I-233, I-265, I-509,
II-154, III-34, III-54, III-93,
V-4, V-21, V-31, V-88, V-121
3. Punctuation: Meas. I-77, I-316, III-74, V-44, V-74
V-81, V-118, V-249
4. Repeated Rhythmic Patterns: Meas. I-242, I-467,
I-496, V-138

TRUMPETS

1. Melodic Material,
Conjunct: Meas. I-220, I-462, II-123.
Disjunct: Meas. I-232, I-329, I-365, I-514, V-104,
V-201, V-231, V-374
2. Sustained Notes
and Chords: Meas. I-48, I-391, II-126, IV-112, V-46
3. Punctuation: Meas. I-248, III-34, III-74, V-4, V-44,
V-74, V-88, V-137, V-249
4. Repeated Rhythmic Patterns: Meas. I-39, II-116, IV-108

TROMBONES

1. Melodic Material,
Conjunct: Meas. I-215, II-123, II-150, V-132, V-498
Disjunct: Meas. I-134, I-316, I-349, I-514

*The measure numbers throughout this table are composed of Roman numerals, which indicate the movement of the work, and Arabic numerals, which indicate the measure of the movement.

2. Sustained Notes
and Chords: Meas. I-47, I-233, I-239, II-126,
IV-115, V-231
3. Punctuation: Meas. I-90, I-271, I-342, I-488, I-519,
III-34, IV-84, IV-103, V-249,
V-408
4. Repeated Rhythmic Patterns: Meas. IV-108, V-138

TUBA

1. Melodic Material,
Conjunct: Meas. II-123, II-150, IV-108, V-88
V-411, V-499
Disjunct: Meas. I-380
2. Sustained Notes
and Chords: Meas. I-90, I-233, II-126, II-156,
V-86, V-231
3. Punctuation: Meas. I-489, I-520, III-34, IV-84,
IV-92, V-249

B. THE FUNCTIONS OF THE BRASS COMBINATIONS

	Melodic Material	Sustained Chords	Punct- uation	Rhythmic Patterns
Horns and Trumpets	V-508	I-64 III-93	III-74 V-44 V-74 V-413	
Horns and Tuba	II-147			
Horns, Trumpets and Trombones	V-515	V-379	I-47 V-408	V-137
Horns, Trumpets, Trombones, and Tuba	I-380 V-556	I-231	III-34 V-412	V-249
Trumpets and Trombones	I-325 V-549			
Trumpets, Trombones and Tuba	II-123	II-126		
Trombones and Tuba	V-418	V-231	I-90 I-488 IV-84 IV-103	
Horns, Trombones and Tuba		V-234		

C. THE FUNCTIONS OF THE VARIOUS DOUBLINGS

	Melodic Material	Sustained Chords	Punct- uation	Rhythmic Patterns
Brass Sections Alone	I-342 I-514 V-211 V-411	I-233 II-157	IV-84 IV-108	
Two or More Different Brasses with other Instruments		III-93 V-231	III-74 IV-103 V-5 V-44 V-74 V-78 V-413	
A Single Brass Instrument with Strings	I-90	I-90 I-155 I-175 I-212 II-120 III-54 III-99	I-488 I-489 IV-92 V-118	
A Single Brass Instrument with Woodwinds	V-231 V-426	I-58 I-209 I-391 IV-112	III-34 V-47 V-88 V-121 V-221	
A Single Brass Instrument with non-brasses	I-462 I-467 V-88	I-32 I-47 I-397 V-426	I-77 I-520 V-127 V-248	V-394

D. THE USE OF SPECIAL EFFECTS

	Horns	Trumpets	Trombones	Tuba
Muted	I-149 I-397 I-467 II-254 III-22 III-74 III-93 IV-142 V-8 V-349 V-379	I-215 I-220 I-462 II-90 II-120 II-228 V-96 V-512	V-374 V-498 V-521	V-498
Glissando			IV-90	
Stopped	III-54			
Bells in Air				
Trills		IV-84 IV-103 IV-112		
Brassy				

CHAPTER 6

VARIATIONS FOR ORCHESTRA
by
Elliott Carter

A. SCORING FOR THE INDIVIDUAL SECTIONS AND SOLO INSTRUMENTS

The brass solos in the Carter, Variations for Orchestra are lyrical, lacking the percussive treatment of those in the Stravinsky and Bartok works (see Ex. 85).



Some of the more disjunct solos are represented by Example 86 (see Ex. 86).



The staccato passages such as the trumpet solo in Example 87 are usually conjunct in melodic motion (see Ex. 87),





The linear aspects of the Carter style make the melodic function of the individual instruments very important, but do not exclude other functions such as sustained notes, rapidly repeated notes (see Ex. 92), and punctuation.



Carter uses a wide variety of combinations for punctuation, but usually in a thin texture of instruments (see Ex. 93 and 94).



B. SCORING FOR BRASS COMBINATIONS

The brass in the Carter work is used in eleven different combinations to serve four functions. With the exception of the repetition of rhythmic patterns and chords, the brass combinations serve the same functions as in the other three works, with the differences coming about because of style peculiarities. Of the eleven combinations, horns, horns and trumpets, and trumpets and trombones as combinations each serve all four of the functions.

The four functions are performed about equally by all of the groups. Sustained notes and chords occur often for the brasses, but instead of being only for harmonic support, the chords are often of melodic importance in the particular style. In Example 95, the chords are alone in the texture and are part of a melodic line distributed among different groups of instruments (see Ex. 95).

Ex. 95

Fl. p $\text{p} \rightarrow \text{mf}$

(Carter meas. 1)

Hr. pp

Vln. Div. a3 pp $\text{pp} \rightarrow \text{mf}$

Melodic material for the brasses is again divided between the two textures, homophonic (see Ex. 96) and contrapuntal (see Ex. 97).

Ex. 96 (Carter 117)

Bsn.

Hrs.

Vln.

Vla.

Ex. 97 (Carter meas. 153)

Hr.

Tr.

Trb.

E.Trb./Tuba

Brasses used for punctuation are seen in Example 98 where rapid woodwind and string activity is punctuated by a brass chord (see Ex. 98).

Ex. 98

Clar. Bb

Hr.

(carter meas. 98)

Tbn. Bb

Vln.

The over-all orchestral texture at the moment the combinations are presented is usually contrapuntal. Some of the contrapuntal textures are forms of simple counterpoint, a melodic and rhythmic figure alternating between two instruments, but most often the texture is extremely complicated and very subtly developed.

Other textures are infrequently used. A texture of chords occurs in Example 99 (see Ex. 99).

Ex. 99

W.W.

Hr.

Tbn. Bb

Tuba

(carter meas. 267)

Str.

Example 100 shows the texture of melody and accompaniment as the over-all orchestral texture, with the brasses being part of the accompanying chord (see Ex. 100).

Ex. 100

(Carter meas. 166)

W.W.

Hr.

Tr.

Trb.

Tuba

Vin.

cant. espr.

f

C. DOUBLING

Doubling is not an important factor in this piece. The very fragmentary nature of the music makes for short-lived doublings when they do occur.

The doublings in the Carter work serve only three functions, melodic, punctuation, and sustained notes and chords. The most important of these is melodic doubling (see Ex. 101 through 103).

Ex. 101

Hr. (Carter meas. 204) *ff*

Trb. *ff*

Vln. *ff*

Ex. 102

Tr. *pp* (Carter meas. 158)

Solo Vln.

Vln.

Ex. 103 (Carter meas. 158)

Bsn. *f* *sost.*

Hr. *f* *sost.*

B.Trb. *f* *sost.*

Vln. *f* *sost.*

D.B. *f* *sost.*

In this style, where almost any isolated note or chord for any instrument may have melodic significance in the over-all texture, examples of doubling for the purpose of punctuation is not a frequent situation (see Ex. 104).



Some of the combinations serve only one of the functions of doubling. The combination of brass and percussion, and the combination of two or more brass instruments with strings are both used only for doubling sustained notes and chords. The combination of brass and woodwinds is used only for melodic doubling. One of the combinations, two or more unlike brass instruments with woodwinds and strings, is used for all three of the functions.

The over-all orchestral texture at the time the doublings occur is predominantly counterpoint. Melody and accompaniment and textures of chords are incidental, but do occur.

D. SPECIAL EFFECTS AND UNUSUAL TECHNICAL DEMANDS

In Variations for Orchestra, Carter used five different special effects, muting being most common (see Ex. 105 and 106).

Ex. 105

(Carter meas. 10)

Handwritten musical score for Example 105, showing four staves: Clarinet (Cl.), Horn (Hr.), Trumpet (Tr.), and Trombone (Trb.). The music is in 2/4 time. The first staff has a melodic line with a slur. The other three staves have a sustained note with a 'con sord.' (con sordina) marking, followed by a 'fp' (fortissimo) marking. The background is a light yellow wash.

Ex. 106

(Carter meas. 29)

Handwritten musical score for Example 106, showing three staves: Horn (Hr.), Trumpet (Tr.), and Trombone (Trb.). The music is in 2/4 time. The first staff has a melodic line with a slur and a 'con sord.' marking. The other two staves have a sustained note with a 'con sord.' marking. The background is a light yellow wash.

Example 107 is an instance of a stopped and brassy effect for a horn. This effect is accompanied only by a harp chord. (see Ex. 107).

Ex. 107

Ex. 107 is a musical score snippet. The top staff is for Horns (Hr.) in G major, marked 'cuiivre' and 'more. f'. It shows a series of notes with accents. A note below the staff indicates '(Carter meas. 46)'. The bottom staff is for Harp, marked with a 'P' and a fermata.

Two effects are used in Example 108, fortissimo pedal tones in the trombones, and fluttertonguing in the horns and trumpets. Carter is the only one of the four composers to use the term "fluttertongue," however, some of the tremolos in the Rite of Spring might possibly be interpreted as fluttertonguing passages (see Ex. 108).

Ex. 108

Ex. 108 is a musical score snippet. The top staff is for Horns (Hr.) in G major, marked 'Fluttertongue'. The middle staff is for Trumpets (Tr.) in G major, also marked 'Fluttertongue'. The bottom staff is for Trombones (Trb.) in G major, marked 'Pedal tone'. Dynamics include 'mf' and 'fff'.

TABLE IV. A COMPARATIVE LIST OF FURTHER EXAMPLES FROM
VARIATIONS FOR ORCHESTRA BY ELLIOTT CARTER

A. THE FUNCTIONS OF INDIVIDUAL SECTIONS AND INSTRUMENTS

HORNS

1. Melodic Material,
Conjunct: Meas. 51, 57, 80, 102, 136, 142, 200, 204, 450, 458, 501
Disjunct: Meas. 26, 33, 46, 99, 117, 147, 151, 196, 473
2. Sustained notes
and Chords: Meas. 3, 11, 14, 57, 65, 80, 117, 129, 166, 182, 257, 361, 446
3. Punctuation: Meas. 88, 131, 176, 273, 276
4. Rapidly Repeated Notes: Meas. 30, 96

TRUMPETS

1. Melodic Material,
Conjunct: Meas. 60, 135, 153
Disjunct: Meas. 14, 27, 33, 147, 196, 418, 455
2. Sustained Notes
and Chords: Meas. 11, 166, 182, 364, 447
3. Punctuation: Meas. 88, 130, 273, 276, 480
4. Rapidly Repeated Notes: Meas. 29, 33

TROMBONES

1. Melodic Material,
Conjunct: Meas. 50, 69, 135, 153, 199
Disjunct: Meas. 33, 36, 204, 207
2. Sustained Notes
and Chords: Meas. 11, 72, 75, 81, 87, 166, 182, 259, 364, 446, 451, 453
3. Punctuation: Meas. 26, 131, 276, 480
4. Rapidly Repeated Notes: Meas. 29, 33, 36

TUBA

1. Melodic Material,
Conjunct: Meas. 51, 57, 132, 153, 623
Disjunct: Meas. 150, 207
2. Sustained Notes
and Chords: Meas. 81, 166, 182, 259, 361, 447,
450, 458
3. Punctuation: Meas. 26, 72, 76, 78, 198, 276

B. THE FUNCTIONS OF THE BRASS COMBINATIONS

	Melodic Material	Sustained Chords	Punct- uation	Rhythmic Patterns
Horns and Trumpets	196	573 598	88 273	
Horns and Trombones	204	453		
Horns and Tuba	57 151	361		
Horns, Trumpets and Trombones	35 69	11 482 489 518		
Horns, Trumpets, Trombones and Tuba	130 147 154 158 209 372 391 458	166 182	276	
Trumpets and Trombones	29 577	364	480 580	
Trombones and Tuba			72 76	
Horns, Trombones and Tuba	51 366	81 259 265 446	83	

C. THE FUNCTIONS OF THE VARIOUS DOUBLINGS

	Melodic Material	Sustained Chords	Punct- uation	Rhythmic Patterns
Brass Sections	69			
Alone	147			
	151			
	196			
	204			
	207			
Two or More	158	182	270	
Different	208	450	276	
Brasses with	462			
other	505			
Instruments	534			
A Single Brass	50	72		
Instrument with	60			
Strings	117			
	505			
	513			
	576			
A Single Brass	505			
Instrument with	519			
Woodwinds	523			
A Single Brass	80			
Instrument with	199			
non-brasses				

D. THE USE OF SPECIAL EFFECTS

	Horns	Trumpets	Trombones	Tuba
Muted	11	11	11	72
	29	29	29	
	65	60	72	
	258	489	76	
	473		81	
	489		489	
Brassy	46			
Flutter-tongue	622	622		

PART III: COMPARISONS AND CONCLUSIONS

CHAPTER 7

A COMPARISON OF THE BRASS COMBINATIONS AND THEIR FUNCTIONS

A. IDENTIFICATION OF THE BRASS COMBINATIONS

It is necessary to consider the brass instrumentation used by each composer when comparing the four orchestrations. Hindemith scored Mathis der Maler for the smallest brass section; four horns in F, two trumpets in C, three trombones, and a tuba. Carter employed the same number of instruments, but scored for B-flat instead of C trumpets, and two tenor and a bass trombone, or three tenor-bass trombones. The Concerto for Orchestra by Bartok has basically the same instrumentation as the Hindemith work, with the exceptions of three trumpets in C with a fourth trumpet ad lib., and one bass and two tenor trombones.

Stravinsky used an expanded brass section in comparison to the other three composers. He scored for eight horns in F; one trumpet in D, four trumpets in C, and a bass trumpet in B-flat; three trombones; two tubas, and two tenor tubas in B-flat. However, some of these instruments are optional. The fourth trumpet may be used in place of the bass trumpet, and horns VII and VIII may be substituted for the tenor tubas.

The similarities of the brass sections of the four works are quickly noted. Only the D trumpet used by

Stravinsky provides a resource which the other instrumentations lack. Since the instrumentations are similar, one must look to the employment of the instruments, the orchestration, for any differences which may exist in the brass writing of the four composers.

A comparison of the combinations of brass instruments used reveals that eight combination possibilities are common to all four of the works. These are: (a) horns, (b) trumpets, (c) horns and trumpets, (d) trumpets and trombones, (e) horns and tuba, (f) trumpets and trombones, (g) horns, trumpets and trombones, and (h) horns, trumpets, trombones and tuba. However, of these eight brass groups, only five are used for the same functions. (The discussion of combinations at this point will exclude those used for doubling, as they will receive separate consideration). Combinations used in melodic capacities by all of the composers include: (a) Two or more horns, (b) two or more trumpets, (c) horns and trumpets, and (d) horns, trumpets and trombones. In addition, combinations of horns are used in all of the works for sustained notes and chords. Horns, trumpets, trombones and tuba were used in combination by all for punctuating chords.

The remaining three combinations common to all four compositions are not necessarily used for the same functions in each case. Combinations of horns and tubas were employed in a melodic capacity in the Carter, Bartok and Stravinsky works, and also used for sustained notes and

chords in the Carter work. Hindemith did not make use of this particular combination for melodic purposes. In Mathis der Maler, horns and a tuba appear in combination only for sustained notes and chords and for a soft punctuation (see Ex. 109).

Ex. 109

Hr. p
(Hind. meas. II 44)

Hr. pp

Tuba pp

The combination including trombones and a tuba was used for punctuation by Hindemith, Bartok and Carter, and for sustained notes and chords by Bartok and Carter. Only in the Rite of Spring do combinations of trombones and a tuba serve melodic functions (see Ex. 110).

Ex. 110 (Strap. meas. 376)

Trb. Solo

Tuba pp

The last of the combinations common to all of the pieces is that involving horns, trombones and a tuba. Stravinsky, Bartok and Carter used these instruments for sustained notes and chords, Hindemith, Stravinsky and Carter for punctuation, but only Hindemith employed them melodically (see Ex. 111).



The six remaining combinations which appeared in at least one of the four works, had only limited usage. Combinations of two or more trombones were used melodically by Hindemith, Bartok and Carter, and for sustained notes and chords by Hindemith alone. Stravinsky did not use two or more trombones alone to serve as a brass combination.

Combinations of horns and trombones were used melodically by Hindemith (see Ex. 112),



and for sustained notes and chords by Carter. Except for doubling, this was the extent of their use.

Combinations of trumpets and trombones appear in a melodic function in the Stravinsky, Bartok and Carter works, are used for punctuation in the Stravinsky and Carter works, and Carter alone used this group for sustained notes and chords. Hindemith did not score for this combination.

One or more trumpets, trombones and tubas functioning together as a combination were used for melodic purposes by Bartok, for repetition of chords in rhythmic patterns by Stravinsky, and for sustained notes and chords in the Concerto for Orchestra.

Horns, trumpets and a tuba were used in combination by Hindemith for sustained notes and chords, and appear in combination for the repetition of chords in a rhythmic pattern in the Rite of Spring (see Ex. 113).

Ex. 113

(strav. meas. 676)

2
Eb.

3
Hr.

4
Tr.

2
Tuba

This combination did not appear in the work of Bartok, nor in that of Carter.

The last of all of the combinations is two or more tubas. Since only Stravinsky scored his work for more than one tuba, only he had the possibility of combining them at hand. In the Rite of Spring, combinations of tubas fill melodic and rhythmic capacities (see Ex. 114).



Of the 14 combinations of brasses discussed, all except trumpets, trombones and tubas; and horns, trombones and tubas are used for melodic doubling. These will be examined in the section devoted to doubling.

B. THE SPACING OF BRASS CHORDS

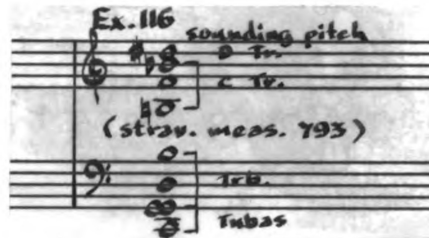
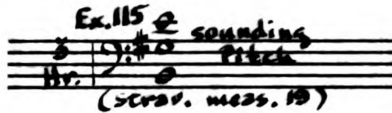
Along with the identification of the various combinations of brass instruments and the determination of the different functions given to the combinations, chord spacing is a necessary consideration. One of the early and most successful ways of voicing a chord for a group of instruments, was to imitate the spacing of the harmonic series. This meant, of course, that chord tones in the low register were widely spaced, and became more closely spaced in the upper register. A chord spaced according to this acoustical law was homogeneous and satisfied the early orchestrator's needs while working with the various timbres.

This method is apparently not archaic in the 20th century. All of the works studied in this survey make use of this method of chord spacing to some degree.

In Mathis der Maler, Hindemith used chord spacing according to the harmonic series exclusively. All brass chords are scored in this manner, and triads are usually in root position and close structure. This scoring was also used by Bartok in the Concerto for Orchestra. The difference in this work is that when triads are involved they are often in first or second inversion, but still in close structure.

Stravinsky also used the harmonic series as a guide for chord voicing, but not exclusively. He also made use of the sonorities produced by widely spaced chords. In the

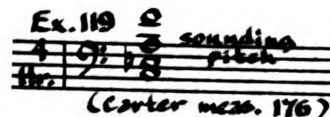
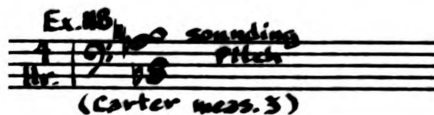
larger structures, this means that the wide spacing of the low register is continued throughout (see Ex. 115 and Ex. 116).



Close spacing in the low register is also used. An example of this is the percussive polychord scored for eight horns (see Ex. 117).



Carter, in his Variations for Orchestra, frequently made use of closely spaced chords in the low register for both sustained sonorities and short, punctuating chords. In the case of the chord in Example 119, the spacing is scored in reverse to the pattern of the harmonic series (see Ex. 118 and Ex. 119).



C. ORCHESTRAL TEXTURES AND INSTRUMENTATIONS

The brass combinations have, to this point, been

discussed as individual entities. They do, of course, fit into over-all orchestral textures and instrumentations. Certain textures and instrumentations were used by all four composers. These include strings, woodwinds and brass in contrapuntal textures, and textures of melody and accompaniment; and strings, woodwinds, brass and percussion (often the tutti orchestra) in three textures. This combination was used in all four works in contrapuntal textures, textures of melody and accompaniment, and textures of chords. The instrumentation of strings and brass was used by all, but with different textures.

The remaining orchestrations are used very rarely, and are example of exceptions rather than common orchestral timbres. An orchestration of woodwinds and brass is used in the Hindemith and Carter works (see Ex. 120 and 121),

Ex. 120

(Hind. meas. 1260)

W.W. *mf*

Hr. *p*

Tr. *p*

Tuba *p*

dim.

dim.

dim.



and strings, brass and percussion in the Stravinsky and Bartok works (see Ex. 122 and 123).

Ex. 122

(Strav. meas. 750)

Handwritten musical score for Ex. 122, Stravinsky measure 750. The score is written on five staves. The top staff is for the Flute (Fl.) and the bottom staff is for the Bassoon (Bsn.). The middle three staves are for the Violin (Vln.), Viola (Vla.), and Cello/Double Bass (Cb./Db.). The music is in 4/4 time and features a complex, syncopated melody with many accidentals and ties. The Flute part is marked "solo" and "p". The Violin and Viola parts are marked "Pizz." and "p". The Cello/Double Bass part is marked "p".

Ex. 123 (Bartok meas. 139)

This musical score for Ex. 123 (Bartok meas. 139) features four staves. The top staff is for Horn (Hr.) in G major, showing three measures of half notes with a crescendo hairpin. The second staff is for Trumpet (Tr.) in G major, showing three measures of complex chords with a fortissimo (ff) dynamic marking. The third staff is for Timpani (Timp.) in G major, showing three measures of half notes. The bottom staff is for Viola (Vla.) in G major, showing three measures of eighth notes with a slur. The background has a yellowish, aged appearance.

A very rare instrumentation involves brass and percussion, and was used only by Stravinsky and Bartok (see Ex. 124 and 125).

Ex. 124 (Strav. meas. 376)

This musical score for Ex. 124 (Strav. meas. 376) features four staves. The top staff is for Trombone (Trb.) 1-3 in G major, showing four measures of half notes. The second staff is for Tuba (Tuba) in G major, showing four measures of half notes with a 'solo' marking. The third staff is for Timpani (Timp.) in G major, showing four measures of eighth notes with a 'pick.' marking. The bottom staff is for Timpani (Timp.) in G major, showing four measures of eighth notes. The background has a yellowish, aged appearance.

Ex. 125 (Bartok, meas. II 131)

The musical score for Ex. 125 consists of four staves. The top staff is for Trumpets 1 and 2 (Tr. 1-2), the second for Trombones 1 and 2 (Trb. 1-2), the third for Tuba, and the fourth for Snare Drum (S. Dr.). The key signature has one sharp (F#) and the time signature is 2/4. The first three staves show a parallel major-minor 7th chord (F# major and E minor 7th) sustained across four measures. The S. Dr. staff is marked 'without snare' and 'p', showing a rhythmic pattern of eighth notes.

Each of the four works contains instances of unaccompanied brass combinations.

CHAPTER 8

A COMPARISON OF DOUBLINGS

Melodic doubling is common to all of the works, but the instrumentation varies with each composer. Instrumentations used in all four compositions include doubling involving different brass instruments, brass and strings, brass and woodwinds, and brass, woodwinds and strings.

Examples 126 through 129 illustrate an instance from each work of melodic doubling involving only brass instruments. Example 126 shows a case of four trumpets in parallel major-minor 7th chords (see Ex. 126);

Ex. 126

Tr. 1-2 *mp* (Strauss, meas. 184)

Tr. 3-4 *mp*

Vln.

in Example 127, the tutti brass section is seen doubling the same line in three octaves (see Ex. 127);

Ex. 127 (Hind. meas. III 59)

Wdr. *ff*

Hr. *ff*

Tr. *ff*

Trb. *ff*

Tuba *ff*

Str. *ff*

four horns, three trumpets, and two trombones double a melodic line in unison with the tuba added in the last three bars of Example 128 (see Ex. 128);

Ex. 128

ff (Bartok mass. 1514)

and in Example 129, horns and trombones double a line in two octaves (see Ex. 129).

Ex. 129

ff (Carter mass. 204)

ff marc.

The remaining two instrumentation groups used by each composer for doubling all make use of only one brass instrument family. This usually includes several of the same instruments in unison or octaves, such as two trumpets, four horns, etc., but not a doubling of unlike brasses, such as one or more horns and trumpets. These combinations include the doubling of a brass instrument and strings, and the doubling of a brass instrument with woodwinds and strings.

Brass and woodwind doublings were frequently used by Stravinsky and Hindemith, but only rarely occur in the Bartok work. All of the cases of this instrumentation grouping involve either horns and woodwinds, or trumpets and woodwinds. Trombones and tubas do not seem to be used in this situation by any of the composers.

Two or more different brass instruments doubling woodwinds and strings, is an instrumentation grouping used only by Hindemith and Carter (see Ex. 130 and 131).

Ex. 130

(Hind. Meas. III 376)

Ex. 131 (Carter meas. 158)

This musical score for Ex. 131, from Carter's work, measures 158. It features five staves: Baritone (Bar.), Horn (Hr.), Tuba, Viola (Vla.), and Double Bass (D.B.). Each staff contains a melodic line with a dynamic marking of *f* *sost.* (forte, sostenuto). The notation shows various intervals, including octaves and thirds, between the staves, illustrating the concept of unusual melodic doublings.

The following examples illustrate the unusual melodic doublings. Brasses and woodwinds are used to double a melodic figure in octaves and thirds in the Rite of Spring (see Ex. 132),

Ex. 132 (Strav. meas. 480)

This musical score for Ex. 132, from Stravinsky's *Rite of Spring*, measures 480. It features four staves: Oboe (Ob.), Horn (Hr.), Tuba, and Viola (Vla.). The notation shows various intervals, including octaves and thirds, between the staves, illustrating the concept of unusual melodic doublings. A glissando marking (*gliss.*) is present on the Viola staff.

and a syncopated tuba line is doubled by the timpani in the same work (see Ex. 133).



The harp is used for melodic doubling with a brass instrument in Carter's Variations for Orchestra (see Ex. 134),



and there is a case of a trumpet doubled by woodwinds and percussion (glockenspiel) at the unison and in octaves in Mathis der Maler (see Ex. 135).

Ex. 135

Ob.

Cl.

(Hind. meas. 125)

Tr. 1-2

Glock.

CHAPTER 9
A COMPARISON OF
SPECIAL EFFECTS AND TECHNICAL DEMANDS

The discussion of special effects and the comparison of their usage must exclude the Hindemith work. It would seem that Hindemith did not score a muted passage, a trill, or any device for the brass which could be classified as a special effect.

Of the twelve different effects used in the three works, only muting and stopped horns are used in all. Muted sustained notes and chords are scored in all three compositions, and punctuating notes and chords are executed with brass mutes in the Bartok and Carter works. All three composers at some time in their works used muted brass melodically.

Stopped horns were used in each of the three works, and in the case of the Stravinsky and Carter works this effect was often employed simultaneously with the "brassy" effect for horn.

Trills were used by both Stravinsky and Bartok on sustained notes, and in Example 136 a tremolo indication is used for ascending lines of notes. This passage might be interpreted by the performer as fluttertonguing (see Ex. 136).

Ex. 136

Ex. 136 is a musical score for five staves. The top staff is for Horns 1-3 (Hr. 1-3), the second for Trumpets 1-2 (Tr. 1-2), the third for Trombones 1-2 (Tr. 1-2), the fourth for Trombone 3 (Tr. 3), and the fifth for Tuba (Tub. 1-3). The score includes dynamic markings such as *ff*, *trem.*, and *p*. A note in the first staff is marked *tr.* and *ff* with the annotation *(Strav. mess. 435)*. The time signature is 4/4.

Glissandos are used in the same two works, and in each case are of melodic importance (see Ex. 137 and 138).

Ex. 137

Ex. 137 is a musical score for three staves. The top staff is for Horn 1-2 (Hr. 1-2), the middle for Trombone 1-2 (Trb. 1-2), and the bottom for Tuba (Tuba). The score includes a *gliss.* marking and a note marked *mf*. The time signature is 4/4.

Ex. 138

Ex. 138 is a musical score for three staves. The top staff is for Horn 1-4 (Hr. 1-4), the middle for Horn 5-8 (Hr. 5-8), and the bottom for Trombone 1-2 (Trb. 1-2). The score includes *gliss.* markings and a note marked *fff*. The time signature is 4/4.

The use of accents may be classified as a special effect in the case of two examples from the Bartok and Stravinsky works (see Ex. 139 and 140).



Ex. 140

Picc. (Strav. meas. 215)

Hr. (Strav. meas. 215)

Vln. (Strav. meas. 215)

The only occurrence of fluttertonguing marked as such, as well as the only case of a pedal tone for trombone, is found in the Carter work (see Ex. 141).

Ex. 141

Hr. (Carter meas. 821)

Tr. (Carter meas. 821)

Trb. (Carter meas. 821)

Fluttertongue

Pedal tone

TABLE V. BRASS RANGES

Stravinsky		Hindemith		Bartok		Carter	
Hr. 1	Hr. 2	Hr. 1	Hr. 2	Hr. 1	Hr. 2	Hr. 1	Hr. 2
Hr. 3	Hr. 4	Hr. 3	Hr. 4	Hr. 3	Hr. 4	Hr. 3	Hr. 4
Hr. 5	Hr. 6	Hr. 5	Hr. 6	Hr. 5	Hr. 6	Hr. 5	Hr. 6
Hr. 7	Hr. 8	Hr. 7	Hr. 8	Hr. 7	Hr. 8	Hr. 7	Hr. 8
Tr. 1	Tr. 2	Tr. 1	Tr. 2	Tr. 1	Tr. 2	Tr. 1	Tr. 2
Tr. 3	Tr. 4	Tr. 3	Tr. 4	Tr. 3	Tr. 4	Tr. 3	Tr. 4
Tr. 5	Tr. 6	Tr. 5	Tr. 6	Tr. 5	Tr. 6	Tr. 5	Tr. 6
Tr. 7	Tr. 8	Tr. 7	Tr. 8	Tr. 7	Tr. 8	Tr. 7	Tr. 8
Tr. 9	Tr. 10	Tr. 9	Tr. 10	Tr. 9	Tr. 10	Tr. 9	Tr. 10
Tr. 11	Tr. 12	Tr. 11	Tr. 12	Tr. 11	Tr. 12	Tr. 11	Tr. 12
Tr. 13	Tr. 14	Tr. 13	Tr. 14	Tr. 13	Tr. 14	Tr. 13	Tr. 14
Tr. 15	Tr. 16	Tr. 15	Tr. 16	Tr. 15	Tr. 16	Tr. 15	Tr. 16
Tr. 17	Tr. 18	Tr. 17	Tr. 18	Tr. 17	Tr. 18	Tr. 17	Tr. 18
Tr. 19	Tr. 20	Tr. 19	Tr. 20	Tr. 19	Tr. 20	Tr. 19	Tr. 20
Tr. 21	Tr. 22	Tr. 21	Tr. 22	Tr. 21	Tr. 22	Tr. 21	Tr. 22
Tr. 23	Tr. 24	Tr. 23	Tr. 24	Tr. 23	Tr. 24	Tr. 23	Tr. 24
Tr. 25	Tr. 26	Tr. 25	Tr. 26	Tr. 25	Tr. 26	Tr. 25	Tr. 26
Tr. 27	Tr. 28	Tr. 27	Tr. 28	Tr. 27	Tr. 28	Tr. 27	Tr. 28
Tr. 29	Tr. 30	Tr. 29	Tr. 30	Tr. 29	Tr. 30	Tr. 29	Tr. 30
Tr. 31	Tr. 32	Tr. 31	Tr. 32	Tr. 31	Tr. 32	Tr. 31	Tr. 32
Tr. 33	Tr. 34	Tr. 33	Tr. 34	Tr. 33	Tr. 34	Tr. 33	Tr. 34
Tr. 35	Tr. 36	Tr. 35	Tr. 36	Tr. 35	Tr. 36	Tr. 35	Tr. 36
Tr. 37	Tr. 38	Tr. 37	Tr. 38	Tr. 37	Tr. 38	Tr. 37	Tr. 38
Tr. 39	Tr. 40	Tr. 39	Tr. 40	Tr. 39	Tr. 40	Tr. 39	Tr. 40
Tr. 41	Tr. 42	Tr. 41	Tr. 42	Tr. 41	Tr. 42	Tr. 41	Tr. 42
Tr. 43	Tr. 44	Tr. 43	Tr. 44	Tr. 43	Tr. 44	Tr. 43	Tr. 44
Tr. 45	Tr. 46	Tr. 45	Tr. 46	Tr. 45	Tr. 46	Tr. 45	Tr. 46
Tr. 47	Tr. 48	Tr. 47	Tr. 48	Tr. 47	Tr. 48	Tr. 47	Tr. 48
Tr. 49	Tr. 50	Tr. 49	Tr. 50	Tr. 49	Tr. 50	Tr. 49	Tr. 50
Tr. 51	Tr. 52	Tr. 51	Tr. 52	Tr. 51	Tr. 52	Tr. 51	Tr. 52
Tr. 53	Tr. 54	Tr. 53	Tr. 54	Tr. 53	Tr. 54	Tr. 53	Tr. 54
Tr. 55	Tr. 56	Tr. 55	Tr. 56	Tr. 55	Tr. 56	Tr. 55	Tr. 56
Tr. 57	Tr. 58	Tr. 57	Tr. 58	Tr. 57	Tr. 58	Tr. 57	Tr. 58
Tr. 59	Tr. 60	Tr. 59	Tr. 60	Tr. 59	Tr. 60	Tr. 59	Tr. 60
Tr. 61	Tr. 62	Tr. 61	Tr. 62	Tr. 61	Tr. 62	Tr. 61	Tr. 62
Tr. 63	Tr. 64	Tr. 63	Tr. 64	Tr. 63	Tr. 64	Tr. 63	Tr. 64
Tr. 65	Tr. 66	Tr. 65	Tr. 66	Tr. 65	Tr. 66	Tr. 65	Tr. 66
Tr. 67	Tr. 68	Tr. 67	Tr. 68	Tr. 67	Tr. 68	Tr. 67	Tr. 68
Tr. 69	Tr. 70	Tr. 69	Tr. 70	Tr. 69	Tr. 70	Tr. 69	Tr. 70
Tr. 71	Tr. 72	Tr. 71	Tr. 72	Tr. 71	Tr. 72	Tr. 71	Tr. 72
Tr. 73	Tr. 74	Tr. 73	Tr. 74	Tr. 73	Tr. 74	Tr. 73	Tr. 74
Tr. 75	Tr. 76	Tr. 75	Tr. 76	Tr. 75	Tr. 76	Tr. 75	Tr. 76
Tr. 77	Tr. 78	Tr. 77	Tr. 78	Tr. 77	Tr. 78	Tr. 77	Tr. 78
Tr. 79	Tr. 80	Tr. 79	Tr. 80	Tr. 79	Tr. 80	Tr. 79	Tr. 80
Tr. 81	Tr. 82	Tr. 81	Tr. 82	Tr. 81	Tr. 82	Tr. 81	Tr. 82
Tr. 83	Tr. 84	Tr. 83	Tr. 84	Tr. 83	Tr. 84	Tr. 83	Tr. 84
Tr. 85	Tr. 86	Tr. 85	Tr. 86	Tr. 85	Tr. 86	Tr. 85	Tr. 86
Tr. 87	Tr. 88	Tr. 87	Tr. 88	Tr. 87	Tr. 88	Tr. 87	Tr. 88
Tr. 89	Tr. 90	Tr. 89	Tr. 90	Tr. 89	Tr. 90	Tr. 89	Tr. 90
Tr. 91	Tr. 92	Tr. 91	Tr. 92	Tr. 91	Tr. 92	Tr. 91	Tr. 92
Tr. 93	Tr. 94	Tr. 93	Tr. 94	Tr. 93	Tr. 94	Tr. 93	Tr. 94
Tr. 95	Tr. 96	Tr. 95	Tr. 96	Tr. 95	Tr. 96	Tr. 95	Tr. 96
Tr. 97	Tr. 98	Tr. 97	Tr. 98	Tr. 97	Tr. 98	Tr. 97	Tr. 98
Tr. 99	Tr. 100	Tr. 99	Tr. 100	Tr. 99	Tr. 100	Tr. 99	Tr. 100

The preceding table gives the ranges employed by each composer for each brass instrument. Stravinsky, Hindemith and Bartok used the old notational system for horns, but Carter used the new system. All pitches indicated are written, rather than sounding pitches.

The eight horns used in the Rite of Spring are grouped by ranges into two, four horn sections. The highest pitch written for the horns is found in the Stravinsky Horn I, III, V, and VII parts, and the lowest pitch is found in the Stravinsky Horn VI, followed closely by Horn III in the Carter work.

A comparison of B-flat and C trumpet ranges reveals that Bartok used the widest range for trumpets, and scored the highest and lowest pitches for the instrument. Although Carter scored a low G for Trumpet II, the upper range extreme is a minor second lower than that appearing in the Bartok work. A marked difference exists between the ranges of Trumpet I and II in the Rite of Spring, and is accounted for by the downward extension of the range of Trumpet II.

By the use of a D trumpet, Stravinsky extended the trumpet timbre up to E-flat above the D-flat for the C trumpet written by Bartok. The smallest range for trumpet was used by Hindemith, both of the trumpets ranging over only an octave and a minor 7th.

The greatest trombone range was scored by Carter, the widest range being for Trombone II. The lowest pitch for

a trombone was scored for Trombone II and bass trombone in the Carter work, but the highest pitch for the instrument was scored by Stravinsky for Trombone I. The range of Trombone I in the Concerto for Orchestra was two octaves, the smallest of all.

A comparison of the tuba ranges and extreme high and low pitches reveals that Stravinsky used the most extreme. The two tubas have a range of three octaves and a major third, not only the widest of the tuba ranges, but the widest range of any of the brass instruments. This instrument is also scored for the lowest and highest pitches of all the tubas, only the tenor tuba is scored higher. The tuba range in the Bartok work is the smallest at an octave and a major 7th.

Some of the extreme pitches for the various brass instruments include Example 142, where the D trumpet performs the highest of notes written for all of the brasses on an unaccented part of a beat (see Ex. 142);

Ex. 142

(Strav. meas. 107)

in another case, the highest note for horns is approached by a glissando (see Ex. 143);



the lowest pitch of all the brasses is used in a sustained trombone and tuba chord in Example 144. The crossing of the two trumpet parts in this example is a common technique used by Stravinsky. What sound like two conjunct ascending lines are actually two very disjunct lines, adding technical difficulties to a passage which sounds much simpler than it is (see Ex. 144).

In Example 145, the approach to and departure from the extremely high double bass tuba note is by the leap of a minor 9th (see Ex. 145).



All of these examples were from the Stravinsky work. Bartok's Concerto for Orchestra contains two notable examples of technically demanding situations involving range. Example 146 shows Horn II leaping down two octaves to the extreme pitch for horn (see Ex. 146),



and the D-flat in the trumpet line in Example 147 is part of a very disjunct melodic line (see Ex. 147).



Extremely high or low notes are not necessarily technically demanding in themselves. The approach to and departure from these notes is all important to the difficulties the performer faces. The preceding examples illustrated extreme pitches occurring in technically demanding situations.

CHAPTER 10

A COMPARISON OF SOLO PASSAGES

In Hindemith's Mathis der Maler, solos and important passages for a single brass instrument are usually of a lyrical nature. However, solo brass passages are not frequently used in this work, where the tendency is towards full orchestrations and an extensive use of melodic doubling.

Most of the solos in the Carter, Variations for Orchestra are lyrical, lacking the sharp, percussive treatment of Stravinsky solos, but lyrical in a manner much different from Hindemith. The solo statements for brass are usually short utterances, touches of timbre, rather than extended passages.

A characteristic brass solo in the Stravinsky work usually involves the repetition of a percussive rhythmic and melodic figure. The use of the repeated, driving motive is a characteristic not found in the writing of Hindemith or Carter.

The solos in Bartok's Concerto for Orchestra are well diversified in character. Some of the lyrical solos are conjunct in melodic motion, but some are quite disjunct. Light staccato brass lines are used, as well as heavy, punctuating lines.

The orchestration of the solo passages varies a great deal in the four works, but one orchestration, strings and

woodwinds accompanying the single brass instrument, is used by all of the composers. Another frequent instrumentation is woodwinds alone accompanying the solo. This is used by all except Carter.

The Stravinsky and Bartok works provide the examples of unaccompanied solos and duets for brass (see Ex. 148 and 149).



Some of the orchestrations of brass solos occur only in one work. Only Bartok used the orchestration including woodwinds and harps for accompaniment. In this case, the clarinet line is subordinate to the horn solo (see Ex. 150).



The Carter work has an unique instrumentation of a solo passage, the trombone being doubled by the harp (see Ex. 151).



CHAPTER 11

SUMMARY

The conservative style of Hindemith is reflected in the brass orchestration of Mathis der Maler. The brass section is one of the smallest in numbers and might be found in some early 19th century orchestral works. Hindemith's spacing of brass chords seems to be exclusively determined by the harmonic series. Another conservative factor is the manner in which melodic doubling is employed. In a contrapuntal texture, each line is likely to be doubled by woodwinds, brass and strings, producing evenly balanced contrapuntal lines in the tradition of Baroque composers.

The full brass section is the most common brass orchestration in this Hindemith work. Brass solos are not important in the work and special brass effects are non-

existent. Hindemith's treatment of the brasses may perhaps bring to mind the approach to orchestration found in some of Cesar Franck's music, that of organ registration.

Although there are vast style differences in the music, Carter's Variations for Orchestra contains characteristics of brass orchestration surprisingly similar to Hindemith's treatment. The most obvious similarity is in the specifications of the brass sections. Carter's is the same as Hindemith's with the minor exception of tenor-bass trombones in place of Hindemith's tenor trombones. Another similarity is found in doubling. Only Hindemith and Carter combined two or more different brass instruments with woodwinds and strings in a doubling situation. These same two works also contain an overall orchestration in common, that of woodwinds and brass. This particular combination is very rare in the Stravinsky and Bartok works.

The Variations for Orchestra contains the most diversity of all of the works in the matter of chord spacing. In addition to chords spaced in the traditional manner, Carter scored for both widely spaced chords and closely spaced chords in the low register.

The individual brass parts in the Carter work, and especially the brass solos, are usually lyrical, but fragmented in nature. This work employs constantly changing orchestral timbre, making extended passages for any single instrument a rare occurrence.

Perhaps one of the most interesting sounds in all four of the works of the survey was scored by Carter. This is the very brief instance where a solo trombone is doubled by the harp.

The style differences between Carter and Hindemith were not reflected in several of the factors of brass orchestration. The Bartok, Concerto for Orchestra also has certain characteristics in common with the other works examined in this survey. To the brass sections used by Hindemith and Carter, Bartok added only a third trumpet and an optional fourth trumpet part. The spacing of brass chords in the Bartok work is generally in the traditional manner as determined by the harmonic series, a factor in common with Mathis der Maler.

Melodic doubling was used by Bartok for more than reinforcing a melodic line. In addition to doublings at the unison and octave, Bartok scored doublings at other intervals (seconds and sevenths) and in parallel chords.

The brass solos in the Concerto for Orchestra are the most diversified in character of all the works. In addition to unaccompanied solos and duets for brass, Bartok also scored an unique accompaniment for a brass solo, an instance where a horn is accompanied by harps and clarinets.

Special effects are also important to Bartok's orchestration for brass. Muting is very common, and special effects for the horn have a wide use.

When compared to the other three works, the brass section in Stravinsky's Rite of Spring is somewhat expanded. In practice, however, the full brass instrumentation is never used at once, and even the eight horns are only rarely scored together.

Brass chords in this work are spaced in the traditional manner. Almost as frequent however, are wide spacings spanning several octaves, as well as close spacings for punctuating effects in the lower registers.

The individual brass parts and brass solos are often comprised of repetitions of driving rhythmic motives. A common instrumentation of brass solos is strings, woodwinds and other brass instruments in addition to the solo part. Unaccompanied brass solos and duets occur in the Rite of Spring. Only Stravinsky and Bartok scored solo brass instruments in this manner.

A notable feature of Stravinsky's brass orchestration when compared to the other three works, is the use of tubas. Not only was scoring for two tubas unique, but Stravinsky also wrote optional parts for two tenor tubas. The tuba ranges are not only the largest of the tubas in comparison to the other works, but they are the largest of all of the brass instruments at three octaves and a major third.

Special brass effects are also very much a part of the brass orchestration in the Rite of Spring. The horn effects including brassy, stopped and glissandos are

especially important to the brass sound.

Similarities are noted when the orchestrations of these four 20th century works are compared. For example, all four works contain passages of unaccompanied brass, from brass solos to chorales involving the entire section. Orchestrations scored for strings, woodwinds and brass, as well as the tutti orchestra including percussion are found in each work.

Similarities also exist between specific works. An orchestration including only woodwinds and brass is found in the Hindemith and Carter works, but not in the other two. Stravinsky and Bartok employed strings, brass and percussion in addition to brass and percussion alone in the texture, a situation which does not occur in the Variations for Orchestra, or in Mathis der Maler.

In this survey, many of the factors of brass orchestration have been isolated and classified. This was done for purposes of comparison, with the realization that in performance these factors function as part of a whole musical style.

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