

The Cambridge Guide to Orchestration

Demonstrating not only how to write for orchestra but also how to understand and enjoy a score, *The Cambridge Guide to Orchestration* is a theoretical and practical guide to instrumentation and orchestration for scholars, professionals and enthusiasts. With detailed information on all the instruments of the orchestra, both past and present, it combines discussion of both traditional and modern playing techniques to give the most complete overview of the subject. It contains fifty reduced scores to be re-orchestrated and a wide range of exercises, which clarify complex subjects such as multiple stops on stringed instruments, harmonics and trombone glissandi. Systematic analysis reveals the orchestration techniques used in original scores, including seven twentieth-century compositions. This *Guide* also includes tables and lists for quick reference, providing the ranges of commonly used instruments and the musical names and terminology used in English, German Italian, and French.

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very meaningful presence in my life*

as well as to

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Introduction

Vedic writings describing both instrumental and vocal techniques of ancient Indian culture give us our earliest information about the first relatively sophisticated musical instruments. Almost all of the instruments we know today, whether or not they are still in use, can be traced back to this culture, including the ones that are commonly understood to be of Arabic origin. The disciplines that teach us about musical instruments are either practical (concerning how to play an instrument), or theoretical (organology, acoustics, history of instruments and orchestration) or a mixture of both (instrumentation and orchestration). This book focuses on instrumentation and orchestration, as well as on an essential knowledge of the individual instruments. Its aim is to teach these subjects, with a strong emphasis on their practical aspects, not only to composers and arrangers but also to orchestra conductors and sound engineers, especially recording engineers. It should be noted that theoretical analysis, aural perception and artistic interpretation of a score are aspects that are just as important as the creation of the score itself.

The difference between instrumentation and orchestration

Before we discuss the discipline of writing a score (either composing or arranging), we have to define the following three terms as they are used in this book:

Organology (science of instruments) is the study of the instruments: their basic history, their individual technical and acoustical properties, their families, their principles of tone production and their characteristics and features. Only the most essential and practical points of these subjects are included in this book.

Instrumentation (scoring) is the study of how to combine similar or different instruments in varying numbers in order to create an “ensemble” sound, as well as different colors. Parameters include dynamic balance, color contrasts or similarities, articulation and use of different registers of the instruments and the orchestra, as well as different methods of sound production on the same instrument. Discussions of instrumentation are usually limited to a certain number of measures since instrumentation often changes continuously within a composition or a movement. The discipline of instrumentation makes up a major part of this book and should be regarded as the “technical aspect” of our teaching.

Orchestration deals with the selection and combination of similarly or differently scored (or “instrumentated”) sections, methods of creating, enhancing or reducing contrasts between these sections, and techniques for expressing and reinforcing musical ideas, gestures and feelings as well as the general character of a composition. Orchestration plays an additional role in supporting musical form. Orchestral color is much more perceptible than the abstract aspects of the form. Thus the *colors (instrumentation)* are brought together within a certain *aesthetic (orchestration)* to enhance and support the form. The discipline of orchestration represents the second major part of this book and should be regarded as the “aesthetical aspect” of our teaching.

Surely everyone agrees with what the great master of orchestration, Rimsky-Korsakov, says in his well-known book *Principles of Orchestration*: that composition and orchestration are inseparable. He denies that one of these can be good while the other is bad. Indeed, a case of a “bad” composition with a “good” orchestration seems rather difficult to imagine, proving the

Introduction

master correct. However, the opposite can be true. There are quite a large number of “poorly” orchestrated “good” compositions. Many works by Schumann and Mussorgsky may be cited as examples. (Ironically, Rimsky-Korsakov himself undertook the orchestration of some such works, whether or not they had been previously orchestrated.)

A score can also have good instrumentation but be poorly orchestrated. That means that no technical problems are to be found in the individual measures; the instruments are well balanced with each other; musical elements are *easily* distinguishable, and so forth. All these points define instrumentation. But if there is insufficient contrast between these groups of measures, if the same color is repeated over and over again, if the score lacks the above-mentioned criteria such as aesthetics, logic and structure (which vary according to the taste of the composer or arranger), then the work is poorly orchestrated. Conversely, it is not possible to speak of “good” orchestration if the instrumentation is “poor.” “Good” instrumentation is a prerequisite for “good” orchestration.

A quick glance at the history of orchestration

The first attempts at instrumentation and orchestration can be traced back to the works of Giovanni Gabrieli, Monteverdi and Schütz. These early innovations, however, were not adopted by the composers of the next generations. Despite the undeniable heights the art of composition reached during the Renaissance and Baroque periods, orchestration always remained subsidiary to it. Finally with Gluck a true appreciation of orchestration began to emerge. The human chorus of ancient times and the trio sonata of the Baroque period served as the main models as the modern symphony orchestra developed. New concepts in compositional techniques, aided by the abandonment of the harpsichord and the disuse of “clarino” technique in the brass instruments, necessitated a search for new colors in orchestral sound. The main reason for the neglect of the “clarino” register was solely technical. The natural brass instruments, which could play only a limited number of tones, could not double the highly ornamented vocal parts of the florid style that became increasingly popular in the late Baroque period.

The fundamentals of modern orchestration were established by Haydn and brought to their first culmination by Mozart. Beethoven defined a new orchestral sonority, which was incorrectly applied by many German Romantic composers who were yet to come. In the Romantic period we find a number of different schools that eventually merged into the styles of the twentieth century. The masters of orchestration in the nineteenth and twentieth centuries, such as Berlioz, Weber, Mendelssohn, Tchaikovsky, Rimsky-Korsakov, Wagner, Strauss, Dvořák, Verdi, Puccini, Debussy, Ravel and Stravinsky, adopted the basic instrumentation and orchestration principles of Haydn, Mozart and Beethoven and developed them into their own, individual styles. Despite all the differences between these schools and varied compositional techniques, the basic scoring principles remained the same. The validity of this statement will be clear if we compare the similarities between the instrumentation and orchestration techniques of different periods and composers, for example Mozart and Debussy, or Haydn and Mahler.

The significance of Viennese classicism in the technique of orchestration

While Rimsky-Korsakov praises Haydn and Mozart, he also criticizes their technique of orchestration, saying their style was outmoded for orchestrating Romantic music. His view was likely

influenced by the orthodox roles of the instruments in the symphony orchestra of the Classical period, which limits the number of possible sound combinations. This superficial and unfortunate observation may well have influenced his opinion.

Today we know that orchestration deals not solely with the isolated production of tone colors or with the unconventional use of instruments, but also with the combination of these colors and effects in order to create an integrated composition. The orchestration of every single Mozart score, whether for symphony, chamber music or opera, is full of astonishing ideas, including subtle changes in the scoring of repeated sections, the creation of endless colors despite the very limited number and type of available instruments, and color contrasts even in the tutti passages. (This latter feature reappeared in Wagner's music, following its temporary disappearance in Romantic music.) The works of Haydn, Mozart and Beethoven, be they string quartets or symphonies, should be of central interest not only for the study of composition but also for learning instrumentation and orchestration. The author of this book dedicates the first two of the six semesters of orchestration courses he offers at the University of Music and Performing Arts in Vienna to the technique of these three composers. It is his firm belief that is not possible to master the technique of instrumentation and orchestration without learning the extremely refined techniques of Viennese classicism.

Teaching methods

The teaching of orchestration should start only after the student has studied organology (the "science of instruments"). After that, the following subjects should be considered *simultaneously*:

- Scoring of piano compositions (or chamber music works) of varied lengths. Shorter excerpts, sometimes even a few measures, are suitable for teaching the technical aspects and difficulties of scoring (instrumentation). As longer works are substituted, the student moves closer to orchestration. Some teachers object to orchestrating piano pieces, arguing that "if the intention of the composer had been to write an orchestra piece, he or she could have done so." We absolutely agree with that but would like to point out that the aim of such exercises is not "to orchestrate a piano work" but "to write an orchestral piece using the material presented in the piece for piano." There are countless such examples in the literature. It will suffice to take a look at the scores of the piano concertos of Mozart and Beethoven, where the solo piano introduces the material which is then "orchestrated" and played by the orchestra. Ravel orchestrated many piano works of his own, including very "pianistic" ones such as "Une barque sur l'océan" from *Miroirs*. As the students orchestrate from the piano works, they develop the ability to "think in terms of an orchestra," which is one of the main goals of their studies.
- (Re)scoring of condensed scores (particelli): these are contracted scores with all voices, octave doublings, dynamics and articulation used in the original score. These exercises, together with discussion and analysis of the original scores (see page 372), help the students to get acquainted with real orchestral language, including but not limited to sustained sounds, pedals, fills, subsidiary lines, different color combinations and contrasts. Then they know what to do when they are scoring a piano work or making an arrangement of another score. Students who have not worked with condensed scores frequently have problems because of their insufficient knowledge of instrumentation. Such students usually copy the parts of the piano music and distribute them to various instruments, believing that this is what orchestration is about. They do not realize that their orchestration still lacks the most crucial element. Condensed scores are not meant to replace the scoring of piano works, but

to provide an additional means of mastering the task. (For more information about these exercises see the beginning of Chapter 6 on page 257.)

- Analyzing scores: a matter of the utmost importance. This should be undertaken conscientiously in a careful and thorough manner. Most conductors are satisfied with their analysis when they have marked the entrances of the instruments and cued them during performance, a task that does not necessarily require a conductor. Among the other tasks to be considered are: finding the hidden relationships between “seemingly” different voices, categorizing the melody, harmony and bass functions and defining how important these functions are, and placing these elements in the fore-, middle or background depending on the style and era (for example melodic elements are often in the middle ground in Impressionism, while all elements are treated equally in Expressionism, etc.).
- Sitting in orchestral rehearsals, if possible next to the instrumentalists, and experiencing the orchestral music “live.” This method is especially useful if the composer or arranger is not very familiar with the individual instruments. If sitting in is not possible, the student can pick any voice from a score (first violin, second oboe, fourth horn, etc.) and analyze that one particular line, or sing as much as possible of it (counting the rests!). This exercise should preferably be accompanied by a recording to make the student feel the atmosphere of a live performance. This wonderful technique teaches not only an appreciation of orchestral color but also the importance of writing “interesting” lines for each and every instrument, a matter that is very frequently neglected in orchestration. Instrumentalists are very grateful to play parts, at least from time to time, that have been written expressly for their instrument and reflect its true “personality.”

Another important aspect of orchestration is to acknowledge the limitations of the players. No matter how good they are, they should not be forced to the point of exhaustion. Scores with extremely long and tiring passages or unreasonably complex structures are bound to be laid aside after a performance or two, and for obvious reasons. Although the orchestral players of our time are not as “irritable” as in the days of Monteverdi, when they could not understand his “reasoning” in prescribing bow tremolo (for the first time in music history) and rebelled against him, or like Wagner’s musicians who unwillingly had to take their orchestra parts home to “practice,” we should be moderate in our demands. Modern scores can demand effects and techniques that are impossible to play, and the signature of a well-known composer alone does not make possible the impossible!

About this book

- This book was written at the University of Music in Vienna, where orchestration is taught as a core course lasting two to six semesters for composers, conductors and sound engineers and as an elective course for other students. The book came into being following numerous requests by students, who expressed their desire and need for a “practical” book available for ready reference. These students also provided the idea for organizing the exercises and class work in a systematic way together with the score analyses that had been discussed in the seminars. Student input and criticism were the primary factors that determined the final form of the book. Thus it represents a joint effort by the author and his students.
- The book is divided into three main sections. The first five chapters are theoretical, discussing the instruments in detail (strings, woodwinds and brass, percussion, plucked and, finally, keyboard instruments). Each group’s characteristics, including traditional and modern playing techniques, are discussed in a single unit. The second part (Chapters 6–7) is

practical, consisting of fifty condensed scores to be orchestrated as exercises. These exercises have been selected by the author and his students from more than one hundred exercises that have been used in orchestration classes taught by the author in Vienna and at schools in other countries since 1990. The efficacy of these exercises has thus been proven many times. Each exercise challenges the student with one or more specific problems. The original scores on which these exercises are based, together with detailed analyses, are also provided to make the method complete. The third part (Chapter 8) sums up the information provided in the first two parts and demonstrates its applicability to contemporary music. Seven carefully selected orchestral compositions of the twentieth century are discussed here.

A brief section with general information on electrophones is also provided.

The following tables and listings are added at the end of the book for quick reference:

- ranges of the commonly used instruments;
- the names of the instruments in English, German, Italian and French;
- commonly used score terminology in English, German, Italian and French.
- Historical and so-called “outmoded” instruments are also mentioned briefly. The reason for this is to provide information to students and musicians who work with the scores of earlier periods, as well as those involved in the growing “revival” of these instruments. We have already seen some of these instruments called for in recent contemporary works.
- The choice of composers and their works in this book was made according to a certain pedagogical approach and need. The goal is to teach the material by using the shortest, simplest and most effective musical examples. Thus while multiple works of a particular composer are used as condensed scores, some composers are not even mentioned. It should be noted that this is not a “music history” book, nor a book of “comparative style analysis.”
- Modern playing techniques are discussed in detail. Although the majority of these techniques are accompanied by notational examples, some are not. In part this is due to the lack of generally accepted notation for some of the techniques, their infrequent use or the limited space available in this book. Despite our best efforts we cannot pretend that every recent playing technique is covered in this book. One brief example: soon after the section on “pizzicato” was completed, covering almost thirty variants of the technique, a student told the author about his own, new pizzicato technique. He attached multiple clothespins to the violin strings, which produced a rattling effect when the strings were plucked and the pins hit each other. As we can see, experimentation with instruments and techniques will continue to develop. But we can also observe a decline in the use of exotic effects in more recent scores. Today’s composers generally prefer more conventional methods of sound production.
- Certain subjects that are often difficult for students to understand have been simplified, explained step by step, and reinforced by additional exercises. These include multiple stops and harmonics on the strings, old and new notation techniques for the brass instruments, trombone glissandi, and so on. For that reason some parts of the text may seem far more detailed than others. In addition, many techniques (such as spiccato and staccato) and instruments (such as ophicleide and sarrusophone, or tam-tam and gong) that are often confused with one another have been clearly defined as an aid to differentiation.
- Like many other textbooks, this one sometimes lays out rules. These should not be regarded as categorical, but rather as flexible recommendations, or – more strongly – as words of caution. Most interesting ideas – in our field at least – result from breaking the rules. But in order to break them, one must first be acquainted with them.
- The original German version of this book was published by Bärenreiter in 2005 and was awarded the “Best Edition” prize for the best music book published in Germany in 2006.

About the classification of musical instruments

Musical instruments can be classified in many ways, and not only according to their acoustical or structural properties. Their classification can also result from the requirements of the book, including the section in which they are presented. Since our goal is to teach practical aspects of instrumentation and orchestration, we will consider the classification of the instruments based on their order in a conventional symphony orchestra. Accordingly we have five groups of instruments, each with a unique manner of sound production:

- bowed string instruments: by bowing a string under tension
- wind instruments: by setting an air column vibrating
- percussion instruments: by setting either the body of an instrument (idiophones) or the membrane attached to the body of an instrument (membranophones) vibrating
- plucked instruments: by plucking a string under tension
- keyboard instruments: by setting a string under tension or an air column vibrating by using the keys of a keyboard.

Another classification would be:

- chordophones: all instruments with strings that are bowed, plucked or struck
- aerophones: all woodwind and brass instruments as well as polyphonic wind instruments (such as the organ)
- percussion instruments: all membranophones and other idiophones that are struck, shaken, scraped or plucked.

Electrical and electronic instruments are in a group of their own. They are mentioned very briefly in one of the appendices of this book. For the reasons discussed there, these instruments are dealt with separately from the acoustic instruments.

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