THEORY OF ORCHESTRATION

by

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Introduction

I assume here that you already know the basics of instrumentation and of idiomatic writing
for instruments. I will cover various general principles here, which are useful as
guidelines. It must be said that, given the way that the instruments and the orchestra
have evolved, if the music is playable, it will often sound not bad. But between not
bad and really good there is a world of difference.

By far the most common mistake in orchestration is doing things for the wrong reason.
Usually this results in not doing everything possible to make the musical character
strong and clear. The following points should help you to use the resources of the
orchestra more effectively.

Although these guidelines concern "classical" concert music, some of them are also
relevant to "functional" music, e.g. music for films, etc.

I) The 4 orchestral families

1. strings
2. woodwind
3. brass
4. percussion

II) The essential qualities of good orchestration

a) The elements of the music (melody, harmony, rhythm, etc.) are clearly differentiated.
They all are audible and each adds something perceptible to the final result.
b) The orchestration comes together into a musically coherent whole.
c) The music has strong, definite character.
d) The instruments are used idiomatically.
e) The instrumental parts are as easy as possible, given the musical character desired.

III) The role of each family

a) Strings
… are the core of classical orchestration, because:
l) their technical flexibility allows for all kinds of passagework;

2) they blend easily, so they are very useful for harmonic support;
3) balance between the sections is simple and straightforward;
4) the strings cover the complete range of the orchestra, from the lowest register to the highest;
5) strings can easily produce multiple dynamics and articulations;
6) string timbre is not tiring for the ear, even over long periods.

b) Woodwinds
… can assume the following roles:
l) melodic,
    a) as soloists playing main lines,
    b) playing counterpoint to other lines;
2) harmonic (although blending woodwind timbres requires some skill);
3) completing the brass in the high register;
4) adding fullness (increasing "volume", see section IV, below) , by doubling the strings.

The horns serve as a link between woodwinds and brass, since they blend well with both.

c) Brass
… can assume the following roles:
1) harmonic, where they are very rich and full;
2) melodic or contrapuntal (note that in these cases the brass almost always become the foreground in the texture);
3) accents and dynamic reinforcement.

d) Percussion
… can assume the following roles:
1) rhythmic clarification;
2) creating accent;
3) enhancing dynamic changes (e.g. a crescendo);
4) creating resonance (e.g. a quiet cymbal roll);
5) playing melodic lines.

IV) Principles of balance

(This following distinction comes from the Traité de l'Orchestration by Charles Koechlin.)

- "Loudness" ("intensité" in French) refers the force of the sound, commonly referred to as the dynamics (e.g. *pp, ff*).
- "Volume" refers to the roundness/thickness of the sound.

E.g.: A horn playing middle C sounds "rounder" than a violin playing the same note.

a) Simultaneous balance **within** families

1) Strings:
- all the (sub-)sections are equal;
- with similar lines, the top part will dominate;
- to bring out an inner part, it needs to stand out rhythmically, or through its articulation, or by being doubled.

2) Woodwinds:
- in principle, they are all equal, but each instrument has its own stronger and weaker registers, so balance depends greatly on which registers are being used.

3) Brass:
- 1 trumpet=1 trombone=1 tuba=l horn (up to *mf*). When louder than *mf,* one heavy brass instrument=2 horns;
- with similar lines, the upper part will dominate;
- to bring out an inner part, it needs to stand out rhythmically, or through its articulation, or by being doubled.

b) Simultaneous balance **between** families

1) Strings and woodwind

a) One woodwind soloist can emerge over all the strings, if:
1) the wind instrument has a convincing, singing line, in a good register, and
2) the wind instrument is not in the same register as the strings, and
3) the strings do not have very active figuration.
b) The winds can provide harmonic background. This requires a group of woodwinds, in blended registers.

2) Strings and brass

a) The brass naturally dominate. Normally, the brass will have the foreground material and the strings the background.
b) The strings can act as the foreground, if:
- the brass are written *p,* and
- the brass are not in their high registers, and
- the strings are laid out in a very sonorous way. i.e. doublings, chords *(non divisi),* and lots of resonant open strings in the passagework.

3) Woodwinds and brass:

- the brass will dominate
- the woodwinds should be written in their upper registers, except for the bassoons, who normally play the bass line.

It is almost impossible to have woodwinds in the foreground, accompanied by a group of
     brass instruments.

4) Percussion and strings/woodwinds/brass :

     - percussion are capable of all dynamics;
     - in *ff,* the percussion will dominate the rest of the orchestra.

c) Successive balance

1) Immediately after a section using full brass, many other timbres will sound very thin, by
     contrast. This sudden loss of volume can be lessened by:
     a) eliminating the brass instruments gradually instead of all together, and/or
     b) doubling the new instruments for a while to make them thicker (increasing their
     "volume"), and/or
     c) allowing enough time for the ear to adjust (e.g. adding a short pause before the
     thinner texture).

2) To have the strings and a group of woodwinds in dialogue, without annoying differences
     in volume:
     a) normally, the full mass of the strings will require a large number of woodwind;
     b) often two or three woodwinds will require more than one section of strings.

3) To create an effective orchestral *crescendo* (do the opposite for a *diminuendo*):
     a) bring in the families in a logical order, e.g.
          1) winds or strings   2) brass   3) percussion (although some percussion
     instruments can play very softly and therefore can be present from the start);
     b) usually the *crescendo* will with one or both of the extreme registers;
     c) do not bring in all the brass at once.

V) Doublings

1) Melodic doublings (at the unison or the octave) are used for the following reasons:
     1) to add intensity;
     2) to create a specific color/character.
     3) At the octave, doublings help fill the orchestral space (register).

2) When the harmony is present in two or more families at the same time:
     a) each family should sound complete in itself;
     b) the doublings and voice leading should be slightly different between one family
     and another, to avoid grey, heavy lines.

VI) Register

a) For each passage, aim at the register which best suggests the musical character desired.
b) Large gaps in spacing chords are rare, and should not happen without good reason, e.g. to achieve a special character.
c) The normal arrangement of orchestral texture follows the harmonic series: larger intervals on the bottom, smaller on top.
d) For occasional contrast, one may have a closely spaced chord in the low register. Usually the middle register should be fairly empty in this case, to avoid confusion with the harmonics from the low notes.
e) Contrast of register is a very powerful musical resource: a piece which stays too long in one register becomes tiring to the ear.
f) Over a whole piece, most of the complete orchestral range available should appear at one point or another, but the extremes should be saved for special moments, such as major contrasts or climaxes.

VII) Planes of tone

Most of the time, orchestral music contains multiple planes of tone. Such planes add richness, but they need to be clearly differentiated.

a) The foreground is characterized by:
    1) (relative) loudness: stronger registers, clear character;
    2) contrast with the other planes of tone, in timbre, register, articulation, etc.

N.B. With equal timbre and dynamics, a sustained line will dominate a staccato line.

b) Intermediate planes of tone: (the bass, and other secondary contrapuntal lines) are characterized by:
    1) contrasting timbre and/or register and/or articulation, compared to the foreground;
    2) less dominant registers.

c) The background plane of tone (e.g. harmonic filler, or resonance) is characterized by:
    1) blended sonority;
    2) neutral/quiet registers and timbres;
    3) limited range;
    4) avoidance of excessive activity.

VIII) Contrapuntal Orchestration

Three approaches:

1) The counterpoint is entirely contained in one single family. Blend is easy, but the lines must be differentiated by register, articulation, and/or rhythm.
2) Each line has its own orchestral colour, e.g. melody in the flute, counterpoint in the violins. This requires choosing instruments and registers with roughly equivalent volume and force. This method can also become tiring to the ear if it goes on for a long time. Sometimes it is a good idea to add a quiet harmonic plane of tone in the background; this helps to blend the ensemble. (This is the principle behind the baroque continuo.)
3) All families play all the lines, doubled. This arrangement is very thick and solid, but it can easily sound grey, even after a fairly short time. It is best saved for climactic moments. Here too, a quieter, unified, harmonic background can be useful.

IX) Orchestral Movement

Movement gives life to the texture. Orchestration without movement quickly becomes static, and can sound lifeless and heavy. Most of the time, movement stays in the background. It is usually associated with a consistent motive in the accompaniment. It is possible to use what I call "pseudo-counterpoint", using one of the four types of movement listed below, adding just enough contrapuntal interest to make the player's part fun to play, but not so much as to distract from the foreground.

Movement can be achieved by:
    1) repeated notes, or tremolos,
    2) arpeggios,
    3) scales,
    4) trills.

X) Orchestral Accompaniment

To allow a soloist (vocal or instrumental) to emerge from the orchestra requires:

1) a contrast between the soloist and the orchestra. The contrast can be of:
    a) timbre, and/or
    b) register, and/or
    c) rhythm.

2) avoiding heaviness in the orchestra. Here are a few ways to lighten orchestral textures:
    a) staccato or pizzicato basses,
    b) rests,

        c) weaker registers in the accompanying instruments.

3) for loud passages:
        a) alternate between soloist and orchestra;
        b) if the timbre of the soloist does not appear itself in the orchestra, one can double the solo line discretely.

XI) Tutti

The word tutti implies the presence of at least three of the four orchestral families.

A tutti can be laid out in several ways. Here are three of the most common methods:

1) All families have the same harmony, but the details of spacing and voice leading are different in each. The melody is doubled at the unison and/or at the octave. This is the most common method: it gives a rich sound, but without the greyness of constant literal doubling.
2) Each family has one musical element, e.g. melody in the brass, held notes in the woodwinds and movement in the strings. This is the most common method when there are multiple contrasting planes of tone in the texture.
3) Each family can double all the main elements of the texture. This method should be used only occasionally, when great force is required. Continued for any length of time, the sound quickly becomes grey and heavy.

XIII) Orchestration and form

The orchestration should respect and clarify the form:
    1) orchestration within a phrase should be consistent;
    2) the orchestration should underline important moments, e.g. cadences;
    3) the orchestration should highlight musical contrasts, respecting the degree of contrast required in the form;
    4) the orchestration should reinforce musical accents;
    5) the orchestration should contribute to the desired musical character.

MORE ABOUT THE ORCHESTRAL FAMILIES

1) String quartet: although this is strictly speaking not orchestral, writing well for string
        quartet is the foundation for writing well for string orchestra.
        a) There is enormous variety of textures and articulations. (Examine just one page
            of any mature Mozart string quartet to see the constantly changing textures.)
        b) The character of the string instruments is essentially singing and polyphonic,
            with great freedom of movement in each line, given the string instruments'
            wide range. But homophonic textures are also common, since the string
            instruments also blend so easily.

Compared to the piano:
        a) the sound is sustained;
        b) the quartet has no pedal, so resonance must be created by held notes.

II) String Orchestra: the foundation of the classical orchestra.
        Differences compared to the string quartet (of soloists):
            a) the range is wider, especially in the bass;
            b) the sound is richer, due to the chorus effect;
            c) the dynamic range is wider.

III) Woodwinds:
        a) the solos voices of the orchestra;
        b) a source of colorful harmonic background.
        Differences from the string orchestra:
            a) there are multiple, different timbres, not easy to blend;
            b) there are greater differences between registers, even within the same
            instrument;
            c) homophonic textures are harder to blend;
            d) the composer needs to allow for breathing in the players' parts.

IV) Brass: Solos are rarer than in the woodwinds; the brass family more often plays a
        harmonic role in the orchestra.
        Compared to the woodwinds, brass:
            a) are less agile,
            b) are louder,
            c) have more trouble with high notes,
            d) blend more easily.

V) Percussion
        a) In the classical orchestra percussion instruments are basically accessories. More
            recently, the melodic and harmonic roles of the percussion have greatly
            expanded.
        The percussion includes 3 timbral families:
            a) the metals, which are quite resonant,
            b) woods and gourds, which sound relatively dry,

   c) skins (e.g. timpani). Instruments in this family can be quite resonant when low, and they becomes drier in higher registers.

  b) When combined with other families, percussion will usually occupy the same register as the other family.

  c) Dry percussion require ornaments (grace notes) for richer attacks.

ORCHESTRAL TEXTURES

The term orchestral texture refers to how the various strands in the music are laid out to make a coherent whole.

The most common textures

1) Monophonic:

       1) one single line, doubled or not;
       2) doublings may be at the unison or the octave;
       3) exceptionally, doublings can also be at the third, the fifths etc., to create synthetic timbres (as in Ravel's Bolero and in organ registration) N.B. The doubling must be quieter than the main line!
       4) Interest can be maintained by using different doublings and registers for successive phrases.
       5) Monophonic texture is simple and clear.

2) Heterophony:

       1) Essentially, this is doubling with ornamentation: the same line appears in various instruments with the details slightly varied.
       2) Heterophonic texture maintains a certain simplicity but it is richer than monophony.

3) Homophony:

       The lines have different pitches, but the same rhythm. All other things being equal, the top line will dominate.

4) Counterpoint:

       Multiple contrasting lines together. Note that even in counterpoint, the lines are never all equal: at any given moment, something will always dominate the texture. But the dominating element moves around, from voice to voice.

5) Melody, accompaniment, bass:

       Here we find:
           1) one leading line,
           2) a harmonic bass,
           3) an accompaniment, which can be homophonic or contrapuntal. Generally, the accompaniment is unified by a common motive.

Changing textures usually correspond to formal contrasts.

TRANSCRIPTION

Transcription means to rewrite a piece for a different instrument or ensemble while trying
to realise the original musical intention, taking into account the particularities of the
new instruments/ensemble. It is like translating from one language to another.

The main problem in transcription usually lies in deciding which elements to retain as is
and which to modify (and how to modify them).

Consider the following aspects of the music:

1) Character
The new version should respect the character of the original as much as possible.
The instruments and registers used will be largely determined by the desired
character.

2) Melody:
a) should be retained as it;
b) can be doubled, for 2 reasons:
1) loudness,
2) colour.

3) Bass line:
a) should be retained as is. Do NOT change the inversions of the chords!
b) in the case of bass figuration, e.g. arpeggios, the real bass line is formed by the
lowest notes of each chord. Higher notes within the same chord are normally NOT
part of the bass line.

4) Spacing of the harmony:
a) often must be changed (e.g. replacing close position in the bass with more open
spacing);
b) voice leading needs to be respected, although it may not be identical to the
original. In particular, respect the resolutions of active tones (leading tones,
sevenths, etc.).

5) Rhythm of the accompaniment
Keep the smallest note value the same, but rearrange the figuration to fit the new
instrument(s)

6) Resonance
Often, the original piece contains resonance effects (e.g. the piano pedal). Such
resonance must be written out (by adding quiet, sustained notes), in the quietest
plane of tone in the background.