Alan Belkin, composer

Artistic Orchestration

This is the third volume in my series of online books on musical technique. The others cover Form, Counterpoint, and Harmony. All are based on my own experience as a composer and teacher.

You may also be interested in my online mini course in orchestration.

This series is dedicated to the memory of my teacher and friend Marvin Duchow, one of the rare true scholars, a musician of great depth and sensitivity, and a man of unsurpassed kindness and generosity.

A note concerning the musical examples: *All the musical examples with audio here are my own. Score examples are notated in concert pitch, although octave transpositions (piccolo, double bass, etc.) have been maintained, to avoid excessive ledger lines. Scores have been reduced, and occasional detailed performance indications removed, to save space. I have also furnished examples from the standard repertoire (each marked "repertoire example"). Unfortunately, copyright issues make it prohibitive to supply scores and audio for these: It would be impossible to continue supplying this work free of charge.*

Table of contents

Introduction: Why this book?
Preliminary considerations
- Remarks on instruments
- What is poor orchestration?

Basic notions, part 1
- Orchestration and form
- Changes of sound
- Rate of orchestral change
- Degree of continuity/contrast
- Interpreting the phrasing
- Orchestration and dynamics
- Register
- Color
- Sustained vs. dry sound
- Fat vs. thin sound; unison doubling
- Balance: simultaneous and successive

Basic notions, Part 2
- Musical lines vs. instrumental parts
- Planes of tone
- Contrapuntal orchestration
- The tutti

Summary: What is good orchestration?
Orchestral accompaniment
Conclusion, acknowledgements, bibliography
Appendix 1: some pedagogical ideas
- Outline sketches as a teaching tool
- Learning orchestration from the repertoire
- Scales of contrast

Appendix 2: Character glossary

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Introduction: why this book?

Several fine books on orchestration already exist: Rimsky Korsakov's *Principles of Orchestration* remains as valuable today as when it was published. The excellent texts by Piston and Adler combine thorough information about instruments with useful advice about their combination.

Koechlin's monumental *Traité de l'Orchestration* is in a class apart: In its four huge volumes, the author generously shares a lifetime's experience as a master orchestrator, and explores many subjects nowhere else to be found. Our work here is much indebted to Koechlin.

The main subject none of these books covers systematically is how orchestration expresses and enhances musical form. This, combined with our focus, throughout this series of online books, on explaining musical techniques in terms of how people hear, will lead us to some useful principles.

Rimsky Korsakov tells us that "to orchestrate is to create, and this is something which cannot be taught". Experience proves him right. Once the basic information about instruments is assimilated, it is difficult to teach the finer points of the art, outside of actual composition. Transcription of piano or chamber music, often used as a teaching method, presents useful challenges, but these challenges are mainly problems of translation, not of composition. We will not deal with transcription here, as the subject is well covered in other books, for example, Joseph Wagner's *Orchestration*.

What is orchestration? For our purposes, orchestration follows instrumentation, where the student learns how instruments work, and what is idiomatic for each one. The common conception of orchestration as assigning timbres to lines is very inadequate. Timbre is a potent aspect of musical character. Using it effectively requires a much knowledge about texture the ways in which musical strands can be combined and how changes of timbre affect our perception of musical form. There is in fact no area of music that is not dependant on timbre: It impinges even on the most elementary harmony exercise. The tension of an appoggiatura will change drastically, depending on whether it is for voices, strings, or piano. Our

definition of orchestration here will therefore be: Composing with timbres. Most of our discussion here will focus on how orchestration can be used to enhance various musical situations.

Orchestration is hard to teach. First, it is difficult to provide feedback for students' work: A real orchestra does not sit around waiting to try out elementary exercises. Second, if the parts are reasonably playable, and provided the coming and going of entries does not actively contradict the work's main structural articulations, it is almost as hard to write glaringly badly for the orchestra as it is to write glowingly well. This is because the orchestra's historical development has largely favored euphony of sound and flexibility of technique. The inadequacy of poor, but playable, orchestration only shows itself over fairly long spans or in repeated listening. Grayness or heaviness of texture fatigues the ear, and the structure and character of the work are unvaried and undifferentiated.

Computer simulation of the orchestra is of course a useful tool, and its quality is constantly increasing. But to do a really convincing simulation requires that one already know, in some detail, how the passage must sound; most non professional simulations are poorly balanced and woefully lacking in refinement. We will make some suggestions for improving simulations here.

As in our previous books, we will concentrate here on general principles instead of rules of thumb. Given that orchestration is so hard to try out experimentally, this is especially important. As an example, a common rule of thumb tells the student to avoid big gaps in orchestral textures. The principles involved here are two:

1. Musical elements that are in separate registers are not perceived as being on the same plane of tone.

2. For fullness of sound, the ear requires fairly complete registral saturation, especially in the middle range.

These principles explain why large gaps may be effective in one situation, for example a quiet, playful passage, but not in another, where fullness and richness are required.

Another advantage of discussing general principles is that many of our remarks will apply equally well to electro-acoustic and mixed music, instead of being limited to traditional instrumental combinations. That said, we will provide many examples from the standard repertoire, for ease of reference.

Note: This work is not meant as a substitute for the texts referred to above, but

as a complement to them.

Preliminary Considerations

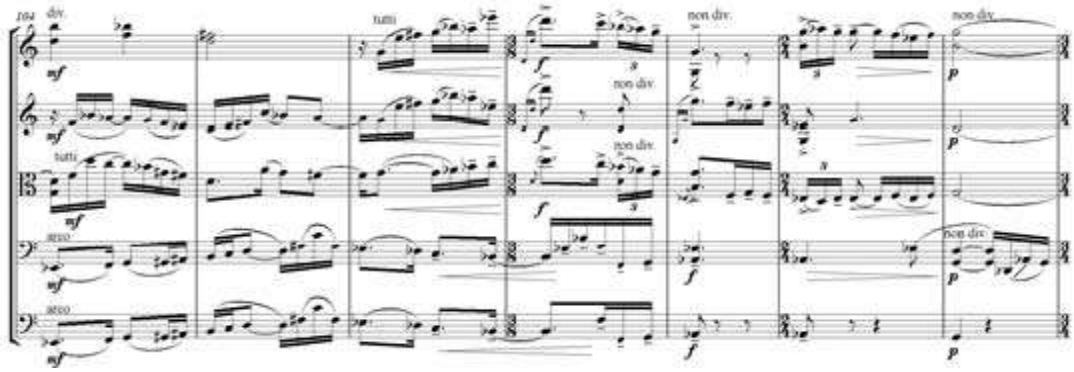
Remarks on Instruments

Before proceeding to our discussion of orchestration *per se*, a few general comments on the roles of the orchestral families are necessary, as well as some specific advice about how to treat them. Since any student studying orchestration should have already mastered basic harmony and consequently the norms of four part choral writing a useful point of departure is to compare each instrumental section with the vocal choir. For students more familiar with the piano, the point of departure should be comparison with that instrument.

Strings

Like the vocal choir, the string family offers excellent homogeneity of timbre, and can play anything from the simplest monophonic line to the richest polyphony. Virtually anything that is suitable for choir will also sound well in strings. However, strings add numerous resources to those of the vocal chorus, due to their much wider range, their much greater mobility and more varied articulations, and their capacity for playing chords.

Unlike choral writing, string writing normally abounds in crossing. This allows the lower instruments to play the main line from time to time, and, most importantly, gives all the individual sections in the family freedom to move, since string instruments' ranges are so much wider than those of voices. Given the easy blend within the family, such crossing creates no special problems.



Adagio Symphonique: The violas first cross over the 2nd violins, and then the 1st and 2nd violins take turns carrying the leading line. This freedom of partwriting creates a dialogue which adds to the music's intensity.

A note concerning strings playing pizzicato: they are best thought of as percussion sounds. While produced by string instruments, they have no timbral affinity with bowed strings

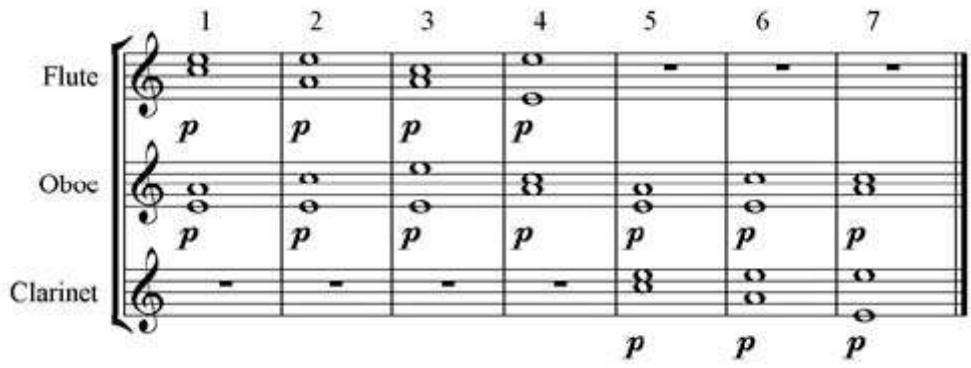
Woodwind

Woodwinds, due to their various distinctive timbres, can provide intimate solo effects. A good policy is to consider each woodwind as being three instruments in one: a high, a middle, and a low timbre. Combinations that work well in one register can be quite odd in another. Also, each type of woodwind is, in effect, a member of a separate choir: For example, clarinets are available from contrabass to piccolo. (The double reeds, oboe, English horn and bassoon, can be considered as one family.)

There is a qualitative change when a line is assigned to two or more of the same instrument in unison. This is much more significant than the quantitative one: Three oboes are not even twice as loud as one, but the quality of sound becomes that of a little chorus, due to unavoidable differences in intonation. A line whose character requires a solo sound will be less effective when doubled, due to this difference in character.

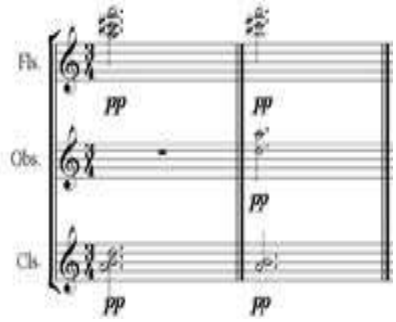
First we hear this melody for one oboe, then for three in unison.

The main problem in writing for woodwinds occurs when they are used in chords, due to their disparity of timbres, both within individual instruments (in different registers) and between them. The common beginner's mistake, of writing a chord with each note in a different timbre e.g. four timbres for a four note chord is very crude. The classical methods suggested by Rimsky Korsakov overlapping and enclosure work by making it difficult to decipher who is doing what, in effect fooling the ear.



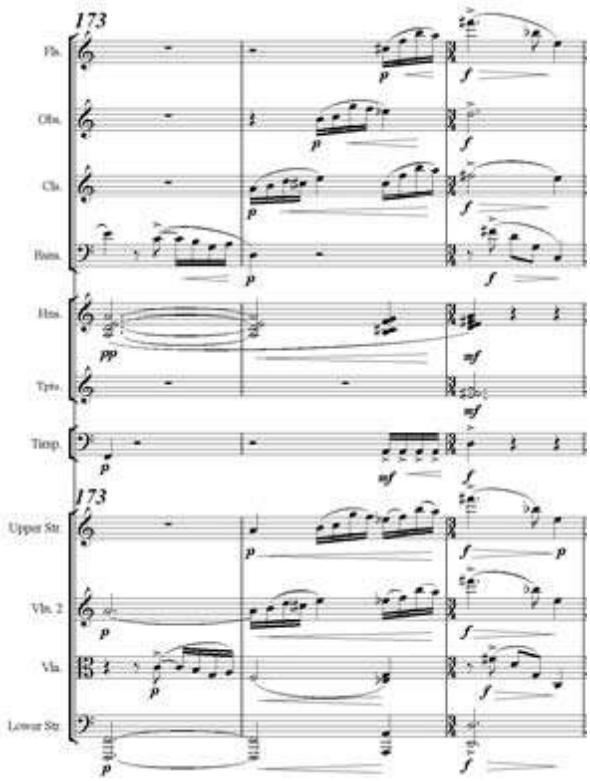
None of these chords blends in the way a string or a brass chord would. However the stacked arrangements (#1 and #5) are the worst, especially since the oboe's dissonant 4th sticks out. The best blended versions (relatively speaking) are the overlapping ones (#2 and #6).

When writing for massed woodwinds, the oboe is the instrument most likely to hurt the overall blend. It will definitively color any combination, for better or for worse.



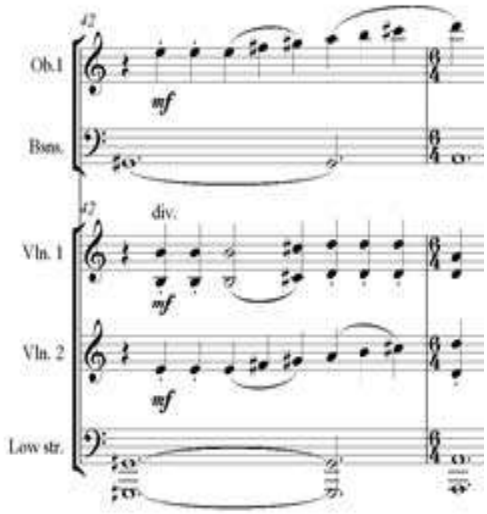
These two chords contain exactly the same notes. The 2nd chord, scored with oboes, is considerably more pungent. Both could be useful, in the right context, but the one with oboes has a more distinct character.

When used in the same plane of tone with strings, the main function of woodwinds is to add volume ("thickness").



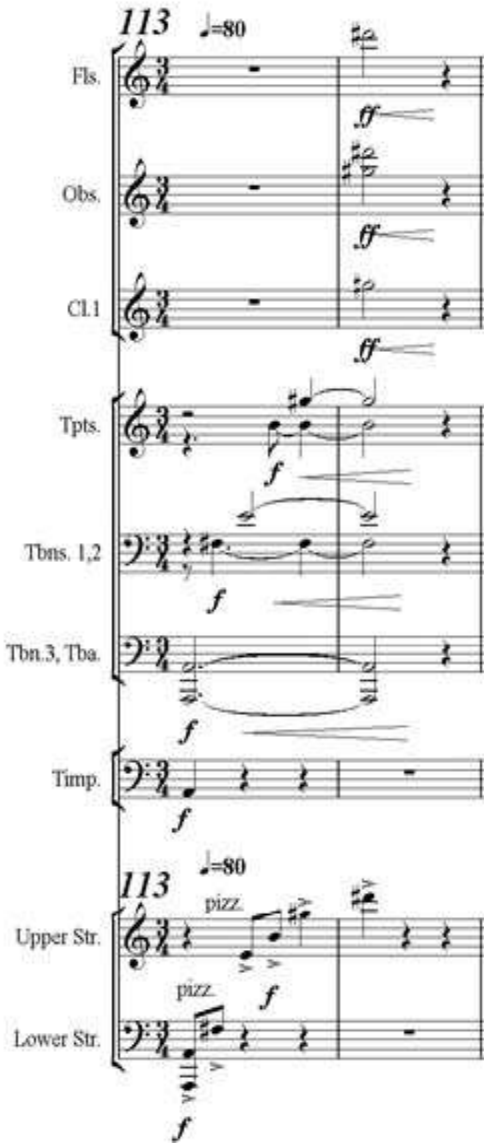
Symphonic Movement #1: The wind doublings of the moving lines in the strings make them thicker and more substantial.

Sometimes, when doubling strings an octave higher, woodwinds can add luminosity.



Symphonic Movement #3: The oboe doubling of the line in the 2nd violin helps it to emerge more clearly, and makes it brighter.

When used in chords, in the same plane of tone with the brass, the winds' main function is to complete the top of the harmony above, since doubling at the unison is virtually imperceptible.



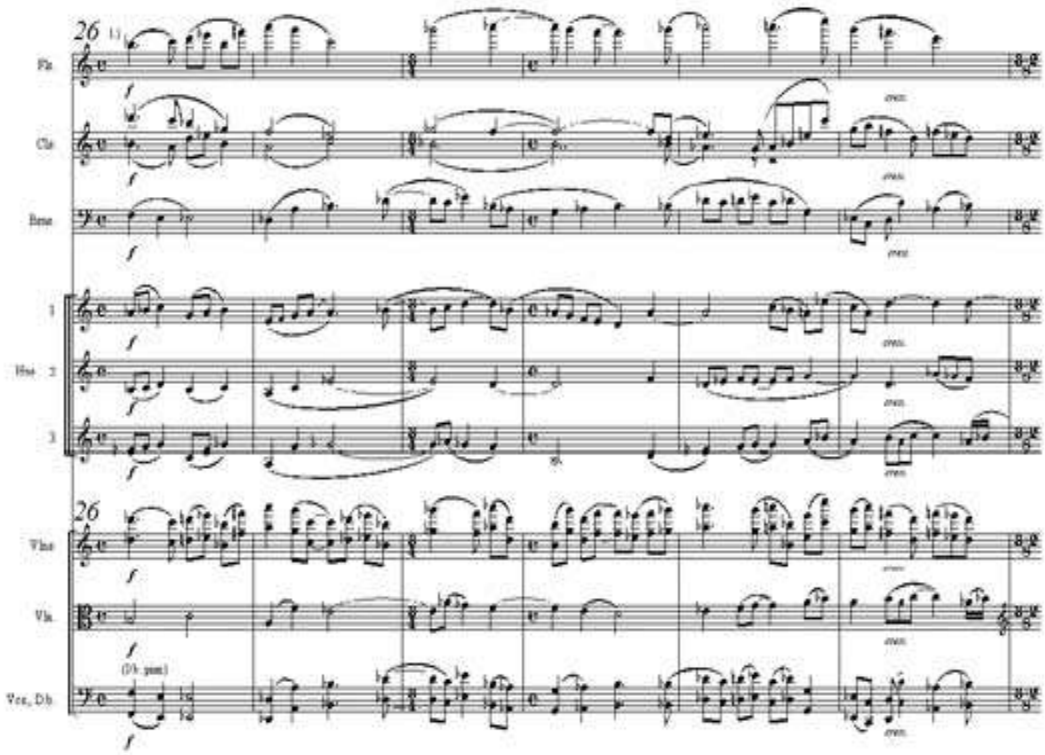
Symphonic Movement #1: High woodwind complete the rising chord in the brass.

Brass

Brass are more homogeneous than woodwind, but less agile. They can play melodic, rhythmic, contrapuntal, and harmonic roles equally well. They also

reproduce choral writing better than woodwind; in much early music, brass, especially trombones, simply double the voices.

Horns are best thought of as alto instruments; beginners often place them much too low or let them wander too high. The best arrangement for horns in harmony is: three or four horns, in close position, in the range of the alto voice. Sometimes the fourth horn doubles the first, an octave lower.



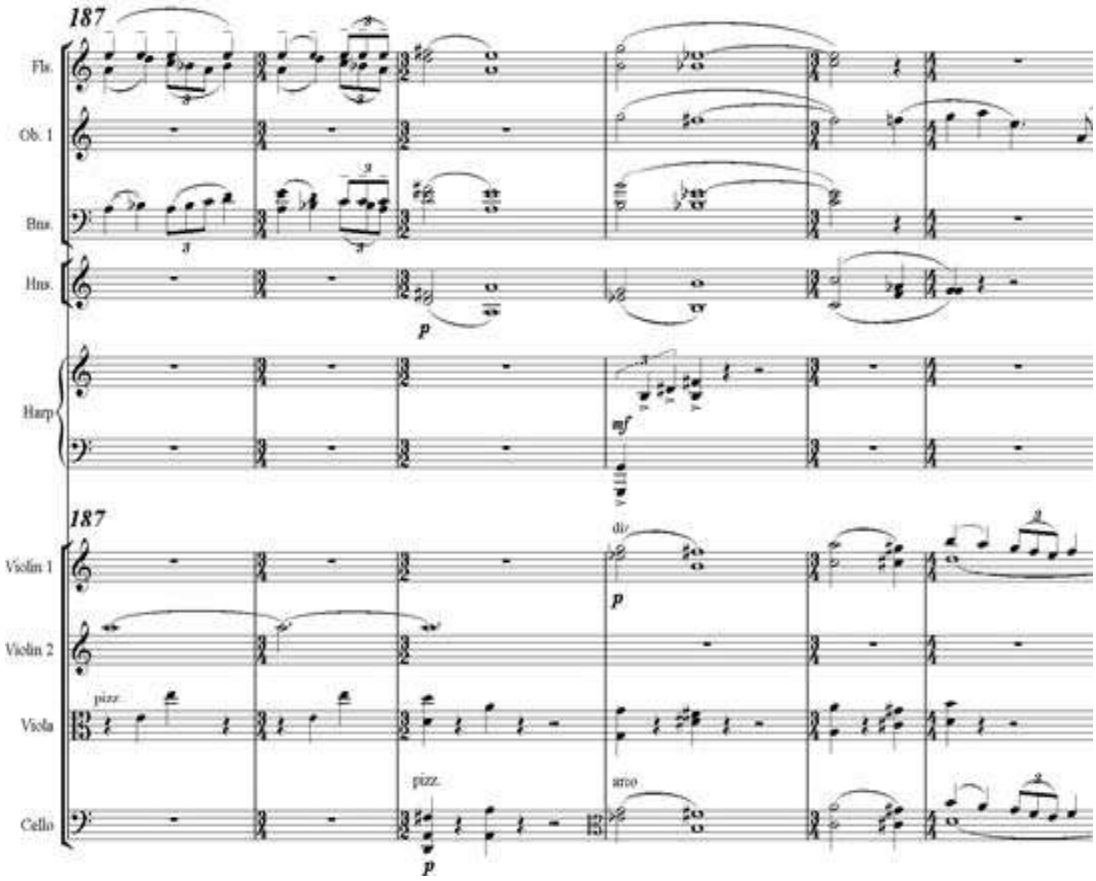
Symphony #5, finale: the three horns here add richness to the texture, without heaviness.

Horns are traditionally divided into high and low specialists, sitting in alternate seats, i.e. horns 1 and 3 are "high", while horns 2 and 4 are "low". While all horn players are comfortable in the middle range, when playing at the extremes, the embouchure required takes special effort and practice. Thus, the "high" horns are uncomfortable on the bottom notes, and the "low" horns are uncomfortable on the top notes.

The horns' lowest notes are best reserved for slow moving pedal passages; they are not suitable for mobile bass lines, which they tend to render ponderous.

Piston mentions that horns are best treated in the general spirit of the natural instrument for example with a preference for open harmonic intervals like fifths

and octaves, and for generally diatonic lines. This remains excellent advice.

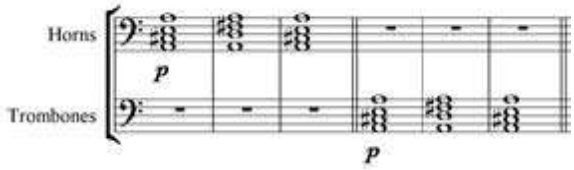


Symphony #8: Restricting the horns to octaves on the longer notes keeps the harmony transparent.

Although horns are now of course chromatic instruments, extreme agility is not in their nature.

These observations are also true of trumpets. (Note, however, that horns and trumpets can manage fairly rapid repeated notes.).

Trumpets sound oddly empty in wide spacing; trombones, on the other hand, sound full in both open and closed positions. Trombones in close writing in the baritone register are somewhat lighter than horns, a useful fact to remember when using brass to accompany solo instruments, or the human voice.



Compare horns and trombones in this register.

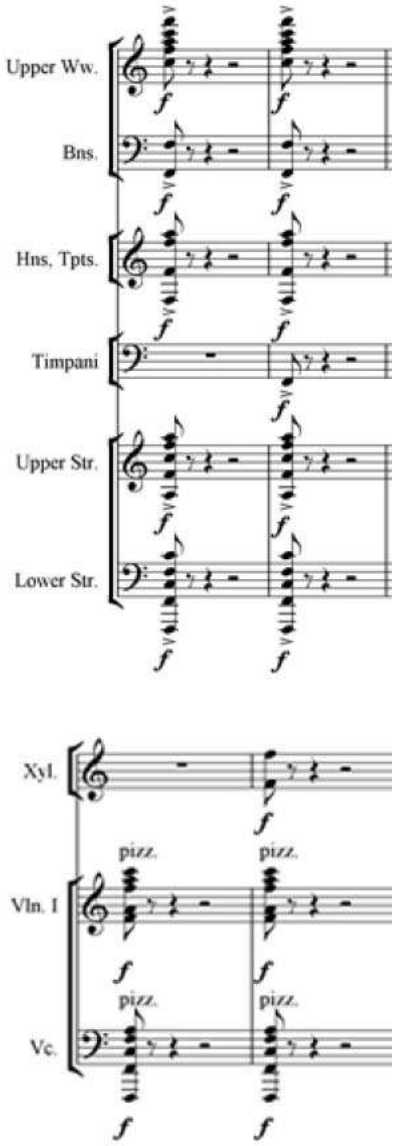
Muted brass should be considered as a separate timbral family, so different is their timbre from open brass. When soft, muted brass are quite close to double reeds in sound; when loud, their strident sound puts them in a class of their own.

Percussion

While there are various ways of classifying percussion instruments, it is most useful for the composer to think of them according to their sound, and then classify them into families by register and pitch. For example, metal instruments are normally "wet", with substantial reverberation, and therefore not well suited to quick, precise rhythms. On the other hand, they can supply background ambiance very well. Wooden instruments are "dry", best used where clarity and definition are important. Membrane instruments are in between: When low, they can reverberate quite long; as they get higher, their sound resembles that of the wooden percussion.

Percussion can function as:

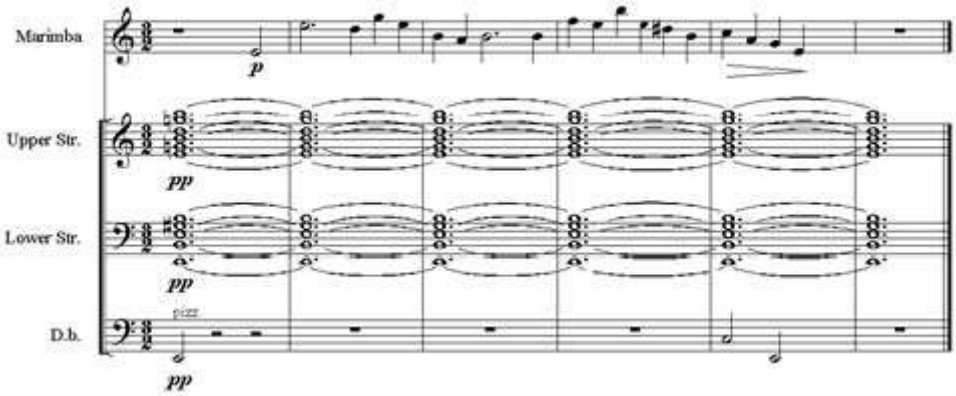
- Accent



Compare the two versions of each chord: Each is presented first without percussion, and then with. Adding percussion sharpens the accents, adding impact and power.

(repertoire examples) There are countless examples of incisive final chords in major orchestral works of the classical period, with timpani added for accent.

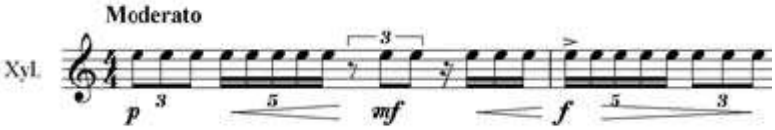
- Melody



The marimba melody emerges easily over the mysterious chord played by divided strings.

(repertoire example) Shostakovitch, 15th Symphony, Finale, coda (rehearsal #148): The timpani present the passacaglia theme while other, fixed pitch, percussion dance around it. Sustained string chords provide a mysterious background.

- Rhythm



The xylophone presents a rhythmic idea.

(repertoire example) Bartok, Concerto for Orchestra, 2nd movement, beginning: The snare drum (playing without snares) presents an important rhythmic theme.

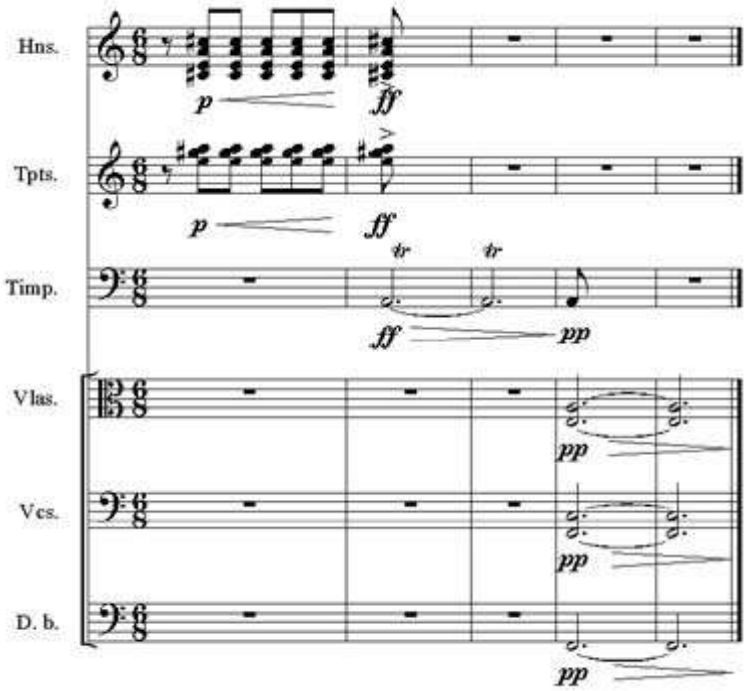
- Resonance

Without the quiet cymbal roll, the flute line would sound patchy and empty.

(repertoire example) Dallapiccola, Canti di Liberazione, opening: While a wide-ranging vocal line flows through the various sections of the choir, quiet cymbal rolls provide a haunting background ambiance. Note how the cymbals are not just

continuous rolls, but are rather composed in overlapping waves.

- Transitional sound between changing dynamics.



Without the timpani roll diminuendo, the contrast between the high brass and the low strings would be much more abrupt.

(repertoire example) Bruckner, 9th Symphony, 1st movement, m. 75 6: A timpani roll, diminuendo, provides a smooth transition between the loud tutti which precedes it, and the very quiet passage which follows.

As a general rule, when percussion is combined with other families in the same plane of tone, it should correspond in register to the music around it.

Human voice

Writing for voices is a too big a subject for detailed consideration here, but a few words of advice are in order.

Words must be set as intelligibly as possible. Singing, by nature, strongly distorts words in favor of vowels; consonants function mainly as articulation.

The rhythm, accentuation, and contour of the vocal line should follow that of the words, well spoken. They may exaggerate, but should not contradict, the rhythm and contour of the spoken verbal phrase. There is also the added consideration that the voice cannot develop a full sound on vowels formed with the mouth closed, like the French "u". (It is not for nothing that the Italian "amore" is a wonderful word to sing!) Therefore climactic passages must be planned around important words, which also permit the voice to sing out.

Voices need time to open out to their full sound; therefore very agile and/or staccato writing is a rare, special effect.

More than any other instrument, voices require writing in the middle of their range most of the time, to avoid discomfort. Very low and (especially) very high writing should be reserved for special moments.

What is poor orchestration?

As mentioned earlier, it is actually quite hard to write really bad orchestration, provided the music is playable.

While we will concentrate here mainly on the positive aspects of artistic orchestration, it is worth identifying the main characteristics of poor orchestration:

- Feebleness of effect: Not using all the resources available to create the desired character (e.g. trying to get a percussive effect using only a few woodwinds, and with no use of percussive sounds); creating contradictory gestures (e.g. adding instruments during a diminuendo).
- Aural fatigue: Overuse of extreme registers or very distinctive colors; lack of blend in harmonic masses.
- Grayness: Too much unison doubling.
- Heaviness: Too much doubling, or overloading the low register.
- Consistently dry sound, without any background resonance. (Dry sound can be effective, but not as a norm.)
- Confusion among musical elements: Poorly differentiated planes of tone.
- Formal confusion: Changes of timbre at arbitrary places; changes not appropriate to the degree of contrast required.
- Lack of clear character.

Basic Notions, Pt. 1

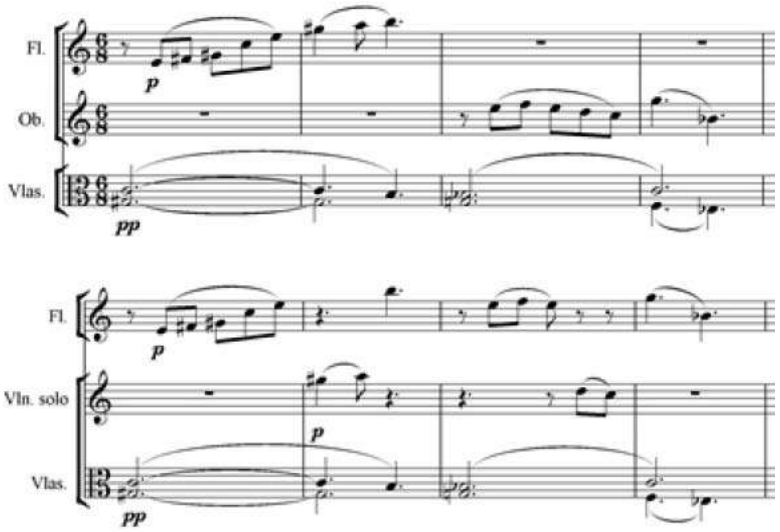
Orchestration and Form

All through this series of online books we have repeatedly insisted that any musical gesture's effect is largely determined by its placement in the work's span of time. Artistic orchestration also needs to be seen as an integral part of musical form.

Key points, which need to be planned orchestrally in relation to the whole work,

include:

- Changes of sound: Changes of timbre must be logical in the musical context. A change of sound creates a formal articulation. The normal place for timbre to change is between phrases, sections, etc. Within a phrase, orchestral changes will normally occur at musically significant moments: motivic changes, climactic moments, and cadences. Changes at other places sound arbitrary.



Compare the first version, where the change from flute to oboe is musically logical, with the second. Ridiculous though it may seem, this problem is common is student work.

(repertoire example) Mozart, Marriage of Figaro, Overture, m. 59 67: Instruments are added throughout the phrase, coordinated with motivic repetitions; the last addition (flutes) arrives as an imitation.

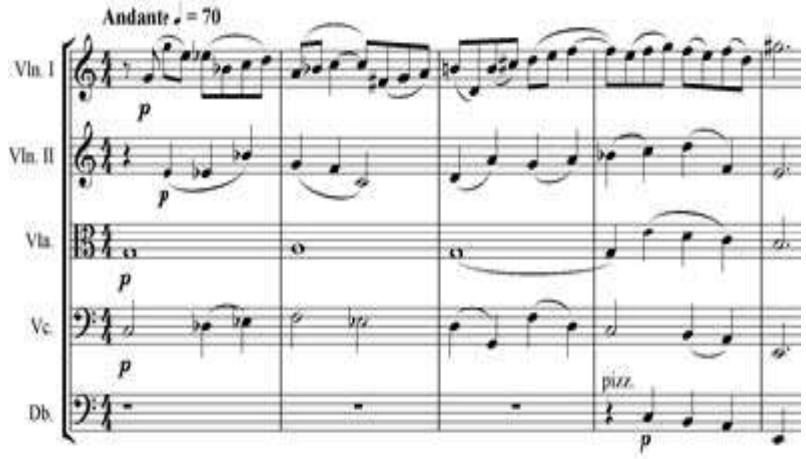
- Accents: moments which attract special attention from the listener (see this example below). Orchestrally, accents usually require momentarily adding some new sound, or changing the playing technique in some way, e.g. by using double stops in strings. The change must of course be proportional to degree of accent required.

- Cadences: Structural articulations can often enhanced by some change in the orchestration.

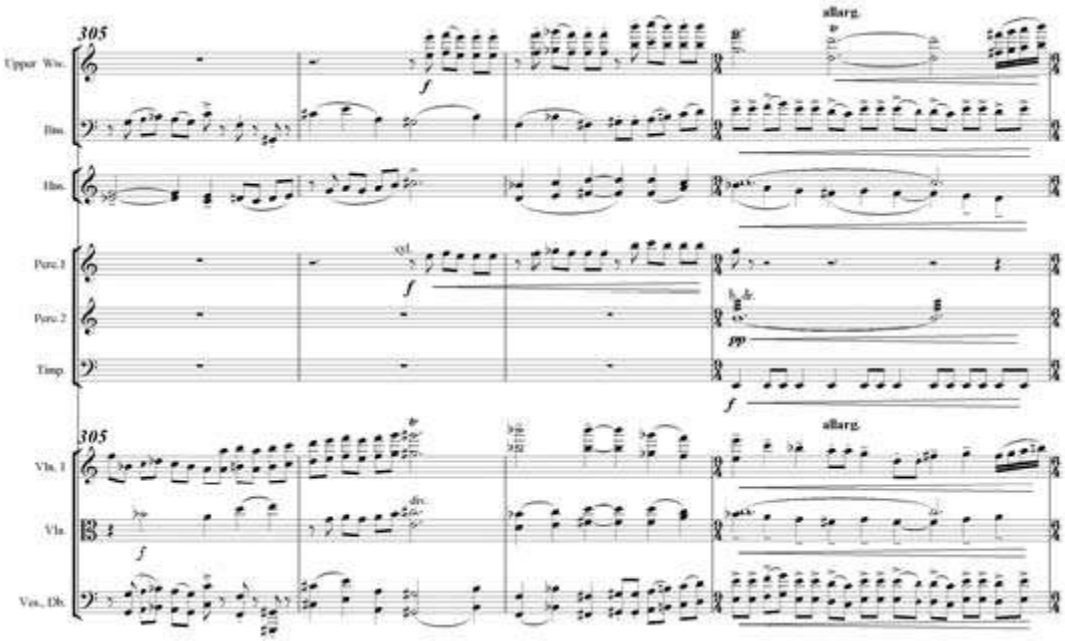
- Progressions: Progressions can create momentum and a sense of direction, as discussed in the first volume of this series. Common examples include:

- Crescendi and diminuendi (see example below).
- Gradually rising or falling passages. {
- Texture getting thicker or thinner.

- Gradation of climaxes: Usually one climax, near the end, stands out more than the others. It is important to reserve some unique orchestral resource for this moment.



The addition of pizzicato basses underlines the cadence. Symphony #7: The main climax of the piece (m. 309) is orchestrally set off by extremes of register, an explosion of rhythmic activity and color in the percussion (glockenspiel, suspended cymbal, timpani), and full brass in quickly moving harmony.



Rate of Orchestral Change

Like harmonic rhythm the rate of harmonic change the rate of orchestral change has an important impact on the music's pacing. It is difficult to quantify as precisely as harmonic rhythm, since orchestral changes come in many degrees of salience adding a unison flute doubling to a line in the violins does not have the same impact as adding three trumpets playing chords. Nonetheless, the rate at which timbres are added or removed, especially within a phrase, can contribute to effects of tension or of relaxation. Such orchestral "speeding up" and "slowing down" normally compliments and enhances the phrase structure of the work.

Allegro ♩=120

Upper Ww.

Hns.

Tpts.

Tbns.

Celesta

Harp

glock.

Perc. 1

tub. bells

susp.cymb.

Perc. 2

Timp.

Allegro ♩=120

Upper Str.

Lower Str.

rit.

10

Upper Ww.

Hns.

Tbns.

susp. cymb.

Perc. 1

rit.

10

Upper Str.

Lower Str.

Symphony #6, finale: After a restless beginning, with significant timbre changes every bar or two, the orchestration becomes calmer from m. 11 onward. This reflects the arrival at a stable presentation of the main theme, following the introduction.

(repertoire example) Mahler, 4th Symphony, 2nd movement, m. 34 46: From m. 34 42, the changes of sound are quite subtle. However, the arrival of stopped horns in m. 43, followed two bars later by the main theme transferred to woodwinds (strings have been playing previously), creates more emotional intensity. In general, the nervous character of this movement is much enhanced by the frequent, prominent, changes of timbre. Compare the beginning of the 3rd movement, whose calm character results from remaining entirely within the string choir.

Degree of continuity/contrast of timbre

The degree of timbral change must correspond to the degree of formal contrast required: A major section break requires more orchestral contrast than a new motive within a phrase. Timbre strongly affects the perception of musical form: Too great a contrast will create an inappropriate break in the music; too small a contrast will deprive the music of necessary punctuation. Beginners often misjudge the degree of contrast between successive passages. While it is impossible to grade orchestral contrasts with complete precision, we will provide some guidelines here for gauging the perceived contrast between successive orchestral phrases. However, first an important caveat: Perceived contrast depends not only on timbre, but also other aspects of the music, such as register, articulation, general texture, etc.

To make our task easier, we will here assume the simplest situation: a phrase with only one timbre, e.g. a melody for flute solo. This will allow us to focus on degrees of contrast between timbres. Obviously, the more other the aspects of the music change at the same time, the stronger the perceived contrast will be.

Here is a rough but useful scale of contrast. We will assume two successive phrases, identical in all ways, except for timbre and transposition, to fit the new instrument's range. The scale has five levels, from minimal contrast to maximum contrast. Within each group, differences are not significant. For purposes of this discussion, we will refer to strings, winds, and brass as "families", and flutes, oboes, clarinets, and bassoons, each with their respective auxiliaries, as "sub families". As a general principle, timbres which blend well in chords present little

or no contrast when heard in succession; timbres which do not blend in chords make for stronger contrasts.

Group 1: contrast is imperceptible or very mild

1. Exchange within the same instrument, between different registers, e.g. low flute/high flute (excepting the most extreme registers).
2. Exchange between adjacent members of the string family.
3. Exchange between trumpets/trombones.

Group 2: mild to moderate contrast

1. Exchange within the same sub family of winds, e.g. flute/alto flute, oboe/English horn, etc.
2. Exchange within the same instrument or sub family, but involving extreme registers.
3. Exchange between diverse members of the woodwind family, and in registers which blend well in chords, e.g. clarinets/bassoons in the middle register, flutes/oboes in the higher register.
4. Exchange between certain woodwinds and brass, where simultaneous blend would be good, e.g. bassoons/horns.
5. Exchange between horn/trumpet or horn/trombone.

Group 3: contrast is more marked

1. Exchange between diverse members of the woodwind family, which would not blend well in chords, e.g. low oboe/low flute. Very often these cases involve the oboe.
2. Exchange between woodwind and brass: combinations which do not blend well simultaneously.
3. Exchange between woodwinds and strings.
4. Exchange between brass and strings.

Group 4: contrast attracts more attention than the similarity

The sound is of a completely different nature, e.g. strings arco exchange with strings pizzicato.

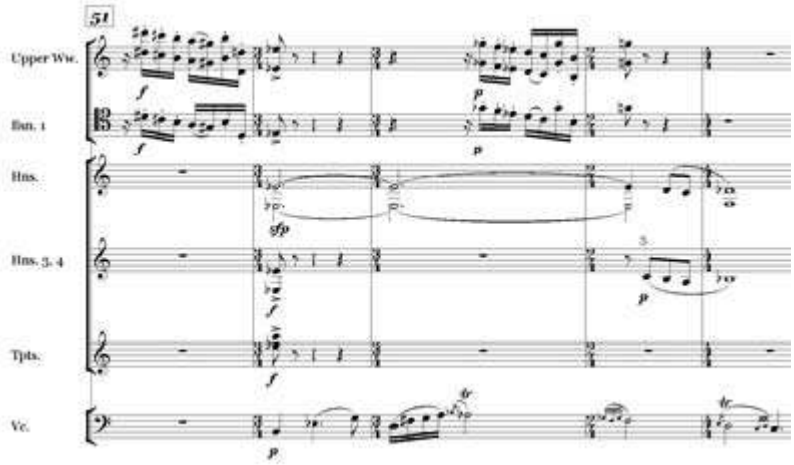
Group 5: contrast is extreme Exchange can only use one aspect of the phrase, e.g. flute vs. snare drum: Only the rhythm can be imitated.

Additional Notes:

- Percussion instruments can be treated as a group of sub families, following the standard classification into woods, metals, skins, pitched and unpitched.
- Pizzicato strings should really be thought of as a kind of pitched percussion.
- In a passage with more than one plane of tone, contrast will be lessened if the background plane remains constant, e.g. a flute phrase repeated by the oboe, where both phrases have identical string accompaniments.
- If the music uses mixed timbres for one element (e.g. a unison melody for oboe and clarinet in unison), the degree of contrast will depend on whether there are common elements between the two mixtures, e.g. oboe + flute in unison will be closer to oboe + clarinet in unison than simply going from oboe alone to clarinet alone. Of course the prominence of the common element(s) is also relevant. Note that extensive use of mixed timbres makes larger formal contrasts harder to effect, since the colors, not being pure, are less distinct.
- A sudden change from very loud to very soft requires special handling. After a fortissimo tutti, the ear requires a moment to adapt to very quiet music; otherwise the first few quiet notes can pass unnoticed. Often in such cases, one or two instruments will be held over from the fortissimo passage for a few beats, to soften the abruptness of the change.

Interpreting the phrasing

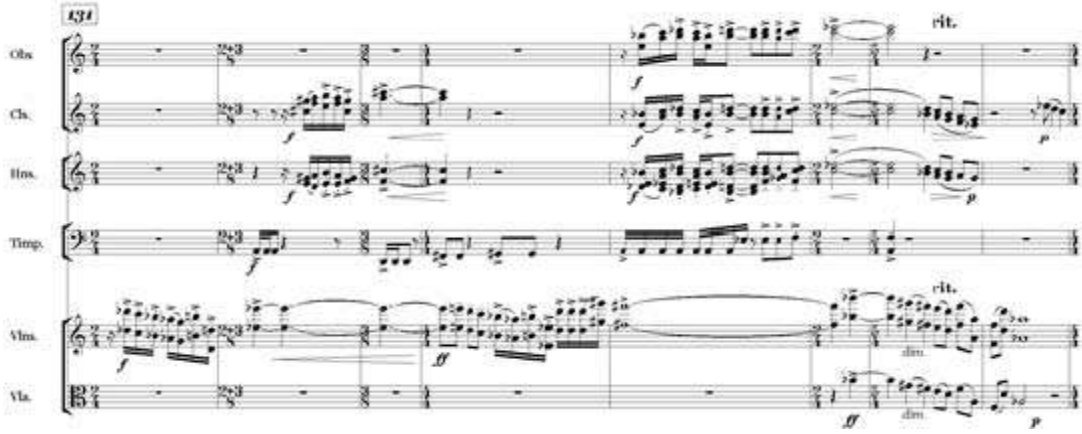
It is possible to enhance the contour of a phrase orchestrally. While the ordinary ebb and flow of the music will be brought out naturally by sensitive players, in cases where the composer feels the need to indicate such dynamic details explicitly, they can also be enhanced by subtly changing the orchestration. The two most common cases are: Accents and highlights: as mentioned above, accents are achieved by momentary additions of one or more instruments, often with percussive attacks (although sometimes just a touch of contrasting color will be sufficient). Normally, what is added should be in the same register as the main line, and proportional to the overall dynamics and character.



Symphony #4, 1st mvt.: The sfp in m. 51 is greatly enhanced by the 8th note attacks in the 3rd and 4th horns, and in the trumpets.

(repertoire example) Beethoven, 7th Symphony, Finale, 2nd theme, m. 74 ff: The sudden accents in the main (string) motive are much enhanced by reinforcement with wind chords.

Crescendi and diminuendi: An orchestral crescendo is achieved by adding instruments in a well graduated order, and a diminuendo by subtracting them. It is especially important not to inadvertently contradict the dynamic evolution of a phrase by doing the opposite, e.g. adding instruments during a diminuendo.



Symphony #4, 1st mvt.: The crescendo is orchestrated by adding high oboes and thickening the horns (m.135). At the climax of the phrase (m. 136), extra accent results from the special sound of the highest register in the horns (Eb), adding an extra octave (violas) to the strings, and the timpani chord in m.137. Note also the removal of the oboes and the thinning in the horns for the subsequent diminuendo.

(repertoire example) Beethoven, 9th Symphony, beginning: The magnificent crescendo is achieved by gradually adding instruments: violin 1, double bass, viola, clarinet, oboe, flute, bassoon, etc.

Orchestration and Dynamics

There is an important distinction to be made between absolute and relative dynamics. Every instrument has some relative dynamic control in every register. However, some instruments, in particular registers, simply cannot achieve certain absolute dynamics. For example, a group of brass playing in their high registers will never be very soft; a low flute can never be extremely loud. The best rule for a beginner is: Orchestrate your dynamics instead of just writing them as textual indications. Especially at dynamic extremes, ensure that the instruments and the registers chosen are conducive to the dynamic level required. As a rough guide, here is a table of what the various families can achieve in *absolute* dynamics.

	ppp	*pp*	*p*	*mf*	*f*	*ff*	*fff*
woodwind	(x)*	x	x	x	x	x	
brass		x	x	x	x	x	x
percussion	x	x	x	x	x	x	x
strings	x	x	x	x	x	x	

(* the clarinet can play whisper soft, provided it is not written too high.)

What is important in this chart is the dynamic extremes. Strings and certain percussion, (tam tam, cymbals, and the lower drums) can start practically inaudibly. For sheer power, nothing has the force and impact of high brass plus percussion.

The notation of dynamics is often problematic for beginners. A good approach is to act as though there are only four dynamic levels: *pp*, *mf*, *f*, and *ff*. First, orchestrate the passage so that the absolute dynamic level desired results naturally from the choice of instruments and registers. Second, think of dynamics as character indications. Choose which dynamic of the above four best suits the passage. Third, avoid the middle dynamics (mp, mf) as starting points: these are what players do when there are no dynamics notated at all. Finally, beginners should avoid writing different dynamics for different instruments; this requires a great deal of experience: Players normally do not see each others' dynamic indications, and normally aim for approximate balance, unless the

conductor specifies otherwise.

Register

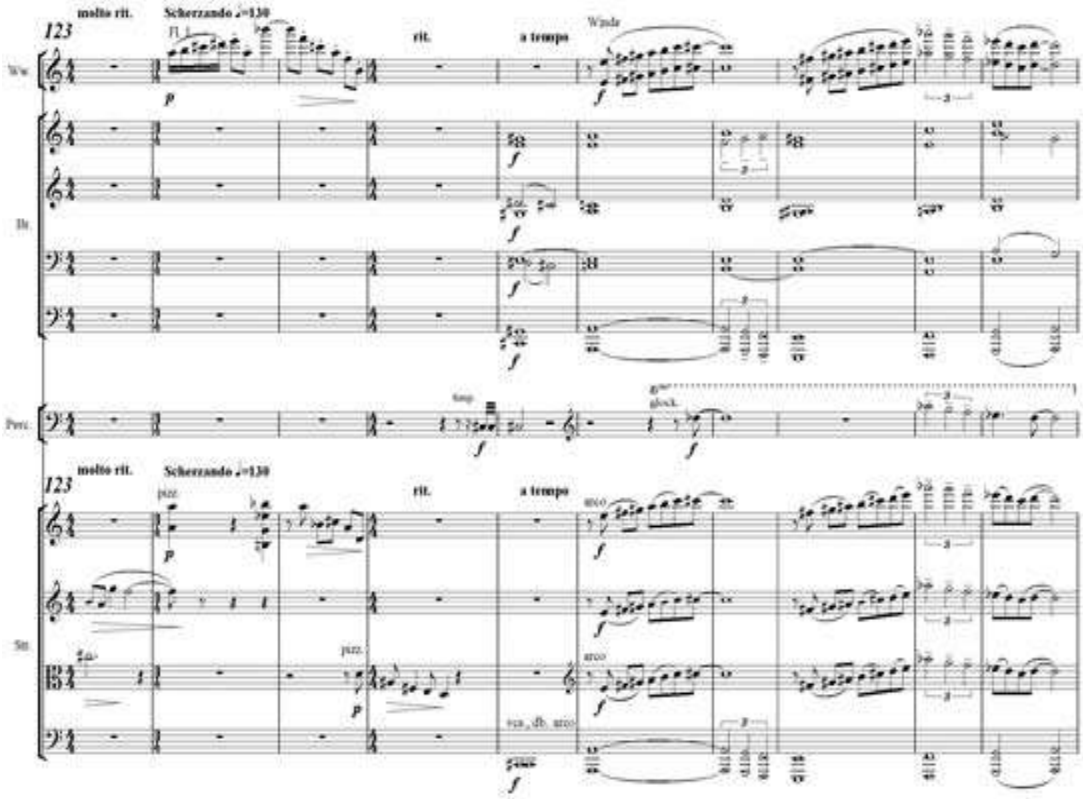
Normal

Register planning is essential to good orchestration, since a change of register is obvious even to a non musician. Most of the time, music is centered in the middle of the range of human hearing (which corresponds to the range of human voices). This is to be expected, because in this register, the human ear easily distinguishes pitch and experiences no strain. If the desired result is a blended sonority, to be perceived as one single plane of tone, the layout of the music within this register normally will follow that of the overtone series: wider in the lower range and more compact getting higher, with no large gaps in the middle such gaps tend to divide the sound mass into separate planes. On the other hand, where differentiation is needed, as in certain types of counterpoint, such gaps may be appropriate.

(repertoire example) Mozart 40th symphony, 2nd movement, beginning: The quiet, calm effect here results in part from the use of middle register strings, normally spaced(after the wide register tutti which finishes the 1st movement). Note how the register becomes higher during the phrase, creating a sense of gradual evolution.

High vs. low sections

It is advisable not to fill the entire audible range all the time: Occasional passages in the higher or the lower range alone provide valuable contrast and relief for the ear.

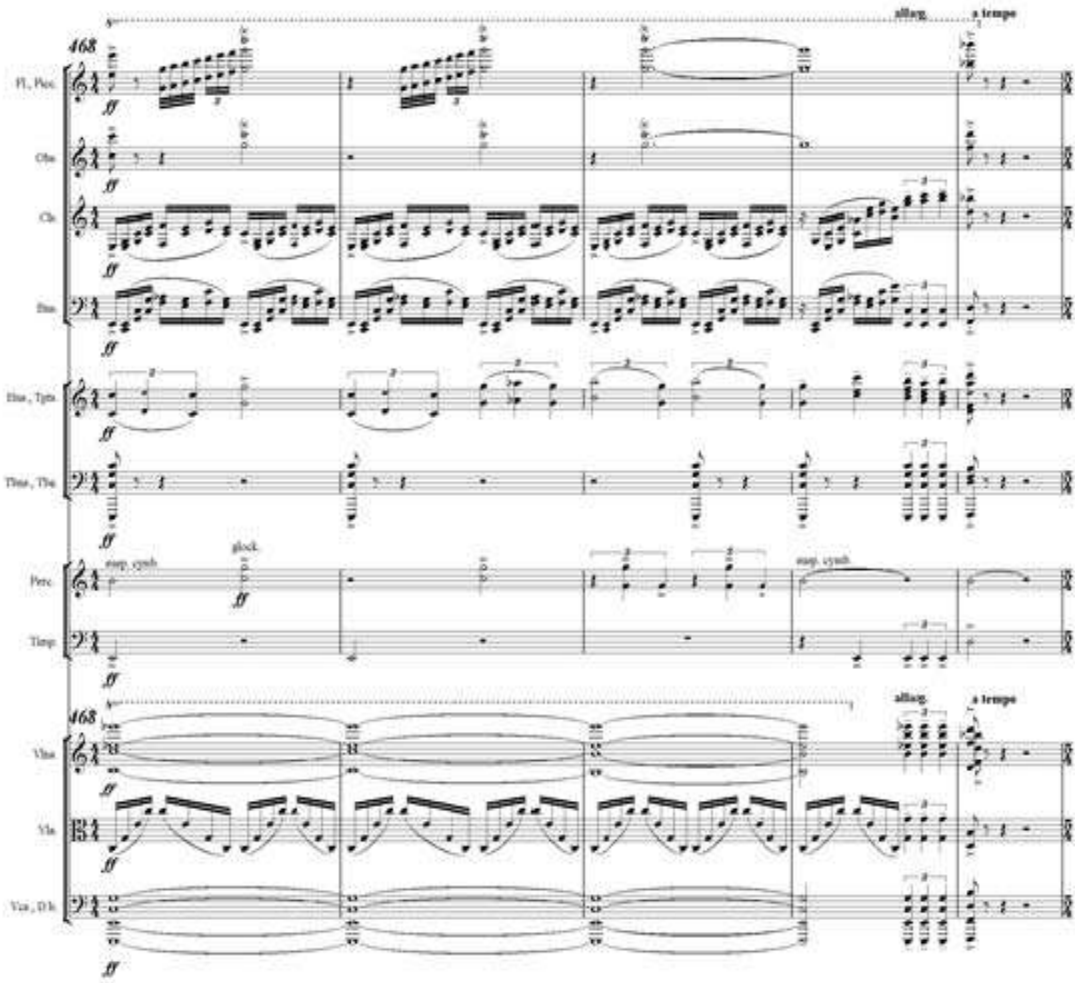


Symphony #8: The light, high passage at the start of this excerpt makes the subsequent massive texture, including low brass, an effective contrast to start a new section.

(repertoire example) Brahms 4th Symphony, 3rd movement, m. 93 ff: Following the normally laid out tutti just preceding, the contrast of low and high chords provides a simple but dramatic contrast.

Extremes

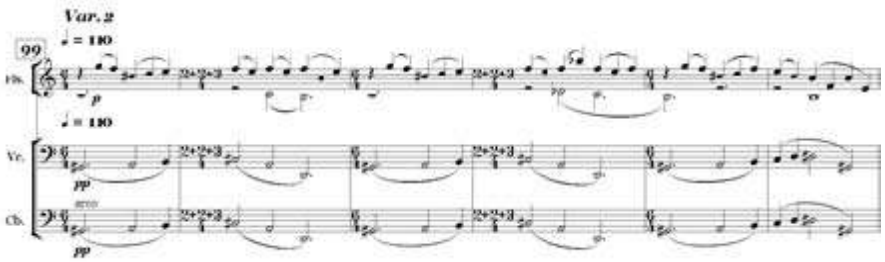
Extreme registers should not be used constantly; they fatigue the ear. It is normal, however, for tutti passages to fill a wide range, with the bottom adding fullness and depth, and the top adding brilliance and power. Note that the number of instruments required at the extremes is considerably smaller than in the middle. For example, even in a large tutti, one piccolo in its highest register will penetrate without difficulty.



Symphony #8: The piccolo in its highest register, and the tuba and double basses in their lowest register, are critical to the climactic impact of this passage. The violins are also at the very top of their range (and indeed require very good players). Note also the trumpets and horns: Although not high in absolute terms, they are very high within these instruments' ranges, creating an effect of intensity and strain.

Hollow Textures

Textures with large gaps can occasionally be quite effective, although the ear tires of this effect rather quickly. This sonority also works better in softer dynamics: Loud passages with holes in the middle tend to sound feeble.

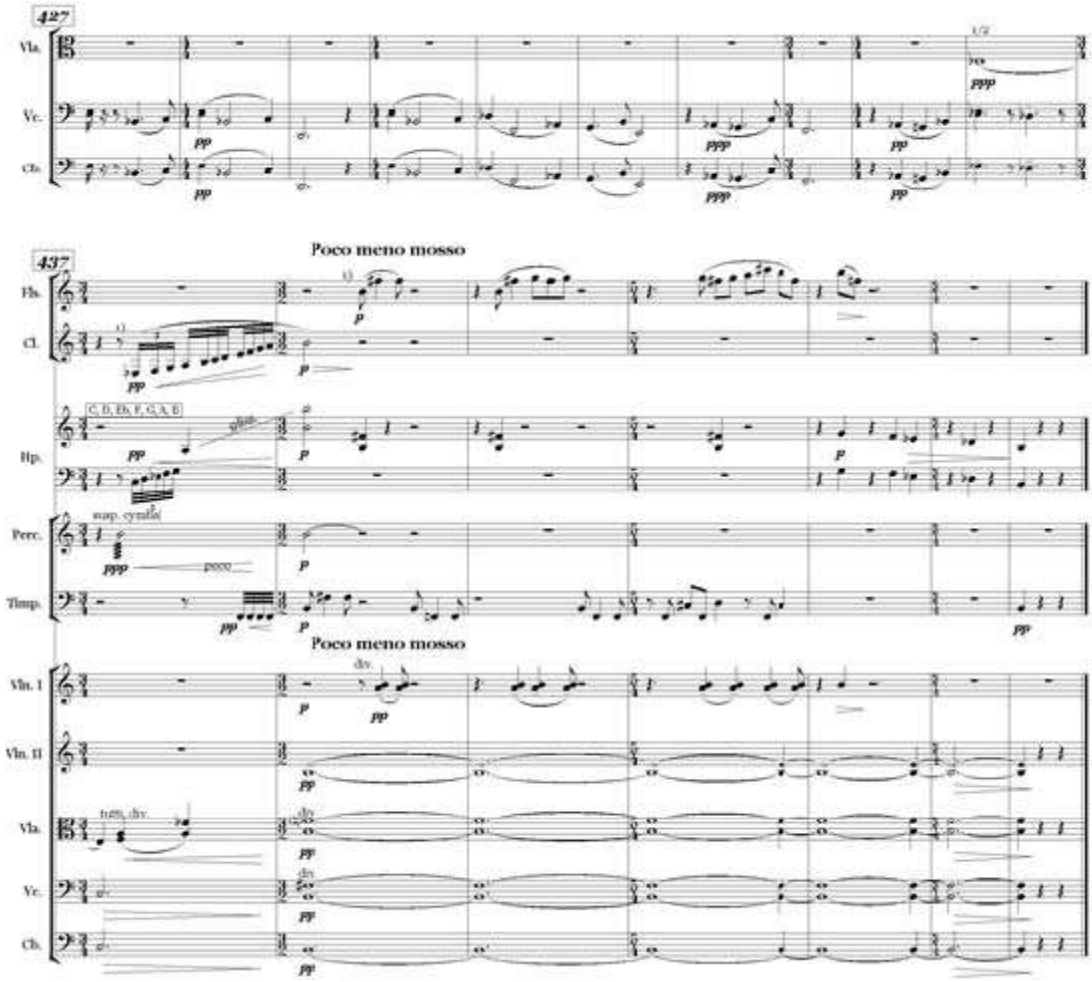


Variations for Orchestra: The empty spacing between the flute(s) and the bass line gives a very distinctive color to this variation.

(repertoire example) Mahler 9th Symphony, 1st movement, m. 382 ff: Extremely widely spaced counterpoint here provides momentary relief from the generally rich orchestral sound.

Registral Progressions

Not all passages stay in one register. Especially when working towards or away from climaxes, often it is effective to create progressions of register, either widening out from the middle in both directions, or else adding more and more high or low material. Such progressions are powerful sources of musical direction.



Variations for Orchestra: After the preceding low passage, the rising harp and clarinet (m. 437) give the impression of pulling aside a curtain to reveal something new. The gentle cymbal crescendo adds a mysterious background.

(repertoire example) Brahms 1st Symphony, 1st movement, m. 293 321: The intensity of this buildup comes in part from the gradual progression from the lower middle range towards the high register, at the climax (m. 320).

Color

Although it will be clear by now that color is not as important an issue in orchestration as is commonly thought, variety of sound, arising from formal and emotional necessity, is of course essential. There are two main principles which make for effective orchestral coloration:

- The color must have the right character.

- Color is less the result of exotic timbres than of novelty in the context of the piece. Even a familiar timbre like an oboe can sound striking and novel, provided it has not been heard for a while. This is why Mozart's orchestration is always so fresh, despite its limited number of colors.

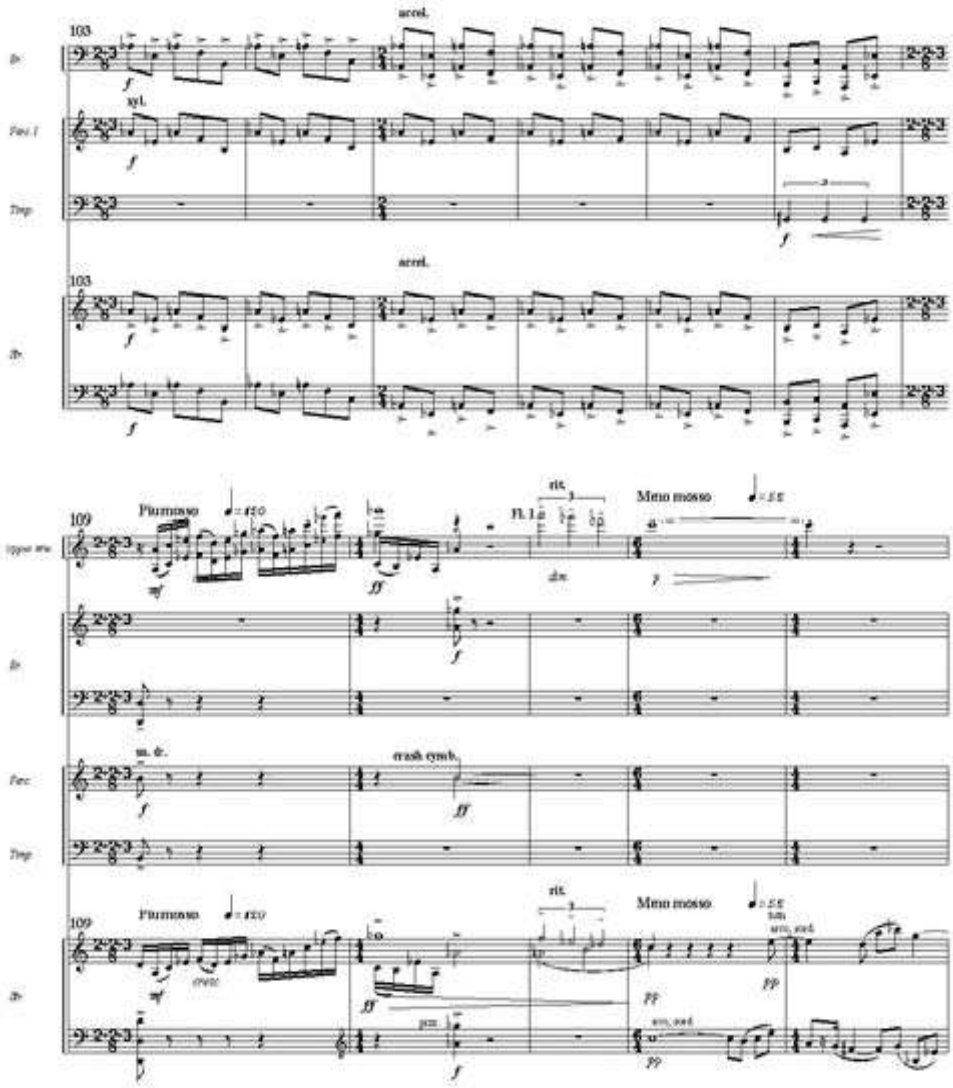
Sustained vs. dry sound

It is often remarked that the orchestra has no sustaining pedal. While this has obvious consequences for transcribing piano music, it also points to an important issue in orchestration in general: Resonance.

Resonance is by definition a part of the background layer. In its literal meaning, it refers to echo, the effect of a "live" room. However, resonance can also be deliberately composed orchestrally, and therefore individualized. Although in the history of orchestration, elaborate planes of background resonance only become the norm with the disappearance of the continuo, Bach (e.g. in various cantatas) already shows sensitivity to the way a long held note can enrich the texture. In fact, he goes even farther, and there are numerous examples of such notes used as points of departure for important lines. This particular way of composing with resonance (others include the lines which dissipate into held notes, and resonance which is intermittent, or which includes some simple rhythmic formula gives way to more refined ways of using sustained sound in the background to enrich the texture.

(repertoire example) Ravel, Valses Nobles et Sentimentales, Epilogue: The background held notes in the strings, set off by gentle harp harmonics, provide a shimmering halo surrounding the main motives in the winds. This conception of the background as delicate vibration is omnipresent in Ravel. Indeed, Ravel's orchestral technique is often most sophisticated in his treatment of such sustained sound in the background.

Although it is not good practice to orchestrate for long without sustained sound, occasional dry passages can be extraordinarily effective. Indeed, the distinction between "dry" (=rhythmic) percussion, and "wet" (=atmospheric) percussion is a useful for composers interested in creating variety of character. This dry/wet distinction translates into the need for variety of articulation (staccato/legato) from a rhythmic and motivic point of view.

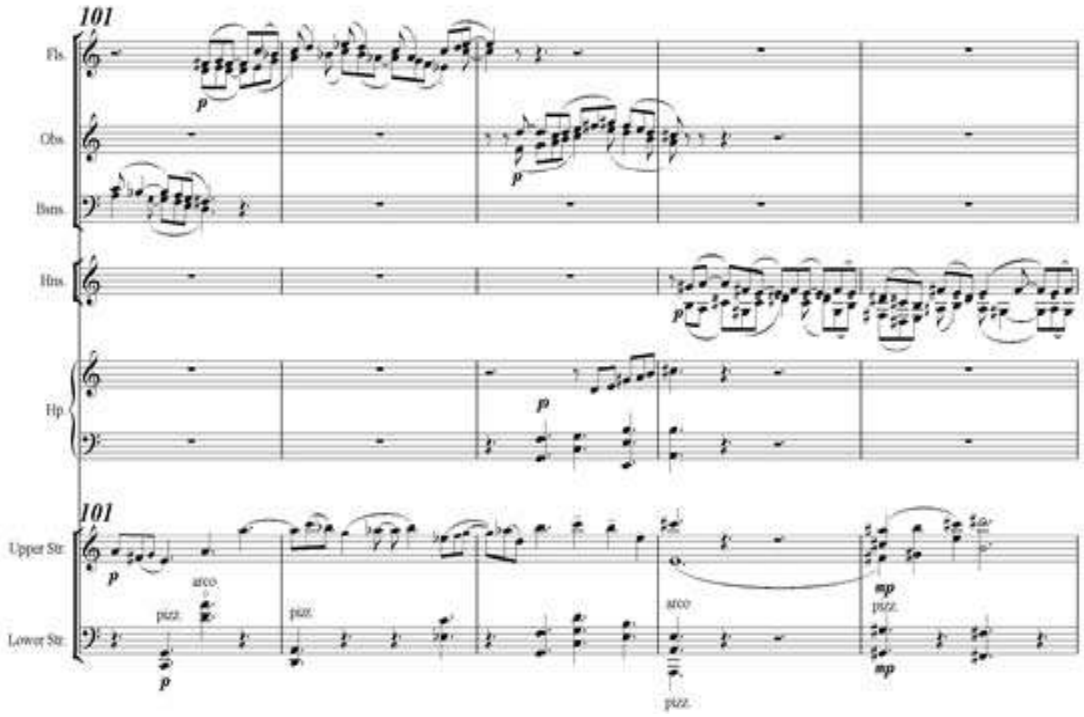


Symphony #3, 1st mvt.: The heavy staccato articulation in m. 103 ff. is broken with the arrival of held notes in m. 110, which introduce a contrasting, legato passage. Note how the former articulation is accompanied by the dry sound of the xylophone, whereas the sustained sounds are introduced by the "wet" cymbal crash.

Fat vs. thin sound; unison doubling.

Koechlin makes a useful distinction between loudness and volume: By "volume" he means the " thickness" of a given sound. For example, at any dynamic level, a horn will always sound thicker, or "fatter", than a violin. Acoustically, thick sounds tend to have stronger fundamentals than thin sounds. Fat sounds occur in the orchestra in two ways: as chosen timbres (e.g. French horn, tuba), and as a result of

unison doublings.



Symphonic Movement #1: Note the much richer, fatter sound when the horns enter in m. 104.

Unison doublings fall into two types: the instruments involved may be the same or different. If they are the same, the change from one to two instruments is more qualitative than quantitative: It adds more volume than loudness. When different timbres are involved, new colors are created, whose success will depend on the character of the resulting sound, and its appropriateness in context. Since overuse of unison doubling is the beginner's most common fault in orchestration, a good elementary rule of thumb is: Do not double at the unison, unless there is a definite need for more volume, or unless the particular color is exactly what is needed for the musical character.

Balance: simultaneous and successive

A related distinction, also discussed by Koechlin, is that between simultaneous balance and successive balance. The former refers to which instruments will dominate within a given combination; the latter refers to balance between successive sounds. This is a problem mainly when passing from very thick sounds to very thin ones: The thin sound can seem disagreeable by comparison with the previous richness, even though, heard in another context, it might not be disturbing

at all. For example, after a loud, full brass passage, an oboe will sound thinner than usual, by contrast.

As to the first type of balance, Rimsky Korsakov lays out many excellent rules of thumb; these need not be repeated here. All other things being equal, (i.e. if the force of the instruments involved is fairly equal), here are some additional guidelines:

- The top line normally attracts the most attention.
- The ear normally follows activity: If, say, in the string choir, all the parts except the viola are static, the movement in the viola will stand out.
- As Koechlin points out, too much activity can distract: Normally strings are ideal for accompanying the voice, but if they are playing vigorous counterpoint they will cover thevoice much more easily than if they have long held notes. In other words, balance is not just a function of the choice of instruments, but also of what they are doing.

Basic Notions, Pt. 2

Musical Lines vs. Instrumental Parts

The orchestra groups many players together. Giving all these players something of interest to do is an important challenge in orchestration. (Strauss, speaking of Wagner, speaks of obtaining the "spiritual participation of the players".) They cannot all constantly play in counterpoint; human hearing quickly tires of such dense textures. On the other hand, orchestration with large amounts of doubling sounds gray and is uninteresting for the players.

This problem leads to a complex relationship between part writing and orchestration, particularly when as is normal, to justify the expense of an orchestra in the first place one tries to use all of the players a fair amount of the time.

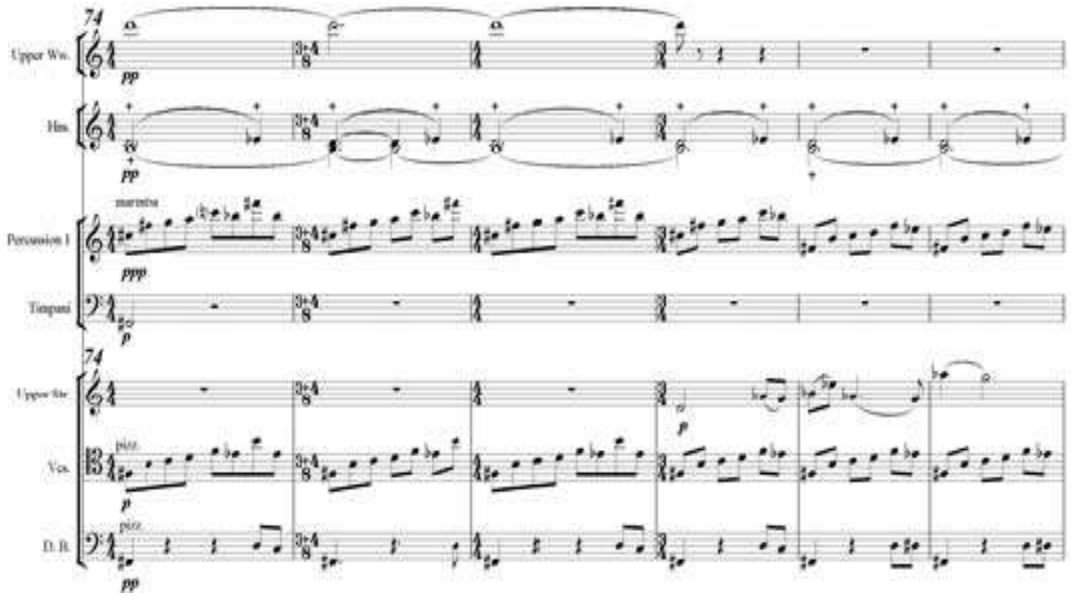
In composing an orchestral piece, most of the time there will be clear leading lines. It is normal to start composing by sketching these leading lines, and gradually fill in more details: If the result is to have audible coherence, it is best to work around what can be heard most easily. However, in the transition from sketch to full orchestration, the conflicting demands of supplying the players with

enough independently interesting material, and keeping the result comprehensible to the listener, require ways of elaborating lines which add detail but do not overburden the ear. Writing for everybody all the time is neither desirable nor practical; most of the time only part of the orchestra is playing. By using varying subgroups within the whole ensemble, the composer can create many intriguing textures. Thus, all the players have a reasonable amount of interesting material to play, and the result is not overly complex.

(repertoire example) Franck, Symphony, 1st movement, m. 171 ff: The passage from strings alone to clarinets plus horns, back to strings, and then to winds again, now without horns, provides welcome relief from the preceding full textures.

The more instruments are playing, the more the composer will use doubling. However, too frequent literal doubling leads to heaviness and a rather gray sound . There are more sophisticated ways to double, which avoid these problems:

- Doubling at intervals other than the unison: Doubling at the octave allows for greater transparency of color, and also fills the musical space in more interesting and varied ways. Occasional doubling at other intervals, especially in the higher octaves, can also create interesting synthetic timbres (like mutation stops on the organ).



Symphony #6, 2nd mvt.: The marimba plays ppp, a twelfth higher than the cellos pizzicato, who are playing p. The marimba is not heard as a distinct line, but

simply colors the timbre of the cellos. (repertoire example) Ravel, Bolero, 3 bars after rehearsal # 8: The horn, playing mf, has the main line here, doubled by higher octaves in the celesta, while two piccolos double respectively at a twelfth and two octaves plus a major third higher. This is very similar to a common organ combination (the "cornet"), which gives a rich, piercing sound.

- Heterophony: Rather than literal doubling, each doubled part can be an ornamental variation on the same basic contour. This keeps the overall design clear, but allows for individuality.

(repertoire example) Mozart, The Marriage of Figaro, Overture, m. 150 ff: Although upper winds and strings follow the same outline here, the differences of detail between them keep the orchestration light and transparent, even in a tutti.

- Doubling which becomes counterpoint and vice versa: Doubling need not stay consistent through a phrase or section. In particular, an instrument can begin a phrase as a doubling, and at some musically meaningful point a change of motive, a climax, a cadence become more contrapuntal, or vice versa.

(repertoire example) Mendelssohn, 4th Symphony, 1st movement, m. 140 145: Oboe 1 goes from simply doubling the main line in the strings (together with other woodwind) to supplying a subtle background counterpoint.

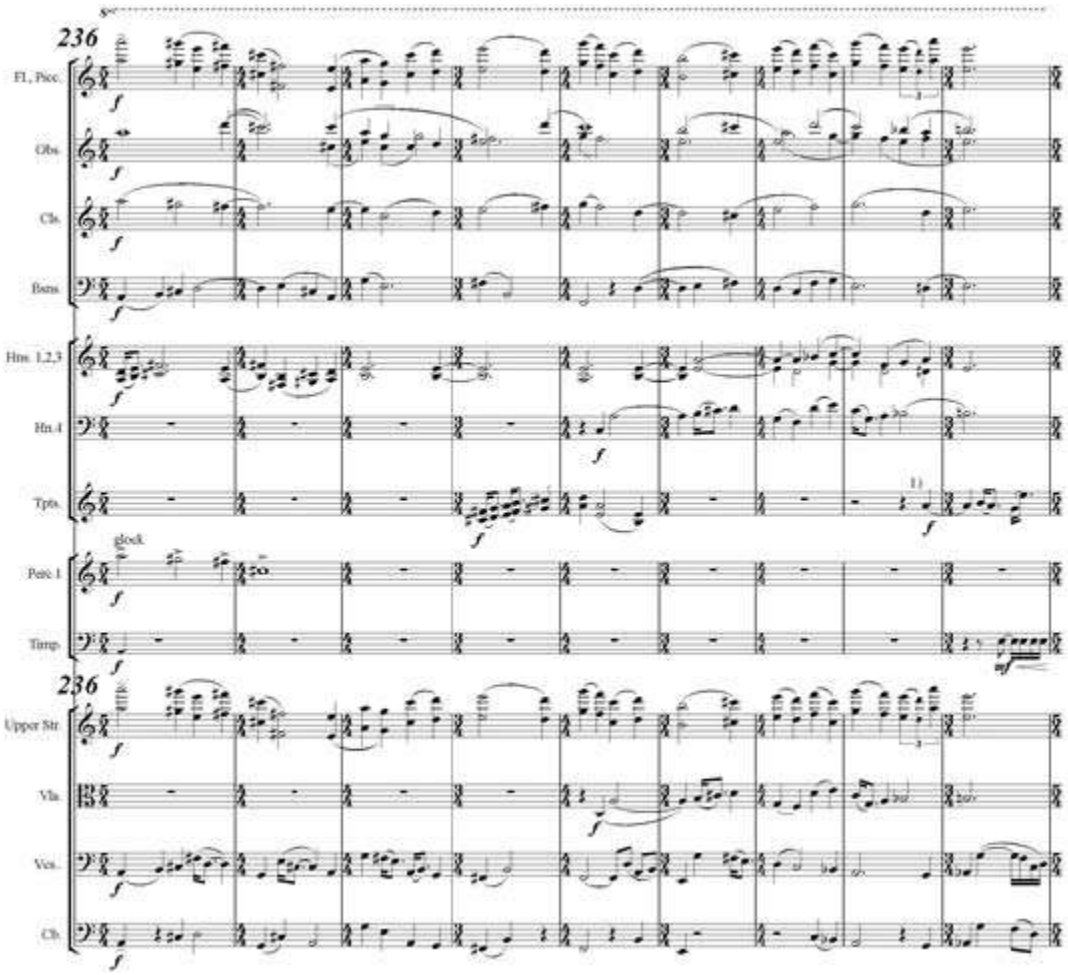
- Piece meal doubling of several other lines: Doubling may move between various lines, thus creating new lines, which do not, however, add significant polyphony to the texture.

(repertoire example) Mahler, 9th symphony, 1st movement, m. 365 ff: The first horn starts as an inner counterpoint, then doubles the cello (m. 368), and then moves on to double the 1st trombone (m. 369).

- Partial doubling: Doubling may be partial, i.e. only of a few main motives in the phrase, just the beginning, or just the end of the phrase. In other words, one doubles only highlights. The doubling can then drop out, or become background resonance, settling down on a held note. The opposite (a held note becomes a doubling) is also possible.

(repertoire example) Mahler, 4th Symphony, 1st movement, m. 318: Here flutes 3 and 4 abruptly stop doubling the first violins reinforcing the sudden dynamic change crescendo into a "p" in the latter.

By individualizing doublings in these ways creating a sort of pseudo counterpoint rather than simply duplicating lines mechanically the overall effect gains in subtlety and nuance. The players' parts are also more individual and interesting to play.



Symphonic Movement #1: This example illustrates several of the above techniques. The double basses have a simplified version of the main bass line (heterophony), and they drop out momentarily in m. 241 2; the glockenspiel doubles only the beginning of the main melody line, which is played by violins and flute/piccolo; oboes 1 and 2 alternate between heterophonically doubling the melody and real counterpoint; the clarinets have a simplified version of the melody. The overall result is a texture which is rich, but not heavy.

Planes of Tone

By "plane of tone" (D. F. Tovey’s term) we refer to one instrument, or a blended

group of instruments, not necessarily from the same family, sharing one rhythmic outline. A plane may consist of one line or a textural mass. Simultaneous planes of tone are differentiated by perceptual prominence: Planes can be more or less equal, as in vigorous counterpoint, or they can fall into foreground (main lines) and various levels of background: secondary contrapuntal lines; figurations to add animation; harmonic masses; resonance.

As we have already mentioned, the listener cannot pay equal attention to several musical strands for any length of time. Even in contrapuntal music, the ear jumps from one part to another rather than following all the parts continuously. Therefore, the composer must have a clear idea of the role each plane of tone in the texture; otherwise, confusion will result.

By definition, a plane of tone is a blended mass. Within a plane of tone, blend is achieved by similarity of timbre and rhythm, close spacing (no large gaps), and balance (all elements fairly equal in force). If there are disparate timbres, as in the woodwind, special strategies, such as close overlapping, are required to trick the ear into accepting the result as a unified whole.

(repertoire example) Tchaikovsky 5th Symphony, 1st movement., m. 411 ff: Here clarinets and oboes are interlocked for better blend, in a standard classical technique.

Between planes of tone, clear differentiation is essential. This is achieved by contrast of register, timbre, and/or rhythm.

(repertoire example) Beethoven 6th Symphony, 1st movement, m. 97 ff: Here the theme stands out in the upper winds, while the strings accompany below.

Planes of tone may be organized as equals (usually successively, as in a dialogue), or hierarchically.

In the case of a dialogue between equals, the planes must be similar both in loudness and in volume ("thickness"). Contrast comes from color, register, and rhythm.

(repertoire example) Brahms 4th Symphony, Finale, m. 81 ff: Quiet chords in the strings alternate with chords in six woodwinds. Had the strings been louder, the woodwinds would have benefited from the addition of horns, for adequate volume.

In the case of hierarchical planes, each plane will have its own distinct characteristics, according to its perceptual prominence. Although multiple

foreground planes are not possible, multiples background planes can coexist.

Foreground

The foreground must stand out from the other elements. Therefore it is usually louder, in a timbre with a strongly characteristic color, and prominently placed (e.g. on top). Examples of this common situation abound.

Background

Background planes can be divided into two basic types: movement and resonance.

Movement

Movement in sound is the essence of music. In counterpoint, in harmony, and indeed, in all music, control of movement is critical. Orchestration brings another dimension to the issue of movement: As the number of instruments increases, if all the instruments are moving on the same rhythmic plane, the effect becomes more and more ponderous. Thus the need, even in a homophonic tutti of any length, for at least mild rhythmic differentiation between parts and families.

A more interesting situation, and one which uses the orchestra's masses as an advantage rather than a weakness, is to supply background figuration, in a secondary plane of tone. Such movement animates the texture, lightens it, and provides shading, making the overall design more subtle. Many of the greatest feats of orchestration can be found in such situations, creating powerfully evocative atmospheres: Think of the start of Ravel's *Daphnis and Chloé*, Wagner's *Ride of the Valkyrie*, and so forth. There are four basic types of orchestral movement, which can be applied simply or enhanced with contrapuntal touches neighbor and passing notes, suspensions, etc.

- Trills/tremolos:

(repertoire example) Wagner, Die Walkure, 3rd act, beginning: The "riding" theme is accompanied by trills in the winds, which add energy and momentum.

- Repeated Notes:

(repertoire example) Beethoven 5th Symphony, 2nd movement., m. 205 (coda): The theme in the bassoon is accompanied by repeated chords (alternating with rests,

which reinforce the tentative character) in the strings.

- Scales:

(repertoire example) Wagner, Die Meistersinger, Overture, m. 42, ff: The scales in the strings (note the simplified bass part) add vitality to the majestic, chordal theme in the winds.

- Arpeggiation:

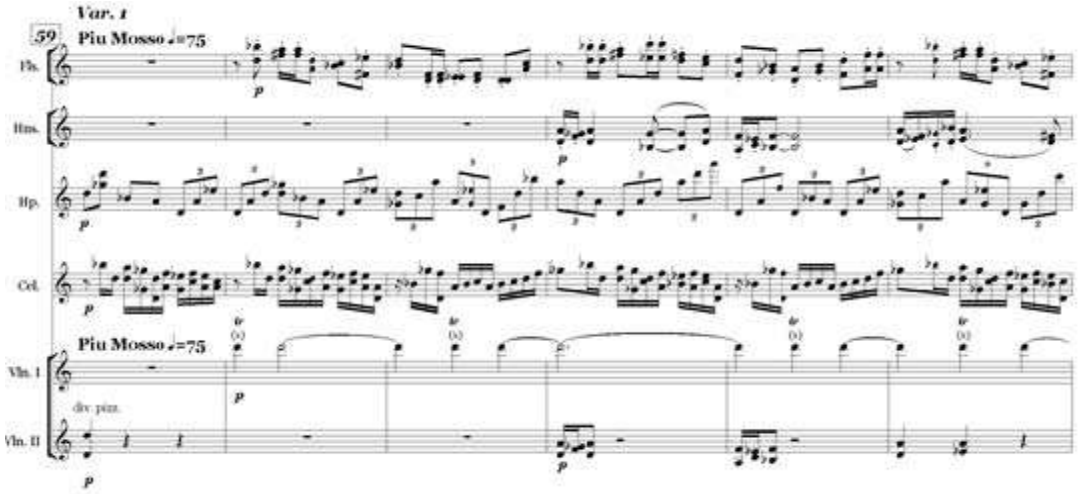
(repertoire example) Brahms 3rd Symphony, 3rd movement, beginning: A beautiful string accompaniment emerges from the combination of rocking arpeggio figures in the strings.

To be successful, these kinds of movement (as opposed to full fledged, foreground counterpoint), must not attract too much attention on their own. They must be clearly set off in a weaker plane of tone. They are usually limited to one or two mildly varied motives, with a high degree of consistency, and do not involve too many varied timbres. Often the accompaniment is lightened with rests.

Quick orchestral movement can also be used to reinforce musical direction: Rising and falling passages can be greatly enhanced by fast runs or scales, in winds or strings, harp glissandi, etc., in the basic direction of the passage, Such movement often takes slightly different forms in different instruments, so as to create general momentum rather than one thickly doubled line.

(repertoire example) Strauss, Die Frau Ohne Schatten; 1st act, rehearsal #6: A wispy image of a rising shadow is created by using several different rising figures simultaneously (combined with held notes for resonance).

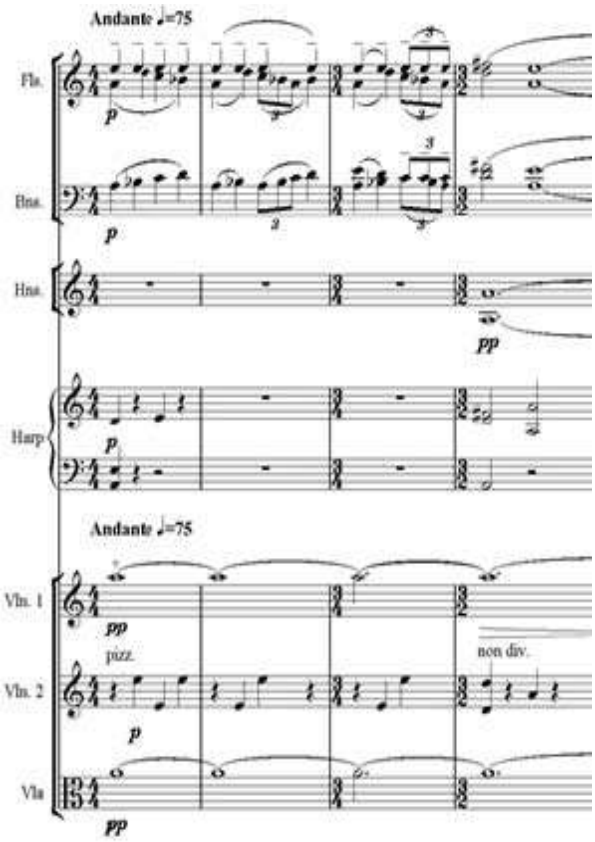
These various types of movement can also be combined:



Variations for Orchestra: Harp and celesta play arpeggiated filigree work, with occasional non harmonic tones, while the flutes cover the same harmony with repeated chords. The 1st violins add yet more animation with regular trills. All this serves as a rich background to the main line, in the horns.

Resonance

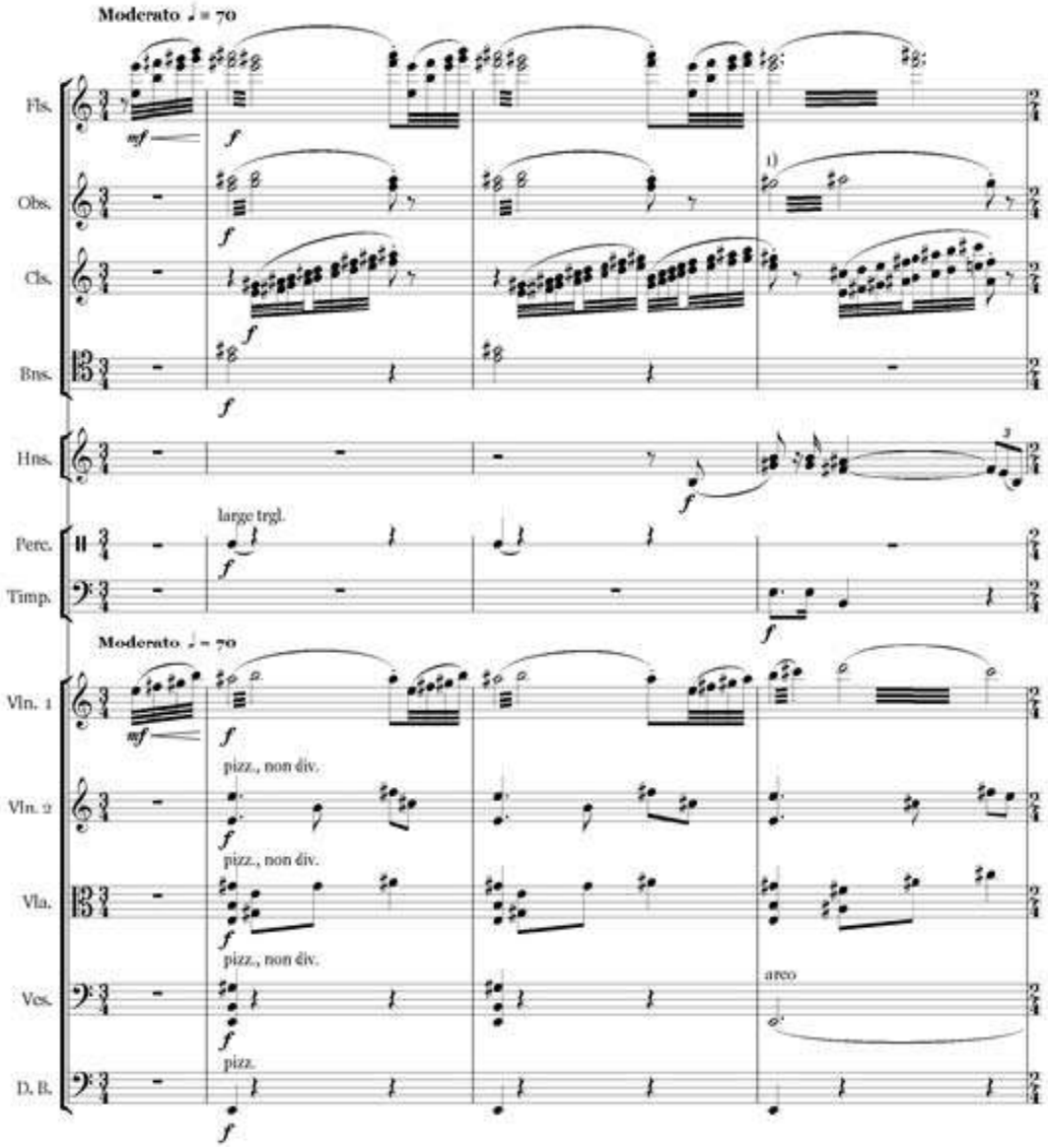
Resonance, the quietest of all planes, should not be noticed on its own. Therefore it is characterized by the softest timbres, the dullest registers, and the least activity. Also, resonance is usually in the same register as the foreground, so as not to draw attention to itself as something apart.



Symphony #8 (beginning): Delicate held notes in violins (harmonics) and violas provide mysterious background resonance for the main idea, which is presented in the flutes and bassoons.

(repertoire example) Mozart Symphony #41, 1st movement, m. 94 ff: The quiet held note in the oboe provides a subtle but poignant background resonance for the string theme.

Often, for richness, background planes are composed of multiple elements. Indeed, one sign of a master orchestrator is the refinement and depth of his orchestral backgrounds. Of course the various elements must compliment each other, and not confuse the listener: Rests and intermittent motives help to space out details, while maintaining clarity.


Moderato ♩ = 70
Fls.
Obs.
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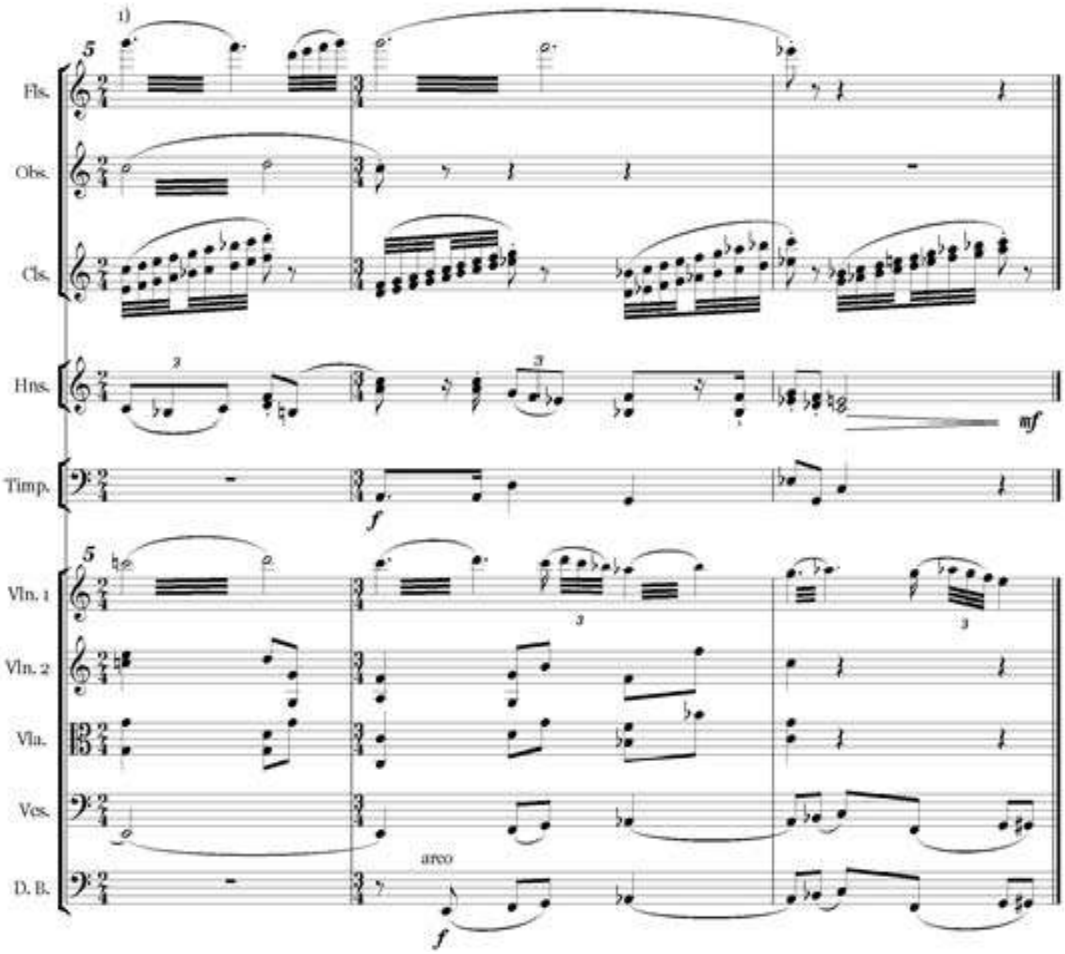


Night Passages: Energy and lightness result from high trills in woodwind and violins, combined with rising scales in the clarinets, which contribute momentum. Bassoons supply intermittent, gentle resonance in the middle register. The first two bars are each set off by a pizzicato chord and a triangle stroke. The pizzicato violas and 2nd violins are arranged as a dialogue. The arrival of the main line in the horns is marked by timpani, doubling the horns' initial rhythm. These many details are arranged in repeating patterns, separated in register, and spaced out by rests, to keep them clear.

Contrapuntal Orchestration

The main difficulties in orchestrating counterpoint are:

- Achieving balance between the lines. Assuming all the lines are of equal importance, the simplest strategy is to give all the lines to the same family,

or, if a thicker sound is appropriate, families: Each line is doubled by a similar combination of instruments.

- Assigning the various contrapuntal lines to different colors (pure or doubled) requires that the colors chosen be equal in loudness and in volume. This latter method can be tiring to the ear and is best used for short passages. It is more appropriate for stratified counterpoint (see our book on counterpoint) than for consistent imitative counterpoint.

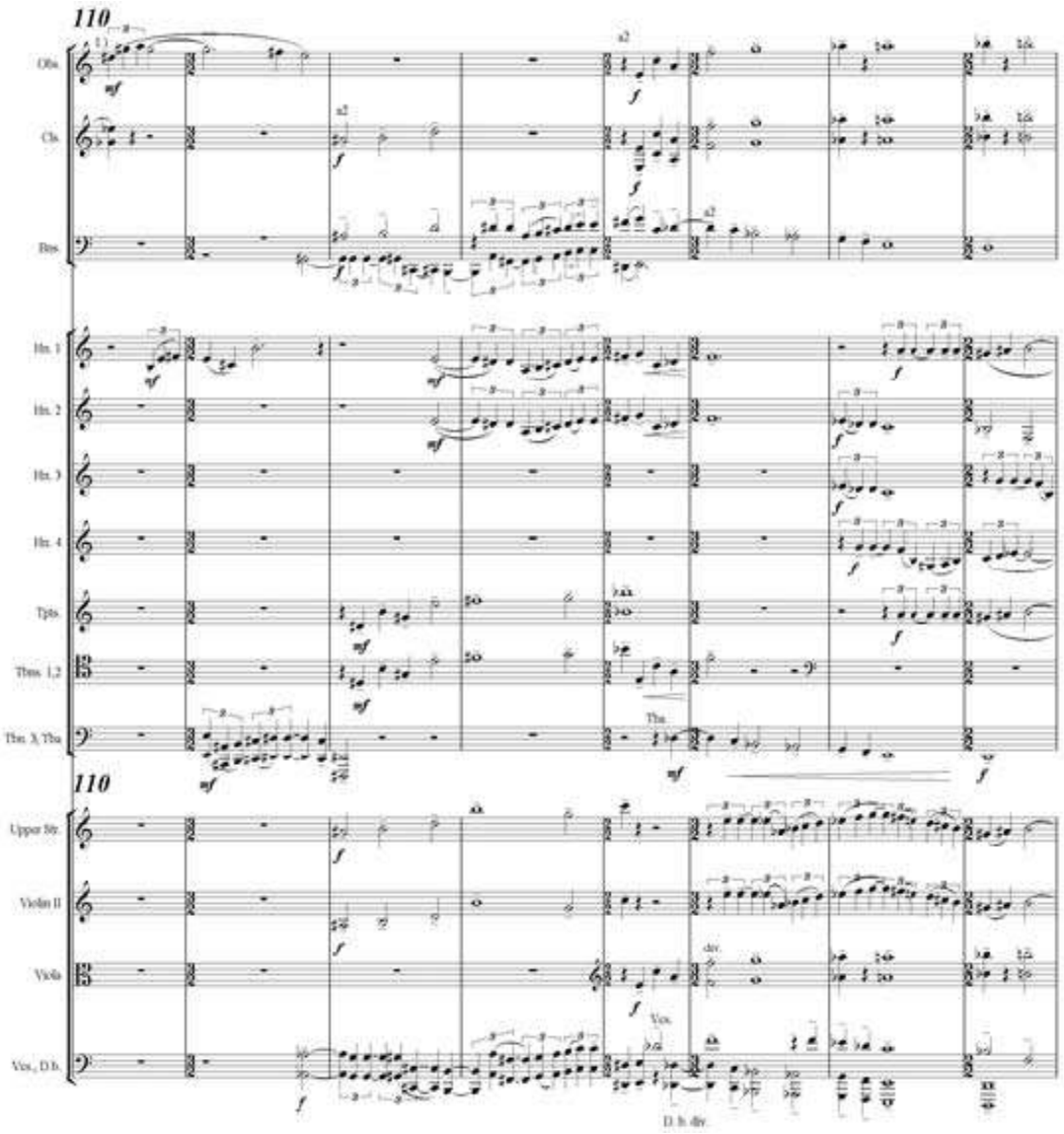
(repertoire example) Beethoven 7th Symphony, 2nd movement, m. 185 ff: All the counterpoint is in the strings. (repertoire example) Mahler, 5th Symphony, Finale, rehearsal #3: The contrasting themes are assigned to massed strings and massed upper woodwind. Note the violin trill, which adds extra animation.

- Marking entries. In counterpoint with frequent imitative entries, it is sometimes effective to treat the beginning of an important entry as an accent, orchestrally enhancing the first few notes in some way.

(repertoire example) Mahler, 5th Symphony, Finale, m. 136: Doubling the first few notes of the strings with the horn (in a luminous register) helps mark the beginning of a new section.

- Integrating the overall result into a coherent whole, and avoiding dryness. The Baroque basso continuo is (in part) a response to the need to bring contrapuntal textures into coherent wholes. While short contrapuntal passages in closely related timbres may occasionally be presented "as is", it is usually a good idea either to add a complete harmonic plane of tone in the background, covering the middle register in particular, or to leave sustained "trailers" (held notes at the end of a phrase) behind the main lines from time to time. This helps avoid overly dry textures, and also mitigates aural fatigue.

(repertoire example) Mahler, 5th Symphony, 3rd movement, m. 799: The vigorous, tutti counterpoint is drawn into a rich whole by the sustained trombone chords. Symphony #6, 1st movement: Almost all of the lines are doubled by rich, mixed timbres. Most of the doubling instruments change roles at key points in their phrases, either to double a different line (e.g. Bn. 1, m. 112 113), or to stop, having emphasized an entry (e.g. Tbns. m. 114 115). Sometimes they leave behind a sustained note (e.g. Hns. m. 115), thereby avoiding dryness.



The tutti

One can speak of a tutti when at least three of the four orchestral families are present. Since the number of instruments in such a grouping will inevitably exceed the number of audibly distinguishable real parts, the challenge of writing a tutti is to create a coherent, rich whole, where all the elements contribute something meaningful.

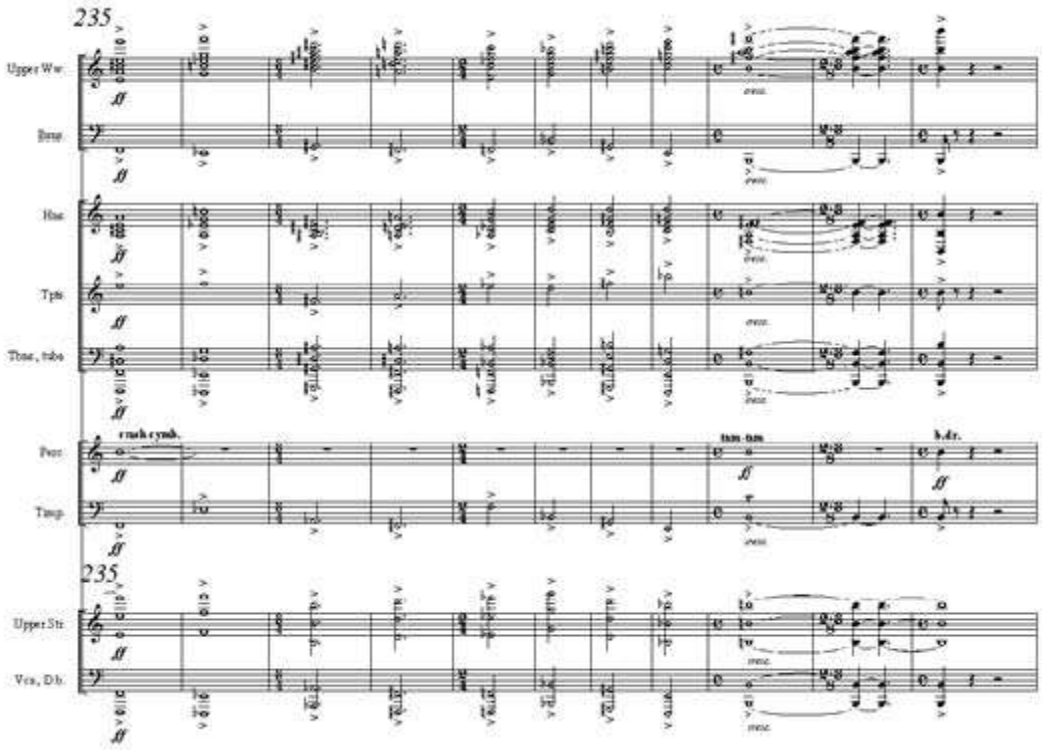
The acoustical realities of orchestral balance limit the number of ways a tutti can be organized. Brass and percussion are by nature the loudest sounds, and certain combinations (e.g. putting the woodwind in the middle register when the full

brass is playing loudly) simply cannot work. Thus we reach the paradoxical conclusion that the more instruments are playing, the less ways there are to combine them. Many contemporary composers are led by this fact to write for the orchestra as a collection of chamber groups; at times this approach is enhanced by unusual spatial setups, which can create interesting stereo effects. However, it seems to me that if one writes for orchestra, all the instruments should play together at least some of the time.

Usually tutti passages are loud, but the occasional soft tutti (for example in the first movement of Beethoven's 9th Symphony, m. 469 ff) can be very effective; the sound has something menacing about it, like a great power restrained.

The main ways of organizing a tutti are:

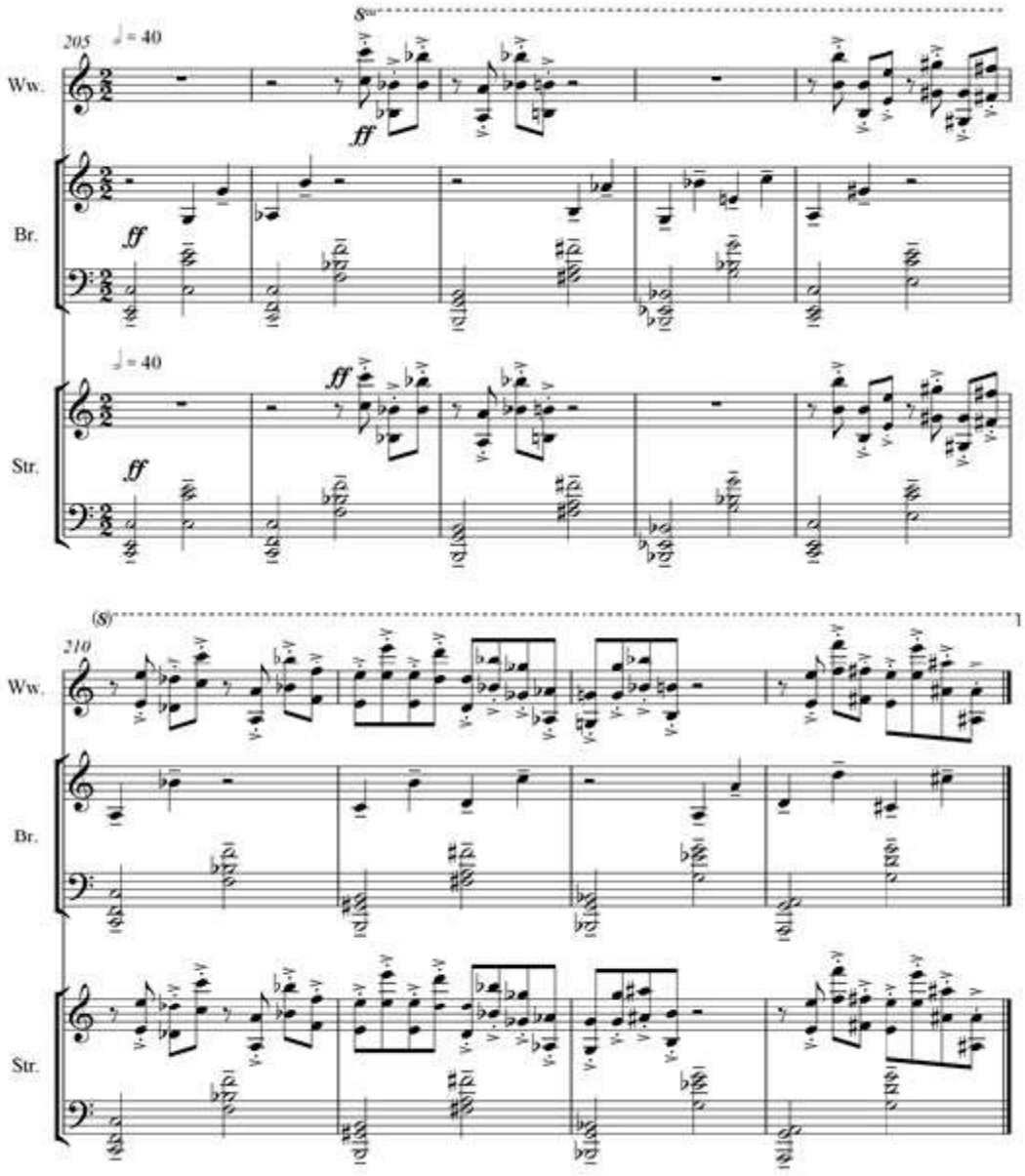
- Each family is complete in itself, but the details and part writing are independent. This is the most common method; it gives a rich sound, without grayness. (Sometimes winds and, more rarely, strings, are left empty in the middle register when a large brass section is very fully scored; they would not in any case be audible in this register over the brass.) The overall harmonic unity guarantees coherence, and the differences between the families create richness of color.



Symphony #5, finale: Strings play the outer parts in octaves. The bass is doubled in the bassoons, and also in the timpani (with a few octave displacements), while the upper woodwinds fill out the harmony above the horns. Note that the trumpets and the highest woodwind have lines which are not the same as the string melody: This arrangement gives a richer result than literal doubling. Trombones and horns have full harmony, in the middle/low register. Cymbals, tam tam, and bass drum mark important accents.

(repertoire example) Wagner, Die Meistersinger, Prelude, beginning: Each family has independent partwriting. Although the winds start off doubling the main melody in the violins, by m. 7 they are already adding details of their own.

- Each musical element is given to a distinct family, or combination of families. This method has the advantage of bringing out each musical element clearly, differentiating it from the others through timbre.



Symphony #6, finale: While the brass play an important harmonic motive, along with its diminution, strings and winds move more quickly and nervously in eighth notes. This doubling is necessary to ensure that this idea will penetrate the brass chords.

(repertoire example) Tchaikovsky, 5th Symphony, Finale, m.474 ff: While strings play the main melody in octaves, horns and winds provide two important contrapuntal accompaniments. The repeated note accompaniment is in lower brass plus double basses.

The third method is simply to literally double all the parts in each family. While

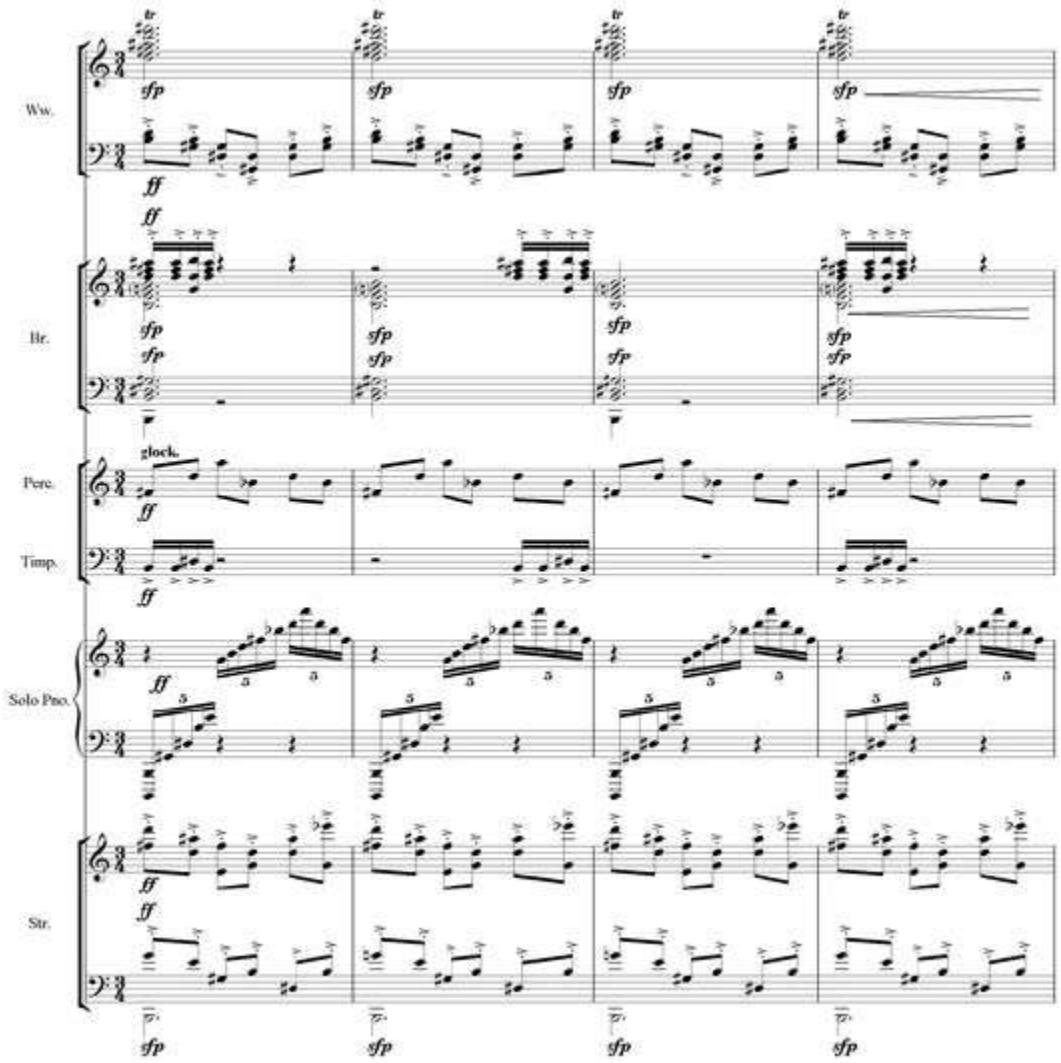
occasionally suitable for short, vigorous passages, this method usually sounds heavy and gray.

Orchestral Accompaniment

When used as accompaniment for a vocal or instrumental soloist, the main problem is how make full use of the orchestra, while not drowning out the soloist. If the orchestra is too often reduced to discrete murmuring in the background, the overall effect will be feeble.

The basic principles for using the orchestra as accompaniment are as follows:

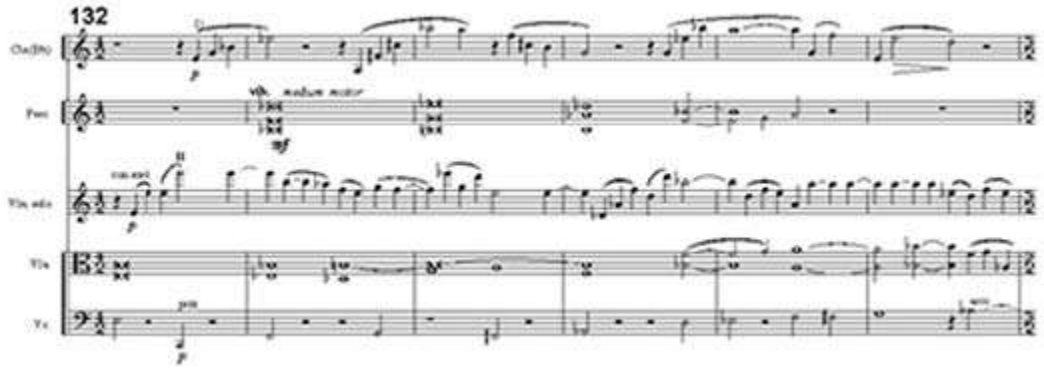
- Bring out the soloist as much as possible by contrast, whether of timbre (e.g. violin solo vs. woodwind), of register (e.g. accompany a cello solo with only upper strings), or of rhythm (e.g. make the solo line more active than the accompaniment).



Piano Concerto: The piano has the fastest note values, and its runs cover the entire range of the orchestra. While not strong enough to dominate here, the piano's sheer intensity of activity gives it sufficient prominence. The sfp dynamics of the held notes in the orchestra help to let the piano through. (repertoire example)

Beethoven, Violin Concerto, 1st movement, m. 102 ff: a small wind ensemble accompanies the (very high) violin.

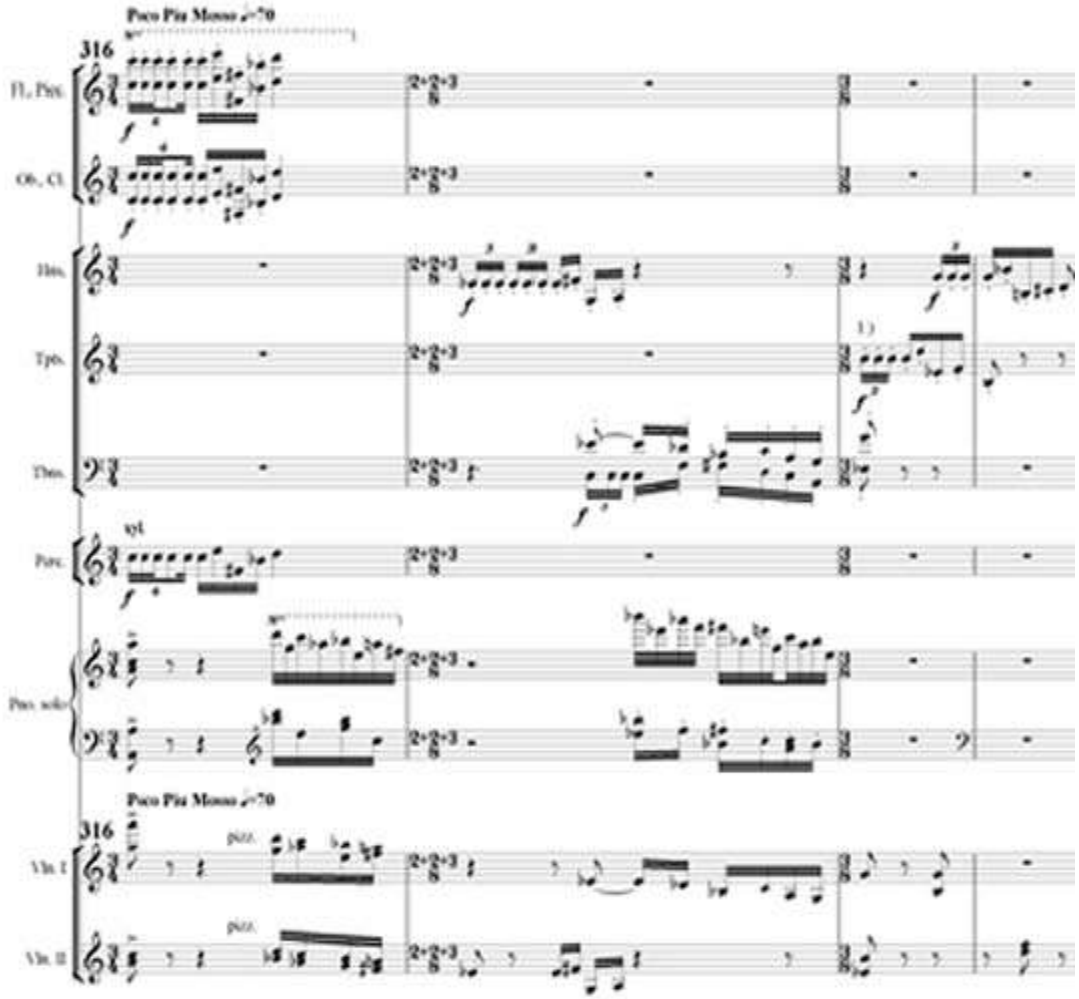
- Lighten the orchestra by aerating the texture with frequent rests, plucked or staccato basses. Limit held notes in the accompaniment to dull or weak registers.



Violin Concerto: The soloist easily emerges here. The sustained harmony in the violas is in a different, subdued register; the chords in the vibraphone do not sustain, and are placed lower than the soloist. The clarinet counterpoint, while in the same register as the solo violin, is contrasting in color, and punctuated by rests. The bass is very light: cello pizzicato.

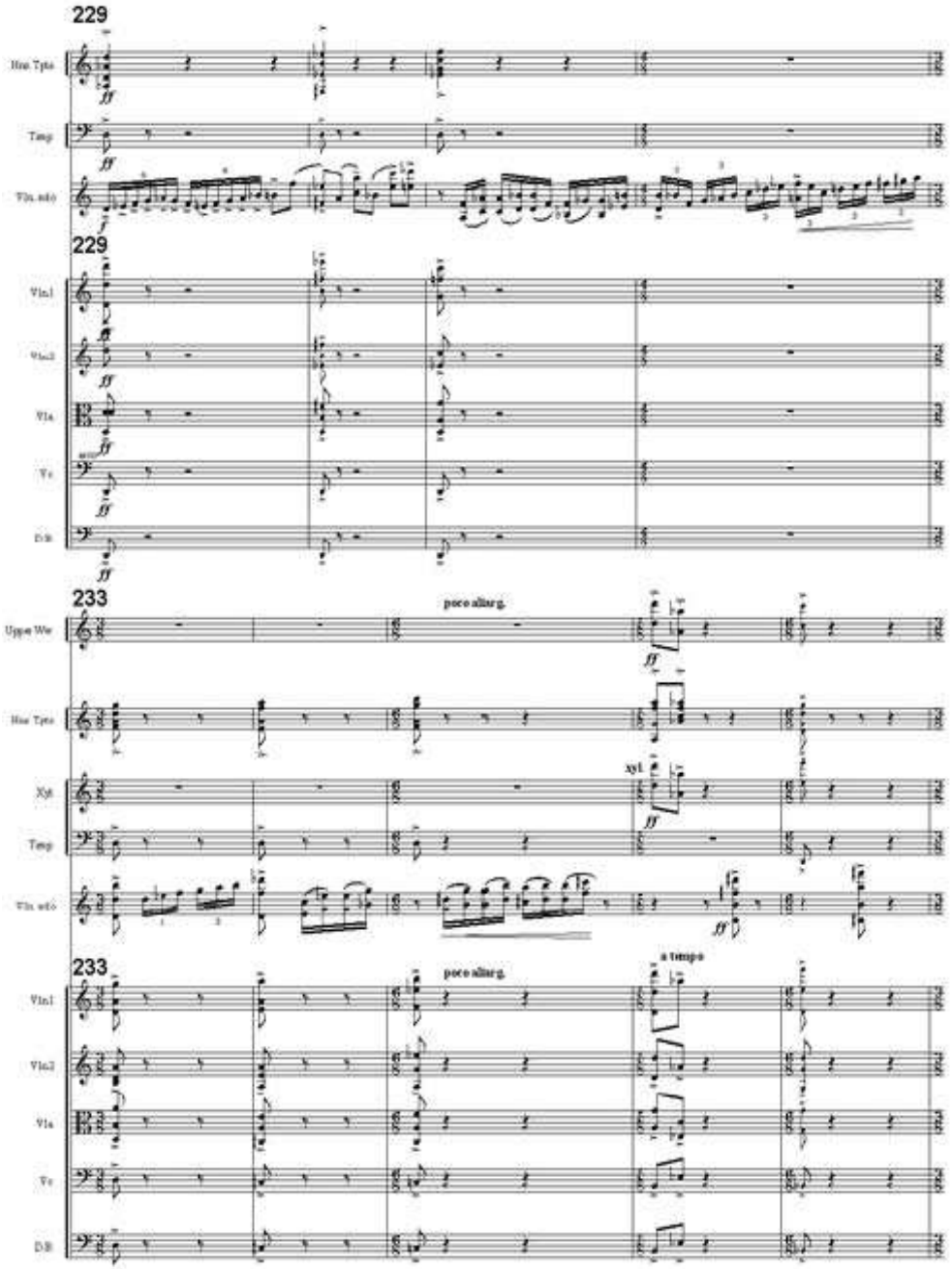
(repertoire example) Prokofiev, 2nd Violin Concerto, 1st movement, m. 171 ff: Note the short rests in the wind and in the lower string motives, as well as the other strings, which play pizzicato.

- Keep the relationship between orchestra and soloist varied and fluid: Sometimes use dialogue, sometimes have each accompany the other.



Piano Concerto: The soloist first has a dialogue with upper wind and xylophone. However, the second time, the brass continues with counterpoint during the soloist's phrase. Pizzicato sharpens the piano's attacks in m. 316, and adds energy to the brass counterpoint which follows.

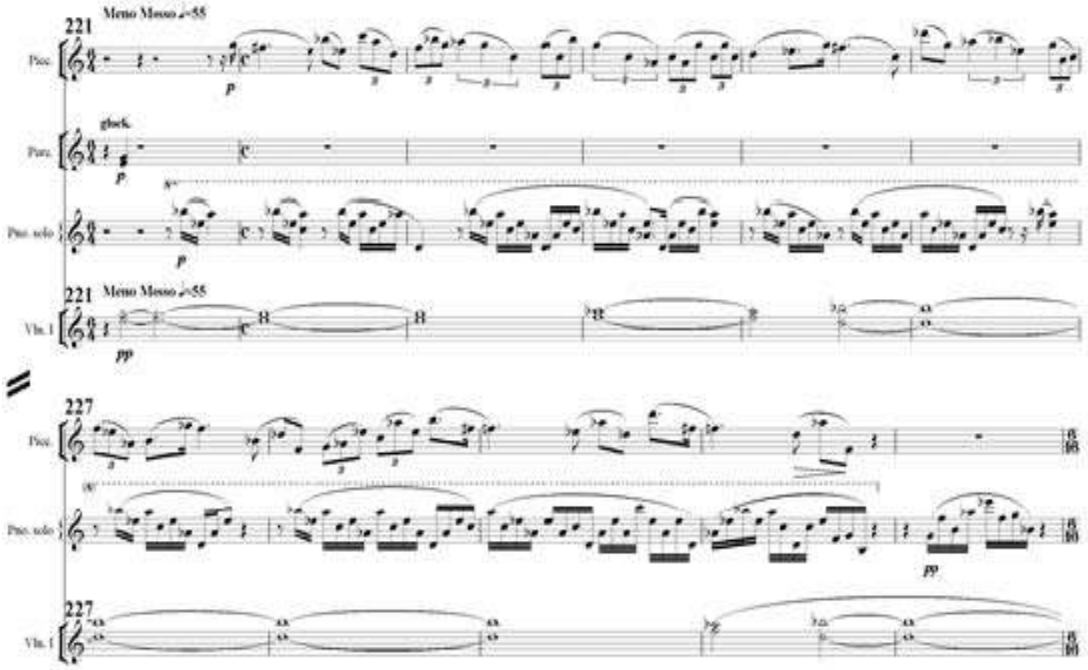
- When great force is required, present the soloist in alternation with the orchestra: This gives the illusion of a confrontation between equals.



Violin Concerto: The solo violin part is punctuated by loud orchestral chords, giving the impression of a lively struggle between soloist and orchestra.

(repertoire example) Beethoven 5th piano concerto, 1st mvt., m. 304 ff.

- To avoid thinness in the orchestral writing, create richness by multiple planes, even if each plane only contains a few notes.



Piano Concerto: A very airy dialogue between piccolo and piano is enriched by gentle held notes in the violins. The glockenspiel triggers the held notes and draws attention to them.

(repertoire example) Bizet, Carmen, 1st act., Scene 1, five bars after the end of the opening chorus (Andante un poco): Short string chords accompany high violins in a light, triplet figure, and a simple woodwind counterpoint in half notes. The effect is rich but extremely transparent.

When accompanying the human voice, some doubling of the solo line may be required, for reasons of balance, intonation, or color. Generally such doubling is less obtrusive at the octave than at the unison. In opera, however, unison doubling occurs somewhat more frequently; this is partly explained by the fact that the orchestra is in the pit, while the voices are on the stage. Elaborate fiorituras should not be doubled, nor should passages where detailed understanding of the words is critical: Doubling obscures detail, and submerges the consonants necessary to clear speech.

(repertoire example) Puccini, Tosca, 2nd act., Vissi d'arte: Gentle string chords accompany the vocal line; the 1st violins double the voice. However, when the voice has repeated notes, the strings are simplified.

Summary: What is good orchestration?

We are now ready to provide a checklist of criteria for good orchestration, complementing our list, given earlier, of the characteristics of poor orchestration.

Good orchestration must:

- Make formal sense: Changes of orchestration must arrive at appropriate places, with appropriate degrees of contrast.
- Supply sufficient variety and freshness of color to maintain interest.
- Enhance the phrasing.
- Ensure clarity of the various musical elements: Every element should be audible.
- Ensure that every element contributes something individual, allowing for what Richard
- Strauss (referring to Wagner's polyphonic style, in the preface to his revision of the Berlioz treatise) calls the "spiritual participation of the players".
- Be as easily playable as possible, always using the simplest means to create the desired effect.
- Be aurally rich (usually through multiple planes of tone).
- Express a clear character.
- Use the whole ensemble effectively.

Conclusion

The most important conclusion to be drawn from our study of orchestration is that orchestration can bring out and enhance any aspect of the music. Once the composer gets into the habit of thinking about how timbre can mark and enrich important formal points, clarify and bring into better focus details of rhythmic design, enhance details of harmony and counterpoint, orchestration becomes what

it should be for maximum artistic effect: an integral part of composition itself.

Acknowledgements

Various people have contributed importantly to this book. Guillaume Jodoin carefully and intelligently proofread the text, always asking pertinent questions. Marc André Bougie suggested valuable examples. My colleague Sylvain Caron generously gave his time to read the text and made constructive comments. Daniel Barkley kindly helped with some of the score examples.

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Appendix: Some Pedagogical Ideas

- Examples from a character glossary

It will be obvious by now that artistic orchestration expresses and enhances musical form and character. To help the student think about musical character, it can be useful to compile a "character glossary". The idea is to list every orchestral resource which can contribute to creating a given character. While no individual passage will use all of them, this method encourages thinking about musical character when making orchestral choices.

In Appendix 2 you will find an example of such a glossary.

- Outline sketches as a teaching tool

A problem in teaching orchestration is that transcription of existing music never gives the student the opportunity of creating a complete orchestral texture on his own. A useful solution, as an intermediate step between transcription and composition, is to use outline sketches ("skeletons"), which the student must elaborate, often in more than one way. A skeleton consists of a melodic phrase or two and a figured bass line. The student has to decide on the character, tempo, dynamics, where to place the melody, how to fill in the harmony, what sort of accompaniment to add, etc.

- Learning orchestration from the repertoire

In studying the orchestral repertoire, the student needs well graduated models to start with. Composers like Mahler and Ravel, wonderful orchestrators though they are, are not suitable for beginners since their textures are often very rich and complex.

An excellent starting point is Mendelssohn: His orchestration is classical in spirit, economical, simple, and always effective. Mendelssohn’s part writing is straightforward, his orchestration perfectly balanced, and his figuration imaginative without being overly elaborate.

Tchaikovsky is a logical next step, similar in technique to Mendelssohn, but with a larger orchestra. Again, his orchestration is effective, clear, and easily understood.

Bizet's *Carmen* is a basic text for orchestration with voices.

Mozart, although he uses an orchestra smaller than Mendelssohn's, has more complex and refined methods of part writing, and therefore should follow, rather than precede the latter. Beethoven introduces many novel orchestral ideas, and, properly understood, his approach to the orchestra will greatly increase the student's sophistication.

More advanced orchestration begins with Wagner, in particular the richness of his orchestral polyphony as a norm, and the way he uses the enlarged orchestral families.

After these models have been assimilated, the student will be prepared for the more complex orchestration of Ravel, Mahler, Strauss, etc. Twentieth century extended instrumental techniques can be useful, but their use still follows the principles enumerated here.

Scales of contrast

An important pedagogical tool in teaching all musical disciplines is the use of graduated, aural "scales". By this, we mean encouraging the student to rate the effects of various musical effects, in order of intensity. This encourages fine distinctions and refined hearing. For example, instead of just saying that a particular timbre is "too dramatic a change", compare it to other possibilities and try to grade them all on a scale of timbral contrast. Even a scale with only four or five levels can be very useful. Try to determine which elements determine the force of the effect; this also helps in making aural distinctions which are useful beyond one particular style.

Appendix 2: An orchestral character glossary

Introduction

The aim of this glossary is to show the beginning orchestrator a certain approach to his craft. Once he knows how to write for instruments effectively and idiomatically, and once he understands the principles of orchestral balance, and how orchestration interacts with musical form, the orchestrator's task is then to

select the most appropriate sound combinations for given musical situations. This selection is made mainly according to musical character. In this glossary you will find a list of character words, and orchestral suggestions for how to express them.

Several essential caveats

Character words are approximate. A word like “lyrical” can imply many different emotions, each of which would be orchestrated somewhat differently. Used simplistically, the combinations given here easily become clichés. Clichés quickly lose their effect, and can even become inappropriately comic. (Think of the diminished chord tremolos signifying danger, in silent films.) The best use for a glossary like this is as a point of departure, rather than as a recipe book. Orchestration is not the only aspect of musical character. Other aspects of the music, like harmony, tempo, rhythm, etc., are equally important. For example, the entries below under “terrifying” and “brilliant” are rather similar; the resulting effect will depend strongly on the kind of harmony used. It is important to look to all aspects of the music for their expressive potential. Indeed, one could make similar glossaries for these other musical dimensions. The composer needs to use every available resource to create the desired character. One characteristic of weak music is the way certain aspects of the music contribute nothing, or even distract from the desired effect.

Characters

Luminous

This character requires two elements: a soft background, usually sustained strings, and another element to add “light”:

- Soft, medium high trumpets or horns.
- Flutes, medium high, not too loud.
- Touches of high metal percussion (e.g. suspended cymbal, glockenspiel), again, not too loud.

Mysterious

Mystery comes from lack of clarity. Appropriate sounds include very delicate background resonance (sustained sound) and/or very quiet movement, not too

thickly spaced:

- Muted strings.
- String harmonics.
- Low flutes.

Menacing

Certain sounds, often starting softly and making a crescendo, which evoke natural threats (e.g. earthquakes, eruptions) are very potent:

- Low drums: rolls or rhythmic patterns, create an almost primeval, threatening effect.
- Low, closely spaced strings and/or woodwinds, muted brass.
- Extreme low sounds, soft: tam tam, bass drum.

Terrifying, angry, savage

- Loud and piercing sounds, which often resemble animal cries, harsh and strident:
- High, dissonant woodwinds and/or brass, perhaps in insistent repeated notes or trills.
- High, dry percussion (e.g. loud xylophone), cymbal roll crescendos.

Brilliant

Often suggests a certain virtuosity, speed:

- Brass in their respective high registers, open intervals, in fast figuration, e.g. repeated notes, trills.
- Brass crescendos.

- Fast, rising lines in strings, woodwinds.

Splendid, rich, triumphant

Requires a mass of instruments, suggesting generosity and richness: Tutti, with sustained brass, closely spaced in upper middle register (especially horns, in the range of the alto voice), along with high strings, in 8ves.

Dramatic

Sudden contrasts in register, timbre, and dynamics.

Funereal

Heavy, dragging sounds, suggesting a mourning procession:

- Low register: Brass and winds playing slowly.
- Timpani or bass drum dotted rhythms.

Playful, funny

The key here is lightness, unless a grotesque effect is wanted:

- Lots of rests.
- High, staccato sounds.
- Avoid sustained sounds in brass.
- Pizzicato.
- Bassoon staccato.
- Caricature (grotesque): Instruments playing passagework characteristic of others, e.g. a tuba playing a comic line which would normally be given to the bassoon.

Sad, melancholy, poignant

Often suggests an individual (solo) lamenting, or discouragement, weakness:

- Slow, sustained strings in lower register.
- Wind solo (especially oboe or clarinet), or low flute, over sustained strings.

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