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OBSERVATIONS ON THE CONCEPT OF THE SOUND PLANE AND THE DEVELOPMENT OF THE OVERALL MUSICAL STRUCTURE

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SUMMARY. In this paper, we aim to define the concept of the sound plane and its relationship with the musical ensemble. We have further detailed the notion of the musical ensemble, emphasizing its formation as a gathering of multiple sound sources. Additionally, we have created several diagrams to present the structure of a musical ensemble, both choral and vocal-symphonic, as well as its evolution through different musical periods. Finally, we have made observations regarding the distribution of sound planes within various types of musical ensembles. All of these ideas have been presented from the perspective of the conductor, who must understand and apply them in the interpretation of a musical work.

Keywords: conductor, musical ensemble, choir, sound plane

Motto
"The artist reveals to humanity the path to harmony,
which is happiness and peace"
George Enescu

Introduction

In this paper, we believe it is absolutely necessary to attempt to define the concept of the sound plane. It is indeed true that, in general, all musicians have a somewhat clear idea of this notion, but we find it useful to present a definition that will assist us in the process of completing the proposed topic.

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The sound plane is one of the fundamental components of the musical ensemble, shaping numerous practical manifestations within it.

We wish to make an important clarification, namely that sound has the following qualities: pitch, duration, intensity, timbre (density)[2].

We need not dwell on the first four qualities, as they have always been well known. Regarding density, it is difficult for us to provide a definition at the level of this research. However, we know that this quality exists and that it forms the basis for the overall balance of the ensemble. Therefore, we attempt to provide a provisional definition: density is the quality of sound to be more or less consistent, regardless of its intensity.

We have associated density with intensity because there are still significant confusions between the loudness of sound (resulting from intensity) and the consistency of sound (resulting from density); it should be clarified that density is not determined by intensity.

The term is often used as a metaphor, but we emphasize that this does not cover the meaning we wish to assign to it. If, in this provisional definition, we have attempted to define density as the consistency of sound, as a final concession in this expression, we could also say that density represents the weight of the sound. Therefore, the term could be defined somewhere between weight and consistency.

The conductor's perspective[3]

Regarding the notion of the sound plane, we begin with an initial consideration, namely that multiple sound sources can either unfold independently or be grouped into sound planes. What does this mean? It means that, most often, sound events are more numerous than the sound planes.

This is most clearly explained within the "technological disciplines" where musical notation is taught, starting with 2-3 voices and continuing up to 4 voices (it is very rare to learn musical notation for more than 4 voices in a technological discipline).

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[3] Para, Ciprian, *Concepția interpretativă în demersul dirijoral (Interpretive Concept in the Conducting Approach*), Editura Media Musica, Cluj-Napoca, p. 34, 2015

Today, it seems natural for us to speak of soprano, alto, and bass from a “fugue” for organ or harpsichord by J.S. Bach, just as it is equally normal to speak about the “bass” in a harmonic writing within Beethoven’s piano works, for example.

If a voice = sound plane, then what is a part?

If, in an Oratorio, at a certain point, the trumpet, flute, first violin, and soprano from the choir all intone the same melodic line, it means they naturally form a sound plane. However, in the same work, the same melodic line will only be intoned by the first violin in the context of a section attributed solely to the string orchestra.

We have made these observations to suggest the complexity of the concept of the sound plane, without which, as we will see further, it will not be possible to define the concept of the musical ensemble.

In other words, the melody of a soprano in a vocal quartet is a sound plane, but it can also take the form of a sound plane of a vocal part in a choir; or, in the case of the vocal-symphonic (accompanied in the corresponding registers by flute, trumpet, first violin), it is another manifestation of the same sound plane.

Closely related to the notion of the sound plane are both the concepts of part and doubling. However, there are clear distinctions between the concept of part and that of doubling. A part serves a sound plane within a timbral unit. For example, the soprano part in a choir means 10-20-30 choir members, similarly, the first violin part in an orchestra means 8-10-14 violinists, etc.

If the melodic line divides, then the same timbral unit opens two sound planes.

The concept of doubling is more complex, as it involves, on one hand, the blending of multiple timbres (the essence of orchestration or certain refinements in choral writing), and, on the other hand, a spatialization of the plane, a dispersal of it across different registers of the general musical scale.

Doubling can create a spectacular dispersal of the sound plane in space; for example: piccolo – double bass, etc.

In conclusion, the sound plane is a consequence of musical writing and cannot be determined by the structure of the ensemble. It is true, however, that for musical writing to be effective, it must take into account the structure of the ensemble, but this structure cannot determine the physiognomy of the sound plane.

Because the complexity of the sound plane issues is closely related to the concept of the ensemble, before delving into details, we consider it necessary to clarify the notion of the musical ensemble.

In contrast to the traditional viewpoint on the idea of the ensemble, we feel compelled to open this paragraph precisely because the issue requires more flexibility in the direction of the observations. An ensemble is far from being a simple association of sound sources, whether they are voices or instruments. However, we can still discern two criteria for associating sound sources within the ensemble, namely:

1. The criterion of belonging to a register (high, middle, low)
2. The criterion of timbral unity

An ensemble formed based on these primary criteria appears as a gathering of multiple sound sources, stratified according to the register criterion and grouped according to timbral criteria. Therefore, the concept of ensemble is fundamentally based on the notion of singing or playing together, which is so suggestively called in German: *"Zusammenspiel."*

The boundary between singular sound sources (solo) and where various musical formations can rightfully be called a musical ensemble is quite difficult to define. For example: if we consider the complexity of musical writing, we often arrive at paradoxical observations: an organ, a piano, or even a solo cello have much more complex musical writing than a vocal part in a choir, where many more performers participate, and yet in no instance can these solo instruments be referred to as an ensemble.

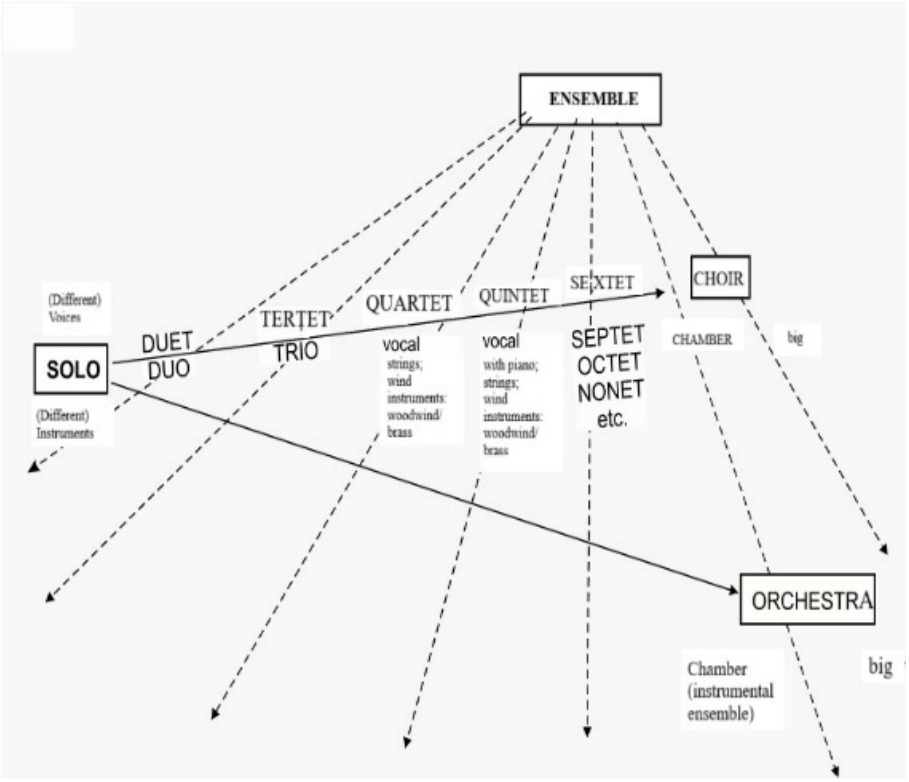
In everyday language, we refer to Duo-duet, Trio-terzet, quartet, quintet, and from there on, more rarely, sextet, septet, octet, nonet, decet, etc. These terms tend to be replaced by the term "chamber ensemble."

As the number of performers increases, the term is replaced by "orchestra."

The phenomenon is similar in vocal music, with one clarification: within the vocal ensemble, in its most characteristic form, i.e., the choir, the concept of the part becomes necessary. That is, the gathering of vocal parts forms the choir, while the gathering of voices forms a duet, trio, etc. In a way, the origin of the choir later determined the genesis of the string orchestra (the string ensemble being the only type of ensemble in which we have instrumental parts, similar to the choir). In the case of wind instruments, we distinguish various chamber formations: woodwind octet, brass quintet, etc.

Having reached this point, we reproduce a diagram that illustrates the scope of the term “ensemble.” (Figure 1)

Figure 1



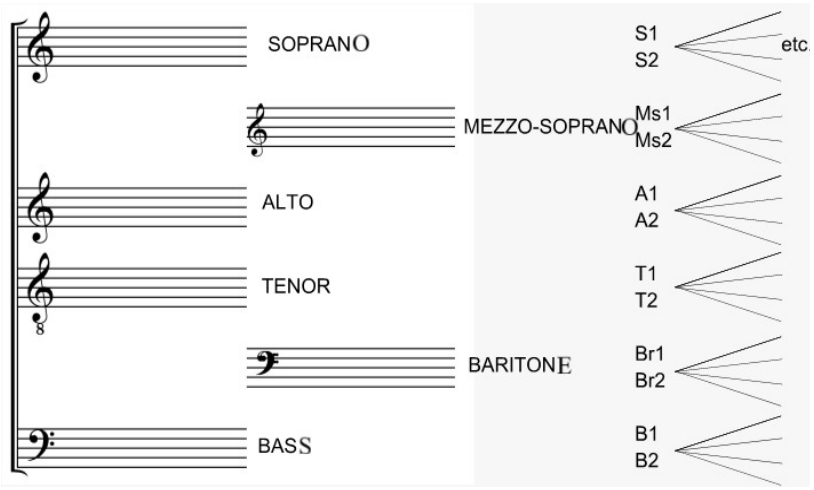
Structure of the Musical Ensemble[4]

Given the observations above, we would like to pause for a moment and focus on the notation of a score intended for the ensemble.

[4] Timaru Valentin. *Ansamblul muzical și arta scriiturii pentru diversele sale ipostaze (The Musical Ensemble and the Art of Writing for Its Various Manifestations)*

In principle, the score takes into account the sound sources' belonging to a specific register and is structured in staves, whose foundation is always the low register. (Figure 2)

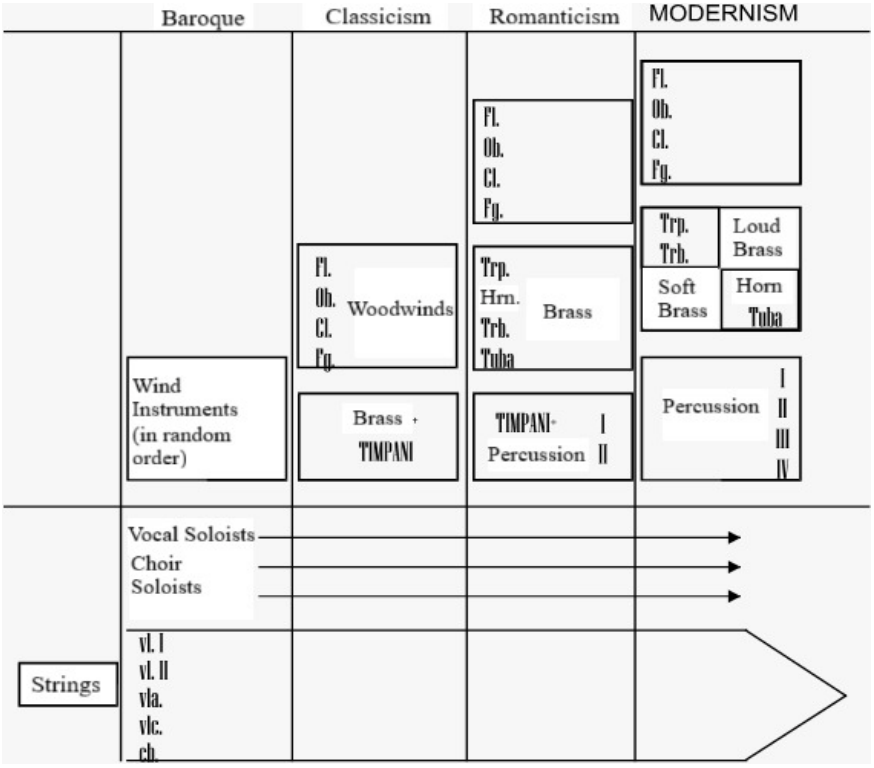
Figure 2



Choral Voices and Musical Keys[5]

In the case of the orchestra, the score has two criteria of notation, which operate simultaneously: first, the one related to the belonging to a register (similar to the choral score), which operates within an instrumental family, and then the overlapping of these systems from various families according to an evolutionary-historical criterion. (Figure 3)

Figure 3



The Principle of Constructing a Score from Different Stylistic Stages[5]

As can be seen, the principle of constructing a complex score is as follows: at the base there is always the string orchestra system (that is, the ensemble that actually generated the concept of the orchestra); above it, other systems were gradually added: first, the wind instruments in a random order, and then their grouping according to their belonging to the instrumental families.

[5] Diagram created by the author, referring to a choral and orchestral ensemble

The evolution of the score followed the principle of a constant "expansion," so that new instruments were always placed above the string orchestra system.

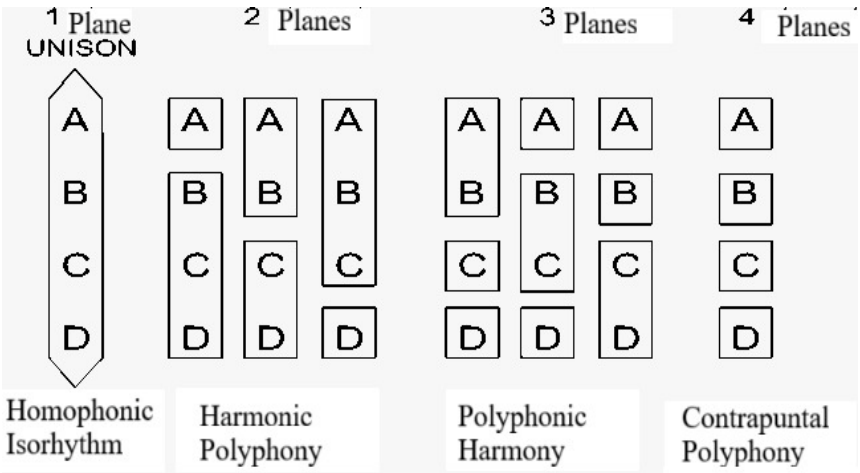
Of course, we often witness certain "licences" that composers take when notating scores. A frequent case is that of the piccolo, followed by horns, percussion, or vocal soloists.

In the case of non-traditional chamber formations, so randomly conceived by contemporary composers, the notation of the score is imposed by the author.

Having reached this point, we believe it is necessary to once again refer to the schematic structure of technological disciplines. This, of course, refers to the fact that both harmony and counterpoint study musical writing primarily up to 4 voices.

If, conventionally, we refer to these voices with the symbols A, B, C, D (this to avoid confusion with the S A T B sound plane in general), then, according to elementary logic, we have the following combinatory possibilities. (Figure 4):

Figure 4



Different Manifestations of the Sound Plane[6]

[6] Diagram created by the author

On the left, we have mentioned the case of the combination of A, B, C, D into a single sound plane, a case that can be encountered in two manifestations:

1) in unison
2) homophonic isorhythm

In the case of homophonic isorhythm, we are in the technological domain of harmony.

At the far right of the diagram, we have 4 voices and 4 sound planes, and without going into details, we simply emphasize that this refers to a polyphonic musical discourse typical of what has been studied in counterpoint.

Between these extremes, we can encounter the distribution of voices across 2 or 3 sound planes, a kind of polyphonic harmony or harmonic polyphony.

This schematic of the voices can, of course, be applied to the soprano, alto, tenor, and bass voices, as well as to any instrumental family.

Of course, the observation can also be extended to the structure with 5 voices, which is especially useful when discussing brass groups (2 trumpets + 3 trombones or 4 horns + 1 tuba, referring to the most common cases in orchestras). We emphasize only this: a sound plane can exist in a multitude of manifestations. It is enough to substitute the symbols A, B, C, D with the components of the ensemble we wish to observe, and we already have support for developing our observations.

For example, in a string quartet, A = first violin, B = second violin, C = viola, D = cello; if we look at the distribution of the sound planes in the string quartet, from the previous diagram we can see the possibilities of this type of ensemble.

Similarly, we can arrange our observations with any family of instruments.

In the case of combining these, the overlapping of different timbres inevitably comes into play.

Next, we will mention a few essential elements for the formation of the idea of an ensemble, closely related to the awareness of the concept of the sound plane, namely: the formation of an ensemble within the context of a timbral unit, that is, within what we call an instrumental family. In this case, the issues of notation are closely related to balancing registers and the physiological proximity of emission (a phenomenon that is valid for both instruments and voices).

In this context, in the case of homophonic writing, the ensemble must convey a principal timbral homogeneity, without which the musical writing is compromised.

In cases of writing on 2 or 3 sound planes, many more details and refinements of the writing can come into play.

In the case of contrapuntal writing, the situation is much clearer, with the ensemble being shaped alongside the music it performs.

Unison, however, is one of the most controversial issues of the ensemble because it essentially serves a single melodic line.

In the context of the ensemble, we find several manifestations of it. For example: the real unison, in relation to the general musical scale, achieved through sound sources that are differently tensioned, depending on the relationship between the ambitus and the passage that must be intoned.

Here, we again encounter many writing refinements as well as subjective spatialization sensations, such as a tenor voice intoning in the superhigh register a unison with an alto voice, projecting the subjective image of a masculine voice singing above the feminine voice, even though, acoustically, our voices are intoning the same pitches. Why this sensation? Because the tenor tensions in the superhigh register, while the alto sings normally in the chest voice register.

Returning to unison, we mention the other manifestation, namely the spatialized unison, where the same sound plane is intoned in different registers, with the clear intention of contouring the same melodic line at different pitch levels.

We believe this is the appropriate place to add some slight clarifications regarding the homogenization of an ensemble, whether vocal or instrumental.

In the case of the choir, if we take into account the typical physiology of each voice, homogenization has a real chance of success. The essential element is that voices should be used in a unified physiology.

Problematics are the very strong and metallic voices, those “brasses” of the part, which need to be softened and have a high potential for de-homogenization in large nuances: forte, fortissimo. Also, high voices, such as soprano and tenor, have a higher chance of de-homogenization, while lower voices, such as alto and bass, are less prone to this issue.

Homogenization at the level of the vocal ensemble implies homogenization of the timbral spectrum, intonation, rhythm, vocal construction, etc.

In the case of woodwind instruments, we have two subgroups with diametrically opposite characteristics: the first—double reeds—are robust,

very timbrally characteristic in the lower register, extraordinarily malleable in the middle register, capable of very sensitive and gradual nuances from piano to fortissimo, only to lose their timbre gradually in the high register.

On the other hand, there is the flute and clarinet, which are very soft, somewhat sensual in the first sixth of the low register; having almost unlimited possibilities in the middle register but gradually becoming more strident in the high and superhigh registers.

In the case of the string orchestra, the issues are very similar to those of the choir, taking into account, of course, the specific technique. As mentioned at the appropriate time, only the choir and string orchestras face the thorny issue of part homogenization (since, as we well know, wind players are chamber formations that are added optionally in the evolution of orchestral music).

Conclusions

In the conclusion of this paper, we would like to highlight a few aspects of the relationship between the sound plane and the musical ensemble.

Any type of ensemble has the flexibility to adapt to various types of musical writing, of course, provided that the respective writing takes into account the fundamental characteristics of the ensemble (ambitus, registers, specific execution techniques, dynamic potential, etc.).

As far as we are concerned, we made this observation to emphasize that, in principle, the sound planes of a musical writing are the same.

Returning to the parallelism we made between voices and instruments, we propose naming the sound planes of musical writing with a few established terms closely related to the voice.

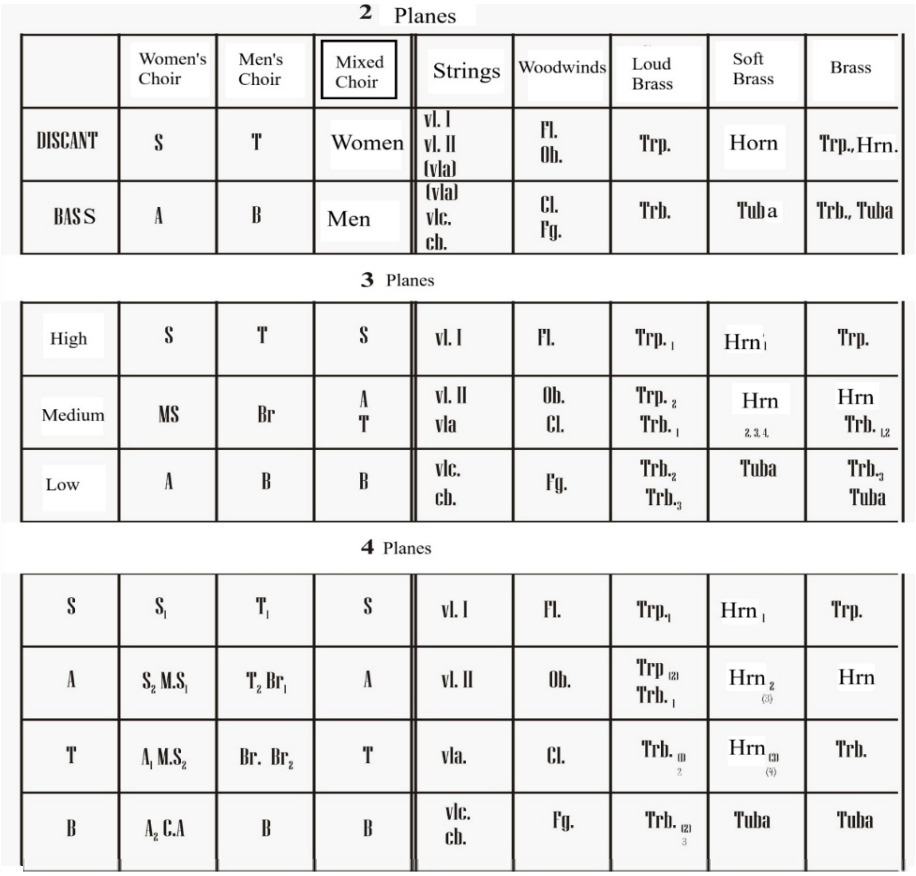
- a two-voice writing encompasses the descant plane and the bass plane;

- a three-voice writing includes the high voice, the middle voice, and the low voice;

- a four-voice writing includes: soprano, alto, tenor, and bass.[7] (Figure 5)

[7] As can be seen from the schemes proposed above, each type of ensemble can adapt to a variety of plans determined by the musical writing

Figure 5



2 Planes

	Women's Choir	Men's Choir	Mixed Choir	Strings	Woodwinds	Loud Brass	Soft Brass	Brass
DISCANT	S	T	Women	vl. I vl. II (vla)	Fl. Ob.	Trp.	Horn	Trp., Hrn.
BASS	A	B	Men	(vla) vlc. cb.	Cl. Fg.	Trb.	Tuba	Trb., Tuba

3 Planes

High	S	T	S	vl. I	Fl.	Trp.$_1$	Hrn$_1$	Trp.
Medium	MS	Br	A T	vl. II vla	Ob. Cl.	Trp.$_2$ Trb.$_1$	Hrn 2, 3, 4.	Hrn Trb.$_{1,2}$
Low	A	B	B	vlc. cb.	Fg.	Trb.$_2$ Trb.$_3$	Tuba	Trb.$_3$ Tuba

4 Planes

S	S$_1$	T$_1$	S	vl. I	Fl.	Trp.$_1$	Hrn$_1$	Trp.
A	S$_2$ M.S$_1$	T$_2$ Br$_1$	A	vl. II	Ob.	Trp$_{(2)}$ Trb.$_1$	Hrn$_{2\ (3)}$	Hrn
T	A$_1$ M.S$_2$	Br. Br$_2$	T	vla.	Cl.	Trb.$_{(1)\ 2}$	Hrn$_{(3)\ (4)}$	Trb.
B	A$_2$ C.A	B	B	vlc. cb.	Fg.	Trb.$_{(2)\ 3}$	Tuba	Tuba

The Sound Plane and Types of Choral Ensembles [8]

Our intention, in this case, was primarily to synthesize the possibilities of musical writing on one hand and to clearly see the possibilities of combining various types of ensembles, on the other hand.

In other words, from our schema, it quickly becomes apparent the natural doublings, for example: voices – string players, voices – woodwind players, voices – brass players, depending on the particular moment of the work we are analyzing. This way, we can understand why it is natural for the

[8] Diagram created by the author

soprano voice, first violin, flute, and trumpet to form a single sound plane in a tutti section of a vocal-symphonic or opera piece.

From this schematic view, we can also observe why middle voices and instruments are so flexible and mobile, shifting as needed either towards the soprano, bass, alto, or tenor ranges. And so, we could conclude that the foundation of ensemble balance should be sought in these “voices”. For example:

- a good choir is one with strong altos and tenors;
- a good quartet is one with a good viola;
- a good string orchestra is one with strong second violin and viola sections;
- a good woodwind octet is one with good oboes and clarinets;
- in brass sections, the key issue is at the horn level.

In conclusion, a conductor should be aware of these issues, especially when the musical writing does not follow the natural distribution of voices across the planes; they are forced to intervene and correct, as homogeneity tends to suffer significantly in such situations.

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