

# Organs for Use with Symphony Orchestra

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There exists in the orchestra repertoire a bulk of works which include the use of an organ. I am speaking not of baroque works which call for a continuo organ, but of post-romantic and contemporary orchestral or choral/orchestral works which call for a modern organ of vast dynamic resources. The list of composers includes such diverse figures as Berlioz, Holst, Saint-Saëns, Khachaturian, Poulenc, Copland, Janaček, Barber, Respighi, Williamson, Strauss, Jongen, Mahler, Duruflé, Elgar, Hindemith, Rheinberger, Britten.

A close examination of these works reveals four basic categories of organ use: accompanimental, augmentative, antiphonal-solo, and ensemble-solo. A simple definition for each: accompanimental—when the organ alone plays the chords over which orchestral instruments play solo material; augmentative—when the organ is used for additional weight or color, and essentially doubles orchestra parts; antiphonal-solo—when the organ and orchestra play one after the other, as in the opening of the last movement of the Saint-Saëns Third Symphony; ensemble-solo—when a melody or important voice is given to the organ, to be heard above orchestra accompaniment.

Most new organs in symphony halls succeed without difficulty in the first category—accompanimental. If the organ is of reasonable size and power, and in a good location, it will at least pass in the

third category—antiphonal-solo, where its tutti does not have to achieve any absolute decibel capability. In the second and fourth categories, however, augmentative and ensemble-solo, something approaching absolutes is required, and it is in these two categories that instruments built in the last few decades have failed us.

Orchestral instruments can adjust their dynamics to achieve balance, and instrumental composers have an intimate knowledge of their capabilities; therefore, their dynamic range is sufficient for what is asked of them. The organ, on the other hand, has been radically different things at different times, and for different purposes. In an orchestra hall, however, should not the principles of construction of an organ be determined through a close study of organ parts in orchestral scores, and perhaps a visit to an orchestra rehearsal armed with a decibel meter? The problem is this simple: organbuilders don't know what they should be trying to build.

Let us cite a few examples of "organ failure." In the second movement of the *Pines of Rome*, the fullest possible bass orchestration, inclusive of trombones and tubas, asks to be further augmented by the full bass of the organ (I believe the marking is triple-forte). In such a passage, the orchestra plays as loudly as is its custom, and the organ will either add to it or not add to it. If we were to consider that the orchestra should play softer so that the organ might be heard, we would, of course, be defeating the purpose for which the organ was added in the first place. The truth is that only in places like Albert Hall in London, Woolsey Hall at Yale, or the St. Cecilia Academy in Rome is it even noticeable

to a listener that anything besides the orchestral instruments is present. Another famous example of failure to do its job is at the end of "The Magician" in *The Planets*. According to all the record liners, the march, which builds to a fever pitch with brass and percussion, is to be "wiped away" by a fortissimo glissando on the organ. Again, only in some turn-of-the-century music halls is this supposedly overwhelming effect even *audible*. In most situations, the march seems to end of its own accord; there is nothing present, as the composer intended, which interrupts its progress.

About these two examples of augmentation, it could be said that the composers overestimated the power of organs. It happens, however, that these composers knew particular instruments and particular halls, and when performed there, the effects work. But we are talking about a style of organ built between 1880 and 1930. Nowadays, most organs considered to be big actually do not exceed 80 db., whereas post-romantic orchestra climaxes (during which the organ is often called upon to enter and be noticed) can easily approach and exceed 100 db.

There are more inadequacies, however, than just at the highest decibel levels. The organ's display of solo flutes, oboes, krumphorns, cornets, etc., are also fairly useless as solo stops. Their builders, accustomed to thinking of the organ as a self-contained entity, voiced them to be accompanied by a traditional complement of *other organ stops* according to the practices of solo organ music. Because those solo stops cannot project as well as their orchestra counterparts, thematic material given to an organ solo stop must often be played on ensemble

registrations (sometimes even inclusive of mixtures), just for "noticeability." This condition severely limits the charm and variety of sound which will emanate from an organ during the course of a given work, unless that work provides opportunities for the organ to be left entirely to itself.

Duruflé and Poulenc, working together on the latter's organ concerto, were wise to allow the organ to be alone so much of the time. Of course, there is the added advantage of only having to contend with strings and timpani. Single-stop solo lines (such as one passage for the hautbois) encounter only the most spartan string accompaniment; even so, many of the registrations in the work have to be boosted beyond what is indicated to maintain a proper balance through the course of even slight dynamic changes in the accompaniment. The harmonic flute solo in the final section of the Duruflé *Requiem* is heard adequately only until the chorus begins to ascend, at which point it is buried until the chorus dies away again. Years ago, I once used a live flautist for this section; with no noticeable crescendo on his part, the solo was completely audible throughout. The flute on my organ was dynamically as loud as the live flute. What made the difference?

Transients and casework have been the traditional organbuilders method of projecting organ sound. But, next to a "live" instrument, such a sound still remains in a comparative background, for all its clarity and harmonic development. The secret ingredient behind "presence" and "projection" in orchestral instruments is *pressure*; a solo line always is played with more pressure than that of the accompanying material. Instrumentalists have



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two techniques: accompaniment-ensemble playing, and solo playing. It translates either into *bow* pressure, *wind* pressure, or *muscle* behind a drum stick. That is how one violin is heard in a concerto above fifty others. Decibels are involved to a degree, but the rest of the battle is one of *authority* or *assertive* power.

In terms of the pipe organ, this means *wind pressure* and *scale*. Organ sounds produced by high pressure are not only louder, they create more of a sonic "disturbance" in the room, even at relatively low dynamic levels. The use of closed-toe voicing with high wind pressure results in the ability to increase the pressure as the stop ascends the scale, which is in keeping with the instrumental phenomenon. Such a style of voicing also permits far more latitude for dynamic readjustment when necessary (as it usually is).

The most important goal of using high wind pressure, however, is the achievement of actual force. When organs were pumped by hand, the use of high-pitched compound stops helped to suggest a kind of illusion of force. But the species of organ which found its way into turn-of-the-century orchestra halls definitely reflects the application of a turbine blower to organbuilding and all the experiments in voicing made possible by an unlimited supply of wind. Because this kind of organ can produce real force rather than illusory force, it is the only kind capable of being an intruder above orchestra instruments which are themselves producing a heavy wall of sound. Although the pejorative term "opaque" was coined to describe this kind of voicing at the beginning of the trend back towards low-pressure, it is indeed *that very ingredient* which is the *desired* quality for projecting organ tone among ensembles of orchestra instruments.

The desire for transparency of organ tone derives from the tendency of organ sounds to obscure one another when several voices are being played on one keyboard. Though I do not believe that high pressure voicing a priori renders polyphony impossible, it is a question of degree, and everyone will admit that polyphony demands a transparency of tone which favors the use of low wind pressure. The situation at hand, however, is a need to produce entities in an organ which will meet a list of demands in which polyphony is a low priority, and where enormous quantities of driven fundamental tone are essential.

The fact that a recent movement has made an important priority of transparent voicing in organbuilding for the sake of baroque polyphony is not at issue here. The dilemma does not rest on a controversy between baroque versus ro-

mantic organbuilding. What has not yet been recognized is that the musical requirements for an organ in the orchestral situation are different from those of even the romantic organ in its solo setting. Because these musical requirements have been only sporadically or accidentally met, they are not codified, so as yet have not been translated into a distinct organbuilding procedure.

I would design an instrument modest in number of ranks, both to keep the organ from burying itself, and to allow for the outsize scaling which will be needed. For quiet passages and for accompanimental purposes, we need a Swell division. For ensemble "backbone," we must have a solid Great division. The most extravagant sonic resources need to be controllable, so they should go into an enclosed Solo division. Underneath all of this, naturally, we need an heroic Pedal. The following specification should be regarded as a generalization; it contains, however, all the specific sounds required by the repertoire.

#### SWELL

(4-6 inches of wind)

- 16' Flute Conique
- 8' Diapason
- 8' Viöle
- 8' Viöle Celeste
- 8' Flute Celeste II
- 8' Rohr Flute
- 4' Octave
- 4' Flute
- 2' Fifteenth
- 1½' Quint
- 1' Mixture IV
- 16' Bombarde
- 8' Trumpet
- 8' Oboe
- 8' Vox Humana
- 4' Clarion

#### GREAT

(7-10 inches of wind)

(scales should be 3-4 notes larger than that of a normal organ design for the same space)

- 16' Violon
- 8' Diapason
- 8' Gamba
- 8' Gross Flute
- 8' Flute Harmonique
- 8' Bourdon
- 4' Gross Octave
- 4' Spitzflute
- 2' Super Octave
- 2' Cornet V
- 2' Mixture VI
- 16' Tromba
- 8' Tromba
- 4' Tromba

#### SOLO

(15-20 inches of wind)

(pipe metals need to be exceptionally thick; pipes should be voiced so that the principal and reed choruses together will produce 100 decibels in the tenth row on a six-note C-major chord)

- 8' Stentorphone
- 8' Flauto Mirabilis
- 8' Gross Gamba
- 8' Gamba Celeste
- 4' Stentorphone Octave
- 2½' Tierce Mixture VIII
- 8' Tuba Magna
- 8' Clarinet
- 4' Tuba Clarion

#### PEDAL

(8-10 inches of wind)

- 32' Bourdon
- 16' Open Wood
- 16' Violon (Gt)
- 16' Bourdon
- 16' Flute Conique (Sw)
- 10½' Quint
- 8' Open Wood
- 8' Octave
- 8' Bourdon

- 8' Violon (Gt)
- 8' Flute Conique (Sw)
- 4' Open Wood
- 4' Octave
- 4' Flute Harmonique (Gt or independent)
- 2½' Mixture IV
- 32' Tromba (Gt ext)
- 16' Tuba Profunda (Solo ext)
- 16' Tromba (Gt)
- 16' Bombarde (Sw)
- 8' Tuba (Solo)
- 8' Tromba (Gt)
- 8' Bombarde (Sw)
- 4' Tuba Clarion (Solo)
- 4' Tromba (Gt)

(All mixtures on this organ are chorus mixtures and should be voiced with equidistant breaks)

These are raw materials. They must now be related to specific contingencies. Sitting in the tenth row, the organbuilder should obtain the decibel level of all the orchestra strings playing a Bach chorale. The decibel level of all the 8' and 4' manual flues should equal that. (The accompanimental stops on the Swell and Great can be voiced for usefulness in the traditional organ sense.) Ideally, the organbuilder should experiment next with a clarinet player, an oboe player, a trumpet player, and a flute player standing on the stage and playing some passage of music in which those instruments play as loudly as is required of them in any orchestral context. Those stops on the organ should equate dynamically when the boxes are open. (The Great Tromba is the reed which should be tested with the trumpet player.) The brass choir playing a Bach chorale mezzo-forte should equal the Swell reed chorus; playing forte, they should equal the Great reed chorus.

The 4' and 2' stops on this organ should be particularly powerful, because they will often need to be an alternative to mixtures. Conductors generally do not like the sound of mixtures, so they should not be necessary until the dynamic level is loud enough for such harmonic development to seem natural. Cymbal mixtures are entirely a baroque organ music apparatus and are inappropriate here because they interfere with the coloration of the upper strings.

The bass department can be a source of great frustration. If a room is too absorbent of bass frequencies, achieving an absolute is next to impossible. Our only hope is to presume the need for "overkill" and our only consolation is in knowing that the orchestra will suffer the same set-back. The independent Open Wood and Bourdon units should be as large and heavy of construction as is physically possible. The Violon and Flute Conique should be adequate alternatives for passages where heaviness is inappropriate. When heavy bass is needed, everything imaginable is still barely enough. (I remember so well an occasion in which I was prepared to make an impressive showing with the pedal division of an organ of considerable size. The music in question was *The Fountains of Rome*. Simply because the timpani was playing, I could not hear the organ at all. Twice in rehearsal, I stopped in mid-stream to see if I could tell the difference. I could not, and apparently neither could the conductor.) The 16' and 32' Tromba unit on our organ should be voiced more for weight than brilliance, leaving the Tuba extension in the Solo as our extra resource for "unreasonable demands." The Tuba resonators need to be both large and heavy, so that this stop can be voiced for everything available.

How do we test this organ to determine whether it is successful? I think the organ should be adequate for the fullest passages of the Saint-Saëns Third Symphony and the Rheinberger concerti without touching the Solo division (let us decide that the word "adequate" means that one can always tell the organ is playing!). It should be "adequate" (same criteria) for the Mahler *Resurrection Symphony* by including the flues of the Solo. Our test of the Pedal would be the second movement of *The Fountains of Rome*, or the second movement of *Church Windows*, both by Respighi. Our test of the full Solo division is certainly "The Magician" from *The Planets* of Hoist (a recent recording of this close-miked an organ to achieve the ideal effectiveness for that climax. Wouldn't it be nice if the concert-goer could have the same pleasure?). Malcolm Williamson wrote an organ concerto with a Tuba Mirabilis solo in the last movement, which needs to project above full orchestra. We have to hope our Tuba Mirabilis can do that!

The number of accompanimental stops on the Swell and Great should enable any kind of choral accompaniment or church service playing, in halls where the auditorium is rented out on Sunday mornings, and I dare say an exciting organ recital could be played on this instrument if there were anyone who could draw enough of a crowd to pay the rent! One important item needed on the console of this organ: a crescendo pedal which goes all the way to full organ (I once played a piece with orchestra where I had to set all ten generalists just for one decrescendo). Perhaps the magic of solid-state controls could give us a selection of programs for the crescendo pedal: one without mixtures, one without reeds, etc.

Few organbuilders would be willing to create such an instrument. We could split the reason half and half between being unequipped and being philosophically too predisposed to the organ of another era. Few builders I have spoken to could really understand that I was not being over-dramatic in my description of the problem. One builder insisted that three inches of wind would be adequate if he could use mechanical key action to project the sound, and locate the pipework in front of the orchestra (somehow!). Some of my colleagues who have had experience playing with orchestra insist that conductors do not want to hear the organ. On this point, I both agree and disagree. Because organists have always had to resort to stops inappropriate in color to obtain dynamic balance, I insist that the conductor's rejection of the organ is based on sonic inappropriateness rather than volume. If simple foundation stops could really be heard, there would be no need to use mixtures or reeds in a place where that kind of organ tone would seem too "angry" against the sound of the orchestra. When reeds and mixtures are desired, if they have been boosted by voicers beyond what they are scaled for, we again have the problem of an "unwarranted tenseness" from the organ, which distracts from the music. This is very often the case.

Not to seem too uncharitable towards recently-built orchestra hall organs, I want to say that I don't know of any that are not at least moderately successful for some things. What I am trying to develop is a *comprehensive* idea for an organ which is cognizant of the full range of expectations. Recent recordings prove to me that conductors are fascinated by the dramatic possibilities of the organ. If they were not, they would not have taken the trouble to have microphones hung all over the organ to achieve it. Sooner or later some organbuilder has got to accept the challenge, and be allowed the opportunity to continue experimentation until we finally have our first totally successful "orchestra organ." I hope it is soon. ■

The late Calvin Hampton, who played widely as a recitalist and as an organist with orchestra, was director of music for the Parish of Calvary, Holy Communion, and St. George's in New York City. His article is a revised version of an address he delivered to the eighth national convention of the American Institute of Organbuilders in Boston, October 1979.