



An Organ for Today

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Those of you who are familiar with my work will know that my approach to the problems of organ building and design has always been the historical one; that is to say, it is to look always at the literature of the instrument and subordinate all considerations to the principal one of making an organ which will faithfully perform that body of music already written for it. Thus, we study the old organs not in the spirit of antiquarianism, for the purposes of blindly copying what was a rather beautiful sound, but in order to examine the instruments in the light of the music they inspired, and thus to discover those principles essential to the successful performance of that literature.

You will immediately recognise the nature and magnitude of the task which then presents itself. Widely differing schools of composition, in countries far apart and in societies with vastly different cultural aims and needs, were growing at the same time and producing consequently organs of completely different character. Our job at this time is somehow to reconcile these varied traditions, bringing them together in such a way as to compromise as little as possible the individuality of each school of composition, while at

the same time ensuring that we produce an organ of character and homogeneity - not a hybrid collection of miscellaneous "tone colours". So often an organist will call for, for example, "a cromorne like the one I heard at Poitiers, and one of those lovely big Cavaillé-Coll harmonic flutes like those at St-Sulpice - and of course we'll need a really big fat trompette-en-chamade as at Toledo for Graduation Day to fanfare the Vice-Chancellor's entrance..." This kind of eclectic selection of stops, mail-order fashion, rather than giving the perfect cromorne for French music and the absolutely right sesquialtera for a choral prelude, will instead result in an organ which in fact plays nothing right, and which has no character or individuality as a whole and complete instrument.

The problems encountered in designing a very large organ, though many, are quite different from those which concern us when we consider an organ of, say, under 40 stops. With the smaller organ, our first task is to establish what the basic organ repertoire is - or, in fact, to ask simply "What is an organ?". No one can seriously dispute that the basis of the literature is the German baroque and pre-baroque, not only in sheer bulk but also by virtue of its quality. It was in Holland and Northern Germany that the organ began to take shape and it was there that it took its biggest evolutionary steps, producing instruments which are universally recognised as great examples of the organ builder's art. The organ grew and advanced at a time when the arts generally were flowering, so that the organ music produced was some of the finest ever written, entirely comparable with the magnificent literature pouring at that time from the pens of some of music's greatest composers in every field. And of course, the German organ reached its peak at just about the time when the whole school of contrapuntal writing reached its absolute culmination in the work of J. S. Bach. So, the general principles, though not necessarily the particular details, of the organs which inspired this music, and the requirements for faithful performance of this dominant portion of the organ repertoire, must be our starting-point for designing the modern organ.

The organ reform movement underway in Europe and America since the mid-20s has sought out these principles through diligent study and experimentation and they are now widely understood and practiced. Therefore, the technical principles we will adopt in developing an organ for today are these:

- The keys must be connected with the valves controlling the flow of wind to the pipes with direct mechanical action to provide responsive touch-sensitive control.
- The wind-chest construction should be of the key-chambered type enabling all pipes of each note to speak precisely together and to produce a prompt, easy speech and a well integrated ensemble.
- The manner of voicing the pipes should be such as to encourage natural, unforced speech using full low-pressure wind, without nicking, to produce a responsive, transparent, functional tone.
- The scaling of the pipes must be entirely empirical growing out of the parameters of each individual situation to produce good balance in each stop individually and within and between the various divisions of the instrument.
- The organ must be placed completely within the room it is to serve in a freestanding position oriented to project effectively toward the main listening area.

- The organ should be completely encased to provide proper blend, amplification and projection and to enhance the sound of the individual pipes through the resonant characteristics resulting from the unique dimensions of the enclosure.

These principles are now quite universally applied and are no longer debatable. But these are technical things and produce what are largely technical results, and there are now many examples to prove that an instrument that is technically correct may not necessarily be musically useful, at least so far as playing the existing literature is concerned. This clearly indicates a general lack of understanding, even today after nearly five decades of revived interest in the organ, of the basic requirements of the literature so far as the tonal design of the organ is concerned. The organ can no longer be justified as a technical plaything. If it is not musically effective, it has no reason for being, no matter how much pleasure the act of its construction has given to the tinkerers who have produced it. The making of a new organ is only justified when it is seen as an instrument for communicating musical ideas.

What then does the music need? Well, first of all, it needs what is needed by polyphonic music for any medium: a clear, transparent texture, whereby each of the horizontal lines may be heard distinctly; and it needs the singing quality that is essential to sustain the line of this flowing music.

Then, there are requirements that are peculiar to organ music. From the sectional nature of such works as Buxtehude's, especially in the chorale fantasias; from the works of Bach, and from works like the Bruhns prelude and fugue, for example, that will be played later on this evening, we learn that the separate, complete divisions of the organ, each with its own character and special timbre, are essential to the music. The intrinsic form of these compositions was inspired by the basic idea that gave shape to the tonal structure of the instruments. This concept of the organ we now call, in retrospect, the *Werkprinzip*. Its motivating principle was contrast and its fundamental effect was the basing of the chorus of each division within an instrument on a different pitch, and this then is essential to the music.

We have to be able to play off one division against another, producing contrasts, not just of dynamic level but of timbre, and, what is most often forgotten or ignored, contrasts of spacing or position. The move from Great to Positiv, for example, is so much more meaningful when the Positiv is in its traditional position behind the player (as it is in the Choate School organ), giving a greater contrast to the "conversational"-type changes of division. Also, the traditional registration for a Bach fugue in the so-called "sandwich" form, that is in the form A, B, A, means so much more when one begins on the Great, moves to the Positiv, then moves back to the Great and couples the two for the last section and, by so doing, makes not just an increase in dynamics but gives the thrilling effect of a gathering together of all the forces. Here again we're made to realise the importance of spatial separation.

From a study of some typical specifications of organs by master-builders of the period, we learn the nature of the stops required, and their use in the music of their time. We are also aided in our study by specific indications of registration given by the composers themselves, although these are admittedly rare in the polyphonic literature. We learn also that the delegation of the stops to their correct divisions is as important as their sound, or their scaling, or any other consideration, and indeed, it is their physical position in the instrument that determines matters such as scaling. For example, the first trumpet in a

German organ was always on the Great, and therefore it had a proportion and a presence that a trumpet placed elsewhere cannot possibly achieve. Its blending characteristics in the ensemble were also unique to its position. A trumpet scaled and voiced to stand elsewhere, no matter how skillfully, will not do.

If an organ is to be truly functional and useful to the music, these traditions regarding the location of stops must be followed. In the German organ, we find that the Great principal chorus, with a corresponding registration in the Pedal but there including also a light reed, was the "pleno" - and many of Bach's fugues are marked "pro organo pleno". Therefore, to play them faithfully, we need these choruses, and the kind of balance produced by this tradition of placement and scaling.

For Bach, a contrasting manual division is also required - an auxiliary pleno; one well-known instance where he himself indicates its use being the "Dorian" prelude.

With imagination, we see how third and fourth contrasting manual divisions might be used to advantage in Buxtehude, for example; as I said earlier, the sectional nature of the music itself, as well as our knowledge of the instrument, works this out for us. But there can be no doubt that the basic instrument of the period was a "pair of organs", that is a two-manual scheme.

I have spoken only of the principal chorus, but the idea of contrast was carried on through all the families of stops, and the contrast between the reeds of the different divisions was especially well established, either by timbre or by pitch. A second manual trumpet at 8' pitch was rare, and occurred only in large organs. Of primary importance was the contrasting of the trumpet of the Great (a tapered stop) with the krummhorn of the Positiv (a cylindrical stop). The vox humana was a favorite but always came after the trumpet and krummhorn. Stops of the regal and schalmei or oboe type were in two-manual schemes. Of course, there are exceptions to just about any generalization we make in this area. But on one point, I have found no exception: while mutation ranks of quint pitch were rather frequent, the independent tierce did not exist in North Germany during the baroque period. The tierce, when it occurred, was in a compound stop such as the sesquialtera or the terzian. The sesquialteras were of principal scale, that is to say they were narrow in tone and had a singing character.

Meanwhile, what was happening in France? Well, the French organ was taking an entirely different course and its music was therefore of quite another character. The French classical repertoire forms the next largest and most important body of music for our consideration, so let us look carefully at its nature and requirements. The essential difference is the emphasis in France upon colour. The decoration of plainsong themes, given out on the strong, penetrating reeds typical in French organs, may be said to have begun this tradition, and the music of France, both sacred and secular, has followed this trend right to the present day, when we can still hear this emphasis, sometimes using bizarre colouration effects, in the music of Messiaen, for example. Polyphony had not so great a part in forming the musical traditions in France, at least so far as the organ was concerned, so although a kind of Werkprinzip was followed and completely developed principal choruses were an essential part of the French organ, the mixtures were lower and scaled wider, so their effect was one of fullness and power. Thus the effect of the mixtures in the French Plein Jeu is rather different from the transparent shimmering texture of the mixtures in the German organo pleno. The stereotype for the French organ, for a period of about 200

years, took shape early in the 17th century, and from that time onward, it contained a profusion of wide-scaled mutations, which were used in various "jeux de combinaisons". We know a great deal about the nature of these "joux" from the copious writings of many French composers and organ experts including Mersenne, Couperin and Dom Bedos. Scores of suites akin to the one by Dandrieu to be heard later were written exploiting these traditional timbres and relying completely on them for their effectiveness: the interest lay not in complex lines of counterpoint, as in the German literature, but in expressive "mood music" wedded to, and entirely dependent on, particular sounds. Every division has its cornet, and the Grand orgue sometimes two - a Grand Cornet of limited compass mounted above the main wind-chest, plus the separate mutations which can be used together to provide another cornet effect of full compass. Whereas in Germany we can find well developed Pedal organs fully capable of complementing the Great division as early as the middle of the 16th century, in France, the Pedal division as such was very late in arriving, and for years it typically consisted of a single 8' flute (usually open) or an 8' reed, only rarely both; and as late as 1690, the four-manual, 37-stop organ in St-Gervais, an instrument I consider an ideal model, had only three stops in the Pedal - 8' flute, 4' flute and 8' trompette.

However, even more than in Germany, the distribution of stops among the manuals followed a strict pattern, and the music reflected this. If we are to play this literature with any meaning at all, these traditions must still be our guide as to the composition and distribution of stops on today's organs, and accorded an importance equal to the traditions of the German Werkprinzip.

The Romantic era brought a new kind of music altogether, but as the orchestra increased in size to cope with the requirements of this new music as created by such composers as Berlioz, Beethoven, Mahler, etc., so did the organ increase. This phenomenon is a rather mysterious one considering the lack of interest in the organ among the leading composers of the past century, but nevertheless, we will find that the most essential change in the nature of the organ caused by the spirit of Romanticism and its music, lay mainly in the realm of pure size. The importance of the orchestralism of these instruments has been generally over-emphasized. Their monumental dynamism is by far their most important feature and its exploitation has produced whatever can be considered worth-while in that portion of the literature they have inspired.

But, we are at the moment considering the basic organ, which is to say, one with two manual divisions, so let us restrict ourselves to what is already enough of a problem: how to bring together the French classical and German baroque traditions in one instrument. Now to point up the differences, let's hear a French fugue, one from a Couperin Mass, played with the typically German registration, principals and mixtures; and then with the registration given by Couperin and traditional to the French classical fugue, that is, reeds. Then we'll hear part of a Bach fugue treated similarly: first with the French registration, then as it is intended.

EXAMPLE 1:

Fugue sur la Trompette from Messe pour les Couvents - COUPERIN

- Played on the Great principal chorus
- Played on the Great trumpet 8', prestant 4'

EXAMPLE 2:

Extract from Fugue in G - BWV 541 - BACH

- Played on the Great reeds
- Played on the Great principal chorus

Well, the contrapuntal texture got rather lost, on the reeds, didn't it? And the Couperin was pretty dull, played with mixtures. But it was not only those technical analytical points that were noticeable; more important, the very character of the music was compromised - we tried in effect to change the nature and culture of an entire people, as displayed in their music. We in America have fought valiantly for the freedom of others because we value highly our own freedom. We should do no less for the culture of others because we just as certainly value our own. In fact, our culture is broader than any on earth because it is cosmopolitan and embraces the culture of many lands. It is not necessary for us to have a Rembrandt or a da Vinci repainted in the style of Sargent or Coply for us to appreciate and accept it as an important part of our cultural heritage. How, then, can we be satisfied with organs which prevent us from enjoying our musical heritage more fully? However, just as we must enjoy both Rembrandt and da Vinci with the same eyes, we must build organs that will serve equally well in the music of the two contrasting cultures we are considering.

Somehow, these two traditions have to be brought together. There are several ways we can approach the problem. one I suppose would be to adopt universally an attitude of insensitive indifference, as guides the work of many North American builders. Another might be to build a monster of hundreds of stops, with a built-in computer robot to stop the organists who play it from using all of it together, instead of selecting the correct "organs" from pieces from each period. Still another is to build specific instruments for each segment of the literature. But this would mean that, unless each place with an organ had at least two complete instruments, some important part of the literature would have to be entirely neglected. or, we can try to work out a system in which both schools are somewhat compromised but in which the functional essentials of both are given equal importance.

I have tried all of these approaches, except the first mentioned! My design for the First Church of Christ Scientist (the Mother Church) in Boston is missing only the robot. I have built several instruments in a strict modern North German manner, and several tipped strongly in a strictly French direction. After much study of the original sources and a very penetrating analysis of my own work, I think we have arrived at a new instrument - an organ for today. It is my very carefully considered opinion that the German music suffers less played on stops scaled rather more towards the flutiness of the French than does the French music when played on narrow German-type stops. To illustrate, let us hear part of a Bach chorale prelude using a sesquialtera combination which on this organ is rather flutey and thus more French than German; then we will simulate a narrow-scaled sesquialtera and use it in the traditional French tierce en taille combination in a Couperin Elevation.

EXAMPLE 3:

- Extract from "Nun komm, der Heiden Heiland" BWV 659 - BACH
- RH Positif bourdon 8', flute 4', nasard, tierce LH Recit flute 8', flute 4'
- Pedale soubasse 16', bourdon 8'

EXAMPLE 4:

- Elevation from Messe pour les Couvents - COUPERIN
- Played on tierce en taille combination using the Recit sesquialtera and other relatively narrow-scaled stops The Bach seems to me not to lose any of its character played thus, but all the warmth and richness of the Couperin is lost. Here it is again using the wider-scaled mutations, in the French manner:
- RH Great flute 8', 4'
- LH Positif bourdon 8', flute 4', quarte de nasard 2', nasard, tierce, larigot, tremulant Pedale soubasse 16', octave basse 8'

You will have heard in that demonstration how the French mutations, scaled correctly (that is, according to the original tradition), gave the piece a singing line and restored its spaciousness and elegance, indeed its entire character and personality, showing the extent to which German-type stops robbed the piece of its very substance. The effect is of course even worse when the single, integrated sound of either the French or the German combination of these components is replaced by stops of the appropriate pitches but unrelated by the builder to serve together, thus giving a disjointed collection of squeaks at miscellaneous pitches.

To me, eclecticism is anathema in any form of art, especially so in organ building, and nowhere is it more harmful than in voicing practices. The modern organ is a total concept and at no time does its totality suffer more than when mixed voicing techniques are used in the same organ. The idea that "a chifty stop here and there makes an organ more suitable for the old music" could not be more in error. Such an approach serves no purpose except to comment rather strongly on the builder's confused thinking. If the parts of the instruments are to function effectively together as in the work of the old master-builders, the total concept is of utmost importance. The pipes must speak naturally with open toes, they must be substantially nickless, they must be encased, the action should be tracker, and all portions of the pipework on a given chest must be designed to work on the pressure available.

The reeds are a special case. Today, some European builders are using higher wind pressures only because they have not the patience to develop effective low-pressure reeds - one of the hardest things to do in building an organ. Thus, pressures are sometimes used for the flue work that are much too high for the size of the room. So, many new instruments are much too loud and hard. In order to make it possible for me to choose just the right wind pressure for the space I am working in, I have developed a special type of low-pressure reed, after many years of experimentation. I believe these reeds will blend well with the flue work just because they are completely adaptable to each individual situation.

I have not mentioned the Italian and English schools, partly because their composers of the period we have been discussing produced less music for the organ, and partly because their music can be accommodated more than adequately on organs oriented towards the French and German traditions. The most significant of the English organs in any case owe much to their European counterparts and Renatus Harris, the most important of the English builders of the period, had strong French inclinations. English organs had no pedals at all until late in the 18th century, and their cornets and reeds were rather similar to the French. You will hear the Grand Cornet of this organ later in an old English Cornet Voluntary.

The Italian organ was light, singing and bright, and was designed chiefly for the accompaniment of voices. The music of both these schools, apart from the English trumpet and cornet voluntaries and a few works of Frescobaldi, was not particularly "of the organ" - you can play it equally well on just about any keyboard instrument, so it cannot be a major factor in influencing organ design, simply because of its flexibility.

Now, we come to the question of the larger organ - the third manual - about which more battles are fought and blood spilled than anything else on the organ front. Is it to be a French classical Recit, which had in the beginning only a cornet and a little later a reed, and was exclusively a solo division of very limited range? Is it to be a German Brustwerk with a chorus based on a 2' principal with a very high-pitched mixture and a 1' and/or 1 1/3' and a Regal or two? or is it to be a French Romantic type Recit in the manner of Cavallé-coll, which was nothing less than a second Great organ, but enclosed - one with 16', 8' and 4' reeds perhaps more powerful than the Great and intended to be more or less permanently coupled to the Great? or an English Romantic Swell with a stringy diapason, shrill "fifteenth" and thunderous reeds for swooping up and down behind Swell shutters portraying plagues of ants or eternal doom descending during the singing of the psalms for the day?

The solution will depend on the use to which the organ will principally be put, the room available, the size of the building, the overall nature of the organ, but most of all, it is a question of priorities, and it is now that we again turn to the existing repertoire and consider how much of it can be encompassed and which of it, in the name of commonsense, economy and discipline, we must discard. From this point on, the answer to these questions becomes chiefly one of size. We discover that the voicing techniques employed so as to render the polyphonic music in the best possible way also serve to the best possible advantage the French classical and Romantic literature, giving a new life and dimension to works by such as Mendelssohn, Widor, and so on, and revealing beauties which hitherto lay buried beneath fat, overblown trombas and indistinct tibia-like flutes. The overall sound, then, presents no conflict. The music of the most important French Romantics, such as Franck, Vierne, Widor, etc., call for such extras as a flute harmonique and celestes, and really very little else more than the classical requirements except for the enclosed large reeds. Since Brahms avowed a preference for the classic organ anyway, the German Romantics are represented in the main by Liszt and Reger, and this Wagnerian style music calls chiefly for huge dynamic changes, sweeping from pppp to ffff, preferably by means of the ingenious and highly useful (in this regard) "Rollerschweller". This is a more serious difference, because it means we must now look at the organ in an entirely different light from hitherto in this discussion.

The organ is seen by these writers not as a collection of organs - that is several independent divisions to be played off against one another - but as one enormous entity to be used in its entirety in continuous crescendi and diminuendi. Whereas couplers in the baroque and classical organ are not an essential part of its nature and its music, they are essential to the Romantic concept of the organ. The couplers are essential to the German Romantics, so the entire ensemble may be used in surging masses of indiscriminate tone, as described in the score. To the French and English, the couplers are essential so the large Swell, coupled more or less permanently to the Great, may use chiefly its reeds to add drama and mystery behind the Great foundation stops and to provide the buildups characteristic of the big movements of the Vierne and Widor symphonies, for example.

With an organ of 60 to 70 stops, I believe it is possible to have just about everything. The third division in this case becomes what for consistency of nomenclature we might call an oberwerk, and it will contain strings, a large open flute, perhaps a 16' bourdon or quintaton, a vox humana, an oboe, chorus reeds at 16', 8', and 4', and a second principal chorus at 8'. (The vox humana seems to suffer less than any other stop from being moved from the time-honoured position on the Great to the Swell where it also serves the purpose of Cesar Franck et al.)

The fourth division might then be a traditional German Brustwerk, or in large structures, perhaps it could be a French Bombarde carried to full maturity with a full battery of reeds and avant-garde type cornets and other compound stops. For a three-manual organ of between 40 and 50 stops, however, it is necessary to limit ourselves somewhat. In many cases, it is simply not possible for reasons of space and physics to fit an 8' chorus reed into the Swell box, and I believe (1) in the organ as essentially an uncoupled instrument, and (2) that the hautbois is a more necessary stop than a second trumpet. My compromise then is to make the hautbois telling enough for use in a moderate-sized build-up - as will be heard in the work by Frank Bridge - while maintaining its effectiveness as a traditional oboe solo stop as you will hear in the first Messiaen piece. The Great trumpet, which is, as I have said, traditionally always the first trumpet on the organ and remains so in my work, is intended and scaled for use in both French Basse de Trompette pieces and Grands Jeux Dialogues; and also for completing the full ensemble in German music. The Great is thus complete in itself, and need not look to a coupled swell for its reed complement. Of course, the large-scale works of Widor and Vierne will not be effective, although in performance some compromise may be worked by bringing the Great reeds on and off, but in fact, sheer size and weight of sound, together with a large, reverberant building, are as much factors in the effective performance of this kind of music as is the sound of the large Swell.

I therefore believe that it is at this point that we must make the decision as to what music not to play on this medium-sized organ, and the symphonic works of the Romantic era are those which are found to be least effective.

Lastly, we come to the demands of the music for today - and tomorrow. In all fields of musical composition today, the emphasis is on exploration of sound combinations - the more bizarre and outré, the better. An organ designed along the lines I have outlined will already contain within it a great many possibilities for experimentation with sound. Using the most traditional of timbres, Messiaen has shown us many new combinations of sounds; Ligeti, Felciano and others are finding even more way-out ways of

treating the traditional organ. There is little need to design specifically for the composers and improvisors of today. There is really just one way in which we may supply additional material, and that is to make more use of dissonant aliquot ranks - something I first experimented with in 1950 in the Mother Church, and which since then has gained in popularity, especially in Europe. Who knows what use will be made of these by the many composers who are being so much attracted to the new organ? I hope great and exciting new things will develop, but these added sounds must always be considered as extras to be included only after the organ is well provided with the essentials.

To sum up my philosophy (and therefore the philosophy that guided the design of Choate School's instrument) once more: I work, as I believe one can only logically work, always from the existing literature, and with the intention of providing the best possible functional instrument for the presentation of that literature. If the organ is beautiful as well, so much the better. But for me an organ is not a collection of miscellaneous sounds, however lovely: it is a sensitive medium for the performance of a significant corpus of musical works.