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The following paper,

A BRIEF FOR THE SYMPHONIC ORGAN

By

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P O S I T I F P R E S S · O X F O R D

A BRIEF FOR THE SYMPHONIC ORGAN

Part I

By the 1930s, the organ – at its best after centuries of progress – had achieved a level of musical expressiveness and technical sophistication that placed it in the mainstream of musical life. Its versatility in both accompanimental and solo rôles earned it recognition as a standard and accepted medium not only for sacred and art music but also in the commercial sphere where the cinema organ was a dominant voice. This is a condition of musical life hard to picture today since most of us grew up seeing the organ removed from the main stage and placed in the museum of early music. Even in the church, the accompanimental and emotive qualities of the organ have often been sacrificed on the altar of limited solo repertoire. I submit that the time has come to resume where the great innovators of organ-building left off and to continue the development of the organ's expressive qualities. If the organ is to retain its centrality in the church and re-gain general acceptance elsewhere, the symphonic organ, which successfully addresses issues of performance flexibility common to other mainstream musical media, must again become a serious pursuit of organ-builders.

An analysis of the several decades' cessation in the evolution of the organ should be the subject of another article save for two points. First, it must be admitted that one of the most compelling reasons for the success of the Organ Reform Movement was the sheer number of bad Romantic organs. I refer to those bereft of any connection with the age-old traditions of the craft – those either poorly designed or poorly made that only drew a caricature of Romanticism. Second, the voluminous research into our glorious past has produced many superb and delightful instruments and a wealth of scholarship, which most likely would not otherwise have resulted. Therefore, it is safe to say that the benefits from this hiatus in the evolution of the organ balance the damage done to Romantic organs in the wake of revision. It has also set the stage for what may be the greatest period in the organ's history, a time when symphonic organs will flourish along with organs dedicated to interpretation of specific solo repertoire, each type serving in the appropriate context. In fact, in the last few years such a trend has begun to emerge. Among the younger generation of organ scholars, there is great interest in all types of music and all types of organ. It is even possible that the days of academic judgment of organs and organists based on style will change to that based on musicianship and quality.

The Symphonic Ideal

Putting musical concepts into words is nearly impossible, certainly so without commonly accepted definitions. I selected the word "symphonic" to describe both the most sophisticated developments of the Romantic era and their further development today. Many have used the term "orchestral" to describe organs of the late Romantic period, but this is misleading. It implies imitating the orchestra, and, in the case of a cinema organ, replacing it. This is not what the organ can or should do. The term "symphonic" implies certain musical qualities. If it can describe a type of orchestra it should be able to describe a type of organ as well. Few will disagree that the modern symphony orchestra is the most expressive of all instrumental media. To be fully expressive a medium must be able to transmit faithfully the intellectual ideas and subjective moods of the composer to the listener in the most minute

detail. This is accomplished through form, rhythm, melody, harmony, dynamics, tone colour, articulation, accent, and phrasing. Other things being equal, the best medium will provide the most precise rhythm, the greatest clarity of melody and harmony, the widest dynamic range, the greatest variety in tone colour, and the most responsive control to provide articulation, accent, phrase, and form. Certainly our fine symphony orchestras have these qualities. Most organs do not. This is a shame, because the organ has the ability to surpass the orchestra in certain ways. First, the organ has a wider frequency range, stretching octaves below and above orchestral instruments. Second, the organ has a unique tone colour, the diapason chorus, an element of nobility and grandeur unsurpassed. Third, the organ has the (sometimes dubiously applied) ability for unlimited *sostenuto*. Used properly, this makes it possible to execute extremely long phrases (the grand line) as well as dramatic *crescendo, diminuendi* and exceptionally long *pp* chords. The strings of the orchestra can come near this quality, but the winds and the human voice cannot. Fourth, and by far most important, the organ is under the control of one artist. No matter how great the orchestra or the conductor, different musical minds are at work. A skilled artist in control of a responsive organ can infuse a work with a single-mindedness that is impossible with any group musical effort. Obviously, this advantage is even more important to the rendering of subtle accompaniments.

What great promise for expanded musicality the organ offers! This is certainly what drove organ-builders of the past to develop ever more expressive instruments. This quality is also what attracted huge audiences to the organ. But the challenges of realizing the full potential of the organ are great; perhaps some are insurmountable. The organ is, after all, a machine: sometimes a very large and complex one. No other instrument is less personal. Even on a modest instrument, the organist is separated from the pipes by enough mechanism to give the feeling of working by remote control. Consoles are often placed where it is impossible to hear balance and difficult to maintain rhythm. These and so many other roadblocks to musicianship lead one to believe that the organ is a monster daring people to tame it. Certainly the organist faces the most demanding challenge among all instrumentalists. Although it is deceptively easy for an amateur to make sounds of pompous grandeur and cheap sentiment, only an artist of great technical ability and depth of understanding can bring out the full expressive capabilities of the organ. If the organ is to become more accessible, it is important not only to develop its expressive range to symphonic proportions but also to increase its flexibility and ease of control.

Having briefly discussed the application to the organ of the term “symphonic,” meaning an instrument of greater expressive range than one designed for a specific part of the solo repertoire, we turn to the word ‘accompanimental’, which is equally important in this context. Most organs are in churches and most churches value accompaniments over solos. A good accompanimental organ requires all of the above-mentioned symphonic qualities. Actually, the requirements for accompaniment are greater than those for the Romantic and Modern repertoires. The organist is asked to accompany full congregations, professional choirs, children’s choruses, small ensembles of instrumentalists and singers, as well as soloists – all of these in music of every conceivable style, sometimes written for orchestra. The ideal accompanimental organ can provide any tone colour or blend of colours at any dynamic level. An organ dedicated to early music and without effective enclosure cannot do it. How many times have we heard conductors say, ‘That’s a nice sound, but it must be louder’, or ‘You have the right volume, but can’t it be of a different quality?’ Often the organist is at a loss to comply and must resort to adding or subtracting upperwork for loudness, and awkwardly transposing octaves to achieve a satisfactory tone colour. Usually these and other tricks fail to satisfy the conductor, who can only regret that he didn’t hire an orchestra in the first place. The best accompanimental organ must have the resources to make instant adjustments to fill the conductor’s requests in rehearsal and adjust to acoustical changes in performance. Without a well-placed and thoughtfully equipped console, this is often impossible. Many organs do not even have the wherewithal to accompany congregational singing, which requires an especially strong and prompt-speaking pedal bass to maintain tempo, and a dominant 8' line to lead melody. Most organs fail to deliver the most thrilling choir accompaniment effect the organ has to

offer: that of full diapason and reed choruses under perfect dynamic control to match the level of any ensemble. Service playing often requires certain special effects as well, such as the heroic Solo Tuba, the whisper-soft céleste, and quiet 32' tone. These effects are not strictly necessary on an organ dedicated to solo repertoire, but they are vital in church work. Musical scope is also important in church work because the organ must maintain the interest of musicians, clergy and parishioners week after week and year after year.

The need for expressive flexibility in accompaniment is perhaps the most important argument in favor of the symphonic organ, but there are others as well that apply in both sacred and secular venues. As a portrayer of the organ solo repertoire, the symphonic organ is obviously far more versatile than the repertoire-specific instrument. It is easier to fit pre-Romantic repertoire to the symphonic organ than it is to fit Romantic and Modern repertoire to the Classical or Baroque organ. There is a direct comparison in the orchestral world: it is easier to give a musically convincing performance of a Mozart symphony with a modern symphony orchestra than it is to attempt a Mahler symphony with a Classical ensemble of early instruments. Admittedly, an intriguing re-production of what Mozart might have heard in his day is only possible with the Classical orchestra, but a first-rate performance by a modern orchestra should be every bit as musically satisfying.

The quality and architecture of tone can be loosely compared with the accent and grammar of language. If the structure (architecture or grammar) is solid, the colour (quality or accent) can vary to a great degree and still preserve meaning. For example, Franck often requires an equally balanced duet between flute and trumpet. A neo-classic organ with a piercing schalmey and a soft rohrflöte cannot do justice to the music because the balance is wrong. However, a good Victorian organ with cornopean and claribel flute can. A listener with an open mind can enjoy the performance with a different quality of tone because the architecture is in place. The flûte harmonique and trompette are ideal, but the English accent can be equally interesting and musically valid. By the same token a Bach trio sonata can be musically effective without a North German accent if the balance among stops is correct.

Being a vehicle for improvisation and an inspiration for new compositions are two related imperatives for the symphonic organ. The greater the range of expressive possibilities, the greater the desire to stretch one's creative skill. Is it possible that a resurgence of inventiveness in symphonic organ-building could ignite a burst of compositional brilliance and improvisational creativity as did the symphonic organ of Cavaillé-Coll? Since the end of the Romantic period, most mainstream composers have ignored the organ. Could this be because of its many limitations and quirks?

Finally we come to the question of solo transcriptions. Some argue that transcriptions deserve no place in organ recitals because the proliferation of symphony orchestras and the universal availability of recordings and broadcasts have eliminated the need for the organ to bring symphonic music to the masses. This is true; and it is good news because it releases the organ from the onerous task of performing music ill-suited to it. With performers free to select only that music which translates best to the organ, transcriptions can be presented as an art-form in their own right. There are two good reasons to do this. First, hearing familiar music in a different medium is often enlightening. Sometimes aspects of the music are made more clear and benefit from a greater range of expression. Second, the organ, being under the control of one artist, can often render a more convincing performance than can an orchestra. There are many pieces that I, for one, would prefer to hear in transcription. There is, however, one cautionary note. Transcription should only be attempted by the very finest artists. Of late there has been something of a transcription fad. Inferior performances of unsuitable repertoire have further bolstered the arguments of transcription 'naysayers'. Therefore, since there is no need for solo transcriptions, they should be strictly limited to repertoire that is organistic in nature. (By the way, the same could be said of much contemporary church music: it is simply not organistic.) The only point to transcriptions nowadays is the creation of an artistic result in the same league as the organ's own repertoire. Even some very good musicians select poor material because in their mind's ear intricate

rhythms and the voicing of complex, dissonant chords are perfectly clear, even though they are not in the slightest bit clear to the listener, who is without a score and hears only the sound produced. It is obvious that an orchestrator has a great deal more freedom than even the finest organist on the finest organ in voicing complex harmony throughout the range of an orchestra. Pieces that require this kind of orchestration should be left to orchestras. (Of course, even symphony orchestras have their limits, which are clearly shown when they attempt swing music at Pops concerts.) There is a wealth of beautiful material available that is truly adaptable to the organ, and therefore broadens the organ's repertoire.

Is there a single test of an organ's symphonic qualities? Certainly the ultimate test is its usefulness and beauty in everyday work, but there is one quick trial that never fails to uncover holes in the fabric – the improvised build-up. If an organ can sustain interest over a long *crescendo* from *ppp* to *fff*, one which exhibits absolute smoothness with no gaps as tone colours merge, as patterns of rhythm, articulation and accent change, and as new pitches are introduced, the organ is likely to be able to perform well in a great range of solo and accompanimental roles.

Symphonic Design

There are seven characteristics that an organ must possess to be considered symphonic: variety of vividly differentiated tone colours; balance, both horizontal (tone) and vertical (pitch); clarity to define form and harmonic structure; wide dynamic range under effective control; a wind system that aids in rhythm and accent; an action system that facilitates accuracy, articulation, phrasing, and accent; comfortable, easy, and minute console control of all the organ's resources. Note the conspicuous absence of imitative orchestral voices on this list. The symphonic ideal has nothing whatsoever to do with imitating an orchestra; it has everything to do with giving the organ the same powers of expression that the symphony orchestra has. An organ can be symphonic without any of the voices that imitate orchestral instruments. The foundation and, indeed, the glory of the organ is its family of diapasons and other tones unique to the organ. The diapason chorus is to the organ as the string section is to the orchestra. It is its signature. The other tonal families add immeasurably to the organ, but without fully developed diapason tone, a symphonic organ is a failure.

Part II

The balance of this article will explore some of the methods used by Schoenstein in designing symphonic organs.

Tonal Variety

In planning a symphonic organ, no tone colour that might be useful is excluded from consideration, and if something new seems appropriate we will develop it. We see no problem in combining individual sounds from French, German, English and American traditions of different periods in one instrument. This may seem like a dangerous approach, and it is, for those who must follow only established rules. If, on the other hand, a designer has in mind a well-formed image of the tonal architecture and its end-result, the freedom to include elements of rare beauty handed down to us by the great builders of the past can open new avenues of creativity. This approach is only successful when applied with the strictest of discipline. Anything which does not blend and pull its weight in the ensemble, or serve in a variety of solo or accompaniment rôles should not be included. On the other hand, collecting multiple elements of different traditions in an attempt to combine two or more repertoire-specific instruments into one is usually disastrous. Fortunately, the once-popular procedure of building an organ with a German Great and Positiv and French Swell, or adding a Romantic Solo to a Neo-Classic design, has lost its appeal. The goal should be to create an ensemble that has integrity in its own right and is able to

acquit itself musically in a number of different styles with such conviction that there is no need to claim 'authenticity.'

An equally important rule of design is to avoid making an instrument any larger than necessary or practical. No organ should have more stops than it needs to get its musical job done. No organ should be so large that it becomes unserviceable or acoustically chokes on its own bulk. When too much organ is squeezed into too little space and/or spread hither and yon, maintenance and tuning problems are sure to result. An organ should be of adequate size to be considered symphonic, but that size is much smaller than one might think. A small organ we have made that can qualify is the 15-voice, 17-rank instrument in the chapel of the University of St. Thomas, Houston, Texas (see stoplist). Certainly 40 to 50 voices provide ample opportunity for design freedom, and 60 to 70 voices are all that should be required even for very big buildings. An example of our approach in a large symphonic plan is at First Plymouth Congregational Church in Lincoln, Nebraska (see stop list). Note that this instrument has 73 voices if the separate gallery organ is not included.

Our stop lists show how we combine various tone colours, but a few explanatory notes may be in order. Combining individual stops into groups, we think of them in these categories: first, traditional choruses of diapasons and reeds; second, stops of moderate power from all tonal families serving in both accompanimental (manual and pedal) and in solo rôles; third, ethereal stops – the extremely soft and delicate tones of the flute, string or hybrid type; fourth, bass stops of exceptional depth and power; and fifth, heroic solo stops. Some stops, of course, can fit into more than one of these categories, but the classification is useful in reviewing whether or not the organ has all of the tonal characteristics common to a good symphonic ensemble.

CHAPEL OF ST. BASIL, UNIVERSITY OF ST. THOMAS, HOUSTON, TEXAS
SCHOENSTEIN & CO. – ELECTRIC-PNEUMATIC ACTION

GREAT (*I - Expressive*)

16'	**Corno Dolce**	12	Pipes
8'	**First Open Diapason**†	61	"
8'	**Second Open Diapason**	61	"
8'	**Harmonic Flute** (*Corno Dolce Bass*)	42	"
8'	**Corno Dolce**	61	"
8'	**Flute Celeste** (*TC*)	49	"
8'	**Salicional** (*Swell*)		
4'	**Principal**	61	"
2'	**Mixture** (*III*)	183	"
8'	**Clarinet**	61	"

Tremulant
Great Super Octave
†*First Open Diapason is in display*

SWELL (*II - Expressive*)

16'	**Bourdon** (*Wood*)	12	Pipes
8'	**Salicional**	61	"
8'	**Stopped Diapason** (*Wood*)	61	"
8'	**Gamba**†	61	"
8'	**Gamba Celeste**†	61	"
8'	**Corno Dolce** (*Great*)		
8'	**Flute Celeste** (*Great*)		
4'	**Salicet**	12	"
4'	**Chimney Flute**	61	"
4'	**Corno Dolce** (*Great*)		
4'	**Flute Celeste** (*Great*)		
$2^2/_3$'	**Twelfth** (*TC - From Nineteenth*)		
$2^2/_3$'	**Nazard** (*From Chimney Flute*)		
2'	**Fifteenth** (*Extend Salicet*)	12	Pipes
$1^1/_3$'	**Nineteenth**	54	"
16'	**Bass Tuba**†	12	"
8'	**Tuba Minor**†	61	"

Tremulant
Swell Sub Octave
Swell Nominal Pitch Off
Swell Super Octave
†*Gamba, Gamba Celeste and Tuba in separate Solo expression box inside Swell box.*
Solo chest prepared for Tierce Mixture, 8' Oboe, and 4' extension of Tuba.

PEDAL

16'	**Diapason** (*Extend 1st Open Diapason*)	12	Pipes
16'	**Corno Dolce** (*Great*)		
16'	**Bourdon** (*Swell*)		
8'	**Open Diapason** (*Great Second Open*)		
8'	**Corno Dolce** (*Great*)		
8'	**Stopped Diapason** (*Swell*)		
4'	**Octave** (*Great First Open*)		
4'	**Flute** (*Great Harmonic Flute*)		
16'	**Bass Tuba** (*Swell*)		
8'	**Tuba Minor** (*Swell*)		
4'	**Clarinet** (*Great*)		

COUPLERS

Great to Pedal
Great to Pedal Super Octave
Swell to Pedal
Swell to Pedal Super Octave
Swell to Great Sub Octave
Swell to Great
Swell to Great Super Octave

MECHANICALS

Solid State Capture Combination Action with:
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- Programmable piston range for each memory level

4 Reversibles including Full Organ
3 Balanced Swell pedals
Cymbelstern reversible

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SCHOENSTEIN & CO. – ELECTRIC PNEUMATIC-ACTION

GREAT (*II*)

16'	**Double Open Diapason**	61	Pipes
16'	**Contra Gamba**	12	"
16'	**Lieblich Bourdon** (*Chimney Flute Treble*)	12	"
8'	**Large Open Diapason**	61	"
8'	**Open Diapason**	61	"
8'	**Small Open Diapason**†	61	"
8'	**Gamba**	61	"
8'	**Harmonic Flute**	61	"
8'	**Corno Flute** (*Wood, Harm. Flute Bass*)†	49	"
8'	**Chimney Flute**	61	"
8'	**Quintadena**†	61	"
8'	**Erzähler**†	61	"
4'	**Principal**	61	"
4'	**Gambette**†	61	"
4'	**Spire Flute**†	61	"
4'	**Fernflöte** (*Stopped Metal*)†	61	"
2'	**Fifteenth**	61	"
$2^2/_3$'	**Cornet** (*TC - II Ranks*)	84	"
2'	**Mixture *mf*** (*III Ranks*)	173	"
2'	**Mixture *f*** *(IV Ranks*)	217	"
8'	**Posaune**†	61	"
	Tremulant†		
	(*Choir Reeds on Great*)		
16'	**Bass Horn**		
8'	**Trumpet**		
4'	**Clarion** (*Celestial Reeds on Great*)		
16'	**Ophicleide**		
8'	**Tuba**		
4'	**Tuba Clarion**		

†*Stops on Echo Great Chest*

SWELL (*III - Expressive*)

16'	**Bourdon** (*Wood*)	12	Pipes
8'	**Open Diapason**	61	"
8'	**Bourdon** (*Wood*)	61	"
8'	**Gamba**	68	"
8'	**Voix Céleste** (*FF*)	63	"
8'	**Cor Seraphique** (*Celestial*)		
8'	**Voix Angelique** (*Celestial*)		
4'	**Gemshorn**	61	"
4'	**Harmonic Flute**	61	"
4'	**Cor Seraphique** (*Celestial*)		
4'	**Voix Angelique** *(Celestial*)		
2'	**Flageolet**	61	"
2'	**Mixture *mf*** (*III Ranks*)	161	"
2'	**Mixture *ff*** (*III-V Ranks*)	269	"
16'	**Bassoon**	61	"
8'	**French Trumpet**	61	"
8'	**French Oboe** (*Bassoon Bass*)	37	"
8'	**English Oboe**	61	"
8'	**Vox Humana** (*Variable Tremulant*)	61	"
8'	**Vox Humana** (*Celestial*)		
4'	**Clarion**	61	"
	Tremulant		
	Gallery Solo Stops on Swell		
8'	**Open Diapason**		
8'	**Harmonic Flute**		
8'	**Oboe**		
8'	**Harmonic Trumpet**		

CHOIR (*I - Expressive*)

16'	**Éolienne**	12	Pipes
8'	**Dulciana**	61	"
8'	**Concert Flute** (*Wood-Lieblich Ged. Bass*)	49	"
8'	**Lieblich Gedeckt** (*Wood & Metal*)	61	"
8'	**Éolienne**	68	"
8'	**Éolienne Céleste** (*GG*)	61	"
4'	**Fugara**	61	"
4'	**Forest Flute** (*Open Metal*)	61	"
$2^2/_3$'	**Twelfth** (*TC*)	49	"
$2^2/_3$'	**Nazard** (*Chimneyed*)	61	"
2'	**Salicet**	61	"
2'	**Harmonic Piccolo**	61	"
$1^3/_5$'	**Tierce** (*TC*)	42	"
$1^1/_3$'	**Nineteenth** (*TC*)	42	"
1'	**Twenty-Second**	49	"
8'	**French Cornet** (*TC - V Ranks*)	210	"
16'	**Bass Horn**	12	"
8'	**Trumpet**	61	"
8'	**Flügel Horn**	61	"
8'	**French Clarinet**	61	"
4'	**Clarion**	61	"
	Tremulant		
8'	**Tuba Magna** (*Solo*)		
4'	**Tuba Magna** (*Solo*)		

SOLO (*IV - Expressive*)

8'	**Stentor Gamba**	68	Pipes
8'	**Gamba Celeste**	68	"
8'	**Böhm Flute**	61	"
8'	**French Cornet** (*Choir*)		
16'	**Bass Clarinet**	61	"
8'	**English Horn**	61	"
8'	**French Horn**	61	"
8'	**French Clarinet** (*Choir*)		
8'	**Corno di Bassetto**	61	"
4'	**Cor Sopranino**	61	"
8'	**Clarinetti** (*III*)		
	Tremulant (*Variable Speed*)		
8'	**Tuba Magna**		
	(*AA-Unenclosed*)	44	"

CELESTIAL (*IV - Expressive*)

In separate enclosure inside Solo box

16'	**Ophicleide**	61	Pipes
8'	**Tuba**	61	"
4'	**Tuba Clarion**	61	"
8'	**Tuben** (*III - Swell*)		
8'	**Cor Séraphique**	68	"
8'	**Voix Angelique** (*AA*)	59	"
8'	**Vox Humana**†	61	"
2'	**Tierce Mixture**	258	"
	(*TC IV-VI Ranks*)		

†*In separate enclosure inside Celestial box*

GALLERY (*Floating Expressive*)

16'	**Stopped Bass** (*Wood*)	12	Pipes
8'	**Open Diapason** (*Unenclosed*)	61	"
8'	**Stopped Diapason** (*Wood*)	61	"
8'	**Harmonic Flute**	61	"
	(*Bass unenclosed*)		
8'	**Salicional**	61	"
4'	**Principal**	61	"
4'	**Chimney Flute** (*GG*)	54	"
4'	**Salicet**	12	"
$2^2/_3$'	**Nazard** (*From Chimney Flute*)		
2'	**Fifteenth**	12	"
2'	**Mixture** (*IV Ranks*)	244	"
16'	**Contra Oboe**	12	"
8'	**Oboe**	61	"
	Tremulant		

ETHEREAL (*Floating with Gallery*)

In separate enclosure inside Gallery box

8'	**Voix Sérénissime** (*II Ranks*)	127	Pipes
8'	**Harmonic Trumpet**	61	"

GALLERY PEDAL

16'	**Contra Bass** (*Wood*)	12	Pipes
16'	**Stopped Bass** (*Gallery*)		
8'	**Bass**	32	"
8'	**Stopped Diapason** (*Gallery*)		
4'	**Octave Bass**	12	"
16'	**Contra Oboe** (*Gallery*)		

PEDAL (*Expressive*)

32'	**Major Bass** (*Resultant*)		
32'	**Contra Gamba** (*Unenclosed*)	12	Pipes
32'	**Sub Bass** (*Resultant*)		
16'	**Open Wood**	32	"
16'	**Open Diapason** (*Great*)		
16'	**Gamba** (*Great*)		
16'	**Violone** (*Wood*)	32	"
16'	**Sub Bass** (*Wood*)	32	"
16'	**Lieblich Bourdon** (*Great*)		
16'	**Éolienne** (*Choir*)		
16'	**Bourdon** (*Swell*)		
8'	**Open Bass**	12	"
8'	**Principal**	32	"
8'	**'Cello**	12	"
8'	**Flute** (*Great*)		
8'	**Stopped Bass** (*Wood*)	12	"
8'	**Bourdon** *(Swell*)		
4'	**Octave**	12	"
4'	**Flute** (*Great*)		
32'	**Contra Trombone**	12	"
16'	**Trombone**	32	"
16'	**Bassoon** (*Swell*)		
16'	**Bass Clarinet** (*Solo*)		
16'	**Bass Horn** (*Choir*)		
8'	**Tromba**	12	"
8'	**Posaune** (*Echo Great*)		
8'	**Corno di Bassetto** (*Solo*)		
4'	**Octave Tromba**	12	"
4'	**French Clarinet** (*Choir*)		
8'	**Pizzicato Bass**†		

†*Draws 8' Open Bass through Pizzicato touch relay*

INTRAMANUAL COUPLERS

Great unison off
Swell 16', Unison Off, 4'
Choir 16', Unison Off, 4'
Solo 16', Unison Off, 4'
Gallery 16', 4'
Above couplers read through Intermanual Couplers.

SPECIAL COUPLERS

Swell to Great Sforzando
Solo to Great Sforzando
Above couplers activated by momentary touch toe lever
Pedal Divide
All Swells to Swell

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- 15 reversibles including Full Organ

Expression shoe selector
Vox Humana expression and Tremulant speed selector
Crescendo Pedal
Separate two manual console for Gallery Organ

INTERMANUAL COUPLERS

Echo Great	to	Choir	Choir	to	Swell
Echo Great	off	Great	Solo	to	Swell
Great	to	Pedal	Great	to	Choir
Swell	to	Pedal	Swell	to	Choir
Choir	to	Pedal	Solo	to	Choir
Solo	to	Pedal	Pedal	to	Choir
Swell	to	Great	Gallery	to	Pedal
Choir	to	Great	Gallery	to	Great
Solo	to	Great	Gallery	to	Swell
			Gallery	to	Choir
			Gallery	to	Solo

Since the diapason is unique to the organ and the tone most often used, we seek to provide several (with appropriate chorus development), each of distinct character, on organs of even modest size. They vary not only in scale, but in mouth width, slotting, etc. We like to include stops of the echo diapason class (dulcianas, salicionals, etc.) as well. During the Organ Reform Movement, open flutes, particularly at 8' pitch, were not in vogue. We tend to include more open than stopped flutes. Stops of genuine string tone have not been popular either. This is a sad omission, and certainly an organ without them cannot be considered symphonic. We like to include a family of strings and célestes from very narrow to very broad scale, all with true string quality rather than the geigen principal type that served as string tone in Neo-Classic organs. We try to include at least one of each of the colour reeds (clarinet, oboe, vox humana and, where possible, horns, and specialty stops such as the Orchestral Oboe) as well as a complete chorus of trumpet tone (in large schemes, those of both closed and open shallot type). To broaden both dynamic and colour ranges, very soft flue stops (often of the hybrid, tapered types) and bold solo stops (usually of the trumpet or tromba class) are important. In small schemes these effects can be had with stops doing double duty through effective expression.

We have developed several new voices. Some of these are variations on long-established styles such as our Celestiana, which is a very narrow-scale, quarter-tapered hybrid of clear but very soft flute tone; the Cor Seraphique with its Vox Angelique céleste is a larger scale version. Our Corno Dolce and Flûte Céleste are brighter renditions of the E. M. Skinner Flauto Dolce and Flûte Céleste. We find this bright character more generally useful in smaller instruments. The Voix Sérénissime is a small scale-string of extremely keen intonation, but soft. The Silver Flute is a narrow-mouth, non-harmonic version of our large Harmonic Flute. It may be thought of as a metal Claribel Flute.

The Symphonic Böhm Flute is an innovation incorporating many different pipe constructions throughout its compass to achieve an interesting effect found in the orchestra's family of traverse flutes. The flute of the symphony orchestra is bright and reed-like in its lower register with a full, increasingly powerful and pure, bell-like treble. These tone qualities are carried downward to the alto, bass and contra-bass flutes and upward to the piccolo. The Symphonic Böhm Flute was realized after extensive studies with flute players and manufacturers, as well as a careful review of Böhm's treatise. The tonal character is achieved, as in real flutes, by maintaining nearly the same diameter from bass to treble. The diameter progresses unevenly to achieve particular effects, but it does not reach the half-way point until the 48th pipe. The pipes in the bass are therefore of string scale, progressing through principal, moderate flute, wide flute, to very wide flute at the top. Pipe construction is of five varieties: slotted; non-slotted; harmonic; double-mouth harmonic; and double mouth, double harmonic. This new solo colour for the organ is both powerful and beautiful.

We employ high wind pressure for beauty, precision, or smoothness of tone where it is required. Solo flutes and strings and all closed-shallot chorus reeds certainly have benefited from this treatment. Loudness can be achieved by other means, but carrying power without harshness is most perfectly achieved through heavy pressure.

A final note on tone is perhaps the most important point in this essay: beauty of tone overrides all else in organ design. Beauty is perhaps too simple a term. Organ stops of great character can be quite bold and assertive, colourful and mysterious, languid and wistful. They are all forms of beauty to my ear. The secret is committed voicing. By that I mean making tone that has something to say, not simply playing it safe with blandness. Anybody who studies organ tone knows what I mean. Great voicing imparts something extra to energize a tone and make it appealing. A single diapason of beautiful quality will outplay a 100-rank organ which is all bluster and blandness. An organ may look symphonic on paper, but if the character of tone is not beautiful, it cannot qualify. An organ of any type with beautiful tone will surpass a poor symphonic one. However, if beauty of tone can be combined with all of the flexibility promised in the symphonic ideal, the result can be sublime.

Balance

To achieve balance there must be a center of gravity, and in the symphonic organ it is at 8' in the manuals. Each division should lay its foundation at the 8' level. This, after all, is where the music is written. In our symphonic concept, upperwork is considered a colouring agent, a way of adding a distinctive character to the 8' line. Therefore, in chorus design, as a general rule, scales decrease as pitch levels increase. Where we have the luxury of two mixture stops in a division, we vary them in colour and dynamic rather than pitch: for example, one at *mf* and another at *ff* or one with a tierce and one without. Sometimes the mixture is enclosed separately. We avoid flutiness and over emphasis of off-unison pitches in upperwork; pure, clear diapason tone is the goal. Most 8' stops, particularly those which must blend with related upperwork, have high harmonic content, a satisfying brilliance in their own right. Eight-foot stops are regulated in a treble-ascendant fashion to emphasize the melody line; pipes become slightly louder as they ascend the compass from the middle of the keyboard.

Horizontal balance is equally important, and we believe that all of the manual divisions should be of adequate power to balance one another, the Swell and Great approximately equal and the Choir only slightly below. Reeds and flues should be equally balanced, but in certain acoustical situations the reeds should dominate. In dealing with chambers, or in rooms of dry acoustic, open flute, string, and chorus reed tone are far more effective in producing tone of noble and powerful character than is diapason upperwork.

Clarity

One only has to see the density of a Reger, Widor, or Elgar score to realize that clarity is vitally important in Romantic and Modern music – as much as in early music. Many organs just present great blocks of sound. This may be titillating, but it is not music-making. The notes must be heard if the intent is to be expressed. Most of the burden of clarity rests on the organist, who must judge his instrument and his acoustic; but the organ must not stand in his way. Clarity is achieved in an organ by many means including steady wind; precise action; voicing for prompt, clean attack; and clear tone that is steady and free of irritating chiff, wild harmonics, and white noise.

Enclosure

There are vital qualities of freshness and presence associated with unenclosed pipework, but we believe that having pipes unenclosed is a luxury that can only be afforded in a scheme which also has a full range of resources, including Pedal stops, enclosed in at least two boxes. In smaller jobs the entire organ should be under expression, although sometimes circumstances dictate otherwise, for example where the Great must be placed forward of the Swell. In very large jobs it is good to have tones of similar character enclosed and unenclosed so that each class of tone can be used in its full range of expressive beauty. The best enclosure is masonry. Hollow brick faced with cement is the preferred construction and this points out the advantage of organ chambers in some situations. If an organ is primarily used for accompaniment where dynamic control and atmospheric, ethereal effects are of utmost importance, a chamber properly designed and located is ideal. An enchambered organ is as different from an encased free-standing one as a piano is from a harpsichord. Each has its advantages and each must be designed differently. The enchambered organ requires a stop-list emphasizing stops scaled and voiced for exceptional projection and carrying power; higher wind pressure; and a layout taking maximum advantage of the opening and preventing echoes within the chamber. In recent years chambers have been thoughtlessly despised. It is time to recognize their value as a means of increasing the range of musical options offered by the organ.

Dynamic Control

The symphonic organ must provide the organist with three distinct types of dynamic control: continuous, discrete-terraced, and sudden. These are all qualities common to the symphony orchestra, but often illusive on the organ. The continuous dynamic is achieved on the organ only through the use of the expression box and shades. A good expression box when fully open should not rob the pipes of clear projection and presence to any great degree, but when closed should reduce loudness from at least *ff* to *p*. To achieve this, a box must be reasonably sound-proof (with adequate density to control leakage of bass) and must be well sealed when closed: gaps are anathema to good expression-box control. The shades cannot be too thick; their bulk will not permit a full use of the opening. Shades should be able to open 90°. They must be fast-acting and silent. Achieving smooth, continuous expression control is one of the greatest challenges in organ-building.

To achieve a continuous dynamic range from *fff* to *ppp* we have developed a system of double expression, placing a box within a box (see Figure 1). The inner box is placed at the rear of the outer main box so that there is a large air space between the two sets of shades. When both sets of shades are closed, the space contained between them provides a very effective sound-trap. We place the softest and most powerful sounds inside the inner box of the division: for example, a pair of ethereal strings and the Vox Humana; the high-pressure chorus reeds and a mixture. A balanced expression pedal is provided at the console for each box. On large instruments a switching system allows the organist to select conveniently which shades are to be assigned to each balanced pedal. With the shades not quite fully open, the stops within the inner box are at a normal volume level to balance the rest of the division. With both sets of shades fully closed, the soft stops in the inner box are reduced to near-inaudibility and the chorus reeds are reduced to the level of colour reeds. With all shades fully open, the chorus reeds and mixture are slightly louder than those of the Great. The Vox Humana usually has its own shades with a console switch to shift from *pp* to *mf*. There are many expressive possibilities with this system. For example, a *crescendo* may be started using the ethereal strings with both boxes closed, opening the inner box until the level is equal to the soft stops in the outer box, which are then added. The outer box is opened, adding stops in the normal manner while closing the inner box. The chorus reeds and mixture are drawn and the inner box re-opened to complete the *crescendo*. This is done with ease after a bit of practice. During the installation of our organ in Washington, D.C. at St. Paul's

Church, Music Director Jeffrey Smith accompanied the Anglican choral service with nothing more than the Swell Organ for over a month. It was the double box arrangement that made this possible.

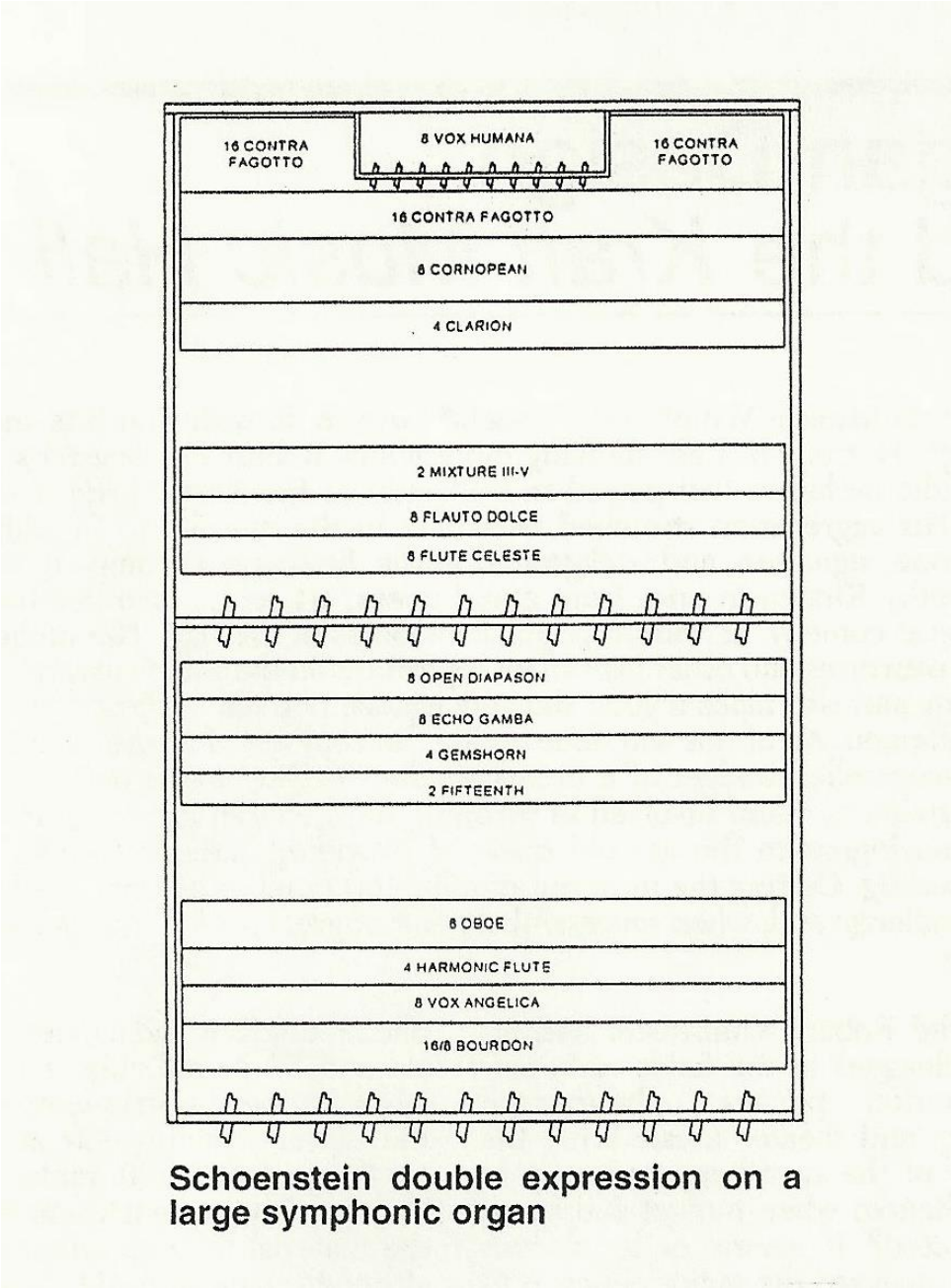

Figure 1. Schoenstein system of double expression.
The softest and loudest voices are placed
under separate control to extend the dynamic range.

The discrete-terraced dynamic requires having an adequate number of stops of similar or related tonal quality at different dynamic levels so that increased power is achieved in increments by adding stops. This effect is realized by hand registration, pistons, or a well-arranged *crescendo* pedal.

The third character of dynamic – sudden change – is usually done with manual shifts, second touch, very fast-acting expression shades, or a silent, fast and uniform stop-action controlled by either the combination action or the *crescendo* pedal and backed up by a steady, responsive wind system. Without this, a symphonic approach to organ playing is impossible. Clattery mechanism is annoying under any circumstances but especially so when sudden changes are required in the midst of a phrase, for example

one to underscore an anthem or hymn text. We have introduced a device that adds another means of accent. This is the s*forzando* coupler. It is a simple device wherein a coupler, for example Solo to Great, is made available through a momentary-touch toe lever. A *fff* combination can be set on the Solo and added to a *ff* combination on the Great at a climactic point with a brief touch of the lever to create a *sforzando* effect.

Wind System

There has been much discussion in recent decades about the virtue of flexible or 'living' wind. If the wind supply were under the direct control of the player, to be manipulated at will, there might be some point to argue. Since it is not, unsteady wind has no place in the symphonic organ. The whole point of the symphonic approach is to seek absolute control by the organist of all resources. So-called flexible wind is set in motion according to the design of the system and the demands being placed upon it. The organist can strive to achieve a reasonably pleasant effect, but he cannot have full control over the result. We believe in providing absolutely steady wind using a multiplicity of regulators, not only to make available different wind pressures, but to assure consistent response from all pipes under all playing conditions. Most chests are fed by at least two steps of regulation, each with spring control, so that the final regulator in the system does not have too much differential for which to compensate. A moving bass line should not upset the treble; intervals and chords should not de-tune when wind demand is high. It is important also for the wind system to have more than adequate capacity to handle any demand and to have quick refill response so that *staccato tutti* chords will sound as firm and full as they do in the orchestra. All too often, organs with great nobility of sustained tone turn into gasping caricatures when the forward motion of the music goes beyond their limits.

Another important wind system effect is a beautiful vibrato. We have developed a Variable Tremulant device which allows the organist to control the speed of the beat from a balanced pedal at the console. We employ this normally on solo stops such as our Symphonic Flute. The normal, completely metronomic tremulant of the organ seems somewhat unnatural when applied to lyrical passages. The Variable Tremulant allows the organist to simulate the more subtle vibrato used by first-class instrumentalists and singers. The Vox Humana is also provided with a slow/fast tremulant switch, to fit both general and French Romantic repertoire.

Action

Speed and precision of both key and stop action are critical to the success of a symphonic organ. Key action must be lightning fast on both attack and release and respond uniformly from all keys regardless of the number of stops or couplers employed. Stop action must be fast and clean, i.e., without any hesitation or gulping on draw or release. Again, the entire action system must be silent. To meet these requirements we use electric-pneumatic action with an individual-valve windchest. (soundboard) (see Figure 2). The expansion cell provides a cushioning effect similar to that of a note channel in a slider chest. It also allows placement of all action components near one another on the bottom board to reduce action channeling and increase speed.

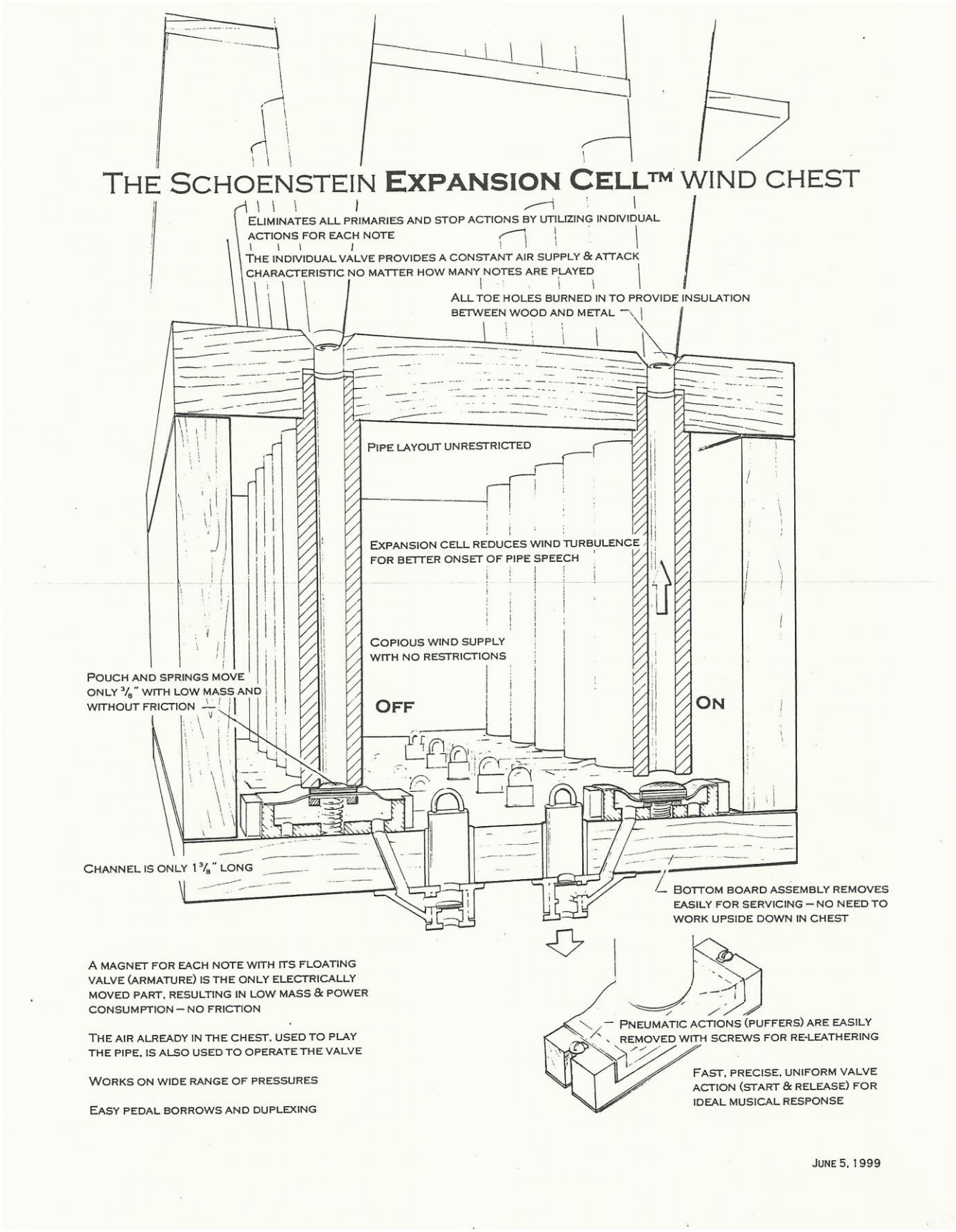
THE SCHOENSTEIN EXPANSION CELL™ WIND CHEST
ELIMINATES ALL PRIMARIES AND STOP ACTIONS BY UTILIZING INDIVIDUAL ACTIONS FOR EACH NOTE
THE INDIVIDUAL VALVE PROVIDES A CONSTANT AIR SUPPLY & ATTACK CHARACTERISTIC NO MATTER HOW MANY NOTES ARE PLAYED
ALL TOE HOLES BURNED IN TO PROVIDE INSULATION BETWEEN WOOD AND METAL
PIPE LAYOUT UNRESTRICTED
EXPANSION CELL REDUCES WIND TURBULENCE FOR BETTER ONSET OF PIPE SPEECH
COPIOUS WIND SUPPLY WITH NO RESTRICTIONS
POUCH AND SPRINGS MOVE ONLY 3/8" WITH LOW MASS AND WITHOUT FRICTION
OFF
ON
CHANNEL IS ONLY 1 3/8" LONG
BOTTOM BOARD ASSEMBLY REMOVES EASILY FOR SERVICING – NO NEED TO WORK UPSIDE DOWN IN CHEST
A MAGNET FOR EACH NOTE WITH ITS FLOATING VALVE (ARMATURE) IS THE ONLY ELECTRICALLY MOVED PART, RESULTING IN LOW MASS & POWER CONSUMPTION – NO FRICTION
THE AIR ALREADY IN THE CHEST, USED TO PLAY THE PIPE, IS ALSO USED TO OPERATE THE VALVE
WORKS ON WIDE RANGE OF PRESSURES
EASY PEDAL BORROWS AND DUPLEXING
PNEUMATIC ACTIONS (PUFFERS) ARE EASILY REMOVED WITH SCREWS FOR RE-LEATHERING
FAST, PRECISE, UNIFORM VALVE ACTION (START & RELEASE) FOR IDEAL MUSICAL RESPONSE
JUNE 5, 1999

Figure 2

The most important musical advantage of individual valves is the elimination of interdependence of pipes. With the exception of mixtures, where all pipes of a given note always speak together, we consider it a serious musical defect to place pipes on a common channel where the wind characteristics are different depending on the number of stops drawn and where there is a possibility of negative interaction within the channel. This is especially true, of course, with combinations of reeds and flues on the same channel and/or several large stops using copious wind. Each pipe should produce the same sound each time it is played, no matter how many others are combined with it. As with flexible wind, the organist loses a degree of control over his instrument if random changes in pipe response can occur.

The most important reason for absolute uniformity of chest response under all conditions is the fact that pipes do not have the flexibility to adjust for variations in attack, wind supply, and release as do other wind instruments. A trumpet player, for example, can adjust attack, tone colour, and release to an amazing degree of subtlety through precisely coordinated changes in breath, diaphragm, throat and mouth shape, tongue motion and position, embouchure, mouthpiece pressure, etc. In an organ, all of the analogous elements of control are set in place permanently by the voicer with the sole exceptions of wind regulator (diaphragm) and pipe valve (tongue motion). The pipe cannot change to accommodate variations in valve action and wind supply. As described before, wind supply cannot be controlled by the organist. This leaves the valve as the only means of control – and that control is limited even on the best mechanical actions. I submit that this element of control is actually a negative because variations in valve action, being different from the one experienced by the voicer, will be more likely to degrade pipe speech than to enhance it. If the key touch can affect attack and release but not all the other elements of tone production, then it follows that the organist is placed in the position of devoting his thought and energy toward avoiding ugly effects instead of concentrating on elements of performance that can be under precise and complete control. By maintaining absolute uniformity the performer knows what will happen every time a pipe is played.

Rather than searching for the elusive quality of touch control on the organ, we believe it is best to enhance speed and accuracy of response. The best way for an artist to achieve lyrical phrasing, clear articulation, and accent is through absolute control of timing. This is facilitated by keyboards with an articulated touch, providing a definite feel of the electric contact point, and an action that is immediately responsive both on attack and release. A sensitive player can then realize the most intricate and subtle musical ideas on what is essentially a large machine. The more the mechanism gets in the way of performance, forcing certain techniques, the less artistic freedom one has and the further the organ strays from the mainstream of instrumental and vocal music.

Flexible Control

We seldom acknowledge that the organist assumes the rôles of orchestrator, conductor and instrumentalist – a daunting task to say the least. In effect, he is given nothing more than the kind of three-stave sketch that a composer might give to an orchestrator. The decisions an organist must make about registration are directly analogous to the orchestrator deciding on instrumentation, doubling, voice leading, chordal balance, etc. Since the organ is really a collection of instruments, the organist also has the conductor's job of balancing the dynamic levels of individual sounds, accompaniments, inner voices of ensembles, counter melodies, and so on. As an instrumentalist he must have virtuoso keyboard technique. To achieve all of this requires great flexibility of control. The temptation is to load the console with a bristling array of playing aids. However, it is easy to pass the point where complexity becomes self-defeating. Here are some of the guidelines we use in designing consoles. First, the console must be comfortable. Dimensions should be standard and then, as far as possible, adjustable to conform to different organists. In addition to the adjustable bench, we have on several occasions provided adjustable-height pedal-boards. We use a radiating and concave pedalboard and also non-inclined manual keys on the theory that when changing from one keyboard to another it is important that they be uniform. Controls must be placed in positions that are easy to see, memorize and

reach. The combination action should be as flexible as possible, giving the organist the opportunity to assign groups of stops to a piston at will. For example, on our combination action with the Range feature, the organist can, while seated at the console, change divisional pistons into generals and vice-versa, assign pedal stops to a manual division, re-arrange reversibles, etc. Multiple memories, of course, are now standard and of great value.

In addition to the multiple, assignable expression boxes, Variable Tremulant, and s*forzando* coupler mentioned elsewhere, we like to include three special Pedal accessories on larger instruments. The first is a coupler bringing the Pedal to the Choir to facilitate fast pedal passages in transcriptions of orchestral accompaniments. The second is a Pedal Divide which silences the Pedal couplers in the low notes and silences the Pedal stops in the upper notes. This allows the simultaneous playing of bass and solo lines on the pedalboard. The third is Pizzicato Bass, with a momentary-touch relay activating pipes of the Pedal Double Open Wood at 8' pitch. This provides a clear, pointed attack to the bass line reminiscent of divisi *arco/pizzicato* double bass writing for orchestra. This effect has been very useful in articulating bass lines, which on the organ are otherwise clouded rhythmically. The octave note is hardly noticeable, but the increase in buoyancy of the pedal line is quite amazing.

The most valuable and perhaps most controversial flexibility device is unification (extension). Certainly nothing other than tracker action has caused more argument over the last fifty years. The individual valve system obviously makes unification both simple and economical. Unification, as we will see, offers several musical advantages, but there are great dangers as well, and it is most unfortunate that it has been so misused that some cannot see any of its advantages. We employ unification in symphonic organs, large and small, wherever a positive musical advantage can be achieved. Unification is, after all, merely coupling of individual stops rather than entire divisions. Whereas coupling is generally accepted, unification is not, despite the fact that coupling of individual stops can offer a far more artistic result.

Perhaps the most interesting use of the unification is in creating new sounds. For example, to produce the stunning orchestral effect of trombones, tenor tubas, or horns playing in unison, we developed the Tuben III stop. This converts a chorus of 16', 8', 4' tubas or trumpets into a unison ensemble by bringing the 4' stop down an octave, the 16' stop up an octave, and combining these with the 8' stop. The three tones of slightly different scale but similar character create a most appealing unison effect and can be further combined with other stops of similar colour at 8' pitch. We have done the same with 16', 8' and 4' clarinet stops, creating the sound, not found previously on the organ – unison clarinet tone, a common orchestrator's device and most valuable to the organist for accompaniment and improvisation.

A traditional use of unification is in pedal borrowing from the manuals. We use this device extensively, based on observation that one of the most difficult tasks facing an organist is finding a bass of suitable volume and colour. We sometimes also borrow stops from one manual to another so that a stop may be used without tying up another manual with a coupler. A common application is transferring the Choir Clarinet to the Great so that it may be played against the Choir mutations. In some cases we derive an entire third manual on a moderate-size organ from stops of the Great and Swell. This manual may either contain solo stops selected from both of the other manuals or a combination of solo stops from one manual and a secondary chorus from the other. A recent example is at Spring Valley United Methodist Church, Dallas, Texas (see stop-list). We occasionally extend stops – commonly downward to 16' in the manuals and occasionally upward. Stops so treated must not be considered substitutes for primary chorus material. In other words, the organ must stand on its own as a completely straight design before any unification is employed. Stops extended upward must have a character of tone such that if a straight stop were to be employed, the scale would be the same or nearly so. Thus, extensions of string stops are much more likely to be successful than extensions of diapason stops.

GREAT (*II - Expressive*)

16'	**Contra Gamba***	12	Pipes
8'	**Grand Open Diapason**†	61	"
8'	**Open Diapason**	61	"
8'	**Gamba***	61	"
8'	**Gamba Celeste** (*TC*)*	49	"
8'	**Major Flute** (*Metal, Harmonic*)†	61	"
8'	**Gedeckt** (*Metal*)	61	"
4'	**Principal**	61	"
4'	**Chimney Flute** (*Metal*)	61	"
2'	**Fifteenth**	61	"
1 1/3'	**Mixture** (*IV Ranks*)	244	"
8'	**Tuba***	61	"
8'	**Clarinet**	61	"

Tremulant
Great 16'
Great Unison Off
Great 4'
Chimes (*Walker Digital*)
**Stops in separate enclosure inside Great box on 10" wind pressure.*
†*Stops in display.*

SWELL (*III - Expressive*)

16'	**Bourdon** (*Wood*)	61	Pipes
8'	**Open Diapason**	61	"
8'	**Stopped Diapason** (*Wood*)	12	"
8'	**Salicional**	61	"
8'	**Unda-Maris** (*TC*)	49	"
4'	**Principal**	61	"
4'	**Salicet**	12	"
4'	**Harmonic Flute**	61	"
2 2/3'	**Twelfth** (*TC - From Nineteenth*)		
2'	**Flageolet**	61	"
1 3/5'	**Seventeenth** (*TC*)	42	"
1 1/3'	**Nineteenth**	54	"
2'	**Mixture** (*III-V Ranks*)*	269	"
16'	**Contra Fagotto***	61	"
8'	**Trumpet***	61	"
8'	**Oboe**	61	"
4'	**Clarion***	61	"

Tremulant
Swell 16'
Swell Unison Off
Swell 4'
**Stops in separate enclosure inside Swell box on 5" wind pressure.*

PEDAL

32'	**Resultant**		
16'	**Open Diapason** (*Wood*)	12	Pipes
16'	**Bass Flute** (*Metal*)	12	"
16'	**Contra Gamba** (*Great*)		
16'	**Bourdon** (*Swell*)		
8'	**Principal**	32	"
8'	**Flute** (*Great*)		
8'	**Bourdon** (*Swell*)		
4'	**Fifteenth**	12	"
4'	**Flute** (*Great*)		
16'	**Ophicleide** (*Extend Tuba*)	12	"
16'	**Contra Fagotto** (*Swell*)		
8'	**Tuba** (*Great*)		
4'	**Clarinet** (*Great*)		

SOLO (*I*)

Great Stops on Solo

8'	**Grand Open Diapason**
8'	**Major Flute**
8'	**Gamba**
8'	**Gamba Celeste**
8'	**Tuba**
8'	**Clarinet**

Swell Stops on Solo

8'	**Stopped Diapason**
8'	**Salicional**
4'	**Salicet**
2 2/3'	**Twelfth**
2'	**Flageolet**
1 3/5'	**Seventeenth**
1 1/3'	**Nineteenth**
8'	**Oboe**

Percussion Stops on Solo
Harp (*Walker Digital*)
Cymbelstern

Couplers on Solo
Solo 16'
Solo Unison Off
Solo 4'

COUPLERS

Great	to Pedal	
Swell	to Pedal	
Swell	to Pedal	4'
Solo	to Pedal	
Solo	to Pedal	4'
Swell	to Great	16'
Swell	to Great	
Swell	to Great	4'
Solo	to Great	16'
Solo	to Great	
Solo	to Great	4'
Swell	to Solo	
Great	to Solo	

MECHANICALS
Solid State Capture Combination Action with:
- 16 memories
- 60 pistons and toe studs
- Programmable piston range for each memory level

6 reversibles including Full Organ
Crescendo Pedal

Unification should not replace the ensemble of straight voices; it should simply make them available in different ways. If a stop can be useful also in another place or at another pitch, and if this does not compromise the integrity of the organ's design, then we believe it is wrong not to include the unification. Failure to do so limits the organist's musical options. The real point of the straight organ design concept is having all of the necessary independent voices even if one must give up some attractive ones to assure good ensemble. Once this is achieved, there is nothing wrong with making the voices you have do double or triple duty. It is interesting to note that in organs of a century ago a solo stop might be contrived through the use of couplers. A stop name would appear on a combination piston, the function of which was to draw a stop, a unison-off coupler, and an octave coupler thus making a 16' reed, for example, available at 8' as a solo stop. One can conclude that the earlier builders were not against unification, they simply did not have the practical means to do it. Unification and other devices to enhance flexibility need not be used by organists who do not like them, but to leave them out of the specification is to deprive others of the full use of the costly resources the organ offers. Players of other instruments are always searching for ease of control so that their energy can be concentrated on musicianship. Organists might be a happier lot by doing the same instead of idolizing the organ's ancient limitations.

Conclusion

We may be entering the greatest era in the fascinating life of the organ. The improvement in substitute electronic instruments has released the organ industry from the burden of making cheap pipe organs for customers with low expectations. Builders are working more and more for those with cultivated taste who appreciate an artistic approach to the craft. Organs are seldom purchased as a piece of church equipment as they were in days past. Now there is a place for all types of high-quality pipe organs from antique reproductions to historically informed eclectic schemes to modern symphonic instruments. If the organ is to progress musically, it will be through the further development of its expressive – symphonic – qualities and the realization that the organ is a wind instrument ensemble with great potential, not merely a sometimes-awkward member of the early keyboard family.

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