Ernest M. Skinner and the American Symphonic Organ

by

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ABSTRACT

The organ is in a continued state of evolution, tonally and mechanically, designed by the builder to meet certain expectations related to the musical aesthetics of the time. Organ building in the United States has been influenced by both European organ building traditions and American innovations. During the early twentieth century, Ernest M. Skinner emerged as one of the greatest organ builders in America. Throughout his life, Skinner's quest was to create an "ideal organ," capable of playing a variety of music.

Skinner's vision was rooted in the Romantic Movement and influenced by the dynamic gradations and rich, colorful sonorities of orchestral and operatic music of the era. A number of technological developments were applied to the design of the organ which made the romantic organ possible. The prominent European organ builders of the nineteenth century created organs that defined the romantic-style instrument in their respective countries. By the end of the century, American organ builders were creating their own versions. Skinner traveled to Europe to learn what he could from the foreign builders.

Skinner built organs that synthesized European and American elements, along with his own innovations, as continuation of nineteenth-century trends that brought the romantic-symphonic organ to its fullest realization. Additionally, Skinner developed many new organ timbres, including a number of stops that imitate various orchestral instruments. The result of Skinner's creative work is the the American symphonic organ.

This paper attempts to illustrate how the tonal designs of organs built by Walcker, Cavaillé-Coll, and Willis influenced the work of Skinner and the American

symphonic organ. The work of each builder is discussed with descriptions of their designs. The designs and innovations of Skinner are examined as related to these European builders. A number of organ specifications are provided to supplement the information presented here. Today, American symphonic organs, particularly those built by Skinner, are revered for their warmth and charm and are inspiring the work of present day organ builders who are incorporating elements of this style into their own designs.

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CHAPTER 1

INTRODUCTION

The organ, an ever-evolving instrument created through artistic and mechanical ingenuity, has a long and rich history, spanning over two thousand years. It is a multi-timbral instrument, built to produce a variety of tonal color. The art of registration of the organ is comparable to orchestration; the organist selects various stops to create tonal colors in a manner similar to the composer writing parts for various orchestral instruments. A composer's orchestration is subject to the instrumental resources available; similarly, an organist's registrations are determined by the tonal design of the organ. An organ's tonal design is planned by the builder, who chooses specific timbres—principals, flutes, strings and reeds—and distributes them over the instrument's manual and pedal divisions. Tonal design determines the types of pipes included and their organization throughout the organ so that the organist will be able to create primary and secondary choruses, individual solo and accompanimental timbres, and colorful combinations. Many factors affect the timbre of pipe-ranks: the materials used (various metal alloys and woods), scaling, shape of the pipe body or resonator, wind pressure, pitch level, the amount of mouth width and cut-up, tone regulation, and voicing techniques.

Other instruments, such as the violin and clarinet, reached a mature form following a period of development after which they changed relatively little. However, the organ is continuously evolving in a process of tonal and mechanical

development. As musical aesthetics and tastes continue to change, so too does the design of the organ.[1]

Organ building in the United States has been influenced by many European organ building traditions. American organs have been built with designs inspired by various European models as well as incorporating uniquely American elements. During the late nineteenth and early twentieth centuries, American organ builders were constructing large, sophisticated instruments. The musical aesthetics of nineteenth century romanticism influenced their work.

> "By the end of the nineteenth century, builders were trying to build louder organs with greater dynamic contrast and control, and especially with greater contrasts between loud and soft stops. They were employing greater numbers of stops, especially 8 ft. and 16 ft. stops which create the solemnity, dignity, and majesty we now popularly associate with organ music. They were also experimenting with structural and tonal changes to produce the greater wind supply, range of tones, and easier access to the console controls needed by the larger number of stops. And they were producing new actions to handle more effectively the demanding orchestral transcriptions and original compositions available for the organ. Into this world of experimentation and change walked E. M. Skinner."[2]

The work of organ builder Ernest M. Skinner (1866-1960), who built instruments in a romantically influenced symphonic style, is considered by historians and enthusiasts to represent the pinnacle of early twentieth-century American organ building. E. M. Skinner designed organs that combined various tonal elements of instruments built by the prominent European and American builders of the late nineteenth and early twentieth centuries with his own innovations to create the

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[1] Robert Noehren, *An Organist's Reader: Essays* (Warren, Michigan: Harmonie Park Press, 1999), 37-38.

[2] Leslie A. Olsen, preface to *The Composition of the Organ,* by Ernest M. Skinner and Richmond H. Skinner, ed. by Leslie A. Olsen (Ann Arbor, MI: Melvin J. Light, 1981) xii.

American Symphonic style. Over the course of Skinner's life, he would emerge as "one of the greatest and most influential organ builders in America."[3]

[3] Dorothy J. Holden, *The Life & Work of Ernest M. Skinner* (Richmond VA: The Organ Historical Society, 1987), 1.

CHAPTER 2

SKINNER'S EARLY MUSICAL INFLUENCES AND THE IDEAL ORGAN

On January 15, 1866, Ernest Martin Skinner was born in Clarion, Pennsylvania, a small town in the Appalachian Mountains in northwestern Pennsylvania.[4] Skinner's fascination with creating musical sounds was formed through an abundance of exposure to music via his family. His parents, Washington Martin Skinner and Alice Francis Brett, were both itinerant professional concert and opera singers; other members of the family also possessed musical talents and were active as teachers and performers.[5] The Skinner family settled in Taunton, Massachusetts when Ernest was about to begin school, around age seven. His father organized a light opera company in Taunton, and Ernest was introduced to the world of music and opera, attending rehearsals and performances of Gilbert and Sullivan's *H.M.S. Pinafore* and *The Pirates of Penzance*. He developed a love for music and opera that would be a "motivating force behind his entire creative life."[6] Skinner's musical creative efforts were not expressed through composition, performance, or teaching. He did not play keyboard instruments; his little fingers on both hands were unusually small and had no joints, which would have been a hindrance to him in developing keyboard technique. "The creation of musical tone through the medium of organ pipes" was Skinner's destined path of musical expression.[7]

Skinner saw his first pipe organ in the Unitarian Church in Taunton where his father was employed as a tenor. He was immediately fascinated by this instrument.

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[4] Holden, 1.
[5] Craig R. Whitney, *All the Stops: The Glorious Pipe Organ and Its American Masters (*New York: Public Affairs, 2003), 5; Holden, 1-2.
[6] Holden, 3; Whitney, 5.
[7] Holden, 2.

When he grew older and was strong enough, he was engaged as a bellows pumper for Mr. Edward M. French, organist for the Baptist Church in Taunton, and he became acquainted with the organ works of Batiste and Lemmens.[8] Skinner was given the opportunity to study the mechanism of this instrument, assisting the tuners, Mr. Cadwater and Mr. Lahaise. He recalled the following story when he diagnosed a problem and made his first repair on this instrument:

> "One day when something went wrong with the bellows I found the hinge of an entire fold had broken loose. I was very proud at having found unaided the cause of the difficulty."[9]

At the age of twenty, Skinner got his first job in an organ factory where he worked as a shop boy for the organ builder George H. Ryder of Reading, Massachusetts. His duties with Ryder included sweeping the shop, observing shop operations, and winding trackers.[10] But he was more interested in the art of organ voicing and assisted Ryder's voicer and tuner, William H. Doblier. Four years later, Skinner was hired as a tuner for George S. Hutchings, an organ builder in Boston. Skinner worked for Hutchings for eleven years as a mechanic, tuner, and factory supervisor. However, Skinner's "greatest ambition was to become a voicer."[11]

Skinner's Quest for the Ideal Organ

The life-long ambition of E. M. Skinner was to create an "ideal organ," capable of playing a great variety of music with "sensitivity, warmth, and an infinite variety of color which would surpass the symphony orchestra."[12] The ideal organ for Skinner

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[8] Holden, 5; Whitney, 5.
[9] Ernest M. Skinner quoted in Holden, 5.
[10] Holden, 6; Whitney, 1, 5.
[11] Holden 6-7.
[12] Holden, 111.

was an all-purpose instrument that combined traditional tonal structure with orchestral sounds; "'a practical organ,' which would be 'suitable in every way for any purpose for which a pipe organ can be utilized.'"[13] His interest in the ideal organ was rooted in the Romantic Movement and the orchestral music of the era which shaped his tonal ideas and his personality.[14] His aspirations motivated two journeys abroad to study organs in Europe.

The first of Skinner's trips took place in 1898 when he was 32 years old, made possible through the financial support of Montgomery Sears, a wealthy patron of the arts in Boston; the second occurred in 1924 at the age of 58. Skinner visited England, Holland, Belgium, and France, "to learn what [he] could of the foreign builders."[15] Skinner returned to America with "English and European sounds resonating in his head" and applied the knowledge he had gained, not intending to imitate slavishly the instruments he heard, but to select the sounds he liked.[16]

Skinner continued the tonal developments of the European romantic era organ builders whose instruments emulate the orchestral ideals of the period. The orchestral music of Wagner, Brahms, and Strauss influenced the organs designed by Walcker in Germany. His gigantic organs built with an abundance of foundation stops emulated the power, warmth, and rich sonorities of the Wagnerian orchestra. In France, the desire to create dramatic and expressive organs motivated the work of Cavaillé-Coll. He preferred the fullness of foundational tone and increased those tonal resources in his instruments. Cavaillé-Coll desired to create versions of stops

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[13] E. M. Skinner quoted in Holden, 13.
[14] Holden, 13, 16.
[15] Whitney, 8.
[16] Whitney, 10.

that authentically replicate the types of sounds their orchestral counterparts created. A number of English builders contributed to the development of organs, culminated in the work of Willis, that were capable of playing orchestral transcriptions and accompanying choirs in concert halls and cathedrals. Hill and Willis were influenced by the work of Cavaillé-Coll, they adapted his tonal ideas for the instruments they built in England.[17]

American builders benefited from technological progress, but despite this, their instruments lacked the smooth, refined tone of the orchestral instruments they attempted to imitate. Skinner played a central role in bringing the concept of the romantic orchestral ideal to its fullest realization, continuing the work of previous builders.[18] Skinner "combined a traditional tonal design, including mixtures, with the variety of color, tonal refinement, and musical flexibility of a symphony orchestra."[19] The overall essence of the Skinner organ is an instrument with vitality, warmth, and charm.[20]

Nineteenth-Century Romanticism

The design of the American symphonic organ, as well as those of its earlier European predecessors, developed within the context of nineteenth century romanticism, the overarching musical aesthetic of the era. Complex political, social, and cultural changes influenced artistic expression, and vice versa. Revolutionary ideas were at odds with tradition-oriented conservatism.[21] "Romanticism repudiated

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[17] Arthur Wills, *Organ,* (London: Macdonald, 1984), 118.
[18] Holden, 16.
[19] Ibid., 13.
[20] Ibid., 30.
[21] Rey M. Longyear, *Nineteenth-century Romanticism in Music* (Englewood Cliffs, NJ: Prentice Hall, 1988), 8, 10-11.

Classic emphases on harmonious adjustment, discipline, moderation, and adaptation whereas it valued striving rather than achieving, becoming rather than being, [and] emotional and inspired rather than rational expression."[22] The romantic ideals of "remoteness, ardor, and boundless longing" were expressed through music.[23] Music was composed with diversity and "intensity of feeling": "world-weariness," frustration, and melancholy inspired music with a "sweet-gloomy tone" while also possessing a determined optimism.[24] Composers sought "extremes in dynamic gradations" as a means of expression.[25] Musicians were interested in rich, colorful sonorities, exploiting timbre to create a "full, lush" sound, conceived as "sweet and pleasing."[26] The orchestra of the nineteenth century provided the colors and sonorities desired by composers, musicians, and audience members. Overall, romantic music "depends on strong emotional expression, which may be generated by some subtlety or richness of harmony or color, by some dramatic juncture, or a variety of other means."[27]

During the nineteenth century, the primary patronage of musical activity shifted from the court and the church to public venues, including opera houses, concert halls, and music festivals. The performance of art music was expanded by musicians and become increasingly accessible to a greater portion of the population during this

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[22] Longyear, 8.
[23] Donald J. Grout, *A History of Western Music* (New York, NY: W. W. Norton and Company, 1980), 559.
[24] Longyear, 9-10.
[25] Ibid., 291.
[26] Ibid., 302.
[27] Stanley Sadie and Alison Latham, *Stanley Sadie's Music Guide: an Introduction* (Englewood Cliffs, NJ: Prentic-Hall, 1986), 281.

era.[28] Furthermore, "orchestras were disseminated across wider geographical areas" and performed in various venues and social contexts throughout Europe and parts of the United States.[29] The nineteenth century orchestra developed into an ensemble that provided a great variety of tonal colors with immense power that filled the large performance spaces used to accommodate the increased audience size. More woodwind, brass and percussion instruments were incorporated within the orchestra as their designs were enhanced to render them capable of "greater tonal power, range, and agility."[30]

The orchestra's "new resources of instrumental color would have been impossible without the technological improvements in all music instruments."[31] Many of these modifications were developed during the late eighteenth and early nineteenth centuries as stringed instruments were constructed to withstand increased string tension, woodwinds were designed with sophisticated keying systems, and brass were equipped with valves and flared bells. Other instruments, such as the French horn, which formerly were "not considered art musical instruments," were redesigned to make them more suitable for the orchestra.[32] All of these innovations were motivated by the "needs of music performance and commercial gain."[33] Performers searched for easier ways to follow composers' wishes; instrument

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[28] Longyear, 3.
[29] Tim Carter and Erik Levi, "The History of the Orchestra," in *The Cambridge Companion to the Orchestra.* ed. Colin Lawson (Cambridge, UK: Cambridge University Press, 2003), 8.
[30] Carter and Levi, 7.
[31] Longyear, 303.
[32] Robert Barclay, "The Development of Musical Instruments: National Trends and Musical Implications," in *The Cambridge Companion to the Orchestra, e*d. by Colin Lawson (Cambridge, UK: Cambridge University Press, 2003), 31-36.
[33] Barclay, 24.

manufacturers, motivated by financial gain and "driven by market forces that emphasize improvement and fairly rapid obsolescence," then worked to solve the players' problems to meet their performance needs.[34]

Similarly, keyboard instruments were subject to innovation and redesign. "The piano of the nineteenth century ... [was] reshaped, enlarged, and mechanically improved, [and] had been made capable of producing a full, firm tone at any dynamic level, of responding in every way to demands for both expressiveness and overwhelming virtuosity."[35] Piano performers "emphasized clarity of texture, fluency of technique, … fullness of tone, wide dynamic range, orchestral effects, dramatic execution, and abundance of technical power."[36]

"The end of the nineteenth century marked the birth of the modern symphony orchestra. It was during this period that many of the major European and American symphony orchestras were formed, and with this development came an increasing standardization in terms of size [and] instrumentation."[37] It was an era of an "ever-expanding palette of color," as new sonorities were discovered, … new instruments were added to the orchestra, and older instruments were redesigned to be more sonorous and more flexible; … new combinations of instruments in the ensemble were invented to produce new color effects."[38] "The principal vehicles for romantic color were the clarinet, bass clarinet, French and English horns, and harp, the extended string sections with individual sections often divided to achieve richer sonorities; comparable expansion of the woodwind and brass choirs to extend their

[34] Barclay,23.
[35] Grout, 572.
[36] Ibid., 572.
[37] Carter and Levi, 13.
[38] Grout, 559.

colors over a wide range; and the improved piano. … Between 1800 and 1914 the orchestra nearly trebled [tripled] in size, not for the purpose of expanding its volume but for enhancing sonority: more winds to achieve homogeneous tone colors on a given chord, more strings to balance the number of winds, more percussion instruments for new colors or increasingly dramatic climaxes."[39]

From a nineteenth-century perspective, the organ of the seventeenth and eighteenth centuries was an antiquated instrument incapable of creating the types of romantic-style musical effects desired by musicians. Many of these instruments were victim to destructive forces amidst an environment of political and social turmoil. Church services were simplified and music was reformed; the baroque organ was no longer musically relevant. The organ was spared extinction as innovative builders of the nineteenth century rethought and redesigned the instrument. Their fascination with the widespread and growing conviction that the organ could function as a "one-man orchestra" was their primary goal in designing the organ of the nineteenth century.[40] The expansion of the orchestra with its abundance of middle and low registers was paralleled on the organ by the multiplication of eight-foot stops that created the desired diversity of tonal color and powerful sounds.[41] The work of Eberhard Friedrich Walcker, Aristide Cavaillé-Coll, and Henry Willis defined the romantically influenced symphonic style of organ in Germany, France, and England

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[39] Longyear, 303.
[40] Peter Williams, *A New History of the Organ: From the Greeks to the Present Day,* (Bloomington, IN: Indiana University Press, 1980), 155-156;
Hans Fidom, *Diversity in Unity: Discussion on Organ Building in Germany between 1880-1918* (Royal Dutch Organists Association, 2002), 29.
[41] Longyear, 302.

respectively. In the United States, Ernest M. Skinner developed his own symphonic organ, inspired by and carrying on the concepts of these European builders.

CHAPTER 3

FORMATIVE EUROPEAN INFLUENCES ON SKINNER

Walcker and the German Romantic Organ

The dominant musical genres of Germany during the nineteenth century were secular—operas, symphonies, and virtuoso-based keyboard writing. The orchestral music of Wagner and Strauss represented a tonal ideal, "based on richness and homogeneity of sound, with wide dynamic contrasts."[42] This aesthetic impacted organ building and design throughout the century. In addition to these secular influences, a new 'romantic' repertoire of hymns required rich orchestral accompaniments.[43] To create the dark, blended sonorities desired by musicians, builders made organs with a greater number of 8' stops, combining principal, flute, and string stops, and adding a reed chorus for additional color. "It was assumed that 8' stops should predominate on the manuals."[44] Builders had already improved the organ's wind-supply, which permitted large instruments where numerous 8' and 4' stops could be drawn together.[45] To fulfill the demand for dynamic variation, gigantic organs were built to accommodate a range from the weakest pianissimo to the loudest tutti.[46] "Clarity of line and part-writing was no longer sought after, and the unyielding chorus of the classical organ was regarded as an outmoded relic of the past."[47] The "romantic" organ was considered a product of progress in Germany, as

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[42] Wills, 86.
[43] Ibid., 86, 98.
[44] Williams, *New History,* 165.
[45] Ibid., 164-165.
[46] Poul-Gerhard Anderson, *Organ Building and Design*, tr. Joanne Curnutt, (New York: Oxford University Press, 1969), 254.
[47] Wills, 98.

well as France and England. These industrialized nations had the financial resources necessary to fund mammoth organs.[48]

Organ building in Germany was increasingly influenced by scientific theory and discoveries.[49] The field of acoustics inspired many theories that were adopted by German organ builders in the nineteenth century. The organist Abbé Georg Joseph Vogler (1749-1814) developed a theory of "resultant tones," that low pitches can be replicated by sounding their equivalent harmonics, thereby eliminating the need for large and costly pipes.[50] Vogler also designed a controversial "simplification" system. He advocated reducing the number of pipes in an organ, removing mixtures, using free reeds, and organizing stops orchestrally.[51] Mutations stops were intended to form "difference tones" as a "method of fabricating 'dignity'."[52] The organist and theoretician, Johann Gottlob Töpfer (1791-1870), developed calculated models for pipe scales, measurements for just proportions, and formulae for calculating wind consumption and cut-up.[53] The scientific process led to his discoveries of more "accurate" measurements for scaling, voicing, and tuning.[54] Töpfer wrote a series of treatises and studies on organ building that culminated in a work published in 1855, *Lehrbuch der Orgelbaukunst*, based on his mathematical theories for calculating all aspects of organ building, including pipe scales. "Perfection was synonymous with

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[48] Paul Peeters, "Walcker and Cavaillé-Coll: A Franco-German Competition," in *The Organ as a Mirror of Its Time, e*d. Kerala J. Snyder (New York, NY: Oxford University Press, 2002) 242.
[49] Anderson, 253.
[50] Williams, *New History,* 156.
[51] Anderson, 248.
[52] Ibid., 249, 250.
[53] Williams, *New History,* 160.
[54] Anderson, 253.

precision."[55] The speech of fluework had to be precise, devoid of subsidiary noises; tuning and tonal regulation was to be as exact as possible. Full-length reed stops were favored for their ability to stay in tune while *regal* stops, built with short-length resonators, were considered inferior because of their thin, snarling tone and intonation problems. The application of Töpfer's simple constants was convenient for builders, and easily copied, resulting in cheap and quickly made organs.[56]

The use of brilliant mixture stops, a fundamental component of the baroque chorus, was considered "shrill" and "at odds with the orchestral sound and the new lyrical approach" advocated by the romantics. "Mutations and mixtures were becoming dishonorable, partly because they were often no doubt badly made."[57] The mixture stops that were designed according to scientific principle included tierce (third-sounding) pitches in addition to the octave and quint (fifth-sounding) pitches. "The tierce mixtures which were popular at the beginning of the century quickly began to pall; they were wearisome in accompaniment and unsuitable for contrapuntal textures. *Cornet* stops (8', 4', 2-2/3', 2', 1-3/5') composed of wide-scaled pipes were often substituted for chorus mixtures on smaller organs.[58] As a result mixtures in general fell from favor and this dislike was to last for a century or more."[59] The Mixture stops of the mid-nineteenth century German organs were

[55] Anderson, 253.
[56] Williams, *New History*, 160.
[57] Peter Williams, *The European Organ: 1450-1850,* (Bloomington, IN: Indiana University Press, 1966)*,* 165.
[58] Fidom, 42.
[59] Wills, 86.

criticized for their "ineffective" composition, voiced on wind pressures that were too high and made their sound "remarkably strong and pervasive."[60]

The organs built by Eberhard Friedrich Walcker (1794-1872) in Germany were designed to create the desired romantic sounds of the era; instruments were built possessing a richness of orchestral tone and flexibility of dynamics.[61] Born into a family of organ builders, E.F. Walcker moved his father's business from Cannstadt to Ludwigsburg in 1820. Walcker devoted himself to developing a modern organ-building organ concept:

> "I lived in the hope that I might be able to lift [the art of organ building] beyond its short-comings and develop the instrument to such a level that it could fulfill its main purpose, in contributing to worship in a worthy way."[62]

Walcker had some contact with Vogler, whose ideas, along with those of Töpfer, influenced him.[63] He expressed dissatisfaction with the traditional classical organs:

> "The better modern opinion discards this entanglement of tones and abides by that which makes the tone pure … one prefers to have many stops, of which the player also can use each individually to bring forth a melody, but by combining them can also provide a rich variety in character. The beauty of the organ hardly consists of screaming, especially confused screaming; we have turned away from that idea. It is rather found when the tone has a great and, I would even dare to say, a holy character."[64]

Among the greatest and more famous of Walcker's organs is the instrument built for Ulm Minster (Münster zu Ulm) in 1849 and enlarged in 1856. This famous organ had four manuals, two pedalboards, and 100 stops, representing the Walcker concept

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[60] Fidom, 39-40.
[61] Peeters, 242-243.
[62] Eberhard F. Walcker quoted in Peeters, 246.
[63] Peeters, 243-246; Fidom, 28.
[64] E. F. Walcker quoted in Peeters, 245-246.

in its fullest form.[65] The Ulm Minster organ demonstrates the following qualities of Walcker's organs.

- an abundance of 8' manual timbres
- a large, heavy *Hauptwerk* that included a number of stops at 16' and 32' pitch (a Vogler influence)
- two or three other manuals, or *werks*, mirroring the *Hauptwerk,* that diminish in intensity and weight
- a *plenum* composed of pyramidal proportions, using an abundance of manual 8' stops with fewer stops at higher pitch levels
- several reeds stops that added color to the ensemble
- mixtures containing *terz* ranks; the upper partial sounding a major third added a reedy quality to the chorus
- a fluty bass pedal division separated into primary and secondary groups[66]

The stops of the instrument were classified as "8' stops, stops lower than 8' pitch, stops higher than 8' pitch, mixtures, [and] reeds."[67] Walcker's tonal concept is fully realized in large instruments that met the demands of the organ repertoire. "All the different sound layers and fine sound gradations, most of all in the soft registrations, as well as the real effect of the roller crescendo, are successful only in Walcker's larger instruments."[68]

In the mid nineteenth century, the organ in Ulm Minster attracted international attention as the largest organ in the world. Aristide Cavaillé-Coll was particularly interested in seeing this organ and made a point of visiting various Walcker organs during his travels through Europe to study the work of other organ builders. The two met in 1844, and again in 1856. Cavaillé-Coll was impressed with Walcker's

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[65] Peeters, 248.
[66] Fidom, 27, 33; Anderson, 256;
George H. Ritchie and George B. Staufer, *Organ Technique, Modern and Early,* (New York, NY: Oxford University Press, 2000), 291.
[67] Fidom, 31.
[68] Peeters, 258.

work and called him a "builder of merit and genius."[69] However, Cavaillé-Coll was privately critical of Walcker's instruments, acknowledging that they had beautiful and majestic foundation stops, but were cold with lean reeds and soft solo stops, and a "hesitant-ensemble."[70] The instrument in Ulm would ultimately inspire Cavaillé-Coll's magnum opus built for the Church of St-Sulpice in Paris.

The importation of a Walcker organ introduced the romantic idea of the symphonic organ to the United States in the mid-nineteenth century and influenced American organ building through the remainder of the century.[71]. The Boston Music Hall Association contracted with Walcker to build a new instrument. As part of the negotiations, "Dr. Jabez Upham, president of the Boston Music Hall Association, wanted Walcker to study the latest developments in organ building in France and England, 'with the proviso that Herr Walcker himself should meet me in Paris, and go thence with me to London, in order to learn and engraft upon his schedule such improvements as the best works of the French and English makers might suggest.'"[72] The Walcker organ for the Boston Music Hall was completed in 1863 and was among the largest instruments in America at that time, with a sumptuous tone and a great variety of 8' voices.[73] "[This] organ symbolized the mainstream of musical taste in New England during the last four decades of the nineteenth century. Whatever

[69] Peeters, 248-249.
[70] Ibid., 249.
[71] Holden, 14-15.
[72] Peeters, 249.
[73] Holden, 14-15.

influence, direct or indirect, this instrument had on organ builders was liberally reinforced by New England's organists, composers and teachers."[74]

The instrument had a short history in the Boston Music Hall; in 1884 it was sold and placed in storage. It was eventually purchased by Edward F. Searles who moved it to Serlo Hall, constructed in Methuen, Massachusetts for the installation of the instrument. The organ was rebuilt and inaugurated in 1909.[75] Following Searles's death, Skinner purchased Serlo Hall, the Walcker organ, and the Methuen Organ Company, housed near the hall, in the 1930 with the intention of establishing an organ building partnership with his son, Richmond Skinner.[76] Skinner was certainly familiar with this important instrument and the German romantic style as developed by Walcker.

Other German organ builders of the nineteenth century designed similar instruments, demonstrating the influence of Walcker's work. The organs built during the middle and toward the end of the nineteenth century usually had an increased number of stops that emphasized 8' manual tone.[77] Friedrich Ladegast (1818-1905) built a large organ for Merseburg Cathedral that was completed in 1855. The dramatic organ works of Franz Liszt are closely associated with this organ: the *Prelude and Fugue on B-A-C-H* was composed for, although not completed in time, the inauguration of this organ, and the *Fantasy and Fugue on Ad nos, ad salutarem undam* was first performed on it.[78] Although the instrument is a large romantic organ, it had no

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[74] Orpha Ochse, *The History of the Organ in the United States,* (Bloomington: Indiana University Press, 1988), 215.
[75] Ibid., 204-205.
[76] Holden, 147.
[77] Peeters, 259.
[78] Arnold, 180.

enclosed division.[79] Wilhelm Sauer (1831-1916) built a large organ in 1888 for the Thomaskirche in Leipzig, where Johann Sebastian Bach served as Kantor over a century earlier, from 1723 until his death in 1750. The organist, teacher, and advocate of the German romantic style, Karl Straube (1873-1950) was closely associated with the Thomaskirche during the early twentieth century when he held the organist position there. Influenced by the late romantic orchestral style, Sauer modified and enlarged the Thomaskirche organ at the direction of Straube.

There is a general perception that the German organ, as developed by Walcker, Ladegast, and Sauer, was the preeminent imitator of the orchestra during the last quarter of the nineteenth century.[80] The organs built by Ladegast and Sauer were similar to those by Walcker in terms of construction and design principles, but their sound is described as being brighter.[81]

Cavaillé-Coll and the French Symphonic Organ

In France, the political and social upheaval of the French Revolution (c.1789-1799) left many organs in ruins. Reformers viewed the Church as an institution closely allied with the oppressive monarchy. Church buildings, symbols of the institution, were converted for use as "temples of reason" by revolutionaries. The organs within were vandalized and their pipes pillaged for metal which was melted down for bullets. The instruments that survived were used for the performance of secular music, but were often neglected and eventually unplayable. Following the turmoil of the Revolution, the government and the Church were reconciled, church

[79] Barbara Owen, "Technology and the Organ in the Nineteenth Century," in *The Organ as a Mirror of Its Time,* ed. by Kerala J. Snyder (New York, NY: Oxford University Press, 2002), 216.
[80] Peeters, 253.
[81] Anderson, 256.

buildings were restored for the purpose of Christian worship and the state agreed to subsidize religion. The restorations of surviving organs in the early nineteenth century were funded by the government. However, the poor quality of these early restorations contributed more to their ultimate destruction than to their intended preservation.[82]

Industrial advancements following the revolution set the stage for rapid developments that influenced all aspects of life in France, including the art of musical instrument making.[83] Among musicians of the era, there was a desire to compose new styles of sacred music. To facilitate the performance of music written in an expressive style, it became necessary for the musical instruments of the church, particularly the organ, to be modified to meet this demand.[84] "The longing for 'expression' on the organ was coupled to the search for greatly increased sonority to form the basis for the development of the romantic organ" in France.[85] The organs built by Aristide Cavaillé-Coll during the nineteenth century define the French symphonic style.

Cavaillé-Coll (1811-1899) was born into a family of organ builders in southern France. Disciplined in the classical tradition, he brought his intellect, mechanical ingenuity, and creative energy to the craft of organ building. Cavaillé-Coll was encouraged by Gioachino Rossini to move to Paris, where he studied and quickly established his own organ building firm. His work contributed to the revival of

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[82] Fenner Douglass, *Cavaillé-Coll and the Musicians: A documented account of his first thirty years in organ building,* (Raleigh, NC: Sunbury Press, 1980), 1.
[83] Ibid., 1.
[84] Ibid., 5.
[85] Douglass, *Musicians,* 2.

organ building in France during the nineteenth century.[86] As were other builders of his generation, Cavaillé-Coll, was influenced by orchestral music.[87] He aimed to replicate with the organ the richness and dynamic capabilities of the orchestral idiom.[88] He travelled throughout Europe, studying organs in Germany, Switzerland, Holland, and England. He corresponded with other organ builders and admired the work of Johann Heinrich Hartmann Bätz in the Netherlands and of Eberhard Friedrich Walcker in Germany.[89] "Cavaillé-Coll was considered a leader on the international level, and in France the chief of them all."[90]

Cavaillé-Coll developed a design for his organs that provided stops of "greater fullness and warmth," and emphasized the strength and character of solo stops.[91] He conceived of two main categories of organ sound; voices particular to the organ such as the foundation stops, and those that imitate the instruments of the orchestra.[92] He preferred an organ tone with strong fundamentals, created by using an increased number of 8' stops available in a variety of timbres.[93] In response to critics of his day, Cavaillé-Coll expressed his desire "to give the various stops in the organ the tonal character of the orchestral instruments whose names they bear," and he worked to improve their imitative qualities.[94] He considered mutation stops, characteristic of seventeenth and eighteenth century French organs, to be a plague of

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[86] Douglass, *Musicians*, 7.
[87] Williams, *European Organ,* 201.
[88] Wills, 86.
[89] Fenner Douglass, *Cavaillé-Coll and the French Romantic Tradition,* (New Haven, CT: Yale University Press, 1999), 145; Douglass, *Musicians,* 160.
[90] Douglass, *French Romantic Tradition,* 144.
[91] Wills, 101.
[92] Douglass, *Musicians,* 24.
[93] Ibid., 147, 155.
[94] Ibid., 54.

these old instruments. He often discarded high-pitched stops or limited their inclusion in his specifications to the creation of complex tones, colorful effects or the synthesis of orchestral colors.[95] Cavaillé-Coll developed new progressive mixture stops that strengthened the trebles of reed stops by adding ranks in the upper ranges. On his organs, the function of mixture stops shifted from crowning the classical *plein jeu* (a French type of principal chorus) to reinforcing the reeds.[96]

Cavaillé-Coll's use of increased wind pressures and wider pipe scales are similar to the work of other builders during the nineteenth century. He applied different wind pressures for flue and reed stops and also increased pressures for the treble ranges to maintain power and quality of tone.[97] Increased wind pressures allowed Cavaillé-Coll to develop harmonic stops, flutes and trumpets; these ranks are constructed of double-length pipes and overblown to sound the second harmonic.[98] His overblown harmonic pipes produced a more aggressive tone with greater volume that improved the tone of the treble ranges of flue and reed stops. Harmonic pipes were developed as an imitation of various orchestral wind instruments whose upper ranges are produced along similar acoustic principles.[99] Many of Cavaillé-Coll's harmonic stops were built with conventional construction for the basses, the harmonic pipes beginning at 2' C. The more common harmonic flute stops were the *Flûte harmonique, Flûte octaviante, Flûte traversière*; the harmonic reeds were the *Trompette*

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[95] Douglass, *Musicians,* 56, 155;
William Leslie Sumner, *The Organ: Its Evolution, Principles of Construction and Use,* (London: MacDonald and Jane's, 1975), 225.
[96] Douglass, *Musicians,* 147.
[97] Sumner, 225.
[98] Wills, 99; Sumner, 225.
[99] Douglass, *Musicians,* 21.

harmonique and *Clairon octaviant*.[100] Cavaillé-Coll included powerful, harmonic reeds in all divisions and at 16', 8', and 4' on the *Grande orgue:* "The *grand choeur* would not be complete without the *Bombarde, Trompette*, and *Clairon* in the *Grand orgue*, sustained in the bass by a *16' Bombarde* and an *8' Trompette*."[101] He also placed loud reeds in a horizontal position, *en chamade*, following Spanish custom. The result was a full organ that was dominated by a blaze of reed tone, rendered brilliant by mixture stops.[102]

Various stops imitating string tone were introduced to the French organ during the nineteenth century. The narrow scaled *Viole de gambe* and *Salicional* added new tonal color to the foundation ensemble and as individual colors.[103] In the secondary *Récit* and *Positif* divisions, these string stops were paired with the *Voix céleste* or *Unda maris*, an undulating stop of quieter string tone, of similar pipe construction and tuned slightly sharp.[104]

Cavaillé-Coll modified other reed stops to give them a more orchestral character. The *Hautbois* was extended to create a *Basson* register. The *Clarinette* often replaced, or was included in addition to, the classical *Cromorne* of the Positif. The V*oix humaine* was transferred to the enclosed *récit expressif*.[105]

Cavaillé-Coll enlarged the *récit expressif*, including powerful harmonic reeds and orchestral stops, and he constructed the expression box to provide a greater range of volume. He considered gradual dynamic change to be an essential orchestral quality,

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[100] Douglass, *Musicians*, 26, 148.
[101] Ibid., 155.
[102] Sumner, 225.
[103] Williams, *European Organ,* 201.
[104] Sumner 223-224.
[105] Ibid., 225.

and he felt that many reed stops were more effective when placed in expression boxes.[106]

In 1836, Cavaillé-Coll was chosen to build a new organ for the Basilique Saint-Denis as part of a restoration project of the church. The instrument was completed in 1841 and was a forerunner of the French symphonic style. Many of the mechanical innovations that contributed to the success of the French symphonic organ were present in this early instrument: an improved winding system with bellows and reservoirs producing higher pressures, the use of the Barker lever, a coupler system with combination pedals, ventil control for the harmonic flutes and reeds of the *Positif*, an enclosed and expressive *Récit*, and harmonic flutes and reeds. Elements of the French classical style also appeared in this design, including classical-style mutation and mixture stops.[107]

The specification of the organ for the Basilique de Sainte-Clotilde, built in 1859, is frequently presented by organists and scholars as best representing Cavaillé-Coll's style. César Franck, organist of Ste.-Clotilde and father of the French symphonic style of organ composition, is associated with this instrument. The organ possesses the fundamental design features of Cavaillé-Coll's instruments. The *fonds d'orgue* (foundations) of the *Grand orgue* and *Positif* are composed of different timbres at 8' pitch: *Montre, Bourdon, Flûte harmonique*, and *Viole de gambe*. The tonal resources of each manual and pedals is divided into foundations at 16', 8', and 4' pitch (*jeux de fonds)*, and harmonic reeds and upper-work (*jeux de combinaison* or *jeux d'anches*) that are brought into operation with ventil pedals. Harmonic reeds are available on all

[106] Douglass, *Musicians,* 16, 24, 156, 158; Sumner, 225.
[107] Douglass, *Musicians,* 141.

divisions, forming an important part of the full ensemble. The string stops of the *positif* and *récit expressif* may be paired with a *céleste* stop. Ironically, this famous organ was not considered by Cavaillé-Coll as one of his more important instruments.[108] Its specification was not an original design but a copy of an instrument proposed for the Cathedral of Bayonne in 1849.[109] The only apparent modifications were the double pallet boxes for the *positif*, a change in keyboard order, with the *Grand Orgue* being the lowest, and an extended pedal compass. Tonal alterations increased the size of the instrument from 40 to 46 stops.[110] It is unlikely that Franck participated in drawing up the specification for this instrument.[111]

Cavaillé-Coll's magnum opus is the organ built for the Church of Saint-Sulpice in 1862, a redesign and rebuild of the church's eighteenth century Clicquot organ. At the time of its completion, this organ was the largest in France. The Walcker organ in Ulm Minster was the inspiration for this massive organ, which Cavaillé-Coll visited during his European travels in 1856. Already in the process of building the Saint-Sulpice organ at this time, he made changes to the original proposal when he returned to France.[112] The fundamental features of Cavaillé-Coll's instruments are realized on a large scale at Saint-Sulpice. The inclusion of more mixture and mutation stops recalls elements from the classical tradition. The *Grand orgue* division contains primarily foundation stops and no reeds while the *Grand-choeur* division includes mostly reed and mixture stops. Coupling the *Grand-choeur* to the *Grand orgue* is comparable to engaging the *jeux de combinaison* of the *Grand orgue* found on other

[108] Douglass, *Musicians*, 109.
[109] Ibid., 109.
[110] Ibid., 137.
[111] Ibid., 113.
[112] Ibid., 137, 160.

Cavaillé-Coll organs. Meanwhile, all the manual divisions may be coupled together on the *Grand-choeur*, the first manual. The *Registres de Combinaison* is a pneumatic stop action that permits the organist to prepare and execute more complex registration changes.

Cavaillé-Coll organs are characteristically French with romantic sounds and choruses of powerful reed stops.[113] "Cavaillé-Coll did not invent high-pressure reeds, overblowing flutes, the swell box, the horizontal bellows, combination pedals, or the pneumatic lever, … but reconciled and transformed them all into something cohesive and unique that was to captivate players."[114]

Skinner visited Paris in both 1898 and 1924 and saw the instruments in Saint-Sulpice and Notre Dame.[115] He met the famous organists who regularly played these instruments, Charles-Marie Widor, Marcel Dupré, Louis Vierne, and Joseph Bonnet. Skinner also visited Cavaillé-Coll's organ building factory in Paris.[116] "The nineteenth-century romantic instruments he heard in France made ... a favorable impression on him."[117] Skinner heard the powerful and brilliant reed choruses, the characteristic *Flûte harmonique* stops, the undulating strings, and gained information on the historical foundation for mutation stops on the French organ.[118]

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[113] Whitney, 10.
[114] Owen, 216.
[115] Whitney, 9-10, 52.
[116] Holden, 21.
[117] Whitney, 10.
[118] Holden, 112; Whitney, 52.

Willis and the English Romantic Organ

England emerged as a world empire during the nineteenth century. Global political union brought economic strength and stability throughout the century. The technological developments that marked the beginning of industrialization brought an abundance of wealth to England. The Industrial Revolution sparked cultural changes, and the pretentions of the age prompted organ builders to apply their creative ingenuity to build larger, more impressive and powerful instruments.[119]

Musical influences originating in continental Europe revealed the short-comings of earlier English organs. Among the earliest of these influences were the recital tours of Felix Mendelssohn (1809-1847) that took place in London between 1829 and 1846. Mendelssohn, the "great protagonist of [Johann Sebastian] Bach's music, hitherto almost unheard in Britain," desired to perform the baroque master's organ works during his concerts, but was disappointed with the inadequacies of the instruments he encountered, particularly their limited or absent pedal divisions. The British admiration of Mendelssohn initiated the introduction of pedal departments on British organs so that "Bach could be played as written."[120] Changes to English organs were not limited to the introduction of a German-style pedal division.

> "English organists, stimulated by the discovery of Bach's organ music and inspired by Mendelssohn, had acquired a more thoroughgoing appreciation of the continental organs, and it was their influence which led to the rapid emergence during the 1840s of the C-compass organ, with its pedal division, fully-developed choruses and tonal

[119] Stephen Bicknell, *The History of the English Organ,* (Cambridge, UK: Cambridge University Press, 1996), 234.
[120] John Norman, *The Organ of Britain: An Appreciation and Gazetteer,* (North Pomfret, VT: David and Charles, 1984), 83.

> novelties, and the consequent disappearance within a single generation of the English long-compass organ."[121]

Henry John Gauntlett (1805-1876), a lawyer by profession and the editor of the journal, *Musical World*, was among a group of Englishmen who toured Europe for the purpose of visiting organs beyond England, his travels taking place in c. 1836 and 1842. His musical ability, strong opinions on the subject, and his close friendship with Mendelssohn, positioned him to initiate changes in English building.[122] Gauntlett was impressed by the large Dutch organs that supported robust congregational singing in the Lutheran churches. As an advocate for hymn singing in Christian worship, he considered the British organ inadequate to support powerful unison singing. Gauntlett viewed the "German system" as an economical means to achieve the desired musical goals he was seeking and was a proponent of building organs with full, C-compass manuals, independent pedal divisions, and complete choruses in all divisions, including the pedal. He designed a number of organs during the mid-nineteenth century and collaborated most notably with the organ builder, William Hill.[123]

The English concert hall organ helped introduce high-quality music to a wider public audience. The town hall with a grandiose concert organ was a source of civic pride for industrial towns throughout England.[124] These organs were useful for accompanying the oratorio performances given by the flourishing choral societies of the period. Organists who performed recitals often included transcriptions of

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[121] Nicholas Thistlethwaite, *The Making of the Victorian Organ,* (Cambridge, UK: Cambridge University Press, 1990), 181.
[122] Bicknell, *English Organ*, 233, 234, 236; Norman, 83.
[123] Norman, 82.
[124] Wills, 115.

orchestral music, brought orchestral repertoire to audiences who would otherwise have a rare opportunity to hear an orchestra.[125] The performance of orchestral transcriptions became quite popular, and English organists adopted a style of playing based on orchestral imitation.[126] Concert organists demanded instruments with "stops that could imitate the technical efficiency and tonal refinement of modern orchestral instruments."[127] There emerged "a growing tendency during the 1850s and 1860s to introduce mechanical and tonal features of the most advanced concert organs into church instruments."[128] English organ builders designed specifications for concert-hall and church instruments that moved away from the "classical ideals of clarity and translucence of tone. The trend became one towards an accompanimental instrument, and one more capable of simulating orchestral sonorities."[129] These builders were inspired by the instruments being built by Walcker in Germany and by Cavaillé-Coll in France.[130]

During the second half of the nineteenth century, England emerged as a prominent organ building nation with the dawn of a new type of instrument, the English romantic organ.[131] There was a considerable demand by churches and town hall venues for new and larger instruments during this period. English organ building firms seized the opportunity and established factories that employed

[125] Bicknell, 249, 259; Wills, 117.
[126] Norman, 85; Wills, 117.
[127] Thistlethwaite, 415.
[128] Ibid., 412.
[129] Wills, 115.
[130] Bicknell, 232.
[131] Bicknell, 257; Thistlethwaite, 417.

numerous craftsmen and operated with a level of high efficiency and output, building many large, high quality instruments.[132]

The tonal characteristics of the English organ were developed with improvements "along the lines of smoothness and increased roundness of tone and volume of sound."[133] The flue chorus of the romantic English organ is based on two *Open Diapasons* at 8' pitch (one large scale and the other small), and the introduction of a *Double Open Diapason* at 16'. This composition of chorus foundation "gave the English organ a fullness of tone not possible on earlier organs."[134] The duplication of registers remains a feature of English organ building.[135] The adoption of C-compass manuals made the introduction of 16' manual stops economically feasible, which provided a wider range of pitches for each manual note.[136] The duplication of individual registers and the use of manual double stops (16') were recognized by organists and builders as an important means to give dignity to the chorus, and correct imbalances between treble and bass.[137] The term *Sesquialtera* was often used by English builders as the name for a chorus mixture having pipes of diapason scale, the three rank examples having the composition 17.19.22. Other examples of the *Sesquialtera* are composed of only unison and quint pitches without the tierce pitches in their compositions.[138] The addition of the tierce rank, with the expected unisons

[132] Bicknell, 257.
[133] Wills, 118.
[134] Bicknell, 243.
[135] Thistlethwaite, 107.
[136] Norman, 82.
[137] Thistlethwaite, 109.
[138] Norman, 76.

and quints, to the mixture stops gives a reedy tang to the full chorus "which is peculiar to the British organ."[139]

The swell box was already a common feature of English organs built during the eighteenth century.[140] By the nineteenth century, the Swell organ was developed, enlarged, and became the second manual of importance. The Swell organ superseded the Choir organ as the main alternative to the Great organ in smaller instruments and the department was extensively developed in larger instruments, reducing the Choir organ to a collection of a few mildly voiced, accompanimental and solo stops.[141] While the Swell organ was originally an expressive solo division with a few treble stops, this division changed as the compass of the manual was extended, and the tonal scheme of the department included a complete flue chorus.[142] Its enclosure resulted in a considerable loss of power. Builders compensated for this loss through the addition of more reed stops to the division. Reed stops made up the tonal character of the English Swell organ and distinguished the department from the Great organ.[143] The upgraded Swell organ with chorus reeds at 16', 8', and 4', was in advance of the department's development in Germany and France. Swell organs were still in an experimental stage in Germany, and the equivalent *Récit expressif* was still a junior partner to the *Grand Orgue* and *Positif* divisions in French organs. The large, English Swell organ had widespread influence through the rest of the nineteenth and into the twentieth century.[144]

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[139] Norman, 73.
[140] Williams, *New History*, 138.
[141] Norman, 80, 84; Wills, 118.
[142] Thistlethwaite, 115.
[143] Norman, 85.
[144] Bicknell, 238.

The Solo organ was an additional new department included in many larger, English instruments during the nineteenth century. This division was comprised of primarily orchestral stops, ranging from imitative flutes and French-styled harmonic flutes to reed stops including the *Clarinet, Oboe, Bassoon*, and *Cor Anglais*.[145] The English admired the French *Flûte à Pavillon*, the *Flûte Harmonique*, and the *Viola da Gamba*, as well as the famous, brassy choruses of *Trompettes*, and they developed their own versions of these stops.[146] The trumpet family was extended with the development of the powerful *Tuba Mirabilis*, built with large scaled resonators and voiced with the highest wind pressures of the organ.[147] The use of higher wind pressures for reed stops provided evenness of tone, and the *tutti* of the English organ became dominated by the power reed stops, comparable to the brass dominated *tutti* of the orchestra.[148] The performance of transcriptions of orchestral music by organists became more effective; "the dominant reed gave an additional tone color for solo use" and the increases in scale and wind-pressures produced additional tonal power.[149] During the nineteenth century, English organs were "unsurpassed as a medium for orchestral transcriptions and for accompaniments."[150]

The work of two English organ builders developed the English romantic organ of the nineteenth century, William Hill, and Henry Willis. Hill (1789-1870) searched for purity, power, and grandeur of tone in his instruments. Hill's mid-nineteenth century organs were built with generous pipe-scales and robust construction, and

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[145] Bicknell, 249; Wills, 117.
[146] Bicknell, 242.
[147] Ibid., 238.
[148] Wills, 118.
[149] Norman, 85.
[150] Wills, 118.

influenced builders of the second half of the century.[151] The flue and reed choruses developed by Hill increased the tonal variety of the English organ.[152]

Hill's organ for George Street Chapel, Liverpool in 1841 included an early Solo organ with one stop, the *Tuba Mirabilis 8*.[153] The *Tuba Mirabilis* is a member of the trumpet family of organ tone, constructed with large-scale resonators and voiced on increased wind pressure to produce a powerful tone that dominates the entire ensemble.[154] Hill's contribution of the rounder and velvet toned *Cornopean* "provided a thicker and richer trumpet tone" and produced a sound similar to the instrument it was named after, an early form of valved cornet.[155] Other reed stops included in Hill's organs include imitative voices such as the *Contra-fagotto, Clarionet,* and *Chalemeau*; stops with full and rounder tone include the *Cromorne-flute* and *Corno-flute*.[156]

Hill developed a variety of quieter registers, wooden flutes, and narrow-scaled registers that produced string tones, including *the Salicional, Viol da Gamba, Cone Gamba, Gemshorn 4'*, and a string-toned version of the *Hohl-flute*, which all became increasingly popular.[157] He also included high pitched, compound stops such as the *Echo Dulciana Cornet V* and the *Doublette II* (fifteenth and twenty-second).[158] His

[151] Wills., 85.
[152] Thistlethwaite, 198.
[153] Norman, 84, 85.
[154] Bicknell, 238; Norman, 84-85.
[155] Bicknell, 238; Thistlethwaite, 113.
[156] Thistlethwaite, 200.
[157] Thistlethwaite, 200, 201; Bicknell, 239.
[158] Thistlethwaite, 201.

organs were equipped with the tonal resources to produce a weighty sound and the flexibility to accompany and imitate the orchestra.[159]

The English romantic style organ of the nineteenth century culminated in the work of Henry Willis (1821-1901). Organs built by this influential builder were massive and exemplified the English style through the second half of the nineteenth century. [160] Willis was an innovator with voicing and mechanism.[161] He made efforts to match or surpass the achievements made by Hill and Gray & Davison.[162] Willis's objectives were to increase volume and refine the tonal colors of the organ. He achieved this goal through the use of increased wind pressures.[163] Early in his career, he included a complete Pedal organ, a powerful reed chorus in the Swell, and orchestral divisions on his instruments.[164] Willis built organs in important concert halls, such as St. George's Hall in Liverpool (1855) and the Royal Albert in London (1871). The instruments built for these large auditoriums were required to produce a great volume of sound, achieved through voicing techniques using high wind pressures. Similar techniques were applied by Willis to his church and cathedral instruments, which attained comparable power and purity of tone.[165] "Willis's registers generally are scaled and voiced to speak directly and with a full tone."[166] His reed stops conveyed powerful, smooth tone color through the use of high wind

[159] Thistlethwaite, 201.
[160] Norman, 86.
[161] Thistlethwaite, 412.
[162] Bicknell, 261.
[163] Norman, 86, Thistlethwaite, 416.
[164] Thistlethwaite, 433.
[165] Ibid., 416.
[166] Ibid., 415.

pressures.[167] "Willis used different wind pressures to create an instrument capable of considerable variations of intensity and volume."[168] Willis's organs are described as having a "hard" sound, but he created a new style, a new tonal ethos, and expressed a new concept.[169]

Willis assimilated a variety of concepts into the development of his instruments.[170] He adapted Töpfer's pipe scale theories, which were associated with the esteemed qualities of even regulation and tonal purity. He avoided the flaw of trebles becoming too thin by calculating pipe scales that halved diameters every sixteen notes and added Töpfer's "secret" constant that halved the diameter every octave.[171] The *'Lieblich' Gedeckt*, a narrow-scaled stopped pipe introduced to England by the German builder, Edmund Schulze, was incorporated by Willis.[172] Traces of French tonal ideas, such as the double-length harmonic flute and reed stops of Cavaillé-Coll, are found in Willis's organs but not in their original form.[173] He reduced the scales of these flute pipes, increased their cut-up, and blew them with greater wind pressure to create his own prototypes.[174]

The Great division of Willis's organs included a complete *Diapason* chorus, usually the only division with this type of chorus.[175] The Willis formula for the chorus were two *8' Diapasons*, the first larger scaled, the second smaller; a *16' Double Diapason*, a *4' Principal*, which were of the same scale; and the remaining upperwork scaled

[167] Norman, 86-87.
[168] Thistlethwaite, 436-437.
[169] Norman, 89; Thistlethwaite, 417.
[170] Thistlethwaite, 416.
[171] Norman, 88-89.
[172] Ibid., 86.
[173] Thistlethwaite, 416; Norman, 86, 92.
[174] Norman, 89.
[175] Thistlethwaite, 433.

progressively smaller. The scales of Mixture stops were "larger than their corresponding ranks in the chorus to act as an effective bridge between the powerful reeds and the remainder of the flue-work."[176] Willis's chorus mixtures often included a third-sounding tierce rank that gave the Diapason chorus a reedy, acidic tone.[177] Willis's flue work was voiced with narrow mouths, blown with higher wind pressures that encouraged a keen and reedy tone.[178]

The secondary flue choruses consisted of various flutes, stopped and harmonic, and string stops. The Choir organ of his smaller instruments was composed entirely of gedackts, strings, harmonic flutes, and orchestral reeds.[179] Willis relied on open wood *Claribels*, stopped metal *Lieblich Gedeckts*, and *Harmonic Flutes* as part of these choruses. Many of his 'stopped diapasons' had treble pipes of open wood construction similar to *Clarabellas*.[180] The narrow-scaled *Lieblich Gedeckt* was included in both Choir and Swell divisions.[181] Willis's metal flutes and harmonic flutes were narrowly scaled and voiced with a more pronounced string tone.[182] The imitative, orchestral strings stops, *Gambas, Violones, Violas*, and *Viols d'Amore*, were usually constructed with narrow scales, slotted, and voiced with a keen tone. The pipes of these ranks had a high languid and a lower lip to provide prompt speech. Willis's *Salicionals* and *Dulcianas* were similar in scale, voiced on lighter wind, and were not slotted.[183] The treble ranges of these softer ranks gradually increased in power and

[176] Thistlethwaite, 439, 440; Bicknell, 262.
[177] Norman, 90.
[178] Bicknell, 263.
[179] Thistlethwaite, 433.
[180] Ibid., 437.
[181] Ibid., 433.
[182] Thistlethwaite, 433; Bicknell, 263.
[183] Thistlethwaite, 438; Bicknell, 262-263.

provided a gentle, melodic crescendo.[184] Narrow scaled registers, *16' Dulcianas, Salicionals*, and *Gambas* were often the secondary chorus manual doubles on the Swell and Choir divisions.[185]

Willis accentuated the reed tone of the Swell division, initiated by his predecessors, through the use of higher pressures that differentiated the Swell from the Great.[186] The tierce-based mixtures were intended to be used with reed stops.[187] The prominence of reed stops in tonal schemes that dominated the full chorus was similar to Cavaillé-Coll's use of harmonic reeds, but with a different treatment by Willis.[188] Willis's powerful chorus reeds were smoother than the French reeds, which appealed to the tastes of the English.[189] He developed his smooth reed tone by using increased wind pressures and regulating their tone by lengthening the resonator, and introducing closed shallots.[190] He also modified the shape of the shallot, inserting part of it into the block and restricting the opening.[191] Willis occasionally introduced harmonic reeds, but not to the extent that Cavaillé-Coll did.[192]

Among the reed stops of the Solo organ, the powerful *Tuba Mirabilis*, the specialty of Hill, was adopted by Willis as part of his design of this division.[193] The characteristic voicing features of Willis's high-pressure reeds were developed by his son, Vincent Willis: weighted tongues for bass pipes, use of short boots and

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[184] Bicknell, 263.
[185] Bicknell, 263;Thistlethwaite, 434.
[186] Norman, 89.
[187] Bicknell, 263.
[188] Thistlethwaite, 416.
[189] Thistlethwaite, 434; Bicknell, 261.
[190] Norman, 87; Bicknell, 261.
[191] Norman, 87.
[192] Thistlethwaite, 434.
[193] Bicknell, 261.

harmonic resonators in the trebles, the introduction of regulating slots in the resonators, and use of curved tongues.[194] The added weights and heavier tongues of the bass octaves stabilized their pitch, but caused them to speak slower.[195] Other characteristic solo reeds were developed by Henry's brother, George Willis: the *Corno di Bassetto*, "a bold, woody, imitation of the Bass Clarinet", the *Orchestral Oboe*, and various high pressure reeds.[196]

The smooth, intense, and powerful bass of the pedal division "stands out as a distinctive characteristic of English organs during this era."[197] The firm bass was formed by the pedal *Open Diapason*, an open wood rank, voiced with high wind pressure, resulting in a powerful, fluty tone.[198] The Pedal reeds were commanding, also voiced on high wind pressures and balanced by the brilliance of the manuals playing full organ.[199] A pedal division containing 32' flue and reed stops was common on Willis instruments.[200]

A characteristic feature of these organs was the gradual crescendo created through the build-up of stops, the addition of the Swell to Great coupler, and opening the Swell box. The "Willis sound" was characterized by flue choruses diluted with the use of *Claribel* and *Harmonic Flutes*, reedy flues, smooth reeds, a full Swell based on a 16' reed chorus, and bold tierce mixtures to complement the

[194] Bicknell, 262; Thistlethwaite, 416.
[195] Norman, 87, 88.
[196] Bicknell, 261.
[197] Ibid., 263.
[198] Bicknell, 263.
[199] Ibid., 263.
[200] Ibid., 257.

powerful reed choruses.[201] The Willis design for the English cathedral organ is exemplified by his instrument for St. Paul's Cathedral, London in 1872. This organ

> "expressed concisely all the principal features of his mature style: distinct pressures for chorus reeds, relatively high pressures for flue-work; tierce-mixtures, gedacts, strings, orchestral reeds; a 16' reed chorus in the Swell, powerful tubas in the Solo; an undulating string in the Swell."[202]

By the end of his career, Henry Willis was hailed as "the greatest organ builder of the Victorian Era."[203] His grandson, Henry Willis III, continued the elder's tradition, reflecting the tastes of the time in organs with big diapasons and smooth reeds.[204] At the beginning of the twentieth century, the Willis design was considered the "essential foundation [for the] distribution of resources." George Dixon (1870-1950), a Willis enthusiast, suggested that the design be improved with more variety of voices and a wider range of tone colors to establish the primacy of the flue-work and restore mutations and upperwork, further maximizing the use of resources through extension and borrowing.[205]

While in England during his trip in 1898, Skinner attended an organ concert performed at St. George's Hall and where he first experienced the sounds of Willis's instruments. "Wild with enthusiasm," he was impressed with the instrument and admired Willis's work as "incredibly fine and superior to anything [he] had ever heard," particularly the high pressure Tuba stops.[206] Skinner made the acquaintance of Henry Willis, Jr., and later "Father" Willis. At their arrangement, he examined a

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[201] Thistlethwaite, 433; Bicknell, 263.
[202] Thistlethwaite, 434-435.
[203] Bicknell, 261.
[204] Norman, 97.
[205] Bicknell, 301-302.
[206] Whitney, 9.

number of Willis instruments, and he learned the fundamental principles of English reed voicing.[207] In 1924, Skinner met Henry Willis III, head of the Willis firm, and obtained information on Willis's scaling of flue-work and mixtures.

[207] Holden, 21.

CHAPTER 4

THE BIRTH OF THE ROMANTIC ORGAN IN AMERICA

"Organ-building in America has always been … dependent on European ideas."[208] The development of the American style organ was influenced by the English, Germans and French.[209] The United States and Great Britain remained in close contact during the late-nineteenth and early twentieth centuries.[210] "'The first real growth of interest [in organ building] coincided with the development of the romantic organ in Europe."[211] American organ builders designed loud instruments with a thick ensemble sound dominated by 8' pitch; these organs contained contrasting loud and soft stops and were equipped with an enclosed division.[212] The designs of these builders included less upperwork and a variety of colorful and imitative stops.[213] The tonal ideal was based on the idea of creating a large body of sound, often described during this era as '"dignified,' 'majestic,' or 'grand.'"[214]

American organists, like their English counterparts, frequently performed transcriptions of orchestral music so they desired an instrument that could imitate orchestral effects, with massive tone, variety of color, and dynamic flexibility.[215] The wide availability of "high quality music helped stimulate popular interest in louder and more public forms of music, especially orchestral music. This interest helped

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[208] Wills, 125.
[209] Ibid., 123.
[210] Bicknell, 259.
[211] Wills, 125.
[212] Ibid., 209.
[213] Holden, 15.
[214] Ochse, 210.
[215] Holden, 15.

stimulate a demand for orchestral sounds in organs and organ music."[216] The application of improved technologies made this type of instrument possible in the early twentieth century. The imported tonal ideas could be carried to their logical end."[217] "Bigger, better, and louder was the motto as the United States began to transform itself from an agrarian to an industrial colossus in the decades before World War I."[218]

Hutchings Employs Skinner

By the late-nineteenth century, American organ builders were constricting instruments with romantic designs. The work of the New England builders of the era, Elias and George Hook, Frank Hastings, William A. and William H. Johnson, and George Sherburn Hutchings illustrate this trend in America. George S. Hutchings (1835-1913) worked for the Hook organ factory during the mid-nineteenth century. In 1869, he formed a company in partnership with Dr. J. H. Willcox, M. H. Plaisted, and G. V. Nordstrom that would eventually be named the "George S. Hutchings Co." before merging with the Votey Organ Company in 1901 to become the Hutchings-Votey Organ Co.[219]

Beginning around 1889 or 1890, Skinner was employed by the Hutchings Organ Co. and worked for the firm for eleven years. Skinner's creative work was devoted to the improvement of the organ's mechanical equipment and the refinement of its electric action, including his electro-pneumatic "pitman" windchest action.[220] "He supervised the installation of numerous organs for the Hutchings firm," many that

[216] Olsen, xii.
[217] Holden, 15; Wills, 125.
[218] Whitney, 21.
[219] Ochse, 233.
[220] Holden, 17, 19.

included his mechanical devises.[221] The Hutchings organ built for the South Congregational Church in New Britain, Connecticut is among the important installations with which Skinner was involved. This instrument was the "largest organ in Connecticut, and with one exception, the largest in New England."[222] The designs of Hutchings's instruments were similar to those of his New England contemporaries, particularly those of Hook and Hastings, with greater emphasis on 8' pitch, a variety of soft registers, and powerful reed stops.[223] But Skinner was developing his own opinions about organ design. In 1894, he conceived of an ideal organ, an instrument having "a complete tonal resource."[224] He drew up and submitted a specification to Everett Truette who published Skinner's design in his journal, *The Organ,* in April, 1894. This specification foreshadows the designs of instruments Skinner built when he established his own company at the turn of the century.

In 1901, Skinner resigned from the Hutchings-Votey Organ Company to begin his own organ building company in South Boston, Massachusetts and to pursue his heart's desire, to become a voicer of organ pipes.[225] As he began building his own organs, two influential men emerged in American organ building circles whose ideas swayed builders through the next three decades, Robert Hope-Jones and George Ashdown Audsley.

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[221] Holden, 17.
[222] Ibid., 17.
[223] Ochse, 221-223, 236.
[224] Ibid., 13.
[225] Holden, 26.

Robert Hope-Jones

Robert Hope-Jones (1859-1914) was "the most controversial figure to enter the American organ industry in the early twentieth century."[226] An electrical engineer and an enthusiastic, amateur church musician, he developed and applied an electrical system to control the organ.[227] In 1886, Hope-Jones fashioned electro-pneumatic mechanisms of his own design and installed them in the organ in St. John's Church in Birkenhead, controlling them from a moveable stop-key console. Hope-Jones's innovation created a sensation, and "his achievement was trumpeted as the greatest step in the history of organ building."[228] "Having started a revolution in the mechanics of the organ, Hope-Jones turned his inventive prowess to its tonal resources. To him, if it was different it was better; and the smooth and loud *Tubas* and tubby *Phonon Diapasons* and *Tibias* he developed were certainly different from what had been considered over the centuries as normal organ tone."[229] His "revolutionary ideas about organ design" could be practically realized through the use of his new control system.[230]

In 1896, Hope-Jones rebuilt the William Hill organ in Worcester Cathedral using his electrical control system, and he redesigned the instrument tonally. Because he considered the conventional upperwork, high-pitched stops, mixtures, mutations, to

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[226] Ochse, 333-334.
[227] Ibid., 334.
[228] David L. Junchen, *The Wurlitzer Pipe Organ, an Illustrated History,* ed. Jeff Weiler, (The American Theatre Organ Society, 2005), 19-20.
[229] Ibid, 23.
[230] Ochse, 334.

be unnecessary, he omitted these stops from his designs.[231] The reputation of the Worcester organ attracted global attention, with testimonials lauding its success:

> "One of the most remarkable exemplifications of organ building of the present day."
> *(A.L. Peace, Organist of the Glasgow Cathedral)*
> "It reaches a standard of excellence far above anything I have seen before."
> *(H. Blair, Organist of Worcester Cathedral).*[232]

Skinner, aware of theses accolades, became interested in Hope Jones's mechanical and tonal innovations, including his experimentation with electric organ action. During Skinner's European travels in 1898, his initial intent was to see the Worcester Cathedral organ. Upon his arrival in England, Skinner had the opportunity to visit the Hope-Jones factory and hear some of Hope-Jones's other organs, the Blind Asylum in Birkenhead, St. George's Church, Hanover Square, and a small organ in Liverpool. Skinner was disappointed with his experience of these organs, noting the strident strings, the brutal and harsh tone, and the noisy combination action. He described the organs as "simply brutal and destitute of musical value."[233] Skinner never went to Worcester Cathedral.

The paths of Skinner and Hope-Jones crossed again less than a decade later. Hope-Jones emigrated from Great Britain to the United States in 1903.[234] He immediately pursued organ building, using his electrical organ control systems and promoting his own tonal ideas. Hope-Jones designed and built an organ for The Park Church in Elmira, New York, which was "the most unified organ ever built at

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[231] Bicknell, 294-295.
[232] Ibid., 296.
[233] Holden, 20.
[234] Ibid., 30-31.

that time … [and] featured the first horseshoe console in America."[235] In 1904, Hope-Jones discussed with the church's organist his opinion of the tonal superiority of the instrument:

> The wealth of deep toned stops … would place the Park Church organ in another class to any of the organs so far erected in America. The sets of pipes of two feet length and less which are so cheap and so are numerously employed in all ordinary organs, are entirely absent in yours. There are but three stops of four feet length included in the scheme while there appears a greater array of 32 feet, 16 feet, and 8 feet stops than can be found in any $20,000 organ in the country. It is only from these deep toned stops that the dignified devotional effects so common in the English and European Cathedral instruments can be obtained.[236]

Skinner continued to hear praise for Hope-Jones, and in 1905, invited him to join the Skinner organization as vice-president and as a salesman. This professional relationship only lasted for fifteen months. Hope-Jones was soon dismissed because he resorted to deceitful tactics to undermine Skinner's authority.[237] Nevertheless, he influenced Skinner's organs through improvements in the electric action using round wire contacts, the use of coil springs on wind reservoirs to regulate wind pressure, and the exploitation of the "unit system" (borrowing). Skinner applied the unit system in moderation, on small organs with limited resources, for manual solo stops, and to augment the pedal department.[238]

Hope-Jones continued to pursue his ideas of tonal development, using higher wind pressures, exaggerated scales for pipe work to produce big flutes, dull and heavy diapasons, and keen strings. He created colorful, distinctive reed voices while

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[235] Junchen, 36.
[236] Ibid., 36-37.
[237] Holden, 31.
[238] Ibid., 31-33.

eliminating what he called "the absurd 'mixture work'" and mutation stops.[239] Meanwhile, Skinner did not use the extremely high wind pressures advocated by Hope-Jones nor the exaggerated pipe scales, with the exception of the occasional presence of a *Philomela*, a type of thick flute, and some sharp strings added to a diverse mix of stops. He considered an organ designed with a limited number of stops at extreme ends of the tonal spectrum to be inartistic. Similarly, he found strings with narrow scales that were blown forcefully to be unmusical.[240] Skinner did not completely eliminate mixtures, except perhaps in the design of his smaller instruments.[241]

Following his association with Skinner, Hope-Jones established his own organ building company in the United States which was eventually purchased by the Rudolph Wurlitzer Company. He designed organs that produced powerful tones while using relatively few ranks of pipes. In summary, Hope-Jones created a tonal concept in which:

- Every stop was enclosed in an expression box and built with the capability to reduce a powerful organ sound to a soft one,
- Every stop was powerfully and smoothly voiced using high wind pressures,
- Soft stops were considered unnecessary and were omitted,
- Ranks were organized and grouped by quality of timbre,
- "Unit stops" were used throughout the instrument and pipe ranks were made playable on any manual at a variety of pitch levels.[242]

Hope-Jones' concept was orchestral; he even called his organ the "unit orchestra," an instrument designed to provide the greatest amount of orchestral

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[239] Holden, 33; Ochse, 335.
[240] Ernest M. Skinner and Richmond H. Skinner, *The Composition of the Organ,* ed. by Leslie A. Olsen (Ann Arbor, MI: Melvin J. Light, 1981), 15, 28.
[241] Holden, 33-34.
[242] Ochse, 335 – 337.

timbres while using the fewest number of pipes. The unit orchestra, also known as the "theatre organ" because these instruments were frequently installed in theatres, was often used for the performance of popular music that appealed to many audiences. Other organ builders of the early-twentieth century applied Hope-Jones's concepts, especially the use of high wind pressures and "unit stops," to instruments built for churches and theatres.

George Ashdown Audsley

George Ashdown Audsley (1838-1925), an architect, organ enthusiast and author, wrote extensively on all aspects of organ building and design in his books: *The Art of Organ Building* (1905), *The Organ of the Twentieth Century* (1919), *Organ-Stops and their Artistic Registration* (1921), and *The Temple of Tone*, (1925). The publication of these texts coincided with the early years of the Skinner Organ Company. Audsley was born in Scotland and lived in England before immigrating to the United States around 1890. Audsley and Skinner were friends and likely exchanged many ideas regarding organ building, including design concepts. Audsley strongly opposed Hope-Jones's ideas on extreme wind pressures, exaggerated pipe scales, unification, and the complete omission of upperwork. For Skinner, Audsley "probably acted as a counterbalance against Hope-Jones' extreme ideas."[243]

Audsley devoted a considerable portion of his writing to the topic of organ design, developing what he termed a "scientific approach."[244] Organists and audience members desired larger instruments in churches, concert halls, and private residences. Organ builders were eager to meet these demands. "Audsley …

[243] Holden, 34.
[244] Ochse, 339.

provided organ designers with a system for planning large organs."[245] Audsley's designs included:

- An abundance of 8' unison stops for each manual with a variety of timbres,
- A variety of 16' sub-octave stops for each manual to provide gravity of tone,
- Octave and higher pitched stops to reinforce the 8' (unison) harmonic series, labeled by Audsley as "harmonic corroborating" stops,
- Pedal stops in a variety of timbres.[246]

Consistent with scientific or systematic practice, Audsley categorized the variety of organ timbres available and defined broad tonal groups of "organ-type tones" and "orchestral-type tones."

> **First Group: Organ-tone, Unimitative Quality**
> Pure Organ Tone: *Open Diapason, Principal, Mixtures*
> Free Organ Tone: *Dulciana, Salicional, Gemshorn, Spitzflöte*
> Flute Organ Tone: *Harmonic Flute, Bourdon, Rohrflöte, Clarabella, Hohlflöte, Waldflöte*
> Viol Organ Tone: *Geigenprincipal, Viola da Gamba*
>
> **Second Group: Orchestral-Tone, Imitative Quality**
> Orchestral Flute Tone: *Orchestral Flute, Flauto Traverso*
> Orchestral String-Tone: *Viole d'Orchestre, Orchestral Violoncello*
> Orchestral Reed Tone: *Oboe, Cor Anglais, Bassoon, Clarinet*
> Orchestral Brass Tone: *Trumpet, Cornopean, Trombone, Ophicleide, Tuba Mirabilis*[247]

He further stated that:

> "Although all these tones must be adequately represented in the tonal appointment of a complete and resourceful modern organ, devised for the rendition of both legitimate organ works and orchestral transcriptions, the [organ-type tones]… are the only ones that are essential to the constitution of the organ proper. The purely imitative [orchestral] voices are, however, of the greatest value, and should be introduced to some extent in instruments of every class."[248]

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[245] Ochse, 343.
[246] Ochse, 339-340.
[247] George Ashdown Audsley, *The Art of Organ Building,* (New York: Dodd, Mead, 1905. New York: Dover, 1965), 465-503
[248] George Ashdown Audsley, *The Organ of the Twentieth Century.* (New York: Dodd, Mead, 1919 (New York: Dover, 1970), 111-112.

Audsley described designs for three different types of organ: the church organ, the concert-room organ, and the chamber organ. He made various distinctions between these types of instruments. For example, he suggested a more orchestral design for the concert-room organ with a greater number of imitative stops, and more delicate stops for the chamber organ. Audsley advocated the enclosure of the organ, all divisions largely or in their entirety enclosed in independent Swell-boxes as multiple expressive divisions.[249] In reality, American organists of the time desired many of the tonal and mechanical features associated with the concert type in their church organs, often leaving no recognizable lines of demarcation between a church and a concert-room organ. [250]

Audsley's earlier tonal schemes arranged stops in a traditional manner with principal and secondary choruses, and manual departments were assigned a variety of organ timbres. His later tonal concepts shifted toward an orchestral distribution of stops, each manual department similar to a section of the orchestra and assigned the corresponding types of stops.[251] An example of the latter type of design is observed in the organ built for the Church of Our Lady of Grace, Hoboken, NJ, in 1907 by the Wirsching Organ Company. Audsley was the consultant for this organ and cites the specification for this instrument in his book, *The Organ of the Twentieth Century*.

[249] Ochse, 341; Audsley *Twentieth Century Organs*, 232.
[250] Audsley, *The Art of*, 233-234
[251] Ochse, 341-342.

CHAPTER 5

THE SKINNER SYMPHONIC ORGAN

Through the first three decades of the twentieth century, Skinner built organs with tonal designs that assimilated the ideas and types of sounds he experienced in Europe and in the United States. During this same period, he created a number of new organ stops, many imitating the timbres of orchestral instruments, and he incorporated these new tonal colors into the instruments he built. Skinner combined the knowledge he obtained from his associates with his own personal ideas to develop a unique tonal palette.

Skinner wrote two books on organ building. The first, *The Modern Organ*, was published in 1917. The second, *The Composition of the Organ*, begun in 1932, was an expanded version of his first book. This project occupied much of his attention during the final decades of his life and was published posthumously.[252] Both of these texts give detailed explanations of Skinner's tonal and mechanical developments.

Skinner was very interested in tonal color, individual primary colors and combinations of stops to create secondary colors, a trait he shared with his nineteenth-century counterparts. He created each of his stops to possess individual tonal characteristics and to combine well with other stops.[253] "The fundamentals of tone production in organ pipes concern scale, width and height of mouth, treatment of upper lip, nicking, winding, method of tuning, material, and location with respect to other pipes."[254] Skinner worked to broaden and amplify the traditional stops of the organ, contributing additional "colorful voices, of which many are orchestral,

[252] Holden, 173, Whitney, 74-75.
[253] Skinner, *The Composition,* 12.
[254] Ibid.*,* 8.

wholly new and true to type [and] … new charming voices developed by new scaling and treatment of conical pipes."[255] In *The Composition of the Organ*, Skinner describes the infinite possibilities for the builder in creating an ensemble:

> "The range of possibilities in tone production is inexhaustible. To demonstrate this we may take a group of two hundred and fifty tenor F pipes, beginning with a full toned flute at the left and ending with a keen toned string at the right and voicing the intermediate numbers with so imperceptible a difference that adjacent notes in the group might well belong to the same stop. Yet one may, in going through the whole number, traverse the Flutes, Diapasons, Gemshorns, Spitz Flutes, Erzahlers, Violas, Salicionals, Gambas, Violes d'orchestre and Dulcets. The organ builder, therefore, has a wide choice in composing his ensemble."[256]

In this same text, Skinner later illustrates a progression of organ flue tone, arranged from one extreme to the other, from over-developed flutes to over-developed strings:

> Tibia
> Philomela
> Dopple Flöte
> Gross Flöte
> Clarabella
> Rohrflöte
> Gedackt
> Principal Flute
> Diapason
> Spitz Flöte
> Gemshorn
> Geigen Principal
> Gamba
> Salicional
> Viole d'Orchestre
> Dulcet
> (Overdeveloped type)[257]

[255] Skinner, *The Composition,* 11.
[256] Ibid., 15.
[257] Ibid., 28-29.

He felt that the "variety of tone between the *Clarabella* and the *Dulcet* [represented] the gamut of [normal] manual organ tone," and that other stops were beyond musical limitations.[258] The designs of Skinner's larger instruments incorporated stops that spanned this range of organ tone. Similarly, Walcker built large organs with a variety of flue tone, enabling the organist to create colorful ensemble registrations. These designs permitted the creation of subtle and effective dynamic changes through the addition of stops that blended well using the crescendo pedal, a registration device related to the German R*ollschweller*.

Skinner described the *Diapason* as a "voice of strength and nobility."[259] The ensemble build-up of the Diapason chorus on Willis organs and the effect of their boldly scaled mixtures thrilled Skinner.[260] He obtained the scaling details of Willis's flue work and mixtures "in exchange for blueprints of [his] combination action."[261] Skinner's Diapasons were big and voiced on relatively high wind pressures, with narrow mouths and high-cut up. They are described as having a tone with a "pronounced octave harmonic" that gave it a "warm, singing quality."[262] They were bright and blended well with the chorus.[263] Skinner improved the speech of flue pipes to create stops with "great richness, fullness, and warmth" that were greatly admired.[264]

> "Although he prided himself on his development of solo stops that imitated orchestral instruments and although his pitch variety [of his earlier instruments] was sometimes minimal, Skinner never really

[258] Skinner, *The Composition,* 29.
[259] Ibid. 24.
[260] Holden, 112.
[261] Ibid., 112.
[262] Skinner, *The Composition*, 37.
[263] Holden, 114.
[264] Ibid., 37.

> tried to force the organ into an orchestral pattern. Paradoxically, in an age that was intoxicated with the sound of the orchestra, Skinner organs were representative of the highest achievement in American organ building not because of their success as orchestral imitations but because they were still fundamentally traditional organs."[265]

From the mid-1920s onward, Skinner's Diapason choruses created a clear ensemble that was clean enough to perform contrapuntal music.[266] Complete Diapason choruses are consistently found in Skinner's larger instruments. These were patterned on the Willis models, *Diapasons* constructed with narrow mouths that permitted "great variation in mouth height and wind pressure and provide[d] the reserve and adaptability in tone production."[267] The Great division Diapason chorus of Skinner's organs resembled those of the English builders, with multiple *Diapasons* at 8' pitch, a *16' Double Diapason*, and crowned by *Octaves, Twelfth, Fifteenth* and *Mixtures*; the Swell organ's chorus had a *Diapason 8', Octave 4'*, and a *Mixture.* The ranks of higher-pitched stops related to the Diapason chorus were constructed in conical form.[268]

Skinner included mixtures and other high-pitched, harmonic reinforcing stops in his designs of larger instruments. Many of his earlier organs are criticized for having a limited variety of pitches, with few stops above 4' pitch, an occasional *2' Piccolo*, and a *Dolce Cornet* as the sole compound stop.[269] However, many of Skinner's later instruments were built with more mixture, mutation, and high-pitched stops. [270] Skinner designed mixtures as a means to reinforce the treble, as well as to provide

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[265] Ochse, 356.
[266] Holden, 114-115.
[267] Skinner, *The Composition,* 9.
[268] Holden, 111; Skinner, *The Composition,* 24.
[269] Holden, 110.
[270] Holden, 33.

color to the pedal division, brilliance to the bass, and volume to the intermediate range. Mixtures increase the pitch compass and lend silvery brilliance to the ensemble while not obscuring or transposing the pitch, and they amplify the ensemble.[271] Skinner's mixtures have been described as adding brilliance without being shrill, enriching the harmonic texture without emphasizing higher pitches.[272] "A Mixture … should be designed to supplement and complete the division to which it belongs. Any manual division may be greatly enhanced if a Mixture is designed to perfect its tonal balance and gamut of pitches."[273] Skinner viewed the use of exaggerated Mixtures as minimizing and transposing the unison pitch.[274] He composed his Mixture stops with unison ranks scaled and voiced as diapasons, while quint ranks were made slightly smaller and voiced less conspicuously.[275]

Skinner used a variety of secondary flue stops. Among these, he cites the following: *Harmonic Flutes, Stopped Diapasons* or *Gedackts, Melodias, Concert Flutes, Claribel Flutes* or *Clarabellas, Flutes d'Amours,* and *Bourdons* or *Lieblich Gedackts*.[276] Skinner judged the *Rohrflöte* as "less satisfactory on account of an uncertain speech in the tenor octave, due to the chimneys," and he described the tone as having an "asthmatic breathy quality."[277] He preferred the use of the metal harmonic flute to other types, describing the tone of this stop as "most characteristic of the orchestral model."[278] Cavaillé-Coll likewise preferred the *flûte harmonique*, which was

[271] Skinner, *The Composition,* 37-38.
[272] Holden, 114.
[273] Skinner, *The Composition,* 41.
[274] Ibid., 12.
[275] Holden, 114.
[276] Skinner, *The Composition,* 27.
[277] Ibid., 51.
[278] Ibid., 26-27, 50-33.

systemically used throughout the French symphonic organ, especially for the 4' and 2' flute pitches. Willis adopted the *Harmonic Flute* and German builders also used it in a limited sense.

Skinner found the development of the full string family of stops to be "principally an American contribution to the art of organ building."[279] His string stops were usually paired with a *céleste* rank and voiced to produce a warm and sympathetic tone, never forced, with breadth in scale.[280] Cavaillé-Coll introduced string-toned stops to the French organ and frequently paired them with *céleste* ranks and the *unda maris*. The English likewise adopted undulating string ranks. German builders, however, utilized *céleste* ranks less frequently; they appear in specifications later in the nineteenth century.

Chorus reeds crown the flue ensemble of the Skinner organ. "The trumpets, in one form or another, are at home on all manuals."[281] The Skinner reed chorus of 16', 8', and 4' trumpets is an important ingredient of the Swell organ.[282] Such reed choruses were important to the English Swell organ, and they are related to the reeds found on Cavaillé-Coll's French symphonic organs. Skinner adopted Cavaillé-Coll's pattern of harmonic construction in the treble portion of the compass for his chorus reeds. He was also influenced by Willis in his voicing and construction of reed pipes, learning from him the principles of English reed voicing. Among Skinner's early accomplishments was building a replica of Willis's *16' Trombone* and refining the

[279] Skinner, *The Composition*, 27.
[280] Ibid., 28.
[281] Ibid., 54.
[282] Holden, 111.

voicing of high pressure reeds of the trumpet family.[283] Skinner's smoothly voiced, English-style reed stops were constructed with reed tongues of thin material that were short and tapered, and they had a curvature with a weight added to reduce undesirable vibrations. When additional smoothness was desired, Skinner constructed shallots with pockets at the lower ends.[284] He built his high pressure reed stops of the trumpet family as replicas of Willis reeds.[285]

Skinner described the Pedal as "the foundation of the tonal composition of the organ … with depth and gravity [unequaled] by any other musical organization."[286] He built the pedal pipes with scales designed for this purpose. For centuries, German organ builders built pedal divisions equipped to provide the bass pitches for the entire organ. The instruments of Walcker magnified the bass characteristics of the division, providing dynamic gradations and a variety of colors. In France and England, organ builders adopting the German system during the nineteenth century built pedal departments with their own low-pitched stops, of both flue and reed varieties. Skinner developed an "augmented pedal" division to overcome inadequacies.[287] He was impressed with the *32' Contre-bombarde* at Saint-Sulpice and later built his own version with wood resonators.[288] He later improved this stop by adapting the Willis pneumatic starter to facilitate prompt attack and release.[289] The

[283] Holden, 21.
[284] Skinner, *The Composition,* 54-55.
[285] Ibid., 21.
[286] Ibid., 62.
[287] Skinner, *The Composition*, 63.
[288] Whitney, 14.
[289] Holden, 115.

result of Skinner's efforts was a large, complete pedal organ, capable of a variety of orchestral effects.[290]

Despite Skinner's brief association with Hope-Jones, he did not embrace the latter's tonal concepts, describing the "unit organ as a building eccentricity."[291] He developed the duplex windchest and used the "unit system" in moderation, limiting the application to small organs, a few manual solo stops, and pedal stops. Skinner's "augmented" pedal unified a few basic ranks and borrowed the bass octaves from manual ranks to provide a larger, more versatile pedal division.[292] His use of keen-toned strings and colorful reed voices may have resulted from the moderate application of Hope-Jones's ideas. These were also concepts explored by Willis and Carlton Mitchell, one of Hutchings's voicers.[293]

Skinner's Tonal Innovations

Among Skinner's great contributions to the art of organ building was his development of new tonal colors for the instrument. These stops are the trademark of his work. In this regard, Skinner shared the innovative spirit of builders such as Walcker, Cavaillé-Coll, and Willis.

Inspired by orchestral music, Skinner's creative energies were focused on the development of stops that imitated orchestral instruments. He considered symphonic orchestral colors to be necessary for the organ:

> "What I have done in creating the Skinner Organ is due almost wholly to a love of music, plus a mediocre inventive faculty, plus an unbounded belief in the possibilities of the organ. The symphonic orchestral colors have always seemed to me to be as necessary to the

[290] Holden, 19.
[291] Skinner, *The Composition*, 11.
[292] Holden, 33.
[293] Ibid., 22, 33.

> organ as to the orchestra and so under the stimulus of some great orchestral or operatic work I have worked out all the orchestral colors and have included them in the Skinner Organ" [294]

Critics of his organs charge him with trying to make the organ an orchestra. But Skinner justified his development of orchestral colors. Since these were the musical sounds most familiar to musicians, the creation of other colors would be "alien to the composer and the organist."[295] Skinner cites the following as the new, orchestral voices he created: "*French Horn, Oboe, English Horn, Heckelphone, Bassoon, Bass Clarinet, Celesta*, and strings of many colors. Other voices developed, *Erzähler, Kleiner Erzähler II, Flauto Mirablils, Cor D'Amour*, Pedal *Gemshorn 16', 8', 5-1/3', 32' Pedal Fagotto, Bombarde, Violone* … and new types of Pedal mixtures."[296]

The *Erzähler* was the first new voice developed and introduced to the organ by Skinner in 1904.[297] It is typically used as a substitute for the *Gemshorn*, a conical style stop which it resembles. The primary different between the two is the degree of taper; the top diameter of *Erzähler* pipes are one-quarter the diameter at the mouth, the *Gemshorn* is usually built with a one-third ratio.[298] The Skinner *Erzähler* was voiced with a fundamental and octave harmonic of equal strength to blend with and reinforce other stops in combination.[299] Skinner imagined the pipes being "talkative, or trying to say something," hence the name of the stop, the German word for "storyteller."[300] Because of the unique harmonics produced by *Erzähler* pipes,

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[294] Holden, 38.
[295] Skinner, *The Composition,* 13.
[296] Ibid., 13.
[297] Holden, 29.
[298] Skinner, *The Composition*, 31-32; Stevens Irwin, *Dictionary of Pipe Organ Stops,* (New York: G. Schirmer, 1965), 105.
[299] Holden, 29; Olsen, xiv.
[300] E. M. Skinner quoted in Holden, 29.

Skinner did not classify this stop as a string or flute, but placed it in its own category.[301] A closely related stop, the beating *Kleine Erzähler*, appeared in 1913. It was comprised of two ranks of small-scaled *Erzähler* pipes, one tuned slightly sharp.[302]

In 1906 a similar stop was introduced to Skinner organs, the *Dulcet.* Constructed of slender scale this stop contained two forcibly blown ranks, one tuned sharp, creating an ethereal quality. The second rank gives warmth through a shimmering beating effect because of the mistuning. Skinner found this stop useful for creating dramatic orchestral effects. [303]

Another way in which Skinner intended to create the "effect of the muted strings of the orchestra"[304] was with the *Flute Celeste* and the similar *Flauto Dolce Celeste*, created in 1910. These stops contain two identical ranks of softly voiced *Spitz Flute* or *Flauto Dolce pipes*, tuned to undulate.

The *Gamba Celeste*, also created by Skinner in 1910, was developed as the largest member of the string palette, voiced with great breadth and power, and included in the solo division.[305] Skinner's *32' Violone* was voiced to provide "a voice of profound depth, having both an impressive character and definition."[306] The bass octaves were usually constructed of wood, and when the register was extended in the treble, metal was used.[307]

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[301] Skinner, *The Composition,* 31.
[302] Holden, 45.
[303] Holden, 39; Skinner, *The Composition*, 287.
[304] Holden, 41-42; Skinner, *The Composition*, 30, 290; Irwin 95.
[305] Holden, 41-42; Skinner *The Composition*, 294.
[306] E. M. Skinner quoted in Holden, 43.
[307] Skinner, *The Composition*, 309.

In 1917, Skinner created two undulating string stops at 4' pitch, the *Violette 4*', a two-rank celeste stop, and the *Unda Maris 4'*. The *Unda Maris*, whose name means "wave of the sea," was used by European builders at 8' pitch. Skinner created a higher version using two sets of *Aeoline* pipes at 4' pitch to supply a soft companion to the two 8' Swell celeste stops, the *Voix Celeste* and *Flute Celeste*.[308]

The *Flauto Mirabilis* was introduced by Skinner as the largest flute stop of the solo division in 1927, "the king of the flutes." Skinner describes this stop as having "great power and … great beauty, … particularly rich in blending qualities." He avoided the thick characteristics of *Tibia* and *Philomela* stops.[309]

The *Orchestral Oboe* was Skinner's first attempt to reproduce an orchestral voice. Developed in 1906, his oboe captured the "plaintive pastoral quality" of the orchestral prototype.[310] The pipes were constructed with narrow shallots, thin tongues, and slender, capped resonators. The tuning slot was cut "well below the cap" to form a pocket that "contributes a sympathetic glow or sweetness to an otherwise acid tone."[311] Skinner felt the *Orchestral Oboe* was an "exact duplicate of its orchestral model."[312]

The *English Horn* was first developed by Skinner in 1910, and later improved in 1925 making a "more authentic reproduction of its orchestral prototype."[313] The pipes were constructed with shallots similar to the orchestral oboe, but with a slender

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[308] Holden, 62-63, Skinner, *The Composition,* 308.
[309] Holden, 128; Skinner, *The Composition,* 27, 290.
[310] Holden, 38-39.
[311] Skinner, *The Composition*, 58.
[312] Skinner, *The Composition*, 300.
[313] Holden, 42, 115.

resonator that "terminates at the top in a gland, as does the orchestral model."[314] The *Heckelphone*, introduced by Skinner in 1920, was described by him as an "immense English Horn."[315]

Skinner's *French Trumpet*, created in 1910, was "brighter than the typical Skinner *Trumpet* or *Cornopean*," and voiced on lower wind pressure than other trumpet-type reed stops.[316] He "originally designed [the *French Trumpet*] to develop power with light wind."[317] This chorus reed "comes through the Swell ensemble as a shower of silver, a magnificent brilliance."[318] Skinner considered the 16' pitch of this stop to be the ideal reed for the Swell organ, providing a 16' voice without heaviness.[319]

Skinner introduced his *Flügel Horn*, also named *Cor d'Amour* and *Corno d' Amour*, in 1910. He developed this stop as a smooth-toned timbre with a "tranquil tonality;"[320] its voicing was balanced between that of the *Oboe* and *Cornopean*. *Flügel Horn* pipes were capped, with small-scale, diminutive trumpet resonators.[321] Skinner often substituted the *Flügel Horn* for the Swell *Oboe*, considering it to be the ideal reed for small organs with one reed stop.[322]

The powerful *Tuba Mirabilis* was frequently found in the solo divisions of English organs and large American organs from the middle of the nineteenth century. In 1910, Skinner developed a "new and improved form of this stop," basing the

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[314] Skinner, *The Composition,* 59.
[315] Holden, 69; Skinner, *The Composition,* 59.
[316] Holden, 43.
[317] Skinner, *The Composition*, 60.
[318] Ibid., 60.
[319] Ibid., 61.
[320] Holden, 43-44; Skinner, *The Composition*, 57.
[321] Holden, 44; Skinner, *The Composition*, 57-58, 290.
[322] Holden, 43-44; Skinner, *The Composition*, 58.

construction and voicing on Willis's examples, and using very high wind pressures.[323] The Skinner *Tuba* was built with French shallots and harmonic resonators in the treble range. These stops dominated the organ ensemble with an authority comparable to that of the brass division in the orchestra.[324]

Among Skinner's most famous tonal creations is the *French Horn*, introduced in 1912.[325] The stop was developed with shallots sized for a pitch one octave lower than normal and capped resonators with tuning slots cut well below the top to create a pocket.[326] The resulting tone is smooth with the "bubble" attack peculiar to the orchestral model.[327]

The *Corno di Bassetto*, "a powerful clarinet" with a tone of "richness and purity," was also introduced in 1912 by Skinner.[328] This stop was constructed with large-scale resonators, occasionally with a bell at the top.[329]

The *16' Orchestral Bassoon*, another Skinner reproduction of an orchestral instrument, first appeared in residence organs equipped with a player mechanism, the "Orchestrator."[330] The resonators of the *Orchestral Bassoon* are of straight construction for about one third of the length; "the remainder is conical in form, slender and coned in somewhat at the top."[331]

Notable pedal reed stops built by Skinner include the *32' Bombarde* and *32' Contrafagotto*. The *Bombarde* was constructed with wooden resonators as opposed to

[323] Holden, 44.
[324] Skinner, *The Composition,* 61.
[325] Holden, 44.
[326] Skinner, *The Composition,* 61.
[327] Skinner, *The Composition,* 61; Irwin, 98.
[328] Holden, 44.
[329] Skinner, *The Composition,* 60.
[330] Holden, 61-62.
[331] Skinner, *The Composition,* 59.

the metal resonators used by Willis and Cavaillé-Coll. The moderately powered *32' Contrafagotto* was developed in 1928 as an alternative to the *32' Violone* providing a valuable lighter voice.[332]

Skinner developed a variety of percussion stops including the *Celesta, Harp, Chimes, Kettle Drums,* and *Piano*. The *Harp* and *Celesta* are essentially the same stop, the *Harp* at 8' pitch, the *Celesta* at 4'.[333] The *Celesta* was constructed with tuned metal bars that were struck with piano hammers and fitted with wooden resonators to obtain a sweeter tone.[334] The *Chimes* were tubular bells struck by hammers attached to electric motors.[335] Skinner's *Kettle Drums* combined a cylindrical drum of indeterminate pitch with a *16' Bourdon* stop that gave the pitch.[336]

The Reputation of the Skinner Organ

By the 1920s, Skinner was "the number one organ builder in the United States, … a dominant, influential figure on the organ scene."[337] He had developed the reputation of an artist, building organs with "superb quality of workmanship and unequaled tonal beauty."[338] "The possession of a Skinner organ became a status symbol," and organists envied those lucky enough to preside over one of his instruments.[339] The mature Skinner ensemble resembled the English Willis sound, with a hint of French Cavaillé-Coll flavor.[340] Skinner's later organs were praised for their tonal characteristics, with designs that emphasized the Diapason chorus,

[332] Holden, 39, 130; Skinner, *The Composition,* 70.
[333] Holden, 43; Skinner, *The Composition,* 75-76.
[334] Holden, 43; Skinner, *The Composition,* 76.
[335] Skinner, *The Composition,* 78.
[336] Ibid., 79-80.
[337] Holden, 71.
[338] Holden, 100; Whitney, 15.
[339] Holden, 104.
[340] Ibid., 142.

brilliant reed choruses crowned by a Solo Tuba, and the characteristic solo reeds, strings, and flutes.[341] The ensembles were described as clear and brilliant without being forced or harsh sounding.[342] Skinner's organs were admired by American and European organists who appreciated their tonal characteristics, electric action, and console designs.[343] A summary description of E.M. Skinner's early tonal work illuminates the aesthetic of all his instruments:

> The full organ is dignified, massive and brilliant, completely filling the church without harshness; brilliancy of the organ is secured by the generous use of reeds; while mixtures have been subordinated and usable in quieter combinations; string stops that give the impression of an orchestral sting section, the fundamental tone full and mellow, suggestive of English diapasons, and an abundance of softer combinations with a floating quality.[344]

[341] Holden, 131.
[342] Ibid., 143.
[343] Ibid., 133-134.
[344] Holden, 18-19.

CHAPTER 6

THE ORGAN REFORM MOVEMENT AND THE END OF AN ERA

Following World War I, American organists traveled to study in Europe where they were exposed to early organ music and antique instruments with crisp, clean sonorities.[345] Skinner sought the approval of the younger generation of organists, and he began a quest for the type of classical ensemble sound that would meet their approval. He turned to George Donald Harrison (1889-1956), a tonal director of the Willis firm in England, and in 1927 invited him to join the Skinner Organ Company to help further improve his organs.[346] Skinner praised the work of Harrison and valued his judgment on tonal matters: "Mr. Harrison is destined to be a great figure in the art of organ building in America."[347] Their work initiated a "renaissance of mixtures" in American organ building in the late 1920s.[348] It was not long before Harrison was taking over many decisions for scaling and voicing Skinner's instruments and tensions grew between the two as their design ideas conflicted with one another.[349] During the 1930s, Skinner began looking for an escape from the company and from the conflicts between himself, Harrison, and company president Arthur Hudson Marks.[350] Meanwhile, in 1932, the Skinner Organ Company merged with the pipe division of the Aeolian Company to form the Aeolian-Skinner Organ Company.[351]

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[345] Holden, 121; Whitney, 54.
[346] Holden, 122.
[347] Ernest M. Skinner quoted in Whitney, 58.
[348] Holden, 127.
[349] Holden, 130, 143-145; Whitney, 61.
[350] Whitney, 63.
[351] Holden, 156-157.

By 1936, Skinner departed from the organ building company that bore his name to pursue a partnership with his son in the factory in Methuen, forming the Ernest M. Skinner and Son Company.[352] The company faced financial difficulties, and the American entry into World War II exacerbated their income problems. Ernest M. Skinner and Son went bankrupt in 1942, and the mortgage holder foreclosed on the property. The following year, a fire destroyed the building that housed the company, the former Methuen Organ Company.[353]

Following the mid-1930s, the younger generation of organists enthusiastically embraced the ideals of the German organ reform movement (*Orgelbewegung*). They preferred to perform early and baroque era contrapuntal music on instruments with seventeenth-century Germanic designed with transparent, brilliant sounds. The emergence of the organ reform movement signaled the decline of the romantic organ. Organists rejected the performance of romantic "transcriptions, tone poems, or any music that relied on 'fancy effects,'"[354] as well as the symphonic designs associated with this music. It was a time when many organists held the Skinner style of organ building in contempt.[355] Even though Skinner continued to build organs through the 1930s and 40s with his son, his influence on American organ building diminished. He witnessed the tonal alterations of many of his masterpieces, executed in the name of organ reform. In 1949, Skinner, a man in his mid-80s, gave

[352] Holden, 180-181.
[353] Holden, 211; Whitney, 73.
[354] Holden, 178; Whitney, 54.
[355] Whitney, 74.

up organ building at the request of his family, concluding a sixty-three year career as an organ builder.[356]

The life of Ernest M. Skinner spanned nearly ninety-five years so that he witnessed the end of an era. His instruments were the culmination of the romantic organ building tradition. The lives of the European masters, Eberhard Friedrich Walcker, Aristide Cavaillé-Coll, and Henry Willis, ended while their organs remained congruent with the prevailing musical aesthetic of the time. However, Ernest Martin Skinner, who once basked in the glory of being "one of the greatest and most influential organ builders in America," lived to experience the backlash against his symphonic instruments.[357] Sadly, he died of "cardiac arrest due to arteriosclerotic heart disease" on November 27, 1960 in Plymouth, Massachusetts, where he had been admitted into a nursing home.[358] Some people maintain that he "died of a broken heart because the world no longer seemed to appreciate the beauty which he had brought into being and to which he had devoted his entire life."[359]

[356] Holden, 226.
[357] Ibid., 1.
[358] Ibid., 247.
[359] Ibid., 247.

CHAPTER 7

THE SKINNER ORGAN TODAY

Today, Ernest M. Skinner is remembered as "one of the greatest names in early twentieth-century American organ building."[360] He was a "many-faceted personality," considered a "genius of a man [who] was also a man of great mystery."[361] He had "drive and brash self-confidence" and was gifted with skilled hands for his craft, a good ear, and mechanical inventiveness.[362] Skinner embodied the romantic spirit as a strong individualist, with creative drive and powerful optimism.[363] The influence of romanticism was felt in his desire to express "personality, feelings, and ideals without being restricted by external rules or standards."[364] At the height of his career, Skinner was "a highly progressive individual in his own generation."[365] "The Romantic style of organ building [was] brought to its ultimate state of development by Ernest Skinner."[366] His designs were not English, French, or German, but a uniquely American blend.[367] And the Skinner legacy lives on.

At the beginning of the twenty-first century, organists and builders are again exploring the orchestral qualities of the organ.[368] The organs built by Skinner during the first three decades of the twentieth century are again being appreciated by organ

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[360] Whitney, 1.
[361] Holden, 250.
[362] Whitney, 6.
[363] Holden, 16.
[364] Ibid., 13.
[365] Ibid., 191.
[366] Ibid., 147.
[367] Whitney, 10.
[368] Ibid., 241.

enthusiasts.[369] The religious and educational institutions that possess organs built by Skinner are successfully restoring these instruments, including the restitution of the early twentieth-century tonal palette. Often the restorations include reversing baroque-style tonal alterations made during the reform movement era.[370] Recent examples of restoration projects include the 1928 Skinner organ, Opus 634 installed in the Rockefeller Memorial Chapel on the University of Chicago campus, and the 1927 Skinner organ, Opus 647, installed in Morley Hall on the Lake Erie College campus thirty miles east of Cleveland, Ohio. Both of these symphonic organs were tonally altered during the 1960s and 1970s in the spirit of organ reform in an attempt to make them conform to the tonal ideals of the period. The restoration process for these organs included reversing the tonal changes as much as possible, recovering removed ranks of pipes, and either replacing lost ranks with pipes from other discarded Skinner instruments or building replicas. The Skinner symphonic organ, in a tonally unaltered state, is once again treasured by organ enthusiasts. The 1930 Skinner organ, Opus 820, installed in Our Lady, Queen of the Most Holy Rosary Cathedral in Toledo, Ohio is an example of such instrument.[371]

An Experience with Two Skinner Organs

Two E. M. Skinner organs in the Chicago, Illinois metropolitan area have recently been restored: the 1921 Skinner organ, opus 327, installed in St. Luke's Episcopal

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[369] Whitney., 243.
[370] Ibid., 249.
[371] Scott Hayes, "Rediscovering Skinner's Opus 647," in *The American Organist*, 43, no. 6 (June, 2009), 54-55.
Pinel, Stephen L. and Stephen J. Schnurr, *Cleveland, a Town of Good Organs, a Profitable Place to Visit: Organ Historical Society Organ Atlas, 2009, the City of Cleveland and Northern Ohio,* Publications Director Rollin Smith and edited by Jonathan Ambrosino (Richmond, VA: Organ Historical Society, 2009), 186-193.

Church in Evanston, Illinois and the 1928 Skinner organ, opus 634, installed in the Rockefeller Chapel at the University of Chicago. Both instruments include timbres that are characteristic of Skinner's mature style.

The organ in St. Luke's Episcopal Church is presently a four-manual instrument with 70 stops, 65 ranks, and three percussions, the original Chimes and Harp/Celesta stops, and a *Cymbala*, a set of Swiss bells similar to a *Zimbelstern* (an addition made in 1958). Originally, this instrument controlled a 1909 Casavant organ installed in the Lady Chapel adjacent to the main church, played as an echo division. The Casavant organ was replaced by a fourteen-rank Möller instrument in 1958 which removed in 1986. At the time Skinner built this organ, he had developed many of his signature orchestral and accompanimental tonal colors, and they are present on this instrument. However the St. Luke's organ was built prior to Skinner's second trip to Europe which initiated his development of brighter Diapason choruses, bolder mixtures, and more mutation stops. During the 1950s and 1960s, minor alterations were made that did not drastically change the overall character of the organ, but with a number of the original Skinner ranks replaced with more baroque-styled voices. The Mixture stops were recomposed or replaced with brighter stops, and an antiphonal horizontal Fanfare Trumpet was added in 1958. Fortunately, most of the original ranks that were removed at that time were carefully placed into storage. In 1990, the Vestry of St. Luke's decided to restore the Skinner organ, contracting with the A. Thompson-Allen Company, the curators of the Yale University organs (including the large Skinner organ in Woolsey Hall), to complete the work. From

1993-1998, the work on Skinner's Opus 327 was completed in stages to faithfully restore this instrument, tonally and mechanically.[372]

Opus 327 embodies the warmth and tone colors typical of a large E.M. Skinner organ. An impressive number of 8' manual flue stops (fifteen total over four manuals and not including the celeste stops) provide the organist with a variety of registration possibilities. The Diapason chorus of the Great organ has three 8' *Open Diapasons*, each differing in scale, volume, and timbre. The *First Open Diapason* is a full bodied register, the *Second Open Diapason* less so, while the voicing of *Third Open Diapason* is developed to bring out a more string-like timbre. The 8' Diapason chorus is completed with the following stops: *Octave 4', Twelfth 2-2/3', Fifteenth 2', Mixture III*, *Chorus Mixture IV*, and a *16' Diapason* that provides gravity to the chorus. These stops impart a brilliance to the ensemble that complements the warmth of the 8' foundations. The *Chorus Mixture IV* stop was a later addition, a gift to St. Luke's from the organist and author, Dr. William H. Barnes. The Swell organ is provided with the secondary Diapason Chorus: *Diapason 8', Octave 4'*, and *Mixture III*.

There are a variety of Flute stops available on all manual divisions which are smooth and blend well with each other and with the Diapason choruses. The harmonic flute on the Great, *Harmonic Flute 4'*, and the Swell, *Traverse Flute 4'*, closely replicate the qualities of the orchestral prototype. The Swell *Spitz Flute 8'* and *Flute Celeste 8',* stops developed by Skinner to replicate the effect of muted orchestral strings, create an ethereal effect with a subtle string-like color. The other string

[372] Richard Webster, "Ernest M. Skinner Opus 327; St. Luke's Episcopal Church, Evanston, Illinois," in *The Diapason* 95, no. 7 (July, 2000), 19-21.

stops, many paired with celeste ranks, are keenly voiced and provide a pronounced timbral contrast to the Diapason and Flute stops.

The Skinner *Erzähler 8'* in the Great division and the *Klein Erzähler II*, an undulating stop in the Choir division, are timbres unique to Skinner's organs. It is difficult to classify the tone of these stops; Skinner himself was reluctant to do so. The *Erzählers* create a mellow sound that blends well with many of the other registers of the organ and are effective for accompanying.

Opus 327 contains an imposing number of reeds, in full reed choruses and also as colorful orchestral solo stops. The Great and Swell organs each have a complete reed chorus: *Trombone 16', Trumpet 8', Clarion 4'*, on the Great; *Contra Posaune 16', Cornopean 8', Clarion 4'* on the Swell. These choruses are crowned by the bold *Tuba Mirabilis 8'* and *Tuba Clarion 4'* from the Solo organ. The reed choruses are smooth and round, especially the Swell *Cornopean*, an influence from the English tradition. The orchestral reed stops Skinner had developed at the time this instrument was built are available on the Choir and Solo organs: *Clarinet 8'* and *Orchestral Oboe 8'* in the Choir, *French Horn 8'* and *English Horn 8'* in the Solo. All of these stops reproduce the timbres of their orchestral counterparts with remarkable realism. The *Clarinet, English Horn,* and *French Horn* stops are smooth and warm while the *Orchestral Oboe* stop has a narrower sound with a distinctive bite, reminiscent of the oboe tone produced at the turn of the twentieth century.

The pedal division of Opus 327 contains a variety of flue stops to provide bass pitches that appropriately balance the manual divisions. These range from the subtlest accompanimental stop to the fullest chorus combination. The impressive

full-length pedal *Bombarde* is available at 32', 16', 8', 4' pitches and supports the manual choruses, including the chorus reeds.

Nearly three-quarters of Opus 327 is enclosed in Swell boxes. These boxes are constructed to allow the organist to make considerable dynamic color changes. They are capable of muting a division to a faint whisper and to create dramatic crescendos when opened by the organist.

The organ built for the Rockefeller Memorial Chapel is presently a four-manual instrument with a total of 132 ranks and 100 stops including the Chimes and Harp/Celesta stops and two *Zimbelsterns*. The instrument was built by Skinner following his second trip to Europe and shortly after G. Donald Harrison joined the Skinner firm. Harrison exerted less influence on the design of this organ than he would on later instruments built by the Skinner Organ Company. Many tonal changes were made to Opus 634 throughout the middle of the twentieth century, influenced by the ideals of the Organ Reform Movement. Because of this, much of the original character of the organ was lost. By the 1980s, the instrument was mechanically unreliable and tonally disappointing. University organist Thomas Weisflog and former university president Donald Randel advocated the complete rebuilding of the organ and the revitalization of the Skinner aesthetic. From 2006 to 2008, the Schantz Organ Company of Orrville, Ohio, rebuilt Opus 634, reversing a number of previous tonal changes, making a few modest additions, and rendering the instrument mechanically reliable. Many of the original Skinner ranks were discarded at the time they were replaced. The Schantz Organ Company attempted to relocate these pipes, to find appropriate vintage replacements, or to reconstruct reproductions. The repositioning of several ranks and the addition of a second

opening of the pipe chamber permits more of the organ's sound to enter into the room.

Opus 634 shares many of the tonal qualities heard in Opus 327. The various choruses are rich and warm and there are many tone colors for the organist to select for registrations. The instrument produces a sound that envelopes the listener with fullness and brilliance in an acoustically rich environment. Many of the timbres found in Opus 327 are incorporated into the larger Opus 634 specification.

The Diapason choruses of Opus 634 are also similar to those of the earlier organ. To the Great, a *Cymball VII* was added during the 2006 rebuilding project and composed of new pipes constructed with Skinner scales. This new mixture stops was added to provide more brilliance to choruses developed on the *First Open Diapason 8',* while the *Mixture V* balances the other two Open Diapasons of the division. The French-style mutation ranks Skinner included in this instrument are a *Nazard 2-2/3', Tierce 1-3/5',* and *Septième 1-1/7'* in the Choir organ, and a *Cornet V* in the Swell Organ.

The *Principal Flute 8'* found on the Great organ is an excellent example of a narrow-scaled harmonic flute stop with a string-like color, similar to the harmonic flutes built by Willis. This stop blends well with the Great organ's *Lieblich Gedeckt 8'* to create a beautiful, full-bodied 8' flute color. The *Flauto Mirablis 8'* in the Solo organ provides another lovely flute color for solo purposes. In the 1950s, the Schlicker organ company added to the Gallery organ two baroque-styled continue stops, a *Gedackt 8'* and a *Rohrflöte 4'*. Even though these registers are not consistent with Skinner's work, the university chose to retain these stops as a testimony of this

instrument's history and as voices that contrast with the smoothly voiced Skinner flutes.

Opus 634 contains an abundance of string stops useful for the development of a variety of string choruses. The Swell organ has a *Dulciana 16'* with a mild string character, a *Gamba 8', Voix Céleste II 8*', a pair of narrow strings, *Echo Viol 8'* and *Echo Viol Celeste 8'*, and the delicate *Unda Maris II 4'*. Meanwhile, the Choir division has *Gambas* at 16', 8', and 4' pitches. These stops give the organist a variety of string colors to suit the literature being performed. The *Orchestral Strings IV,* available on all manual divisions, combines four additional string ranks for more string color.

Many of the types of reed choruses and orchestral reed colors found on Opus 327 are also found on Opus 634. By the time the Rockefeller Chapel instrument was built, Skinner had devised new organ colors, particularly orchestral reeds, to include in this organ. To the Swell was added the *French Trumpet 8'*, its brilliant tone contrasting with the smooth English-style *Cornopean*. The *Bassoon 16'* included in the Choir was made playable on the Solo to replicate the timbre of the orchestral instrument. The Solo *Heckephone 16'* is a full bodied version of Skinner's *English Horn*, available on both the Choir and Solo; and the *Corno de Bassetto 8'* is a more assertive version of the *Clarinet* stop. To the Gallery organ was added a new horizontal trumpet, the *Randel State Trumpet 8'*, named after the former University of Chicago president. This is a commanding antiphonal voice to balance the Solo division's two 8' *Tuba* stops.[373]

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[373] Jeff Dexter, "Cover Feature: Skinner Organ Company, Boston, Massechusetts, Schantz Organ Company, Orrville, Ohio, University of Chicago Rockefeller Memorial Chapel, Chicago, Illinois, " in *The American Organist*, 42, no. 10 (October, 2009) 54-57.

The performance of romantic era organ literature is a rewarding experience on both Opus 327 and Opus 634. Each of these instruments possesses the warm sound and varied colors associated with symphonic organ repertoire. Both of these organs are built in resonant acoustical environments that enhance their tonal qualities.

CHAPTER 8

CONCLUSION

E. M. Skinner's tonal concepts inspire the work of organ builders in the twenty-first century who are designing symphonic-style instruments. These new organs incorporate tonal elements used by Skinner during the early twentieth century. An example of this is the San Francisco based Schoenstein Organ Company, whose mission statement mentions the work of Skinner:

> The Schoenstein Style: we are builders of organs in the Romantic-Symphonic style employing electric-pneumatic actions. Many have characterized our work as carrying forward into the twenty-first century the type of approach pioneered by E. M. Skinner.[374]

Other builders who have recently built organs incorporating aspects of Skinner's romantic-symphonic designs, or Skinner-style stops, include Dobson Pipe Organ Builders in Lake City, Iowa; Reuter Organ Company of Lawrence, Kansas; Petty-Madden Organ Builders in Allentown, Pennsylvania; Quimby Pipe Organs of Warrensburg, Missouri; and Casavant Frères Organ Builders in St-Hyacinthe, Quebec, Canada.[375] The Skinner organ is emerging as a historical model to be

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[374] http://www.schoenstein.com/style.html.

[375] John A. Panning, "Cover Feature: Cathedral of Our Lady of Angles, Los Angeles, California, Dobson Pipe Organ Builders" in *The American Organist* 37 no. 4 (April 2003), 40-42.
John A. Panning, "Cover Feature: Highland Park United Methodist Church, Dallas, Texas, Dobson Pipe Organ Builders Inc" in *The American Organist* 44 No. 4 (April 2010), 42-44.
Rodney Ayers, Kathy Welling, and others "Cover Feature: Saint Matthew's Episcopal Church, Wilton, Connecticut, Reuter Organ Company, Opus 2234" in *The American Organist* 44 no. 9 (September 2010), 36-38
Bynum Petter and Larry Marietta, "Cover Feature: First Congregational Church, Berkeley, California, Petty-Madden Organbuilders, Hopewell, New Jersey" in *The American Organist* 44 no. 2 (February 2010), 44-46.
Sylvain Vachon, Jacquelin Rochette, and others, "Cover Feature: Saint Paul's Episcopal Church, Indianapolis, Indiana, Casvant Frères" in *The American Organist*

emulated, an American instrument rooted in the traditions of nineteenth-century romanticism.

The organ's tonal design is a continual source of fascination for the player. Every instrument is a unique creation; the organist encounters new challenges and sonic experiences while adapting each instrument's resources to the interpretation of repertoire. The large symphonic organs built by Skinner provide the organist with an abundance of beautiful timbres necessary for the performance of romantic organ literature. At this time, there is a renewed interest in this music and the types of instruments for which it was composed. E.M. Skinner's American symphonic organ is once again revered by organists and enthusiasts.

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42 no. 6 (June 2008), 58-60.
Dr. John F. Fiedler, Dana Effler, and others, "Cover Feature: First United Methodist Church, Dallas, Texas, Casvant Frères" in *The American Organist* 38 no. 3 (March 2004), 32—34.
Quimby Pipe Organs, "Cover Feature: Dauphin Way United Methodist Church, Mobile, AL, Quimby Pipe Organs, Inc." in *The American Organist* 42 no. 11 (November 2008), 50-52.

St. Luke's Episcopal Church, Evanston, IL

E. M. Skinner Organ Company, 1921, Opus 327


University of Chicago – Rockefeller Memorial Chapel, Chicago IL

E. M. Skinner Organ Company, 1928, Opus 634 / Schantz Organ Co., 2008


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APPENDIX A

ORGAN SPECIFICATIONS

The following instruments have been referenced in this paper. They represent the work of builders whose instruments influenced the designs of E. M. Skinner.

Münster zu Ulm (Ulm Minster): Ulm, Germany. Built by Eberhard Friedrick Walcker, 1856.

Boston Music Hall: Boston, MA, USA. Built by Eberhard Friedrick Walcker, 1863.

Merseburg Cathedral: Merseburg, Germany. Built by Friedrich Ladegast, 1853-1855.

Thomaskirche: Leipzig, Germany. Built by Wilhelm Sauer, 1908.

Basilique Saint-Denis: Paris, France. Built by Aristide Cavaillé-Coll, 1841.

Basilique Sainte-Clotilde: Paris, France. Built by Aristide Cavaillé-Coll, 1859.

Église Saint-Sulpice: Paris, France. Built by Aristide Cavaillé-Coll, 1862.

Great George Street Chapel: Liverpool, England. Built by William Hill, 1841.

Saint Paul's Cathedral: London, England. Built by Henry Willis, 1872.

St. George's Hall: Liverpool, England. Built by Henry Willis, 1855, altered in 1867 and 1897.

The Church of Our Lady of Grace: Hoboken, NJ. Built by the Wirsching Organ Co., 1907 using the Audsley System –Quintuple Expression.

Worcester Cathedral: Worcester, UK. The Hope-Jones Electric Organ Company, 1896.

Park Church: Elmira, NY. Built by E. M. Skinner, 1905, opus. 130, designed by Robert Hope-Jones.

South Congregational Church: New Britain, CT. Built by George S. Hutchings Organ, 1897.

Münster: Ulm, Germany
Eberhard Friedrick Walcker, 1856

Manual I *(Hauptwerk)*
C- F, 54 notes

32’	Man. Untersatz
16’	Principal
16’	Tibia major
16’	Viola di Gamba
8’	Octava
8’	Gemshorn
8’	Viola di Gamba
8’	Gedeckt
8’	Salicional
8’	Flöte
5-1/3’	Quint
3-1/5’	Terz
4’	Octava
4’	Flöte
4’	Rohrflöte
4’	Fugara
2’	Octava
2’	Waldflöte
1’	Super Oktav
V	Cornett (10-2/3’)
V	Mixtur (8’)
V	Mixtur (4’)
V	Scharff (2’)
II	Sexquialtera (4’)
16’	Contra Fagott
16’	Second Fagott
8’	Posaune
8’	Trompete
4’	Clarino
2’	Clarinetto

Manual II C- F, 54 notes

16’	Gedeckt
16’	Salicional
8’	Principal
8’	Flöte
8’ + 2’	Piffaro
8’	Quintatön
8’	Dolce
8’	Gedeckt
5-1/3’	Quint
4’	Spitzflöte
4’	Viola
4’	Octav
4’	Klein Gedeckt
4’	Traversflöte
2’	Piccolo
2’	Octav
VIII	Mixtur (8’)
III	Cymbal (1’)
8’	Trompete
8’	Posaune
8’	Fagott
8’	Clarinett
4’	Corno

Manual III C- F, 54 notes

16’	Bourdon
8’	Principal
8’	Gedeckt
8’ + 4’	Piffaro
8’	Harmonica
8’	Spitzflöte
8’	Vox humana
4’	Octava
4’	Gemshorn
4’	Dolce
2-2/3’	Nasard
2’	Octav
2’	Flautino
V	Mixtur (4’)
8’	Physharmonica
4’	Oboë
	Cop. zu Physharm.
	Trem. zu Vox human

Manual IV C- F, 54 notes
Zungenstimmen
(Reed stops)

I Pedal C- D, 27 notes

32’	Principalbass
32’	Grand Bourdon
32’	Bombarde
16’	Subbass
16’	Octavbass
16’	Principalbass
16’	Bourdon
16’	Violon
10-2/3’	Quint
8’	Octava
8’	Flöte
8’	Viola
8’	Violoncell
6-2/5’	Terz
5-1/3’	Quint
4’	Octava
V	Cornett (4’)
16’	Posaunenbass
16’	Fagottbass
8’	Posaune
8’	Trompete
4’	Clarine
4’	Corno Basso
2’	Cornettino

II Pedal C- D, 27 notes

16’	Gedeckt
16’	Violon
8’	Flöte
4’	Flöte
2’	Hohlflöte
16’	Serpent
8’	Bassethorn

Pedalcoppeln

Cp. II.Ped zu II.Man.
Cp. I.Ped zu II.Ped.
Cp. I.Ped zu I.Man.

Manualcoppeln

Co. II.zu IV. Clav.
Co. I.zu II. Clav.
Co. II.zu III. Clav.
Co. IV.zu I. Clav.

http://www.walcker.com/opus/0001_0999/0501-ulm-muenster.html accessed 15 January 2012.

Boston Music Hall, Boston, MA, USA
Eberhard Friedrick Walcker, 1863

1884, sold W. B. Grover; 1897, sold to Edward F. Searles of Methuen MA.
1907, rebuilt and installed in Serlo Hall, inaugurated in 1909.
1930s, E. M Skinner bought Serlo Hall, the organ, and Methuen organ Company
1946, Rebuilt and tonally altered by G. Donald Harrison.

(I) Great Organ

16' Principal
16' Tibia Major (t.c.)
16' Viola Major
16' Basson [sic] /
8' Ophycleide*
(free reed – divided stop)
8' Principal
8' Flöte
8' Gemshorn
8' Viola di Gamba
8' Gedekt
8' Trombone /
4' Trompete*
(divided stops)
4' Octave 4'
4' Fugara 4'
4' Hohlflöte 4'
4' Flute d'Amour
4' Clairon [sic]
2' Waldflöte
5-1/3' Quint
3-1/5' Tertz
2-2/3' Quint
2' Octave
V Cornett (5-1/3' - 16' series)
VI Mixtur (2-2/3' - 8' series)
IV Scharff (1-1/3' - 4' series)

(II) Swell Organ

16' Bourdon
8' Principal
8' Salicional
8' Dolce
8' Quintatoen
8' Gedekt
8' Trombone Bass /
4' Trombone Discant*
(divided stop)
8' Basson Bass /
4' Hautbois Discant*
(free reed – divided stop)
4' Principal Octav
4' Rohrflöte
4' Traversflöte
4' Cornettino
5-1/3' Quintflöte
2-2/3' Nasard
2' Octave
V Mixture (2')

(III) Choir Organ

16' Gedekt
8' Principal Flöte
8' Spitzflöte
II Bifra (8' & 4')
(8' Gedeckt and 4' String with special tremolo)
8' Gedekt
8' Clarin Bass /
4' Clarin Discant*
(divided stop)
8' Viola
8' Physharmonica
(free reed with, dynamics adjustable with wind pressure)
4' Hohlpfeife
4' Principal Flute
4' Dolce
2' Flautino
1' Super-Octav
II Sequialtera (2-2/3' & 1-3/5')

(IV) Solo Organ

16' Bourdon
8' Geigen Principal
8' Aeoline
8' Conzert Flöte
8' Corno-Bassetto
II Vox Humana (8')
(with a special swell and tremolo, one wood rank, one metal)
4' Gemshorn
II Piffaro (4' & 2')
(4' Gedeckt and 2' String)
4' Vox Angelica *(free reed)*
2-2/3' Quint
2' Piccolo

Pedal Organ

Forte Division:

32' Principal Bass
V Grand Bourdon (32')
(four independent ranks, plus 16' Sub Bass, a resultant register on the 32' series: 10-2/3', 8', 6-2/5', 4')
32' Bombardon *(free reed)*
16' Octav Bass
16' Sub Bass
16' Trombone
16' Contra-Violon
8' Octave Bass
8' Hohlflöte-Bass
8' Violoncell [sic]
8' Trompete
4' Corno-Basso
4' Octave
2' Cornetto

Piano Division:

(enclosed in swell box)
16' Bourdon
8' Viola
8' Flöte
4' Flöte
2' Waldflöte
16' Basson *(free reed)*

Assessories

4 manual couplers

13 combinations pedals (all double acting)

Zungenwerke: draws all the reed stops

Fortissimo, First Manual: draws all stops of the Great manual except the reeds, and Cornett and Scharff.

Forte, First Manual: draws the 8', 4', and one 16' stop in the Great manual.

Piano, First Manual: draws the 8' stops in the Great manual.

Solo, fourth manual: draws the corno-bassetto stop in the Solo.

Volleswerke: draws the full organ, except the Vox Humana and the Physharmonica stops

Copula, IV to Ped; III to Ped; II to Ped; I to Ped: Manual to Pedal couplers

Copula zum forte Pedal: couples the Forte Pedal division to the Pedal, without which none of those stops will sound.

(no designation): draws the full Swell Organ

Register Crescendo

Hydraulic blower.

Ochse, 201 – 205.

Merseburg Cathedral: Merseburg, Germany
Friedrich Ladegast, 1853-1855

(II) Hauptwerk

32’	Bordun
16’	Prinzipal
16’	Bordun
8’	Prinzipal
8’	Hohlflöte
8’	Gemshorn
8’	Gamba
8’	Doppelflöte
5-1/3’	Quinte
4’	Oktave
4’	Spitzflöte
4’	Gedackt
2-2/3’	Quinte
2’	Oktave
II	Doublette (4’ + 2’)
IV	Mixtur
IV	Scharff
III-V	Kornett
16’	Fagott
8’	Trompete

(III) Oberwerk

16’	Quintaton
8’	Prinzipal
8’	Rohrflote
8’	Viola di Gamba
8’	Flauto amabile
8’	Gedackt
4’	Oktave
4’	Gemshorn
4’	Rohrflöte
2-2/3’	Quinte
2’	Waldflöte
1-3/5’	Terz
1’	Sifflöte
IV	Mixtur
8’	Schalmey
8’	Stahlspiel

(IV) Echowerk

16’	Lieblich Gedackt
8’	Geigenprinzipal
8’	Flauto dolce
8’	Salizional
8’	Unda maris
8’	Lieblich Gedackt
4’	Oktave
4’	Zartflöte
4’	Salizional
2-2/3’	Nasard
2’	Oktave
III	Cymbel
II-IV	Progressio harmonica
16’	Äoline

(I) Ruckpositiv

16’	Bordun
8’	Prinzipal
8’	Flauto traverso
8’	Gamba
8’	Quintatön
4’	Prinzipal
4’	Gedackt
2’	Oktave
IV	Mixtur
II-V	Kornett
8’	Oboe

Pedal

32’	Untersatz
16’	Prinzipal
16’	Salizet
16’	Subbass
16’	Violon
10-2/3’	Grossnasard
8’	Oktave
8’	Bassflöte
8’	Violoncello
6-2/3’	Terz
5-1/3’	Rohrquinte
4’	Oktave
4’	Flöte
IV	Mixtur
IV	Kornett
32’	Posaune
16’	Posaune
16’	Dulzian
8’	Trompete
4’	Klarine

Wills, 92-93.

Thomaskirche: Leipzig, Germany
Wilhelm Sauer, 1908

(I) Manual

16’	Principal
16’	Bordun
8’	Principal
8’	Geigenprincipal
8’	Gedackt
8’	Döppelfloete
8’	Flauto dolce
8’	Flûte harmonique
8’	Quintatön
8’	Gamba
8’	Gemshorn
8’	Dulciana
5-1/3’	Quinte
4’	Oktave
4’	Rohrflöte
4’	Gemshorn
4’	Violini
2’	Oktave
II	Rauschquinte
III	Mixtur (2’)
V	Scharff (2’)
II-IV	Cornett
IV	Großcymbel
16’	Trompete
8’	Trompete

(II) Manual

16’	Salicional
16’	Gedackt
8’	Principal
8’	Gedackt
8’	Rohrflöte
8’	Conzertflöte
8’	Flûte harmonique
8’	Schalmei
8’	Salicional
8’	Harmonica
8’	Dolce
4’	Oktave
4’	Flauto dolce
4’	Salicional
2-2/3’	Quinte
2’	Piccolo
IV	Mixtur
III	Cymbel
III	Cornett
8’	Tuba
8’	Clarinette

(III) Manual im Schweller *(enclosed in Swell)*

16’	Lieblich Gedackt
16’	Gamba
8’	Principal
8’	Gedackt
8’	Quintatön
8’	Spitzflöte
8’	Flûte d’amour
8’	Gemshorn
8’	Viola
8’	Aeoline
8’	Voix céleste
4’	Prästant
4’	Fugara
4’	Traversfloete
2-2/3’	Quinte
2’	Flautino
III	Harmonia aetheria
8’	Trompette harmonique
8’	Oboe

Pedal

32’	Majorbaß
32’	Untersatz
16’	Principal
16’	Contrabaß
16’	Subbaß
16’	Lieblich Gedackt
16’	Violon
16’	Salicetbaß
10-2/3’	Quintbaß
8’	Principal
8’	Offenbaß
8’	Baßflöte
8’	Cello
8’	Dulciana
4’	Oktave
4’	Flauto dolce
32’	Contraposaune
16’	Posaune
16’	Fagott
8’	Trompete
4’	Clarine

Thomaskirche continued

Accessories
6 Normalkuppeln
(II to I, III to I, III to II, I to Pedal, II to Pedal, III to Pedal)
Unteroktavkuppeln II/I, (Subcoupler II to I)
Oberoktavkoppel Pedal (Pedal Octave coupler),
Tuttikoppel
3 freie Kombinationen (3 free combinations, adjustable)
Mezzoforte, Tutti, (fixed combinations)
Mezzoforte/Forte/Tutti/Pedal (fixed combinations)
Rollschweller (Crescendo)

Falkenberg, 150.

Basilique Saint-Denis: Paris, France
Aristide Cavaillé-Coll, 1841

Pédale: 25 notes, F to F
32' Flûte ouverte
16' Flûte ouverte
8' Flûte ouverte
4' Flûte ouverte
5-1/3' Gros nasard ou quinte de 8'
16' Basse-contre
8' Basson
16' Bombarde
8' Première trompette
8' Deuxième trompette
4' Premier clarion
4' Deuxième clarion

(I) Positif: 54 notes, C to F
16' Bourdon
8' Salicional
8' Bourdon
4' Prestant
4' Flûte
3' Nasard ou quinte
2' Doublette
1-3/5' Tierce
IV Cymbale
IV Fourniture
Jeux de combinaison
8' Flûte harmonique
4' Flûte octaviante
2' Flageolet harmonique
8' Trompette harmonique
8' Cor d'harmonie et hautbois
8' Cromorne
4' Clairon octaviant
Tremblant

(II) Grand Orgue: 54 notes, C to F
32' Montre
16' Montre
8' Montre
8' Viole
16' Bourdon
8' Bourdon
8' Flûte traversière harmonique
4' Flûte octaviante harmonique
4' Prestant
3' Quinte ou quinte
2' Doublette
IV Grosse Fourniture
IV Grosse Cymbale
IV Fourniture
IV Cymbale
8' Première Trompette harmonique
8' Deuxième Trompette
8' Basson et cor anglais
4' Clairon octaviant
8' Cornet à pavillon

(III) Bombarde: 54 notes, C to F
8' Grand Cornet VII
16' Bourdon
8' Bourdon
8' Flûte
4' Prestant
3' Nasard ou quinte
2' Doublette
16' Bombarde
8' Première Trompette de Bombarde
8' Deuxième Trompette harmonique
4' Première Clairon harmonique
4' Deuxième Clairon octaviant

(IV) Recit Expressif: 54 notes, C to F
8' Bourdon
8' Flûte harmonique
4' Flûte octaviante harmonique
2' Octavin harmonique
2-2/3' Quinte
8' Trompette harmonique
4' Clairon harmonique
8' Voix humaine harmonique

Pedales de combinaison:
Expression Récit
Récit to II
Bombarde to II
Grande Orgue to II
Positif to II
Pédale d'octaves (Octaves graves)
Pédal de Tirasse (all manuals to pedal)
Pédal des dessus (Appel Positif, dessus: jeux de combinaison)
Pédal des basses (Appel Positif, basse: jeux de combinaison)

Douglass, 27-29; Williams, 201-202.

Basilique Sainte-Clotilde: Paris, France
Aristide Cavaillé-Coll, 1859

(I) Grand Orgue

16’	Montre
16’	Bourdon
8’	Montre
8’	Flûte harmonique
8’	Bourdon
8’	Viole de gambe
4’	Prestant
Jeux de combinaison	
4’	Octave
2-2/3’	Quinte
2’	Doublette
IV	Fourniture
16’	Bombarde
8’	Trompette
4’	Clairon

(II) Positif

16’	Bourdon
8’	Montre
8’	Flûte harmonique
8’	Bourdon
8’	Viole de gambe
8’	Unda Maris (Voix céleste)
4’	Prestant
Jeux de combinaison	
4’	Flûte octaviante
2-2/3’	Quinte
2’	Doublette
III-IV (?)	Plein-jeu
8’	Trompette
8’	Cromorne (Clarinette)
4’	Clairon

(III) Recit Expressif

8’	Flûte harmonique
8’	Viole de gambe
8’	Bourdon
8’	Voix celeste
8’	Basson Hautbois
8’	Voix humaine
Jeux de combinaison	
4’	Flûte octaviante
2’	Octavin
8’	Trompette
4’	Clairon

Pédale

32’	Sousbasse
16’	Contrebasse
8’	Basse
4’	Octave
Jeux de combinaison	
16’	Bombarde
16’	Basson
8’	Trompette
4’	Clairon

Pédales de combinaison

Pedale d’orage (later Tirasse REC)
Tirasse I
Tirasse II
Tirasse III
Anches Pédale
Octaves graves I
Octaves graves II
Octaves graves III to II
Anches I (jeux de combinaison)
Anches II (jeux de combinaison)
Anches III (jeux de combinaison)
Accouplement II to I
Accouplement III to II
Tremolo
Expression (Récit)

Douglass, 141.

Église Saint-Sulpice: Paris, France
Aristide Cavaillé-Coll, 1862 *(Clicquot 1776-1781, Daublaine-Callinet 1834-1846)*

Pédale: 30 notes, C to F
32’ Principal Basse
16’ Contrebasse
16’ Soubasse
8’ Flûte
8’ Violoncelle
4’ Flûte
Jeux de combinaison
4’ Clairon
8’ Ophicléide
8’ Trompette
16’ Basson
16’ Bombarde
32’ Contre-Bombarde

(I) Grand-Choeur: 56 notes, C-G
8’ Salicional
4’ Octave
IV Fourniture
VI Cymbale
IV Plein Jeu
V Cornet
8’ Première Trompette
8’ Deuxième Trompette
4’ Clairon
2’ Clairon Doublette
8’ Basson
16’ Basson
16’ Bombarde

(II) Grand-Orgue: 56 notes, C-G
32’-16’ Principal Harmonique
16’ Montre
16’ Bourdon
16’ Flûte cônique
8’ Flûte harmonique
8’ Flûte traversière
8’ Montre
8’ Bourdon
8’ Diapason
8’ Flûte à pavillon
4’ Prestant
5-1/3’ Grosse Quinte
2’ Doublette

(III) Bombarde: 56 notes, C-G
16’ Soubasse
16 Flûte cônique
8’ Principal
8’ Flûte harmonique
8’ Bourdon
8’ Gambe
8’ Violoncelle
8’ Kéraulophone
4’ Flûte octaviante
4’ Prestant
Jeux de combinaison
5-1/3’ Grosse Quinte
3-1/5’ Grosse Tierce
2-2/3’ Quinte
4’ Octave
2’ Octavin
V Cornet
8’ Trompette
4’ Clairon
8’ Baryton
16’ Bombarde

(IV) Positif: 56 notes, C-G
16’ Violon basse
16’ Quintaton
8’ Quintaton
8’ Flûte traversière
8’ Salicional
8’ Viole de gambe
8’ Unda maris
4’ Flûte douce
4’ Flûte octaviante
4’ Dulciane
Jeux de combinaison
2-2/3’ Quinte
2’ Doublette
III-VI Plein Jeu harmonique
1-3/5’ Tierce
1-1/3’ Larigot
1’ Picolo
8’ Trompette
8’ Clarinette
4’ Clairon
16’ Euphone

(V) Recit Expressif: 56 notes, C-G

16’ Quintaton
8’ Bourdon
8’ Violoncelle
4’ Prestant
2’ Doublette
IV Fourniture
V Cymbale
8’ Basson Hautbois
8’ Voix humaine
8’ Cromorne
16’ Cor Anglais
8’ Voix céleste

Jeux de combinaison

8’ Flûte harmonique
4’ Flûte octaviante
4’ Dulciana
2-2/3’ Nazard
2’ Octavin
V Cornet
8’ Trompette
8’ Trompette Harmonique
16’ Bombarde
4’ Clairon

Pédales de combinaison

Orage
Tirasse Grand-Choeur
Tirasse Grand-Orgue
Anches Pédale
Octaves (Grave) Grand-Choeur
Octave (Grave) Grand-Orgue
Octaves (Grave) Bombardes
Octaves (Grave) Positif
Octaves (Grave) Récit
Anches Grand-Orgue
(Couples Grand-Choeur to II)
Anches Bombardes
Anches Positif
Anches Récit
Copula Grand-Choeur
(activates Grand-Choeur on I)
Copula Grand-Orgue (II to I)
Copula Bombardes (III to I)
Copula Positif (IV to I)
Copula Récit (V to I)
Tremblant (Récit)
Expression (Récit)

Registres de Combinaison

Pédale, Grand-Orgue, Bombardes, Positif, Récit, (left and right sides)

Registres Accessoires

Sonnette du Haut (left and right sides)
Sonnette du Bas (left and right sides)

Pressions (Wind Pressure) in mm

Grand Orgue: 95, 100
Grand Choeur: 95, 115
Solo: 100, 115, 127
Positif: 100, 115, 120
Recit: 100, 115
Pedale: 90 - 100
Chamade: 140-150

Specification après les études de Jean-Pierre Decavele and Jean Renaud; aussi "Le grand Orgue de St. Sulpice," Gregor Klein (*La Flûte Harmonique*, Numéro Spécial, 1981, no. 20);
Douglass, plate 7; http://www.stsulpice.com/Docs/console.html, accessed 15 January 2012.

Great George Street Chapel: Liverpool, England
William Hill, 1841

Great Organ: 54 notes, C-F
16' Bourdon [C-B]
16' Tenoroon Open Diapason [c-f'"]
8' Open Diapason
8' Open Diapason
8' Stopped Diapason Bass [C-B]
8' Stopped Diapason Treble [c-f'"]
5-1/3' Quint
4' Principal
4' Stopped-flute [metal]
2-2/3' Twelfth
2' Fifteenth
1-3/5' Tierce
III Sesquialtera
II Mixture
II Doublette
8' Trombone
4' Clarion
2' Octave Clarion

Choir Organ: 54 notes, C-F
8' Stopped Diapason
8' Dulciana
8' Claribel-flute
4' Oboe-flute
4' Wald-flute
2' Piccolo
8' Corno-flute
8' Cromorne

Solo Organ (playable from Swell keys)
8' Tuba Mirabilis

Swell Organ: 54 notes, C-F
16' Bourdon [C-B]
16' Tenoroon Dulciana [c-f'"]
8' Open Diapason
8' Stopped Diapason Bass [C-B]
8' Stopped Diapason Treble [c-f'"]
8' Dulciana (Echo) [c-f'"]
4' Principal
4' Suabe-flute
2-2/3' Twelfth
2' Fifteenth
2' Flageolet
III Sesquialtera
II Mixture
V Echo Dulciana Cornet
[from c or c'?]
16' Contra-fagotto
8' Cornopean
8' Trumpet
8' Oboe
4' Clarion
8' Swiss Cromorne-flute

Pedal Organ: 27 notes, C-D
16' Grand Open Diapason
16' Bourdon
8' Principal
4' Fifteenth
V Sesquialtera
16' Trombone

Couplers
Swell to Great
Choir to Great
Great to Pedal
Swell to Pedal
Choir to Pedal
Pedal Octave [?]

4 combination pedals

Bicknell, 237.

Saint Paul's Cathedral: London, England
Henry Willis, 1872

Great Organ

16'	Double Diapason
8'	Open Diapason
8'	Open Diapason
8'	Claribel Flute
5-1/3'	Quint
4'	Principal
4'	Flute Harmonique
2-2/3'	Octave Quint
2'	Super Octave
III	Fourniture
III	Mixture
16'	Trombone
8'	Tromba
4'	Clarion

Swell Organ

16'	Contra Gamba
8'	Open Diapason
8'	Lieblich Gedact
8'	Salicional
8'	Vox Angelica
4'	Principal
2'	Fifteenth
III	Echo Cornet
16'	Contra Posaune
8'	Cornopean
8'	Hautboy
4'	Clarion

Choir Organ

16'	Bourdon
8'	Open Diapason
8'	Dulciana
8'	Violoncello
8'	Claribel Flute
8'	Lieblich Gedact
4'	Flute Harmonique
4'	Principal
2'	Flageolet
8'	Corno di Bassetto
8'	Cor Anglais

Solo Organ

8'	Flute Harmonique
4'	Concert Flute
8'	Corno di Bassetto
8'	Oboe
8'	Tuba Major
4'	Clarion

Pedale

32'	Double Open Diapason
16'	Open Diapason
16'	Violone
8'	Octave
8'	Violoncello
III	Mixture
32'	Contra Posaune
16'	Grand Bombard
8'	Clarion

Couplers
Solo to Great; Choir to Great; Swell to Great;
Swell to Great Sub; Swell to Great super;
Great to Pedals; Choir to Pedals; Swell to Pedals; Solo to Pedals
Ventil Pedals

4 combination pistons to each manual, 4 combination pistons to the Pedale, acting on the Great pistons,
Coupler pedals: Great to Pedale (double-acting); Swell to Great

Thistlethwaite, 503.

Saint George's Hall: Liverpool, England
Henry Willis, 1855, altered in 1867 and 1897
Specification after the 1897 rebuild

The original scheme for the organ was conservative, with old-style long manual compass (GGG-a) and duplication of voices.

Pedal Organ: 32 notes, C-G

32'	Double Open Diapason (wood)
32'	Double Open Diapason (metal)
16'	Open Diapason (wood)
16'	Open Diapason (metal)
16'	Salicional
16'	Bourdon
8'	Principal (metal)
8'	Principal (wood)
6'	Quint
4'	Fifteenth
V	Fourniture
III	Mixture
32'	Posaune
16'	Posaune
16'	Ophicleide
8'	Trumpet
4'	Clarion

Choir Organ: 61 notes, C-C

16'	Double Diapason (closed)
8'	Open Diapason
8'	Claribella
8'	Stopped Diapason
8'	Dulciana
8'	Viola Da Gamba
8'	Vox Angelica
4'	Principal
4'	Harmonic Flute
4'	Gamba
2-2/3'	Twelfth
2'	Fifteenth
2'	Flageolet
III	Sesquialtera
8'	Trumpet
8'	Cremona
8'	Orchestral Oboe
4'	Clarion

Great Organ: 61 notes, C-C

16'	Double Open Diapason
8'	Open Diapason
8'	Open Diapason
8'	Open Diapason
8'	Open Diapason
8'	Stopped Diapason
8'	Violoncello
5-1/3'	Quint
4'	Principal
4'	Principal
4'	Viola
4'	Flute
3-1/5'	Tenth
2-2/3'	Twelfth
2'	Fifteenth
2'	Harmonic Piccolo
II	Doublette (2' & 1')
III	Sesquialtera
IV	Mixture
16'	Trombone
8'	Trombone
8'	Ophicleide
8'	Trumpet
4'	Clarion
4'	Clarion

Swell Organ: 61 notes, C-C

16'	Double Diapason (closed wood bass)
8'	Open Diapason
8'	Open Diapason
8'	Dulciana
8'	Viola da Gamba
8'	Stopped Diapason
8'	Voix Celeste
4'	Principal
4'	Octave Viola
4'	Flute
2-2/3'	Twelfth
2'	Fifteenth
2'	Fifteenth
2'	Piccolo
II	Doublette (2' & 1')
III	Mixture
V	Fourniture
16'	Trombone
16'	Contra-Hautboy
8'	Ophicleide
8'	Trumpet
8'	Horn
8'	Oboe
8'	Clarinet
4'	Clarion
4'	Clarion
8'	Orchestral Oboe

Solo Organ: 61 notes, C-C

Enclosed

8'	Open Diapason
8'	Viola da Gamba
8'	Stopped Diapason
4'	Orchestral Flute [sic]
2'	Piccolo
16'	Contrafagotto
8'	Trombone
8'	Bassoon
8'	Vox Humana
8'	Orchestral Oboe
8'	Corno di Bassetto

Unenclosed, high pressure

8'	Ophicleide
8'	Trumpet
4'	Clarion
4'	Clarion

Couplers:

Swell to Choir, Unison
Swell to Great, Sub, Unison, Octave
Choir Octave, Sub
Choir to Great, Unison
Solo to Great, Unison
Solo Octave, Sub
Choir to Pedal
Great to Pedal
Swell to Pedal
Solo to Pedal

Thistlethwaite, 135 – 149, Audsley, 727-729.

The Church of Our Lady of Grace: Hoboken,NJ
Wirsching Organ Co., 1907
Audsley System –Quintuple Expression

First Organ – First Clavier
Unenclosed
16' Double Principal
8' Grand Principal
8' Major Principal
8' Grand Viol
4' Major Octave
Enclosed (Swell Box 1)
8' Major Flute
8' Minor Flute
2-2/3' Octave Quint
2' Super-Octave
V Grand Cornet
(Rohrflote 4', Twelfth 2-2/3', Fifteenth 2', Seventeenth 1-3/5', Nineteenth 1-1/3')
16' Double Trumpet
8' Trumpet
4' Clarion

Second Organ – Second Clavier
Enclosed (Swell Box 2)
16' Lieblichgedeckt
8' Geigenprincipal
8' Lieblichgedeckt
4' Lieblichflote
V Dolce Cornet (Dulciana scale)
CC-BB: 19, 22, 24, 26, 29
C to B 12, 15, 17, 19, 22
C1 to b1: 8, 12, 17, 19, 22
C2 to c4: 1, 8, 10, 12, 15
Enclosed (Swell box 3)
8' Dulciana
8' Viola da Gamba
8' Viola d'Amore
8' Orchestral Clarinet
8' Vox Humana
Tremolant

Third Organ – Third Clavier
Enclosed (Swell Box 2)
8' Dolce 8'
8' Flauto d'Amore 8'
4' Orchestral Flute 4'
2' Orchestral Piccolo 2'
8' Orchestral Oboe 8'
Tremolant
Enclosed (Swell Box 3)
8' Minor Principal 8'
8' Violoncello 8'
8' Concert Violin 8'
8' Corno di Bassetto 8'
16' Contrafagotto 16'
Tremolant

Pedal Organ
32' Double Principal 32'
16' Grand Principal 16'
16' Contra-Basso 16'
16' Dulciana 16'
16' Bourdon 16'
8' Grand Octave 8'
(ext. Grand Principal)
8' Dolce 8' (ext. Dulciana)
8' Violoncello 8' (ext. Contra-Basso)
III Compensating Mixture III
16' Trombone 16'

Auxiliary Pedal Organ
Enclosed
16' Lieblichgedeckt 16' (manual II)
16' Double Trumpet 16' (manual I)
16' Contrafagotto 16' (manual III)

Couplers:
Second Organ, First Subdivision to First Organ, Unison
Second Organ, Second Subdivision to First Organ, Unison
Second Organ, First Subdivision to First Organ, Octave
Third Organ, First Subdivision to First Organ, Unison
Third Organ, Second Subdivision to First Organ, Unison
Third Organ, Second Subdivision to First Organ, Sub-Octave
Third Organ, First Subdivision to Second Organ, Unison
Third Organ, Second Subdivision to Second Organ, Unison
First Organ, First Subdivision to Pedal, Unison
First Organ, Second Subdivision to Pedal, Unison
Second Organ, First Subdivision to Pedal Organ, Unison
Third Organ, Second Subdivision to Pedal Organ, Unison

George Ashdown Audsley, *The Organ of the Twentieth Century* (New York: Dodd, Mead, 1919; New York: Dover, 1970), 482-485;
http://database.organsociety.org/SingleOrganDetails.php?OrganID=7710) accessed 19 Aug 2011

Worcester Cathedral: Worcester, UK
The Hope-Jones Electric Organ Company, 1896
Rebuild of the William Hill organ along Hope-Jones's design.

Great Organ: 61 notes, C-C
254 mm wind pressure
16' Diapason Phonon (wood & metal)
8' Diapason Phonon (metal)
8' Tibia Plena (wood)
16' Tuba Profunda (metal)
8' Tuba (metal)
127 mm wind pressure
8' Open Diapason (metal)
8' Hohl Flute (wood)
8' Viola d'Amour (metal)
4' Octave Diapason (metal)
4' Quintadena (tin)
2' Harmonic Piccolo

Choir Organ: *(unenclosed)* 61 notes, C-C
76 mm wind pressure
16' Double Open Diapason (wood & metal)
8' Open Diapason (metal)
8' Cone Lieblich Gedact (metal)
8' Viol d'Orchestre (tin)
8' Tiercina (tin)
8' Dulciana (metal)
4' Flute (metal)
2' Flautina (metal)
8' Clarinet (metal)
8' Cor Anglais (tin)

Pedal Organ: 30 notes, C-F
127 mm wind pressure
64' Gravissima (ext. 32', bass acoustic)
32' Double Open Diapason (wood)
32' Contra Violone (zinc)
16' Tibia Profunda (wood and iron)
16' Open Diapason (wood)
16' Violone (zinc, ext. 32')
16' Bourdon (wood)
8' Octave Violone (ext. 16')
8' Flute (wood, ext. Bourdon 16')
508 mm wind pressure
32' Diaphone (wood)
16' Diaphone (wood, ext. 32')
16' Tuba Profunda (metal)
8' Tuba (metal, ext. 16')

Swell Organ: 61 notes, C-C
254 mm wind pressure
8' Horn Diapason (metal)
8' Quintaton (tin)
8' Tibia Clausa (wood)
2' Harmonic Piccolo
16' Double English Horn (metal)
8' Cornopean
4' Clarion
127 mm wind pressure
16' Contra Viol (tin)
8' String Gamba (tin)
8' Violes Celestes II & III (tin)
4' Gambette
4' Harmonic Flute (metal)
8' Oboe (tin)
8' Vox Humana (metal)
8' Cor Anglais (free reed, tin)

Solo Organ: 61 notes, C-C
254 mm wind pressure *(enclosed)*
8’ Diaphonic Horn
4’ Rohr Flute (metal)
16’ Bombarde (metal)
8’ Tuba Sonora (metal)
8’ Orchestral Oboe (brass)
508 mm wind pressure
8’ Tuba Mirabilis (ext. of Pedal Tuba)

Couplers
Great sub (HP) Great Super (LP)
Swell to Great sub, unison, super
Choir to Great sub, unison
Solo to Great sub, unison (double touch), super,
Swell sub, super
Solo to Swell (second touch)
Choir to Swell (second touch)
Choir sub, super
Swell to Choir sub, unison (double touch) super,
Solo sub, super,
Great to Pedal
Swell to Pedal
Choir to Pedal
Solo to Pedal
Swell Tremulant

Bicknell, 294-295.

Park Church: Elmira, NY
E. M. Skinner, 1905, Opus. 130
Designed by Robert Hope-Jones, vice president

4 manuals / 53 stops / 27 ranks / 1,818 pipes

Great Organ

16’	Contra Tibia Clausa	61
8’	Diapason	61
8’	Violin Diapason	61
8’	Tibia Plena	SO
8’	Concert Flute	61
8’	Muted Viole	61
4’	Octave	61
4’	Harmonic Flute	61
16’	Ophicleide	SO
8’	Harmonic Tuba	SO
4’	Harmonic Clarion	SO

Swell Organ

16’	Contre Viole	73
8’	Diapason Phonon	73
8’	Tibia Plena	SO
8’	Quintadena	73
8’	Lieblich Gedackt	73
8’	Viole d’Orchestre	73
8’	Viole Celeste	73
8’	Aeoline	73
8’	Unda Maris	61 *(TC)*
4’	Flauto Traverso	73
III-IV	Echo Mixture	219
8’	Harmonic Tromba	73
8’	Harmonic Tuba	73
8’	Cor Anglais	73
8’	Clarinet	73
	Tremulant	

Orchestral Organ

(primarily duplexed from Swell)

16’	Contre Viole	
8’	Tibia Plena	SO
8’	Lieblich Gedackt	
8’	Viol d’Orchestre	
8’	Viol Celeste	
8’	Aeoline	
8’	Unda Maris	
4’	Flauto Traverso	
III-IV	Echo Mixture	
8’	Orchestral Oboe	73
8’	Clarinet	
8’	Vox Humana	73
	Tremulant	

Solo Organ

8’	Tibia Plena	61
16’	Ophicleide	12
8’	Harmonic Tuba	61
4’	Harmonic Clarion	12

Pedal Organ

32’	Tibia Profundissima	12
	(two pressure)	
32’	Resultant Bass	--
16’	Tibia Profunda	32
16’	Violone Diapason	12 (GT)
16’	Bourdon	GT
16’	Contre Viole	SW
8’	Tibia Plena	SO
8’	Flute	GT
16’	Ophicleide	SO
8’	Harmonic Tuba	SO
4’	Harmonic Clarion	SO

http://aeolian-skinner.110mb.com/ (accessed 29 July 2011).

South Congregational Church: New Britain, CT
George S. Hutchings Organ, 1897

3 manuals / 58 ranks / 63 stops / 3,454 pipes

Great Organ

16’	Open Diapason	61
8’	First Open Diapason	61
8’	Second Open Diapason	61
8’	Doppel Flute	61*
8’	Gross Flute	61
8’	Gross Gamba	61*
8’	Gemshorn	61
4’	Octave	61*
4’	Flute Harmonique	61*
2-2/3’	Octave Quinte	61*
2’	Super Octave	61*
IV	Mixture	244*
16’	Ophicleide	61*
8’	Trumpet	61*
4’	Clarion	61*

* *(stops enclosed in Choir Swell Box)*

Swell Organ

16’	Bourdon Treble	49
16’	Bourdon Bass	12
8’	Open Diapason	61
8’	Stopped Diapason	61
8’	Spitz Flöte	61
8’	Salicional	61
8’	Vox Celestis	49
8’	Aeoline	61
8’	Unda Maris	49
4’	Octave	61
4’	Flauto Traverso	61
4’	Salicet	61
2’	Flageolet	61
V	Dolce Cornet	305
16’	Contra Fagotto	61
8’	Cornopean	61
8’	Oboe	61
8’	Vox Humana	61
4’	Saxophone	61
	Tremolo # 1	
	Tremolo # 2	

Choir Organ *(enclosed in separate Swell box)*

16’	Contra Gamba	61
8’	Open Diapason	61
8’	Geigen Principal	61
8’	Concert Flute	61
8’	Quintadena	61
8’	Dolcissimo	61
8’	Vox Angelica *(prepared for)*	
4’	Fugara	61
4’	Flute d’Amour	61
2’	Piccolo Harmonique	61
8’	Orchestral Oboe	61
8’	Clarinet *(Clarinet Bass)*	61
	Tremolo	

Solo Organ *(Augmented, Accessory to Great Organ-Heavy Wind)*

16’	Bombarde *(Tuba)*	
8’	Tuba Mirablisi	85
4’	Trumpette *(Tuba)*	

Pedal Organ *(Augmented)*

32’	Contra Bourdon *(Bourdon)*	
16’	Open Diapason	42
16	Bourdon	54
16’	Violone	42
16’	Lieblich Gedackt	SW
16’	Dulciana	42
10-2/3’	Quinte *(Bourdon)*	
8’	Octave *(Open Diapason)*	
8’	Gedackt *(Bourdon)*	
8’	Gamba *(Violone)*	
8’	Orchestral ‘Cello *(tuned with a wave)*	30
8’	Violoncello *(Dulciana)*	
4’	Super Octave	30
16’	Trombone	42
16’	Bassoon	SW
8’	Tromba *(Trombone)*	

South Congregational Church continued

Couplers
Swell to Pedal
Great to Pedal
Choir to Pedal
Swell to Great
Choir to Great
Swell to Choir
Great Organ Off
Solo Organ Off
Swell to Great 4'
Choir to Great 16'
Swell to Swell 4'
Swell to Swell 16'

Reversibles
Great to Pedal *(piston and pedal)*

Combinations *(pistons and pedals)*
Great 5
Swell 7
Choir 5
General 4
General release
(Combinations indicated by an electric annunciator)

Mechanicals
Balanced Swell Pedal
Balanced Great and Choir Pedal
Balanced Crescendo Pedal
Sforzando Pedal
Sostenuto

Holden, 255-256.

APPENDIX B

SPECIFICATIONS OF SELECT SKINNER ORGANS

The following specifications of organs built by E. M. Skinner are provided to further illustrate the characteristics of his tonal designs and that of the American symphonic organ. Many of the instruments cited introduced at the time of their completion, one or more of Skinner's tonal innovations. The European romantic organs were orchestral in the sense that they had weight and warmth. The organs built by Skinner evolved beyond the symphonic organs of the nineteenth century into instruments capable of imitating more orchestral tonal colors.[376]

- **Skinner's Ideal Organ Specification of 1894** appeared in the journal, *The Organ*, published by Everett E. Truette, Volume II, No. 12, April, 1894.
- **University of Virginia -- Old Cabell Hall: Charlottesville, VA, 1906** is representative of Skinner's early tonal designs, similar to the tonal designs of Hutchings. This organ contained a number of string stops, the Erzähler, and a capped Oboe stop that foreshadowed the development of the English Horn stop.[377]
- **City College of New York -- Great Hall: New York, NY, 1906** incorporated Skinner's Orchestral Oboe, Dulcet 8' II, and a Bombarde 32' constructed with wooden resonators.[378]
- **The Cathedral of Saint John the Divine: New York, NY, 1910** contained the first implementations of a number of Skinner's tonal developments,

[376] Holden, 38.
[377] Holden, 38.
[378] Holden, 38-39.

including the French Trumpet 8', Gamba Celeste 8', Flügel Horn 8', Violine 32' in the pedal, and a newly designed Tuba Mirablis 8'.[379]

- **Saint Thomas's Episcopal Church: New York, NY, 1913;** E. M Skinner cited the specification of this organ as representing the tonal designs in his first book, *The Modern Organ,* published in 1917.[380]
- **Carnegie Music Hall: Pittsburgh, Pennsylvania, 1917** was the first use of a 4' celeste stop on a Skinner organ, Violette 4' and the Grosse Gedeckt 8'.
- **Saint Paul Auditorium: Saint Paul, MN, 1920** "contained virtually every tonal invention of Ernest Skinner in existence at that time, including the … 4' Unda Maris and Heckelphone stops … and a String organ of six ranks." A concert grand piano and a xylophone were also included. This instrument was considered the best organ in the country at that time.[381]
- **Cleveland Auditorium, Cleveland, OH, 1921** was the largest organ built by Skinner up to that point and combined traditional elements with orchestral timbres.[382]
- **Eastman School of Music -- Kilbourn Hall, Rochester, NY, 1921** was designed in collaboration with Harold Gleason, head of the school's organ department, who incorporated ideas of George Ashdown Audsley's writings. Other features of the instrument included an adjustable crescendo pedal, a coupler for reversing the order of the manuals as encountered in French organs, a string division, and more mutation stops. Gleason designed an

[379] Holden, 43-44.
[380] Skinner, *The Modern Organ,* 30-33.
[381] Holden, 81.
[382] Holden, 83.

organ with historic and orchestral elements, designed "to contain everything [he] could think of."[383]

- **Rockefeller Memorial Chapel, The University of Chicago, Chicago, IL, 1928** was built following Skinner's second trip to England and France. Instruments built after this point incorporated more Willis style mixtures and French mutation stops. G. Donald Harrison collaborated with Skinner on this instrument.[384]
- **University of Michigan - Hill Auditorium Ann Arbor, MI, 1927** incorporated a new solo Flauto Mirabilis and a revised version of the Erzähler.[385]
- **Yale University – Woolsey Hall, New Haven, CT, 1928** is the largest organ ever built by Skinner.
- **Cathedral Church of Our Lady, Queen of the Holy Rosary, Toledo, OH, 1930** contains complete Diapason and reed choruses with most of the types of stops that characterize his instruments and is one of the few tonally unaltered Skinner organs.[386]
- **The National Cathedral of SS. Peter and Paul, Washington, DC, 1938** was one of the final monumental organs built by Skinner. The episcopacy of the National Cathedral requested that Skinner build the organ. The instrument was praised as "one of the really great organs of the world" for its "unforced beauty of tone" with "many voices [that are] musical and lovely"

[383] Gleason quoted in Holden, 85; Holden, 85.
[384] Holden, 131-132.
[385] Holden, 128.
[386] Holden, 142.

with an 'effective ensemble which is clear and brilliant beyond description."

"an organ designed by a musician, for musicians."[387]

The following two organs built by Skinner were examined by the author in March, 2012. The specifications included here were verified at that time.

- **Saint Luke's Episcopal Church, Evanston, IL, 1921**
- **Rockefeller Memorial Chapel, The University of Chicago, Chicago, IL, 1928; Schantz Organ Co., 2008**

[387] Holden, 183-187; Robert Barrow and Glenn Dillard Gunn quoted in Holden, 187.

Skinner's Ideal Organ Specification: April, 1894.

A combined Swell and Choir organ: all of the stops available in the Swell would be available on both the Swell manual and Choir manual.

Great Organ

16'	Open Diapason
8'	Open Diapason (American type)
8'	Open Diapason (English type)
8'	Open Diapason (Small)
8'	French Horn
8'	Violoncello
8'	Gemshorn
8'	Harmonic Flute (large scale, wood)
4'	Harmonic Flute (metal)
4'	Octave
2-2/3'	Quinte Flute
2'	Fifteenth
IV	Mixture
8'	Trumpet

Swell and Choir Organs

16'	Gedeckt
16'	Contra Salicional
16'	Contra Dulciana
8'	Open Diapason
8'	Geigen Principal
8'	Spitz-flote
8'	Salicional
8'	Voix Celeste
8'	Viol d'Orchestra
8'	Aeoline
8'	Concert Flute
8'	Stopped Diapason
8'	Dulciana
8'	Quintadena
4'	Violina
4'	Octave
4'	Salicet
4'	Flauto Traverson
4'	Flute d'Amour
IV	Dolce Cornet
2'	Piccolo
8'	Saxophone
8'	Oboe
8'	Orchestral Oboe
8'	Clarinet
8'	Cornopean
16'	Contra Fagotto

Echo Organ (Ventil), from Great

8'	Vox Humana
8'	Echo Flute
8'	Echo Voix Celeste
8'	Quintadena

Pedal Organ

32'	Bourdon
16'	Bourdon
16'	Open Diapason
16'	Violone
16'	Dulciana
8'	Flute
8'	Gedeckt
8'	Dulciana
10-2/3'	Quinte

Couplers

Swell on itself at 8vs.
Swell to Great (unison)
Swell to Great at 8vs. (pedal)
Choir to Great (unison)
Choir to Great Sub-Octave
Swell to Choir (unison)
Great Separation.
Great off, Echo on
Swell to Pedal.
Choir to Pedal.
Great to Pedal (reversible)
Pedal on itself at 8vs. *[sic]*

Everett E. Truette, ed., *The Organ*, Vol. II, No. 12 (April 1894) Facsimile Edition (Harrisville, NH: Boston Organ Club, 1995), 290-291; Holden, 254-255.

University of Virginia -- Old Cabell Hall: Charlottesville, VA
E. M. Skinner Organ Company, 1906, Opus: 127

3 manuals / 35 Stops / 27 ranks / 1,585 Pipes

(II) Great Organ

16’	Diapason	61
8’	Diapason	61
8’	Gross Floete	61
8’	Gamba	61
8’	Gedackt	SW
8’	Erzähler	61
4’	Octave	61
2’	Fifteenth	61
8’	Cornopean	SW

(III) Swell Organ

16’	Bourdon	61
8’	Diapason	61
8’	Salicional	61
8’	Voix Celestes	61
8’	Gedackt	61
8’	Dulciana	CH
4’	Flute	CH
4’	Violin	61
2’	Piccolo	CH
III	Cornet	183
8’	Cornopean	61
8’	Oboe	CH
	Tremolo	

(I) Choir Organ *(enclosed with Swell)*

8’	Melodia	61
8’	Geigen Principal	61
8’	Dulciana	61
8’	Unda Maris	49
4’	Flute	61
2’	Piccolo	61
8’	Clarinet	61
8’	Oboe	61

Pedal Organ

16’	Diapason	30
16’	First Bourdon	30
16’	Second Bourdon	SW
8’	Floete	12
8’	Gedackt	SW
8’	Cello	SW

(Salicional & Voix Celestes)

Holden, 258-259.

City College of New York, Great Hall: New York, NY
E. M. Skinner, 1906, Opus: 135

4 manuals / 84 stops / 65 ranks / 3,846 pipes

Great Organ - 6" wind

16’	Bourdon	61
8’	First Diapason	61
8’	Second Diapason	61
8’	Third Diapason	61
8’	Diapason	61
8’	Grossfloete	61
8’	Gamba	61
8’	Gedackt	61
8’	Erzahler	61
4’	Octave	61
4’	Flute	61
2’	Fifteenth	61
16’	Tuba	SO
8’	Trumpet	61
8’	Tuba	SO
4’	Tuba	SO

Swell Organ - 6" wind

16’	Bourdon	61
8’	First Diapason	61
8’	Second Diapason	61
8’	Grossfloete	61
8’	Gedackt	61
8’	Salicional	61
8’	Viol d’Orchestre	61
8’	Voix Celestes	61
8’	Spitzfloete	61
8’	Aeoline	61
4’	Octave	61
4’	Flute	61
4’	Salicet	61
2’	Flautino	61
III	Cornet	183
16’	Trumpet	61*
8’	Cornopean	61*
8’	Horn	61*
8’	Oboe	61
8’	Vox Humana	61
4’	Clarion	61*
	** 10" wind*	
	Tremolo	

Choir Organ- 6" wind

16’	Dulciana	61
8’	Diapason	61
8’	Gamba	61
8’	Quintadena	61
8’	Concert Flute	61
8’	Dulciana	61
8’	Unda Maris	61
4’	Flute	61
4’	Violino	61
2’	Piccolo	61
16’	Fagotto	61
8’	Clarinet	61
8’	Orchestral Oboe	61
	Tremolo	

Solo Organ - 10" wind

8’	Stentorphone	61
8’	Philomela	61
8’	Gamba	CH
8’	Concert Flute	CH
8’	Dulciana	CH
8’	Quintadena	CH
8’	Dulcet II	122
4’	Flute	61
4’	Flute	CH
16’	Tuba	61*
16’	Fagotto	CH
8’	Tuba Mirabilis	61*
8’	Tuba	12*
8’	Orchestral Oboe	CH
8’	Clarinet	CH
4’	Tuba	12*
	** 15" wind*	

Pedal Organ - 6" wind

32’	Diapason	32*
16’	First Diapason	12*
	** 10" wind*	
16’	Second Diapason	32
16’	First Bourdon	GT
16’	Second Bourdon	SW
16’	Violone	32
16’	Dulciana	CH
10-2/3’	Quint	32
8’	First Flute	12
8’	Second Flute	12
8’	Viola	12
8’	Gedackt	GT
8’	Cello	SW
4’	Flute	32
32’	Bombarde	32**
16’	Ophicleide	12**
16’	Trombone	SO
8’	Tromba	32**
	*** 25" wind*	

Holden, 259-260; Steve Layden, “Aeolian-Skinner Archives,” http://aeolian-skinner.110mb.com (accessed 19 October 2010).

The Cathedral of Saint John the Divine: New York, NY
E. M. Skinner Co., 1906 *(completed 1910)***, Opus: 150**

4 manuals / 104 stop / 81 ranks / 5,614 pipes

Great Organ

16’	Diapason	61
16’	Bourdon	61
8’	First Diapason	61
8’	Second Diapason	61
8’	Third Diapason	61
8’	Philomela	SO
8’	Gross Flute	61
8’	Hohl Flute	61
8’	Gedackt	61
8’	Gamba	61
8’	Erzahler	61
8’	Harmonic Flute	61
4’	Octave	61
4’	Gambette	61
4’	Flute	61
2’	Fifteenth	61
V	Mixture	305
16’	Ophicleide	SO
8’	Trombone	SO
4’	Clarion	SO

Swell Organ

16’	Dulciana	73
16’	Bourdon	73
8’	First Diapason	73
8’	Second Diapason	73
8’	Third Diapaon	73
8’	Spitzflote	73
8’	Salicional	73
8’	Voix Celeste	73
8’	Viola	73
8’	Aeoline	73
8’	Unda Maris	73
8’	Claribel Flute	73
8’	Gedackt	73
4’	Octave	73
4’	First Flute	73
4’	Second Flute	73
4’	Violina	73
2’	Flautino	61
V	Mixture	305
16’	Trumpet	73
16’	English Horn	73
8’	Cornopean	73
8’	French Trumpet	73
8’	Oboe	73
8’	Vox Humana	73
4’	Clarion	73
	Tremolo	

Choir Organ

16’	Gedackt	73
16’	Gamba	73
8’	Diapason	73
8’	Geigen Principal	73
8’	Concert Flute	73
8’	Quintadena	73
8’	Dulciana	73
8’	Dulcet II	134
4’	Flute	73
4’	Fugara	73
2’	Piccolo	61
16’	Fagotto	73
8’	Saxophone	73
8’	Clarinet	73
8’	English Horn	73
8’	Orchestral Oboe	73
8’	Vox Humana	73
	Tremolo	
	Carillon	

Solo Organ

8’	Stentorphone	73
8’	Philomela	73
8’	Claribel Flute	73
8’	Harmonic Flute	73
8’	Gamba	73
8’	Gamba Celeste	73
4’	Octave	73
4’	Hohlpfeife	73
4’	Flute	73
16’	Ophicleide	12
8’	Tuba	73
8’	Tuba Mirabilis	73
8’	Flugel Horn	73
8’	Clarinet	CH
8’	Orchestral Oboe	CH
4’	Clarion	12
	Tremolo	

Pedal Organ

32’	Diapason	32
32’	Contra Violone	32
16’	Diapason	32
16’	Second Diapason	12
16’	Violone	12
16’	First Bourdon	32
16’	Second Bourdon	SW
16’	Gamba	CH
16’	Dulciana	SW
8’	First Octave	12
8’	Second Octave	12
8’	Gedackt	12
4’	Super Octave	12
32’	Bombarde	12
	(ext. Tuba Mirabilis)	
16’	Euphonium	12
	(ext. Tuba Mirabilis)	
16’	Ophicleide	SO
16’	English Horn	SW
8’	Tuba Mirabilis	SO
8’	Tuba	SO
4’	First Clarion	SO
4’	Second Clarion	SO

Skinner, *The Composition,* 240-242; http://aeolian-skinner.110mb.com/ (accessed 31 January 2012).

Saint Thomas's Episcopal Church: New York, NY
E. M. Skinner Organ Co., 1913, Opus: 205

Great Organ

16'	Diapason
16'	Bourdon
8'	First Diapason
8'	Second Diapason
8'	Third Diapason
8'	Philomela
8'	Waldfloete
8'	Flauto Dolce
8'	Erzähler
4'	Octave
4'	Flute
2-2/3'	Twelfth
2'	Fifteenth
IV	Mixture
16'	Ophicleide
8'	Tuba
4'	Clarion

Swell Organ

16'	Bourdon
16'	Dulciana
8'	First Diapason
8'	Second Diapason
8'	Clarabella
8'	Gedeckt
8'	Salicional
8'	Voix Celestes
8'	Gamba
8'	Aeoline
8'	Unda Maris
8'	Quintadena
4'	Octave
4'	Flute
2'	Flautino
III	Mixture
III	Dolce Cornet
16'	Contra Posaune
8'	Cornopean
8'	French Trumpet
8'	Oboe
8'	Vox Humana
4'	Clarion
	Tremolo

Choir Organ

16'	Gamba
8'	Geigen Principal
8'	Concert Flute
8'	Kleine Erzähler
8'	Dulcet II
4'	Flute
16'	Fagotto
8'	Flügel Horn
8'	Clarinet
8'	Orchestral Oboe
8'	English Horn
	Tremolo
	Celesta

Solo Organ

8'	Philomela
8'	Gamba
8'	Gamba Celeste
8'	Harmonic Flute
4'	Flute
16'	Contra Fagotto
8'	Tuba Mirabilis
8'	French Horn
8'	Flügel Horn
8'	Vox Humana
8'	Clarinet
8'	Orchestral Oboe
8'	English Horn
	Tremolo

Echo Organ

8'	Diapason
8'	Night Horn
8'	Flute Celeste
8'	Vox Angelica
8'	Aeoline
4'	Flute
8'	Vox Humana
	Tremolo

Pedal Organ

32'	Diapason
32'	Violone
16'	First Diapason
16'	Second Diapason
16'	Bourdon
16'	Violone
16'	Gamba
16'	Echo Lieblich
16'	Dulciana
8'	Octave
8'	Gedeckt
8'	Cello
8'	Lieblich Floete
32'	Bombarde
16'	Ophicleide
16'	Contra Posaune
8'	Tuba
4'	Clarion

Ernest M. Skinner, *The Modern Organ*, (New York: H. W. Gray, 1917), 30-33.

Steve Layden, "Aeolian-Skinner Archives," http://aeolian-skinner.110mb.com (accessed 19 October 2010).
The website indicates the following specification differences: Great: Flute Harmonique 4'; Swell: Flute Harmonique 4', Mixture IV; Choir: Flauto Traverso 4', Contra Fagotto 16' additional stops, Spitzflote 8', Flute Celeste 8' Gemshorn 4', Piccolo 2'; Solo: additional stop, Concert Flute 8'; Echo: Flute Harmonique 4', additional stops: Salicional 8', Voix Celeste 8', Viol Celestes II 8', Concert Flute 8', Dulcet 4'; Pedal: Still Gedectk 8', additional stop, Bourdon 32'.

Carnegie Music Hall: Pittsburgh, Pennsylvania
E. M. Skinner Organ Co., 1917, Opus: 270

4 manuals / 106 stops / 108 ranks / 7,324 pipes

Great Organ - 6" wind

16’	Double Diapason	61
8’	First Diapason	61
8’	Second Diapason	61
8’	Third Diapason	61
8’	Fourth Diapason	61
8’	Doppel Flute	61
8’	Gross Flute	61*
8’	Wald Flute	61*
8’	Philomela	61
8’	Erzahler	61
4’	Octave	61
4’	Flute Harmonique	61*
4’	Gemshorn	61
II	Twelfth-Fifteenth	122
V	Mixture	305
16’	Ophicleide	61*
8’	Tromba	61*
4’	Clarion	61*
	* *enclosed*	
	Celesta Sub	CH
	Celesta	CH
	Chimes	EC
	Clavier	*(Steinway)*

Swell Organ - 6" wind

16’	Bourdon	73
8’	First Diapason	73
8’	Second Diapason	73
8’	Quintadena	73
8’	Stopped Diapason	73
8’	Claribel Flute	73
8’	Viol d’Orchestre	73
8’	Voix Celeste III	219
8’	String Choir VI	438
	(in separate box)	
8’	Spitzflote	73
8’	Flute Celeste	73
4’	Octave	73
4’	Flute Harmonique	73
4’	Violetta	73
4’	Dolce Celestis II	146
2’	Flageolet	61
V	Sesquialtera	365
III	Dolce Mixture	219
16’	Contra Fagotto	73
8’	Cornopean	73
8’	Oboe	73
8’	Vox Humana	73
4’	Clarion	73
	Tremulant	

Choir Organ - 6" wind

16’	Contra Gamba	73
8’	Diapason	73
8’	Concert Flute	73
8’	Flute Celeste	73
8’	Viola	73
8’	Dolce	73
8’	Unda Maris	73
8’	Dulcet II	146
8’	String Choir	SW
4’	Gemshorn	73
4’	Flute d’Amour	73
2’	Piccolo	61
16’	Dbl. English Horn	73
8’	Bassoon	73
8’	Clarinet	73
8’	Hautbois	73
8’	Orchestral Oboe	73
8’	Solo Vox Humana	73
	Tremulant	
	Celesta Sub	
	Celesta	61 bars

Solo Organ - 6", 10", 18" wind

8’	Diapason	73
8’	Stentorphone	73
8’	Grossgedeckt	73
8’	Orchestral Flute	73
8’	Gross Gamba	73
8’	Gamba Celeste	73
8’	String Choir	SW
4’	Octave	73
4’	Hohlpfeife	73
16’	Trombone	73
16’	Dbl. English Horn	CH
8’	Tuba Mirabilis	73
8’	Tuba Minor	73
8’	Trumpet	73
8’	French Horn	73
8’	Cor Anglais	73
8’	Orchestral Oboe	CH
8’	Corno di Bassetto	73
4’	Tuba Clarion	73
	Tremulant	

Echo Organ - 6" wind

16’	Dulciana	73
8’	Cor de Nuit	73
8’	Lieblich Gedeckt	73
8’	Viol Sordino	73
8’	Vox Angelica	73
4’	Flute Harmonique	73
III	String Mixture	219
8’	Vox Humana	73
	Tremulant	
	Cathedral Chimes	25 tubes

Pedal Organ - 6" wind

32’	Double Diapason	32
32’	Contra Bourdon	32
16’	First Diapason	12
16’	Second Diapason	32
16’	Bourdon	12
16’	Violone	32
16’	Gedeckt	EC
16’	Dulciana	CH
16’	Contra Gamba	CH
10-2/3’	Quinte	*(Bourdon)*
8’	Octave	12
8’	Flute	12
8’	Violoncello	12
8’	Still Gedeckt	SW
4’	Principal	12
32’	Bombarde	32
16’	Trombone	12
16’	Ophicleide	GT
16’	Contra Fagotto	SW
8’	Tromba	12
4’	Clarion	12
32’	Clavier	GT
16’	Clavier	GT

Skinner, *The Composition,* 259-262; http://aeolian-skinner.110mb.com/ (accessed 31 January 2012).

Saint Paul Auditorium, Saint Paul, MN
E. M. Skinner Organ Co., 1920, Opus: 308

4 manuals / 104 stops / 83 ranks / 5,492 pipes

Great Organ

16’	Diapason	61
16’	Bourdon	17
	(Pedal ext.)	
8’	First Diapason	61
8’	Second Diapason	61
8’	Stentorphone	SO
8’	Claribel Flute	61
8’	Melodia	61
8’	Gamba	61
8’	Erzahler	61
8’	String Organ VI	SO
8’	Flute Celeste II	SW
4’	Octave	61
4’	Flute	61
2-2/3’	Twelfth	61
2’	Fifteenth	61
III	Mixture	183
16’	Ophicleide	61
8’	Tuba	61
4’	Clarion	61
	Concert Grand Piano	
	Cathedral Chimes	25 tubes
	Xylophone	

Swell Organ

16’	Bourdon	73
16’	Dulciana	73
8’	First Diapason	73
8’	Second Diapason	73
8’	Clarabella	73
8’	Gedeckt	73
8’	Salicional	73
8’	Vox Celestes	73
8’	Gamba	73
8’	Spitz Flute	73
8’	Flute Celeste	61
8’	String Organ VI	SO
4’	Octave	73
4’	Flute	73
4’	Unda Maris II	122
2’	Flautino	61
III	Mixture	183
16’	Trumpet	73
8’	French Trumpet	73
8’	Cornopean	73
8’	Flugel Horn	73
8’	Vox Humana	73
4’	Clarion	61
	Tremolo	

Choir Organ

16’	Gamba	73
8’	First Diapason	73
8’	Second Diapason	73
8’	Concert Flute	73
8’	Wood Celeste	61
8’	Dulcet II	146
8’	Gemshorn	73
8’	String Organ VI	SO
4’	Fugara	61
4’	Flute	61
2-2/3’	Nazard	61
2’	Piccolo	61
16’	Fagotto	73
8’	Clarinet	73
8’	Flugel Horn	73
	Tremolo	
	Celesta	61 bars
	Celesta Sub	

Solo Organ

8’	Stentorphone	73
	(unenclosed)	
8’	Harmonic Flute	73
8’	Grossgedeckt	73
8’	Gamba	73
8’	Gamba Celeste	73
8’	String Organ VI	438
4’	Octave	61
4’	Hohlpfeife	61
16’	Heckelphone	73
8’	Tuba Mirabilis	73
	(unenclosed)	
8’	Tuba	73
8’	French Horn	73
8’	English Horn	73
8’	Orchestral Oboe	73
8’	Corno di Basseto	73
8’	Musette	73
4’	Clarion	61
	Tremolo	

String Organ

(floating - playable through String organ knobs)

8’	Gamba	73
8’	Gamba Celeste	73
8’	Viole d’Orchestre	73
8’	Viole Celeste	73
8’	Dulcet	73
8’	Dulcet Celeste	73

Pedal Organ

64’	Gravissima	*(resultant)*
32’	Diapason	32
32’	Violone	32
16’	First Diapason	12
16’	Second Diapason	GT
16’	Violone	12
16’	Bourdon	32
16’	Gamba	CH
16’	Echo Lieblich	SW
16’	Dulciana	SW
8’	Octave	12
8’	Gedeckt	12
8’	Cello	12
8’	Still Gedeckt	SW
4’	Super Octave	12
4’	Flute	12
32’	Bombarde	32
16’	Trombone	12
16’	Heckelphone	SO
16’	Posaune	SW
16’	Fagotto	CH
8’	Tomba	12
8’	Trumpet	SW
4’	Clarion	12
16’	Piano	
8’	Piano	

http://aeolian-skinner.110mb.com/ (accessed 31 January 2012).

Cleveland Auditorium: Cleveland, OH
E. M. Skinner Organ Co., 1921, Opus: 328

5 manuals / 147 stops / 150 ranks / 9,965 pipes

Great Organ

16’	Diapason	73
16’	Bourdon	61
8’	First Diapason	73
8’	Second Diapason	73
8’	Third Diapason	73
8’	Stentorphone	73
8’	Philomela	73
8’	Clarabella	73
8’	Gamba	73
8’	Erzahler	73
	String Organ	
5-1/3’	Grossquint	73
4’	First Octave	61
4’	Second Octave	61
4’	Harmonic Flute	61
2-2/3’	Twelfth	61
2’	Fifteenth	61
III	Mixture	183
V	Chorus Mixture	305
16’	Ophicleide	73
8’	Tromba	73
4’	Clarion	61
	Cathedral Chimes	25
16’	Piano	85
8’	Piano	
4’	Piano	

Swell Organ

16’	Bourdon	73
16’	Dulciana	73
8’	First Diapason	73
8’	Second Diapason	73
8’	Stentorphone	73
8’	Clarabella	73
8’	Gedeckt	73
8’	Gamba	73
8’	Viol d’Orchestre	73
8’	Salicional	73
8’	Voix Celeste	73
8’	Flauto Dolce	73
8’	Flute Celeste	61 *(TC)*
8’	Aeoline	73
8’	Unda Maris	61 *(TC)*
	String Organ	
4’	Octave	61
4’	Flute Harmonique	61
4’	Violina	61
4’	Voix Celeste	61
4’	Unda Maris II	122
2’	Flageolette	61
III	Sesquialtera	183
V	Mixture	305
16’	Posaune	73
16’	English Horn	73
8’	Cornopean	73
8’	French Trumpet	73
8’	Tuba	73
8’	Corno d’Amour	73
8’	Vox Humana	61
4’	Tuba Clarion	61
4’	Clarion	61
	Tremolo	

Cleveland Auditorium continued

Choir Organ

16’	Contra Gamba	73
8’	First Diapason	73
8’	Second Diapason	73
8’	Concert Flute	73
8’	Bois Celeste	73
8’	Quintadena	73
8’	Viola	73
8’	Dulcet II	146
8’	Klein Erzahler	134
	String Organ	
4’	Octave	61
4’	Flute	61
4’	Gemshorn	61
2-2/3’	Nazard	61
2’	Piccolo	61
1-3/5’	Tierce	61
1-1/7’	Septieme	61
III	Mixture	183
16’	Fagotto	73
8’	Trumpet	73
8’	Orchestral Oboe	73
8’	Clarinet	73
4’	Clarion	61
	Tremolo	
	Celesta Sub	61 *(TC)*
	Celesta	

Solo Organ

16’	Contra Salicional	73
8’	Diapason	73
8’	Stentorphone	73
8’	Gross Gedeckt	73
8’	Doppel Flute	73
8’	Harmonic Flute	73
8’	Gross Gamba	73
8’	Gamba Celeste	73
	String Organ	
4’	Prestant	61
4’	Hohlpfeife	61
4’	Viola	61
4’	Gamba Celeste	61
2’	Piccolo	61
V	Mixture	305
V	Cymbale	305
16’	Ophicleide	73
8’	Tuba Mirabilis	73
8’	French Tuba	73
8’	Tuba	73
8’	Bassoon	73
8’	French Horn	73
8’	Corno di Bassetto	73
8’	Heckelphone	61
8’	Orchestral Oboe	61
8’	Musette	61
4’	Tuba Clarion	61
4’	Clarion	61
	Tremolo	

Echo Organ

8’	Diapason	73
8’	Gedeckt	73
8’	Gamba	73
8’	Gamba Celeste	73
	String Organ	
4’	Flute	61
4’	Gamba Celeste II	122
8’	Tromba	73
8’	French Horn	61
8’	Vox Humana	61
	Tremolo	
	Cathedral Chimes	25

Pedal Organ

64’	Gravissima	-- *(resultant)*
32’	Diapason	12 *(ext. 2nd Diapason)*
32’	Contra Violone	12 *(ext. Violone)*
16’	First Diapason	32
16’	Second Diapason	32
16’	Violone	32
16’	First Bourdon	GT
16’	Gamba	CH
16’	Lieblich Gedeckt	SW
16’	Dulciana	CH
16’	Echo Bourdon	32
10-2/3’	Quinte	GT *(Bourdon)*
8’	Octave	12 *(ext. 1st Diapason)*
8’	Principal	12 *(ext. 2nd Diapason)*
8’	Cello	12 *(ext. Violone)*
8’	Gedeckt	GT *(Bourdon)*
8’	Still Gedeckt	SW *(Bourdon)*
8’	Echo Gedeckt	12 *(ext. Echo Bourdon)*
4’	Super Octave	12 *(2nd Diapason)*
V	First Mixture	-- *(synthetic)*
V	Second Mixture	-- *(synthetic)*
32’	First Bombarde	12 *(ext. Trombone)*
32’	Second Bombarde	12 *(ext. Ophicleide)*
16’	Trombone	32
16’	Ophicleide	32
16’	Posaune	SW
16’	Fagotto	CH
8’	Tromba	12 *(ext. Trombone)*
8’	Trumpet	12 *(ext. Ophicleide)*
4’	First Clarion	12 *(ext. Trombone)*
4’	Second Clarion	12 *(ext. Ophicleide)*
16’	Piano	GT
8’	Piano	GT

Eastman School of Music -- Kilbourn Hall: Rochester, NY
E. M. Skinner Organ Co., 1921, Opus: 325

4 manuals / 115 stops / 86 ranks / 6,018 pipes.

Great Organ - First Enclosed Section

16’	Double Diapason	73
8’	First Diapason	73
8’	Second Diapason	73
4’	Octave	73

Great Organ- Second Enclosed Section

16’	Quintaten	73
8’	Third Diapason	73
8’	Bourdon	73
8’	Harmonic Flute	73
8’	Erzahler	73
4’	Harmonic Flute	73
2-2/3’	Twelfth	61
2’	Fifteenth	61
1-3/5’	Seventeenth	61
1-1/3’	Nineteenth 61	
1-1/7	‘Septieme	61
IV	Mixture *(15, 17, 19, 21)*	
	(draws four previous registers)	
16’	Double Trumpet	73
8’	Harmonic Trumpet	73
4’	Harmonic Clarion	73
	Tremulant	
	Chimes	SO
	Harp	CH
	Orchestral Strings	

Swell Organ

16’	Bourdon	73
16’	Contra Viole	73
8’	First Diapason	73
8’	Second Diapason	73
8’	Claribel Flute	73
8’	Gedeckt Flute	73
8’	Salicional	73
8’	Viole de Gamba	73
8’	Voix Celeste	73
8’	Flauto Dolce	73
8’	Flute Celeste	73
8’	Ethereal Celeste II	146
4’	Octave	73
4’	Traverse Flute	73
4’	Violina	73
4’	Unda Maris II	146
2-2/3’	Harmonic Twelfth	61
2’	Harmonic Piccolo	61
1-3/5’	Seventeenth	61
1-1/3’	Nineteenth	61
16’	Contra Tromba	73
8’	Tromba	12
8’	Cornopean	73
8’	Corno d’Amour	73
8’	Vox Humana	73
4’	Clarion	73
	Tremulant	
	Chimes	SO
	Harp	CH
	Orchestral Strings	

Kilbourn Hall continued

Choir Organ

16’	Contra Dulciana	73
8’	Diapason	73
8’	Chimney Flute	73
8’	Concert Flute	73
8’	Viole d’Amour	73
8’	Viole Celeste	73
8’	Dulciana	12
8’	Unda Maris	61
8’	Kleine Erzahler II	146
4’	Flute d’Amour	73
4’	Octave Dulciana	12
2-2/3’	Nazard	61
2’	Flageolet	61
2’	Super Octave *(Dulciana)*	12
1-3/5’	Tierce	61
III	Dulciana Cornet	183
16’	English Horn	73
8’	Orchestral Trumpet	73
8’	Clarinet	73
8’	Orchestral Oboe	73
8’	Musette	73
8’	Vox Humana	73
	Tremulant	
	Chimes	SO
	Harp	
	Celesta	61 tubes
	Orchestral Strings	

Solo Organ

8’	Orchestral Flute	73
8’	Orchestral Strings IV *(enclosed in separate box)*	292
8’	Cello	73
8’	Cello Celeste	73
8’	Stentorphone	73
4’	Forest Flute	73
8’	Tuba Mirabilis	73
8’	Heckelphone	73
8’	French Horn	73
8’	Corno di Bassetto	73
8’	Orchestral Oboe	CH
8’	Clarinet	CH
8’	Orchestral Trumpet	CH
8’	English Horn	CH
8’	Musette	CH
	Tremulant	
	Chimes	27 tubes
	Harp	CH

Pedal Organ

32’	Contra Bourdon	32
16’	First Diapason	32
16’	Second Diapason	GT
16’	Violone	32
16’	First Bourdon	12
16’	Second Bourdon	SW
16’	Quintaten	GT
16’	Viole	SW
16’	Dulciana	CH
10-2/3’	Quint	--
8’	Octave Diapason	12
8’	Octave Bourdon	12
8’	Octave Violone	12
8’	Soft Viole	SW
8’	Soft Flute	SW
8’	Octave Dulciana	CH
5-1/3’	Quint Octave	--
4’	Super Octave	12
4’	Super Octave Bourdon	12
2-2/3’	Twelfth	--
2’	Piccolo	12
32’	Contre Bombarde	32
16’	Trombone	12
16’	Contra Tromba	SW
16’	English Horn	CH
8’	Trombone	12
8’	Tromba	SW
4’	Clarion	12
	Orchestral Strings	
	Tympani	

Skinner, *The Composition*, 272-273; http://aeolian-skinner.110mb.com/ (accessed 31 January 2012).

The University of Chicago -- Rockefeller Memorial Chapel: Chicago, IL
E. M. Skinner Organ Co., 1928, Opus: 634

4 manuals / 117 stops / 110 ranks / 7,217 pipes

Chancel Organ

Great Organ

32’	Violone	PED
16’	Open Diapason	61
8’	1st Open Diapason	61
8’	2nd Open Diapason	61
8’	3rd Open Diapason	61
8’	Principal Flute	61
8’	Erzahler	73
8’	Chimney Flute	SW
8’	Orchestral Strings IV	CH
8’	Flute Celeste II	SW
4’	Octave	61
4’	Flute Harmonique	61
2-2/3’	Twelfth	61
2’	Fifteenth	61
V	Mixture	305
16’	Double Trumpet	61*
8’	Tromba	61*
4’	Clarion	61*
	* *high pressure, enclosed in Choir*	
	Chimes	SO

Swell Organ

16’	Bourdon	73
16’	Dulciana	73
8’	Open Diapason	73
8’	Claribel Flute	73
8’	Chimney Flute	73
8’	Gamba	73
8’	Voix Celeste II	146
8’	Flute Celeste II	134
8’	Echo Viole	73
8’	Echo Viole Celeste	73
8’	Orchestral Strings IV	CH
4’	Octave	73
4’	Flute Triangulaire	73
4’	Unda Maris II	146
2’	Flautino	61
V	Cornet *(1-8-12-15-17)*	305
V	Chorus Mixture	305
16’	Posaune	73
8’	French Trumpet	73
8’	Cornopean	73
8’	Oboe	73
8’	Vox Humana	73
4’	Clarion	73
	Tremolo	

Choir Organ

16’	Gamba	73
8’	Geigen Principal	73
8’	Gamba	73
8’	Concert Flute	73
8’	Orchestral Strings IV	244
8’	Kleine Erzahler II	134
4’	Flute Harmonique	73
4’	Gambette	73
2-2/3’	Nazard	61
2’	Piccolo	61
1-3/5’	Tierce	61
1-1/7’	Septieme	61
16’	Bassoon	73
8’	English Horn	73
8’	Clarinet	73
8’	Orchestral Oboe	73
8’	French Horn	SO
	Tremolo	
	Harp	
	Celesta	

Solo Organ

8’	Open Diapason	73
8’	Flauto Mirabilis	73
8’	Gamba	73
8’	Gamba Celeste	73
8’	Orchestral Strings IV	CH
16’	Heckelphone	73
8’	Tuba Mirabilis	73
8’	Tuba	73
	(smooth)	
8’	French Horn	73
8’	English Horn	73
8’	Heckelphone	73
8’	Corno di Bassetto	73
4’	Clarion	73
	Tremolo	
	Chimes	25 tubes

Pedal Organ

32’	Major Bass	32
32’	Violone	32
16’	Major Bass	12
16’	Contre Basse	32
16’	Bourdon	32
16’	Open Diapason	GT
16’	Gamba	CH
16’	Echo Lieblich	SW
16’	Dulciana	SW
8’	Octave	12
8’	Octave	GT
8’	Gedeckt	12
8’	Cello	24
8’	Still Gedeckt	SW
4’	Flute	12
IV	Mixture	128
32’	Bombarde	32
16’	Trombone	12
16’	Posaune	SW
16’	Bassoon	CH
8’	Tromba	12
8’	Posaune	SW
4’	Clarion	12
	Chimes	SO

Gallery Organ

Great Organ

8’	Diapason	61
8’	Gemshorn	61
8’	Melodia	61
4’	Octave	61
8’	Trumpet	61

Swell Organ

16’	Bourdon	73
8’	Open Diapason	73
8’	Rohrflote	73
8’	Salicional	73
8’	Voix Celeste	73
4’	Octave	73
4’	Flute Harmonique	73
III	Mixture *(15-19-22)*	183
8’	Cornopean	73
8’	Corno d’Amour	73
8’	Vox Humana	73
	Tremolo	

Pedal Organ

16’	Sub Bass	32
16’	Bourdon	32
16’	Echo Bourdon	SW
8’	Octave	12
8’	Flute	12

Skinner, *The Composition,* 249-252; http://aeolian-skinner.110mb.com/ (accessed 31 January 2012).

University of Michigan - Hill Auditorium: Ann Arbor, MI
E. M. Skinner Organ Co., 1927, Opus: 664

4 manuals / 122 stops / 114 ranks / 7,446 pipes

Great Organ

32’	Violone	PED
16’	Diapason	61
16’	Bourdon	61
8’	Diapason One	61
8’	Diapason Two	61
8’	Diapason Three	61
8’	String Organ VI	SO
8’	Stopped Flute	61
8’	Claribel Flute	61
8’	Erzahler	61
5-1/3’	Quint	61
4’	Octave	61
4’	Principal	61
4’	Flute	61
3-1/5’	Tenth	61
2-2/3’	Twelfth	61
2’	Fifteenth	61
IV	String Mixture	SO
IV	Harmonics	244
	(17-19-21-22)	
V	Mixture	305
	(15-19-22-26-29)	
16’	Trombone	61
8’	Orchestral Trumpet	61
8’	Tromba	61
4’	Clarion	61
	Celesta	
	Harp	
	Chimes	
8’	Piano	
4’	Piano	

Swell Organ

16’	Dulciana	73
16’	Bourdon	73
8’	Diapason	73
8’	String Organ VI	SO
8’	Viole d’Orchestre	73
8’	Voix Celeste	73
8’	Echo Dulcet	73
8’	Clarabella	73
8’	Rohrflote	73
8’	Flauto Dolce	73
8’	Flute Celeste	73
4’	Octave	73
4’	Flute Triangulaire	73
4’	Unda Maris II	134
2’	Flautino	61
IV	String Mixture	SO
V	Cornet	305
	(8-12-15-17)	
V	Mixture	305
	(15-19-22-26-29)	
16’	Posaune	73
8’	Tromba	73
8’	Cornopean	73
8’	Oboe	73
8’	Vox Humana	73
4’	Clarion	73
	Tremulant	

Hill Auditorium continued

Choir Organ

16’	Contra Gamba	73
8’	Diapason	73
8’	Concert Flute	73
8’	Gamba	12
8’	String Organ VI	SO
8’	Dulciana	73
8’	Dulcet II	134
4’	Gemshorn	73
4’	Flute	73
2-2/3’	Nasard	61
2’	Piccolo	61
1-3/5’	Tierce	61
1-1/7’	Septieme	61
IV	String Mixture	SO
16’	Heckelphone	SO
16’	Bassoon	73
8’	Heckelphone	SO
8’	French Horn	SO
8’	English Horn	73
8’	Harmonica	73
8’	Bassoon	12
8’	Clarinet	73
	Tremulant	
	Harp	
	Celesta	

Solo

8’	Stentorphone	73
8’	String Organ VI	366
8’	Flauto Mirabilis	73
8’	Gamba	73
8’	Gamba Celeste	73
4’	Octave	73
4’	Orchestral Flute	73
IV	String Mixture	244
	(8-10-12-15)	
16’	Contra Tuba	73
16’	Heckelphone	73
8’	Tuba Mirabilis	73
8’	Tuba	73
8’	Heckelphone	12
8’	Corno di Bassetto	73
8’	French Horn	73
8’	Orchestral Oboe	73
4’	Clarion	73
	Tremulant	
	Chimes	

Echo

8’	Gedeckt	61
8’	Muted Viole	61
8’	Unda Maris	61
8’	Vox Humana	61
	Tremulant	

Hill Auditorium continued

Pedal

32’	Diapason	32
32’	Violone	32
16’	Diapason	32
16’	Diapason	12
16’	Diapason	GT
16’	Violone	12
16’	Bourdon	32
16’	Gamba	CH
16’	Dulciana	SW
16’	Echo Lieblich	SW
10-2/3’	Quint	--
8’	Principal	12
8’	Octave	12
8’	Cello	12
8’	Gedeckt	12
8’	Stillgedeckt	SW
5-1/3’	Quint	--
4’	Flute	12
3-1/5’	Tierce	7
2-2/7’	Septieme	5
IV	Mixture	128
	(15-17-19-22)	
32’	Bombarde	32
16’	Ophicleide	12
16’	Posaune	SW
16’	Bassoon	CH
10-2/3’	Quint Trombone	GT
8’	Tromba	12
4’	Clarion	12
	Chimes	
	Bass Drum	
	Tympani	
16’	Piano	
8’	Piano	
	Pedal Divide	

Skinner, *The Composition,* 266-268; http://aeolian-skinner.110mb.com/ (accessed 31 January 2012).

Yale University - Woolsey Hall: New Haven, CT
E. M. Skinner Organ Co., 1928, Opus: 722

4 manuals/ 198 stops / 195 ranks / 12,573

Great Organ

32’	Violone	61
16’	Diapason	61
16’	Bourdon	61
8’	First Diapason	61
8’	Second Diapason	61
8’	Third Diapason	61
8’	Fourth Diapason	61
8’	Principal Flute	61
8’	Claribel Flute	61
8’	Doppelflote	61
8’	Gamba	61
8’	Erzahler	61
5-1/3’	Quint	61
4’	Principal	61
4’	Octave	61
4’	Waldflote	61
4’	Hohlpfeife	61
3-1/5’	Tierce	61
2-2/3’	Twelfth	61
2’	Fifteenth	61
V	Chorus Mixture	305
IV	Harmonics	244
VII	Cymbale	427
16’	Trombone	61
8’	Tromba	61
8’	Trumpet	61
4’	Octave Tromba	61
4’	Clarion	61
	Chimes	SO

Swell Organ

16’	Gamba	73
16’	Bourdon	73
8’	Diapason	73
8’	Geigen Diapason	73
8’	Gamba	73
8’	Voix Celeste II	146
8’	Salicional	73
8’	Aeoline	73
8’	Unda Maris	73
8’	Open Flute	73
8’	Flauto Traverso	73
8’	Gedeckt	73
8’	Quintadena	73
8’	Flute Celeste II	146
4’	Octave	73
4’	Violina	73
4’	Flute Triangulaire	73
4’	Unda Maris II	146
2-2/3’	Twelfth	61
2’	Flautino	61
V	Quint Mixture	305
V	Cornet	305
16’	Posaune	73
8’	Trumpet	73
8’	Cornopean	73
8’	Oboe	73
8’	Vox Humana	61
4’	Clarion	73
	Tremolo	
	Chimes	SO

Choir Organ

16’	Dulciana	73
8’	Violin Diapason	73
8’	Cello	73
8’	Flute Harmonique	73
8’	Gedeckt	73
8’	Dulciana	73
4’	Octave	73
4’	Viola	73
4’	Flauto Traverso	73
2’	Harmonic Piccolo	61
16’	Fagotto	73
8’	Corno d’Amore	73
8’	Clarinet	73
	Tremolo	

Solo Organ

16’	Diapason	73
16’	Viole	73
8’	Diapason II	146
8’	Gross Gamba	73
8’	Gamba Celeste	73
8’	Flauto Mirabilis	73
8’	Stopped Flute	73
4’	Octave	73
4’	Gambette	73
4’	Hohlpfeife	73
2-2/3’	Nazard	61
2’	Piccolo	61
V	Fourniture	305
16’	Ophicleide	73
8’	Tuba	73
8’	Orchestral Trombone	73
8’	Trumpet	73
8’	French Horn	73
8’	Heckelphone	73
5-1/3’	Quinte Tromba	73
4’	Tuba Clarion	73
	Tremolo	
	Chimes	
8’	Tuba Mirabilis	73*
8’	Trumpet Harmonique	73*

**(unenclosed)*

Orchestral

8’	Viole d’Orchestre	73
8’	First Viole Celeste	73
8’	Second Viole Celeste	73
8’	Muted Viole	73
8’	Muted Celeste	73
8’	Kleine Erzahler II	146
8’	Concert Flute	73
8’	Bois Celeste	73
4’	Orchestral Flute	73
4’	Flute a Cheminee	73
2-2/3’	Nazard	61
2’	Piccolo	61
1-3/5’	Tierce	61
1-1/3’	Larigot	61
1-1/7’	Septieme	61
V	Dulciana Mixture	305
16’	Bassoon	73
8’	French Horn	73
8’	English Horn	73
8’	Bassoon	12
8’	Orchestral Oboe	73
8’	Corno di Bassetto	73
	Tremolo	
	Harp	
	Celesta	61 bars
	Chimes	SO

String Ensemble

8’	Orchestral Strings 1	146
8’	Orchestral Strings 2	146
8’	Orchestral Strings 3	146
8’	Orchestral Strings 4	146
8’	Muted Strings 1	146
8’	Muted Strings 2	146
8’	Muted Strings 3	146
8’	Muted Strings 4	146
IV	Cornet des Violes	244
	Tremolo	

Woolsey Hall continued

Echo Organ

16’	Bourdon	73
8’	Diapason	73
8’	Cor de Nuit	73
8’	Viole d’Amour	73
8’	Dulciana	73
8’	Vox Angelica	73
4’	Fernflote	73
8’	Trumpet	73
8’	Oboe Horn	73
8’	Vox Humana	73
	Tremolo	
	Chimes	SO

Pedal

64’	Gravissima	
(resultant)		
32’	Diapason	12
32’	Violone	GT
32’	Contra Bourdon	12
16’	First Diapason	32
16’	Second Diapason	32
16’	Dulciana	32
16’	Violone	GT
16’	Bourdon	GT
16’	Gedeckt	SW
16’	Gamba	SW
8’	Octave	12
8’	Principal	12
8’	Salicional	GT
8’	Cello II	SO
8’	Flute Bass	GT
8’	Still Gedeckt	SW
4’	Super Octave	32
4’	Flute	32
VI	Harmonics	192
V	Mixture	160
32’	Bombarde	12
16’	Trombone	32
16’	Bass Tuba	SO
16’	Fagotto	CH
10-2/3’	Quint Trombone	GT
8’	Tromba	12
8’	Tuba	SO
4’	Clarion	SO

Echo Pedal

16’	Diapason	32
16’	Bourdon	EC
8’	Octave	12
8’	Flute	EC
	Chimes	SO

Skinner, *The* Composition, 269-271; http://aeolian-skinner.110mb.com/ (accessed 31 January 2012).

Cathedral Church of Our Lady, Queen of the Holy Rosary: Toledo, OH
E. M. Skinner Organ Co., 1930, Opus: 820

4 manuals / 75 stops / 76 ranks / 4,916 pipes

Great Organ: 6.5" wind

16'	Double Diapason	61
8'	First Diapason	61
8'	Second Diapason	61
8'	Third Diapason	61*
8'	Harmonic Flute	61
8'	Viola	61*
8'	Gedeckt	61*
8'	Erzahler	61
4'	Octave	61
4'	Flute	61*
2-2/3'	Twelfth	61
2'	Fifteenth	61
IV	Harmonics	244
IV	Chorus Mixture	244
16'	Trumpet	61
8'	Tromba	61
4'	Clarion	61
	** (enclosed in Choir)*	

Swell Organ: 6" wind

16'	Melodia	73
8'	Diapason	73*
8'	Rohrflote	73
8'	Salicional	73
8'	Voix Celeste	73
8'	Flute Celeste II	134
8'	Echo Gamba	73
4'	Octave	73*
4'	Flute Triangulaire	73
2'	Flautino	61*
V	Mixture	305*
16'	Waldhorn	73*
8'	Trumpet	73*
8'	Oboe d'Amore	73
8'	Vox Humana	73
4'	Clarion	73*
	Tremolo	
	Harp	CH
	Celesta	CH
	** (10" wind)*	

Choir Organ: 6" wind

16'	Gamba	73
8'	Diapason	73
8'	Concert Flute	73
8'	Gamba	73
8'	Kleine Erzahler	73
8'	Kleine Celeste	61 *(TC)*
4'	Gemshorn	73
4'	Flute	73
2-2/3'	Nazard	61
2'	Piccolo	61
III	Carillon	183
16'	Fagotto	73
8'	Flugel Horn	73
	(1933 Aeolian-Skinner replacing Orch. Oboe)	
8'	Clarinet	73
	Tremolo	
	Harp	
	Celesta	61 bars

Solo Organ: 10" wind

8'	Flauto Mirabilis	73
8'	Gamba	73
8'	Gamba Celeste	73
4'	Orchestral Flute	73
16'	Corno di Bassetto	73
	(6" wind)	
8'	Tuba Mirablis	73*
8'	French Horn	73*
	** (20" wind)*	
8'	Corno di Bassetto	73
8'	English Horn	73
	Tremolo	

Cathedral Church of Our Lady, Queen of the Holy Rosary continue

Pedal Organ: 6" wind

32'	Major Bass	32
16'	Diapason	12
16'	Metal Diapason	GT
16'	Bourdon	32
16'	Gamba	CH
16'	Melodia	SW
16'	Dulciana	32
8'	Octave	12
8'	Gedeckt	12
8'	Cello	12
8'	Still Gedeckt	SW
4'	Super Octave	12
IV	Mixture	128
	(5" wind)	
32'	Fagotto	12 (CH)*
16'	Trombone	32*
16'	Waldhorn	SW
16'	Fagotto	CH
8'	Tromba	12*
	** (15" wind)*	

Holden, 276; http://aeolian-skinner.110mb.com/ (accessed 31 January 2012).

The National Cathedral of SS. Peter & Paul: Washington, DC
Ernest M. Skinner & Son Organ Co., 1938, Opus: 510

4 manuals / 118 stops / 132 ranks / 8,215 pipes

Great Organ

16’	Diapason	61
8’	First Diapason	61
8’	Second Diapason	61
8’	Third Diapason	61
	Muted String Ensemble	
8’	Principal Flute	61
8’	Clarabella	61
8’	Viola	61
8’	Erzahler	61
5-1/3’	Quint	61
4’	Octave	61
4’	Principal	61
4’	Harmonic Flute	61
2-2/3’	Twelfth	61
2’	Fifteenth	61
IV	Harmonics	244
VII	Plein Jeu	427
III	Cymbale	183
16’	Posaune	61
8’	Tromba	61
8’	Trumpet	61
4’	Clarion	61

Swell Organ

16’	Bourdon	73
16’	Dulciana	73
8’	First Diapason	73
8’	Second Diapason	73
8’	Claribel Flute	73
8’	Gedackt	73
8’	Viol d’Orchestre	73
8’	Viol Celeste	73
8’	Salicional	73
8’	Voix Celeste	73
8’	Flauto Dolce	73
8’	Flute Celeste	61
	Muted String Ensemble	
8’	Aeoline	73
8’	Unda Maris	73
4’	Octave	73
4’	Harmonic Flute	61
4’	Gemshorn	73
4’	Violin	73
4’	Unda Maris II	122
2-2/3’	Twelfth	61
2’	Fifteenth	61
V	Cornet	305
V	Full Mixture	305
III	Carillon	183
16’	Posaune	73
8’	Trumpet	73
	(light wind)	
8’	Cornopean	73
8’	Flugel Horn	73
8’	Vox Humana	73
4’	Clarion	61
	Tremolo	

National Cathedral continued

Choir Organ

16’	Gemshorn	73
8’	Diapason	73
8’	Concert Flute	73
8’	Gemshorn	73
8’	Viol d’Orchestre	73
8’	Viol Celeste	73
8’	Kleiner Erzahler II	134
4’	Harmonic Flute	73
4’	Gemshorn	73
4’	Violin	73
2-2/3’	Nazard	61
2’	Piccolo	61
1-3/5’	Tierce	61
1-1/7’	Septieme	61
III	Carillon	183
16’	Orchestral Bassoon	61
8’	Trumpet *(small orchestral type)*	73
8’	Clarinet	61
8’	Orchestral Oboe	61
	Tremolo	
	Celesta	61
	Celesta Sub	61

Solo Organ

8’	Flauto Mirabilis	73
8’	Gamba	73
8’	Gamba Celeste	73
4’	Orchestral Flute	61
VII	Compensating Mixture	427
16’	Ophicleide	73
16’	Corno di Bassetto	12
8’	Tuba Mirabilis	73
8’	Trumpet	73
8’	French Horn	61
8’	Cor d’Amour	61
8’	English Horn	61
8’	Corno di Bassetto	61
4’	Clarion	73
	Tremolo	

Pedal Organ

32’	Diapason	12
32’	Violone	12
16’	Diapason	32
16’	Diapason *(metal)*	32
16’	Contra Bass	32
16’	Violone	32
16’	Bourdon	32
16’	Echo Lieblich	SW
16’	Gemshorn	CH
16’	Dulciana	SW
8’	Octave	12
8’	Principal *(metal)*	12
8’	Gedackt	12
8’	Still Gedeckt	SW
8’	Cello	12
8’	Gemshorn	CH
5-1/3’	Quinte	CH
4’	Super Octave	32
4’	Still Flute	32
4’	Still Gedeckt	SW
V	Mixture	160
IV	Harmonics	128
32’	Bombarde	12
32’	Fagotto	12
16’	Trombone	32
16’	Fagotto	32
8’	Tromba	12
8’	Fagotto	12
4’	Clarion	12
4’	Fagotto	12

Holden, 278-280; Skinner, *The Composition,* 245-248.

St. Luke's Episcopal Church: Evanston, IL
E.M. Skinner Organ Co., 1921, Opus 327

4 manuals / 65 ranks / 70 stops

Great Organ: unenclosed, 7-1/2" wind

16'	Diapason	73
8'	First Diapason	73
8'	Second Diapason	73
8'	Third Diapason	73
8'	Erzähler	73
4'	Octave	61
IV	Chorus Mixture	244
	(Enclosed in a separate box)	
8'	Claribel Flute	73
4'	Harmonic Flute	61
2-2/3'	Twelfth	61
2'	Fifteenth	61
III	Mlxture (A-9)	183
16'	Trombone	73
8'	Trumpet	73
4'	Clarion	61
	Chimes	SO

Swell Organ: enclosed, 7-1/2" wind

16'	Bourdon	73
8'	Diapason	73
8'	Salicional	73
8'	Voix Celeste	73
8'	Gedeckt	73
8'	Spitz Flute	73
8'	Flute Celeste	61 *(TC)*
8'	Aeoline	73
4'	Octave	61
4'	Traverse Flute	73
2'	F1autino	61
III	Mixture (C-14)	183
16'	Contra Posaune	73
8'	Cornopean	73
8'	Oboe	73
8'	Vox Humana	73
4'	Clarion	73
	Tremolo	
	Harp	CH
	Celesta	CH

Choir Organ: enclosed, 6" wind

8'	Diapason	73
8'	Dulcet II	146
8'	Melodia	73
8'	Kleine Erzähler II	134
4'	Flute d'Amour	61
2-2/3'	Twelfth	61
2'	Piccolo	61
1-1/3' *[sic]*	Tierce	61
8'	Clarinet	73
8'	Orchestral Oboe	73
	Tremolo	
	Harp	61 bars
8'	Fanfare Trumpet	61
	7-1/2' wind	

Solo Organ: enclosed, 10" wind

8'	Diapason	73
8'	Philomela	73
8'	Gross Gamba	73
8'	Gamba Celeste	73
8'	French Horn	73
8'	English Horn	73
4'	Tuba Clarion	61
	Tremolo	
	Chimes	25 tubes
8'	Tuba Mirablis	73
	20" wind	

Pedal Organ: 6" wind

32'	Diapason	*(ext. 1st)*
16'	First Diapason	68 *(wood)*
16'	Second Diapason	32 *(metal)*
16'	Violone	44
	(wood and metal)	
16'	Bourdon	56 *(wood)*
16'	Echo Rourdon	SW
8'	Octave	*(ext. 1st)*
8'	Cello	*(ext.)*
8'	Gedeckt	*(ext. Bd.)*
4'	Super Octave	*(ext. 1st)*
4'	Flute	*(ext. Bd.)*
32'	Bombarde	*(ext.)*
16'	Trombone	68
8'	Tromba	*(ext.)*
4'	Clarion	*(ext.)*

Richard Webster, "Ernest M. Skinner Opus 327; St. Luke's Episcopal Church, Evanston, Illinois," in *The Diapason* 95, no. 7 (July, 2000), 20.

Rockefeller Memorial Chapel – University of Chicago, Chicago, IL
E. M. Skinner Organ Co., 1928, Opus: 634 / Schantz Organ Co., 2008

4 manuals / 132 ranks / 100 stops

Great Organ
6" flues / 10" reed wind pressure

32'	Violone	PED
16'	Open Diapason	61
8'	First Open Diapason	61
8'	Second Open Diapason	61
8'	Third Open Diapason	61
8'	Principal Flute	61
8'	Lieblich Gedeckt	61
8'	Erzähler	61
8'	Orchestral Strings IV	CH
4'	Octave	61
4'	Principal	61
4'	Flute Harmonique	61
2-2/3'	Twelfth	61
2'	Fifteenth	61
V	Mixture (2')	305
VII	Cymbal (2')	427
16'	Double Trumpet	61
8'	Tromba	61
4'	Clarion	61
	Chimes	SO

Swell Organ
7-1/2" flues / 10" reed wind pressure

16'	Bourdon	73
16'	Dulciana	73
8'	Open Diapason	73
8'	Claribel Flute	73
8'	Chimney Flute	73
8'	Flute Celeste II	134
8'	Gamba	73
8	Voix Céleste II	146
8'	Echo Viol	73
8'	Echo Viol Celeste	73
8'	Orchestral Strings IV	CH
4'	Octave	73
4'	Gemshorn	73
4'	Flute Triangulaire	73
4'	Unda Maris II	146
2'	Flautino	61
V	Chorus Mixture (2')	305
V	Cornet	305
16'	Posaune	73
8'	Cornopean	73
8'	French Trumpet	73
8'	Oboe	73
4'	Clarion	73
8'	Vox Humana	73
	Tremolo	

Choir Organ

6" wind pressure

16'	Gamba	73
8'	Geigen Principal	73
8'	Orchestral Strings IV	292
8'	Kleine Erzähler II	134
4'	Geigen Octave	73
4'	Gambette	73
4'	Flute Harmonique	73
2-2/3'	Nazard	61
2'	Piccolo	61
1-3/5'	Tierce	61
1-1/7'	Septième	61
16'	Bassoon	73
8'	English Horn	73
8'	Clarinet	73
8'	Orchestral Oboe	73
	Tremolo	
	Harp	61 bars
	Celesta	
8'	Randel State Trumpet	GA

Solo Organ

10" flues / 15" Fr. Hn, Tuba wind pressure

8'	Open Diapason	73
8'	Flauto Mirabilis	73
8'	Gamba	73
8'	Gamba Celeste	73
8'	Orchestral Strings IV	CH
16'	Heckelphone	73
8'	French Horn	73
8'	Corno de Bassetto	73
8'	Tuba	73
8'	Tuba Mirabilis	73
	25" wind pressure	
4'	Clarion	73
16'	Bassoon	CH
8'	English Horn	CH
8'	Orchestral Oboe	CH
	Tremolo	
	Chimes	25 tubes
	Zimbelstern	5 bells
8'	Randel State Trumpet	GA

Pedal Organ

6" & 8" flues / 15" & 20" Bomb. wind pressure

64'	Gravissima	*resultant*
32'	Major Bass	56
32'	Violone	56
16'	Major Bass	ext.
16'	Diapason	56
16'	Open Diapason	GT
16'	Violone	ext.
16'	Bourdon	56
16'	Echo Lieblich	SW
16'	Gamba	CH
16'	Dulciana	SW
8'	Major Bass	ext.
8'	Octave	ext.
8'	Gedeckt	ext.
8'	Still Gedeckt	SW
8'	Cello	ext.
4'	Super Octave	ext.
4'	Flute	ext.
IV	Mixture (2-2/3')	128
32'	Bombarde	68
16'	Trombone	ext.
16'	Posaune	SW
16'	Bassoon	CH
8'	Tromba	ext.
8'	Posaune	SW
4'	Clarion	ext.
8'	Randel State Trumpet	GA

Gallery Great

6" wind pressure

8'	Open Diapason	61
8'	Melodia	61
8'	Gedeckt	61 *
8'	Gemshorn	61
8'	Gemshorn Celeste	61
4'	Octave	61
4'	Rohrflöte	61 *
2'	Fifteenth	61
IV	Mixture (1-1/3')	244
8'	Trumpet	61
	** 3-1/2" wind pressure*	

Gallery Swell

6" wind pressure

16'	Echo Bourdon	85
8'	Open Diapason	73
8'	Rohrflöte	ext.
8'	Salicional	73
8'	Voix Céleste	73
4'	Octave	73
4'	Flute Harmonique	73
2-2/3'	Sesquialtera II	122
2'	Flageolet	61
III	Mixture (2')	183
16'	Flügel Horn	12
8'	Cornopean	73
8'	Corno d'Amore	73
	Tremolo	
	Gallery Zimbelstern	5 bells
8'	Randel State Trumpet	61

22-1/2" wind pressure

Gallery Pedal

6" wind pressure

32'	Resultant	--
16'	Diapason	56
16'	Bourdon	56
16'	Echo Bourdon	GA SW
8'	Octave	ext.
8'	Bourdon	ext.
8'	Rohrflöte	SW
4'	Super Octave	ext.
4'	Bourdon	ext.
16'	Double Trumpet (ext. GT)	12
16'	Flügel Horn	GA SW
4'	Flügel Horn	GA SW

Jeff Dexter, "Cover Feature: Skinner Organ Company, Boston, Massechusetts, Schantz Organ Company, Orrville, Ohio, University of Chicago Rockefeller Memorial Chapel, Chicago, Illinois," in *The American Organist* 42, no. 10 (October, 2009), 57.

APPENDIX C

MECHANICAL AND TONAL DEVELOPMENTS AND TECHNICAL DISCOVERIES OF ERNEST M. SKINNER

Appendix from *The Composition of the Organ*

THE CLOSED CIRCUIT STOP ACTION which made possible the CRESCENDO PEDAL, patented about the year 1898. This consists of a master contact sequentially completing circuits actuating stops.

THE SFORZANDO (electric), which closes register circuits simultaneously.

AN ORGAN MAGNET having an armature valve with a fixed movement which cannot be maladjusted.

CONSOLE IMPROVEMENTS. The first American builder to employ the concave, radiating 32 note pedal-board on every instrument he built.

ELECTRO-PNEUMATIC COUPLER SWITCH in which the multiple switch wire assembly is an integral part of the pneumatic controlling it.

THE PITMAN WIND CHEST, having the perfect Casavant system of supplying the pipes by pneumatic valves, which they so graciously gave to me. To this the pitman stop action was applied, replacing the ventil. Now used on both sides of the Atlantic.

THE DUPLEX WIND CHEST, having two separate actions for two manuals, both in control of certain stops, thereby making them available singly or in any combination on either manual, without the use of couplers.

BASS CHESTS, operated by a pneumatic impulse tubed from the associated manual chest, upon which are placed the large pipes of manual stops, thereby providing perfect speaking room for them and acting to steady the wind for the treble pipes.

CONE VALVES for reservoirs which function suitably at any pressure.

A TUBULAR ACTION so responsive that it will operate through 40 feet of 1/8-inch tubing at 3 inch pressure.

THE WHIFFLETREE SWELL ENGINE which provides a perfect response to the movement of the foot at whatever speed, which no mechanical action can equal.

NEW FORMS OF PEDAL CHESTS.

NEW PRESSURE REDUCING VALVES having no springs.

A NEW FORM OF SWELL LOUVERS providing equal distribution of motion and effect and having frictionless bearings.

A PNEUMATIC SWELL PEDAL ACTION with a floating lever which acts upon a "hunting" principle.

THE DOUBLE PRIMARY KEY ACTION PNEUMATIC employed to operate the large key action motors which are necessary with mechanical action.

AN ADJUSTABLE COMBINATION MECHANISM which supplants remote control and makes possible a smaller console than can be used with remote control.

AN AUTOMATIC PLAYER MECHANISM operating two manuals of 61 notes each and a pedal of 32 notes, with perforated music rolls 10-11 8 inches wide having a 120 note compass and which acts at the same time to draw the stops and actuate the swells.

THE "ORCHESTRATOR". A mechanical player operated by music rolls, of 120 note compass, which plays in the orchestral idiom: that is, every note in chords are different tonal voices. Every duct in the tracker board of this instrument has four different functions.

AN ACCENTING PIANO PLAYER, later called the "Themodist".

LOCATION OF THE WIND STREAM. This writer was the first to discover the true position of the wind stream of a speaking pipe. … This discovery disclosed the fact that sharpening the upper lip of metal flue pipes (a universal practice) was detrimental to their tonal character, especially so in respect to strings. This resulted eventually in a new pipe structure and treatment, with improvement in both speech and tone.

THE CLINIC ORGAN, for use in hospitals. It is portable and supported on casters. The 42 note keyboard weighs less than ten pounds and is connected to the organ by 20 feet of flexible cable, thereby permitting a patient to play it while in a recumbent position. Its two ranks of pipes are a Kleiner Erzähler.

TONAL DEVELOPMENTS

ERZAHLER
KLEINER ERZÄHLER
DULCET
GROSS GAMBA
GAMBA CELESTE
FLAUTO MIRABILIS
4' TAPERED VIOLINA
4' UNDA MARIS (2 ranks)
FLAUTO DOLCE
and FLUTE CELESTE
16' PEDAL GEMSHORN

ORCHESTRAL OBOE
ENGLISH HORN
FRENCHHORN
16' CORNO Dl BASSETTO
ORCHESTRAL BASSOON
HECKELPHONE
COR D'AMOUR (Flugel Horn)
32' PEDAL VIOLONE
16' PEDAL MAJOR BASS
32' PEDAL FAGOTTO
32' PEDAL BOMBARDE

A NEW METAL 8' FLUTE for the Choir Organ.

A 4' HARMONIC FLUTE of radically new scale, treatment and character of tone: a real flute.

A NEW 8' DIAPASON of 48 scale with a 4' Principal of 60 scale, to form a most suitable combination for choir accompaniment.

PEDAL MIXTURES of new composition, one of which has recently been installed in the organ at St. Thomas Church, New York City.

MANUAL MIXTURES of new composition. About thirty-four in number.

A NEW CLARINET of warmer and more authentic character.

A FRENCH TUBA, being a reed of great power and brilliance.

A NEW FORM OF LANGUET which improves the speech and power of large wood pipes.

Ernest M. Skinner and Richmond H. Skinner, *The Composition of the Organ*, 311-313

APPENDIX D

GLOSSARY AND ORGAN BUILDING TECHNOLOGIES

GLOSSARY

The following section is provided for the reader who may not be familiar with organ terminology.

Stop Nomenclature

STOP: the control used by the organist to engage or silence a set of organ pipes.

Most organ stop controls are labeled with two components, the name of the stop which refers the timbre, and an Arabic numeral that refers to the pitch level of the stop. This numeral corresponds with the approximate length, measured in feet, necessary for an open metal pipe to produce the lowest pitch of the manual or pedal compass. An 8' pitch designation corresponds with the pitches produced by the piano. Generally, 8' is considered the unison pitch level for manual divisions while the pedal department unison is pitched an octave lower, 16'. The following chart illustrates the relationship of the various unison pitch designations:

32'	Two octaves below unison	(Pedal, one octave below unison)
16'	One octave below unison	(Pedal, unison)
8'	Unison	(Pedal, one octave above unison)
4'	One octave above unison	(Pedal, two octaves above unison)
2'	Two octaves above unison	(Pedal, three octaves above unison
1'	Three octaves above unison	(Pedal, four octaves above unison)

MUTATIONS: non octave-sounding stops. Their pitches correspond with those of the harmonic series. The pitch designation is usually some form of mixed number or fraction, but occasionally, other whole numbers are used. Mutations for the 8' series include:

2-2/3' - G, one octave plus a perfect fifth above unison, third harmonic (3')
1-3/5' - E, two octaves plus a major third above unison, fifth harmonic
1-1/3' - G, two octaves plus a perfect fifth above unison, sixth harmonic
1-1/7' - B-flat, two octaves plus a minor seventh above unison, seventh harmonic

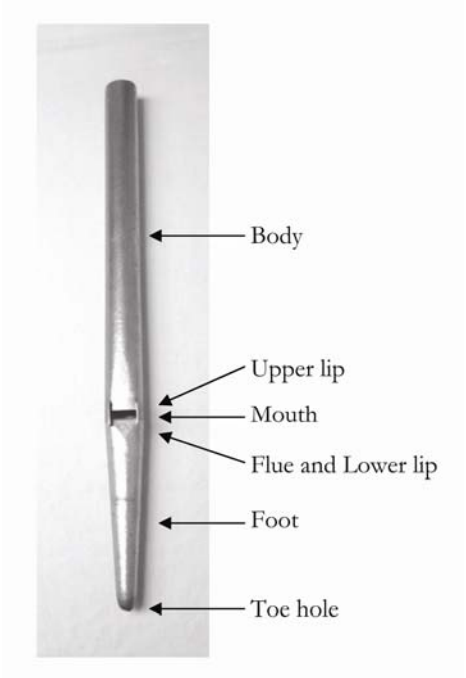
RANK: a single set of pipes; usually a series that produce all the pitches for the manual or pedal compass, one pipe for each note.

COMPOUND and MIXTURE stops: multiple ranks of pipes that are controlled by a single stop control. A Roman numeral indicates the number of ranks controlled by the stop. An Arabic numeral is occasionally added and indicates the pitch level of the lowest rank.

UNIFICATION or UNIT SYSTEM: the use of a single rank of pipes for multiple stop controls at multiple pitch levels and/or on multiple divisions. The terms EXTENSION, BORROWED, and AUGMENTED refer to unification.

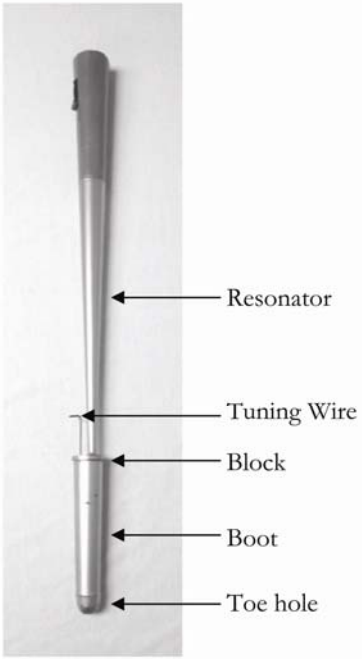
Organ Pipe Forms

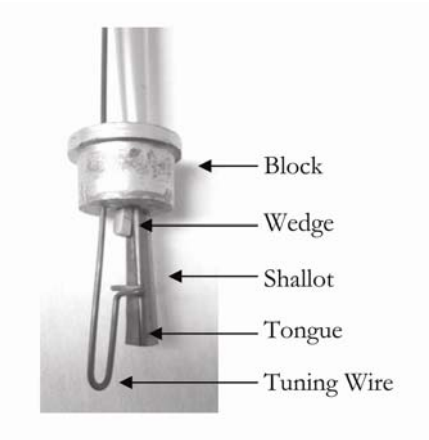
FLUE or LABIAL pipes: the more common of two primary organ pipe forms. A flue pipe is constructed in two sections, the ***foot*** and the ***body***, which are separated by the ***languid***, an internal, cross-section piece. The languid is positioned within the pipe to create the ***flue***, a narrow, slit-like opening. The opening at the juncture of the foot and body is the ***mouth***, with an ***upper lip*** and a ***lower lip***, the lower lip of the mouth is a component of the flue. Wind is blown into the pipe through the ***toe***



hole at the base of the foot which is admitted into the body of the pipe through the flue and directed toward the upper lip. This process causes the vibration of the air column within the pipe that produces the tone heard. The sound production process of flue pipes is similar to the flute or the recorder.

REED or LINGUAL pipes: a secondary organ pipe form. A reed pipe is constructed in two sections, the ***boot*** and the ***resonator***. At the juncture of the boot and the resonator is the ***block***. Inside the boot is the block assembly which includes the ***shallot***, which has a small opening, and the ***tongue***, or ***reed***, which is made of a small, thin piece of brass. Wind is blown into the pipe through the toe hole at the base of the boot which causes the tongue to vibrate against the opening of the shallot. The vibrations of the tongue are amplified by the resonator. The sound production of reed pipes is similar to the clarinet.





Timbre classifications:

PRINCIPAL or DIAPASON stops are constructed with open, cylindrical metal flue pipes to create a timbre unique to the organ. The characteristics of principal tone are a full-bodied fundamental and harmonic development that tappers gradually and evenly.

FLUTE stops are constructed with either metal or wood flue pipes in a variety of forms; open, stopped, half-covered, conical, and harmonic or double-length. The characteristics of flute tone are a well-developed fundamental and diminished upper-harmonics. Some forms replicate the tone of the orchestral instrument.

STRING stops are constructed with open, narrow-scaled cylindrical metal flue pipes. The characteristics of string tone include the production of less fundamental tone and the development of upper harmonics. The thinner, brighter timbres of these stops suggest the tone of bowed stringed instruments.

REED stops are constructed with reed or lingual pipes in a variety of forms. There are many sub-categories of reed stops: chorus, orchestral, solo, and *Regals* or *Schnarrwerk,* constructed with short-length resonators.

Other Terms

CÉLESTE: a rank of pipes tuned slightly sharp or flat and combined with a rank tuned at pitch to create undulations or pitch beats.

CHORUS: the combination of stops with similar timbre, principal, flute, reed, etc. usually created with stops at different pitch levels. Examples include: *Diapason 8'*, *Principal 4'*, *Twelfth 2-2/3'*, *Fifteenth 2'*, *Mixture IV* (a Principal

chorus); *Gedeckt 8'*, *Flute 4'*, *Piccolo 2'* (a Flute chorus); or *Contra Trumpet 16'*, *Trumpet 8'*, *Clarion 4'* (a Reed chorus).

CUT-UP: the distance between the upper and lower lips of a flue pipe's mouth.

FOUNDATIONS: flue stops sounding at 8' pitch on the manuals; occasionally stops at 16' and 4'pitches are also included. The term is also applied to stops of Principal or Diapason timbre.

SCALE: the diameter or width of the pipe in relation to its length. Pipe scale affects timbre and harmonic development; wider scales favor the fundamental pitch and produce a darker timbre while narrow scales develop the over-tones and produce a brighter timbre.

SUB-COUPLER: a mechanical devise that sounds the selected stops one octave lower than their indicated pitch designation.

SUPER-COUPLER: a mechanical devise that sounds the selected stops one octave higher than their indicated pitch designation.

TREMOLO or TREMULANT: a mechanical devise that creates fluctuations in the wind pressure to produce a vibrato effect.

UPPER-WORK: flue stops pitched higher than 4' pitch on the manuals; 2', 1' pitches, mutations, and mixture stops.

The information collected in this glossary is culled from the following sources:

Roger E. Davis, *The Organists' Manual: Technical Studies and Selected Compositions for the Organ* (New York, NY: WW Norton, 1985), 185-201.

Stevens Irwin, *Dictionary of Pipe Organ Stops,* Rev. ed. (New York: G. Schirmer, 1965), 10-29.

George H. Ritchie and George B. Stauffer, *Organ Technique, Modern and Early* (New York, NY: Oxford University Press, 2000), 372-377.

Illustrations were created by the author.

The concept of the symphonic organ could only be realized after a number of important technological developments were applied to organ building. The following sections are provided as an overview as to how these technologies developed and their importance to the creation of romantic organs.

Organ Winding

Skinner stated that "the foundation [of modern organ building] is in its unlimited wind supply: any quantity at any pressure."[388] A large symphonic organ depends on it being equipped with a sufficient amount of wind; the greater proportion of foundational stops demand greater amounts of wind. Late-eighteenth century English organ builders, among them Samuel Green (1740-1796), increased the effectiveness of their winding systems using the horizontal-rise reservoir with double folds and inverted ribs. This became "the standard winding system for organs" for the next century,[389] consisting of feeder bellows and wind reservoirs with inverted folds to stabilize the wind.[390] The improved winding system gave builders the ability to create organs that produced greater volume and quality of tone. Steady and continuous wind also helped maintain correct intonation and pitch of the organ.[391]

The Englishman John Abbey (1785-1859) introduced the new wind system to the French in Paris.[392] The French organ builder Aristide Cavaillé-Coll immediately recognized the advantages of the improved design and made modifications to the bellows that included reservoirs constructed with mechanisms that stabilized the

[388] Skinner, 11.
[389] Bicknell, 186-187.
[390] Douglass, *Musicians,* 6.
[391] Douglass, *Musicians,* 18-19.
[392] Ibid., 6.

wind pressure and provided multiple wind pressures.[393] Constant wind pressure is essential for the tonal success of the reeds, "pipes constructed with metal tongues that, when blown, beat against openings in the shallot to create vibrations of air that are reinforced by the pipe's resonator."[394] Reed stops were a common feature of French organs throughout the eighteenth century. Cavaillé-Coll increased their wind pressures, particularly in the upper registers, and devised a winding system where each stop would receive the type of pressure best suited to it.[395]

In central and eastern Europe, box bellows and cylindrical bellows were applied to organs during the nineteenth century. These bellow systems consisted of a "wooden box falling slowly within a secondary larger, but tight-fitting, open-topped box, from which wind was thereby expelled."[396] While the mechanics differed, the systems were devised to provide constant and increased wind pressures.

By the end of nineteenth century, winding systems were powered by gas, hydraulic, and electric motors that further ensured regular and ample wind supply. Builders continued to improve the conventional bellows and reservoirs, including the addition of coiled springs to regulate wind pressures.[397] "By the end of the [nineteenth] century, it was found that wind could be supplied directly to the reservoir by electric motors incorporating a rotating fan, and most organs old and

[393] Douglass, *Musicians,* 3, 18-19.
[394] Ibid.*,* 3.
[395] Ibid.*,* 20.
[396] Williams, *New History*, 90, 164.
[397] Sumner, 227; Williams, 164; Holden, 32-33.

new are now fed with wind by this method."[398] Skinner summarized that "with the advent of electricity, we have unlimited, rock steady wind."[399]

Key Action

With the ability to build an organ provided with a seemingly unlimited amount of wind, builders were free to pursue the creation of significantly larger instruments. They faced a new challenge, however. Such large organs, with higher wind pressures, and the growing desire to couple multiple manuals together for maximum sound production, were not comfortable to play without mechanical assistance. The increased size of the instruments and the higher pressures created a heavy key action.[400] "Progress in the romantic movement hinged upon the invention of a successful assist for the manual key action."[401] Organ builders experimented with pneumatic levers in England beginning as early as 1827 to reduce key resistance. Early attempts to lighten the touch of the keyboards include efforts made by Joseph Booth of Wakesfield, who used pneumatic 'puffs' to open pallets in the windchest, and David Hamilton in 1835 who used an early form of the pneumatic lever.[402]

The invention of a pneumatic machine by Englishman Charles Spackman Barker (1806-79), patented in 1839, launched the widespread use of pneumatic devices by organ builders. The Barker lever, named after its inventor, was designed and applied to the organ to lighten the manual key action.[403] The lever operated via a small bellows mechanism attached to each pull-down of the pallet. The mechanism helped

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[398] Williams, *New History,* 164.
[399] Skinner, 11.
[400] Williams, *New History,* 167; Douglass, *Musicians,* 22-23.
[401] Douglass, *French Romantic Tradition*, 144.
[402] Bicknell, 239.
[403] Douglass, *Musicians,* 17.

to overcome the stiffness of the key action due to the increased pallet size and coupled manuals of the romantic organ.[404] Technological advancements were highly valued by a population living in the thrall of the Industrial Revolution. The pneumatic device was seen as a scientific marvel, releasing the organ from its primitive restraints.[405] An early form of the Barker lever was offered to English organ builders, including William Hill, who received the device with little enthusiasm, likely due to imperfections that made the device faulty and impractical.[406] In 1837, Barker approached Cavaillé-Coll, who saw the Barker lever as a solution to his key resistance problems and eagerly adopted the concept, developing it into a practical version that he applied to most of his large organs, the organ built for the Abbey of St. Denis in 1841 the first application of the device.[407]

Walcker built organs with a new type of sliderless wind chest, the *Kegellade*, or cone chest, which he perfected and patented in 1842. The *Kegellade* is a ventil-type chest designed with each pipe having its own, cone-shaped pallet. The advantages of cone chests were that they required less exact workmanship and were less susceptible to mechanical faults and pipes robbing wind from each other.[408] Both Cavaillé-Coll and Willis rejected the Walcker cone chest.[409]

English organ builders applied technological developments to create light and responsive actions.[410] Willis developed his own pneumatic system, inspired by

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[404] Douglass, *Musicians,* 23; Sumner, 226.
[405] Douglass, *Musicians,* 30.
[406] Bicknell, 240-241.
[407] Ibid., 240-241.
[408] Anderson, 254-255.
[409] Williams, *New History,* 163.
[410] Wills, 117.

Cavaillé-Coll's successful use of the Barker lever in his French instruments.[411] "Willis's achievements as an engineer were outstanding: his application of pneumatic action in its various forms to the design of organ actions … revolutionized the art of organ-building."[412] He applied various pneumatic technologies to key action, including the Barker lever.[413] His large organ built for the Great Exhibition of 1851 held in Crystal Palace in Hyde Park, London, was built using pneumatic levers.[414] Prosper-Antoine Moitessier is credited with inventing tubular pneumatic action in 1845. Willis developed an improved version of this for which he sought a patent in 1868.[415] Tubular pneumatic action uses wind via tubes between the keyboard and wind chests to operate the pneumatic motors that open the pallets in the organ's wind chest. Walcker later adapted tubular pneumatic action to his cone chests by 1889.[416]

Builders were intrigued with the idea of harnessing the power of electricity and exploring electric actions. "As early as the 1850s [Cavaillé-Coll] was aware that experiments with the use of electricity could be pointing toward a more radical change for the future."[417] Early European experiments were initiated by Albert Peschard and Charles Barker in 1861.[418] In the United States, John Standbridge and Hilborne Roosevelt built organs with electric action beginning in 1868. Often, these

[411] Thistlethwaite, 416.
[412] Ibid., 414.
[413] Bicknell, 245.
[414] Norman, 86.
[415] Bicknell, 268.
[416] Williams, *New History,* 167.
[417] Douglass, *French Romantic Tradition,* 143.
[418] Ochse, 208.

early versions of electric action operated under battery power and were unreliable.[419] Robert Hope-Jones, an electrical engineer, developed an electrical system and fashioned his own electro-pneumatic mechanisms to control the organ.[420] Among the improvements Hope-Jones contributed to electric action was the use of round wire contacts that replaced flat spring contacts.[421]

The first major contribution to American organ building by E. M. Skinner was his development of the pitman wind chest action, an electro-pneumatic type, in 1898.[422] The name "pitman" is a wordplay that describes the mechanism of the wind chest, "a man-in-the-pit, so to speak, to let the air into the pipe on signal from the organist playing the keys."[423] The pitman electro-pneumatic chest used magnets to open the valves admitting wind to the system. This chest was developed by Skinner while working with Hutchings to refine electric action and improve the mechanical equipment of the organ.[424] He also developed a duplex pitman chest that permitted the borrowing of registers and increased the flexibility of small organs.[425] Skinner's perfected electro-pneumatic action permitted light, responsive key action and the flexible placement of organ pipes and console, and made possible the realization of large, symphonic organs.

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[419] Ochse, 208.
[420] Ibid, 334.
[421] Holden, 32.
[422] Ibid., 19.
[423] Whitney, 11.
[424] Holden, 17.
[425] Ibid., 27.

Registration Controls

Organ builders also provided the organist with mechanical controls to change stops and couple manual and pedal divisions. Cavaillé-Coll developed pedal levers for coupling manuals that relieved the player of moving the keyboards as was the case in the earlier "shove coupler" designs.[426] The device was further applied by him, along with the use of Barker pneumatic levers, so that all manuals could be coupled and played together.[427] The English builders William Hill and Henry Willis introduced Super-Octave and Sub-Octave couplers.[428]

Cavaillé-Coll divided the wind chests and applied a ventil system so the organist could silence portions of the organ without having to operate the stop controls. His systematic arrangement of the tonal resources of each manual and pedal division into foundations, *jeux de fonds*, and reeds with upper work, *jeux d'anches*, enabled the French organist to create dramatic tonal effects with ease. A system of ventil pedals controlled the wind into the *anches* side of the chest so that prepared reed stops could be instantly brought into operation or silenced.[429] Cavaillé-Coll's larger organs were equipped with pneumatic motors that moved the chest sliders and a ventil system of stop control that enabled the organist to prepare stop selections in a flexible manner.[430]

Other devices were developed to assist the performer's control of the instrument. The German *Rollschweller*, a revolving drum operated by the organist's foot, gradually

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[426] Douglass, *Musicians,* 9.
[427] Ibid.*,* 16-17.
[428] Norman, 94.
[429] Sumner, 226.
[430] Douglass, *French Romantic Tradition,* 145; Sumner, 225.

added or subtracted stops to create seamless crescendos and diminuendos.[431] Willis patented a similar crescendo pedal devise that activated the pneumatic stop motors and produced similar effects.[432] Willis's use of pneumatic motors to operate the stop action that moved the chest sliders and stop controls led him to devise combination thumb pistons that were placed under the keys.[433] Following on from this, Skinner was able to create adjustable combination thumb and toe pistons and to develop a crescendo pedal using electric contracts. He also invented an electric *sforzando* device and simplified the organ's coupling action.[434]

The Swell Box

The ability of the organist to create graduated variances in dynamics without changing stops or altering the timbre is a characteristic of symphonic organ. During the eighteenth and nineteenth centuries, organ builders developed an enclosure for a portion of the instrument with an adjustable opening operated by the organist, the swell box. This devise expanded the organ's dynamic range and flexibility of control.[435] The first swell boxes can be traced to Faustinho Carvalho, who built organs in Spain and Portugal that had pipes enclosed in a box with an adjustable opening; a particular example is the instrument built for the Seville Cathedral, Spain, in 1703. The English organ-builder Abraham Jordan imported the concept and first used it in the organ built for the church of St. Magnus the Martyr, London Bridge, in

[431] Ritchie and Staufer, 291.
[432] Williams, *New History,* 176.
[433] Sumner, 226; Bicknell, 245.
[434] Holden, 17.
[435] Wills, 118.

1712. Though at first swell boxes were rather crude devises, the idea caught on and echo divisions were converted to swell divisions throughout England.[436]

The swell box was perfected in England.[437] John Abbey introduced the application of swell shutters to the French in 1833.[438] Cavaillé-Coll was among the first French organ builders to regularly install an enclosed expressive division with swell shutters.[439] His *récit expressif* developed as a combination of the classical *echo* and *récit* divisions, which was enclosed and equipped with Venetian swell shutters.[440] The German *Schwellwerk*, a somewhat later addition, was a less impressive division as compared to instruments built in England and France, and was resisted by traditional organists in Germany.[441]

The use of a balanced swell pedal and pneumatic motors to move swell shades made the swell box convenient for the organist.[442] Late nineteenth and early twentieth century organs were built with multiple swell boxes, particularly in English and American instruments, enclosing the Swell, Choir and Solo divisions; in some cases even the Great and Pedal divisions were enclosed.

The German System

The development of the symphonic organ during the nineteenth century necessitated complete manual compasses as found in German organ building practices, notably the instruments of Walcker.[443] In the "German system," manuals

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[436] Norman, 76-77.
[437] Bicknell, 259.
[438] Williams, *European Organ,* 198, 201.
[439] Douglass, *Musicians,* 3.
[440] Ibid.*,* 16, 158.
[441] Fidom, 58.
[442] Bicknell, 277; Douglass, *French Romantic Tradition*, 145.
[443] Williams, *European Organ,* 201.

had the same compass starting at 16' or 8' C with an independent chorus structure; a fully independent pedal provided the bass, starting at 16' C.[444] Cavaillé-Coll introduced the German system to France with his organ at St-Denis in 1841.[445] He expanded the compass of the *Récit* to 54 notes to match the *Grand-orgue*, enabling its use for solo lines or in combination with the *Grand-orgue*.[446] He also adopted the German-style pedalboard that allowed for legato pedal playing and provided the division with the tonal resources to function as the bass for the instrument.[447] By the mid-nineteenth century, English organ builders ceased using the long compass manual that started with GGG (a fourth below CC, or 8' C), incorporating the German system that provided English organs with consistency of manual and pedal compass.[448] Pedal organs, previously absent or permanently coupled to the manuals, were provided with independent registers.[449] Willis modified the German pedalboard, pioneering the concave, radiating pedalboard.[450] Early American organs were built with varying manual and pedal compasses, but by the mid- to late-nineteeth century, American builders applied the German system.[451] Skinner adopted the Willis-style pedalboard.[452]

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[444] Edward J. Hopkins and Edward F. Rimbault, *The Organ: Its History and Construction*. Third Ed. (London: Robert Cocks, 1877), 216.
[445] Bicknell, 241.
[446] Douglass, *Musicians,* 25.
[447] Ibid.*,* 16.
[448] Bicknell, 232, 239.
[449] Ibid., 232.
[450] Bicknell, 277.
[451] Ochse.
[452] Holden, 27.

Nineteenth-century builders considered the organ's mechanism to be a vital part of its sound production.[453] "The organ progressed as a piece of engineering and it became easy to control."[454] The Skinner organ console was designed for the convenience of the organist, with standard positioning of keyboards, the concave, radiating pedalboard, and mechanical devices such as expression pedals, pistons, and a visible, adjustable combination action that moved the draw-knobs.[455] Skinner explained the connection between the organ's tonal design and the mechanism:

> "the modern organ, with its magnificent power and wealth of orchestral color and perfection of mechanism, is made possible wholly through the disassociation of the touch and the wind pressure."[456]

Skinner felt that organ building reached a culminating point in the early twentieth century because of the following attributes: "unlimited, rock steady wind, the perfect key action, instantaneous stop control, responsive swell expression and, in the tone of the organ, a wealth of color and magnificence."[457] The sound of Skinner's American symphonic organ developed as a synthesis and continuation of European romantic organ building styles.

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[453] Douglass, *Musicians,* 58.
[454] Sumner, 227.
[455] Holden, 46.
[456] Ernest M. Skinner, *The Modern Organ*, (New York: H. W. Gray, 1917), 1.
[457] Skinner, *The Composition,* 11.