A Comparison of the German Baroque and the French Romantic Organ

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To fully appreciate the unique differences between these two magnificent types of organ, one must first have some understanding of what an organ consists of and how it works. Both of these are, of course, far too complex to be dealt with in full in a paper of this nature; the following brief description of an organ will serve as a foundation for a comparison of the German Baroque and the French Romantic organ.

The organ is a wind instrument played from a keyboard. In order to be capable of handling the bulk of legitimate organ music, an organ must have at least two manuals, or keyboards, and an additional keyboard, or more accurately pedalboard, which the player operates with his feet. (Although organs do exist which have only one keyboard or as many as seven keyboards). Each keyboard controls a number of sets or ranks of pipes of varying qualities and pitches. These ranks or "stops" may be used separately or together by drawing the appropriate stop knobs at the keyboards. When a stop is drawn, a constant supply of air at steady pressure supplied by the wind chest is forced under that rank of pipes. As a key is depressed, valves under the pipes open and allow the wind to pass into the pipe. This produces the sound.

Each manual keyboard has a range of five complete octaves, extending from C to c4. The pedalboard consists of two and one-

half octaves, from C to g'.[1]

Since the low C of an open pipe is approximately eight feet long, a stop of unison or normal pitch is usually indicated by the designation 8' (eight-foot). If the low C pipe is 16' long, the entire stop or rank will sound one octave lower than the 8' pitch. Similarly, stops indicated by the symbols 4', 2', 1' will sound one octave, two octaves, three octaves, respectively, above the unison pitch of the note played. There are also stops which correspond to off-unison partials (2 2/3', 1 3/5', 1 1/3'), and which sound 12, 17, and 19 scale notes above the unison pitch of the note played, respectively. These stops are known as mutations. Other stops, called mixtures, comprise both unison and off-unison partials.[2]

Organ pipes are divided into two classes: (a) flue (labial) pipes, in which the sound is produced by a vibrating column of air within the pipe; and (b) reed (lingual) pipes, in which the sound is produced by a stream of air causing a tongue (reed) to vibrate inside the pipe. Flue pipes are capable of producing three basic qualities of tone: principal, the basic organ tone which is peculiar to the organ; flute, which contains stopped, open, and half-opened ranks with rounder timbres than principals or strings; and string, which has a high harmonic development and

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1 Harold Gleason, Method of Organ Playing (New York: Meredith Corporation, 1962), p. 2.

2 Stevens Irwin, Dictionary of Pipe Organ Stops (New York: G. Schirmer, Inc., 1965), p. 128.

whose tones may vary from a smooth, broad quality to a thin, pungent one.[3] Reed pipes are capable of producing many different qualities of tone color. They are usually classified according to the length and type of their resonators--conical, cylindrical, and fractional (less than half of the normal pitch-length). Within these three groups are chorus reeds, solo reeds, and reeds suitable for both chorus and solo.[4]

Until the nineteenth century all action work in the organ was mechanical or tracker action, in other words, the connections between the keys and the pallets which admit air to the pipes were systems of levers. The connections between the stops and the sliders in the sound-board were systems of levers, trundles, etc., and the composition pedals, if any, for moving groups of stops, were connected by levers to the stop action which they moved. Towards the end of the eighteenth century and in the first half of the nineteenth, organs grew out of all proportion to the necessities of a musical instrument, and towards the end of this period high-pressure stops were introduced on a considerable scale. Thus, the fingers and feet of the organists of these large instruments were sorely tried and the need for some assistance was seen. Other organ actions which have been developed since the year 1830 are: (1) the pneumatic lever action, in which the trackers of the organ mechanism are still retained, but at some point in the system of

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3 Gleason, Method of Organ Playing, p. 3.

4 Ibid., p. 4.

mechanical action a pneumatic help in the form of a "motor" is introduced; (2) tubular-pneumatic action, in which the trackers and other mechanical devices are replaced by lengths of "compo" tubing and the work of pulling down the pallet is done by pneumatic motors associated with the wind-chest; and (3) various types of electro-pneumatic and direct electric action, which are operated by the use of an electric current.[5] But nothing has yet been discovered which gives the organist more control of the pipework of his instrument and allows a greater variety of subtle touches than a well-made tracker action in a small or moderate-sized, low-pressure organ such as those found in the Baroque period.[6]

The Baroque period opened in 1600 with the advent of opera. It was characterized by its fondness for the grandiose. The positive style of Baroque art was full of vigor, strong emotion, symbolism, and subtlety. It was an art combining imagination and elaborate detail with great emotional fervor. Since one of the most striking features of the Baroque was its extensive use of the grandiose, the pipe organ was assigned a prominent role in the performance of the music of this period.

The phrase "Bach's organs" might well be substituted for German Baroque organ. Johann Sebastian Bach was the musical giant of the Baroque period, especially of the German Baroque since he was himself born in central Germany in 1685. Therefore, since

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5 William Leslie Sumner, The Organ: Its Evolution, Principles of Construction and Use (London: MacDonald and Co., 1962), p. 332.

6 Edward J. Hopkins, The Organ: Its History and Construction (London: Robert Cocks and Co., 1877), p. 69.

Bach was the central figure of German Baroque music, the instruments upon which he played would be most representative of the German organs of this time.

The finest organ on which Bach ever played was the Schnitger instrument in the St. Jakobi Church, Hamburg.[7] (The specifications for this organ may be found in Table I). The most important organ-builders in Germany, and probably also in Europe, during the Baroque period were Arp Schnitger, the Silbermann brothers and Joachim Wagner. In view of the fact that Arp Schnitger is a more important and characteristic builder of the Baroque period than the Silbermanns and J. Wagner, it will be his organs which shall be used as being representative of the German Baroque organ. His school of organ-building is made more important by the fact that it was this type of instrument which Bach had in mind as an organ composer.[8] As may be observed from Table I, in a four-manual Schnitger organ the order of the manuals from the lowest is: Hauptwerk, Oberwerk, Rückpositiv, and Brustwerk. These terms refer to the placement of the pipes, Hauptwerk referring to those pipes placed at "head" level, Oberwerk referring to those pipes placed "over" the Hauptwerk, Rückpositiv referring to those pipes placed "behind" the performer, and Brustwerk referring to those pipes placed at "chest" level.

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7 Sumner, The Organ: Its Evolution, Principles of Construction and Use, p. 89.

8 C. F. Abdy, The Story of Organ Music (London: The Walter Scott Publishing Co., Ltd., 1905), p. 127.

Table I...Specifications of the Schnitger organ at St. Jakobi Church, Hamburg (1688@1692)[9]

HAUPTWERK

Prinzipal	16	Gedackt	8	Flachflöte	2
Quintatön	16	Oktav	4	Rauschpfeife	3 ranks
Oktav	8	Rohrflöte	4	Mixtur	6-8 ranks
Spitzflöte	8	Superoktave	2	Trompete	16

OBERWERK

Prinzipal	8	Nasat	3(2 2/3)	Zimbel	3 ranks
Holzflöte	8	Oktav	2	Trompete	8
Rohrflöte	8	Gemshorn	2	Vox humana	8
Oktave	4	Scharff	4-6 ranks	Trompete	4
Spitzflöte	4				

RÜCKPOSITIV

Prinzipal	8	Nasat	3(2 2/3)	Scharff	4-6 ranks
Gedackt	8	Oktave	2	Dulzian	16
Quintatön	8	Sifflöte	1½(1 1/3)	Bärpfeife	8
Oktave	4	Sesquialter	2 ranks	Schalmei	4

BRUSTWERK

Holzprinzipal	8	Sesquialter	2 ranks
Oktave	4	Scharff	4-6 ranks
Hohlflöte	4	Dulzian	8
Waldflöte	2	Trechterregal	8

PEDAL

Prinzipal	32	Rauschpfeife	3 ranks
Oktave	16	Posaune	32
Sub-bass	16	Posaune	16
Oktave	8	Dulzian	16
Oktave	4	Trompete	8
Nachthorn	2	Trompete	4
Mixtur	6-8 ranks	Kornett	2

Coupler: Oberwerk to Hauptwerk; Oberwerk tremulant.
Coupler: Brustwerk to Oberwerk.
The organ has been restored (1950) and is again in use.

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9 Poul-Gerhard Andersen, Organ Building and Design (New York: Oxford University Press, 1969), p. 240.

The Schnitger organs were more thoroughly German than those of the Silbermanns. Andre Silbermann had felt the Latin influence in his work in Alsace, and Wagner, the Berlin organ-builder with whom Bach had little or no contact, also showed the Latin influence.

Schnitger's organs were always provided generously with apparatus for raising the wind. He placed between 3 and 16 bellows on each of his organs, and these bellows measured from 6 ft. x 3 ft. to 10 ft. x 5 ft. The wind pressures varied between 3 inches and 3.6 inches. (Schnitger measured wind pressure in terms of the Grad, which is about .083 inches).

The naturals of the keys were covered with ebony or beech or strips of glazed pottery, and the sharps with ivory or bone. The length of a manual keyboard of forty-five notes was 26.5 inches, that of a "sharp" key 2.6 inches and a "natural" key 4.2 inches. The depth of touch of the different manuals varied between 3/4 inches and 1/3 inches and for the chief manual (Hauptwerk) was often so great as to be uncomfortable for modern methods of playing. The bottom C# key and sometimes D# and G# were omitted from Schnitger's manual keyboards, as they were not usually required when playing with the restricted keys dictated by mean-tone temperament. (In mean-tone temperament the major thirds are in tune, and the fifths are slightly narrow, and the differences between the major and minor seconds are smoothed out, which is the reason for the expression "mean-tone").[10] The pedal claviers

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10 Hopkins, The Organ: Its History and Construction, p. 172.

usually had twenty-six or twenty-seven keys and the lengths of the claviers varied from 43½ inches to 46 inches.

The majority of the Schnitger organs contain no wooden pipes. It is easier to make and voice metal pipes than those of wood, and the lead-tin alloy is better than glue-joined wood in the damp climate of the north German district. English tin of 95 percent purity was used for the show pipes; and for the principal-toned stops inside the instrument a lead-tin alloy was used. The flutes and cornets were made of a metal containing a large proportion of lead. Brass was often used for the tubes of the smaller reeds.[11]

The pitch of Schnitger's organs was about three-quarters of a tone higher than that at present (A=440). The organs were tuned to mean-tone temperament, and modulation into remote flat and sharp keys was impossible, but in a few major keys the effect of the pure thirds must have been very satisfactory.

Schnitger was as conscientious in building his pedal divisions as with his manual divisions; on his larger instruments he developed the flue tone from 32 ft. to a choice of mixtures, the reeds from 32 ft. to 2 ft. It is noteworthy that he knew how to make a 16-ft. manual stop playable on the pedals, but he rarely used the device. Everything had to be independent. He did not make the mistake of later times of multiplying unison tone at the expense of proper harmonic ranks. Schnitger knew a great deal about synthetic tone-building, and he almost certainly sensed that synthesis

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11 Sumner, The Organ: Its Evolution, Principles of Construction and Use, p. 86.

of tone from true harmonics has its limitations. Schnitger found that the rather insignificant buzzing tones of his baerfeifen (which is a smothered, very reedy, hollow, cavernous tone stop) gave a richness to his ensemble flue tone which no mixture or mutation scheme could achieve. The reeds of the Baroque organ had no climactic effect and their tones were absorbed by that of the full flue-work.[12]

The division of the stops into thin and wide groups (male and female stops; in which the stops of bright "open" tone, including small-scaled reeds and fifth-sounding mutations, were of the first or male class, whereas flutes, quintatons, and regals were of the second or female class because of their thick tone) which originated in the Renaissance continued in the Baroque. The thin group consisted of a bright-toned principal chorus with trompete and the whole was of moderate power. This was contrapuntal tone par excellence.[13] The 8-ft. rank was of quiet, bright tone and was not too loud to give an accompaniment to a solo played on the rückpositiv (choir manual). Third-ranks such as the tierce, which gives a reedy or growling quality to the tone, were excluded from the narrow group; they appeared in Germany after 1620. The following example from the Hauptwerk of Schnitger's organ at Norden, built in 1686, illustrates this grouping of stops:[14]

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12 Hopkins, The Organ: Its History and Construction, p. 243.

13 Sumner, The Organ: Its Evolution, Principles of Construction and Use, p. 90.

14 Ibid., p. 91.

GROUP I (Narrow Scale)		GROUP II (Wide Scale)	
Trompete	16	Quintadena	16
Principal	8	Rohrflöte	8
Oktav	4	Spitzflöte	4
Quinte	2 2/3	Nasat	2 2/3
Oktav	2	Gemshorn	2
Mixtur	8 ranks		

The organ of the seventeenth and eighteenth centuries was properly supplied with choruses of flue tone on 2, 3, or 4 manuals and on the pedals. Loudness was not sought by adding 8-ft. ranks together and finally by swamping everything with unison reeds. The sensation of loudness, when necessary, was produced by spreading the acoustic energy among ranks of different pitches. The 8-ft. diapason rank was not the norm of tone, but the open flue chorus was the chief tonal attribute of the instrument. Reeds were used for adding colour and brilliance.

After 1720 and in the later eighteenth century, rococo and romantic tendencies brought in a period outwardly rich, attractive and progressive, but inwardly sterile and soulless. The art of music had other attractions, and the mature Mozart, Haydn, and, later, Beethoven sought other media. Moreover, even the generation following Bach evolved new forms of expression and new techniques, and shelved his work and made his influence smaller than due such a great musical giant. It is true that the swell pedal was unknown to Bach (or was heard of as an English curiosity) and that all his organs had tracker action, but it must be pointed out that the "block dynamic" of the Baroque organ did not need the swell pedal,

which might be fatal to good contrapuntal playing, and that no electric or pneumatic action, however well made, can rival tracker action, applied to organs of moderate size working on low pressures, for allowing subtleties of touch and phrasing.[15]

The nineteenth century ushered in a new concept of music and musical style. Romanticism originated in the medieval spirit of troubadour poetry and song. To be "romantic" was to be original, modern, national, popular, down-to-earth, not abiding by the rules and regulations of religion or the prevailing social institutions.[16] Expressiveness is the essence of romantic music, and most of the great romantic composers dismissed the organ's laborious simulation of expression as being unworthy of their attention. Yet the few great organ works of Franz Liszt and César Franck show how fine a medium the romantic organ might have become under suitable direction.[17] And as Schnitger was most representative of the Baroque period in the area of building organs for the Baroque style, so Aristide Cavaillé-Coll was representative of the building of organs for the expression of the Romantic era, particularly of the French Romantic period.

Cavaillé-Coll first turned to the task of making the organ more expressive. At Lerida a swell-box was fitted to the echo organ. The organ-builder Abbey had applied compostion pedals to

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15 Sumner, The Organ: Its Evolution, Principles of Construction and Use, p. 96.

16 Don C. Walter, Men and Music in Western Culture (New York: Meredith Corporation, 1969), p. 111.

17 Anthony Baines, Musical Instruments Through the Ages (New York: Walker and Company, 1961), p. 63.

his organs, but the fixed combinations of stops which they controlled were not thought to be ideal by Cavaillé-Coll, who insisted that an organist should show his individuality, like a chef, by his mélanges.[18] The coupling of one manual to another had hitherto usually been performed by taking hold of two knobs, one at each end of the keyboard, and pulling the whole clavier forward. Cavaillé-Coll's father had almost found a practical and easy way of coupling manuals without moving the keyboards, but it was left to the son to devise the "pedale d'accouplement". By this means, stops prepared on one manual could be added to another without holding up the march of the music. In France, the grand orgue is supreme, but the other divisions of the instrument stand in such relation to it that it is not only worth while to add them successively for crescendos and tonal changes or to subtract them for diminuendos, but in Cavaillé-Coll's symphonic organs this is the normal procedure.[19]

Cavaillé-Coll used different wind pressures for flue and reed stops, and used increased pressures of wind to maintain the power and quality of the trebles of some of the ranks of pipes. His voicing of orchestral reeds and imitative string-toned stops reached a high degree of perfection. He divised and improved new types of flute stops. The metal flûte harmonique, with holes pierced halfway along the cylindrical pipe body, can be traced back to Praetorius

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18 Wallace Goodrich, The Organ in France (Boston: The Boston Music Company, 1917), p. 16.

19 Sumner, The Organ: Its Evolution, Principles of Construction and Use, p. 221.

(1619), but Cavaillé-Coll said that he was led to develop this tone by experimenting with pipes bored with holes at different distances along the bodies in order to make a musical scale with pipes of the same diameter and length.[20] Occasionally, in his large organs, ranks of mutation harmonics for building complex and effective tone colours were provided. The use of mutation ranks by organ builders until the time of the Revolution was for the production of non-imitative and characteristic organ tone, but Cavaillé-Coll used such ranks of pipes for the synthesis of orchestral colors. The full organ in a Cavaillé-Coll instrument was a rich blaze of reed tone of a free type, rendered brilliant by the eclat of mixture stops. There was a complete break here with the traditional organ in which the manual reeds would lend color and brightness to the flue tone but would not engulf it. Only the pedal reed would be all-powerful and then only in a number of cases. He adopted the compensated double-fold reservoirs first used by Cumming and introduced into France by John Abbey. By careful calculations, he was able to plan sufficient blowing equipment to produce wind for several pressures in ample quantity for the largest demands which could be made on his organs, even when they were used harmonically with all the couplers drawn.[21] One of the few real improvements to the organ since the year 1700 has been the perfection of means to secure sufficient wind at

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20 Sumner, The Organ: Its Evolution, Principles of Construction and Use, p. 223.

21 Goodrich, The Organ in France, p. 23.

constant pre-determined pressures. Before the time of Cumming's invention, fluctuations in wind pressure took place as the reservoirs emptied, and often showed a slight rise as the reservoir collapsed. When diagonal bellows fed directly into a wind trunk considerable skill on the part of the blowers must have been necessary, not only to keep up a continuous wind supply but also to maintain the speech of the pipes.[22]

Cavaillé-Coll extended the manual compasses to A and provided inter-manual and often sub- and super-octave couplers in addition to pedal to manual couplers for all the manuals. Often, he separated the chorus reeds and mixtures on a grand-choeur manual, which could be added to the 16-ft., 8-ft., and 4-ft. flue-work confined to a grand-organ manual. The plein jeu of the old great organs vanished. Batteries of 16, 8, and 4-ft. reeds were added to the grand organ, and the small récit was enlarged and made expressive by being placed in a swell-box.

He extended the compass of the hautbois by adding a bassoon, and changed the tone of the old organ hautbois to one of a more orchestral flavor. The cromorne, so useful for the playing of the music of the seventeenth and eighteenth century masters gave place to the clarinet; the voix humaine, an example of the old schnarrwerk and a useful timbre-creator, was transferred as a solo stop to the récit expressif. Undulating stops, formed by adding slightly mistuned ranks to those of quiet "string" or salcional tone, became

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22 Sumner, The Organ: Its Evolution, Principles of Construction and Use, p. 224.

popular on the récit expressif or positif divisions of the organ. All these things offered fearful temptations to those who approached the organ in a "symphonic-romantic" mood without reference to its musical tradition.

Cavaillé-Coll produced an open metal foundation stop which was unlike the English diapason in tone. It was called montre, because the traditional stops of that name appeared as the pipes in the organ case; and usually the 16-ft. montre in his organs provided the large, speaking show pipes, though the pipes of the stops of that name were not always visible in the organ case-work. He cut slots in the back of these pipes because, as he said, careless tuners would otherwise have pinched the pipes as a means of tuning them. The slots produced a hard quality of tone, which nevertheless blended well with the rest of the flue-work and with the reeds. The romantic-symphonic organ was more tractable and easy to manage than its predecessors.[23] He secured a large measure of standardization and uniformity in his organ-console arrangements. Composers could write their works with a knowledge of the instrument for which they were writing. They would have a good idea of the actual sounds which would be produced when they suggested certain schemes of registration with Cavaillé-Coll's organs in mind. In a four-manual Cavaillé-Coll organ, the order of the manuals from the lowest is: grand, positif, récit expressif, bombarde. The bombarde controlled loud reeds and insome cases

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23 Goodrich, The Organ in France, p. 45.

loud mixture stops. Later, following the Spanish custom, these reeds were placed horizontally with their open ends facing into the church.[24]

Over 600 organs built by Cavaillé-Coll have been listed. In Paris, those at Notre Dame, Saint-Sulpice, La Madeleine, Sainte-Clotilde, Saint-Vincent de Paul, La Trinité and Saint-François-Xavier retain the tonal qualities which he gave them; the changes made to them have been of the nature of restorations and small additions have not altered their chief characteristics.[25] (The registration for the organ at Sainte-Clotilde may be found in Table II. The registration has remained the same as it was when César Franck played it from 1859 to 1890).[26]

Table II...Specifications of the Cavaillé-Coll organ at Ste. Clotilde, Paris

GRAND ORGUE

Montre	16	Gambe	8	Plein jeu (5 ranks)	
Bourdon	16	Préstant	4	Bombarde	16
Montre	8	Octave	4	Trompette	8
Flûte harmonique	8	Quinte	2 2/3	Clairon	4
Bourdon	8	Doublette	2		

PÉDALE

Sub-bass	32	Octave	4	Trompette	8
Contrebasse	16	Bombarde	16	Clairon	4
Flûte	8	Basson	16		

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24 Goodrich, The Organ in France, p. 225.

25 Sumner, The Organ: Its Evolution, Principles of Construction and Use, p. 227.

26 Ibid., p. 411.

RÉCIT-EXPRESSIF

SWELL ORGAN

Viole de gambe	8	Flûte octaviante	4	Basson-hautbois	8
Flûte harmonique	8	Octavin	2	Voix humaine	8
Bourdon	8	Trompette	8	Clairon	4
Voix céleste	8				

POSITIF

Bourdon	16	Salicional	8	Doublette	2
Montre	8	Prestant	4	Trompette	8
Flûte harmonique	8	Flûte octaviante	4	Clairon	4
Bourdon	8	Quinte	2 2/3	Clarinette	8
Gambe	8				

Various devices were employed in different countries to aid the organist in controlling his stops. Cavaillé-Coll had a system of ventil pedals whereby stops could be prepared on a laye or sound-board and brought into operation when required. Sometimes one keyboard would control more than one sound-board. Even the pipes of the great organ (grand orgue) could be isolated from their own keys, leaving to sound only those of other coupled manuals. Further, a system was devised so that prepared stops would actuate the corresponding sliders (and cause the pipes to sound when the keys were pressed) only when wind was admitted to the drawstop machines by means of a pedal. The manual claviers were extended to 54 notes, then to 56, and finally to 60.[26]

Cavaillé-Coll never lost sight of the need for a second manual which should be comparable in its number of stops, though not in power, with the grand organ. He never starved the tonal resources of his grand organ to provide a large swell division, although in

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26 Sumner, The Organ: Its Evolution, Principles of Construction and Use, p. 225.

his later instruments the heavy reeds were playable from a separate clavier known as the bombarde.

The great merit of the Romantic organ was the facility which it gave to an easy performance. The introduction of the pneumatic lever, which was followed by various tubular-pneumatic actions, lightened the touch of the keys to that of a grand pianoforte. The energy of the organ wind was also used to move the sliders of the stops, and there were new devices for moving the stops in groups and for quickly altering the registration scheme. These improvements were not always unmixed blessings. Very often, long tubular actions produced a sluggish emission of sound and destroyed all proper attack. In this the pneumatic lever was superior, and a well-made action gave instant response. Facilities for stop-changing were not infrequently abused by organists, and good rhythm, phrasing, and architectural form in their music were sacrificed to restless tonal changes.[27]

The symphonic French organ was not ideal for playing the works of the Thuringian master, J. S. Bach.[28] But the new and beautiful voices, both of flue and reed stops, which were heard in the Romantic instrument added a richness to the music of the era which the Baroque organ could not fulfill. Each instrument met and fulfilled to the limits of its ability the requirements

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27 Sumner, The Organ: Its Evolution, Principles of Construction and Use, p. 227.

28 Baines, Musical Instruments Through the Ages, p. 63.

of the style of music of its period. One is not "better" than the other, for they are both masterpieces in their own right. It is this world's fortune that it is blessed with two such instruments---instruments built by men as talented and masterful as the musicians for whom they were built.

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EXEMPLARS OF THESE ORGANS IN U.S.?
WHERE? HOW IDEALLY DO THEY EXEMPLIFY?

Sec'y B Jacobs