

ENCYCLOPEDIA OF KEYBOARD INSTRUMENTS



The *Organ*

AN ENCYCLOPEDIA

EDITED BY  
DOUGLAS E. BUSH AND RICHARD KASSEL

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Douglas E. Bush, Editor

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## The Organ

instrument, replaced, dismantled, lost, or destroyed; if the organ still existed, any change in keyboards and stops; and the type of action employed. Sometimes an unusual aspect of the organ is mentioned.

Manuals, stops, and pedalboard are indicated as follows:

no. of manuals/no. of stops	[pedalboard present]
manuals/stops/pull-down	[pull-down pedals present]
manuals/stops/no pedal	

Examples taken from the book:

[Casparini] Görlitz, St. Peter and St. Paul, "Sonnenorgel" (1697–1703; case survives)

[Hutchings] Bellows Falls, Vermont, United Church, 1883 (2/15, mech.; rest. S.J. Russell, 1984)

[Reil] Joure, Gereformeerde Kerk De Oerdracht, 1997, 2/25 (repl. 1968 Reil [destr. by fire, 1994])

[Andreas Silbermann] Colmar, St. Matthieu (1732; 3/24; reb. Stiehr, 1861; rest. Dott, 1995–98, to 1861 state; now 3/38)

[Bernard Smith] Edam, Cathedral (1663; reb. Verhoufstad, 1716; 2/15/pull-down)

# Abbreviations

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<b>Abbreviation</b>	<b>Equivalent</b>
anon.	anonymous
b.	born
ca.	circa
chris.	christened/baptized
collab.	collaborated with
compl.	completed [by]
d.	died
destr.	destroyed
dism.	dismantled
ed.	edited, editor/s
electro-pneum.	electro-pneumatic [action]
enl.	enlarged [by]
fl.	flourished
incorp.	incorporated [by; into]
mech.	mechanical [action]
mech./electric	mechanical/electric [actions; both being employed in one instrument]
orig.	originally
pneum.	pneumatic [action]
reb.	rebuilt; renovated; altered
reconstr.	reconstructed
repl.	replaced [by]
rest.	restored [by]
tub.	tubular [action]
tub./pneum.	tubular/pneumatic [actions; both being employed in one instrument]

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# A

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## **ABBEY, JOHN (YORK) (1783–1859)**

English-born French organ builder. Born in Whilton, Northamptonshire, on 22 December 1783, Abbey apprenticed to James Davis. He subsequently entered into partnership with Hugh Russell (b. London, ca. 1731; d. 1825), who had previously worked with John ENGLAND. In London, he met Sébastien Erard; this led to an invitation to build an organ for the Louvre Industrial Exhibition (Paris, 1827; to Paris Conservatory by 1864). Abbey settled permanently in Paris, where he fulfilled royal commissions for the chapel of the Legion of Honor at St. Denis; the chapel of the Tuileries (1827–29; severely damaged during 1830 revolution); and the Opera (1831; destr. by fire, 1873). These instruments introduced France to FREE REEDS, the Cummings inverted-rib BELLOWS, Venetian SWELL, the Dulciana stop (originally brought to England by JOHN SNETZLER), and the hitch-down DRAWSTOP pedal. Abbey's small chancel organ at Paris, St.-Étienne-a-Mont (1829), initiated the French accompanimental *orgue du choer* tradition as a counterpart to the main west end instrument. Abbey subsequently built large gallery organs at Amiens Cathedral (1833), Tulle (1839 exhibition, first prize), Bayeux (1843), Viviers, and Châlons-sur-Marne (last two survive in orig. form). He built smaller gallery or chancel organs for Versailles Cathedral (1837) and the hospital chapel, Houdan, Neauphle-le-Château (1845), and, in Paris, chancel organs at St. Nicolas-des-Champs, St. Elisabeth, St. Thomas d'Aquin, and St. Médard. He also restored cathedral organs at Mende (1835–39), Rheims (1844), Evreux, Moulins, and Nevers, as well as St.-Étienne-

du-Mont, St. Philippe-du-Roule (1834), and Notre Dame de l'Assomption, all in Paris.

Abbey's organs were highly reputed for their overall excellence of craftsmanship, responsive action, and fine voicing. They featured composition pedals, string stops, adjustable action, and backfalls. His work effected a transition from French classical to Romantic, and his only competitor was Aristide Cavaillé-Coll (who won a contract for St. Denis's new organ over Abbey in 1833). Abbey exported instruments as far away as South America; he trained Joseph Casavant as well as his own sons John Albert Abbey (1843–1930) and Edwin Abbey (1840–1895), who continued their father's firm after his death in Versailles on 19 February 1859. Edwin's son John-Marie Abbey (1886–1931) was the last builder in the family, and the firm closed in 1935.

RICHARD KASSEL

## **ABBOTT AND SIEKER**

Formed in 1961 by Richard Laurence (Larry) Abbott and Uwe (Pete) Sieker, the firm of Abbott and Sieker continued in operation until 1994. Larry Abbott (b. Pomona, CA, 24 July 1925; d. Santa Monica, CA, 29 July 2001) graduated from Pomona College in organ and music theory; there he became interested in organ building. He worked for Pipe Organs Incorporated for over ten years. Pete Sieker (b. Hamburg, 23 June 1929) apprenticed with Paul Rother (1947–50) in Hamburg and later worked for RUDOLF VON BECKERATH in Hamburg and for KEMPER in Lübeck. He emigrated to the United States in 1957, working as a pipemaker for



Fig. 1. Abbott & Sieker organ, op. 34 (3/45), Trinity Methodist Church, Pomona, California.

AUSTIN ORGANS, INC. (Hartford, CT) until 1958, when he moved to Los Angeles and began working for Pipe Organs, Inc. (an offshoot of the KILGEN firm), where he met Abbott.

During the 1960s Abbott and Sieker employed about ten craftsmen; an economic slump in the 1970s slowed the number of contracts, however, and the company was forced to build on a smaller scale. During its existence, the firm built 115 pipe organs in Los Angeles and southern California. Although the firm never built tracker organs exclusively, it played an important role in the ORGAN REFORM MOVEMENT of the western United States. The tonal ideal was sympathetic to the aesthetic of the “American classic” organ, and the company strived to build instruments possessing a fine ensemble sound and having organ cases harmonious to their architectural environment. Employees who eventually started their own organ-building businesses include MANUEL J. ROSALES, GREG HARROLD, RICHARD L. BOND, MICHAEL L. BIGELOW, Renée Marceau, and Winfried Banzhaf (who returned to Germany).

PETE SIEKER

DOUGLAS E. BUSH

## Bibliography

Pape, Uwe. *The Tracker Organ Revival in America*. Berlin: Pape Verlag, 1977.

## ACCOUPLMENT

SEE COUPLER

## ACOUSTIC BASS

SEE RESULTANT/ACOUSTIC BASS/GRAVISSIMA

## ACOUSTICS

Every musical action can be considered as the production of a chain of energy. The way this energy travels through the several parts of a system determines the final result: the sound we hear. A very important phase in the process of making music on the organ is the instrument itself. Being an energy system of its own, the important moments of its acoustic chain of energy are: (1) the floating air in or through the pipe and the disturbances of the equilibrium of the air within; (2)

the oscillation of the air column within the pipe, and (3) the radiation of sound from the pipe to the surrounding air.

All of these moments are governed by general mathematical and physical rules, but their actual behavior is determined chiefly by the nature and use of the building materials. A full understanding of the acoustic functioning of the organ is therefore only complete when the two levels (theory and actual realization) are both considered.

## Introduction

The greater part of acoustic events has to do with periodic motions. A periodic motion consists of the repetition of a basic movement in equal intervals of time, such as the swinging of the pendulum of a clock. The time that is needed for such a single motion is called the periodic  $T$ , and is expressed in seconds. For the clock pendulum, this is the time to go from its perpendicular position (equilibrium) to the right, back to the equilibrium, to the left, and back to the perpendicular position. The number of times such a single motion (or cycle) takes place in one second is called the frequency

$$(f = 1/T)$$

and is expressed in hertz (Hz; 1Hz = one cycle per second).

We are also interested in the distance of the mass  $m$  from its equilibrium position. At every time  $t$ , this distance is called the displacement, or elongation  $y$  of the swinging mass. The maximum displacement is called the amplitude  $a$ , because the periodic motion takes place in two directions between  $-a$  and  $+a$ :

$$-a < y < +a$$

It is useful to represent periodic motion by a graph of displacement  $y$  versus time  $t$ . Some periodic motions have special characteristic. Of great importance in music is simple harmonic motion, which is characterized by the fact that the force that drives the mass to return to its equilibrium position is proportional to the displacement of this mass from its equilibrium. Simple harmonics can be represented by the projection of a point  $p$  traveling at constant speed around a circle; the projection is a sine wave.

When a pipe is blown, it produces a simple harmonic motion and longitudinal (compression) wave up and down its length. In longitudinal waves, the particles move in the same or opposite direction of that of the wave. A fine example of a longitudinal wave is given by the movement of a disturbed spring.

The pulses that are generated at the starting point are for the greater part reflected at the terminal point,

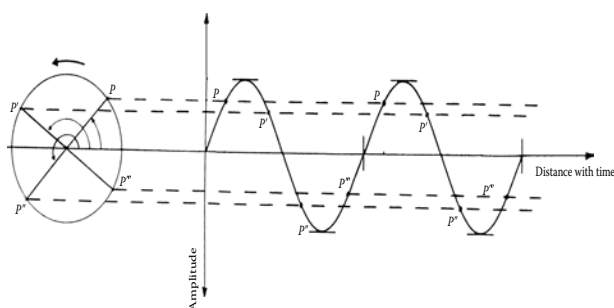


Fig. 2. The generation of a sine wave: the traveling of a point ( $p$ ) around the circle, projected on a system of coordinates.

and so they travel back in opposite direction. This reflection, as far as pipes are concerned, is a result from either the closure of the pipe or the sudden impedance mismatch when, at the edge, the air is no longer held back from spreading by the sides of the pipe. In general, impedance is the ratio between a force exerted on a system and the response of the system to that force. This has some important implications: if transfer of energy from one system (the air column) to another system (the pipe) is meant to be optimal, the impedances of both systems ought to match each other.

If pressure pulses are continually added to the oscillating air column, the wave becomes a complex system of initial and returning pulses at the same time. This might create a very chaotic situation, were it not that waves traveling in the same medium but in opposite directions can pass through each other. The principle of linear superposition determines the behavior of this passing: the pressure of the pulses with the same sense is added, and that of pulses with opposite sense is subtracted. This adding or subtracting is called constructive and destructive interference, respectively.

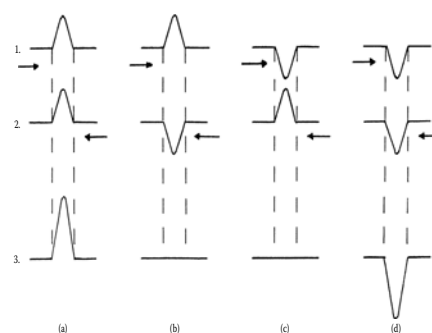


Fig. 3. The principle of construction and destructive interference: Waves traveling in opposite directions with opposite senses (1b + 2b and 1c + 2c) interfere destructively when passing through each other (3b and 3c). Waves traveling in opposite directions with equal senses (1a + 2a and 1d + 2d) interfere constructively when passing through each other (3a and 3d).

## Mode versus Node

The continuous pulsation of a string gives birth to yet another phenomenon. The interference of initial and reflected pulses will create the impression that the wave no longer moves. The result is a standing transverse wave, having “nodes” at points of destructive interference with resulting zero pressure, and “antinodes” at points of constructive interference with maximal pressure. The presence of “nodes” and “antinodes” allows the air column to oscillate in several ways, or modes. For instance, if we consider a node that is in the middle, it divides the air column in two halves, and the column will also oscillate as two halves together with its basic vibration. Typically, every node produces its own frequency; as an aggregate, these are called partials (overtones).

The series of partials is a harmonic series. When we consider the fundamental frequency to be a result of the first mode, then the subsequent oscillation modes will result in the frequencies of the octave, the twelfth, the fifteenth, the major seventeenth, and so on, above the fundamental frequency. The present and relative strength of partials is very important for the final tone quality.

The resulting frequency  $f$  depends on the speed  $v$  of the air, the length  $l$  of the air column, and on whether one or both ends of the pipe are closed. The frequency  $f_n$  of the  $n^{\text{th}}$  oscillation mode is given by the following:

$$[1] f_n = n (v \div 2l) \text{ (for open pipes), and}$$

$$[2] f_n = (2n-1) (v \div 4l) \text{ (for closed pipes).}$$

Relations [1] and [2] indicate that

[3] Open pipes have their fundamental frequency one octave above the fundamental frequency of a closed pipe of equal length, and the higher resonance modes are different for open or closed pipes.

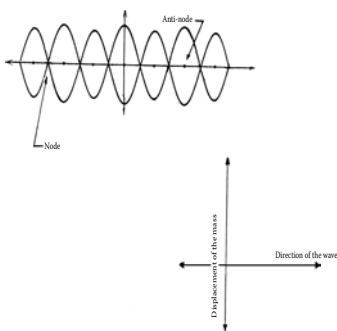


Fig. 4. Standing transverse wave, with nodes at points of destructive interference with zero displacement and anti-nodes at points of constructive interference with maximum displacement.

The relations [2] and [3] are in effect only when the diameter of the pipe is quite small compared to its length. Moreover, for very low notes, quite long pipes would be needed. To avoid this, pipes for lower notes are usually closed (stopped).

Stopped cylindrical (and square) pipes sound one octave lower, but lose their even partials and therefore have a different sound. Conical stopped and half-stopped cylindrical pipes descend a bit less than the one octave. Practical considerations therefore make builders use pipes with irregular dimensions and corrective techniques. The most common technique is end correction, a partial closure at the end of a pipe that produces its “effective” speaking length; this can be applied at both ends of open pipes or at the bottom end of closed pipes. Top correction for open pipes is done in order to have the antinode placed effectively at the end, but not beyond.

## Organ Pipes: Acoustic Properties and Sound Production

In an acoustic sense, there are two main criteria to divide organ pipe classes. The first criterion has to do with the shape of the pipe. Four classes can be distinguished: (1) cylindrical (circular or square cross section); (2) exponential; (3) logarithmic; and (4) conical. Only cylindrical or conical pipes have resonance frequencies that are multiples of the fundamental frequency (in other words, their partials are harmonics). Most organ pipes are cylindrical or conical. Of much more importance is the classification of organ pipes according to their source of oscillation. Four classes of pipes can be distinguished: FLUE (LABIAL) pipes, REED (LINGUAL) pipes, pipes with FREE REEDS, and DIAPHONE pipes (with valvular reeds). The oldest and most common are flue pipes and reed pipes.

### Flue or Labial Pipes

Flue pipes can be built of wood or metal. Wooden flue pipes are usually square, whereas metal flue pipes tend to be circular. The source of the sound is the flue (or slit), and it produces an edgetone.

When air flows around an object (or through a pipe), or when an object moves at some speed through a gas or fluid medium, some resistance is built up: fluid friction. Dependent on the speed, this fluid friction can have different realizations. The fluid pattern at low speed is regular and is described as laminar or streamline flow. Turbulent flow is the next step; characteristic of this pattern are small eddy currents behind the object. When the relative speed increases still further, the eddy currents become more prominent, and vortices (whirlpools) are created. They occur alternately on

both sides. The trail of vortices thus arising is known as the Karman trail.

In flue pipes, air is blown with considerable strength against the flue. The flue therefore functions as a kind of wedge with the splitting of the Karman trail as a result. Strong modifications in the vortices also arise. This splitting of the Karman trail entails periodic air pulses, the Karman trail being swept from one side to the edge of the other. From this moment on, the air column in the pipe starts to “feed back”; indeed, the sharp disturbance of the air around the mouth of the pipe and the air within the pipe becomes a coupled system. The regular “puffs” of the Karman trail initiate the building up of resonant oscillation modes of equal or comparable frequency. Some modes come into existence very quickly and force the pulse frequency at the mouth to come “into tune.” The frequencies at which the air column in the pipe responds are determined by the latter’s length and the surface of its cross section. In theory, a steady state results. The resulting frequency is even determined in part by the mouth itself: the frequency field of the “puffs” depends on the ratio of the speed of the air to the distance between the lower and upper lips of the pipe. Moreover, the flue itself tends to stabilize at certain frequencies. In theory, a flue pipe will resonate steadily at the fundamental frequency. However, substantial increase in air speed or force may force the pipe to “jump” to one of its higher resonances, a phenomenon called *OVERBLOWING* (see below). It is thus conceivable that flue pipes will vibrate in all of their oscillation modes.

The distance between the two lips (i.e., the height of the mouth opening) is not only important for the determination of pitch; the mouth’s dimensions also affect tone quality. The narrower the flue (the actual opening, or windway, through which air travels into the mouth), the softer the resulting sound. On the other hand, the ratio between the length and width of the pipe is important: the narrower the pipe, the richer the harmonic spectrum will be (due to the presence and strength of partials), and the more stringlike the sound will be. Though Backus and Hundley have stated that the pipe material itself is not very important for the sound quality, experiences of organbuilders and tuners tend to challenge this view.

### ***Reed or Lingual Pipes***

The main common feature between flue and reed pipes is their functioning as a coupled system. In both classes, the initial vibration is caused at the mouth (the slit for flue pipes, the reed tongue for reed pipes); the air column in the pipe starts to oscillate and gives feedback to the source of vibration (although the degree of feedback is less for reed pipes). Both classes produce edge tones as the air is set in motion.

In the reed pipe, the frequency is determined not only by the length of the air column but by the length, mass, and stiffness of the reed. Normally, the longer the tongue is, the lower the frequency. Complementarily, the ratio between tongue length and length of the air column is also important. However, the mass and especially the stiffness of the reed tongue determine to a great degree the tone quality, for the thinner the reed is, the richer the tone will be. This raises the issues of the different series of partials that prevail for vibrating strings and air columns on one hand, and for vibrating “rods” on the other hand. If a reed is very stiff, it may behave like a rod, and thus have the partial series: 1:3:5:7:9 . . . instead of 1:2:3:4. . . . The rod’s partials are fundamentally inharmonic; a reed constructed in this way will have poor tone.

An important feature in reed pipes is the presence of several modes of vibration in the reed itself. It is thus possible to have quite different sound qualities within the class of reed pipes. Indeed, when reed pipes are of full length, the pipe usually resonates to the fundamental frequency of the reed together with whatever partials present in the reed; a very rich tone results. If, on the contrary, the length of the pipe is diminished, it will only resonate to the higher partials of the reed; buzzing sounds of somewhat indefinite tone occur.

Compared to flue pipes, a full-length cylindrical reed pipe has more or less the same dimensions as a stopped flue pipe of the same pitch. Full-length conical reed pipes are a bit shorter than open flue pipes of the same pitch. For conical reeds, the length is more or less three-quarters of the pitch length for cylindrical pipes (e.g., 6’ or 7’ length for an 8’ Trumpet). Lingual pipes are also known as “beating” or “striking” reeds, to distinguish them from the next category.

### ***Pipes with Free Reeds***

Like its model the reed or lingual pipe, the free reed receives its oscillation from a vibrating reed. The length, mass, and stiffness of the reed are equally important in determining pitch and tone. The major difference is that, while the reed inside a lingual pipe beats against a shallot when it vibrates, a free reed comprises a close-fitting tongue that oscillates through a hole in an oblong plate of brass; it swings without striking, thus is “free.” The major advantage of free reeds is their tolerance of crescendos and diminuendos without pitch change; this “expressive” feature of free reeds accounts for their great success in the nineteenth century. The primary drawback is that the tone of a free reed is poor in quality by virtue of its vibrational freedom. The absence of a controlling shallot causes irregularity in the reed’s vibration, and not all important partials are firmly established.

## ACTION

### *Diaphones (Valvular Reeds)*

Acoustically speaking, the diaphone (patented by Robert HOPE-JONES, 1894) are unique. The source of oscillation is not a stream of steady air, but a regular succession of air puffs. When the keyboard is activated, air under pressure sets a vibrator in motion. A small disc is connected to the free end of the vibrator; as the vibrator moves, the disc admits regular puffs of air into a pipe. The length of the connecting piece between vibrator and disc determines the frequency of the air puffs and thus of the pitch. Valvular reed pipes have the same “expressive” qualities of free-reed pipes, with even louder dynamic possibilities. However, the diaphone was so distinctive that it could not blend with other classes of pipes or timbres; it was limited to theater organ use, more notable for “effect” than for inherent musical qualities.

### *Overblowing*

When a great amount of force is exerted on an oscillating air column in a pipe, the pipe may at some point “overblow.” Overblowing is simply the shifting of a fundamental oscillation mode to a higher mode; the overblown tone will therefore be one of the higher partials of the fundamental frequency. Some organ pipes are built precisely to create this overblowing result, with narrow scale and mouth. Open pipes normally overblow at the second partial (an octave above the fundamental) and have a length twice the pitch length. Stopped overblown pipes sound the third partial (a twelfth higher) and are three times as long. One typical overblown flute pipe, the Flûte Harmonique, is of double length and normal scale, and is pierced at the point where the node occurs (around the middle of the pipe) with one or two small holes. When overblowing is undesirable, especially in narrow-scaled string-toned pipes, builders add ears, beards, and other small metal devices around the mouth of the pipe to help direct the air.

PETER G. C. VAN POUCKE

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## ACTION

The technology by which the performer is able, by pressing a KEY, to activate a motion from the KEYBOARD through the WINDCHEST to a now-open PIPE, at which point the pipe sounds. This article is divided into the following sections:

Mechanical Actions

Pin Key Action

Suspended Key Action

Balanced Key Action

Floating Action

Pneumatic Actions

Tubular Action

Electro-pneumatic and Electric Actions

Austin Universal Windchest Action

All-Electric Action

## Mechanical Actions

A means of connecting the movement of the manual keys with the sound-producing elements of organ (windchest, pallet box, pipe) so that the organ could be played. As larger organs were built in the fifteenth century on, it was not longer possible to align each key with its corresponding pipes using a direct pin key action. The use of flexible strips (tracks), rigid rods (stickers), fulcrum-based parts (backfalls, squares), and the rollerboard allowed the “transmission” of the action from the depressed key to the opened pallet (all parts were made with wood, and no superior material has been discovered). SLIDERS that allowed a stop to open or close could be controlled from the console via a drawstop attached to a trundle and sticker device. Two mechanical (also called tracker) key actions developed in the Renaissance were the (earlier) suspended and (later) balanced systems; the so-called floating action was developed to compensate for atmospheric changes in both.

## Pin Key Action

This is the earliest form of mechanical action, in which a sticker, a rigid thin wooden (or metal) rod, transmits action from keyboard to windchest pallet. In the earliest approach (Renaissance and beyond), a pallet box was located below the keyboard; its pallet was held in place by a spring. Depressing a key caused a sticker

attached to the bottom of the key's front end to push down and open the appropriate chest pallet, allowing air to enter the upper chest (groove, or KEY CHANNEL) from the lower, air-collecting chest and from there to the RANK of pipes. Each key and pallet was directly connected with the associated pipe or pipes. This system was also found in portatives, positives, regals, and smaller house organs. As slider-chests came into being, room needed to be made for the sliders; the pin action was shifted so that the keys were below the pallet. The sticker was attached to the top of the key, which now functioned more like a lever; with the use of a backfall, the pallet was pulled instead of pushed down. In pedalboard actions, the sticker was attached under the back end of the key so that, when engaged, it moved a more extensive device to engage the pedal chest pallet. This somewhat less direct system was the basis for mechanical (tracker) key action, which made the building of larger organs (with wider keys) feasible, thanks to the development of the rollerboard and the use of trackers and squares (in addition to backfalls and stickers).

### Suspended Key Action

In suspended action, the key is supported by a fulcrum at the tail end; the tracker that pulls down the roller connects at approximately the midlength of the key. As with balanced action, the tracker pulls down the roller through a button, and the windchest end of the roller pulls down a tracker, which opens the chest pallet. Suspended action is based on pulling its components (i.e., there is no "transfer" or redirection of motion through change of direction) and is generally considered to have a lighter and more sensitive touch. But, unlike balanced action, the suspended key is a more secondary lever, held up by the pallet until depressed.

Suspended action retained its usefulness through the centuries, giving way to the pneumatic actions of the nineteenth century. With the later twentieth century's renewed interest in historic organs, the suspended action returned to favor among organists and organbuilders who sought to restore or re-create as many elements of the pre-pneumatic instrument as possible. However, balanced action was extensively used by U.S. and European builders in the nineteenth century, even as pneumatic WINDING of organs became the norm. A majority of builders of new tracker organs retain a neo-classical aesthetic, and suspended action remains their preference. But the growing neoromantic revival points to continuing efforts on behalf of balanced action, and other builders simply prefer it to suspended action.

### Balanced Key Action

In balanced action, a key is propped by a fulcrum somewhere at its midlength: pressing the front end down lifts up the tail end of the key. This lifts the front of a backfall, also resting on a fulcrum; the backfall's tail end descends, pulling down a tracker attached to the key's specific roller through a small projection (button). At the other (windchest) end of the roller, another tracker pulls down the pallet inside the chest, allowing air to flow through the foot of the pipe and sounding it. Because the tracker connects at the tail end of the key, the pallet holds the key up in a less direct way. The key becomes a more primary lever in balanced action, arguing in favor of a special sensitivity because of its more direct relationship between finger (key) and sound (pallet). The figure on the following page shows the parts involved in balanced key action.

This next figure shows in simple cross-section the difference between balanced and suspended key actions.

When the tracker began its twentieth-century revival, suspended and balanced actions were also revived. At first, balanced action was felt to be sluggish and heavy when compared to suspended action, and was mostly abandoned. Improved engineering has led to progress in building successful balanced actions; these allow the organbuilder to be more flexible in instrument design while retaining a sensitive key touch.

A significant advantage of balanced over suspended action is its use in detached consoles. The Baroque North German and Dutch organs focused on during the EUROPEAN ORGAN REFORM MOVEMENT were moderate in size, with limited development of 16' or 8' manual stops, smaller pipe scales, and shorter keyboard compasses. The organ was arranged in compact WERKPRINZIP cases, division atop division; straightforward suspended action was easily applicable. Present-day American Werkprinzip organs have more 16' and 8' manual stops, full compasses, and larger pipe scales. Such instruments often require larger cases that generally will not fit under the ceilings of nonvaulted American buildings. Unlike suspended action, balanced key action allows the console to be detached from the case, which promotes a close association between the organist, instrumentalists, and choirs.

In all mechanical actions, friction must be eliminated throughout the system wherever possible. Several elements contribute toward the best possible conditions: (1) appropriate leverage, the ratio between the depression of the key and the opening of the pallet; (2) a precise and noiseless "pluck point" (CHIFF) when the key is depressed, the air seal on the pallet is broken, and the pallet moves away from its seat of rest, allowing air to flow; (3) an overall quiet action with a minimum of "bushing" (felt and other materials) used

## ACTION

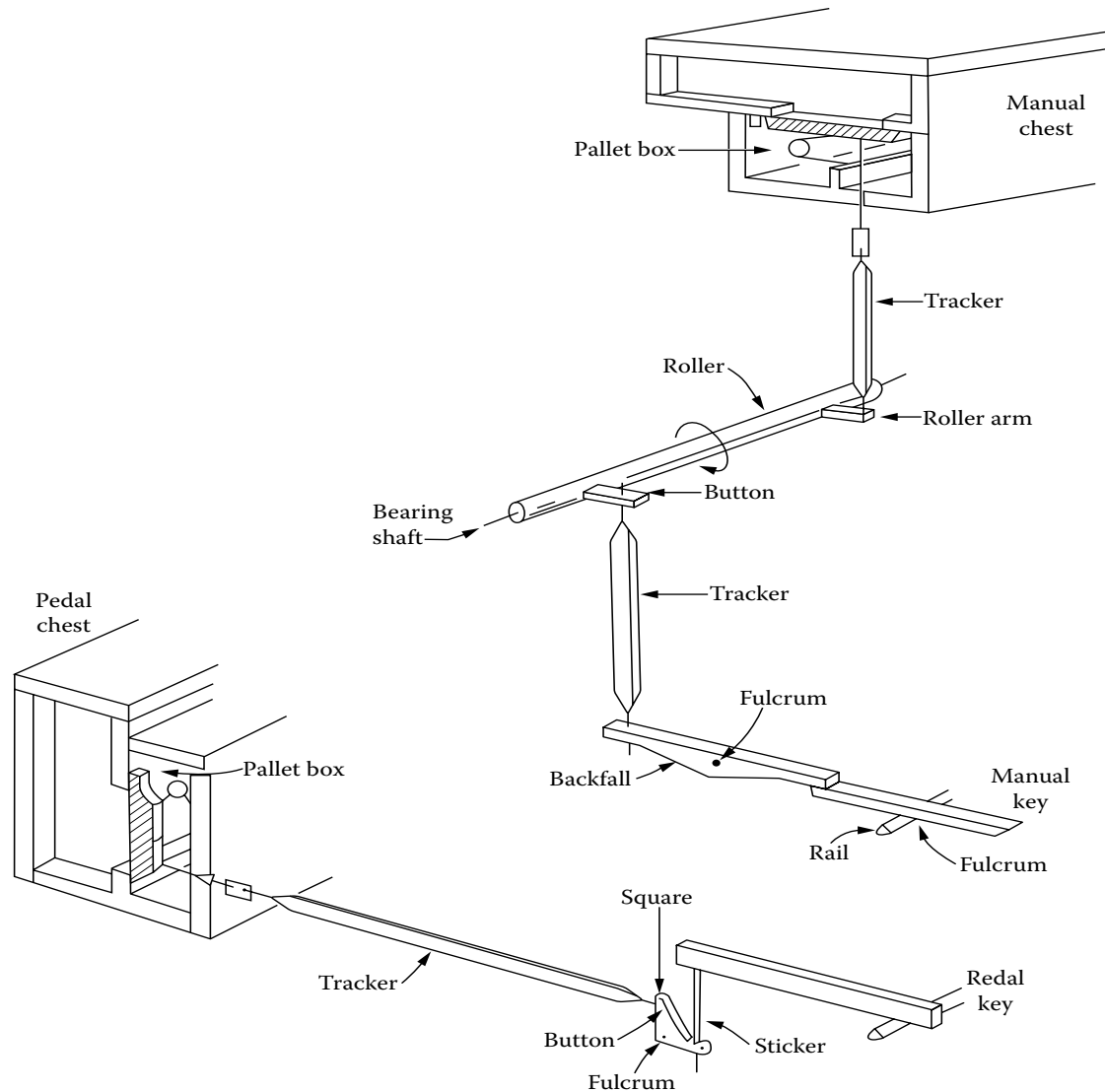


Fig. 5. Components of balanced key action.

to “smooth out” the action but highly vulnerable to climactic changes; (4) a well-balanced pallet able to deliver to the key channel; and (5) keeping horizontally suspended trackers well-supported (with tracker pendulums) without sagging (with tracker hangers) or slapping against each other (with comb guides).

Well-made trackers, squares, and rollers can help reduce inertia in the key action. To ease the playing of rapid music, the travel of the action can be reduced at the first action square after the keyboard; the whole action then moves a smaller distance. Then, at the last square or roller before the pallet, the motion is increased to equal the key movement again.

### Floating Action

The reduction of friction in tracker action organs is accomplished most significantly by floating action,

named for its ability to move up and down to compensate automatically for climactic changes that alter the relationship between keyboard and pallet. Also called self-regulating or self-adjusting actions, floating actions subtly overcome inertia to permit undisputed key-to-pallet movement while preventing excessive motion.

Each floating action is a wooden or metal beam with one action square per note on the manual keyboard attached to it. This beam is usually placed below the windchest at the point where the horizontal trackers coming from the console turn to go up to the chest. The actions of the squares are eventually communicated (backward) to an additional square rail. This is floated with a mineral oil-filled dashpot, which holds a piston within. The cylinder is attached to the square beam, while the piston is anchored to a

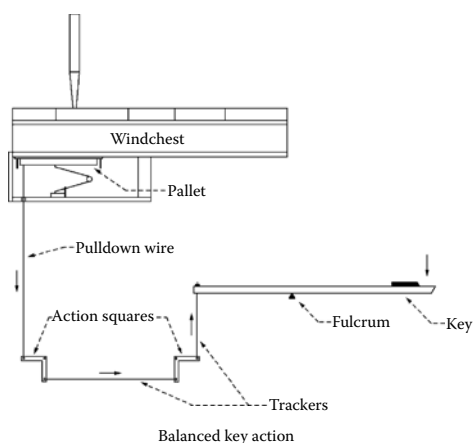
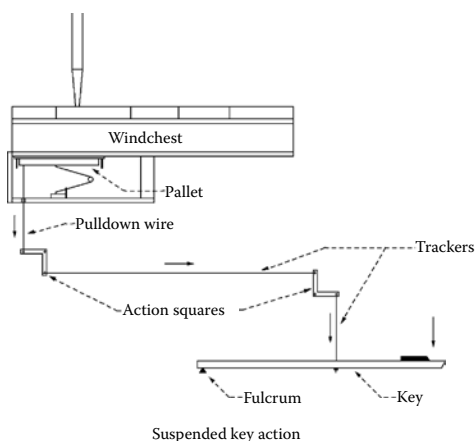


Fig. 6. Suspended and balanced key actions.

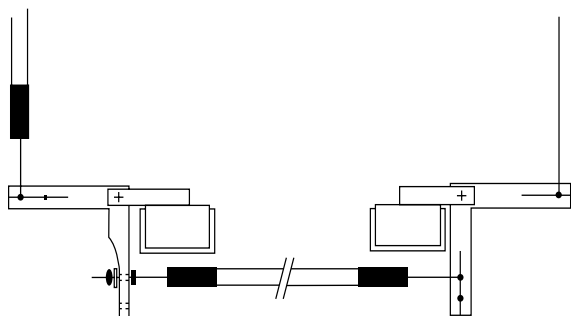


Fig. 7. Controlling keyboard inertia: Squares interact with movement of tracker.

point above, providing a damper effect to allow for gradual adjustment under a small amount of constant pressure while preventing sudden responses to musical extremes. The action then continues to the rollerboard and beyond. Floating action requires less maintenance and preserves the overall quality of the tracker action longer than more direct solutions. It represents a solution to a particularly modern “problem”: the effects of the American heated church, causing fluctuations in

temperature and humidity that never occurred in the unheated churches of Europe.

## Pneumatic Actions

The most ingenious development in nineteenth-century organ building was really an application of one of the organ’s oldest principles: the pneumatic (wind-driven) motor. As hand-blowers were sending compressed air into the windchest, reservoir, or feeder, builders realized that some of the air being taken in could be diverted. In effect, the pneumatic is a small bellows, made in different forms, to actuate various components within an organ. This would allow organs to increase in size dramatically by the end of the nineteenth century, especially as detached consoles were employed.

The ultimate goal of pneumatic devices was to lessen the weight necessary to depress a key and thus engage the sound-processing mechanism. The earliest such device was the relief pallet, a small pallet that opened first to break the air seal on the larger pallet, thus relieving the heavy pluck in large pallets and reducing the pressure required to open those pallets. This figure shows several types illustrated in George A. AUDSLEY’s *The Art of Organ-Building*:

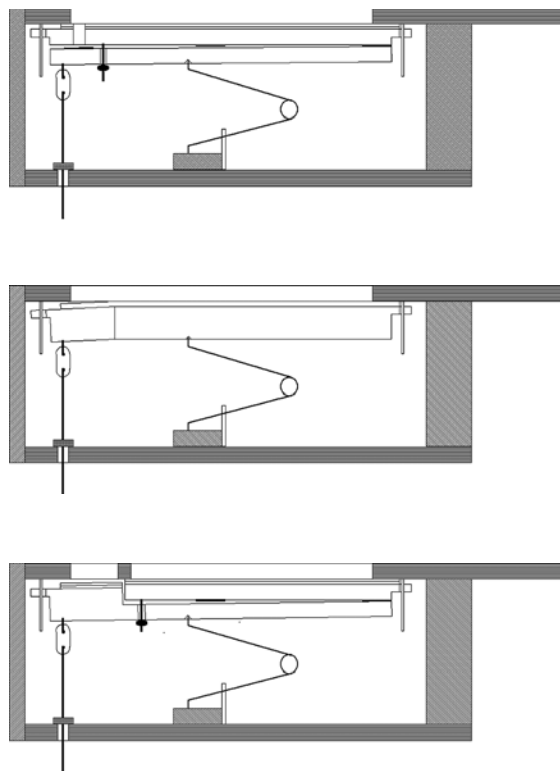


Fig. 8. Three early twentieth-century types of relief pallets.

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Such devices reduced the pluck, but added a “spongy” feeling to the action.

After further experimentation, BARKER LEVER action replaced the relief pallet. It allows the use of unimpeded finger action regardless of the number of pallets to be opened. The Barker lever was the first widely accepted organ “pneumatic motor.” Pressurized air from the main bellows moves into the lower half of a divided windchest, dedicated to a single key, with an escape valve. When that key for that chest is activated via a backfall, a “pallet valve” is pulled down, forcing the pressurized air through to the upper half (escape valve now sealed) and from there to a duct that leads to a second, single-fold wedge bellows (the pneumatic motor). The bellows fills, pulling down a tracker (or other device or devices) that in turn pulls down the pipechest pallet. When the key is released, the pallet valve springs back to close off air to the upper half, and the exhaust valve is reopened to let air escape. No more air is forced through the duct, and the pipechest pallet tracker releases its hold on the pallet itself, silencing the associated pipes.

This remarkable “mechanical-pneumatic” device, introduced in France in the 1830s by Charles S. BARKER, became a signature element of Aristide CAVAILLÉ-COLL’s organs (beginning with Paris, St. Denis, 1837); he and others saw that this pneumatic motor improved the action of larger instruments, and he employed the device until the end of his career (he did not turn to tubular pneumatics until the 1890s). As adapted by Cavallé-Coll, these levers not only allowed higher wind but also permitted the organist to play when all manuals were coupled together, producing a new and powerful sound. The organist had only to provide force sufficient to open the relatively small pallet incorporated into the Barker lever; this “machine” then did the heavy work of opening the large pallets that allowed the pipes to speak.

The application of the Barker lever caused the lessening of direct control of the pallet and a resulting loss in touch; but its application of coupling to manuals and (later) combination actions, and its contribution to evenness of wind, were fully exploited by builders and performers alike.

### Tubular Action

The application of the pneumatic principle led to the development of an action that allowed for larger organs and the detached consoles that became increasingly necessary. As instruments grew, so did the length of the windtrunk from the main bellows to the pipechests as well as the distance between console and windchest. The TUBULAR ACTION that developed in the 1840s and ’50s in France took advantage of the available wind

pressure at both the console and windchests stages; the two types depended on lead tubing, two pneumatic motors, and a pipechest pallet to transmit stop and key actions.

One system, called pressure-pneumatic or inflate-pneumatic, had a separate, small “touch box” above the tail end of the key, which was under pressure. Depressing the key caused a small pallet to open, an exhaust pallet to close, and air to travel through lead tubing to the main windchest. At that point, a vertical “primary” motor opened an escape valve, depriving a horizontal “secondary” motor of air pressure. The wedge bellows deflated, pulling open the chest pallet and forcing air into the pipes. In the other system, the exhaust-pneumatic, the key action simply opened a key pallet that caused a domino effect: the air in the tube escaped, deflating the primary motor (under air pressure), which opened an escape valve that deflated the secondary motor, pulling open the chest pallet to supply air to the pipes. In other words, the exhaust-pneumatic principle utilized a vacuum to cause the organ to sound, a counterintuitive but successful approach.

Tubular pneumatics solved many of the problems that large Romantic organs brought with them, but the response was mixed, with the most favorable coming from England, the U. S., and (later) Germany; E. F. WALCKER and other builders continued to work with mechanical actions late into the century. Most French builders were content with perfecting Barker lever-based systems. Of the two systems, exhaust-pneumatic was preferred, considered less sluggish and more quiet and durable than the pressure-pneumatic.

German builders at the time were increasingly fond of the cone-chest (*Kegellade*, a kind of VENTIL chest), an alternative to the slider-chest still in use. In the cone-chest organ, all pipes of a rank were MOUNTED on a single channel, without grooves or other “bars”; opening a stop meant that all keys in the ranks were being supplied with pressurized air. The key action used a series of trackers, backfalls, and squares to raise a “lift rail”; this caused the cone-valves to rise as a group, so that any open rank would force air into a conduit leading directly to the pipe and causing it to speak. The cone-chest’s valves need not have been cone-shaped; in some cases, they were replaced by discs operated by small pneumatic motors (bellows-chest).

The membrane-chest, another ventill type, was explored by German and American builders in the late nineteenth century. William SCHUELKE, a Prussian-born builder working in Milwaukee, patented a membrane-based tubular pneumatic windchest (1895). Here the pressurized air filled both the STOP CHANNEL (when open) and a key channel below the ventill channel. When closed, the key channel’s air pushed up a leather membrane that closed off a conduit to a specific

pipe, keeping air from reaching it. Depressing the key released the key channel pressure, which allowed the vent channel air into the conduit, where it forced the membrane open as it entered the pipe. Again, if the stop rank was open, the pipe for that note would speak.

While tubular systems were superseded by electro-pneumatic actions from the late nineteenth century, they were still being used with some frequency up until World War II. In the present age of restoration, attempts to install electric systems where there had been none have often proven difficult; consequently, tubular pneumatics have seen a revival in the spirit of neo-romantic authenticity (and modern practicality).

While the pneumatic Barker lever became the basis for several systems, other pneumatic “machines” worked to assist the overall winding and action. These devices included wind REGULATORS such as the CONCUSSION BELLOWS (WINKER) and SCHWIMMER. Two major builders contributed the WILLIS FLOATING AND FISK SERVOPNEUMATIC LEVERS, latter-day successors to the Barker lever. A recent solution to problems caused by higher wind pressures, multiple divisions requiring coupling, and detached consoles, one that avoids the Barker lever altogether, is the pneumatic balancer.

The pneumatic balancer is mounted to the bottom board of the pallet box with a forked arrangement to connect it to the pallet PULL-DOWN wire (tracker). The principle of the balancer is that the pneumatic motor (A) has a connection to the key channel in the windchest via the tube (B). Because the pneumatic is pulled open when the pallet is closed, the pressurized air in the pallet box (C) is always trying to collapse the pneumatic. The pneumatic is pulling against the pull-down wire (D) at the forked connection (E). The air pressure against the sides of the pneumatic exerts enough pressure to balance with the air pressure against the pallet (F). When the player presses a key on the keyboard, the organist’s finger is in direct control of opening the pallet, yet the pressure exerted by the pneumatic greatly reduces the pressure required to open the pallet.

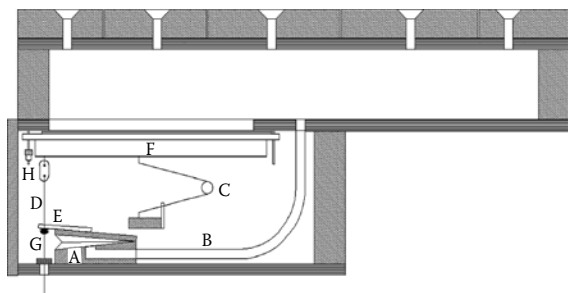


Fig. 9. Regulating resistance: pneumatic balancer mounted to the bottom board of pallet box with control of pneumatic extension through nut on pull-down wire.

## Electro-pneumatic and Electric Actions

The harnessing of electricity was seized upon by organbuilders, first in France, and later in North America and the rest of Europe. Although experiments with electricity began in the mid-nineteenth century, only in the 1880s did reliable systems involving electricity become feasible, notably in the work of Hilborne L. ROOSEVELT. He patented an “electro-pneumatic” key action as early as 1868; exhibited a part tubular-pneumatic, part electro-pneumatic instrument at the Philadelphia Centennial Exposition (1876; 3/46); and, with his brother Frank Roosevelt, built an instrument (Great Barrington, MA, Congregational, 1883), in which its complex “blowing apparatus” was placed in a cellar room below the vestibule: three water motors (for winding and combination action pneumatics), horizontal feeders, large windtrunks and airshafts, bellows large and small, pneumatic actions, and regulators, all leading to the organ’s various departments.

The electro-pneumatic system was indeed a fusion of the old (pneumatic action) and the new (electromagnets). The key action set off the contact plate of an electrified magnet; this effected the closing of an armature valve, initiating the familiar double-motor valve process. As before, each key had its own system. The Austin Universal Windchest (see following page), developed in the early twentieth century, continues to use electro-pneumatic action. At this point, the addition of electromagnets to the pneumatic equation served to replace the key touch box or pallet and the lead tubing. Early systems used a form of membrane-chest action. However, the invention of the PITMAN CHEST by Ernest M. SKINNER offered a more sophisticated use of pneumatics by which a single windchest and its conduit determine the action not only of the electromagnet and armature valve but (following the process) a rod with two seals, the pitman (a small valve), and the pallet and a flexible membrane attached to it. Each pipe conduit has its own pitman unit. The entire action is determined by the presence or absence of pressurized air along the way (see Cook). The system remains in use today.

Electro-pneumatic actions became associated with the “American classic” version of the Organ Reform Movement, specifically in the work of G. Donald HARRISON and Walter HOLTKAMP. It should not be too surprising that these most eclectic of builders, trying to make instruments that were all things to all historical eras of organ music, would rely on the most “up-to-date” action. Other builders took advantage of the new RELAY AND SWITCH SYSTEMS to build electromagnetic versions of the binary principle (“on” or “off”; later, “a” or “b”) to produce an electric system that skipped the pneumatic element of organ action simply opening a pipe’s pallet directly. Complementarily, electric

## ACTION

rotary turbine blowers became the standard mode of winding.

Robert Hope-Jones refined electro-pneumatic action, not only to permit the organ console to be placed at a distance from the pipes that it controlled, but to support the system of unification, which allowed a rank of pipes to sound at different pitches and on different keyboards. He and others applied electromagnetics to stop actions (e.g., sliders) and MECHANICAL AIDS (COUPLERS, combination actions) as well as the TREMULANT and SWELL chest shades.

However, the most dramatic use of relay and switch systems was in the development of the UNIT CHEST. Duplexing (in which more than one manual can control the same pipe rank) and extension (UNIFICATION, which allowed a rank of pipes to sound at different pitches and on different keyboards) saved the expense and extra space required by a full set of pipes. Duplexing and, to a lesser extent, extension were original mechanical in nature; but electro-pneumatic and electromagnetic technologies (e.g., Wicks's "Direct-Electric" system; see below) became the preferred method of engineering the unit chest's components.

Hope-Jones's dream of a truly "orchestral" instrument was realized in the UNIT ORGAN, in which the unit chest principle was extended to as many different ranks and pipes as possible (the so-called floating chest). This took the form of the fully electric theater organ, which took the qualities of the automatic barrel and band organs, tailored them to providing soundtracks for silent films, and put them back in the hands of live players, much as Georg Joseph VOGLER must have hoped would happen with the first ORCHESTRION more than a century earlier.

### Austin Universal Windchest Action

A type of action invented by the English-born John T. AUSTIN, who came to America in 1892. He first joined the firm of FARRAND AND VOTEY in Detroit. Familiar with the limitations of organ action systems then in vogue, Austin developed and patented a new action that he called the Universal Air Chest System (1893). The first Austin patent action organs were built in the shops of Clough and Warren in Detroit, starting in 1893. The AUSTIN ORGAN COMPANY was established in Hartford, Connecticut, in 1899.

In any pipe organ, the numerous pipes of different lengths and pitches stand on a box (windchest) of lightly compressed air, under the top of which are valves that, when operated, control the flow of air up into the pipes. The type of control within the windchest and the types of connection between the playing keys and the valves designate the form of action in a given instrument.

A pneumatic motor is a small bellows, made in different forms, to actuate various components in an organ windchest. The current Austin action is designated as "electro-pneumatic," whereby the connection between the console and the organ is electric, but the actual opening and closing of the valves is achieved pneumatically—that is, utilizing the lightly pressured air already within the windchest to do the actual work of opening and closing the valves. The Austin action is unique in the industry because it is essentially a very open mechanical system of lightweight but extremely durable components, operated by only one set of pneumatics inside and along one side of the windchest.

In almost any pipe organ the pipes stand in rows on the windchest with the valves beneath in matching rows. To actuate the valves in an Austin organ, each key has a pneumatic connected to a lightweight wooden trace or "tracker," which in turn is connected to all valves of all pipes of a given note. Thus, there are sixty-one key pneumatics and associated trackers in a standard windchest, one for each note of the five-octave keyboard; in theory, pressing one key down can generate the sound of all pipes associated with that note. The "stop action," which allows a particular set of pipes to be played (or not) at the will of the organist, consists of a long metal rod or bar running along under each row of pipe valves. This bar rotates a third of a turn either "on" or "off," thus acting as a removable fulcrum to make each row of valves active or inactive when individual key pneumatics and associated trackers are activated from the console. Only those pipes of a particular timbre associated with a stop in the "on" position will sound; the stops may be combined as the organist prefers. As with most mechanical systems in a well-built organ or piano, the load on any one component is very light, so that as a group they are extremely durable and long-lasting.

Over the years, many developments and improvements have been made in the Austin action, but the basic concept remains the same. During his long career, Austin held no fewer than forty-eight patents related to the pipe organ, especially windchest and console developments. The term *Universal* derives from the fact that it is a very open system whereby each pipe, when speaking, is connected directly to the air supply of all of the other pipes with little or no channeling through masses of lumber or air conductors. The windchest may rest on a small room full of lightly pressured air (airbox) or be built with transparent bottom panels. With either approach, all of the action components are clearly visible to a person standing beneath. Typical air pressures in a pipe organ range between 1-1/2 to 2-1/2 ounces per square inch, although occasional special stops may require up to 12 ounces per square inch. Inasmuch as all of the valve action in an Austin wind-

chest is immediately under the top surface of the windchest, an Austin organ can be built with windchest tops as low as 26" off of the floor, important when space is at a premium.

### All-Electric Action

The idea of an all-electric action followed logically from the application of electricity to winding and key-stop actions. Perhaps the first integrated pipe organ electric action, one still being produced, is the Direct-Electric system, a trademark for an invention by the Wicks Organ Company of Highland, Illinois (1915–17). Developed as a successor to mechanical action and as an alternative to the tubular- and electro-pneumatic actions of the period, all-electric action uses electromagnets for all its functions. Keys and other console controls operate electrical contacts; cables and switches direct the current to electromagnetic valves under the pipes.

Early attempts to use electricity to eliminate mechanical action parts (by the 1870s) were hampered both by lack of reliable current sources and by "residual magnetism," which caused the moving armatures of strong electromagnets to become magnetized and stick to the cores; weaker magnets avoided residual magnetism, but were less effective. Other attempts used pneumatics to open the pipe pallets (controlled by very small electric valves) or placed small electric valves within tubular systems. These methods allowed remote consoles, and were developed into widely used electro-pneumatic systems in the twentieth century.

Wick's attempts to solve the problems with strong electromagnets were directed toward finding a method of opening the pipe valves directly with electricity. This research led to the development of the magnets used in the Direct-Electric system (trademarked 1926); the first organ incorporating this action was installed in Unison City, Indiana (May 1915). By about 1917, all Wicks organs had this action. Wicks had to repair or rebuild almost all of them up until around 1920, installing improved components. Other action parts and improvements were patented: valve action (1922), reversible (1926); switch mechanism (1926); relay (1930); combination action (1930); balanced valve (1934); transposing switch (1962); and solid-state relay (1964).

The electromagnets and the windchest action are the heart of the system. The center-pivoted manual keys have a bronze plate striking a series of contacts with a wiping motion (which cleaned off the wire) when the key is depressed; the contacts, originally phosphor bronze wires, were changed to silver to avoid corrosion and dead notes (early 1950s). The contact point could be felt when playing; the contacts were mounted at an

angle (1966), providing more wiping motion with less key force. The pedal contacts were originally mounted at the end of the keys, but moved below the keys to reduce strain on the contact wires (1985).

A key contact wire, one per keyboard stop, handled the current for each chest magnet. The large console cable went directly to the chests, one wire per pipe. When couplers were added, or a keyboard had more than fourteen stops (but no couplers), relay and switch systems became necessary. Early relays had a wooden roller with a contact bar on one side, rotated by a relay magnet to make a wiping contact with a set of contact wires. These were replaced with "steel" relays, in which the relay magnet moved a plated contact against the contact wires (1938). These units had a felt bumper to control bouncing (and interference with the release of the key) on the "off" stroke. In the 1950s these contact wires were also changed from phosphor bronze to silver. In 1964 solid-state relays were introduced; the key circuits controlled large power transistors, which supplied current to the chest magnets without relay contacts; switches were used only for unified stops and for couplers. These relays were supplanted in 1979 by a completely transistorized system, requiring only a single key contact and without moving parts or contacts.

In all these systems, each stop and coupler was controlled by a multiple-contact switch, an original component of Direct-Electric action. These switches initiated couplers (in the console) and stops (in the relay cabinets or the console). Turning a stop or coupler "on" activated a magnet that moved an armature containing phosphor bronze (silver after 1967) contact pins; these made a wiping contact with bronze leaves arranged in a row while closing a circuit for each note. When used for stop switches in the transistorized relays (1967–79), the pins were replaced by diodes. The introduction of solid-state systems made these switches redundant.

The first electric combination action, located in the console, operated "lock bars" that latched contacts into "on" or "off" positions when setting pistons. To set the combinations, multiple-contact switches directed current to the appropriate magnets; the latched contacts constituted the "memory," and relays distributed the current. In 1934, a new remote system was introduced, in use until the 1970s, that retained the multiple-contact switches for setting combinations but required only one magnet per stop and a mechanical trace to move the latched contacts. Like the main coupler and multiple-stop systems, current was distributed to the combination actions by rotating wood contact bars, replaced in 1938 with steel relays. Swell and crescendo pedal contacts operated in a similar manner.

## ACUTA

In the console, stop and coupler controls incorporated a two-magnet system to manipulate the stops. In the 1930s these magnets were separated from the stop controls, so that there were now separate contacts for stops and for combination action settings. Reversibles used a similar two-magnet unit with a latching contact that switched the current between opposite magnets. These units were gradually replaced (from 1979). Later developments incorporated parts from outside suppliers: new piston contacts (1960s); the introduction of transistors (1960s); an experimental transistorized memory system (1975); cable connectors designed to permit finished cables to be pulled through conduits (1979); and a solid-state system, located inside the console (1979).

Because Direct-Electric action was introduced as an “improvement” over other actions (primarily electro-pneumatic), most of the commentary about it was found in sales literature, with Wicks as proponent and competitors as opponents. Advocates emphasized reliability, longevity, reasonable cost, and the elimination of re-leathering. Criticisms included “hazards” from large electric currents, “spongy” keyboards, noisy consoles, and excessive unification. In spite of early criticisms, the use of all-electric action has become widespread since the 1920s, with suppliers to the organ-building trade offering many such parts.

Barnes is the best source for illustrations of the earlier Direct-Electric system. In evaluating his claims, readers should remember that he was not an organ-builder (see the introduction to the second edition).

*SEE ALSO MECHANICAL AIDS; POUCH OR PUFFER*

### NOTE CONTROL

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## ACUTA

*SEE SCHARF/SCHARFF/SHARP/SCHERP/ACUTA*

## ADEMA

Dutch organ-building family. In 1855, brothers Carolus (Karel) Borromeus Adema (1824–1905) and Petrus (Piet) Josephus Adema (1828–1919) opened De Gebroeders Adema in Leeuwarden (Friesland). Karel had apprenticed with the VAN DAM firm and worked for BÄTZ and WITTE (Utrecht), while Piet worked first for Willem Hardorff (Leeuwarden), then for Hippolyte Loret (Mechelen); Hardorff was especially influential on the Ademas. A younger brother, Johannes Romanus Adema (1834–1862), worked for the firm as a case builder, while Adrianus Adema (1825–1870) and Epko Adema worked there in other capacities.

The first Adema instruments were built for Leimuiden (1856) and Leeuwarden, St. Nicolaaga (1858), the latter the firm’s first two-manual organ (now Terneuzen, Good Shepherd). Another early instrument stands at Heerenveen, Holy Spirit (1867; rest. Reil, 1986).

In 1871 Adema reached a turning point with its three-manual organ for Amsterdam, Mozes en Aäronkerk/St. Anthony of Padua (now much altered), in which the firm’s classical Dutch approach was modified by French elements such as the BARKER LEVER. This hybrid style was incorporated into the firm’s instruments at Veenhuizen (1872), Oudkarspel, Hervormde St.-Maartenskerk (1874; destr. 1969), and Bodegraven (1876).

In 1877, the firm split into two companies, with Karel (C. B. Adema & Zonen) remaining in Leeuwarden and Piet (P. J. Adema & Zonen) relocating to Amsterdam. The reason for the split may well have been philosophical, with Karel favoring the older Dutch style while Piet welcomed the new, more international elements represented by Aristide Cavallé-Coll. In Leeuwarden, C. B. Adema and his sons, Lambertus Theodorus Adema (1864–1931) and Sybrandus Johannes Adema (1863–1941), maintained the Dutch classical style, using mechanical action and focusing on the Frisian market, as in Leeuwarden, St. Bonifacius (1899), Balk, St. Ludger (1910; rest. A. Schreurs, 1985); Warga, St. Martin (1911; rest. 1994–99); and Irnsum, St.-

Marcuskerk (1926; C. B. Adema's first pneumatic organ). The firm closed after Sybrandus's death.

Using the Mozes en Aäronkerk organ as a starting point, P. J. Adema & Zonen's instruments increasingly reflected the Cavallé-Coll aesthetic, as in Workum, St. Werenfridus (1884–85; rest. Adema, 2003), Harlingen, St.-Michael (1898; rest. A. Schreurs, 1999–2000), and Pijnacker, St. John the Baptist (1898–99). P. J. Adema introduced pneumatic action into its instruments, beginning with *Uitgeest, Birth of Our Beloved Lady* (1898; rest. H. Schreurs, 1977); later examples include Gouda, *Our Beloved Lady* (1902; now in Bussum, St. Vitus) and Haarlem, St. Bavo's Cathedral, transept organ (1906–7, pneum.; rest. Vermeulen, 1960–61, electro-pneum.). Piet's sons Sybrand Adema (1868–1926) and Joseph Adema (1877–1943) continued the firm, but worked separately. Sybrand built instruments for Amsterdam, St. Anne (1916) and Amsterdam, Beloved St. Nicholas and St. Barbara (1923; now Groenlo, St. Calixtus). Joseph Adema's most important work was the three-manual organ for Amsterdam, St. Willibrordus (1920–24, pneum.; now Haarlem, St. Bavo's, 1971, electro-pneum.). Following the death of Joseph Adema, P. J. Adema was taken over by his nephew Hubert Schreurs (1906–1981), who continued the French-influenced tonal traditions while reintroducing slider-chests and mechanical action wherever appropriate. Schreurs focused on the restoration of instruments by his predecessors and others (Vermeulen). An exception was the new organ at Oudkarspel, Lutheran (1972, mech./elec.). After his death, his son Antoine Scheurs (b. 1942) took over. With church closings becoming more common, Scheurs's work was oriented almost exclusively toward maintenance and restoration. Even the "new" organ at Bodegraven, St.-Willibrordus (1984, mech.) took much of its pipework from an 1898–99 MAARSCHALKERWEERD organ previously in Alkmaar. In 2002, Antoine Schreurs turned the firm to his colleague Ronald van Baekel (b. 1969). Renaming the firm Adema's Kerkorgelbouw, van Baekel moved the workshop to Hillegom; his first new organ was for Laren, St. John's Cathedral (2002).

RICHARD KASSEL

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## ADLUNG, JACOB (JAKOB) (1699–1762)

German organist, composer, and theorist. A native of Thuringia (b. Bindersleben near Erfurt, 14 January 1699), Adlung rose from humble beginnings to become a musician and scholar of considerable erudition, due to his native intelligence and disciplined lifestyle. After preparatory studies in Erfurt, he matriculated at the University of Jena, where he pursued philosophy, mathematics, languages, and theology. Having already undertaken musical studies in Erfurt, he became an organ student of Johann Nicolaus Bach (Johann Sebastian Bach's cousin), organist of the Jena Stadtkirche. Immediately upon his return to Erfurt in 1727, he won the post of organist at the Predigerkirche, upon the death of the incumbent, Johann Heinrich Buttstedt. Adlung kept this post until his death in Erfurt on 5 July 1762, supplementing his income by teaching keyboard and languages, making and selling keyboard instruments, and offering courses in philology, mathematics, and philosophy.

Although a number of Adlung's organ compositions survive, his most significant contribution to the organ rests in the extensive information about the instrument that he gives in his two major publications: *Anleitung zu der musikalischen Gelahrtheit* (Introduction to Musical Learning; Erfurt, 1758) and *Musica mechanica organoedi* (Musical Mechanics for the Organist; Berlin, 1768). Three other treatises written between 1723 and 1727 were destroyed in a fire in 1736. Information about the organ in the *Anleitung* (chaps. 6–10) is largely duplicated in the more extensive *Musica mechanica*, edited by J. L. Albrecht and Johann Friedrich AGRICOLA and published posthumously. The latter work is a compendium of knowledge about the sixteenth- and seventeenth-century organ, incorporating information from many sources, beginning with Michael PRAETORIUS's *Syntagma musicum* (1619). It includes an extensive compilation of stoplists of organs, some still extant. Since Agricola was a student of J. S. Bach, his involvement with the publication renders it particularly important for understanding the organ as Bach knew it.

The characteristics of the organ in Thuringia, as Adlung describes them, present marked contrasts to the North German (SCHNITGER) and Saxon (Silbermann) types. Characteristics include: a few reed stops, especially in the manuals; early abandonment of the Rückpositiv; proliferation of colorful stops at 8' pitch; the early appearance of narrow-scale string stops (before 1700); less concern for the case as a sound-reflecting enclosure; a predilection for prominent third-sounding ranks, both independent and as components of mixtures; less emphasis on higher-pitched stops in the pedal; and the frequent appearance of a Glockenspiel. In retrospect, it is evident that eight-

## ÆOLIAN COMPANY

eenth-century Thuringian organ design was the most progressive of its time, often foreshadowing typical Romantic traits by one hundred years or more.

QUENTIN FAULKNER

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## ÆOLIAN COMPANY

American manufacturer of musical instruments (1878–1932), most for residential use. Virtually every instrument the firm sold (pianos, reed organs, pipe organs) was equipped with a player mechanism. Æolian's organ division built almost nine hundred instruments. During its last years of business, the division produced distinguished organs that fused American and English ideals of tonal philosophy. This division of the Æolian Company merged with the Skinner Organ Company in 1932 to become the ÆOLIAN-SKINNER ORGAN COMPANY.

From approximately 1895 to 1930, the Æolian Company of New York was among the largest manufacturers of musical instruments in the world, with four factories, numerous music halls, and representation in every major city on the globe. The company began life as the Mechanical Organette Company in 1878, producing the Musical Wonder, a tabletop, hand-cranked, self-playing reed organ. After renaming itself Æolian in 1887, the firm expanded its product line to include the self-playing Orchestrelle (1890), a REED ORGAN that operated on compression rather than the more common suction mechanism, and the Pianola (1900), a felt-fingered piano player that could be rolled up to any keyboard. The latter yielded enormous profits, which Æolian used to market its entire line heavily. In 1913, it unveiled its latest creation: the Duo-Art, a piano that reproduced, to a considerable measure, the touch and nuance of an artist's performance. Unlike the Pianola, the Duo-Art was installed inside a piano. Æolian soon signed an agreement with Steinway to outfit six hundred pianos a year with the Duo-Art mechanism.

Æolian's first residence PLAYER PIPE ORGAN was produced in 1895 for Oliver H. B. Belmont of Newport,

Rhode Island. The organ was actually a FARRAND AND VOTEY to which Æolian added a player for semiautomatic operation. In 1899, Farrand and Votey ended its partnership; Edwin Scott Votey (1856–1931) continued to build pipe organs, merging with Æolian in 1900. A relatively unknown figure, Votey was a highly inventive designer responsible for many fascinating concepts in pneumatic technology. Æolian established an organ factory in Garwood, New Jersey, where it built approximately 890 organs using VENTIL windchests of Votey's design. However, Votey left in 1902 to work for George S. Hutchings in Boston. Other notable personalities in Æolian were Frank Taft (1868–1955), managing director; Leslie N. Leet (d. 1963), a former Skinner supervisor who arrived in 1924; Eugen Braun, chief voicer; and William L. Alfring, president during the 1920s.

Æolian's tonal philosophy, though entirely symphonic in nature, mixed in some unusual throwbacks to the nineteenth century. Wind pressures were low, ranging from 3-1/2" to 5" for all manual divisions, except Solo organs, typically on 8". Unification was extremely rare, even on the small Pedal divisions. However, duplexing was extensively employed in smaller organs; an entire division might be made available on two manuals. While most pipe constructions followed ordinary American practices, Æolian had its share of specialty treatments. Among these were small-scaled tapered diapasons, flutes, and mixtures; open wood flutes with dropped languids; consistent use of string-scaled Comets; Oboes with short-length bass resonators; free-reed Clarinets; Vox Humanas enclosed separately in boxes to refine their tone; and, in its early instruments, labial French Horns. These various restrained voices converged into an orchestral gentility quite unlike other American pipe organs.

From 1900 to 1917, the automatic players operated only the notes, while stops and swells were worked manually. Large organs featured two consoles: a standard console for normal playing and an Æolienne, identical to the main console but with a roll player instead of keyboards. In 1917, Æolian introduced the Duo-Art reproducing pipe organ, a fully automatic player that controlled notes, stops, and expression. Some rolls were advertised as "hand-played," and were offered as faithful records of the work of great artists. The rest were transcriptions of symphonic works, operatic airs, light classics, and popular tunes, prepared by staff technicians known as the Æolian Organ Guild. A few famous conductors, including Leopold Stokowski, directed the interpretation of some symphonic rolls. Composers, including Camille Saint-Saëns and Edwin H. Lemare, wrote pieces specifically for the Duo-Art that could not actually be performed by a person.

To counter alignment problems between the roll (15-1/4" wide) and tracker bar (tracking 176 holes) caused by seasonal humidity changes, Æolian devised a tracker bar divided into seven sliding sections; mechanical "ears" at either end measured the roll width and matched the bar's width to the roll's. In the late 1920s, Æolian developed the Concertola, a mechanically controlled device that allowed the listener to choose from among ten rolls placed on a miniature Ferris wheel, using a handheld controller. The Concertola would then find, thread, play, and rewind the selection, then move on to the next one. Uninterrupted recitals of up to ninety minutes in duration were now possible, long before the automatic changer was developed for the phonograph record.

The Duo-Art player was designed to control a two-manual, thirty-stop specification of Great, Swell, Echo (playable from the Swell), and Pedal divisions. Ten of the twenty-six stops were strings. The arranged rolls often combined strings, flutes, and woodwind-type reeds to create a light orchestral tutti. Diapasons and Trumpets were used sparingly, or were reserved for sforzando effects. In moderately sized Æolians, the Duo-Art assigned a separate rank for each item on its stoplist. Duo-Arts on large organs were equipped with piano, mezzo, and forte controls. While piano might allow the Duo-Art to engage softer single stops, forte would draw together several stops of similar tone, thus making use of the entire instrument. Æolian stop nomenclature evolved, starting from typical stopnames of the trade (1900–ca. 1904), then shifting to an "Italian phase," with Oboe becoming Oboe di Caccia, Aeoline changing into Pastorita, and String Mixture V rechristened as Serafino V. During the early 1910s, the firm switched to a strictly functional description: tone family, dynamic indication and/or pitch indication. Pastorita, née Aeoline, was now String PP; Gamba became String F; Gamba Celeste turned into String F Vibrato. 16' stops were called Deep, 4' and 2' stops were called High; unison pitch was otherwise assumed. Thus, a family of flutes would be Deep Flute 16, Flute MF, and High Flute 4.

Self-playing instruments of all types experienced a great popularity from 1880 to 1925. During the years 1917 to 1927, the entire Æolian firm realized upward of \$11 million in gross sales annually, with pipe organ sales occasionally responsible for over \$1 million annually. With the prestige of its Steinway association, its many concert halls, and its broad customer base from piano sales, Æolian commanded the residential organ market. Ultimately, the market for such fantastic home appliances could not be sustained. The automatic musical instrument market peaked in 1923, and then began to decline considerably. By 1928, Æolian found itself in considerable debt. To broaden its market, the

pipe organ department created a separate division called Æolian-Votey. In October 1927, noted organ designer Robert Pier Elliot was hired to assist in the transition. Though he stayed only one year, Elliot's tenure changed Æolian's outlook and tonal philosophy. He instituted the use of high-quality pitman windchests, which were easier to service and restore and had much faster and quieter stop action than the previous ventill design. He also encouraged the use of English-style flue and reed choruses; Æolians between 1928 and 1931 featured especially brilliant reeds, mixtures, and integrated ensembles. Notable installations were the Westchester County Center, New York (op. 1647, 4/65, 1930), the sizable concert organ for Pierre S. duPont at Longwood Gardens, Pennsylvania (op. 1726, 4/143, 1930), and Duke University Chapel in Durham, North Carolina (op. 1785, 4/120, 1932), the last organ to be completed under Æolian supervision.

Despite these last efforts, the Æolian pipe organ division continued to operate unprofitably. In January 1932, the division merged with the Ernest M. Skinner Organ Company of Boston to form the Æolian-Skinner Organ Company. Æolian contributed rough materials, Duo-Art master rolls, ready-for-sale production rolls, contracts in progress, and \$50,000 cash in exchange for 40 percent of Æolian-Skinner stock; Skinner received the remaining 60 percent. All production continued at the Skinner plant in Boston, while Æolian's Garwood factory was closed. The new company was basically the Skinner firm continuing under a different name, however. Some of Æolian's mechanical designs were incorporated into the Skinner chest and console mechanisms; otherwise, the Æolian name, like the prosperous era in which it had flourished, faded into history.

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## ÆOLIAN-SKINNER ORGAN COMPANY

American organ-building firm. Based in Boston, Æolian-Skinner was a dominant force in organ building from 1932 to 1960. Guided by tonal director G. Donald



Fig. 10. Aeolian-Skinner organ, op. 1413 (4/70), Alice Millar Chapel, Northwestern University, Evanston, Illinois.

HARRISON, the company instituted a move away from symphonic tonal designs to the eclectic principles of the “American classic” style. The company produced approximately 650 organs and rebuilt several hundred more.

The Aeolian-Skinner Organ Company was formed on 1 January 1932 by the merger of the Skinner Organ Company of Boston and the pipe organ division of the ÆOLIAN COMPANY of New York. Prior to this alliance, each firm had occupied the premier position in its respective field: Æolian was the elite residence organbuilder and Skinner was the aristocratic church and concert organbuilder. Arthur Hudson Marks (1874–1939), president of the Skinner firm, became president of Æolian-Skinner, while Ernest M. SKINNER became vice president. Æolian’s managing director, Frank Taft (1868–1955), and president, William Aifring (d. 1937), were listed as vice presidents. All production was continued at the Skinner plant in Boston, while Æolian’s Garwood, New Jersey factory was closed. Gradually, some of Æolian’s mechanical designs were incorporated into the Skinner chest and console mechanisms, resulting in more of a hybrid instrument than

has usually been assumed. Additionally, the Skinner player system was discontinued, and Æolian-Skinner exclusively marketed Æolian’s Duo-Art.

From a tonal standpoint, however, Æolian-Skinner continued as if the merger had never occurred. The company continued its development of “classic” ensembles, which had occupied Skinner since 1924 and assistant general manager Harrison since his coming to the company from England in 1927. Realizing that Harrison was more in tune with current trends, Marks unseated the sixty-five-year-old Skinner. After much argument and resistance, Skinner was stripped of power in July 1933. He fulfilled his contractual obligations to the firm through January 1936 and then established the Ernest M. Skinner and Son Company in Methuen, Massachusetts.

Meanwhile, Harrison became known as an agent of tonal reform among younger organists and enthusiasts, a group pressing for advancement along “classical” lines. Harrison’s end goal was clarity, but of his own type. Above all, he strove to build an organ on which the listener could hear the movement of inner voices in polyphony. He advocated complete Diapason choruses on all manuals, reed choruses that did not dominate fluework, independent Pedal divisions, low wind pressures, and more unenclosed pipework. In his earlier designs (Cambridge, MA, Harvard University, Memorial Church, 1933, 4/118; New York, St. Mary the Virgin, 1932–33, 4/69; Worcester, MA, All Saints, 1934, 4/103; San Francisco, Grace Cathedral, 1934, 4/89; New Haven, CT, Trinity Church, 1935, 3/69) Harrison distilled nineteenth- and twentieth-century English and American ideas into a clear statement of an Anglo-American tonal philosophy. In the fall of 1935, Harrison moved one step away from his English heritage toward a more individual statement. The Æolian-Skinner organ for the Groton (Massachusetts) School, St. John’s Chapel (1935, 3/86) contained an all-flue Great with twin Diapason choruses and three mixtures, a Swell (containing small-scale chorus reeds that employed French-style dome-head shallots), a Choir with a minor reed chorus, Harrison’s first unenclosed Positiv, and a fourteen-stop independent Pedal. Wind pressures ranged from 2” to 4”. Four months later, Æolian-Skinner installed a similar instrument at Boston’s Church of the Advent (1936, 3/76); this organ was to be Æolian-Skinner’s consummate showpiece.

This pattern of tonal design—enclosed and reedless Great and Positiv, enclosed Swell and Choir, independent Pedal—became the foundation for all important Æolian-Skinner organs. Meanwhile, Harrison pursued further neoclassical avenues. He developed a family of wide-scale cylindrical and tapered flutes, based on German scales supplied by Hans STEINMEYER via Henry WILLIS. From 1937 well into World War II,

Harrison experimented with modern versions of older German solo reeds such as Krummhorns, Faggots, and Rohr Schalmeis; he would eventually develop Ranketts, Dulzians, Chalumeaus, and others. In 1938, the organ for New York, Columbia University, St. Paul's Chapel, included Great, Positiv, and Brustwerk divisions in addition to the usual Swell and Choir. By 1945, his tonal philosophy had been labeled "American classic."

After World War II, Æolian-Skinner was deluged with work, including many rebuilds of older organs, especially Skinners. Among the largest contracts were the Riverside; St. Bartholomew's; St. Thomas; St. John the Divine; and Fifth Church of Christ, Scientist churches (all in New York); University of Michigan; Princeton University Chapel; St. Paul's, Chestnut Hill, Philadelphia; and St. Paul's School, Concord, New Hampshire. Harrison's self-proclaimed masterpiece was a virtually new organ for the Mormon Tabernacle in Salt Lake City (1949, 5/188). This instrument was a definitive realization of Harrison's vision of a large organ: mostly mild stops uniting into a type of grandeur that Harrison considered unattainable by other methods. The company's largest new organ produced under Harrison's direction was for the extension of the First Church of Christ, Scientist, in Boston (1952, 4/237), designed in conjunction with Lawrence I. PHELPS.

Harrison died suddenly on June 14, 1956, while finishing an Æolian-Skinner rebuild of the Skinner instrument at New York's St. Thomas. Joseph S. Whiteford (1921–1978), who had joined the company in 1948 as stockholder and vice president, replaced Harrison as president and tonal director. Whiteford's tonal designs were much like Harrison's, although he favored a different overall sound, preferring unnicked flues of definite articulation, somewhat lower pressures than Harrison, a greater use of tapered Principals and strings, intense and fiery chorus reeds, and a generally slim-scaled ensemble. Notable instruments produced under his direction include the Independence, Missouri, Reorganized Church of Latter-Day Saints; the Buffalo, New York, Westminster Presbyterian Church; and New York City's Philharmonic (now Avery Fisher) Hall.

Æolian-Skinner's last years were fraught with economic difficulties. Citing health reasons, Whiteford retired in 1960, but remained chairman of the board and tonal director. John J. Tyrrell served as president from 1960 until 1966, when Whiteford withdrew financial support. Tyrrell was succeeded by Donald Gilett, an Æolian-Skinner tonal finisher since the early 1950s, and vice president from 1963. Æolian-Skinner's final tonal director was Robert Sipe, a mechanical action builder brought into the firm by Texas investor E. David Knutson in 1970. Æolian-Skinner produced seven tracker organs before a dwindling of capital necessitated a reorganization to avoid bankruptcy in

1972. Although the firm defaulted on no contracts, this was essentially the end of the company.

In American organ building, the Skinner Company reigned supreme from 1905 to 1932, followed by Æolian-Skinner from 1932 to around 1960. Harrison's "American classic" organ successfully captured the spirit of that period's musical practice, and was still well-suited to church playing. Harrison's eclecticism was only loosely based on historical precepts. His larger concern was to create an organ upon which many schools of organ literature would sound clear and plausible, if not always authentic. For Harrison, this meant following the spirit, if not the letter, of several schools of design, refining, and combining the historical tonal elements in ways which suited his multiple purposes. Along with Walter Holtkamp, Æolian-Skinner was the dominant force in organ design after 1945, and the finest of their instruments continue to influence builders today.

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## AEOLINE

A string stop of very soft tone; considered by some to be the softest string tone in the organ. It is usually found at 8' pitch, but 4' and 16' examples are sometimes found. As a flue stop it first appeared around 1820 in Germany, and soon became popular in Germany, Switzerland, and North America in both large and small instruments. Different sources variously describe the Aeoline as belonging to the Gamba, Salicional, or Viol family. The degree of "stringiness" varies between different examples, being more stringy in German examples. Audsley considered it an Echo Salicional or, if voiced with a more stringy tone, an Echo Viola da Gamba. The Aeoline is often used as one rank of a Celeste. Audsley and Carl Locher claim that it is often

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used with the Voix Celeste, though that stop is usually intended for use with the louder Salicional.

The term *Aeoline* was also used as early as 1815, mainly in Germany, for a free-reed stop of 8' or 16' pitch and soft tone. It was sometimes made without resonators, as with the Physharmonika, or with small bells or conical resonators. According to Wedgwood, it had thin, narrow tongues, and its tone resembled a soft Oboe. While some early sources describe it as being imitative of the aeolian harp, Bonavia-Hunt reports that the Aeoline was "a form of accordion introduced by Wheatstone before the concertina." Synonyms include *Aeolian*, *Aeolina*, *Äoline*, *Êoline*, and *Eolina*.

See also **Stop**

EDWARD L. STAUFF

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## AFRICA

The second largest continent has had comparatively little use for the pipe organ. Although a Hellenic Alexandrian named CTESIBIUS (Ktesibios) is credited with the invention of the hydraulic organ (ca. 300 BCE), the impact of this creation went north- and eastward. By the time Muslims conquered Africa north of the Sahara Desert (seventh century CE), there were no traces of the Greek and Roman hydraulics.

Colonization by European countries during the nineteenth century imposed arbitrary boundaries on indigenous kingdoms and peoples; it also brought missionaries, and the small churches they set up made use of reed organs. More permanent installations were limited to cities where European Christians were numerous and wealthy enough to support them. Most of these churches were in SOUTH AFRICA, originally a group of colonies dominated by the Dutch (Boers) and British before the Union of South Africa was declared (1910). Anglican and Reformed churches were and have remained important to South Africa's social fabric, even with the end of apartheid. Of the black-dominated African nations, NIGERIA has shown the greatest interest in Western organ music, with or without indigenous influences as a factor.

In the area north of the Sahara, the presence of pipe organs was intended almost exclusively to meet the needs of colonists. In Egypt, Gustave Flaubert reported hearing a midnight Mass in Latin in a distinctly non-European setting, to the "lilting tunes" of an organ (*Carnets de Voyage*, 24 Dec 1849 entry). A century later, Marilyn Mason became the first American organ-

ist to perform in that country. There have been organs at both the old and present All Saints' Cathedral in Cairo.

Aristide CAVAILLÉ-COLL built two small instruments for North Africa: Algiers, Protestant Church (1852) and Tunis, Cathedral (1883). His successor, Charles Mutin, built six organs for Algeria; only two have survived. One of these, now at the Basilique Notre Dame d'Afrique in Algiers, was originally purchased in 1911 (during the French occupation) by an Englishman named Wendell, who intended it for a large house that he had transformed into a Moorish palace. On the advice of Camille Saint-Saëns (who lived nearby), Wendell purchased a pneumatic-action instrument with a BARKER LEVER (3/25) and stops that allegedly resembled the sounds of Arab instruments. After Wendell's death (1930), his widow donated the instrument to the Basilique Notre Dame d'Afrique, which erected a special platform for it. Over the years, the organ became practically unplayable; weather extremes had damaged the wood further. The diocese raised money for repairs (begun 1998); restored in 2002, it is now used in recordings. The situation is more dire in the Sudan, occupied by Egypt and Britain (in turn or in league) until the 1950s. At Wad-Medini, St. Paul's, the lid of the nonfunctioning organ was recently lifted to reveal a lizard scurrying across the keys.

The region with the most pipe organs, southern Africa (i.e., south of the Congo River Basin), includes areas once colonized by the British (Malawi, Zambia, Zimbabwe), French (Madagascar), Belgians (Congo, formerly Zaire), Germans (Namibia), and Germans replaced by the Belgians (Rwanda) or the British (Tanzania), in addition to South Africa.

In Lilongwe, Malawi, there is an organ to accompany the congregation at St. Peter's Guesthouse. In 1996, the Cathedral of the Holy Cross in Lusaka, Zambia, brought in an organ by "C. Lloyd of Nottingham" (active from the 1860s to the 1900s), built around 1884 (2/25; mech./electro-pneum.); like most pipe organs in Africa, it has been affected adversely by the weather and lack of maintenance professionals nearby. There is also an organ at All Saints' Church in Mbala (Abercorn), Zambia. Zimbabwe (formerly Rhodesia) has the greatest presence of pipe organs in this formerly British region. In Harare, there are organs at St. Mary's Cathedral, a two-manual NORMAN AND BEARD; Highlands Presbyterian, a 1897 two-manual HILL AND SON (orig. South Africa, Bloemfontein, Cathedral); and Sacred Heart Cathedral, an 1928 Casavant. Also in Zimbabwe, Bulawayo, St. John's Cathedral, there is a 1914 Norman and Beard.

Antananarivo, Madagascar is a typical setting for examples of African "world music" with connections to organ playing The well-known popular band Tarika

Sammy has been active since the 1980s; in addition to being surrounded by music since birth, one member, Tiana, had a father who played organ in church. The guitarist Etienne “Bouboul” Ramboatiana, a leading representative of the country’s booming string-playing scene, was the organ player of Andohalo Cathedral but moved on because of the poor income.

Namibia, known as Southwest Africa during South Africa’s post-German occupation, has Wilhelm SAUER organs in Windhoek, Christuskirche (1897) and Swakopmund, Lutheran (1897), as well as an organ by the South African builder Fehrle at Windhoek, Dutch Reformed, Pionierspark (1980). A visitor to Rwanda in 2004 noted that after decades of civil war he had “yet to see a working piano or organ” there.

A few new pipe organs have been exported to southern Africa in recent years. The instrument OBERLINGER built for the Palace Church of President Mobutu Sese Seko in Gbadolite, Zaire (now Congo; 1988; 2/29) may not have survived that leader’s overthrow in 1997. More promisingly, a German missionary named Reiner Kammleiter turned his organ-building skills into a program at the Evangelical Lutheran Vocational School in Hai, Tanzania. Since the mid-1980s, he and his students have built instruments using readily available, highly valued materials such as African hardwoods (now used by many builders outside Africa), sheepskin leather for bellows, and cowhorn for keys. He has built several organs for Tanzanian churches (Dar es Salaam, Msasani Lutheran, 1/17); and one instrument was sent to Rothenburg, Germany, Friedhofskirche (2/14).

However, contemporary southern Africa reflects a much greater trend: the importation of ELECTRONIC ORGANS from worldwide manufacturers. The Allen Organ Company of Macungie, Pennsylvania, for example, has installed two-manual digital organs in Keetmanshoop (Namibia), Dutch Reformed, and Harare, Nazareth House. Smaller electronic organs for churches and portable instruments for use in popular music have all but eliminated the market for pipe organs. Whatever the difficulties in repairing or getting replacement parts for these instruments (and their vulnerability to atmospheric conditions), the maintenance of electronic organs is far more practical than purchasing a pipe organ from abroad or, even more unlikely, setting up shop to build organs locally.

The final area of discussion, central Africa (sub-Saharan, but north of the Congo Basin), has had pipe organs in Freetown (Sierra Leone), St. Charles Methodist, and Namirembe (Kampala, Uganda), St. Paul’s Cathedral. More recently, Sauer built a positive for a Ghanaian destination (before 1990). A 1955 WALKER organ is installed at Nairobi (Kenya), All Saints Cathedral. But the trend toward electronic organs has been in evidence as well; Allen installed a new-genera-

tion, three-manual instrument in Yamoussoukro (Ivory Coast), Basilique Notre Dame de la Paix in 1989.

Attempts to preserve old instruments have suffered from lack of funding and local interest. One emblematic example involves the former hunting lodge of one Lord Egerton of Knutsford (UK), located in Nakuru, near Nairobi. In 1951, Egerton installed an instrument, by Jack Davies and Son of Northampton, converted into an Æolian Duo-Art roll player piano. Egerton sold the estate to the Kenyan government before his death in 1958. The Kenyan Museum Service took the building over in 1995; a visit since that time revealed that both house and organ had suffered considerable deterioration. As happens so often in the organ world, a plea for assistance now occupies an Internet website.

RICHARD KASSEL

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## AGATI

Italian family of organbuilders. After working as an apprentice with TRONCI in Pistoia and Filippo Gatti in Bologna, Pietro Agati (b. Pistoia, 15 Feb 1735; d. there, 10 Dec 1806) opened his own workshop in Pistoia in 1759. He is known primarily for his organs in San Vitale (1760) and Vignole di Quarrata (1797), the latter representing Pietro’s most complete extant organ. Over the years, however, the organ at Vignole, which Agati evidently modeled after Willem Hermans’s organ at Spirito Santo, Pistoia (1664), was restored by Filippo Tronci in 1887, Carlo Paoli in 1893, and Fratelli RUFFATTI. The original forty-seven-key manual is still intact, but the entire stop-action mechanism was rebuilt (by Tronci) and a more modern pedalboard added.

Giosuè Agati (b. Pistoia, 21 Jan 1770; d. there, 10 Dec 1847), son of Pietro Agati, carried on the firm’s name, making it known to the public in 1835 that he could “beat any price presented by other firms.” He built several fine organs including those at the Oratorio di SS Trinità, Límite sull’Arno (1821), Serravalle Pistoiese (1822), and Gavinana, Pistoia (1838). In addition to building organs, Giosuè modified Giuseppe

## AGRICOLA, JOHANN FRIEDRICH

Testa's organ at Popiglio, S. Maria (1665) in 1823, rebuilding the windchest and adding trumpets.

The last of the Agati organbuilders was Nicomede Agati (b. Pistoia, 8 April 1796; d. there, 16 May 1885), son of Giosuè. He built a number of smaller organs including those at Fucecchio, Collegiata (1849), Pescia, S. Antonio (1853), and Pistoia, S. Chiara (1877). Nameplates on many of the organs indicate that his younger brother Giovanni Agati (b. 28 Jan 1798; d. 1876) and nephew Luigi Agati (b. 8 March 1861; d. 23 Feb 1883) assisted him. With no heirs to carry on the firm, however, Nicomede sold the firm to his competitor Filippo Tronci in 1883, requiring that the new firm be named Agati-Tronci. The firm continued to build organs until 1919.

The Agati family produced some five hundred organs throughout Italy and abroad, including those at Santo Sepolcro in Jerusalem; the Colon Theater in Buenos Aires; and in France, Corsica, Chile, and Egypt.

THOMAS CIMARUSTI

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## AGRICOLA, JOHANN FRIEDRICH (1720-1774)

German composer, organist, conductor, singing master, and writer on music. Agricola entered the University of Leipzig in 1738 to study law and subsequently became a student of Johann Sebastian Bach. In 1741 he settled in Berlin and studied with Johann Joachim Quantz, and later with Carl Heinrich Graun and Johann Adolf Hasse. He became court composer to Frederick the Great in 1751, assuming the role of musical director of the opera at the death of Graun in 1759. Italian operas, German sacred oratorios and cantatas, lieder, keyboard pieces, and chorale preludes comprise much of his output. While Agricola's music was constantly criticized by Frederick, his work remains significant. Highly regarded as a singing instructor, Agricola translated and annotated Francesco Tosi's treatise on singing (*Anleitung zur Singekunst*, 1757). Charles Burney related that Agricola was the best organ player in Berlin and the best singing master in Germany.

Agricola distinguished himself as a transmitter of biographical information on Bach and insight into the performance of his music. Together with Carl Philipp Emanuel Bach, he published the elder Bach's obituary ("Nekrolog," 1754) in Lorenz Mitzler's *Neu eröffnete Musikalische Bibliothek*. This document reveals a great deal about Bach's musical beliefs and personal views of both himself and other figures of the day. It is also an important source for Bach and the organ that placed the composer's contributions in perspective, and served as a basis for future biographies.

In 1768, Agricola and J. L. Albrecht published an annotated edition of the *Musica mechanica organoedi* of Jacob ADLUNG, incorporating what he had learned about organ construction and design from Bach. In the commentary he relates Bach's views on organ building and registration, performance practice, and composing for the instrument. Specifically, Bach's own attitudes are revealed: his enthusiasm for reeds, especially those of French instruments; his opinion on low-pitched (32') stops; his preference for keyboards with shorter, narrower keys, and pedalboards that allowed for easier use of heel and toe; his views on Silbermann's pianofortes; and a description of the *Lautenclavicymbel* (lute-harpsichord). Agricola also brings into question, through specific criticisms, the idea that the organs of Gottfried SILBERMANN were ideal for Bach's music.

Agricola mediated the aesthetic debate between Friedrich Wilhelm Marpurg and Georg Andreas SORGE. In his writings, he promoted Italian music, in the face of Marpurg's advocacy of the French style, under the pseudonym Flavio Anicio Olibrio. His articles and criticisms that appeared in Friedrich Nicolai's *Allgemeine deutsche Bibliothek* reflect a conservatism typical of northern German thought of the day.

BRIAN DOHERTY

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## AHREND, JÜRGEN (B. 1930)

German organbuilder. Born in Göttingen on 28 Apr 1930, Ahrend apprenticed with Paul OTT there (1946-49) before joining the firm as an employee. In 1954, he formed a partnership with another Ott apprentice, Gerhard BRUNZEMA, in Leer-Loga, East Frisia. Ahrend

and Brunzema produced fifty-four new instruments and undertook nineteen restorations. In January 1972 Brunzema left the firm to begin an organ-building career in Canada.

Since the partnership's dissolution, Ahrend's firm has been involved in over 150 projects, including restorations. Newly built organs have been installed at Eugene, University of Oregon (1972; 4/38), University of Edinburgh (1978; 2/21), Melbourne, Monash University (1979; 4/45), Tokyo, St. Gregory House (1986; 2/13) and six instruments for Berkeley, University of California (between 1975 and 1981).

Ahrend incorporates several historical organ-building techniques into his instruments: (1) hand hammering the metal before it is formed into pipes (Bremen-Farge, Reformierte Kirche, 1957), designed to tamp the metal into a closer molecular structure and irregular surface that may help improve the tone, even speed up the ageing process to achieve the fine tone characteristic of the best historical instruments; (2) suspended action (Frankfurt-Nordweststadt, Cantate Domino Kirche, 1970), felt to have more precise touch control and lighter weight than the balanced action used in northern European-type tracker instruments built during the Romantic and ORGAN REFORM MOVEMENT eras; (3) flexible wind, supplied by weight-loaded (rather than spring-loaded) wedge bellows (Westerstede, 1971), rather than the steady, heavily regulated wind supply characteristic of twentieth-century instruments; (4) unequal temperaments (Eugene, University of Oregon, 1972); and (5) compact, simplified consoles, with narrow octave spans and short keys and pedals, lacking all registrational aids.

Restorations account for about half the workshop's time, and Ahrend is much admired for his ability to recognize and retain the salient characteristics of the original instruments. Restorations of the seventeenth-century organ at Westerhusen (1955; 1/7) and a Renaissance organ at Rysum (1961; 1/7) led to larger contracts. Significant restorations include the Ebert organ at Innsbruck, Hofkirche (1976; 2/15); the Huss/Schnitger organ at Stade, SS Cosmae & Damiani (1974; 3/42); the 1736 Erasmus Bielfeldt organ at Stade, St. Wilhadi (1988–90; 3/40); Arp Schnitger organs at Groningen, St. Martini Kerk (1984; 3/53, 32'), Norden, St. Ludgeri (1985; 4/46), and Hamburg, St. Jakobi (1993, 4/60); the 1714 Sieber organ at Vienna, Michaeler Kirche (1987; 3/40); the 1616–17 Esajas Compenius organ at Frederiksborg Castle, Hillerød (collab. M. Kjersgaard, 1988). and the 1741 Joachim Wagner organ in Trondheim (Norway) Cathedral (1994; 2/30).

JOHN HAMILTON

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## ALBERDI RECALDE, LOPE (1869–1948)

Spanish organbuilder of Basque origin. Born in Gauteiz de Arteaga, Vizcaya, on 25 September 1869, Alberdi Recalde was apprenticed to Aquilino Amezáa in Barcelona in 1885, became director of the firm in 1895, and took over entirely the following year. He was assisted by his sons Antonio Alberdi Aguirrezábal (1893–1986) and Luis Alberdi Aguirrezábal. Active for over fifty years, Alberdi Recalde built over two hundred organs, including instruments in the abbey at Montserrat, the Jesuit church in Madrid, the Gerona and Santiago cathedrals, La Seu d'Urgell in Catalonia, and several in Spain's Basque country (Bilbao, S. Nicholas; Bergarar, Andra Mari; Guanaco; Bera). He collaborated with one Martí on organs in Navarra (Echalar, S. María, 1902) and Toledo (Talavera de la Reina, Colegio Compañía de María, 1905). A builder of high-quality instruments, Alberdi Recalde was considered advanced technologically, using mixed mechanical systems, replacing pneumatic with electric action, and avoiding the use of sliding valves. His organs found their way to South America and the Philippines. He died in Barcelona on 19 March 1948.

RICHARD KASSEL

## ALEXANDRE

French reed organ manufacturer. Founded in 1829 by Jacob Alexandre (b. Paris, 1804; d. there, 11 June 1876), it was originally intended for the production of accordions. As early as 1834 the firm exhibited a small REED ORGAN with two ranks of reeds, and the line soon expanded, particularly with the purchase in 1841 and 1845 of the reed organ patents of Louis-Pierre Alexandre Martin of Provins. Jacob Alexandre was joined by his son Édouard Alexandre (d. Paris, 9 Mar 1888); the firm became Alexandre, Père et Fils. Alexandre's instrument was originally called a "orgue-mélodium" (introduced 1844) to avoid a legal clash with Alexandre François DEBAIN, inventor, patent holder, and owner of the "harmonium" trademark. Martin himself became an Alexandre partner for a time; he and Édouard were responsible for a number of innovations in the harmonium. Martin, in particular, invented the percussion action, whereby small hammers struck the

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reed tongues, thus assuring promptness of speech; and the *prolongement*, by means of which individual tones could be sustained.

Shortly after 1855, Alexandre built a large factory at Ivry-sur-Seine; the firm rapidly became the leading builder of harmoniums in France, winning numerous awards for excellence and innovation. Offices and showrooms were scattered across Paris. Its instruments of the period generally had four ranks of reeds controlled by a five-octave keyboard, with octave couplers, a GRAND JEU, and, most important, the expression stop, the presence of which became the hallmark of the true (compression) harmonium. This device, which bypassed the reservoir to allow direct control of the dynamic level by means of the treadles, has been credited to the Alexandres; it as well as many other improvements were widely adopted by other makers.

Ironically, it was at the Alexandre firm that the suction principle was discovered, as early as 1835, which was to change the reed organ world drastically. The firm built several organs utilizing this principle, but Alexandre was dissatisfied with their limited expressive capabilities. The invention was subsequently developed by MASON AND HAMLIN, generally thought to have been the first to produce the so-called American organ on a production basis. The Alexandre firm suffered considerably from the competition of instruments using this system, and in 1874 finally introduced an instrument utilizing the suction principle, the Alexandre Organ.

By 1878 the Alexandre firm had a factory capacity of one thousand organs per month. The firm built instruments of all sizes and varieties, and by 1898 its catalog exhibited a popular four-octave instrument called the “orgue à cent francs” as well as large three-manual and pedal instruments and all sizes in between. They also produced a church model with seven and one-half ranks of reeds, a combined reed and pipe instrument, a combination piano and reed organ, and a tiny tabletop instrument called the “mélodiflûte.” Numerous reed organbuilders began their careers with Alexandre, such as Christoph & Etienne, Mustel, and Trayser. The name was continued into the 1930s by the reed organ maker G. Fortin of Paris.

JAMES HOWARD RICHARDS

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## ALIQUOT

Acoustically speaking, a stop based on the partials of a given pitch, but in a manner that focuses on non-octave and –fifth partials. In general, “aliquot” denotes a “lowest prime factor”—that is, a number that divides another without remainder (e.g., 5 is an “aliquot part” of 10). Since wavelengths are inversely proportional to frequency, the wavelengths of the partials are aliquot-parts of the fundamental wavelength. Organbuilders apply this principle in the MUTATION stop (overtone stop, aliquot stop, *Aliquotstimme*).

Mutation stops are generally single-rank stops, with wide scaling and high lead content. They are pitched at one of the partials (third, fifth, seventh, ninth, etc.). Sometimes aliquot stops are also MIXTURES (e.g., the Tierce). In other instances, mutation stops occur in PRINCIPAL ranks, such as the Twelfth (2-2/3') and Nineteenth (1-1/3').

Widely used examples of aliquot stops are the Larigot (1-1/3') and Nasard (2-2/3' or 1-1/3'); in some cases, the Rohrflöte (10-2/3', 5-1/3', 2-2/3', or 1-1/3'), Septième (4-4/7', 2-2/7', or 1-1/7'), and Tierce (1-3/5').

PETER G. C. VAN POUCKE

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## ALLEN ORGAN COMPANY

SEE ELECTRONIC ORGAN

### ALLEY, JOSEPH (1804–1880)

American organbuilder. Born in Kennebunk, Maine, on 4 Mar 1804, apparently self-taught, Alley began making reed organs at age eighteen. In 1826 he moved to Newburyport, Massachusetts, where he married Lucy B. Knowles; of their children, only Joseph Alley

II (1832–1870) is known to have followed his father's trade, working for him as a pipemaker.

Backed by local businessmen, Alley built several organs (and a few pianos) between 1826 and 1850. Three or four of these were located in Newburyport churches, while others were installed in Maine and along the Merrimack River at least as far as Haverhill, Massachusetts. At the time of his death he is said to have built thirty-seven organs, but only one is extant, in the First Religious Society of Newburyport (1834). Although twice rebuilt, the instrument still contains much of Alley's work.

In 1849 and 1851, in conjunction with Henry Ward Poole (1826–1890), Alley built two experimental "eu-harmonic" organs, which, by means of added pipes and shifting pedals, were said to play in pure (just) intonation, sounding untempered intervals from a normal keyboard. While Alley and Poole had high hopes for the commercial success of their invention, only two instruments were ever made, and both were sold at a loss. Neither man ever gave up the dream of a purely tuned organ, and when Poole returned briefly in 1868 with a design for a thirty-six-note keyboard, Alley built a small reed organ to his design. Otherwise, Alley gave up his workshop and spent the remainder of his life making pipes for other builders. He died in Newburyport on 8 March 1880.

BARBARA OWEN

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## ALSACE

The most eastern region of France; its major cities include Strasbourg, Colmar, and Mulhouse. Alsace was part of the Holy Roman Empire until the seventeenth century, and was ceded to Germany after the Franco-Prussian War (1871–1918). One result is that builders from both countries were active there, producing a unique blend of characteristics. The Alsatian organ style follows the French classical tonal design but with fewer reed stops and a German-style independent Pedal. In Strasbourg, the SILBERMANN family shop (Andreas, Johann Andreas, Johann Daniel) was active from 1699 to 1781. The Callinet family in Rouffach (François,

Joseph, Claude-Ignace, Louis, Louis-François) was active in the nineteenth century for various firms (including DAUBLAINE-CALLINET). After Joseph Callinet's death in 1857, Claude-Ignace Callinet modified his style by trying new stops and techniques. Joseph's foreman, François-Antoine Berger, set up his own shop and continued the Callinet tradition, pursued by his son and grandson, Joseph-Antoine Berger and Alfred Berger. Edmond-Alexandre ROETHINGER (1866–1953) founded Maison Roethinger and built Italian-style organs with low wind pressure. A number of the instruments used pneumatic action, but Max Roethinger (1897–1981) returned to tracker action after 1960. Georges Schwenkedel (1885–1958) and Ernest Mulheisen (1897–1981) left Maison Roethinger in 1921 to create Maison Schwenkedel. In 1941, Mulheisen made the changeover to building neobaroque organs; the company, now called Muhleisen G. Walther et Associés, is run by Georges Walther. Ernest Muhleisen's brother-in-law, Alfred KERN, founded a company in Strasbourg in 1953.

Important Alsatian organs include the Andreas Silbermann organs at Marmoutier, St. Étienne (1709; 3/28) and Ebersmunster, St. Maurice (1732; 3/28); the Johann Andreas Silbermann organs at Strasbourg, St. Thomas (1741; 3/38; reconstr. Kern, 1979) and Soultz-Haut-Rim, St. Maurice (1750; 3/31); Mollau, St. Jean Baptiste (Joseph Callinet, 1833; 2/26); Mulhouse, Temple St.-Etienne (Cavaillé-Coll, 1863; 4/52); and Fréland, Assomption de la BVM (Louis-François Callinet, 1877; 2/28).

*See also* **France; Organ Reform Movement; Schweitzer, Albert**

HEATHER HERNANDEZ

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## ALTERNATIM

### ALTERNATIM

In the European Latin liturgy, a procedure in which a specific piece is divided between distinct, generally dissimilar forces; the musical realization of a division of spoken text between leader and congregation. First practiced in unaccompanied chant, alternatim later incorporated the organ into its a cappella texture. Alternatim was first applied to responsorial plainchant (e.g., gradual or alleluia), with a solo singer (cantor) taking the opening phrase of a verse, completed by the full choir; the medieval organ may have doubled the choir or even played the chant alone in alternation. Discant organum (eleventh and twelfth centuries) alternated lively polyphonic solo sections supported by chant fragments in long note values (the cantus firmus, either sung, played on the organ or both) with plainchant choir, a texture that survived in altered form into the Renaissance.

By the time the organ was fully integrated into church performance (fourteenth century), the organist would play polyphonic settings of chant verses, usually improvised, in alternation with plainchant choir. Increasingly, other parts of the Mass (in both the Ordinary and Proper) were performed in this fashion; the procedure attained general currency by the fifteenth century, even though composers were now producing fully polyphonic sung Mass and Proper settings. While improvisation continued to fulfill the organ's alternatim role, new organ genres, notably settings of Mass passages (especially Ordinary pieces based on the corresponding cantus firmus) and hymns or versets (replacing even- or odd-numbered verses), emerged in the late medieval era and Renaissance. In a majority of cases, manuscript and published works do not provide enough music for a full complement of verses, suggesting repetition or, more likely, improvisation to complete the organ's role. Organum-like pieces gave way to greater variety of texture and less dependency on the cantus firmus. Organ alternatim survived the reform measures of the Council of Trent (mid-sixteenth century) and flourished, especially in France and Italy (and, to a lesser degree, Germany, Spain and England). By the eighteenth century, French composers were dominating ORGAN MASS and other alternatim composition; even after the Vatican banned alternatim performance in 1903, they continued to compose non-liturgical works in that tradition.

RICHARD KASSEL

### ALTES LAND

Altes Land ("Old Land") is a lowland area extending seventeen miles on the southwest bank of the lower Elbe River, between the cities of Stade, Buxtehude,

and Hamburg-Harburg. It is part of the Elbe-Weser region in northern Germany. The eastern extent of Altes Land has been open to question, as it has never been a political unit; it seems reasonable to name the Süder-Elbe River branch as that border.

Hamburg organbuilder Arp SCHNITGER lived in Neuenfelde and provided eight out of the ten regional Lutheran churches with new or rebuilt organs; many of these survive with original stops and other elements. Rudolf von BECKERATH started his career by taking organ measurements in the area. Altes Land was also one of the first regions to get the attention of the ORGAN REFORM MOVEMENT; restoration efforts began as early as 1938, in Neuenfelde.

Schnitger instruments are found in Neuenfelde (1683–88; rest. Ott, 1978–79); Hollern (1688–90; reb. E. Kemper, 1966–67); Steinkirchen (1685–87; rest. Beckerath, 1987); and Borstel (1677; new case, 1770–72). Schnitger cases now house instruments by KEMPER (Estebürge, 1702; new organ, 1958–59) and FÜHRER Orgelbau (Jork, 1709; new organ, 1980–82). The instrument in Mittelnkirchen is a mélange of registers dating back to the sixteenth century, including those of Arp SCHNITGER (1688) and Jacob Albrecht and Johann Matthias Schreiber (1750–53), followed by several restorations, most recently by Beckerath (1992). Other historic instruments are in Grünendeich (D. C. Gloger, 1766; rest. Hillebrand, 1992); Twielenfleth (P. Furtwängler, 1861); Neuenkirchen (Ott, 1936); and nearby Buxtehude, St. Petri (P. Furtwängler, 1859; rest. Führer, 1983).

JÜRGEN EHLERS

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## ALUMINUM

Aluminum has been commercially available as a metal for only one hundred years. Previously it was so rare, exotic, and precious that it was even chosen for the point at the top of the Washington Monument in the Washington, D.C. The price eventually fell and, with new fabrication techniques, aluminum has been developed as a metal for organ pipes.

In the 1940s organbuilder Charles McMANIS pioneered the development of extruded aluminum organ pipes. Difficult to solder or weld, the material was problematic and saw only limited use. In the 1960s Gerhard Beisecker patented a method of joining aluminum seams on the backs of organ pipes, but the system was less than permanent and proved a dead end in aluminum pipe development, even though some ranks were sold and installed.

Technical advances in welding aluminum are responsible for a resurgence of this metal and, for the first time, organ pipes of aluminum have been fabricated with an all-welded construction. Unfortunately, the appearance of the welds on aluminum pipes is not as clean, smooth or small as on “pipe metal” (tin/lead), zinc, or copper, and many builders await an improvement in these welding techniques before such pipes are acceptable.

In the meantime, aluminum is becoming a reasonable alternative to tin in many ways. Polished aluminum pipes now rival polished tin in appearance, with the long-term stability (preserved by the instant formation of the clear aluminum oxide skin on the metal) necessary for facade pipes. Cost is another factor, with tin having become very expensive in comparison to aluminum. Finally, much exploration is being done on the possible applications of aluminum. In addition to 16 façade pipes, small pipes that would normally be made of pipe metal have been produced in aluminum.

Naturally, any new material will find slow acceptance, simply because it is not the standard tin/lead alloy, and not all builders find the sound of aluminum pipes sufficiently pleasing. Another apparent disadvantage to the all-aluminum pipe is that all constructional features must be done in aluminum, including ears, hooks, and miters; furthermore, unless special welding equipment is available, physical revisions or additions to the pipes are difficult if not impossible to make. (Doing a miter “on the job” is therefore pretty much

out of the question.) The builder using aluminum pipes must work out every detail carefully in advance.

A highly pure aluminum produces the best results—a pipe that is soft and strong. Alloyed with other metals, aluminum becomes harder and more rigid, but even the softest available material seems adequate for supporting the largest pipe (one person can easily lift a 16 aluminum Prestant). It is the near deadsoft character of the metal that brings it closer to tin/lead in sound than either zinc or copper usually does, at least to the ears of some builders.

SEE ALSO **PIPE METAL**

CHARLES HENDRICKSON

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## AMERICAN CLASSIC ORGAN

SEE *NEOCLASSICAL ORGAN*; *ORGAN REFORM MOVEMENT*; *UNITED STATES OF AMERICA*

## AMERICAN GUILD OF ORGANISTS

The American Guild of Organists (AGO), a national organization of organists and church musicians, was founded in 1896 in New York (on the model of Britain’s Royal College of Organists) and subsequently chartered by the State of New York as an educational association. Membership is organized by local chapters throughout the country; in 2003 there were approximately 20,000 members, spread among over 340 chapters in the United States, a European chapter, and chapters on several other continents. The annual budget exceeds \$2 million. The organization conducts annual examinations designed to further practical skills in performance, conducting, and accompanying; it publishes a monthly magazine, *The American Organist* (begun as *Music Magazine* in October 1967, under its current name since January 1979), as well as other material in the field.

Originally established for the purpose of improving the quality of church music in the United States, a constitution was adopted two months after the initial organizational meeting on 3 February 1896. Gerrit Smith was the first warden and Dudley Buck the first honorary president; founders included John K. Paine and George W. Chadwick. The first chapters were established in Pennsylvania, Massachusetts, and Illinois in 1902, 1905, and 1907, respectively. The group merged with the National Association of Organists in 1935.

## AMERICAN ORGAN ARCHIVES

Membership reached 6,000 in 199 chapters by its fiftieth anniversary in 1946.

National conventions were held at various intervals following the first one in 1914 in New York, becoming biennial events after World War II. Since the 1960s these have alternated with conventions in nine regions throughout the country. A national competition in performance was founded in the 1950s; improvisation and composition competitions have since been established. The levels of certification, achieved by the passing of written and performance examinations, begin with Service Playing and range up to Fellow of the AGO. The appointment of a full-time executive director in 1978 signaled the AGO's desire to expand beyond its New York base with a volunteer organization and elected officers representative of the country at large, complemented by less stringent requirements for membership and holding office and the diminishing of examination activities. The national headquarters remains in New York.

Past official journals have been *The Pianist and Organist* (1896–99), *Bulletin of the American Guild of Organists* (1899–1901), *Church Music Review* (1901–18), *The American Organist* (1918–20), *New Music Review* (1920–35), and *The Diapason* (1935–1967, which continued as an unaffiliated publication).

See also **Organizations**

ARTHUR LAWRENCE

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## AMERICAN ORGAN ARCHIVES

A specialized organ research collection that houses books, periodicals, recordings, microfilms, directories, census data, nameplates, tools, business records of firms, and extensive files pertaining to American and European organbuilders. Funded and owned by the Organ Historical Society (OHS), it is operated by Westminster Choir College, Princeton, New Jersey, and directed by a board of governors. Located at the Talbot Library at Westminster Choir College it is one of the world's largest collection of organ research materials. The archive is strong in organ periodical literature and books, and has a quantity of manuscript material. Much of the collection is cataloged in the Online Computer Library Center (OCLC) database.

The archive was organized in 1960 by the National Council of the OHS, based on the contributions of OHS members in the form of duplicate books, periodicals, and other materials. Thomas S. Eader (1931–1987)

was appointed archivist, and the collection was held at the Historical Society of York County, Pennsylvania. In 1964, Homer D. Blanchard (1912–1988) became archivist; in 1967, the collection was moved to the library of Ohio Wesleyan University in Delaware, Ohio. In November 1984, Stephen L. Pinel succeeded Blanchard, who resigned for health reasons; after negotiations, Pinel was able to move the collection to its present location.

See also **Organizations**

STEPHEN L. PINEL

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## AMERICAN THEATRE ORGAN SOCIETY

The American Theatre Organ Society (ATOS), organized in 1955, is dedicated to the preservation, restoration, and promotion of the THEATER ORGAN and its music. Its headquarters is in San Francisco. ATOS has grown from modest beginnings into an international society of more than five thousand members. ATOS chapters present concerts, silent film programs, and educational seminars; they also encourage young musicians to become proficient theater organists through events like the annual Young Organist Competition and through scholarships to aspiring organ students. ATOS produces a bimonthly journal, *Theatre Organ*, and a radio program, *Theatre Pipes*. Its comprehensive archives/library collection in Joliet, Illinois, is available by appointment to members, music scholars, and historians.

Some prime examples of extant American theater organs are Radio City Music Hall's Mighty WURLITZER organ (4/58) in New York; the MOLLER (4/42) in the Fox Theatre, Atlanta; the Wurlitzer (4/20, double console) at the Paramount Theatre, Denver; the AUSTIN (4/75) at Bushnell Memorial Hall, Hartford, Connecticut; the ÆOLIAN-SKINNER (4/71) at the Hershey, Pennsylvania, Community Theatre; the Barton (4/24) in the Rialto Square Theatre, Joliet, Illinois; the Wurlitzers of the Orpheum (3/14) and El Capitan (4/37) Theatres in Los Angeles; the PILCHER (4/85) in Memorial Auditorium, Louisville, Kentucky; the W. W. KIMBALL (3/38) at the Oriental Theatre, Milwaukee; the Wurlitzer (4/27, double console) at the Paramount Theatre in Oakland, California; the Wurlitzer (5/21) at the Providence, Rhode Island, Performing Arts Center; the Robert

Morton (4/23) at the Saenger Theatre, Pensacola, Florida; and the Wurlitzer (4/21) at the Castro Theatre in San Francisco.

See also **Organizations; Richards, Emerson**

RICHARD KASSEL

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American Theatre Organ Society. <<http://www.atos.org>>. The Theatre Organ Home Page. <<http://www.theatreorgans.com>>.

### ANCHES

A term first employed in French Romantic organ building and registration; its literal translation is “reeds.” But in practice, *anches* is used in a broader sense: to designate the reed ensemble of each division, which commonly included most reed stops, higher-pitched flue stops (often above 4’), and the mixtures. César Franck, Louis Vierne, Charles-Marie Widor, and other nineteenth- and twentieth-century composers used the anches to produce brilliant dynamic effects. The use of the anches is a critical aspect of French organ music of the Romantic and modern periods.

The practice of combining reed stops with select flue ranks to produce a carefully balanced reed ensemble can be traced to the GRAND JEU of the French classical organ. The Grand Jeu, however, was a fully independent registration, used for *dialogues*, *points d’orgue*, and other types of majestic concluding pieces; the Grand jeu was never combined with the Principal ensemble of the time, the PLEIN JEU. The idea of creating a new type of reed combination that could be added to or subtracted from an ensemble of foundation stops, or FONDS, during the course of a piece, in order to create crescendos and diminuendos, was the achievement of the nineteenth-century organbuilder Aristide CAVAILLÉ-COLL. The expressive potential of Cavallé-Coll’s innovation was convincingly demonstrated by Franck, whose *Six pièces*, published in 1868, inaugurated a new era, the age of the “symphonic” organ. Since that time, almost every major nineteenth- and twentieth-century French composer of organ music has utilized the anches concept to achieve dynamic effects.

On a Cavallé-Coll organ, the anches stops of a division were placed on a separate windchest from the fonds, so that they could be activated independently through the use of a VENTIL. While the precise makeup of the anches ensembles differed slightly from instrument to instrument, Cavallé-Coll commonly included all reeds (except the Voix Humaine and, sometimes, the Hautbois); the mixtures; the 4’ Flute, Octave, or Dulciana; and all other flue stops above 4’. The reed stops were commonly harmonic—that is, the pipes

contained double-length resonators in the treble to produce a rich, full sound. The flue stops, too, were commonly harmonic in the treble, with double-length pipes overblown to emphasize the fundamental.

In French Romantic practice, the anches of each division were normally “prepared” (drawn) before the playing began. (Anches drawstops were colored red or sometimes yellow, rather than black, so that they could be distinguished easily and quickly.) The anches would not sound, however, until their ventils were activated by means of *pédales de combinaison*—iron hook-down pedals that projected out from the console, just above the pedalboard—one for each division (GRAND ORGUE, RÉCIT, etc.). With the manual COUPLERS (*accouplement*) and manual-to-pedal couplers (TIRASSE) activated, and the fonds of each division drawn, an organist could produce a large crescendo on a three-manual instrument by playing on the Grand Orgue and then adding the anches ensembles one by one: first, the Récit (with the swell box closed at first, then gradually opened), followed by Positif (POSITIV), Grand Orgue, and Pédale (PEDAL). To produce a decrescendo, the procedure was reversed. Franck meticulously notated the process of adding and subtracting the anches in the scores of his large organ works, from the *Grande pièce symphonique* of 1863 to the *Trois chorals* of 1890.

On the Cavallé-Coll organ in Ste. Clotilde, Paris (1859), the instrument for which Franck wrote most of his music, the anches included all reed stops (except the Basson-Hautbois 8’ and Voix Humaine 8’ on the Récit) and flue stops of 4’ pitch or higher (except the 4’ Prestants on the Grand Orgue and the Positif and the Octave 4’ on the Pédale). In the following stoplist, the anches components are marked with an asterisk; stops that Franck would have drawn for *tous les fonds* (i.e., all fonds stops) are marked with a plus sign:

#### Grand Orgue (Manual I. C-f’’)

Montre	16
Bourdon	16
Montre	+8
Flûte Harmonique	+8
Bourdon	+8
Viole de Gambe	+8
Prestant	+4
*Octave	4
*Quinte	2 2/3
*Doublette	2
*Plein jeu VII	2
*Bombarde	16
*Trompette	8
*Clairon	4

#### Récit expressif (Manual III. C-f’’)

Flûte Harmonique	+8
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## ANDERSEN, POUL-GERHARD

Bourdon	+8
Viole de Gambe	+8
Voix Céleste	8
Flûte Octaviane	4
*Octavin	2
*Trompette	8
*Basson-Hautbois	+8
*Voix Humaine	8
*Clairon	4

### Positif (Manual II. C-f''')

Bourdon	16
Montre	+8
Flûte Harmonique	+8
Bourdon	+8
Viole de Gambe	+8
Unda Maris	8
Prestant	+4
*Flûte Octaviane	4
*Quinte	2 2/3
*Doublette	2
*Plein jeu harmonique	III-VI
*Trompette	8
*Clarinette	8
*Clairon	4

### Pédale (C-d')

Soubasse	32
Contrebasse	+16
Basse	+8
Octave	4
*Bombarde	16
*Basson	16
*Trompette	8
*Clairon	4

On larger organs (e.g., the 1862 five-manual instrument for St. Sulpice), Cavaillé-Coll counted such additional stops as the 32' Bombarde (Pédale), the Grosse Quinte 5-1/3' and Grosse Tierce 3-1/5' (Bombarde), and the Tierce 1-3/5' and Larigot 1-1/3' (Positif) among the anches.

Other nineteenth-century French builders adopted Cavaillé-Coll's fonds-anches scheme, but often approached the precise composition of the anches ensembles differently. Ducroquet and Fermis et Persil went so far as to include 8' flue stops. At the opposite end of the spectrum, Joseph MERKLIN, Cavaillé-Coll's chief competitor, commonly constructed an anches ensemble of reeds and mixtures only. It is noteworthy that Franck played the organs of all four builders.

See also **Mechanical Aids; Reed**

GEORGE B. STAUFFER

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## ANDERSEN, POUL-GERHARD (1904–1980)

Danish organbuilder. An unassuming but active figure in twentieth-century organ building, Andersen's contributions are known internationally by organbuilders and performing artists, many of whom came to Denmark to record on his instruments.

While pursuing a career as civil engineer at the Polytechnic Institute, Andersen studied organ playing. In 1926, he began his apprenticeship at MARCUSSEN & SON in Åbenrå, Jutland. He quickly became a respected associate. In 1963, he established his own organ-building company. As a builder, Andersen occupied a position of leadership in the Danish ORGAN REFORM MOVEMENT. The group, which included performers such as Finn Viderø and Sybrand ZACHARIASSEN, advocated a return to classical principles of organ building. In 1995, his firm merged with P. Bruhn & Son.

Andersen built new instruments, but is primarily known for his restorations, including organs in Christians Kirke, Copenhagen (1976, incorp. 1759 H. J. Müller facade); Frederiksborg Slotskirke (1972, incorp. 1864 Marcussen facade); St. Olai Cathedral, Helsingør (1969); Vor Frelser's Kirke, Christianshavn/Copenhagen (1965); and cathedrals in Lund and Skara (both Sweden).

JOANNE CURNUTT

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## ANDOVER

American organ-building firm. The Andover Organ Company was founded in 1948 by Thomas W. Byers of Louisville, Kentucky. Byers attended Princeton University and had worked for PILCHER in Louisville and Raymond in Princeton. He wanted to build a better organ than he saw in contemporary American practice. Influenced by Arthur Howes's Organ Institute in Andover, Massachusetts, he began a new company in the



Fig. 11. Andover organ, op. 83a (3/39), Church of the Epiphany, Danville, Virginia (Photo by William Van Pelt).

Andover area, at first in Lawrence, then a permanent workshop in Methuen. Along with maintenance, he rebuilt a number of existing organs, giving them clearer and more brilliant ensembles. Also, new organs with electric action and modern tonal design were made.

In 1955, Charles B. FISK, who had studied physics at Stanford University and subsequently worked for Walter HOLTKAMP, became a partner with Byers. During the early years, much work was performed on old New England tracker organs, and the emphasis of the company gradually turned in this direction. In 1956, their first new organ, using slider-chests and electric action, was installed in the Congregational Church of Williamstown, Massachusetts, followed the next year by a similar instrument for the Rice Institute in Houston, Texas.

In 1956, Robert J. Reich, a Yale graduate and former teacher, joined the company, followed in 1957 by Leo E. Constantineau, a graduate of the New England School of Art, cabinetmaker, and specialist in visual and mechanical design. By 1958, the company decided to build only tracker organs in the future and to specialize in tracker organ rebuilding and maintenance, soliciting this type of work throughout New England and

adjacent states. The first new American tracker organ since the end of the tracker era was installed in 1959 in Redeemer Lutheran, Lawrence, Massachusetts.

In 1958, Fisk became sole owner of the Andover Organ Company. In 1960 he moved to Gloucester, Massachusetts, to build tracker organs under his own name. Constantineau and Reich remained in Methuen as president and treasurer/tonal director, respectively, of Andover. In 1962, Donald H. Olson, a graduate of St. Olaf College, joined the company, later becoming general manager and part owner. In 1964, Andover effected the world's first "retrackerization" of an electrified tracker organ at St. George's Primitive Methodist, Methuen, setting an example for future retrackerizations by Andover and others.

In 1979 the firm purchased an old mill building in the Arlington District of Lawrence, Massachusetts, where it remains today, employing twenty workers. Andover's average annual output is two new organs and three to four rebuilds or restorations. Since the 1950s, Andover has restored, renovated, or rebuilt several hundred old tracker organs, often with tonal improvements, and always with retention of mechanical action.

## ANDREWS, ALVINZA

Some of the more significant organs of the company are: Mt. Hermon School, Northfield; Phillips Academy, Andover; Gordon-Conwell Theological Seminary, Wenham; St. Paul's Episcopal Cathedral, Boston; First Congregational, Rockport (all in Massachusetts); Lawrenceville (New Jersey) School; Lutheran Theological Seminary, Gettysburg, Pennsylvania; Meredith College, Raleigh, North Carolina; St. John's Episcopal, San Bernardino, California; Church of the Epiphany, Episcopal, Danville, Virginia; Westminster Presbyterian, Clinton, South Carolina; and First Presbyterian, Richmond, Virginia. Andover's most recent new organ (op. 112) was built for Saint Bartholomew's Episcopal, Yarmouth, Maine (2/18).

ROBERT J. REICH

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## ANDREWS, ALVINZA (1800–1862)

American organbuilder. In 1834, Andrews began making SERAPHINES in Waterville, New York. By 1842, he was building pipe organs; a small instrument was erected that year in Zion Episcopal, Morris, New York. In August 1852, Andrews relocated his shop to Utica, a center of commerce in upstate New York with convenient access to transportation. Following his death in Utica on 8 October 1862, he was succeeded by his son, George Norton Andrews (b. Waterville, NY, 12 Oct 1832; d. Oakland, CA, 17 Sept 1904), who relocated the business to Oakland, California in January 1888.

In total, the Andrews firm built about two hundred instruments between ca. 1840 and 1904. During the 1840s and '50s, it supplied clients in Boston and New York, in competition with Henry ERBEN and Thomas APPLETON. His largest organ may have been the instrument built in 1855 for Utica's Westminster Presbyterian. Andrews's organs were influential and had a wide geographical distribution. A serious study of his work is awaited.

STEPHEN L. PINEL

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## ANSELMI-TAMBURINI

SEE TAMBURINI

## ANTEGNATI

Italian family of organbuilders, composers, and musicians active between the late fifteenth and mid-seventeenth centuries. The Antegnati organ firm was founded by Bartolomeo Antegnati (b. Brescia, ca. 1450; d. Bergamo, 1501), the son of Giovanni Antegnati, a lawyer who had established citizenship in Brescia with his father Lorenzo in 1436. Having set up a workshop in Lumezzane, Bartolomeo became the first organbuilder of the family, possibly learning the art of organ building from Bernardo d'Allemagna. An early work appears to be the reconstruction of the S. Maria Rotonda in Brescia (1481) by one "magistro Bartolomeo de Lumesani." He is best known for his organs at S. Pietro, Bergamo (1484), the Duomo in Milan (1489–91), S. Maria Maggiore, Bergamo (1496), and the cathedrals in Como and Mantua. In 1501 he found himself in Albino (near Bergamo), where he began negotiations for the construction of an organ for the Coronation of the Virgin Mary in Lodi, a task he abandoned in 1503. In addition to building organs, Bartolomeo was organist at Brescia Cathedral.

Of Bartolomeo's two sons, Giovanni Giacomo Antegnati (b. Brescia, ca. 1501; d. 1563) received the most praise for his work. His organs include those at S. Maria delle Grazie, Brescia (1533), the cathedrals in Milan (1552–59) and Parma (1556–59), and S. Maria della Passione (1558). He also restored the organs at the Vigevano Cathedral (1547) and Salò Cathedral (1548). Taking up residence in Milan in 1540, Giovanni Giacomo may have been the organist at the Duomo for a period of time. Benedetto Antegnati (b. 1535; d. 1608), son of Giovanni Gioacomo, built and restored a number of organs, including those at S. Alessandro, Brescia (1564), Duomo, Turin (1567), S. Maria della Steccata, Parma (1573), and the Parma Cathedral (1575).

Bartolomeo's other son, Giovanni Battista Antegnati (b. Brescia, ca. 1490; d. Lodi, ca. 1556), was known primarily as an organist, holding a position in the Chiesa dell'Incoronata, Lodi (1544–56); he was involved in the reconstruction of the organ in the Basilica del Santo, Padua. Giovanni Francesco Antegnati (fl. 1533–1585), probably the third of Bartolomeo's sons, was praised by Giovanni Maria Lanfranco (*Scintille di musica*,

1533) for his “extreme diligence in the construction of monochords, harpsichords, and clavichords.” He also helped Giovanni Giacomo in the construction of the organ at Salò Cathedral (1548).

The most remarkable builder of the Antegnati family was Graziadio Antegnati (b. 1525; d. after 1590), son of Giovanni Batista. He built organs at S. Maria Maggiore, Bergamo (1564–66), S. Spirito, Bergamo (1566–67), S. Barbara, Mantua (1565), Asola Cathedral (1573–1575), and the Crema Cathedral (1586). His only extant organ, however, is at S. Giuseppe, Brescia (1581).

Costanzo Antegnati (b. Brescia, 9 Dec 1549; d. Nov 1624), son of Graziadio, is the best-known member of the family. He collaborated with his father (from 1570) before taking a post as organist at Brescia Cathedral, a position he held until 1604. His organs include those at S. Giorgio, Bagolino (1590), the Madonna della Steccata, Parma (1593), S. Maria Maggiore, Bergamo (1593–94), and S. Giorgio Maggiore, Venice (1612). His fame rests primarily on his *L'arte organica* (Venice, 1608), a treatise containing a list of 144 organs built by the family, rules in tuning organs, harpsichords, and monochords (basically advocating meantone temperament), and suggestions on organ registration. In addition to twelve ricercars (published as *L'Antegnata* (1608) together with *L'arte organica*), Costanzo also composed a number of madrigals, masses, and motets. Costanzo's son, Giovanni Francesco Antegnati (b. 1587), serves as an “interlocutor” in *L'arte organica*.

The last organ-building member of the Antegnati family was Graziadio Antegnati (b. Brescia, 1609; d. 1656). In 1636 he was the *conservatore* of the organ at S. Marco, Venice; he later became organist at the Padua Cathedral (where he maintained the organ, 1644–45). He also worked on instruments at S. Giorgio Maggiore, Venice, and Brescia, S. Carlo, attributed (1636; 1/12; rest. Maccarinelli, 1958).

The specifications of the Antegnati organ were uniform in style: a single manual, a pull-down pedal, an open flue chorus (Principale 8'), a few Flutes of wider scale, and a single ripieno stop, incorporating an Ottava (4'), Quintadecima (2'), and, depending on the size of the instrument, Decimanona (1-1/3'), Vigesimaseconda (1'), Vigesimasesta (2/3'), Vigesimanona (1/2'), and Trigesimaterza (1/3'). Antegnati avoided reed stops and (unlike other Italian builders) double ranks for the ripieno and the Principale.

THOMAS CIMARUSTI

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## APPLETON, THOMAS (1785–1872)

American organbuilder. Born in Boston on 26 December 1785, the son of a carpenter, Appleton was apprenticed to a cabinetmaker, but became associated with William M. GOODRICH in 1807 along with the piano builder Alpheus Babcock, who later shared their workshop. The partners operated a workshop at the Franklin Musical Warehouse. A small chamber organ, now in the Congregational Church of Phillipston, Massachusetts, has “Goodrich & Appleton” inscribed on its nameboard, and appears to have been built in 1812, the year Appleton married Goodrich's sister.

When the Franklin establishment closed, Appleton opened a workshop in Boston late in 1820. He built an organ for the First Church in Roxbury, Massachusetts, assisted by Ebenezer Goodrich, who, over the span of two or three years, occasionally worked for him. Others who were associated with him in the 1820s were Henry CORRIE and cabinetmaker James Cogswell, who made many of Appleton's unusually handsome organ cases. During the 1830s Appleton was unquestionably the leading organbuilder in Boston, securing contracts for prestigious churches such as Boston, Bowdoin St. (1831, associated with Lowell Mason) and the Hartford, Connecticut, Centre Church (1835), as well as Boston's Academy of Music (1836). By the 1840s his work could be found along the eastern seaboard from South Carolina to Maine; one of his largest organs was built in 1846 for the Church of the Pilgrims in Brooklyn, New York.

Among the men trained in his workshop were WILLIAM B. D. SIMMONS, Thomas McIntyre, and Thomas D. Warren, who was Appleton's partner from 1847 until 1850, when Appleton moved his workshop to Reading, Massachusetts. In 1856 Horatio Davis was, for a brief time, Appleton's partner. Although highly regarded, Appleton faced increasingly serious competition from younger builders such as the Hooks; fewer organs appear to have been built in the Reading shop. His last instrument, built in 1867 for Boston's Baldwin Baptist, was among the largest of his more

## AQUINCUM ORGANBUILDER COMPANY

than 100 organs. He died in Reading on 11 July 1872. Two of his organs are now in the Metropolitan Museum of Art, New York, and the Smithsonian Institution, Washington, D.C.

BARBARA OWEN

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## AQUINCUM ORGANBUILDER COMPANY

Hungarian organ-building firm. Founded in 1894 in Budapest by RIEGER, the company began as a branch to the main workshop in Jägerndorf, Austria (now Krnov, Czech Republic). The Budapest shop soon became an independent firm and, in the first half of the twentieth century, produced well over a thousand instruments for locations in Hungary and throughout Europe. During World War II the company sustained considerable physical damage and during the difficult postwar era the nationalized company struggled to continue its maintenance and building of church organs. After the proprietors of the former Rieger branch were expelled from Hungary in 1974, Gábor Kovács took over as director of the Budapest branch. In 1976 the firm returned to the production of tracker organs, signaled by the exhibition of two instruments at the Budapest International Fair. Changing its name to Aquincum, the firm developed markets in Germany, Hungary, and Iceland. In 1990 the management obtained ownership of Aquincum as a private enterprise under the direction of Kovács.

Aquincum has based its tracker organs on the Dutch classical suspended action organ, although elements of Romantic voicing are mixed into the Baroque sound. New instruments in Hungary include: Debrecen, Reformed (3/57); Pannonhalma, Benedictine Abbey (1985; 3/41); Nagyköros, Reformed Church (1997; 3/46); Tihany, Benedictine Abbey (2/24); Szombathely (3/54); Piliscsaba, St. Peter Catholic University (3/37); Hévis, Holy Spirit (3/36); and Zirc, Cistercian Abbey (3/44). Among the firm's restorations was the reconstruction and enlargement of a 1902 Rieger organ at the Ferenciek Tere Templon in Budapest, built in 1743.

The original case was adapted to hold four manuals and the Pedal; all work was done on location. The wind pressure is 75 to 80 mm; tracker key action is used, but the stops and combination stops are electric.

DOUGLAS E. BUSH

RICHARD KASSEL

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## ARGILLIÈRES, D'

SEE D'ARGILLIÈRES (DARGILLIÈRES, DESARGILLIÈRES)

## ARNAULT (ARNAUT) DE ZWOLLE, HENRI (D. 1466)

Doctor of medicine, astrologer, astronomer, and theorist. It is generally accepted that Arnault was born in Zwolle (Netherlands), although some have suggested that he may have been from Zuuolis (Bohemia). Arnault de Zwolle is best known for his treatise on musical instruments (MS Bibl. Nat. Paris, lat. 7295). This treatise is usually dated around 1440, when Arnault was in the service of Philip the Good, Duke of Burgundy. In about 1455 he entered the service of Charles VII of France, and later of Louis IX of France. He died of the plague in Paris.

Arnault's untitled treatise is very important since it is the oldest known technical description of European musical instruments. He provides diagrams on the construction of the lute, the harpsichord, the clavichord, the *dulce melos* (keyed dulcimer), and the organ. He gives an empirical description of organ pipes, describes two sorts of PORTATIVE chests, refers to REED as well as PEDAL pipes, and provides details on the *tergali positivo* (CHAIR ORGAN, or POSITIVE).

FERDINAND J. DE HEN

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## ARTICULATION

SEE VOICING

## ASIA

The countries and regions of the largest continent have highly developed cultures that predate Western cultures by centuries. China is the legendary birthplace of the *shêng*, a free-reed MOUTH ORGAN, five millennia ago, although the instrument's first known mention is around 1000 BCE. The early cultural exchanges came mostly from the East, rather than the West, often accompanied by invasion. The direction of influence began to shift in the seventeenth century, fueled by missionary fervor, then colonization and/or commercial interests. Occidental musical culture followed, especially in areas controlled or heavily influenced by the British Empire. Organs were imported to China; a 1921 inventory revealed pipe organs in Shanghai (tracker instruments by WALKER, pneumatic instruments by HARRISON AND HARRISON or Spurden-Rutt; also the ODELL firm from the U. S.), and Tianjin (Spurden-Rutt). In Hong Kong, Blackett and Howden or Walker made most of the instruments. There was a 1905 HENRY WILLIS II instrument in Bangkok and a Brindley and Foster in Ceylon (now Sri Lanka). In French Indochina, Notre Dame Cathedral in Saigon (now Ho Chi Minh City) had an Aristide CAVAILLÉ-COLL; the church survived the long civil war, but the organ's present status is unclear. A lesser-known company, Gebrüder Wellershaus of Saarn/Mühlheim, put at least one instrument in Java (now part of Indonesia) in the early twentieth century.

While the Philippines belonged to Spain (sixteenth through nineteenth centuries), the colony imported organs that were assembled and maintained by Spanish (and perhaps Mexican) builders. A remarkable organ was built by a Spanish missionary, Fr. Diego Cera, who had built organs in Manila. He began building an organ in nearby Las Piñas in 1816 using only bamboo wood, abundant in the region, for the pipes. The organ was first heard in 1821; metal horizontal trumpets were added by 1824. This one-manual organ, with nine divided stops and a one-octave Pedal stop, endured floods, earthquakes, and other ravages of time, and was unplayable by the end of the century. The KLAIS firm finally restored the instrument at its Bonn workshop (retaining its tracker action) and reinstalled it to great acclaim in Las Piñas in 1975. Since World War II, new (mostly German) instruments have been imported and assembled by local Filipino builders; while most of these are in Manila, the Mindanao city of Ozamiz has a Wagenback and LAUKHUFF in the Cathedral of the Immaculate Conception (1967; 2/30). There are signs of a local organ-building industry: in 1994, Cealwyn Tagle and Edgar Montiano completed the first Filipino-made pipe organ, located in the Diego Cera Auditorium adjoining the Las Piñas parish church.

The organ became far more prevalent in Asia after World War II, especially in Japan, which had main-

tained an ambivalent attitude toward Western culture for centuries and accepted its trappings with considerable reluctance. One rare exception was Torakusu Yamaha (1851–1916), who founded the Yamaha Reed Organ Manufacturing Company in 1887 and built his first reed organ in 1900. Japan came out of Allied occupation with a thirst for things modern (Western technology) and classical (Western music). As Western music received increasing attention in academia, concert performance, and as part of the small but significant influx of Western religions, pipe organs were commissioned from foreign builders in unprecedented numbers. The most active firms have been Klais, SCHUKE, Rudolf von BECKERATH, CASAVANT FRÈRES, OBERLINGER, and Werner Bosch Orgelbau (founded 1945, located in Niestetal/Hesse), which has built over ninety instruments for Japan. Other German firms include Paul OTT, RIEGER, Jehmlich, and Speith-Orgelbau, Rietberg (Nagasaki, St. Pius X, 2/21). The Danish firm MARCUSSEN & SON received attention when it rebuilt its 1992 organ for Konan Women's University in Kobe soon after the 1995 earthquake there. British builders returned to build instruments throughout Japan, including MANDER, Harrison and Harrison, and Simon Platt. American companies such as TAYLOR AND BOODY (Yokohama, Ferris Girls' School, 1989, 3/45, tracker), John BROMBAUGH, CHARLES B. FISK, and Hoenig (Ft. Madison, IA) brought their American neoclassical approach to the country. Having acquired the necessary skills, Japanese firms began constructing organs, including the neoclassicist builder Hiroshi TSUJI (Gifu/Kurokawa, Museum of Fine Arts, 1984; 1/9, after 1775 Tronci organ), Tokugoro Ohbayashi (Shirioishi/Tokyo, "The Cube" Concert Hall, 1997, 5/115, "symphonic" organ with MIDI compatibility), and Tetsuo Kusakari (Kiyose/Tokyo, Migiwa Church, 1997, 2/8, tracker). A physicist, Toshiyuki Mitsuhashi, built a well-received instrument for a church in Tsukuba. The federal government and two organizations, the Japan Organ Society and Japan Association of Organists, have been crucial to the support of postwar organ building, not without some infighting. The founding of the Japan Reed Organ Club in 1996 indicated the local popularity of instruments once popular in the West.

South Korea, which has experienced economic growth similar to Japan's, has instruments installed in several cities; the most active builders include Schuke (Seoul, Sejong Cultural Center, 1976, 6/121, largest Asia), Rieger/Glatte-Götz (Seoul, Torch Center for World Missions, 1997, 4/85) Klais (Seoul, Presbyterian, 3/57), RUFFATTI (Seoul, Dae Bang Dong Church, 1998, 2/17), Oberlinger (Taejon, Hyecheon University, 1999, 3/44), Platt (Seoul, Chung Lim-Dong Hall, 1995, 3/36), Bosch (Seoul, Myeong Dong Cathedral, ca. 1985, 3/35) Harrison and Harrison (Seoul, Anglican Cathedral,

## AUBERTIN, BERNARD

1985, 2/20), Speith (Taejon, Baptist, 3/45), Vleugels (Seoul, First Methodist Church, 2/21), Rieger-Kloss, and Wicks. The Klais firm installed a well-publicized instrument at the Esplanade at the Singapore Arts Center (2003, 3/63), as well as organs in Hong Kong (Chinese University), Malaysia, and Taiwan. The most symbolic installation of all may be Oberlinger's 1999 instrument at Beijing's China National Radio (3/50).

In India, Indochina, Indonesia, and Sri Lanka, there are few traces of colonial pipe organ culture; in India, particularly, the harmonium became the preferred keyboard instrument for light classical music and *filmi* (soundtracks). More important, however, was the introduction of the electronic organ. First imported from the United States and Europe in great numbers after World War II, Asian builders were soon equaling and then outpacing the imports with products of good or better quality as their models. Japan started the trend, followed soon by South Korea, Taiwan, and mainland China. Other countries (Indonesia, Philippines) were active in the assembly, if not the manufacture, of electronic organs. The expense and complexity of pipe organ building has pushed smaller churches toward electronic instruments; but in Japan and wherever else Western music (especially that of Johann Sebastian Bach) has taken root, the pipe organ remains a sought-after instrument, although remaining by and large a product of foreign builders.

RICHARD KASSEL

## AUBERTIN, BERNARD (B. 1952)

French organbuilder. Born in Boulay, Metz, Lorraine on 25 August 1952, Aubertin established the Manufacture d'Orgues Franc-Comtoise in Courtefontaine in 1978. In its factory, a twelfth-century former Augustinian priory in the Jura Mountains near Dôle and Besançon, the Aubertin firm has produced about twenty historically oriented instruments ranging to as many as forty-seven registers, and a similar number of restorations. Metal for lead pipes and for tin pipes in French style is hammered on a motorized re-creation of François BÉDOS DE CELLES's metal-hammering machine; key action is suspended in historic fashion; temperaments are unequal (normally Kirnberger III, sometimes meantone); wind supply is from wedge bellows, sometimes equipped for optional manual pumping. In the fashion of Arp SCHNITGER and other historic builders, Aubertin designs his cases in geometric proportions, according to the church or hall in which the instrument is to be installed. Influenced by a long family tradition of woodwork, his wood carvings are lavish and frequently incorporate local symbols. An instrument in a twelfth-century church at Viry-Châtil-

lon near Paris includes the town's coat of arms, which commemorates its identity as Paris's earliest airfield; an instrument for a Vichy church built under Napoleon III features stylized Napoleonic eagles. In addition to the firm's instruments in Europe, a 1992 instrument of forty-five registers was installed in a concert hall in Shirane-Sho (Japan), near Mount Fuji.

JOHN HAMILTON

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## AUDSLEY, GEORGE A(SHDOWN) (1838–1925)

British-born architect, decorative arts scholar, and organ designer. Audsley was born in Elgin, Scotland, on 6 September 1838. His elder brother, William James Audsley (1833–1907), had established an architectural practice in Liverpool by the late 1850s. George apprenticed at another Liverpool architectural firm before joining his brother around 1860, and began to lecture on elements of Victorian interior design, then heavily influenced by the pre-Raphaelite movement. George (usually in collaboration with his brother) published books on Christian symbolism, illumination and mural painting, use of color, floral decoration, ornamentation, design of smaller residences, Japanese plastic arts, and chromolithography. George and William were elected fellows of the Royal Institute of British Architects (1876). In the mid-1880s, William emigrated to the United States and set up offices in New York; he was followed by George (ca. 1892), who collaborated with him in building churches in the metropolitan area. George continued the firm after William's death, but returned to England in 1910 to publish several books on decoration, color, Japanese art, and British cathedrals, mostly with his son Berthold Audsley (b. 1873). The two returned to the United States in 1914; George continued to consult and write until his death in Bloomfield, New Jersey, on 21 June 1925.

George A. Audsley's serious interest in the organ began when he heard a recital by William T. Best on the Willis organ (1855) at St. George's Hall, Liverpool, in 1856. The combination of the organ's power and the acoustics of the vaulted hall in which it was erected made for an impressive aural display. Audsley began studying organs in Europe (later in the United States), publishing a series of articles, "Practical Hints for Amateur Organ-Builders," in 1876. One of these referred to the chamber organ he had built for himself (1865–72; 2/17; enl.; 2/20; second manual enclosed,

first manual partly enclosed). During this time Audsley began to offer professional organ consulting services. At first he was involved with installations in his own buildings, as in Liverpool, St. Margaret, Anfield (1870), where a Hill and Son organ was installed in 1873 (mech., hydraulic winding; reb. Rushworth and Dreaper, 1922; 3/41, tub.; electric blower; destr. 1961). He apparently designed other British instruments in the 1870s and '80s, although evidence remains vague.

A significant breakthrough for Audsley involved his case design for the Hilborne L. Roosevelt organ at Great Barrington, Massachusetts, First Congregation (1883; 3/60; extant). This success emboldened Audsley further; beginning in 1886, he began to publish articles on stop nomenclature and, more significantly, his three categories of organ (chamber, church, and concert hall) and their ideal characteristics (for a complete list of writings, see Fox). He attacked "prejudiced groups of professional organists," suggesting that organ-building insiders could never free themselves from familiar paths, even those "working in all good faith." His views brought the criticism of "insiders" like Carlton C. MICHELL, who preferred "the simplification system [to] the old one of multiplication," and that as an amateur Audsley would be unable to persuade buyers "to pay the increased cost which his ideas involve, beside [his] commission . . . when they can go direct to the professional experts and manufacturers and save both charges with better results" (1889). Although Audsley could hold his own in the verbal warfare over his ideas that continued to the end of his active career, he felt himself to be "rejected by the builders."

Audsley was selected to design the instrument for the Louisiana Purchase Exhibition (St. Louis, 1904), to be built by the Los Angeles Art Organ Company, successor to Murray M. HARRIS. He designed the instrument (5/140) on the Romantic principles of Aristide CAVAILLÉ-COLL and E. F. WALCKER. Having distinguished between church and concert organs, Audsley placed an Orchestral division (rather than a Choir) that, in larger organs, would divide into separate woodwind and brass manuals. The Ancillary Organ or floating division was most often dedicated to the strings, which could be coupled with woodwind, brass, or both. The organ was destined for Kansas City after the Exposition, but instead went into storage until 1909, when John Wanamaker purchased the instrument for his new department store in Philadelphia. It underwent a number of enlargements between 1914–27 (now 6/461), and remains a recital instrument at what is now Lord and Taylor.

While working to create the Exposition instrument, Audsley was seeing his book, *The Art of Organ-Building* (1905), through the press. This thorough and opinionated survey of organ case and tonal design

established Audsley's reputation as a leading authority on organ design and construction, although he had based much of his work on F. E. Robertson's *Practical Treatise on Organ Building* (1897). The book is especially noteworthy for finely executed drawings of organ mechanisms and a variety of pipes. Audsley followed this work with *The Organ of the Twentieth Century* (1919) and *Organ Stops and Their Artistic Registration* (1921), both based on the 1905 work; *The Temple of Tone* was left unfinished, and was published posthumously (1925).

Michell and others proved correct regarding the high costs of Audsley's designs; as he was not a builder himself, he needed to convince both builder and client to accept his ideas. He did succeed in this through his association with Philipp Wirsching (1858–1926), a German immigrant who worked for FARRAND AND VOTEY as well as W. W. KIMBALL before setting up his own firm (Salem, Ohio, 1898–1917). Audsley-Wirsching organs were erected at the Yonkers, New York, E. C. Clark residence, which Audsley built (1907; 1/22?; destr.); Philadelphia, St. Louis (Ludwig; 1907; dism.); Hoboken, New Jersey, Our Lady of Grace (1908; 3/52; later reb.; extant); and New York, E. Mills residence (1909; dism.).

Around 1918, he established "Brook and Audsley, organ architects" with A. S. Brook, an organist who had helped erect the Exposition organ. The pamphlet announcing the firm including the following: "G. A. Audsley, the author of the standard work on the art of organ-construction, is a church architect of reputation, and was the *first* expert in the history of organ-building to put two swell boxes or expressive divisions in an organ, and to point the way to the development of the organ as an expressive instrument throughout all its tonal divisions" [emphasis in the original]. Here Audsley expresses his assertion of the centrality of expressivity (dynamic change) and flexible sonority, an obsession that had its origins at the 1856 Liverpool recital. Audsley was clearly taking an architectural (audience's) view of organ tone, rather than a builder's or performer's.

No work is directly attributable to Brook and Audsley; however, two more Audsley-designed instruments were built: a theater organ at Upper Montclair, New Jersey, Bellevue Theater (Austin, 1921–22; 3/20), the kind of extension organ he would have opposed on principle earlier (to Whitinsville, Massachusetts, 1943; reb. 1947); and Hamilton, Ohio, First Methodist Episcopal (Moller, 1925; 3/64; repl. Casavant, 1969).

Audsley's broad perspective on organ building covered everything from the designs on the drawstops to room acoustics and their effect on tonal design. He was the Ernest M. SKINNER of his era—a Romantic orchestral organ idealist who fought with heat for his views

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when required. The difference between them was that while Skinner was a fully trained builder whose battles at the ÆOLIAN-SKINNER ORGAN COMPANY over the fine points of design could be intense, Audsley would complain of a font change in a published article of his in the *American Organist*. He was not a scientist of sound, either; his theories of acoustics were patently incorrect. Yet this “amateur” managed to realize his dream as an “organ architect” in a glorious fashion; his most significant legacy, the Wanamaker organ, remains a larger-than-life realization of that dream, however altered over the years. Finally, *The Art of Organ-building*, flaws notwithstanding, may still be the most significant tome on the subject in English.

RICHARD KASSEL

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*The Art of Organ-Building*. 1905. Reprint, New York: Dover, 1965.

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## AUSTIN, JOHN T(URNELL) (1869–1948)

English-born builder and inventor, active in America. Austin was born in Podington, a village north of London; the eldest of three boys, he was one of five children of Jonathan Austin, a gentleman farmer and amateur organbuilder, credited with at least three organs; his sons had their first organ-building experience assisting their father. Well-educated, John attended a boarding school in London, where he was a choir boy. He later attended a preparatory school in Wellingboro, and took lessons from an organist in Irchester, where he had lived since 1877.

In 1889 Austin traveled to America, and soon found work with FARRAND AND VOTEY in Detroit. Discovering that the WINDCHEST mechanism of Farrand and Votey organs was relatively inaccessible and difficult to service, he began searching for a more practical approach to chest construction. The result was an invention that became an important feature of Austin organs: the Universal Air Chest, a windchest that combined the functions of traditional chests, wind conductors, and

reservoirs, permitting a technician to work on the interior of the chest even while the organ was turned on and being played.

Failing to interest Farrand and Votey in his invention, Austin went to work for the Clough and Warren Organ Company of Detroit in 1893. Between June 1893 and February 1899 this firm built twenty-eight organs using the Austin Universal Air Chest design. There were other important events in John Austin’s life. In 1893 his brother, Basil G. Austin (1874–1958), arrived from England. He, too, worked first at Farrand and Votey, then at Clough and Warren. In 1894 John Austin became an American citizen.

The Clough and Warren factory burned down on 2 February 1899. Soon after, John Austin, Robert Pier Elliot (1871–1941), and two business partners formed the AUSTIN ORGAN COMPANY. The firm was located for a brief time in Boston, but by the fall of 1899 it had moved to a permanent home in Hartford, Connecticut. Basil, who had gone to the Yukon Territory to look for gold in February 1898, returned in July 1900 to join his brother in the new company. Another brother, Harry Austin (1870–1931), and his family moved to Hartford from England in 1920. Both he and his son Frederic B. Austin (1903–1990) worked in the Austin factory. In 1936 the Austin Organ Company closed, and John and Basil Austin retired from business. A new company, Austin Organs, Inc., was then formed under the leadership of Frederic B. Austin.

John Austin’s employees viewed him as generous and considerate; in the organ world he was highly respected as a man of exceptional ability and integrity. His organ-related innovations focused on reliable performance and ease of maintenance. In addition to the Universal Air Chest, he invented new designs for console components, swell shutter action, chest action, centrifugal blowers, and an automatic player mechanism. In all, he is credited with fifty patents. His brother Basil also contributed inventions used in Austin organs, and assisted with the development of some of John’s inventions. These inventions were a major factor in distinguishing the firm’s instruments and even its Hartford factory from those of competitors. The tools he devised for the manufacture of organ parts made the Austin shop a model of efficiency; a machine that operates ten saws and seven drills is still in use.

ORPHA OCHSE

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**AUSTIN ORGANS, INC.**

American organ-building firm. The company was founded in 1899 as the Austin Organ Company by John T. AUSTIN and a small group of business associates. Initially located in Boston, the company moved to a permanent home in Hartford, Connecticut, before the end of the year. In 1900 John Austin's brother, Basil G. Austin (1874–1958) joined the firm; together, the Austin brothers developed one of America's most successful organ companies.

John and Basil Austin retired from organ building in 1936, and the original company closed. It was succeeded in 1937 by a new company, Austin Organs, Inc., under the leadership of Frederic B. Austin (1903–1990), a nephew of the founders. He successfully guided the firm through the difficult years of the late 1930s and World War II and into a dynamic postwar boom in organ building. When he retired as president in 1973 he was succeeded by his son, Donald B. Austin (1933–2004), president and chairman of the board of directors until 1998. He was succeeded by his daughter, Kimberlee J. Austin (b. 1960), daughter of Donald B. Austin. The firm closed in early 2005.

From the beginning, the company's reputation for integrity, high-quality workmanship, and reliable instruments led to significant contracts for large instruments in prominent locations. Two well-known examples of Austin municipal organs still in use are the Kotschmar Organ in Merrill Auditorium, Portland, Maine (1912), and the Spreckels Organ in Balboa Park, San Diego (1914). Although the greater number of Austin organs have been built for churches, the firm has also produced instruments for venues such as theaters, lodges, residences, department stores, schools, radio stations, and municipal auditoriums. By the end of the twentieth century the company list of instruments had reached opus number 2781. Among notable Austin instruments of recent years are organs in the National Shrine of Our Lady of Czestochowa and the Episcopal Church of Bethesda-by-the-Sea, Palm Beach, Florida. St. John's Episcopal Church, West Hartford, Connecticut, was given an instrument in memory of John T. Austin (1949–50). This organ was seriously damaged by a fire in 1992, and replaced by another Austin organ four years later; several chests and twenty-four ranks of pipes from the original Memorial Organ were incorporated.

A growing appreciation for American organs built between 1910 and 1950 has led Austin Organs to play an increasingly important role in restoring instruments, among them Austin organs (e.g., the 1926 organ in Irvine Auditorium, University of Pennsylvania, Philadelphia), but organs of other builders as well (Grand Rapids, MI, Fountain Street Church, 1924 Skinner organ; op. 2782, 2004; 5/172).

In tonal style, Austin organs have characteristically maintained a middle-of-the-road position, changing with moderation in the direction of current style trends. John, Basil, and Frederic Austin were all English-born, and tended to prefer English models. James B. Jamison joined the Austin firm in 1933. While he was not officially appointed tonal director, he influenced Austin tonal style toward greater clarity in ensembles from 1933 to 1949. His tonal models, too, were generally English, modified by some characteristics of American and French styles. For over fifty years, Austin tonal directors were from England: Richard Piper (1949–78), David A. J. Broome (1978–98), and Bruce Q. Buchanan (1998–2002). The last tonal director was Daniel R. Kingman.

ORPHA OCHSE

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**AUSTIN UNIVERSAL WINDCHEST***SEE ACTION; WINDCHEST***AUSTRALIA**

Shortly after the first English settlement of Australia in 1788, a number of British emigrants brought with them some small barrel or chamber organs. It was not until the 1820s, however, that the first commissioned church organs arrived, built by the London firm of John Gray for churches in Sydney and Hobart. In the following two decades, a number of mainly small instruments arrived from Britain; a notable exception, the 1840 Henry Bevington organ for St. Mary's Cathedral, Sydney, had a 32' Pedal stop and an A. W. N. Pugin case (destr. by fire). By the 1850s, large numbers of British organs were shipped to Australia in the wake of high British emigration and the wealth that accrued as a result of the gold rushes.

There is evidence that William Hance was building an organ in Hobart, Tasmania (then called Van Diemen's Land) as early as 1832, but it is unclear whether it was successfully completed. The earliest documented attempt at local organ building was made at Sydney in 1840 when Johnson and Kinloch completed a new two-manual organ for St. Matthew's, Windsor; these builders later individually built instruments for clients in New South Wales. Through the 1840s, there were isolated examples of local organ building in Adelaide (by Samuel Marshall) and Melbourne (by Peter Hurlstone). During the 1850s in Melbourne, James Moyle and

## AUSTRALIA

Henry Smith were engaged in organ building, while in Tasmania Jesse Biggs was involved in tuning, maintenance, and the installation of imported organs. In the Barossa Valley region of South Australia, several German expatriates built German-style small instruments. These included Carl Krüger (1802–1871) and Daniel Heinrich Lemke (ca. 1832–1897). Krüger had come from Cottbus in 1848, while Lemke had emigrated from Grabowa Hauland, Posen in 1855. Their instruments were mainly small positives, considered to show the influence of Gottfried SILBERMANN. Johann W. Wolff later built organs in South Australia, while Ernst Ladegast (1853–1937), son of noted German organbuilder Friedrich LADEGAST, emigrated in 1883 to Sydney and worked there for several firms.

From the 1860s on, the indigenous organ-building industry gained momentum, especially in Victoria, where a tariff gave protection to local builders; elsewhere in Australia the industry was slow to develop. George FINCHAM (1828–1910) worked for London organbuilders Bevington and J. C. BISHOP before emigrating to Melbourne in 1852. Opening a factory in the suburb of Richmond, his first instrument was completed in 1862; the firm prospered and, by the end of the century, had built almost 150 new organs for churches and public halls in four Australian states and New Zealand. Its magnum opus was the grand organ for the 1880 Melbourne Exhibition with four manuals, seventy speaking stops, 4,726 pipes, Barker lever action, and a 32 facade. Initially adopting mechanical action, the firm employed a new system of tubular-pneumatic action from the late 1880s. Fincham organs were characterized by spotted metal pipework, low wind pressures, generally complete choruses, and multitowered cases. During the boom decade of the 1880s, the firm built than fifty-seven instruments; only twenty-six were built in the 1890s, owing to that decade's depression. Fincham and Hobday established in Adelaide in 1881, building eleven organs there; the business was taken over by Josiah E. DODD in 1894. Meanwhile, in Victoria, Fincham received competition from Alfred FULLER and William Anderson in the 1880s and 1890s. In Sydney, C. J. Jackson and William DAVIDSON were prominent as organbuilders from the end of the 1860s and Charles RICHARDSON (son of a prominent English builder) from the 1880s onward. Most of their instruments were smaller instruments, largely with mechanical actions.

By the end of the nineteenth century, Australia possessed some of the finest contemporary examples of the organbuilder's craft anywhere in the world. All of the illustrious English organbuilders of the period were represented by instruments there, including J. W. WALKER and Sons (fifty-four instruments) and HILL AND SON (thirty-four instruments), together with

many regional builders from Birmingham, Bristol, Huddersfield, Hull, and Manchester. These instruments largely went to New South Wales in the absence of a strong local organ-building industry; many survive unscathed and are now of international significance. Hill and Son built the town hall organs at Adelaide, Melbourne, and Sydney, the latter the largest in the world at the time. Major church organs included the Hill instruments at St. Andrew's Cathedral, Sydney and SS Peter and Paul's Cathedral, Goulburn, the T. C. LEWIS at St. Paul's Cathedral, Melbourne, and the Forster and Andrews at St. Saviour's Cathedral, Goulburn. A number of organs arrived from continental Europe, from such firms as MERKLIN-Schütze, E. F. WALCKER, R. A. Randebrock (Paderborn, Germany), and Théodore Puget (Toulouse). In the early twentieth century, exports continued, including important instruments by Hill and Son, NORMAN AND BEARD, and Bishop and Son, culminating in the Hill, Norman and Beard organ for Melbourne Town Hall (1926–29; 4/108) and the Willis and Sons rebuilding of the Brisbane City Hall organ (1927–29). From around 1917, America's WURLITZER firm began to export theater organs to all of the Australian states, some as large as four manuals and more than twenty ranks; a few ÆOLIAN COMPANY player organs were imported for private homes.

A number of new names entered the organ-building scene in New South Wales and Victoria early in the twentieth century, including G. C. Griffin, C. W. Leggo, W. L. Roberts, and F. Taylor; all built instruments of symphonic design, most with tubular-pneumatic actions. The most important Australian builder of symphonic organs was Adelaide's Josiah E. Dodd, who forged a progressive organ-building style popular with clients in five Australian states and New Zealand. Later, the firm of Hill, NORMAN AND BEARD, AUSTRALIA opened a factory in Melbourne in 1927, the firm completing more than eight hundred contracts until its closure in 1974. The firm was the first in Australia to adopt electro-pneumatic action as its standard, many of which were built upon the extension principle.

While the interwar Depression saw fewer new organs built, the postwar period, particularly in the 1950s and 1960s, resulted in an organ-building boom, with many firms working to maximum capacity, building instruments with electric actions. These included Hill, Norman and Beard; Fincham and Sons; and Laurie Pipe Organs (all in Melbourne); J. E. Dodd and Sons, and Gunstar Organ Works (Adelaide; amalgamated 1942); and WHITEHOUSE Brothers (Brisbane). However, with a growing interest in the classical organ and the belated arrival of the ORGAN REFORM MOVEMENT in the 1960s, firms began building mechanical action instru-

ments. Ronald W. SHARP (b. 1929) was the first to build modern tracker instruments in Australia, culminating with the largest mechanical action instrument in the world, at the Sydney Opera House (1979). The Sydney builder Roger H. POGSON (b. 1932) followed soon afterward; like Sharp, his instruments exhibit an original approach to design and solidity of construction. Later, Knud SMENGE (b. 1937) began building organs in Melbourne in the early 1980s after working in Denmark with MARCUSSEN & SON and Bruno Christensen and Son. His more than forty new instruments have a strong, articulate sound and outstanding craftsmanship.

In the late 1950s, the import of organs resumed with the arrival of Australia's first modern mechanical action instruments from E. F. Walcker; at the same time, J. W. Walker and Sons carried out considerable work in Australia. The first significant European export of the period was the large Rudolf von BECKERATH instrument (1972) for the Great Hall of the University of Sydney. Other important concert instruments included the RIEGER organ for the Festival Theatre, Adelaide (1979); the CASAVANT FRÈRES organ for Elder Hall, University of Adelaide (1979); the Jürgen AHREND organ for Robert Blackwood Hall, Monash University, Melbourne (1980); the Casavant organ for the Melbourne Concert Hall (1982); the KLAIS organ for the Brisbane Performing Arts Centre (1987); and the Walker organ for the Adelaide Town Hall (1990). Notable church organs of the past decade include the Kenneth Jones organ at Trinity College Chapel, University of Melbourne (1998), the Rieger organ at The Scots' Church, Melbourne (1999), the Casavant organ at St. Francis's, Melbourne (2000), and the Fernand LÉTOURNEAU organ at St. Mary's Cathedral, Sydney (2000). With the Australian dollar remaining uncompetitive internationally, it is unlikely that major imports will continue on the scale of the previous two decades.

The conservation of historic organs in Australia has been supported and promoted by the ORGAN HISTORICAL TRUST OF AUSTRALIA (founded 1977); government funding, particularly in New South Wales and to a lesser extent in Victoria, has greatly assisted careful restoration of significant instruments. Numerous firms have carried out restoration and rebuilding work. Pogson restored the Sydney Town Hall organ (1972–82), considered the most extensive of its type ever carried out. A number of significant and well-executed restorations have been carried out by Mark Fisher, Peter D. G. Jewkes, PITCHFORD AND GARSIDE, and the SOUTH ISLAND ORGAN COMPANY of Timaru, New Zealand. The facade pipe decoration of many organs has also been carefully restored, particularly by Marc Nobel and Christine Holmes. Significant historic

instruments continue to be refurbished for new locations, in particular redundant organs by Norman and Beard (1898) for St. Patrick's Cathedral, Parramatta, New South Wales, and by Hill, Norman and Beard (1930) for Scotch College, Melbourne.

JOHN MAIDMENT

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## AUSTRIA

### Late Gothic and Renaissance

As early as the thirteenth century, an organ is first mentioned in Austrian history, in association with Salzburg Cathedral. Another organ was located in St. Stephan's Cathedral, Vienna (1334). No descriptions of these and the many other organs of this period elsewhere have survived. Records of the tonal configuration of the late Gothic organs of the fifteenth century have been preserved, though none of the instruments are still intact.

During the fifteenth and sixteenth centuries, Czech organ building played a major role in Austria; notable centers of organ building were established in Budweis and St. Joachimstal. The main organbuilders of this time included the Czechs Jan von Dobrau (Hans Behaim), Michael Knall, Friedrich Pfanmüller, Albrecht Rudner, and Joachim Rudner; the Austrians Leonhard von Salzburg and Gregor of Villach; and the German Jörg EBERT. There was much overlap between geographic areas at this time: German and Austrian

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organbuilders worked in Bohemia, and Bohemians worked in Austria.

In 1500, with Renaissance fine art beginning to differentiate itself from the Gothic tradition, organ building kept to the Gothic style to a great extent, with Italian organs preserving the “Gothic principle” the longest. A transformation from the late Gothic to the Renaissance organ took place gradually in the Czech lands, including Austria, in the possession of the Hapsburgs since 1255. Friedrich Pfannmüller (Oberpfalz) and Joachim and Albrecht Rudner (Budweis) were especially important in this transition. Pfannmüller’s instrument in the cathedral and the St. Viet castle church in Prague. The organ, a Renaissance type with Diapason chorus, mixtures, and many ranks in all manuals, was considered by contemporaries to be “the most beautiful and largest [organ] of Christendom.” Tirol was the capital of Austrian organ activity at the time, led by composer, organist, and organbuilder Paul Hofhaimer (1459–1537).

### Baroque

In the mid-sixteenth century, the Tridentine Counter-Reformation limited the role of the organ to accompaniment of choral and congregational singing. Solo music during the Mass and the alternatim practices of the Renaissance were no longer permitted; the organ would simply double vocal parts. The Italian organ, which had changed little since its inception and was built with a purely vocal concept, was best suited for the task. Italian organs began to be ordered in Austria, although local builders began to make organs in the Italian style; organbuilders continued to exchange ideas as they traveled to different regions. Developments in the Principal rank and the progressive introduction of character stops of South German-Austrian organ led to a synthesis of Austrian and Italian organ types that produced the Italian-Austrian Baroque organ.

The seventeenth century featured tonal development as well as enrichment of organ casings. The main organ-building families of the seventeenth century came from Passau, Germany, near the Austrian border. These master builders of Passau defined the style of the time through their Brustwerks, many-ranked mixtures, and an increase in reed stops. The most significant surviving work of Andreas Putz (ca. 1580–1657) is the organ in Stift Schlägl in Upper Austria, completed in 1634. Johann Georg Freundt (1615–1678) built an organ from 1639 to 1642 in the Klosterneuburg monastery church near Vienna from the materials of two older organs. This new organ had three manuals, a rarity in seventeenth-century Austria, and a Pedal. It is one of the most important surviving organs in Austria from this century. The leading supplier of Italian-style organs during this

period was the German Theodor W. S. Agathe, who also built organs in Bohemia.

### Eighteenth Century

In the late 1600s, organbuilders began to experiment with organ tone based on the combination of individual stops. This led to the creation of personal styles, in which each builder could develop individual concepts of specification. Another Passauer, Joseph Christoph EGEDACHER II, built an organ in Waldsassen, Germany with thirty-two voices, divided among only two manuals and Pedal. This relatively large number of registers allowed Egedacher flexibility in registrational color. He later moved to Salzburg, where he built an organ in the cathedral. His son Johann Ignaz Egedacher’s most important existing work is a 1731 organ in the monastery church in Zwettl, which demonstrates the influence on the Passau school of Egedacher’s work. Johann David Sieber (Siebert) completed the organ in St. Michael’s, Vienna, in 1714 in this style. This organ has forty voices, divided among a Great, Chancel organ, Continuo, and Pedal.

While the larger organs, reserved for the most important churches, clearly demonstrate the development in tone of the eighteenth century, small organs are the ones that mold the organ-building landscape. Self-taught organbuilder Nikolaus Rummel Sr. (b. ca. 1708) built the chancel organ in the monastery church in Wilhering in 1746. Lorenz Franz Richter (b. 1722) extensively shaped the organ-building landscape in northern Austria. His largest and most important existing instrument is at Kefermarkt, parish church.

One of Vienna’s most important organbuilders was the German Johann Hencke from Westphalia. In 1752, he finished what is considered his best work, at Herzogenburg’s monastery church. This organ boasts a richly colored tone by means of its metal and wooden Principals, a variety of flutes, strings, and reeds. An outstanding personality of the latter eighteenth century was Franz X. CHRISMANN, born in what is now Slovenia. A theologian and priest before turning to organ building, Chrismann’s instruments reveal qualities both typical and prophetic of the future. He built the so-called Bruckner organ in St. Florian (1770; Anton Bruckner played this organ from 1848 to 1856). Its tonal conception featured character stops such as the Unda Maris, falsetti, and strings. In addition, Chrismann combined groups of registers to form single registers defined by a certain trait, as well as emphasizing foundation stops.

### Early Romantic Period (1800–ca. 1870)

This era was an unfavorable one for the organ. The music of the Vienna Classical style demanded modes

of expression not possible on the instrument. In a Roman Catholic country, the organ rarely played an independent role in church music. The “desacralization” of monasteries by Emperor Joseph II in the late eighteenth century, followed by the anticlerical policies of Napoleon I, contributed further to the overall bleak picture.

Organ building still followed Baroque traditions in the configuration of the manuals (Hauptwerk, Rückpositive, Brustwerk) and the short octave in the manuals and Pedal. Their dimensions remained, for the most part, as they were in the eighteenth century. But gradual changes also took place: the second manual lost its independence from the first, the single aliquots and the mixed voices decreased, and the tonal character became coarser. This transformation in style is exemplified by Ignaz Kober’s organ in the monastery church in Heiligenkreuz. Much like Christmann, Kober formed groups of character stops within similar registers that would lead to the orchestral expression of the later Romantic era.

Other organbuilders working within the Baroque tradition were Peter Hölzl, Josef Loyp, and Ludwig Moser (1807–1881). Carl Friedrich Ferdinand Buckow (1801–1864), who lived in Hirschberg, Silesia (now Jelenia Góra, Poland), finished his fiftieth organ in the Basilica Maria Treu, Vienna, in 1858. Anton Bruckner treasured this instrument, which remains one of the best in Vienna.

### Late Romantic Period (1870s–1920s)

The end of the 1860s brought about a radical change to organ building. Instead of a traditional organ tone, an orchestral one was favored. The new type of organ was supposed to enable the smoothest possible crescendo and decrescendo; dynamic variation, not tone color, became the priority. The first manual became the loudest, the third the softest. Most organs had only fifteen to twenty registers; the Principal registers were reduced in favor of an increase in foundation stops. As long as organs with specifications of similar stops with mechanical slider-chests were built, polyphonic music could still be played, although the intonation was somewhat crude.

The largest organ factories of the time were RIEGER in Jägerndorf (now Krnov, Czech Republic) and MAURACHER in Salzburg. Matthäus Mauracher (1818–1884) was the best-known builder of the latter half of the nineteenth century. The Breinbauer family continued to make handcrafted instruments, building mainly small organs for rural country churches along the lines of models provided by the Cäcilienverein. Other smaller companies continued such traditional building methods after the turn of the century. Marcell Kaufmann (1849–1906) popularized the building of cone-chests in

Vienna. Johann Georg Mayer (Feldkirch, 1846–1894) and Aton Behmann (Schwarzach, 1850–1932) also built cone-chests; but their sons Albert Mayer (1875–1969) and Josef Behmann (1880–1932) switched to building tubular-pneumatic actions.

Technical advances and changing tastes brought about innovations. Mechanical, pneumatic, and electro-pneumatic cone-chests with pneumatic or electro-pneumatic action were built. The ventill chests required by the cone-chests possessed the necessary clarity for performance of polyphonic music, but were not ideal for performing historic organ music. Crescendo pedals and similar devices were invented; mechanical action was totally given up at this time. Since pipes no longer required a certain proximity to the manuals, organ cases became deeper.

Late Romantic factory-made organ building, inspired by unbridled enthusiasm in technical progress, could only exist undisputed for thirty years or so. Finally, organists and even players of other instruments realized that the results of this exceptional enthusiasm were steering organ building away from actual organ tones. The organ’s past was becoming its future.

### The Effects of Reform Ideas in Austria

At the International Music Society convention in Vienna in 1909, during which Albert SCHWEITZER spoke about issues in organ building, a set of postulations for the Alsatian-German ORGAN REFORM MOVEMENT were codified. This included specifications for a new style of organ building, including leveled construction in the organ’s interior and full octaves in the tonal groups. The Alsace reform idea was soon criticized as being “romanticized” and biased in favor of the Alsatian organ type. Wilibald GURLITT and Hans Henny JAHNN, both from Germany, wanted the North German Baroque organ to be incorporated in the new movement as well.

In Austria, composer Johann Nepomuk David, organbuilder Josef Mertin, and organ restorer Egon Krauss seized upon the reform ideas and won over organbuilder Wilhelm Zika, Sr. (1872–1955) to their cause. They stipulated that organs be built with manuals differentiated in character from one another and with mechanical slider-chests with stop channels. Zika built an experimental instrument in the Lutheran church in Wels (1929) that garnered less interest in Austria than it did in Switzerland and Germany.

At first, the new thinking in organ building did not prevail among Roman Catholic authorities in Austria. In 1928, the church even reaffirmed the long-held principle that the organ should accompany congregational singing, the choir, and the liturgy. Since organists could perform this function best if the manuals allowed them to face the choir and the altar comfortably, a nonme-

## AUTOMATIC PLAYERS

chanical action was necessary. Ferdinand Molzer and Ferdinand Kauffmann (1910–1965) continued to build factory-made organs. Huge organs with electro-pneumatic cone-chests (Vienna, St. Stephan's Cathedral, 1960; 4/125) were a definite setback in the realization of reform ideas.

Instead, the transformation of organ-building styles occurred in stages. First, specifications became more "Baroque" without the intonation of the organ changing substantially; however, pneumatic or electro-pneumatic action was retained. Then pneumatic or electrically powered slider-chests were finally replaced by mechanical slider-chests. Possessing a relentlessly neobaroque sound at the beginning, organs were developed that possessed a round, soft tone that sparkles in the plenum. With this, the connection had been made to the Austrian Baroque organ. There are still some differences between the Baroque and the neobaroque Austrian organ, notably the retention of full Swell divisions in many instruments. But the Austrian NEOCLASSICAL ORGAN would retain a character different from that of the German reform instrument.

During World War II, the development of organ building came to a standstill in Austria. In 1954, Danish builder Sybrand ZACHARIASSEN gave a lecture at the Second International Convention for Catholic Church Music in which he advocated enclosed cases (to help project the sound), slider-chests, and mechanical action. This lecture inspired the Austrian Baroque or neoclassical reform movement, complete with its own interpretation of the WERKPRINZIP. Among the major organbuilders of this time was Johann Pirchner the

Younger (b. 1928), who built the first modern Austrian tracker organ at the Music Academy in Vienna (2/14). Helmut Kögler, who took over Wilhelm Zika's workshops (now Orgelbauanstalt Kögler) in 1972, manufactures countless organs with mechanical slider-chests. Josef von GLATTER-GÖTZ and his sons built mechanical tracker organs, among which was a six-stop positive that became a popular model and was displayed at the 1950 World's Fair in Chicago. After this, Glatter-Götz (having moved Rieger to Schwarzach, Austria) sold organs in Africa, America, Asia, and Australia as well as in Europe. Among other builders were Gregor HRADETZKY, who built an organ for the Stiftskirche in Wilten/Innsbruck, Wilten (1964; 4/44; Oberwerk with Swell); his son Gerhard Hradetzky (b. 1944), who founded his own workshop and took as inspiration the Austrian organ building of the early nineteenth century with its Austrian-Italian tonal orientation; and Herbert Gollini (b. 1927), who rebuilt the organ at Hohenems, St. Karl (1988; 3/40).

MAXIMILIAN ZWEIMÜLLER

Translated by Michelle Maczka

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## AUTOMATIC PLAYERS

SEE *MECHANICAL ORGAN*; *PLAYER PIPE ORGAN*



# B

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## **BACKFALL**

In mechanical balanced action, a horizontal bar with a central fulcrum or bridge that transfers individual KEY action (directly or indirectly) to the TRACKER that operates the WINDCHEST pallet. In all actions, depressing the manual key (also based on a central fulcrum, or rail) causes the back of the key to rise. In one system, this causes a vertical STICKER to rise, in turn pushing the back end of the backfall upward. This motion pulls down a tracker, attached to the backfall's front end, which pulls down the pallet. In another system, the back end of the key pulls up a tracker that pulls up the front end of the backfall (now located below key level); the tracker attached to the back end pulls down on the pallet as before. These two systems apply to smaller instruments where the key action is located more or less directly under its pallet box (i.e., where there is no ROLLERBOARD). In larger instruments where action is displaced by rollerboards, the front end of the backfall rests directly on the back end of the key. When the backfall's front end is engaged and rises, the back end falls, causing the attached tracker to rotate the roller mechanism that ultimately engages the pallet tracker.

The backfall is part of a refinement of the suspended action that predates seventeenth-century balanced action by more than a century. It continued to play a key role in the BARKER LEVER action of the early nineteenth century; with the advent of pneumatic mechanisms later that century, tracker action gave way to multiple pneumatic motors and lead tubing to carry the action. With the ORGAN REFORM MOVEMENT of the early twentieth century (and the postwar interest in

replicating centuries-old instruments), the backfall as part of tracker actions has been revived.

*See also* **Action; Balancier**

RICHARD KASSEL

## **BADER**

German family of organbuilders, active in the Low Countries. Daniel Bader (fl. 1600–ca. 1638), the first member of the family known to have been an organbuilder, was a pupil of the Brabantine builder Arendt (Arnold) Lampeler van Mill. Bader worked primarily in Belgium, but is best known for rebuilding (1612) an organ by Lampeler van Mill (Münster, St. Paulus-Dom, 1588). The 1588 organ replaced a 1536 organ built to replace yet another, which had been destroyed by Anabaptists in 1534. Bader's son Arnold repaired the 1588/1612 instrument in 1624. Bader moved to Arnsberg, Westphalia in 1595. In 1600, he became a member of the St. Luke's guild in Antwerp, where he built an organ for the St. Jacobskerk in 1603. Back in Westphalia, he built a small positive for the Arnsberg castle around 1610. He probably died in 1638 at Appingedam while working at the organ of the St. Nicolaaskerk.

Four of Daniel's sons became organbuilders: Hans Henrich Bader (d. ca. 1680), Ernst Bader, Arnold Bader (b. 1601; d. Dronrijp, Friesland, 1656 or 1657), and Tobias Bader (d. Arum, Friesland, 1666). Arnold received the commission for a two-manual organ at the Petrikerke in Münster in 1624. In 1626, he married the daughter of organbuilder Johann Busse, with whom he probably worked. In 1645, Arnold and Tobias became

citizens of Leeuwarden. Arnold died in 1656 or 1657 while working at a new organ in Dronrijp; Tobias completed both this organ and another in Ternaard (both extant); he probably died in 1666, shortly after starting work at a new organ in Arum.

Hans Henrich worked with Arnold in Münster in 1624. In 1637, he built a new organ for Zutphen, St. Walburgiskerk (1639–43), in part assisted by Arnold and Tobias. In 1648, Hans Henrich completed a new organ for the St. Willibrordikirche in Wesel, Westphalia. Three of Hans Henrich's sons were organbuilders: Conrad Bader (b. ca. 1625; d. 12 Dec 1667); Tobias Bader II (b. after 1633; d. 12 June 1690), and Johann Gottfried Bader (b. after 1633; d. after 1701). Joseph Bader and Pieter Bader—apparently sons of Johann Gottfried—were active as organbuilders near Brussels (1720–45).

The Zutphen organ, rebuilt by Timpe in 1813, is undoubtedly the finest surviving example of a Bader organ. Typical Westphalian features in Zutphen are the independent Pedal with 16' stops, unknown in the Netherlands until the second half of the century; the 4' Flutes on Hoofdwerk and Rugwerk; the small number of high mixtures; and finally the high Chorton pitch. Another characteristic of Hans Henrich's work is his lifelong use of the old-fashioned spring-chest. Arnold and Tobias adjusted more to the style of the Dutch organbuilders around them.

JAN-PIET KNIJFF

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### BAILLIE-HAMILTON, JAMES (JOHN BUCHANAN) (1837–AFTER 1926)

Scottish inventor. A man of considerable financial means, he dedicated his time to the VOCALION, a form of REED ORGAN. As originally conceived, the Vocalion seems to have been influenced by the Aeolian harp as much as the free reed, involving wind-driven strings. An apparatus of this sort was demonstrated at meetings of the Royal Society in 1875 and 1883, but with mixed results. The original idea of the string gave way to a wire as an extension of the reed, or a coil attached to it; for practical reasons this was dropped in favor of a system utilizing large free reeds winded by high pressure in conjunction with carefully chosen resonators

or qualifying tubes of the appropriate size and shape. Baillie-Hamilton was influenced by Hermann Smith (d. ca. 1914), who had spent much time in researching the properties of free reeds. He published the results of his work in articles in *The English Mechanic*; he provided Alexander Ellis (1814–1890) with information for the section of musical reeds in Ellis's "Appendix XX" to Helmholtz's *On the Sensations of Tone*. In a letter written to *Musical Opinion* in the early 1880s, Smith apparently claimed that Baillie-Hamilton had appropriated his ideas for use in the Vocalion; the letter was never published.

The Vocalion was successfully exhibited at Westminster Abbey and the International Inventions Exhibition of 1885. The firm of HILL AND SON produced the instrument in England on a limited basis, but each Vocalion seems to have been one of a kind and largely handmade. In the late 1870s Baillie-Hamilton moved his operations to the United States; by 1884 his address was given on patents as "Boston, Massachusetts," and he had dropped the hyphen from his name. He apparently joined with the American reed organ manufacturing firm of MASON AND HAMLIN to develop the Vocalion further, but the collaboration was not successful. Baillie-Hamilton then worked with the Canadian organbuilder WARREN, with whom he remained for about two years perfecting the "Canadian Vocalion." He returned to England with Warren to raise funds, but they failed to attract investors. By 1886 Baillie-Hamilton was back in the UNITED STATES with enough capital to establish the Hamilton Vocalion Manufacturing Company at Worcester, Massachusetts. This firm failed in 1887 or 1888, and the Vocalion passed into other hands. Vocalion production was terminated by the last of its owners, the ÆOLIAN COMPANY, shortly after its acquisition in 1903, although Vocalion-type windchests were incorporated in Orchestrelle player organs until about 1920.

Baillie-Hamilton returned to England; in about 1926 he was living in Portman Square, London. His last patent was for a combined piano and reed organ in which the windchest incorporated the piano soundboard itself, thus at least partially returning to the original Vocalion concept of combined reed and string.

JAMES HOWARD RICHARDS

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## BALANCIER

French for backfall, the lever that transmits and often changes the direction of motion from either a sticker or a tracker to another sticker or tracker. George A. AUDSLEY defines three categories: one that makes use of the fulcrum between the power source and the weight, a common lever in organ building; one that places the weight between the power and the fulcrum—for example, a key body linked to a suspended action; and, the rarest form of lever encountered in organ building, one that situates the weight at one end of the backfall with the power applied between the weight and the fulcrum, a principle sometimes used to gear the key-to-pallet travel ratio up or down as required.

The use of the backfall in French organs before the advent of the console and BARKER LEVER was restrained, as most Grand Orgue, Récit, and Pédale divisions used suspended action. The Echo and *Positif á dos*, however, did make use of an elongated series of backfall levers, collectively called a fanboard, which transmitted motion from the keys (via stickers in the case of the Positif) to the windchest. The Positif fanboard, located in the floor under the player's bench, radiated (splayed) outward from the keys toward the pipechests. The fanboard allowed the Positif to use a chromatic pipe arrangement (except for the lowest octave, which used a rollerboard and was placed diatonically on the chest).

The balancier assumed a primary role in nineteenth-century actions, necessitated by detached consoles (rather than the attached keydesk) and the Barker lever. The complexity caused by the number of directional changes in action between the console and the windchest, and the linkage between the output of the Barker lever and the pallet in the windchest, encouraged the use of the balancier until the proliferation of electric actions in France following World War I.

*See also* Action

JESSE E. ESCHBACH

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## BALBIANI

*SEE* VEGEZZI-BOSSI

## BALDWIN

American instrument-building firm. Dwight Hamilton Baldwin (1821–1899), a minister educated at Oberlin College, was an itinerant music teacher who settled in Cincinnati in 1857, teaching music in the public schools. That year, Baldwin and Luther Whiting Mason, son of Lowell Mason and brother of Henry Mason (co-founder of MASON AND HAMLIN), published several books of songs. The most prominent music educator in the area, Baldwin was frequently called upon for advice on the purchase of musical instruments. Capitalizing on his reputation, he became a retail dealer of pianos and organs in Cincinnati around 1862. In 1866 Lucien Wulsin (1845–1912) was hired as a clerk, becoming a partner in 1873 with the formation of the D. H. Baldwin Company. By 1875 the firm was selling 2,500 pianos and organs annually. A branch at Louisville, Kentucky, was opened in 1877 under the charge of Robert A. Johnson (1838–1884), who became a partner in 1880. After Johnson's death, three other partners joined the firm: Albert A. Van Buren, George W. Armstrong Jr., and Lucien Wulsin's younger brother Clarence. The firm became one of the largest retailers of keyboard instruments in the Midwest, with franchises including Steinway and Sons, Chickering and Sons, Decker Bros., J. and C. Fischer, Haines Brothers, Vose, and the ESTEY Organ Company. In 1899 Baldwin died, leaving the bulk of his holdings in the business to the Presbyterian Church, and the D. H. Baldwin Company was dissolved. In 1903, Lucien Wulsin and George Armstrong bought control of the company, with Wulsin serving as chief executive officer until 1912, followed by Armstrong until 1926, and Lucien Wulsin, Jr. (1889–1964) to 1964.

Baldwin's manufacturing activities began in Chicago in 1889 with the purchase of the Hamilton Organ Company of Chicago and the production of Monarch and Hamilton reed organs. In the late 1920s the firm began a research and development program that resulted in the introduction of the Baldwin ELECTRONIC ORGAN in 1946. This venture also laid the groundwork for Baldwin's extensive future involvement in electronics. Like other firms, Baldwin's manufacturing was altered to aid the war effort during World War II; in 1946 keyboard production resumed. By 1958, factories had been established in Arkansas and Mississippi; by 1972, only the executive offices remained at Cincinnati. In the 1960s, Baldwin acquired the prestigious German piano-making firm of Bechstein. In 1967 a factory was opened in Juárez, Mexico, for the manufacture of electronic equipment and piano actions. This period saw

## BAND ORGAN

the increased acquisition of electronic firms; forty-two corporate purchases were recorded between 1968 and 1982. The Baldwin Piano and Organ Company was reduced to a small division of a huge corporation called Baldwin United.

During 1982–83, after the acquisition of the Mortgage Guarantee Insurance Company, rising interest rates forced Baldwin United to file for Chapter 11 bankruptcy. The executive staff of the profitable piano and organ division negotiated a leveraged buyout in 1984. In the 1980s Baldwin Piano and Organ sold Bechstein. When Baldwin purchased the WURLITZER firm (est. 1856) in 1988, it also acquired the total assets of the ÆOLIAN COMPANY (now Corporation), which Wurlitzer had acquired in 1985. Over the years, Æolian had acquired many notable piano names, including Chickering and Sons.

Baldwin no longer made electronic church organs, instead devoting its electronics expertise to the development of digital pianos and electronic player pianos. During more recent years Baldwin suffered financial losses and mismanagement; by early 2001, little remained of Baldwin but its name, a huge debt, and two struggling piano factories. In November 2001 the Gibson Guitar Company bought Baldwin from General Electric for \$22 million. Pianos bearing the Chickering and Wurlitzer names were to be made abroad; pianos bearing the Baldwin name were to remain American-built high-quality instruments in limited numbers. The Baldwin electronic organ was not revived.

JAMES HOWARD RICHARDS

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## BAND ORGAN

SEE MECHANICAL ORGAN

## BARBIER, NICOLAS (FL. CA. 1580)

Probably of Flemish origin, Barbier was an important late-sixteenth-century builder in Normandy. The organ he built at Gisors, St. Gervais-et-St.-Protais (1577–82; rest. and Récit added, J.-B. N. Lefèvre, 1769–74; destr. 1940) is regarded as one of the most valuable in establishing the basis for the French classical organ. Although it is sometimes referred to as the “first French classical organ,” several further developments would take place before the typical French classical specification emerged. Most of the Gisors organ’s features were distinctly Flemish, of the type often associated with the LANGHEDUL family; it is not known whether the Langheduls might have influenced Barbier, or what their relationship was. Typical of many Flemish instruments, the Gisors organ (2/21) had a Pedal of only two 8’ stops, including a reed (Sackbut), with its pipes placed in windchests to either side of the main case. The Positif (POSITIV) was not separate, but incorporated within the main case of the Grand Orgue, which used a spring-chest. The manuals had a compass of 48 notes (C-c<sup>'''</sup>, no C- $\sharp$ ), no individual Tierce rank, a two-rank Nasard (Rauschquinte), a “Regal serving as a Voix Humaine,” and a Petite Quinte or Larigot 1-1/3’ as the only mutation in the Positif. This organ seemed to influence the normal scheme for organs built in France up through the reign of Louis XIV.

DOUGLAS E. BUSH

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## BARDEN, NELSON C. (B. 1934)

Founder and president of Nelson Barden Associates, a Boston-based restoration firm that specializes in electro-pneumatic pipe organs. Barden was one of the first restorers to incorporate historically accurate and sensitive techniques in such restorations. Along with Edward Millington Stout III in San Francisco and the Thompson-Allen Company of New Haven, Connecticut, Barden’s work has largely redefined the standards in this field.

Barden went into business in 1957, after serving an apprenticeship with Roy E. H. Carison of Boston. In the 1960s he developed an interest in the Ampico Reproducing Piano. In partnership with Kenneth Clark, Barden restored dozens of Ampico pianos and other automata. During these years, the pair became acquainted with the WELTE ORGAN COMPANY’s Philharmonic Pipe PLAYER ORGAN, eventually attaching one to the Welte

organ in the Church of the Covenant, Boston. Other early restoration efforts included work for the Museum of Fine Arts, Boston, and the New England Society for the Preservation of Antiquities.

Barden's work is inspired by the automatic instrument field, where museum-quality restorations are more common. His first significant restoration was in the First Church of Christ, Scientist, Cambridge, Massachusetts (W. W. Kimball, 1936; 3/51; 1977–79). This was followed by Church of the Advent, Boston (Æolian-Skinner, 1936; 3/77; 1979–81); Old South Church, Boston (Skinner, 1921; 4/114; 1988–90); and Church of the Good Shepherd, Jacksonville, Florida (Skinner, 1929; 4/47; 1990–92).

The most impressive work of Barden has been the creation of a newly rebuilt and computerized player pipe organ (1994) based on two Boston University automatic players which he had previously restored: a 1930 Skinner (1981–83; 2/12) and a 1930 Æolian (1983–87; 3/23). Supplementary pipework and percussions from other Skinner and Æolian organs were added; Welte and Moller players were connected to the Skinner and Æolian Duo-Art systems, creating a library of more than 2,500 roll selections. The instrument can now play from a roll produced by a digitalized system on which all facets of performance can be edited. The 62-rank hybrid organ is designed for walk-through tours, and a mock-console exhibit mimics the notes and stops as they operate.

Experience with the Welte player and the roll recordings of Edwin H. Lemare prompted Barden to research that organist's life and history. This resulted in a biography published serially in the *American Organist* and in *The Organ* (1986). Barden's research of the period 1890–1940 has contributed to the revival of interest in the American symphonic organ and the art of transcription playing.

JONATHAN AMBROSINO

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### BARKER, CHARLES S(PACKMAN) (1805–1879)

English inventor and organbuilder. He is considered the inventor of the BARKER LEVER (first patented in 1839), a wind-driven (pneumatic) device employed in assisting the playing of large tracker organs where the weight of the touch is uncomfortably heavy. The invention of this device revolutionized the organ.

Barker was baptized on 7 January 1805 in Walcot, Bath (Somerset). Very little is known about his training and education. He arrived in France in 1837 and met the family of Aristide CAVAILLÉ-COLL, then working on the organ for the basilica of St. Denis near Paris. The collaboration with Cavallé-Coll ended in 1841, just a few weeks before the dedication of the St. Denis organ. Barker's reception in France led him to take up residence in Paris, but his primary residence was still in England; he never took up French citizenship or permanent residency.

Barker became shop manager of the DAUBLAINE-CALLINET firm in Paris in June 1841, retaining this position until the firm's sale to MERKLIN-Schütze of Brussels in 1855. During this time he oversaw the building of new organs at Paris, St. Eustache (1844; 4/69) and the cathedrals of Pontoise and Nîmes, as well as the rebuild at Paris, St. Sulpice (1846). He directed the factory preparations for the National Industrial Products Exhibitions of 1844 and 1849 (Paris) and the

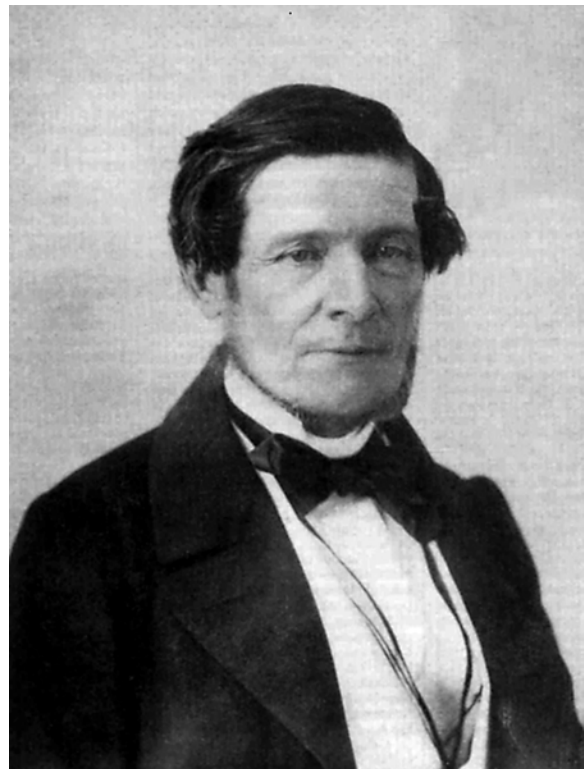


Fig. 12. Charles Spackman Barker.

## BARKER LEVEL

1851 Great Exhibition in London. In 1855 Barker exhibited a small, improved model of his pneumatic lever at the World Exhibition in Paris that year. He won a First Class Gold Medal and was made a Chevalier of the Legion of Honor in 1855.

Barker left Joseph Merklin's shop in 1857 and went into partnership with Charles Verschneider (a voicer). He started working on the application of electricity to organ building, and soon became a major pioneer in the field. The 1866 instrument by Barker and Verschneider in Salons-de-Provence is ostensibly the first electric-action organ in the world. Oddly enough, the request for admission of the firm to the 1867 World Exhibition was rejected. The outbreak of the Franco-Prussian War in 1870 and the subsequent expulsion of aliens forced Barker to return to England, where he died in Maidstone, Kent, on 26 November 1879.

During his career, Barker gained patents on four occasions. The 1839 patent covered the Barker lever; the 1844 patent is general in nature. An 1855 patent covered "improvements made on a device for lightening the touch of church keyboards," while a 1862 patent was given him for "improvements made in the building of organs, pneumato-electric [*sic*] device."

See also **Action**

DAVID SMIT

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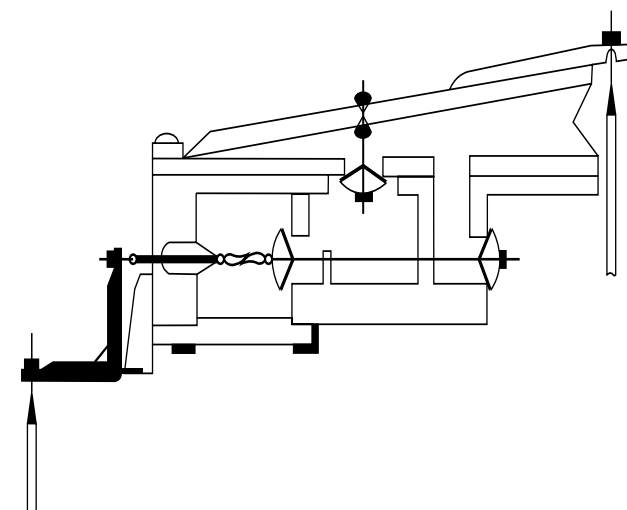


Fig. 13. Barker lever.

## BARKER LEVER

An aid to organ ACTION, motivated by a small pneumatic motor inserted between a key and its pallet in the windchest; also called a Barker machine. The device became routine in French work after 1840, due to the new aesthetic dictates of the period requiring a greater wind supply, evenness of wind, and frequent coupling of two or more manuals. This pneumatic motor, introduced into France in 1839 by Charles S. BARKER (whose name became synonymous with it), is controlled easily by minimal finger action, regardless of the number of pallets to be opened.

The pneumatic motor itself, working under high wind pressure, is activated by a small pallet directly linked by traditional tracker action to a given key. When activated, the pneumatic pouch expands, triggering the sticker, backfalls, trackers, and pallets attached to it. Manual coupling and suboctave coupling occur at the "output" end of the Barker lever. Within a given specification of Aristide CAVAILLÉ-COLL, the presence of a Barker machine may often be deduced by the inclusion of suboctave (Octaves Graves) couplers; such couplers were rarely found in divisions using unassisted mechanical action. The majority of nineteenth-century instruments were not equipped with Barker levers on every division; two notable exceptions were St. Sulpice, Paris (1862), and Notre-Dame de Paris (1868).

Early accounts of the Barker lever criticized the abrupt change of touch when progressing from a Barker-assisted manual to an unassisted manual. This may have before led to the development of the Grand-Orgue sur Machine pedal, which let the player disengage the Grand Orgue division while allowing the previously coupled manuals to continue with the Barker lever in force. The player could produce the effect of a manual change by releasing the Grand Orgue sur Machine pedal (and other couplers if desired) without ever leaving the Grand Orgue manual itself, keeping the Barker "touch" intact throughout a given piece of music.

JESSE E. ESCHBACH

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## BAROQUE ORGAN

From the end of the Renaissance until the end of the eighteenth century, the organ remained essentially the same; there were a few technical changes (winding, bellows), but as a whole the Baroque organ remained the same as its Renaissance predecessor. WEDGE BELLOWS were perfected and were of two types: single and multifold. They were made of wooden boards with the ribs glued to leather strips. They could be operated by hands (smaller organs) or by feet (big church organs). For the larger bellows, levers were used. WINDING was more even with these bellows than with the earlier cuneiform (forge) BELLOWS. A weight placed at the top end of the bellows produced air pressure. Sometimes, in later instruments, different types of wind RESERVOIRS were placed between the bellows and the WINDCHEST (e. g., feeder bellows, box-bellows, and *soufflet à lanterne*, or lantern bellows). Valves allowed for sucking in the air but closed automatically by expelling the wind.

Small DIVISIONS such as the RÜCKPOSITIV or BRUSTWERK were added to the basic trio of HAUPTWERK, OBERWERK, and PEDAL. The number of stops increased, providing a richer and more varied sonority. Sometimes, because of technical specifications (narrow pallets and/or channels), it was, in practice, impossible to use all the theoretically possible combinations of stops. The *Sperrventil* (a valve that prevents excess air from entering a specific chest or saves it for another chest) made it possible to preselect the stops. The transmission system between the keys and the pipechests was based on the ROLLERBOARD, with intervening devices such as STICKERS, TRACKERS, and BACKFALLS.

In the Low Countries, the COUPLER (described by Michael PRAETORIUS, 1619), permitting the playing of different divisions at the same time, was incorporated from the first quarter of the sixteenth century. The post-BLOCKWERK structure of the organ (later called the WERKPRINZIP, featuring distinctive, independent chests) began to evolve during the fourteenth century but reached its fulfillment during the Baroque period. However, differences remained between northern and southern Europe, heightened by the Reformation as well as by the many wars. The Lutherans encouraged the use of the organ and permitted solo performance in the service. Calvinists banned it, at least in the beginning; later on, organs were allowed to accompany the singing of psalms. Originally, Roman Catholic liturgy



Fig. 14. A Polish Baroque treasure: Glowinski and Studzinski's instrument at Lezajsk, Bernardine Basilica (1618–28).

featured the organ in solo and ALTERNATIM settings; during the Counter-Reformation, the church limited the organ to an accompanying role, leading to a different type of instrument.

In England, little is known about the organs before the Reformation. Usually, they had only one manual, few stops, and no pedal. The High (Anglican) Church admitted them in 1610, but the destruction of church organs was an element of the Civil War (1642–49). Under the commonwealth, organs were forbidden. With the Restoration (1660), organs were reintroduced; these began to have two manuals, but still lacked a pedal, mixture stops, or reeds. In 1720 the PULL-DOWN pedal appeared for the first time in England. An important development was the introduction of the SWELL (an enclosed ECHO) by Abraham Jordan, applied for the first time in the four-manual organ at St. Magnus, London Bridge (1712).

The typical North German organ was created by Arp SCHNITGER, who made the Pedal totally independent and introduced many reed stops. In southern Europe, the typical organ offered only a few stops, the Pedal

## BÄRPFEIFE

was integrated into manual divisions (via pull-downs), and the FACADE was fairly flat and symmetrical. During the eighteenth century, more string stops were added. Two-manual organs were limited to larger churches and abbeys; four-manual instruments are rare (e.g., the abbey at Ottebeuren). In the Low Countries, organs developed according to the prevailing religion: the (northern) Netherlands (now independent) was mostly Calvinist (Reformed) and used organs with strong sonorities to accompany the singing of psalms (from 1650 onward). The southern Netherlands (Flanders, the future Belgium) was Roman Catholic; most organs were one-manual instruments with no independent pedal. In the eighteenth century, Johannes Baptista Forceville made a synthesis between Flemish and German organ-building traditions (Antwerp, St. Carolus Borromeus).

In Scandinavia, only Sweden had important organs prior to the Reformation; thereafter, a large number of POSITIVES were built. In Norway, organs had appeared before the Reformation but were limited to larger towns; the Baroque era saw the arrival of instruments in towns and villages. Denmark has a long history of organ building, but the first builders were mainly foreigners, among them Hans BREBUS. In the Baltic Sea region, the Nordic War (1700–1721) caused the destruction of numerous organs in Finland and Estonia; only one positive from a church of Nauro (Finland) is preserved, now in the National Museum, Helsinki. In Catholic Latvia and in Lithuania, organs usually had only one manual. Typical for these countries was the use of Zimbelstern and Pauken stops. Although Poland is known to have had organs as early as the twelfth century, only one prospect survives from the beginning of the seventeenth century.

Western Europe saw different developments. In France, facades were ornately, even excessively decorated in the pre-Rococo manner (influenced by Italian cases). The French Baroque organ, described in detail by François BÉDOS DE CELLES, featured the DIVIDED STOP, allotting different halves of the manual to the RÉCIT and Echo divisions. In Calvinist Switzerland, many organs were destroyed as “papal” and “pagan.” Southern Europe brought yet more organ types. In Italy the facade was usually divided into five chests. The pull-down pedal had twelve to seventeen keys and was attached to the single keyboard.

In Portugal the seventeenth century marked a decline. The riches of the new Latin American colony, Brazil, brought new capital in the eighteenth century; many foreign organbuilders came to Portugal to build one-manual instruments with richly decorated cases. Spanish organbuilders preferred less ornate cases but with distinctive Trumpet stops horizontally protruding into the nave (EN CHAMADE REEDS). Pedals were fairly simple, much like those in France, but there were

experiments with tuning that led to enharmonic keys (SUBSEMITONES).

Organs appeared in the New World, first in Mexico where they were introduced by Pedro de Gante about 1530. The Spanish introduced organs to Ecuador, Peru, Venezuela, and Bolivia, the Portuguese to Brazil. The future UNITED STATES had its first organs around 1630; seventeen Spanish-style organs were built in New Mexico. The first American citizen to build an organ was Johann Gottlob KLEMM—a three-manual organ for the Trinity Church of New York. The first Canadian builder was Paul Jourdain dit Labrosse, who made a seven-stop organ for Quebec Cathedral (1721–23).

See also **Organ Mass**

FERDINAND J. DE HEN

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## BÄRPFEIFE

A reed stop of the Regal class, having been made with a variety of resonator shapes. Bärpfeife is one of the oldest organ stops, having been introduced in the mid-1500s by NIEHOFF. The most common consisted of two truncated cones joined at the base. Often an additional truncated cone was added to the top. The tone of the Bärpfeife has been described as soft, growling, and smothered. James Ingall Wedgwood reports that it was intended to imitate the growling of a bear, hence the name; but *The New Grove Organ* claims that “the term has nothing to do with growling bears, however coarse the tone.” While some sources consider Bärpfeife to be a synonym for the Dutch Baarpijp or Baarpyp, others define the latter as a tapered flue stop similar to the Gemshorn, used as early as 1735.

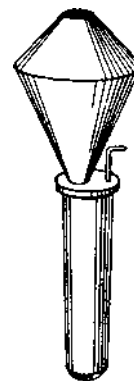


Fig. 15. Bärpfeife.

See also **Stop**

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## BARREL ORGAN

SEE *MECHANICAL ORGAN*; *PLAYER PIPE ORGAN*

## BASSET HORN/CORNO DI BASSETTO

An imitative reed stop, similar to the Clarinet, but richer, found in 8' and less often 16' form; based on the orchestral tenor clarinet of the same name (used by Wolfgang Amadeus Mozart). The stop was found in nineteenth-century German instruments (WALCKER) as a free reed; but English builders (HILL, GRAY AND DAVISON, WILLIS) opted for a striking reed, usually cylindrical (sometimes inverted conical, occasionally with a bell).

See also **Stop**

## BASSOON/BAJÓN

SEE *FAGOTTO/BASSOON/BAJÓN*

## BÄTZ

Family of organbuilders active for three generations in the Netherlands. Johann Heinrich Hartmann Bätz (b. Frankenroda, Saxony, 1709; d. 1770) learned organ building with Christoph Thielemann of Gotha. Finishing his apprenticeship in 1733, Bätz left his homeland and came to the Netherlands, where he worked on the Haarlem, St. Bavo's organ with its builder, Christian MÜLLER, also originally German. Bätz established his own workshop in Utrecht in 1739 and built sixteen organs before his death. His largest instruments were made for Gorinchem, Grote- of Janskerk (1761; repl. C. G. F. Witte, 1853), The Hague, Evangelisch-Lutherse Kerk (1762), Woerden, Petruskerk (1768), and Zierikzee, Grote- of St. Lievens Monsterkerk (1770; destr. 1832). His two-manual instruments normally had a broad-sounding Hoofdwerk with a more brilliant Rugwerk. The Bovenwerk, when present, featured primarily Flute stops.

Gideon Thomas Bätz (1751–1820) and Christoffel Bätz (1755–1800), sons of Johann Heinrich Hartmann

Bätz, represent the second generation of builders. Johann Heinrich Wilhelm Bätz, brother of Johann Heinrich Hartmann Bätz, conducted the business with his nephews after his brother's death until Gideon Thomas came of age (1772). In 1778, Christoffel went his separate way, although he continued to assist his brother from time to time. Between them, Gideon Thomas and Christoffel built just over twenty organs, most of them one-manual instruments. A more Rococo style is present in their work.

The third generation consists of Jonathan Bätz (1787–1849) and Johan Martin Willem Bätz (1789–1836), sons of Christoffel. Johan Martin Willem, who was making pianos in Amsterdam, joined his uncle, Gideon Thomas, in 1818. After their uncle's death in 1820, the two brothers continued the business. Johan Martin Willem left the workshop in 1831 and did little organ building thereafter. In 1833, Jonathan took on as partner Christian Gottlieb Friedrich WITTE, who had worked for the firm since 1826. Witte in turn married the granddaughter of Gideon Thomas in 1839. After Jonathan's death in 1849, Witte took over the firm but retained the Bätz name. In the period between 1820 and 1849, twenty-one instruments were built, among them three instruments, each with three manuals and a Rugwerk division: Amsterdam, Ronde Lutherse Kerk (1830), Utrecht, Cathedral (1831; praised by Cavallé-Coll), and Delft, Nieuwe Kerk (1840). The Amsterdam and Utrecht instruments had vorgan cases designed by the Belgian architect Tilman François Suys, the first in neoclassical style and the second with neogothic tendencies.

The third generation continued to build organs in the traditional Dutch manner. Like their uncle and grandfather, Jonathan and Johan Martin Willem Bätz were excellent craftsmen who used high-quality materials in their instruments. While much of their work is by nature conservative—mechanical key and stop actions, slider-chests, fully developed Principal choruses, and Rugwerk divisions—the tonal approach inclined toward a fuller sound, following nineteenth-century trends. The second manual was normally a Bovenwerk with stopped flutes and string stops for softer effects and accompaniment. While not as classical as the eighteenth-century organs, the third generation's instruments remained excellent vehicles to accompany congregational singing in the Dutch Reformed and Lutheran Churches of the Netherlands.

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## BAUERFLÖTE

The names *Bauerflöte*, *Bauernflöte*, *Bauerpfeife*, and *Bauernpfeife* all refer to a FLUTE stop of 8', 4', 2', or 1' pitch, dating from around 1550. It is more commonly found at the higher pitches. Different sources disagree as to whether its scale is large or small, and whether the pipes are open or stopped, or have chimneys like the Rohrflöte. Its tone is clear and, in the higher pitches, whistle-like. In German organs it frequently appears in the Pedal at 2' or 1' pitch, where it is used for playing the melody in choral preludes.

See also **Stop**

EDWARD L. STAUFF

## BAVARIA

The “free state” of Bavaria (Bayern) has one constant throughout its history: the continuing importance of the Roman Catholic Church, which by the seventh century had filled the region with bishoprics, places of worship, and monasteries. The Reformation made inroads, and the struggle between church and state intensified from the seventeenth century onward, but modern Bavaria and the state of North Rhine–Westphalia, constituted in 1947, remain the German stronghold for Catholicism, with two-thirds of the Bavarian population identified with that religion. Another essential of Bavarian history is the continual warfare within and without the duchy (as it was known from the fourteenth century on) and the resulting shifting of alliances throughout its history. Bavaria was a part of the Holy Roman Empire; the duchy and the Holy See did not always see eye to eye. The duchy endured the Thirty Years’ War (1618–48), the War of the Spanish Succession (1701–13), and the roller-coaster ride of the French Revolution and Napoleonic eras (1789–1815), during which Bavaria declared neutrality, was occupied twice, fought on both sides, and signed treaties that returned the Austrian lands Bavaria held in exchange for what is now Bavarian territory. It bounced between alliance with and fear of Prussia, but eventually became a willing partner in Bismarck’s German Empire (1871).

During the late eighteenth century, Catholic Germany came under the Enlightenment’s influence, under the

leadership of Emperor Joseph II; one consequence was the secularization and confiscation of monastic and other institutional property (a process already undertaken by Protestant Germany after the Thirty Years’ War). The Bavarian electors (rulers) took over and closed mendicant orders and religious foundations; by 1800, all orders, especially the Jesuits, had lost all property and revenues. Some abbeys became hospitals, dormitories, or army barracks, or were distributed to lesser members of the ruling class. Catholic Bavaria was especially hard-hit, losing abbeys in Andechs, Augsburg, Benediktbeuern, Kempten, Metten, Michelsberg (Bamberg), Oberaltaich, Ottobeu(e)rn, Ratisbon (Regensburg), Scheyern, Tegernsee, and Wessobrunn. While many regained their religious role during the nineteenth century, the orders now had little impact on secular matters.

The organs of Bavaria had benefited from the limited impact of the Reformation within its borders, but the continual warfare and dissolution of the monasteries led to the loss of several instruments. Only in the post–World War II era has Bavaria been in a position to restore or replace these presecularization instruments. Unlike other German regions, Bavaria’s importance as an organ-building center really began after the eighteenth century. No single Baroque builder had the impact of a Schnitger or Silbermann there, although there were many important builders and dynasties. Another element of Bavarian organ building was the fact that Austria and Bavaria shared ideas and territory, and many important Bavarian instruments were built by Austrian builders (and vice versa). Southern Bavaria and northwestern Austria were often united geopolitically; linguistic, and other cultural similarities remain strong to this day.

In organ building, the stylistic influence of Bavaria’s southern neighbors made itself felt from the late seventeenth century on. The “grandeur” of the high Baroque held its sway over much of Europe for several decades, producing such instruments as the “birthday cake” organ (see Bridgeman-Sutton), attributed to Andreas Jäger, at Wies/Erding (1757; rest. G. Schmid, 1959; now 3/42). But much of Bavaria moved swiftly into Rococo “decadence” at a time when tonal design and organ technology were at a relative standstill. The Rococo case featured cream colors and marbling (especially red) instead of bare wood; increased use of gold leaf; sentimental Italianate religious paintings filling the remaining empty spaces; and porcelain musician angels stood on top of, rested gargoyles-like upon, or even pushed pipes aside in individual chests.

During the nineteenth century, as political uncertainty was settling into German unification, Austrian builders were increasingly replaced by German builders inside and outside Bavaria; economic stability began to fuel

the Bavarian organ-building trade, which prospered, thanks in part to an excellent supply of materials and the successful revival of Catholicism. World War I and the subsequent economic downturn did surprisingly little to hurt the Bavarian trade; the events of the 1930s and '40s were more devastating, but many builders survived and continued after the war. The recent decline in Bavarian organ building is attributable to factors found elsewhere: decreased church membership, economic strain, and (as a Catholic area) the effects of Vatican II and challenges within the church provided by Hans Kung and other theologians.

Over the centuries, Bavarian builders were most numerous in the southern regions of Swabia (particularly in the Augsburg, Donau-Ries, Oberallgäu, and Unterallgäu *Landkreise*, or districts), Upper Bavaria (Mühldorf am Inn, Munich), and Lower Bavaria (Deggendorf, Landshut, Passau, Straubing). The smaller central regions had correspondingly fewer builders—Middle Franconia (Ansbach, Nürnberg) and the Upper Palatinate (Regensburg)—but the northern regions of Lower Franconia (Bad Kissingen, Würzburg) and Upper Franconia (Bamberg, Hof) had a more active organ-building trade. Internal geography was a factor, with the Franconian Jura (Alps) dominating the topography of central Bavaria. In other cases, population and politics determined the whereabouts of builders. Besides the case of Munich, Bavaria's capital and largest city (in which half of Upper Bavaria's builders worked), there were Lower Franconia's border with Hesse, particularly that state's populous Frankfurt am Main area; Swabia's border with Baden-Württemberg, which has its own "Alps" and dense forests (supplying organ-building materials); and Upper Bavaria's fluid border with the Voralberg, Tirol, and Salzburg areas of Austria, with the corresponding flow of trade between the regions.

For centuries, those who emigrated to major German cities had to secure the *Bürgerrecht* (citizenship) to live in and practice their trade within that city. The first important builder for whom there is substantial documentation is Caspar Sturm (ca. 1540–after 1599), who moved to Regensburg as a church organist, became a builder, then joined the Munich court chapel of Duke Albrecht V (1568–1577); he relocated to Ulm in 1577 and died in Regensburg. He built organs in Munich, Stetten, Indersdorf, Scheyern (Benedictine monastery, 1575, 3/19), Isareck bei Moosburg, Rottenbuch, Abensberg, Ulm Cathedral (1576–78), and Weltenburg (1597). Anton Neuknecht (fl. 1581–1608), a citizen of Landshut, later moved his workshop to Munich (1586), but had left by 1592. He built instruments in Austria—Hall (Tirol), Innsbruck, and Stams—but most of his activity was in Germany: Munich, Trausnitz bei Landshut, Benediktbeuern, Eggenfelden, Wasserburg

(St. Jakob, 1581), Rain am Lech, Ravensburg, and Strasbourg (Notre Dame, reb. 1491 Krebs organ, 1608; reb. A. Silbermann, 1713–16). Urban Heusler (fl. 1584–1617) worked in Munich; in part with Leonhard Kurz (1595–1612); works include Erding (St. Johann), Munich (St. Michael, 1597), Fürstenzell bei Passau, Munich (Holy Spirit), Andechs (Benedictine monastery, 1608), Eggenfelden (Stadtpfarrkirche), and Haidhausen.

Hans Lechner (d. 1634) was born in Irlbach bei Straubing; he was an experienced builder when he came to Munich in 1617, the year he became a citizen and took over Heusler's workshop. Lechner was Upper Bavaria's most important seventeenth-century builder; his works include several in Munich: the court chapel at the "Residenz"; "Old" St. Peter (ca. 1620); Evangelical Paulaner Gemeinde; Notre Dame (now Cathedral; 1628–31; destr. 1944); and Frauenkirche (1631). He also built organs at Tegernsee (Benedictine monastery); Landshut (St. Jodok, 1625); Regensburg ("Kurfürstentag," associated with the Diet of Regensburg, 1630), and Thalkirchen (St. Maria, 1630 [attrib]; now in Munich, Deutsches Museum; proto-Rococo case elements). Other Munich-based builders were Hans Mehrer (d. after 1669), who came from Würzburg and received citizenship in 1635 and repaired instruments damaged by invading Swedish armies, also working on organs in Thalkirchen, Dachau, Haidhausen, Ramersdorf, Munich ("Old" St. Peter, based on Lechner organ, 1648), and Munich, Holy Spirit (1669). Adam Fundensin (d. 1707) was a Silesian who apprenticed in Ingolstadt (Upper Bavaria) and married the widow of Munich builder Michael Martin (Freising, Franciscan monastery, 1662), taking over his workshop. He built instruments for Munich-Schwabing (St. Ursula), Tergerensee, Wartenberg, Weyarn (monastery, 1692; reb. Weber, 1745), Seligenthal bei Landshut (monastery, ca. 1702; now Beutelhausen bei Landshut), Paindlkofen, and Beutelhausen. Joseph Gloner (fl. 1708–ca. 1735) of Tölz bought Fundensin's workshop (1708) and installed organs at Munich (Holy Spirit Hospital), Gauting, Vilsheim bei Landshut, and Grünsink bei Wessling (Wallfahrtskirche, ca. 1730; rest. Kubak). Ignaz Philipp Hillenbrand (1710–44), from Würzburg and son of a builder, became a Munich citizen in 1738; during his short career, he built organs in Freising (Franciscan monastery), Lilienberg/Munich (monastery), Haag bei Wasserburg, Bernried, Munich ("Old" St. Peter, 1740; 2/26), Gars am Inn (Redemptorist monastery), and Grossholzhausen.

Two builders dominated Upper Bavarian organ building in the eighteenth century. Quirin Weber (1693–1751) was based in Dachau; he built instruments at Oberammergau, Munich, Ettal, Neustift bei Freising (ca. 1765 [attrib], with a mature Rococo