The Metropolitan Museum of Art Bulletin Summer 1989


BIBLIOTECA
POLITECNICA

KEYBOARD INSTRUMENTS

Laurence Libin

THE METROPOLITAN MUSEUM OF ART

Detail of Venetian spinet (fig. 17). The inscription over the keys reads in translation, "I'm rich in gold and rich in tone; if you lack virtue, leave me alone."

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The Metropolitan Museum of Art began systematically to acquire musical instruments in 1889, when gifts from Joseph W. Drexel and Mrs. John Crosby Brown became the nucleus of the collection, now one of the most comprehensive in the world. Originally a stepchild of the Department of Renaissance and Modern Art, the musical instruments collection was designated a separate department in 1949. This year, therefore, marks both the centenary of the collection and the fortieth anniversary of the Department of Musical Instruments.

Musical Instruments is the only curatorial department routinely to employ a selection of its holdings for the purpose for which the instruments were created. Beginning in the 1940s Paul Hindemith, Mieczyslaw Horszowski, Paul Badura-Skoda, and other leading musicians have played the Museum's instruments—including some of those illustrated here—at public concerts and for broadcasts and recordings. In recent years Curator Laurence Libin and his staff have increasingly assisted performers, musicologists, and instrument builders who seek insight as to how early composers intended their music to sound. The twentieth-century revival of instruments once considered obsolete—such as the harpsichord and the fortepiano—and the flourishing international movement toward historically informed performance owe much to the activities centered on this collection.

One of the Department's great strengths is the remarkable assemblage of fine keyboard instruments ranging in date from 1540 through the nineteenth century. Their astonishing variety is amply demonstrated in Laurence Libin's selections for this ***Bulletin***, in which harpsichords, clavichords, pianos, and organs are presented together with less familiar and unusual types of keyboard instruments. Many of these, such as the Erard grand piano made about 1840 for Lady Foley or the Appleton organ built in 1830 for a Connecticut church, combine sophisticated mechanisms with highly artistic case designs; more than a few, including the oldest extant piano by the instrument's inventor, Bartolomeo Cristofori, and the oldest surviving virginal by Hans Ruckers, are monuments in the history of music.

This handsomely illustrated and informative survey highlights only one aspect of the Metropolitan's encyclopedic collection of nearly five thousand instruments. These enormous resources ensure that for years to come the Department of Musical Instruments will be able to make original and meaningful contributions to musical knowledge and appreciation.

Philippe de Montebello
Director

1. Detail of *The Coronation of the Virgin*, Giovanni di Paolo (about 1400–1482), Italian (Sienese), tempera on panel. The angel plays a portative organ with button-type keys; too many pipes are depicted for the short range of the keyboard.

Keyboards in many forms are familiar to everyone. Cash registers, typewriters, and push-button telephones, as well as musical instruments, use keyboards, which originated in the need to transmit motion from an operator's hands to remote locations. Some early forms of the word "key" denote a wedge or other tool used to cleave or split. A key in a lock has the related function of effecting an opening; likewise, an organ's keys open valves, admitting wind to the pipes. The Latin word for key, *clavis*, gave Old French the term *clavier* ("key bearer"), which came to be a generic name for musical keyboards operated by fingers, fists, or feet.

The first musical keyboard was a row of levers governing wind channels in the hydraulic organ, or *hydraulis*, invented by the Alexandrian engineer Ctesibius in the third century B.C. The hydraulis's widely spaced key levers could be depressed by fingers or fists; probably no more than two keys were operated at once. Springs returned the keys to rest when manual pressure was released. Little is known about the construction of organs in Early Christian times, and after the fall of the Roman Empire their development languished. These first keyboard instruments, which punctuated sports events as ball-park organs do today, fell into obscurity in the West by the eighth century but were later reintroduced from Byzantium. They probably first appeared in churches by the tenth century, late in the Carolingian era. Although some kind of organ reached China in the thirteenth century, the instrument was not adopted in Asia; rather, the keyboard was destined almost exclusively for Western music.

An eleventh-century manuscript (Berne, codex B 56), possibly written at the Benedictine abbey of Fleury, describes a keyboard just like the one discussed by Hero of Alexandria in his *Pneumatica* nearly a thousand years earlier. But the Germanic monk Theophilus, also writing in the eleventh century, prescribes a more primitive mechanism than that used by the hydraulis: instead of pivoted keys he specifies flat, perforated sliders that must be shoved back and forth beneath the pipes to control their sounding. Since sliders do not retract automatically, they make for slow performance, suitable, however—like church bells—for signaling and for simple tunes. Slider organs became outmoded as keyboard music grew more complex.

Claviers remained clumsy and small—hardly more than an octave of diatonic notes (the modern naturals, or white keys) plus B flat—until well into the Middle Ages, when Benedictine monks began building organs throughout western Europe. The development of polyphony in the thirteenth and fourteenth centuries led claviers to gain all five accidentals (the modern black keys) and to grow in range to about twenty notes. To accommodate an increasingly florid idiom, keys were made smaller and arranged to fit more comfortably under the fingers. The oldest known keyboard notation, contained in the Robertsbridge Codex (ca. 1320; British Library, London), reveals a fluent finger technique including three-note chords that can be played only on fairly narrow, closely spaced keys. Advances in keyboard design henceforth paralleled the evolution of harmony and melodic ornamentation.

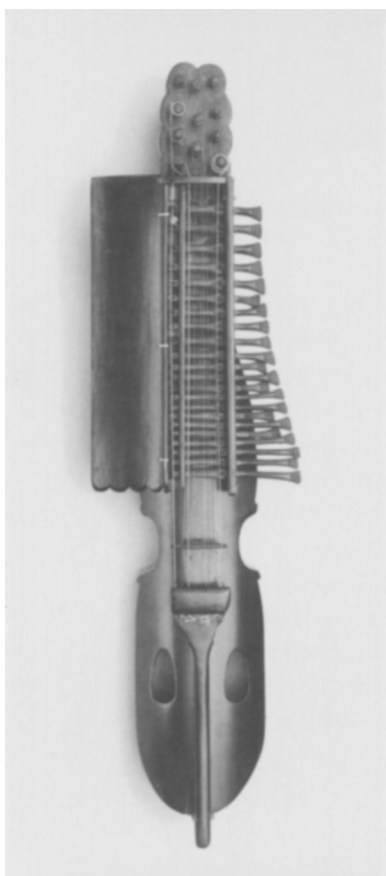
2. CLAVIOLA, Ole Breiby, Jersey City, New Jersey, after 1897. W. 11¼ in. (28.6 cm)

By the late fourteenth century, a period of rapid technological innovation, harpsichords and clavichords had joined the keyboard family. Harpsichords, first called *clavicembalum* in an Italian document of 1397 but certainly constructed earlier, have strings that are plucked, as do their keyless ancestors, psalteries. Clavichords, which evolved from monochords used for teaching and acoustical demonstrations since the fifth century B.C., have strings struck by metal wedges, or tangents. The earliest recorded mention of a clavichord occurred in Germany in 1404, but the type is older. Two extinct keyboard instruments named in late medieval documents, the chekker and the *dulce melos*, are of mysterious construction, though the strings of the latter, like the similarly named dulcimer, seem to have been struck.

Portable organs with little rectangular key buttons, such as often appear in religious paintings (fig. 1), were capable of great facility and nuance. Francesco Landini's tombstone of 1397, at San Lorenzo, Florence, shows the virtuoso performer, composer, and organ builder playing an *organetto*, with which he reputedly charmed birds from the trees. Later, Leonardo da Vinci experimented with organlike claviers for his *viola organista*, a zither with mechanically bowed strings. This invention, like many other products of Leonardo's engineering genius, had no immediate success, but it was revived in such diverse forms as the *Geigenwerk* built by Hans Haiden in Nuremberg around 1575, and in Ole Breiby's Claviola (fig. 2), patented in Jersey City, New Jersey, in 1897.

Though modern pianists are accustomed to an octave span of 6½ inches (16.5 cm), key sizes and shapes have never been completely standardized.

3. Detail of *Madonna and Child Enthroned, with Saints and Angels*, Francesco Giovanni Maineri (active by 1491–d. about 1504), Italian (Ferrarese), oil on canvas. One angel plays a positive organ while a second pumps its two small bellows; faulty perspective distorts the rank of metal pipes.



4. NYCKELHARPA, maker unknown, Sweden, 19th century. H. 33¼ in. (84.4 cm)

Keys arranged like a piano's but of different dimensions already appear in fifteenth-century pictures (fig. 3). A treatise of about 1440 by the physician and astronomer Henri Arnaut of Zwolle (Bibliothèque Nationale, Paris) shows several plans for three-octave claviers. Keyboard ranges increased as composers explored the limits of musical space, pushing into higher and lower registers. The oldest extant stringed keyboard instrument, a clavicytherium, or upright harpsichord, probably made in Ulm, Germany, around 1480 and now in the Royal College of Music, London, has a forty-note compass, while the oldest dated harpsichord, made in 1503 and today in Castello Sforzesco, Milan, has forty-five keys, with the seldom-used lowest accidentals omitted to give a "short-octave" bass. Renaissance organs had already exceeded this range; in 1473 the organ at San Martino in Lucca reportedly had fifty-three or fifty-four keys. Contemporary northern European organs generally had fewer.

The oldest surviving piano (fig. 45), made in 1720 by Bartolomeo Cristofori, has a range typical for its period, about four and one-half octaves. The conventional five octaves of Late Baroque harpsichords remained standard for pianos in Mozart's period. Beethoven knew pianos with up to six and one-half octaves, and after the mid-nineteenth century pianos regularly achieved a seven-octave range. Exceptional concert grands with eight octaves have been built in the twentieth century, but hardly any music exploits their bottom notes. Today's usual eighty-eight keys (seven and one-third octaves) appears to be the practical limit determined by conventional piano keyboard design and average arm reach. Even so, some organs and electronic instruments can exceed this range by means of devices that control still higher and lower notes.

Attempts to aid fingering by introducing a curved or terraced keyboard

(for example, a six-tier piano clavier patented by Paul von Jankó in 1882) have been resisted, although the double-manual piano invented by Emanuel Moór (fig. 5) had a brief vogue in the 1920s; its upper keyboard sounds an octave higher than the lower, and a pedal-operated coupler allows octave intervals to be played on single keys of the lower manual. A more useful innovation, widely adopted since the late nineteenth century, is the radial and concave organ pedal board, which replaced old-fashioned flat-pedal claviers to accommodate an extended range (today normally thirty-two notes) and extensive use of the heels.

Keyboard instruments, together with clockworks the most complicated mechanisms maufactured before the birth of modern technology, are essentially urban products. Their construction involves esoteric calculations, fabrication of intricate moving parts operating within close tolerances, and metal-working skills, such as wire drawing and alloy casting, that are not normally associated with rural craftsmanship. The economics of this "high-tech" manufacture point originally to an elite market; the surviving repertoire of early keyboard music is correspondingly sophisticated. Only with expanding affluence during the Late Renaissance did organs and harpsichords begin to figure much in musical life outside aristocratic circles and religious institutions.

Improved transport and productivity helped keyboard instruments become more widely available in the late eighteenth and nineteenth centuries, when ownership became a mark of status among the aspiring middle class. Much simple popular music was composed or arranged for this new bourgeois market. Outside urban areas, in rustic folk music, small keyboards such as the hurdy-gurdy and Swedish nyckelharpa (fig. 4) enjoyed a significant role; the hurdy-gurdy even became fashionable among French aristocrats before the Revolution.

Because of their ample surface area, keyboard instruments can be lavishly decorated (fig. 6). Their very size makes them important as furniture,

5. GRAND PIANO WITH DOUBLE KEYBOARD, Bösendorfer, Austria, about 1940 (action invented by Emanuel Moór). L. 82⅝ in. (209.9 cm)

and because they are often signed and dated, they can be valuable guideposts in the history of cabinetry. The custom of displaying makers' names sets keyboards apart from furnishings such as tables and chairs, which are labeled inconspicuously if at all. Prominent labeling is a trait keyboards share instead with machinery and appliances. Part of the challenge of designing keyboard instruments lies in attractively disguising their mechanical nature; to do so, builders have collaborated with other artisans, as is demonstrated by the three-octave glassichord by Chappell & Co., London. This parlor instrument, made up of thirty-seven tuned glass bars struck by padded hammers, is concealed within a Regency-style drop-leaf table (fig. 7).

Until the industrial and social revolutions of the late eighteenth century, it was usual for urban instrument makers to join brotherhoods such as Antwerp's Guild of Saint Luke, which embraced both painters and harpsichord builders. Guilds imposed rigorous apprenticeships, maintained quality, and protected members from competition, but they also discouraged innovation, thus preventing any master from gaining a decisive com-

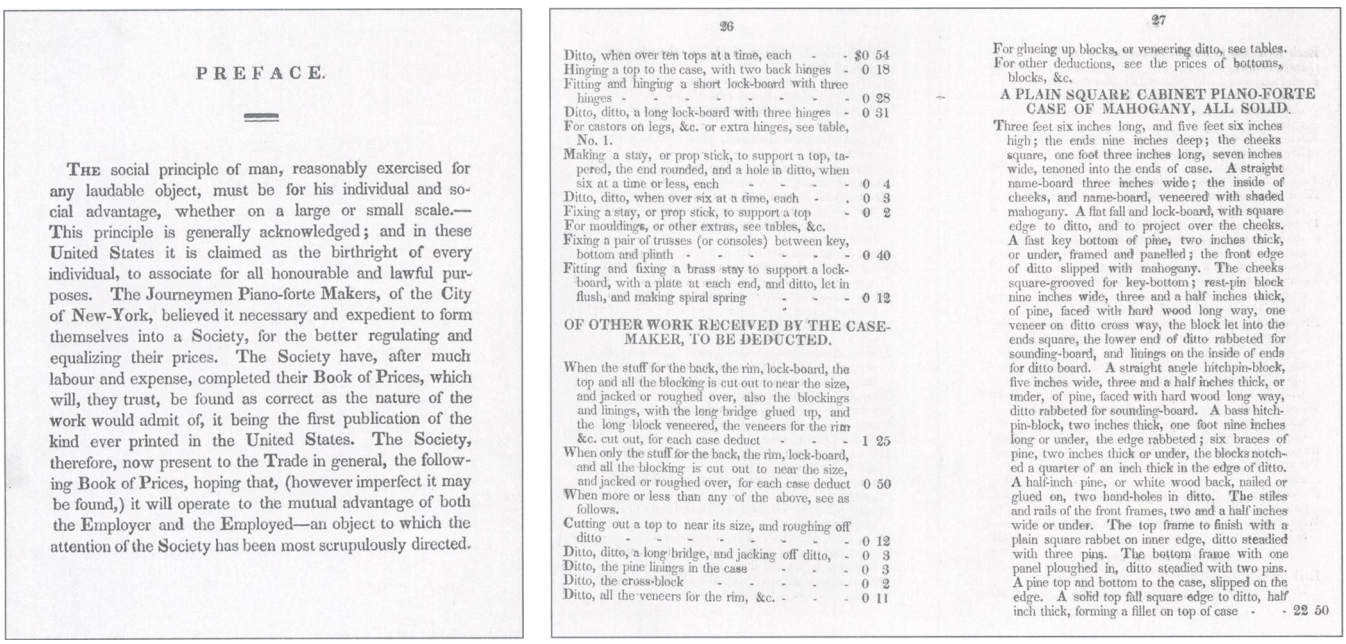
6. DESIGN FOR A WALL ORGAN, Giacomo Sangermano, Italian, from an engraving showing the restoration of the Vatican vaults, 1773

7. GLASSICHORD, Chappell & Co., London, about 1815. W. 59⅝ in. (151.4 cm)

mercial advantage. Builders outside the mainstream of guild control (for example, court-employed makers exempt from civic regulations) produced inventions like the curious upright harpsichord imaginatively depicted by Andrea Sacchi (fig. 8), but such novelties usually failed to gain widespread acceptance.

The decay of guilds and the enhancement of patent protection during the Industrial Revolution fostered a new age of competitive innovation. Coinciding with construction of the first large public concert halls, the rise of Romanticism during Beethoven's lifetime (1770–1827) saw the decline into virtual obsolescence of the intimate, delicate harpsichord and the triumph of the louder, sturdier, more "democratic" piano. As the industrial era advanced, pianos became so complicated that their maintenance had to be entrusted to specialized technicians who, like today's auto mechanics, distanced owners from a working knowledge of their instruments (fig. 9). Later nineteenth-century pipe organs, too, suffered from excessive application of gadgetry; they often became overgrown and impersonal when pneumatic and electric key actions replaced

8. *Marcantonio Pasqualini Crowned by Apollo*, Andrea Sacchi (1599–1661), Italian (Roman), oil on canvas. Pasqualini, a renowned singer, stands before a clavicytherium (upright harpsichord) that lacks a conventional soundboard but is rich in allegorical decoration; it is a symbolic counterpart to Apollo's lyre.



PREFACE.

THE social principle of man, reasonably exercised for any laudable object, must be for his individual and social advantage, whether on a large or small scale.—This principle is generally acknowledged; and in these United States it is claimed as the birthright of every individual, to associate for all honourable and lawful purposes. The Journeymen Piano-forte Makers, of the City of New-York, believed it necessary and expedient to form themselves into a Society, for the better regulating and equalizing their prices. The Society have, after much labour and expense, completed their Book of Prices, which will, they trust, be found as correct as the nature of the work would admit of, it being the first publication of the kind ever printed in the United States. The Society, therefore, now present to the Trade in general, the following Book of Prices, hoping that, (however imperfect it may be found,) it will operate to the mutual advantage of both the Employer and the Employed—an object to which the attention of the Society has been most scrupulously directed.

26

Ditto, when over ten tops at a time, each - - $0 54
Hinging a top to the case, with two back hinges - 0 18
Fitting and hinging a short lock-board with three hinges - - - - - - - - 0 28
Ditto, ditto, a long lock-board with three hinges - 0 31
For castors on legs, &c. or extra hinges, see table, No. 1.
Making a stay, or prop stick, to support a top, tapered, the end rounded, and a hole in ditto, when six at a time or less, each - - - - - 0 4
Ditto, ditto, when over six at a time, each - - 0 3
Fixing a stay, or prop stick, to support a top - 0 2
For mouldings, or other extras, see tables, &c.
Fixing a pair of trusses (or consoles) between key, bottom and plinth - - - - - - - 0 40
Fitting and fixing a brass stay to support a lock-board, with a plate at each end, and ditto, let in flush, and making spiral spring - - - - 0 12

OF OTHER WORK RECEIVED BY THE CASE-MAKER, TO BE DEDUCTED.

When the stuff for the back, the rim, lock-board, the top and all the blocking is cut out to near the size, and jacked or roughed over, also the blockings and linings, with the long bridge glued up, and the long block veneered, the veneers for the rim &c. cut out, for each case deduct - - - - 1 25
When only the stuff for the back, the rim, lock-board, and all the blocking is cut out to near the size, and jacked or roughed over, for each case deduct 0 50
When more or less than any of the above, see as follows.
Cutting out a top to near its size, and roughing off ditto - - - - - - - - - 0 12
Ditto, ditto, a long bridge, and jacking off ditto, - 0 3
Ditto, the pine linings in the case - - - 0 3
Ditto, the cross-block - - - - - - 0 2
Ditto, all the veneers for the rim, &c. - - - 0 11

27

For glueing up blocks, or veneering ditto, see tables.
For other deductions, see the prices of bottoms, blocks, &c.

A PLAIN SQUARE CABINET PIANO-FORTE CASE OF MAHOGANY, ALL SOLID.

Three feet six inches long, and five feet six inches high; the ends nine inches deep; the cheeks square, one foot three inches long, seven inches wide, tenoned into the ends of case. A straight name-board three inches wide; the inside of cheeks, and name-board, veneered with shaded mahogany. A flat fall and lock-board, with square edge to ditto, and to project over the cheeks. A fast key bottom of pine, two inches thick, or under, framed and panelled; the front edge of ditto slipped with mahogany. The cheeks square-grooved for key-bottom; rest-pin block nine inches wide, three and a half inches thick, of pine, faced with hard wood long way, one veneer on ditto cross way, the block let into the ends square, the lower end of ditto rabbeted for sounding-board, and linings on the inside of ends for ditto board. A straight angle hitchpin-block, five inches wide, three and a half inches thick, or under, of pine, faced with hard wood long way, ditto rabbeted for sounding-board. A bass hitch-pin-block, two inches thick, one foot nine inches long or under, the edge rabbeted; six braces of pine, two inches thick or under, the blocks notched a quarter of an inch thick in the edge of ditto. A half-inch pine, or white wood back, nailed or glued on, two hand-holes in ditto. The stiles and rails of the front frames, two and a half inches wide or under. The top frame to finish with a plain square rabbet on inner edge, ditto steadied with three pins. The bottom frame with one panel ploughed in, ditto steadied with two pins. A pine top and bottom to the case, slipped on the edge. A solid top fall square edge to ditto, half inch thick, forming a fillet on top of case - - 22 50

9. Pages from *The New York Book of Prices for Manufacturing Pianofortes by The Society*, describing for journeymen piano makers and their customers the construction of typical pianos and setting the price of each operation.

10. *Madame Charles Simon Favart (Marie Justine Benoîte Duroncenay)*, François Hubert Drouais (1727–1775), French, oil on canvas, 1757. Madame Favart, an opera singer, signifies her musicianship by playing a double-manual harpsichord.

11. HARMONIUM, Victor and Auguste Mustel, Paris, after 1886. W. 50⅜ in. (127.9 cm)

sensitive mechanical linkages, and inexhaustible turbine blowers replaced tedious but musically responsive hand pumping. The burgeoning domestic market called forth a host of new keyboard types, including the ubiquitous harmonium (fig. 11) and others that appealed to popular taste but inspired no great repertoire.

Keyboard instruments assumed the same burden of ancient gender stereotypes that associated primitive winds with aggressive male behavior and strings with gentler aspects of femininity or divinity. Church organ lofts were chiefly a male domain; idealized portraits of female organists, common since the fifteenth century, usually represent Saint Cecilia, the legendary patron saint of music (fig. 12). Actual women keyboardists (fig. 10), who sometimes personify harmony, are very often depicted playing stringed keyboards, the gender of which is strongly suggested by the old names "virginal" and *Frauenzimmer* ("lady") for kinds of harpsichords.

Pianos inherited much of the harpsichord's female symbolism, and most pianos purchased for amateurs have been destined for women and children to play. A piano in a Victorian home was usually played with its lid closed, not only to reduce loudness and exclude dust, but also for fear that the bared innards might offend feminine sensibilities. Unlike most Romantic-era pianos, which look rather plain inside, gorgeously decorated harpsichords of the Baroque age commonly bear paintings as well as mottoes that are revealed when the lids are raised. In unexpected contrasts such as this, keyboard instruments reflect changing social mores. Further, because of the importance of their repertoire and their unique marriage of artistry and technology, keyboards, of all instruments, most fully express music's vital role in Western culture.

Clavichords are mechanically the simplest and most sensitive as well as the quietest keyboard instruments (fig. 12). Being nearly inaudible at a distance from which a piano could sound intolerably loud, clavichords are seldom played with other instruments or in concert halls. Their essentially private repertoire is rich in music of the 1760s through the 1780s, when the impassioned *Sturm und Drang* style was current in Germany; there, especially, composers exploited the clavichord's dynamic flexibility in solos of great emotional intensity. Throughout its long history, however, the clavichord has served most commonly as a practice and teaching instrument; none is more demanding of a player's concentration.

The clavichord's intimacy arises from its means of tone production. Its keyboard has only one moving part per note, the key itself, which can be depressed by a touch as light as half an ounce. As the key lever rocks on its fulcrum, a slender metal tangent stuck into the top of the lever rises to strike the paired strings above. The tangent thus sets the strings into an audible vibration that is communicated to the amplifying soundboard by means of a low wooden bridge. The strings continue to vibrate, though with rapidly diminishing loudness, so long as the tangent remains in contact with them. When the finger leaves the key, the tangent descends and a strip of cloth instantly silences the strings.

Besides activating the strings, the tangent also defines their pitch. Proper placement of the tangents is critical; commonly a maker is guided by the predetermined spacing of slots in a board, or diapason, that forms a rack for guide pins in the ends of the keys. Fine adjustments can be made by bending the tangents slightly to alter an instrument's temperament—the division of its scale into larger or smaller half-step intervals. (Many different temperaments were available to musicians before the modern system of exactly equal temperament was adopted in the nineteenth century.) Because the tangent remains in contact with the strings while they vibrate, the player can inflect the pitch slightly by changing the finger's pressure on the key; this action stretches or slackens the strings, raising or lowering their pitch. Bouncing the fingertip imparts a subtle vibrato. This expressive touch, known as *Bebung* ("trembling"), is unique to the clavichord.

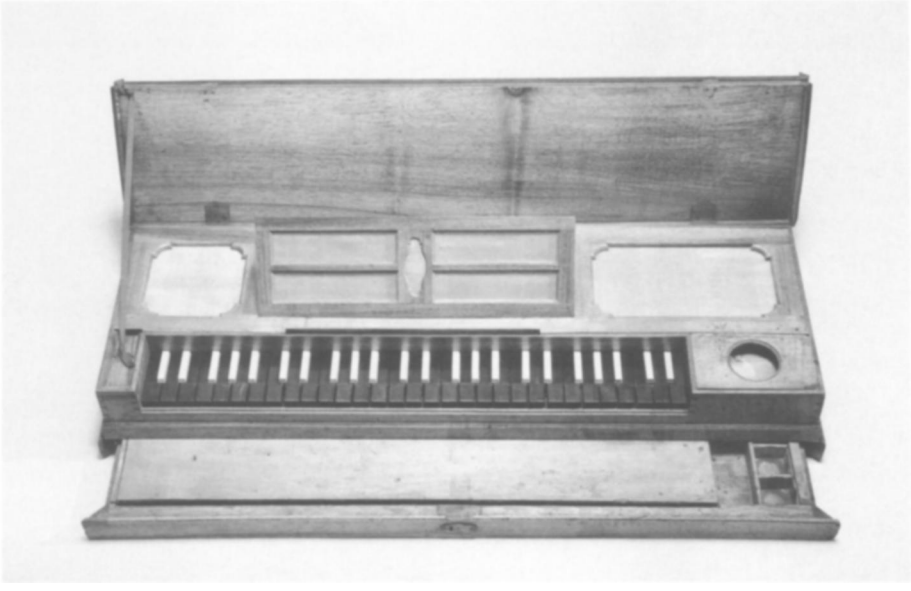
Often in small clavichords two or three adjacent tangents will strike the same pair of strings. Because they are struck at different places, these same strings can produce two or three different notes in succession. This economical method of construction, known as fretting, calls for fewer strings and puts less stress on the case. Large, unfretted clavichords of five-octave or greater range, built mainly after 1740 in northern Germany and Scandinavia, may have a more sustained tone than smaller instruments but are not necessarily louder. In some clavichords, a third set of strings sounding an octave higher than the others is added in the bass to improve pitch definition. Still, these large instruments cannot produce a loud sound because the requisite strong blow of the tangent would wildly distort the pitch and perhaps dislodge the strings from the bridge. In clavichords, therefore, loudness has never been considered so much a virtue as have singing tone and expressive nuance.

12. *Saint Cecilia*, copy after Peter Paul Rubens (1577–1640), Flemish, oil on canvas, 2nd half of the 17th century. While unrealistic in detail, the saint's small fretted clavichord shows the characteristic splaying of keys required to place their tangents at the correct positions beneath the strings.

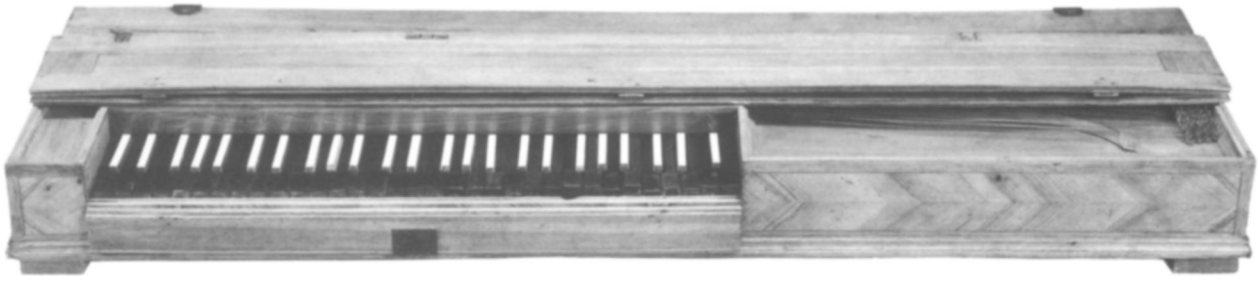
A small, high-pitched, South German clavichord of the late eighteenth century (fig. 13) is suitable for all but the most ambitious household repertoire. A drawer extending the full width of the walnut case encloses compartments for pens, ink, and music paper; another compartment for extra strings and a tuning wrench is concealed by a sliding cover to which is attached a ribbon that holds the raised lid. Over the strings lies a removable, fabric-backed panel that includes a hinged music rack. The fully chromatic keyboard—a short-octave bass being nearly obsolete by this time—encompasses fifty-three notes.

Christian Gottlob Hubert, a Polish-born instrument maker active at the German courts of Bayreuth and Ansbach, is best remembered as a prolific clavichord builder, but in his lifetime he was equally admired for producing pianos that were sold as far away as England. A contemporary writer, J. G. Meusel, describes Hubert as "a very small man of quiet and noble character, though at the same time somewhat choleric and headstrong, and in his products unusually accurate and punctilious." Meusel gives comparative prices for Hubert's clavichords and pianos; a typical clavichord cost three Caroline guilders, but a piano cost between twenty and twenty-five. While relatively inexpensive, Hubert's clavichords were carefully constructed and of exceptional musical merit. The Museum's characteristic oak-and-walnut-veneered example (fig. 14) has forty pairs of strings for fifty-six keys. Hubert's handwritten label records its construction in 1782.

Christian Kintzing of Neuwied, who collaborated with the renowned cabinetmaker David Roentgen on other projects, made his only extant clavichord in 1763 (fig. 15). A remarkable feature of this instrument is the separate row of brass tangents mounted on a hinged rail beneath the keys. When



13. CLAVICHORD, maker unknown, Germany, 18th century, W. 36⅞ in. (93.7 cm)

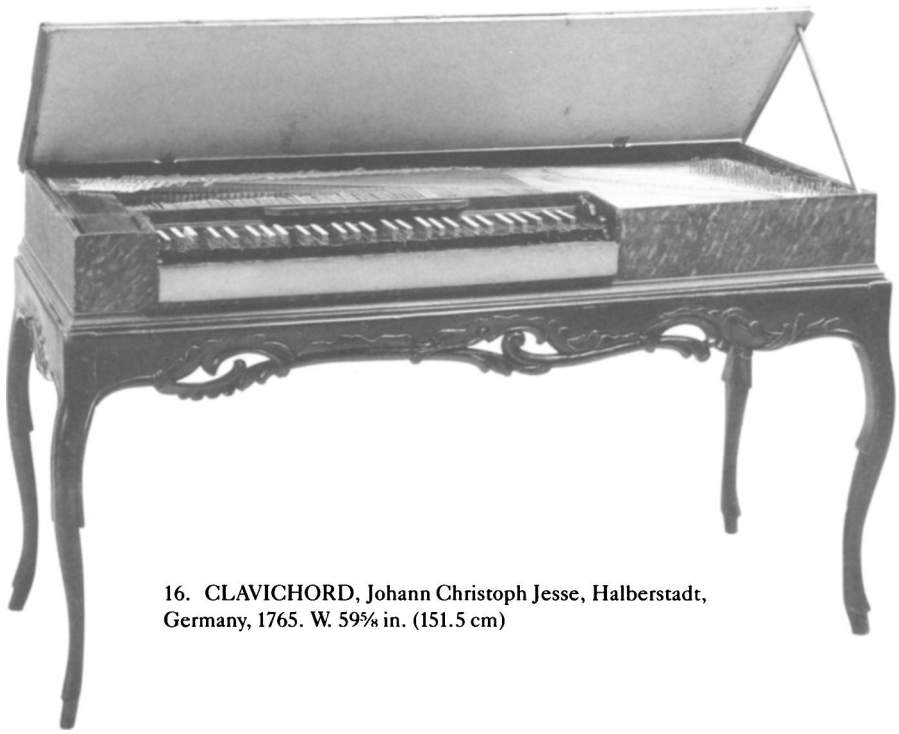


14. CLAVICHORD, Christian Gottlob Hubert, Ansbach, Germany, 1782. W. 56⅛ in. (142.6 cm)

15. CLAVICHORD, Christian Kintzing, Neuwied, Germany, 1763. W. 54⅝ in. (138.8 cm)

raised by knobs flanking the keyboard, these tangents remain against the strings and so prolong the sound after the key tangents fall away. The impetus for this device lay in the sustained tone of the hammer dulcimer, earlier popularized by the virtuoso Pantaleon Hebenstreit. Hebenstreit's playing excelled in tonal variety; in this clavichord, variety is achieved by dividing the row of added tangents so that they can affect the bass and treble strings separately.

In 1765 Johann Christoph Jesse, organist of Saint Martin's in Halberstadt, constructed the Museum's largest clavichord, a five-octave, unfretted instrument that rests on a carved stand with cabriole legs (fig. 16). The case is painted black with panels imitating tortoiseshell; the interiors of the lid and of the panel enclosing the keyboard are painted red. This clavichord was probably used for teaching and practicing; letters designating the notes are written faintly on the keys as a guide for an inexperienced player.



16. CLAVICHORD, Johann Christoph Jesse, Halberstadt, Germany, 1765. W. 59⅝ in. (151.5 cm)

17. PENTAGONAL SPINET, maker unknown, Venice, 1540. W. 19 in. (48.3 cm)

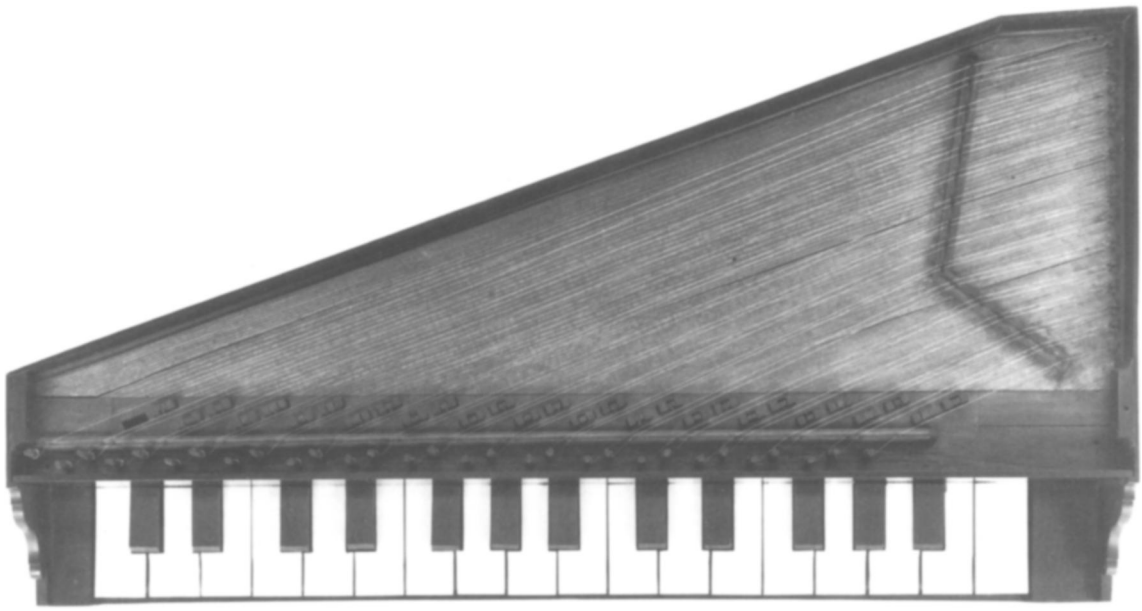
The plucking mechanism in all members of the harpsichord family consists of a quill protruding sideways from a tongue that pivots in a slender, vertical shaft, or jack. This wooden jack rests on the end of the key, with the quill beneath its string. As the key is depressed, the jack rises in its guide rack and the quill plucks the string; descending, the tongue pivots aside to prevent a second pluck and is returned to rest by a spring, while a cloth damper silences the string. Spinets and virginals, which usually have only one string and jack per key, are strung transversely; in today's parlance, a virginal has both bridges on the soundboard, while a spinet—like a harpsichord—has one bridge on the soundboard and the other, called the nut, on the tuning-pin block. Larger harpsichords may have two or more strings and jacks per key, with strings running from front to back. Since the plucking force remains constant regardless of the player's touch, loudness cannot be varied by finger pressure. Instead, additional sets of strings and jacks allow dynamic and tonal contrasts.

One of the oldest keyboard instruments still intact and playable is the Museum's exquisite Venetian spinet made in 1540 for the music-loving duchess of Urbino (pp. 2-3, fig. 17).

18. DOUBLE VIRGINAL, Hans Ruckers the Elder, Antwerp, 1581. W. 70 7/16 in. (179 cm)

An inscription inside records the courtly commission and the price, but the maker is unknown. The thin pentagonal case of cypress, protected when not in use by a separate outer case, is colorfully ornamented with carving, intarsia, and parchment cutouts. A line of poetry over the keys translates, "I'm rich in gold and rich in tone; if you lack virtue, leave me alone." The pun on "virtue" (*del buono*), which implies personal goodness and musical virtuosity as well as a good tune, perfectly expresses the playful sensuality of Italian Humanism.

The most precious of the Museum's several Flemish virginals looks inconspicuous when closed but opens to reveal a painted interior showing a festive sporting scene and a Latin motto meaning "Music, sweet solace of labor" (fig. 18). The oldest extant work of Hans Ruckers the Elder, progenitor of a great dynasty of harpsichord builders in Antwerp, this instrument dates from 1581, when Spain dominated Flanders. Medallions of King Philip II of Spain and his fourth wife, Anne of Austria, appear on the front. When discovered early in this century near Cuzco, Peru, the instrument was thought to have been a royal gift to the marquise of Oropeza, called the "daughter of the Incas." The main part of this double virginal, known as the "mother," encloses a smaller, octave-higher "child" in a compartment at the left. In the mother, a row of wire hooks known as brays can be pressed against the strings to create a buzzing effect. Mother and child can be played separately, or the child can be placed atop its mother so one person can play both at once; thus configured, the double virginal presages the later double-manual harpsichord.



19. TRIANGULAR OCTAVE SPINET, Girolamo Zenti, Rome, before 1668. W. 17⅞ in. (45.4 cm)

An ebony, casketlike virginal in the style of Samuel Biedermann the Elder (fig. 20), probably made in Augsburg about 1600, is decorated with engravings by Hans Sebald Beham and the elder Crispijn van de Passe. A delicate parchment rosette adorns the sound hole. Two shallow drawers, perhaps for sewing equipment, fit into the top of the lid. Sounding several octaves above normal pitch, this virginal was not intended for serious music-making but was an aristocratic plaything. Another ebony boudoir piece (fig. 19), once the property of Ferdinand de' Medici, is described in a court inventory of 1700 as being housed in an outer case with a concave bottom that fit comfortably over the body as the player reclined in bed. The tiny keys suit a child's hand. Inscriptions on two key levers identify its maker, Girolamo Zenti.

20. RECTANGULAR OCTAVE VIRGINAL, maker unknown, Augsburg (?), about 1600. W. 17⅜ in. (44.1 cm)

Zenti journeyed as far as London and Stockholm building graceful instruments such as a large cypress harpsichord made at Rome in 1666 (fig. 21). This full-toned instrument, which can be removed from its repainted outer case and placed on a table for greater resonance, originally had fewer keys than it has now; it was extended to its present GG-c^3 range (see note p. 56) in 1755 by Giovanni Ferrini, successor to Bartolomeo Cristofori as the Medici court harpsichord maker. Stops, operated from the right side of the case, control two sets of jacks and unison strings. This and the previous instrument by Zenti constitute half of the famous builder's undoubtedly authentic extant production; several other harpsichords bearing his name, including a bizarre but beautifully painted example in the Museum's collection (fig. 22), are falsely ascribed.

21. HARPSICHORD, Girolamo Zenti, Rome, 1666. Inner instrument L. 93 in. (236.2 cm)

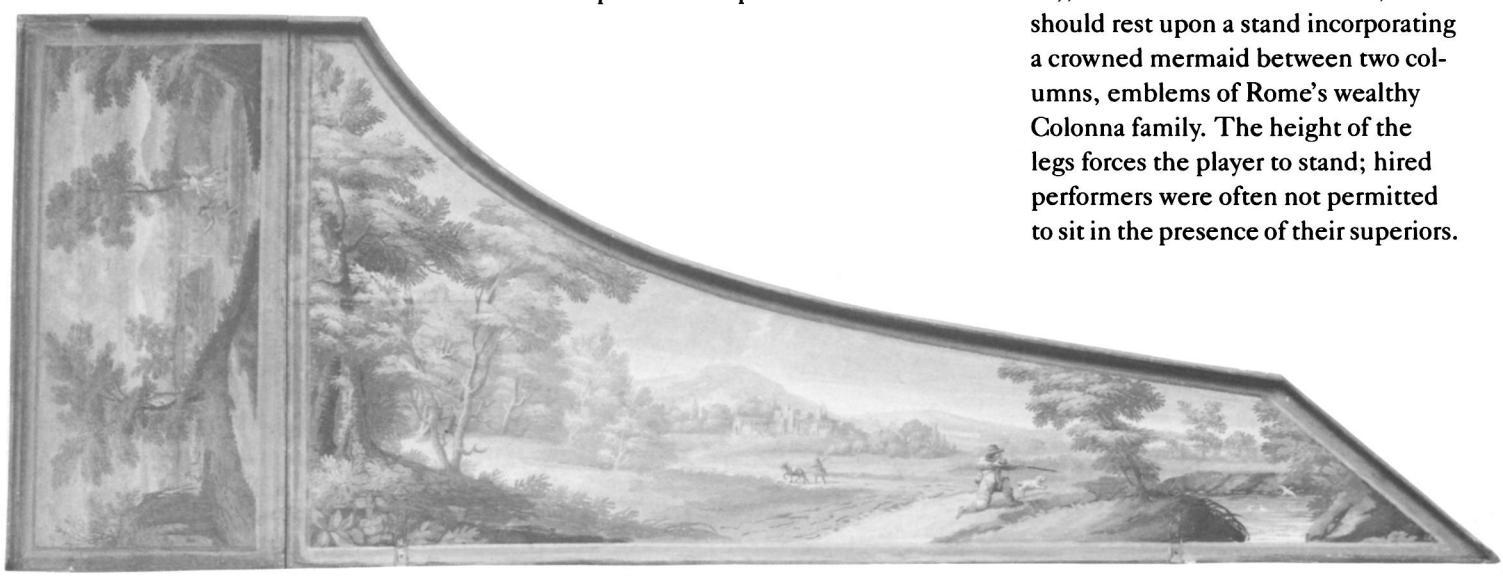
22. HARPSICHORD, maker unknown, Italy, 17th century and later. L. 77¼ in. (196.2 cm)

A magnificent harpsichord contemporary with Zenti's originally occupied a prominent place in Michele Todini's private gallery of musical instruments in Rome (figs. 23,24). No more astounding example of Roman Baroque woodwork exists. Flanked by nearly life-size figures of Polyphemus and Galatea and supported by tritons accompanied by water nymphs and dolphins, the gilded outer case depicts along its side the triumph of Galatea, whose unwanted suitor, the cyclops Polyphemus, morosely plays a bagpipe. According to Todini's description of the ensemble, the bagpipe's sound was simulated by concealed organ pipes of which no trace remains. The extraordinarily long harpsichord's two sets (choirs) of unison strings conveyed the effect of Galatea's missing lute.

23, 24. HARPSICHORD, Michele Todini, Rome, about 1675. Inner instrument L. 105⅞ in. (268.9 cm). Detail of side of case.

25. HARPSICHORD, maker unknown, northern Italy, about 1725. Outer case L. 95½ in. (242.6 cm)

Also noteworthy for its richly decorated outer case, an anonymous northern Italian harpsichord of about 1725 (fig. 25) has suffered alteration but retains an unusual original feature: instead of the normal two sets of unison strings, it has three. The third choir might have been strung with a different wire to exaggerate tonal contrast, or perhaps was tuned to another temperament or pitch. Like Todini's effort to combine organ and harpsichord timbres in a single instrument, this multiplication of resources arose from a desire for more expressivity, the same urge that gave birth to the piano. Experiments toward this end took place in an atmosphere of noble patronage, hence it is no coincidence that an equally attractive, somewhat earlier Italian harpsichord (figs. 26, 27), which also has three choirs, should rest upon a stand incorporating a crowned mermaid between two columns, emblems of Rome's wealthy Colonna family. The height of the legs forces the player to stand; hired performers were often not permitted to sit in the presence of their superiors.



26. LANDSCAPE WITH A HUNTER: TOBIT AND THE ANGEL (inside of lid of fig. 27), unknown Roman (?) painter, late 17th or early 18th century. H. 35 in. (88.9 cm), W. 95¼ in. (241.9 cm)

27. HARPSICHORD, maker unknown, Italy, 18th century.
Inner case L. 91 in. (231.1 cm)

In contrast to lightly constructed Italian harpsichords, which typically have one keyboard governing two choirs of strings, heavier English and Franco-Flemish instruments often have a second keyboard and a third set of shorter strings sounding an octave above the others. First employed for playing in a different key, the upper manual assumed expressive functions—for example, allowing echo effects—in the mid-seventeenth century. About 1650 Hans Ruckers's nephew Jan Couchet built a richly painted single-manual harpsichord that was later enlarged by the addition of several notes and a second keyboard (fig. 29). Knobs controlling the four rows of jacks protrude through the right side of the case, where the player can reach them only during breaks in the music. A coupler allows the upper-manual strings to be played from the lower keyboard.

A two-manual Parisian harpsichord (fig. 28) made in 1742 by Louis Bellot includes three sets of strings, the standard coupler, and a "buff" stop with small pads that mute one unison choir. Levers operating the stops are located behind the nameboard. The exterior decoration and lid stick are probably later additions, but the lively soundboard painting (see detail on inside front cover) is characteristic of the period of the great French composer Jean-Philippe Rameau, whose last book of harpsichord music appeared in 1741.

28. HARPSICHORD, Louis Bellot, Paris, 1742. L. 94 in. (238.8 cm)

29. HARPSICHORD, Jan Couchet, Antwerp, about 1650.
L. 90⅛ in. (228.9 cm)

Originally a double-manual harpsichord, a Parisian instrument built in 1754 by Jean Goermans lost its upper keyboard and jacks when it was converted to a piano, probably in the nineteenth century (fig. 30). The painted soundboard, which incorporates the maker's guild insignia in the sound hole, survives intact, as does most of the charming chinoiserie that decorates the case. As a piano the instrument could hardly have worked effectively; most likely its function in the Romantic era was ornamental. That it exists at all is fortunate in view of the great number of harpsichords destroyed during the French Revolution or later burned as firewood.

Unlike Continental harpsichords, which commonly were painted, carved, and gilded, English instruments achieved a handsome effect from fine hardwood veneers setting off polished brass hardware. A crossbanded mahogany, rosewood, and satinwood spinet dated 1753, made in London by John Crang, bears a traditional Latin inscription (the same as that on the Ruckers double virginal) and a marquetried musical trophy on the nameboard (fig. 31). John Crang was primarily an organ builder; his only other known spinet is in the Victoria and Albert Museum. Instruments such as these were common in town houses, where their shape saved valuable floor space.

The same form was employed for a mahogany spinet made in Boston by John Harris, an English colonist (fig. 33). This Queen Anne-style instrument is believed to be the one mentioned in the *Boston Gazette* for September 18, 1769: "It is with pleasure we inform the public, that a few days since was ship'd for Newport, a very curious spinnet, being the first ever made in America." In fact, Harris's instrument was long preceded by that of a German-born builder, John Clemm, whose much-altered walnut spinet of 1739, made in Philadelphia, is the oldest extant American example (fig. 32). The year this spinet was completed, Clemm won a commission to build the first organ for New York's Trinity Church.

30. GRAND PIANO (adapted from a harpsichord), Jean Goermans, Paris, 1754. L. 95⅛ in. (241.6 cm)

31. BENTSIDE SPINET, John Crang, London, 1753. L. 39 in. (99.1 cm)

32. SPINET, John Clemm, Philadelphia, 1739. L. 74¼ in. (188.6 cm)

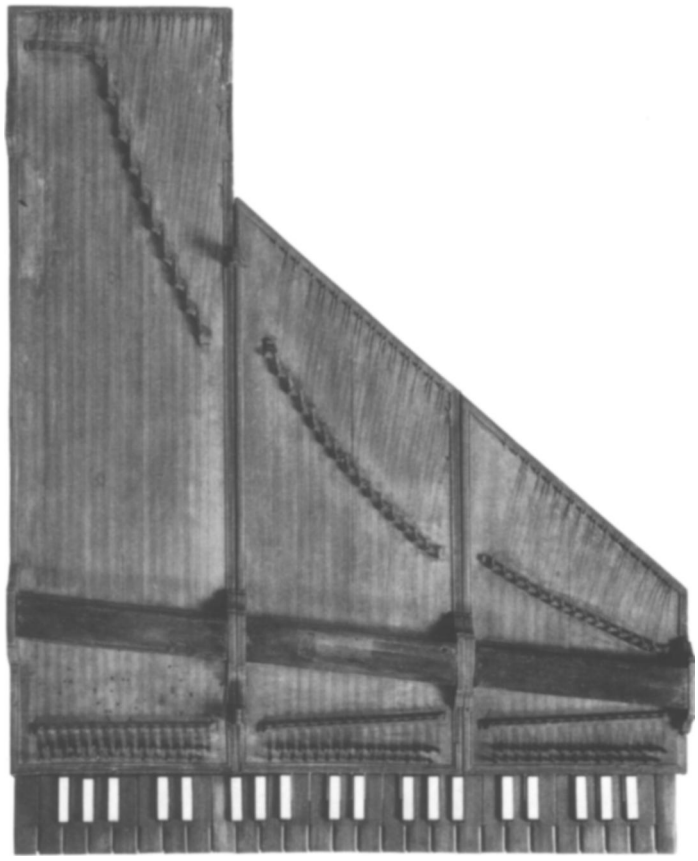
33. SPINET, John Harris, Boston, about 1769. W. 79⅜ in. (201.61 cm)

Jacob Kirckman and his nephew Abraham, Alsatian immigrants to London, were probably the most productive builders of their day. The last Kirckman harpsichord was made as late as 1809, long after the piano had achieved ascendancy, and many of the firm's durable instruments remain in use. Thomas Jefferson was among their distinguished customers. A typical Kirckman harpsichord, having one manual and three sets of strings plus a buff stop, dates from 1781 (fig. 34). Its exterior displays mahogany panels surrounded by light-colored stringing and cross-grained mahogany banding. The interior walls are veneered in figured maple with dark stringing, and the keyboard is surrounded by walnut burl. Four brass stop knobs protrude through the nameboard within convenient reach of the player; a pedal silences the octave and one of the unison registers. The greater tonal versatility thus afforded the performer, who need not cease playing to change stops, indicates a response to the increasing popularity of the dynamically flexible piano.

Unusual types of harpsichords represent solutions to nonmusical problems. Limited floor space or perhaps a desire to emulate the erect stature of the pipe organ may have inspired the creation of the clavicytherium, or upright harpsichord. A curious German Baroque example has two choirs of unison strings rising over a crudely painted soundboard (fig. 35). When not in use, the instrument is enclosed by hinged panels.

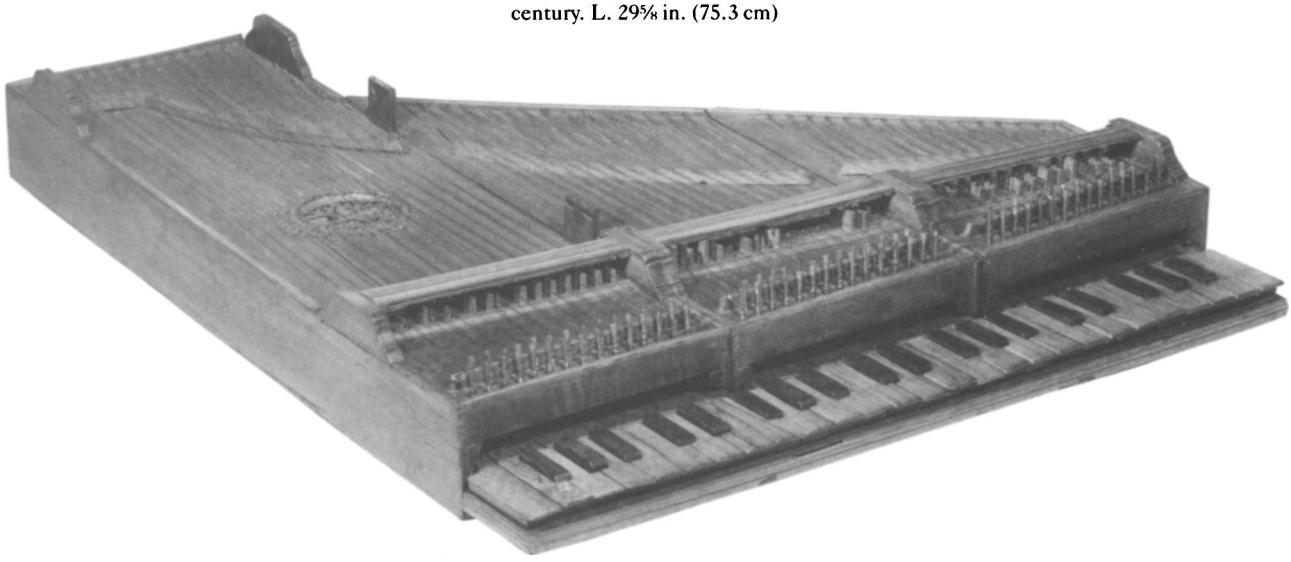
34. HARPSICHORD, Jacob and Abraham Kirckman, London, 1781. L. 86½ in. (219.7 cm)

35. CLAVICYTHERIUM, maker unknown, Germany, mid-18th century. Total H. 83½ in. (212.1 cm)



36. FOLDING HARPSICHORD, Christian Nonnemacker, Genoa (?), 1757. L. 30⅜ in. (77.2 cm)

37. FOLDING HARPSICHORD, maker unknown, Italy, mid-18th century. L. 29⅝ in. (75.3 cm)



38. CLAVIORGANUM (organ not shown), Herman Willenbrock, Hannover, 1712. L. 89 9/16 in. (226.9 cm)

The folding harpsichord, patented in 1700 by Jean Marius in Paris but possibly invented in Italy, sacrifices loudness for convenience of transport; its three hinged, lidless sections fold into a compact rectangle when the keyboard is removed. The only two examples in this country, both in the Museum's collection, are of nearly matching dimensions and design, suggesting a common model (figs. 36, 37). One, of cypress, represents anonymous Italian workmanship; the other, dated 1757, was made by Christian Nonnemacker, a German resident in Genoa.

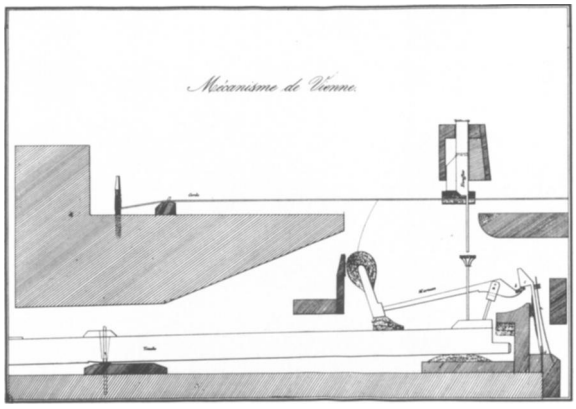
Perhaps because of the depredations of war and a preference for less-expensive clavichords, German harpsichords are extremely rare. One example, the only extant product of Herman Willenbrock, combines a gracefully curved harpsichord with, beneath the case, a one-rank pipe organ played from the lower manual (fig. 38, organ is not shown in illustration). Made in Hannover in 1712, probably for George I, this claviorganum might have been known to Handel, who visited the city in that year. The outer case of this once-resplendent instrument bears remnants of chinoiserie; the lid interior shows a view of Schulenburg Castle. The long S-curved side is characteristic of surviving North German harpsichords.

Nearly obsolete during the Romantic era, harpsichords were revived at the end of the nineteenth century to serve renewed interest in Baroque music on the part of such performers as Wanda Landowska and Arnold Dolmetsch. A Frenchman who studied music in Brussels and London, Dolmetsch was a distinguished instrument maker and exhibited his first harpsichord at London's Arts and Crafts Exhibition of 1896. While visiting America, he accepted employment with Chickering & Sons, the renowned Boston piano builders. He remained there from 1905 to 1911, supervising production of Baroque-style instruments such as the virginal of Flemish type, finished in 1906 and not excelled in historical accuracy for many years (fig. 39).

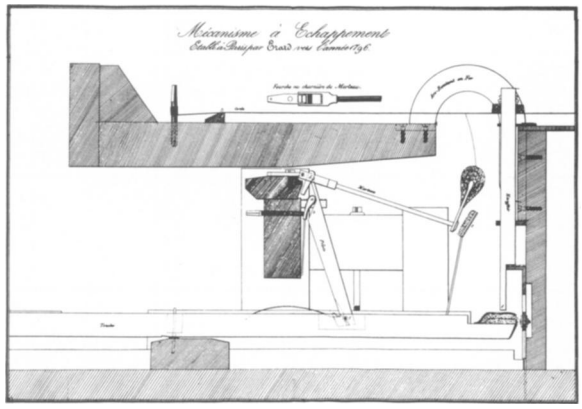
A pianist of the first rank, Wanda Landowska was attracted to the harpsichord at the turn of the century and commissioned instruments from the old French firm of Pleyel. Eschewing the historical models that fascinated Dolmetsch, Pleyel built novel harpsichords that resemble pianos in their iron-bound framing and mechanical complexity. Built around 1929, an apartment-size harpsichord (fig. 40) with two AA-f^3 manuals (a range without historical precedent), and six pedals controlling four rows of jacks, a coupler, and a buff, shows superb workmanship but sounds and feels turgid compared to authentic Baroque models, which enjoy universal favor today. However, composers such as Francis Poulenc and Manuel de Falla wrote stunning concertos for Landowska's Pleyel.

39. HARPSICHORD, Arnold Dolmetsch for Chickering & Sons, Boston, 1906. W. 68 in. (172.7 cm)

40. HARPSICHORD, Pleyel et Cie., Paris, 1929–30. L. 71⅞ in. (182.6 cm)



Viennese action



Erard's 1796 escapement action

41–44. PIANO ACTION DIAGRAMS, from a brochure published by the Erard firm: "Perfectionnements apportés dans le mécanisme du piano par les Erard, depuis l'origine de cet instrument jusqu'à l'Exposition de 1834." Minkoff reprint (Geneva, 1980)

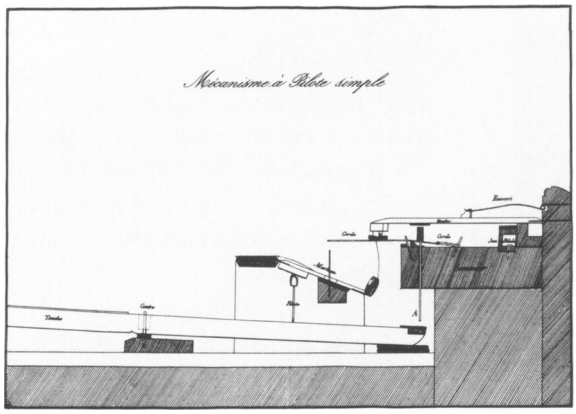
Piano mechanisms, or actions, involve complex systems of levers —including the keys themselves—that transmit motion from the player's fingers to pivoted hammers that strike the strings and rebound, allowing unimpeded vibration. The force of the player's touch, amplified by leverage, affects the hammers' velocity and, consequently, the loudness they produce. Diagrams (figs. 41–44) best illustrate major types of actions employed in different schools of piano manufacture; each design confers certain advantages that mold piano technique.

Within a few generations of its invention the piano had become a basic tool for music education, a middle-class status symbol, and a major item of commerce. Transcriptions brought nearly the entire repertoire of Western music under the pianist's command, and the instrument's capabilities inspired enduring masterworks. Today's pianos are relatively standardized, yet a century ago each musical capital espoused distinctive, locally made brands. In Vienna alone during Beethoven's lifetime over 100 piano makers vied for endorsements.

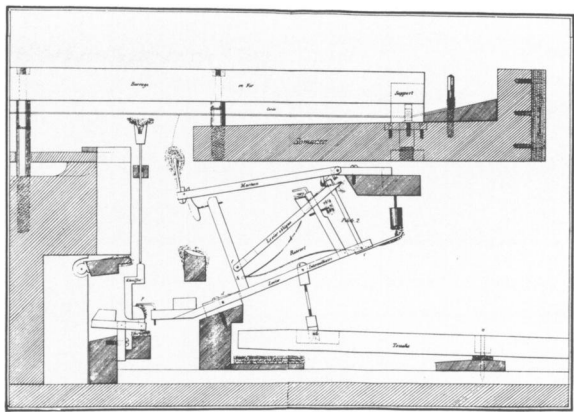
A product of experiments dating back to the 1690s, when Bartolomeo Cristofori, its inventor, left his native Padua for the Medici court, the oldest extant piano has remained in use for more than 265 years (fig. 45). Modifications begun in the eighteenth century include altering the compass from FF-c^3 (omitting FF-sharp and GG-sharp) to the present C-f^4. The structure of this unprepossessing, experimental instrument remains essentially intact, however, and shows that Cristofori did more than devise the first successful piano action, a highly sophisticated one surprisingly similar to those employed today. Cristofori also freed more soundboard area by elevating the rail to which the strings are attached, and isolated the soundboard from the outer case, thus relieving the soundboard from compression. This piano's tone changes markedly from bass to treble; the bass is warm and reedy, the treble is duller and short-sustaining. In contrast, the modern piano strives for consistent timbre throughout its range.

First considered a radically different type of harpsichord (*gravicembalo col piano e forte*, or "harpsichord with [gradations of] soft and loud"), the piano interested adventurous composers such as Domenico Scarlatti and Johann Sebastian Bach. The journalist Scipione Maffei described Cristofori's accomplishment in 1711; translated into German in 1725, this account was reprinted and widely distributed. In 1736 the Saxon court organ builder, Gottfried Silbermann, showed a piano made after Cristofori's design to Bach, who later approved Silbermann's efforts and once acted as his sales agent. The Cristofori-Silbermann model became the prototype for the modern grand piano, which ultimately derives its shape from the Italian harpsichord.

The so-called square piano derived its rectangular shape and internal layout from the clavichord. First appearing around 1740 in Germany, it served chiefly as a domestic instrument. Less refined than the courtly grand piano, the relatively inexpensive square type had a simpler mechanism that often lacked dampers.

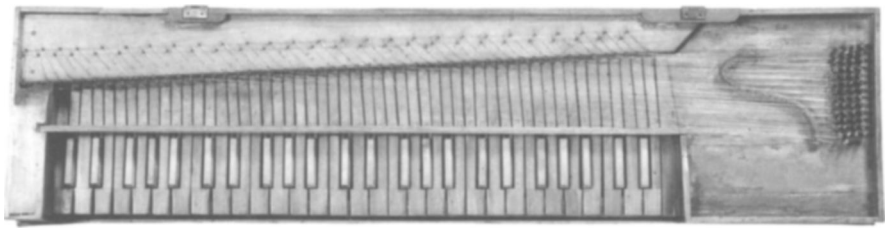


Single action for square pianos

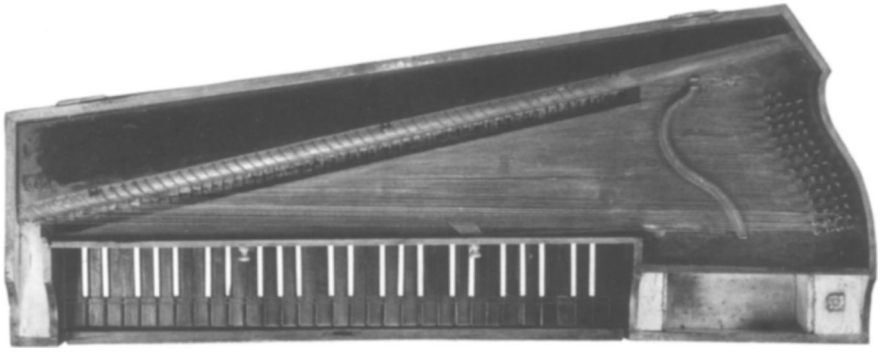


Erard's double scapement action

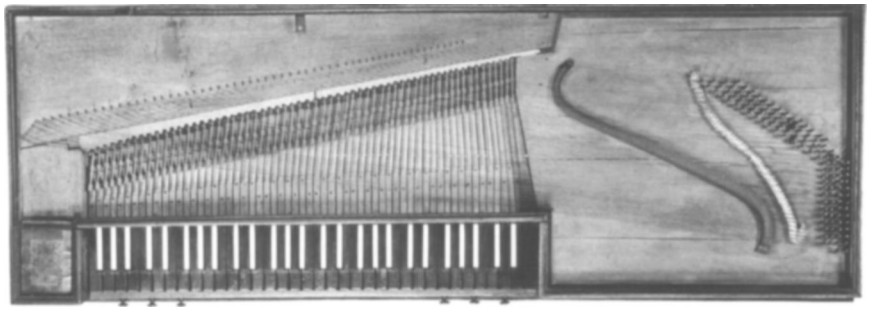
45. GRAND PIANO, Bartolomeo Cristofori, Florence, 1720. L. 90 in. (228.6 cm)



46. SQUARE PIANO, maker unknown, Germany, about 1790. W. 37 1/16 in. (95.7 cm)



47. SQUARE PIANO, style of Johann Matthäus Schmahl, Germany (?), about 1770–90. W. 43 1/16 in. (111 cm)



48. SQUARE PIANO, Johann Christoph Jeckel and Christian Jeckel, Worms, 1790. W. 62 5/8 in. (159.1 cm)

One tiny square piano of late eighteenth-century German manufacture involves only two moving parts per note: the key itself, and a short lever hinged to it that thrusts the wedge-shaped wooden hammer upward (fig. 46). Each hammer strikes a single damperless string.

Mozart supposedly owned a more elaborate portable piano shaped like a harp lying on its side. The Museum's example of this type of about 1770-90, attributed to Johann Matthäus Schmahl of Ulm, uses hand stops to lower a mute onto the strings and interpose leather tabs between the bare wood hammers and strings to alter the timbre (fig. 47). A larger, more elaborate square piano (fig. 48) made in 1790 by Johann Christoph Jeckel and Christian Jeckel of Worms is identified on its label as a *Bandlony*, a corruption of "pantalon," the hammer dulcimer named for Pantaleon Hebenstreit. Six hand stops below the keyboard operate various tone modifiers: a cloth fringe lowered onto the strings, leather pads between the wood hammers and the strings, and dampers. The stops are divided to affect bass and treble strings separately, allowing considerable tonal contrast.

While square pianos far outnumbered grands during the eighteenth and nineteenth centuries, the latter type, with its better tone and more even touch, was preferred by serious musicians. At the center of musical culture, Viennese builders specialized in graceful, clear-toned grands. A pristine cherrywood grand built around 1790 by Ferdinand Hofmann is typical of Mozart's era. This stylish Viennese instrument includes a strikingly attractive music rack and fretwork arcade over the keyboard (fig. 49). Knee levers lift the dampers; a knob over the enamel nameplate operates a mute.

49. GRAND PIANO, Ferdinand Hofmann, Vienna, about 1790. L. 83 1/16 in. (211 cm)

50. GRAND PIANO, Johann Schmidt, Salzburg, 1790–95. L. 83 7/16 in. (212 cm)

A plainer, unsigned, cherrywood grand is attributed to Johann Schmidt of Salzburg, a friend of Mozart's father (fig. 50). This rather quiet piano has a pedal board operating hammers that strike the same strings as the lowest thirteen manual keys, plus five still lower notes. The extended range is required in the slow movement of Mozart's D-minor concerto, K. 466, which cannot be played as written on the manual keyboard alone. Recent cleaning of this instrument revealed Mozart's name, scratched on long ago.

Joseph Böhm, an acquaintance of Mozart's rival Antonio Salieri, built pianos for wealthy customers of Beethoven's day. The Museum's sumptuous, six-octave Böhm grand of about 1820 (fig. 51), veneered with figured elm and ornamented with gilt mounts and carved eagles, reportedly first belonged to the Grand Duchess of Parma. This piano, which is more robust than those of the preceding generation, has damper and mute pedals, which replaced knee levers and hand stops in Viennese pianos around 1810.

51. GRAND PIANO, Joseph Böhm, Vienna, about 1815–20. L. 87 15/16 in. (223.4 cm)

Piano pedals and many other innovations can be credited to progressive English makers, who learned their craft from German refugees fleeing the Seven Years' War. Most likely one of these immigrants, among whom Johann Christoph Zumpe was foremost, built the instrument on which Johann Christian Bach, Queen Charlotte's music master, first performed a piano solo before the London public in 1768. Royal endorsement of the piano guaranteed its acceptance, and Zumpe made a fortune before retiring to Germany. A typical example of his modest workmanship is the Museum's 1767 square piano (fig. 52). The next generation of London builders created more attractive and larger instruments, such as an inlaid, crossbanded mahogany square built by John Broadwood and Son in 1797 (figs. 53, 54). In the 1790s Broadwood's firm manufactured about four hundred squares and one hundred grands annually.

52. SQUARE PIANO, Johann Zumpe, London, 1767. W. 50⅛ in. (127.3 cm)

53, 54. SQUARE PIANO, John Broadwood and Son, London, 1797. W. 64⅛ in. (162.9 cm). Detail of soundboard.

55. GRAND PIANO, John Broadwood, London, 1792. L. 89⅛ in. (226.4 cm)

56. GRAND PIANO, John Broadwood & Sons, London, about 1808–10. L. 89⅛ in. (226.4 cm)

Three Broadwood grands spanning the years from 1792 to 1827 illustrate the piano's development during this critical period of transition from the Classical era to the Romantic. The five-octave 1792 grand, which outwardly resembles an English harpsichord, employs the pedals that John Broadwood introduced around 1785 (fig. 55). To equalize string tension and allow a more uniform tone, Broadwood here employed a separate bridge for the bass strings and calculated a better striking point for the hammers. By 1810 Broadwood had added six notes to the treble, increasing the piano's width and causing the pedals to be centered under the keyboard (fig. 56) rather than attached to the legs as they had been previously. More strings and rising pitch meant greater stress on the case, which now was made thicker and reinforced with five steel arches over the hammer gap where the earlier piano had three.

Broadwood's 1827 grand presents an entirely different aspect in its heavy, dark rosewood case with independent columnar legs (fig. 57). Having one more octave than the previous grand, this piano withstands greater string tension by means of steel reinforcing bars across the soundboard, as well as six arches over the hammer gap. Additional bracing within the case permits an open bottom instead of the enclosed one of earlier pianos, allowing better sound projection when the piano is elevated on a stage, as was becoming commonplace in concerts.

57. GRAND PIANO, John Broadwood & Sons, 1827. L. 97⅞ in. (248.6 cm)

58. GRAND PIANO, Erard & Co., London, about 1840. L. 97 3/16 in. (246.9 cm)

About 1840 the London branch of the famous French firm of Erard et Cie. built a six-and-one-half-octave grand piano of unequaled magnificence for the wife of Lord Foley, baron of Kidderminster, whose arms appear on the richly marquetried satinwood case (figs. 58, 59). Splendidly reminiscent of a Baroque harpsichord, this costly showpiece incorporated the most advanced mechanism of its day. Erard's double-escapement action encouraged a remarkable advance in virtuosity by allowing faster note repetition. This action, as well as the use of felt rather than leather to cover the hammers, and extensive metal reinforcement mark this as an essentially modern piano, quite distinct in touch, tone, and structure from the all-wood Classical type.

59. Detail of underside of lid

60. *Two Young Girls at the Piano*, Pierre Auguste Renoir (1841–1919), French, oil on canvas, 1892. By the late 19th century a piano stood in virtually every household with pretensions to culture. Some level of proficiency was expected of most well-brought-up girls, except in families where religious beliefs conflicted with the playing of instruments.

61. SQUARE PIANO, Robert Nunns and John Clark, New York City, 1853. W. 87⅞ in. (223.2 cm)

Thanks to the Bostonian Alpheus Babcock's 1825 patent of a one-piece cast-iron frame and its subsequent development by Jonas Chickering, the American square piano grew to enormous size before becoming obsolete late in the nineteenth century. A seven-octave behemoth made by Nunns & Clark in New York City may have been shown at New York's Crystal Palace exhibition of 1853, the year of its manufacture (fig. 61). Renaissance architecture and ornament inspired the massive rosewood case, which includes a bas-relief portrait medallion, probably depicting the original owners, that fits into a concavity below the mother-of-pearl and tortoiseshell keys. Such an ostentatious piano functioned unmistakably as a status symbol.

Because they normally stand against a wall, presenting the player's back to the audience, and because their awkwardly angled mechanism does not foster a sensitive touch, upright pianos seldom appear on concert stages. Instead, they are most at home where floor space is limited (fig. 60). Uprights such as Johann Christian Schleip's lyre-form model, fashionable around 1830 in Berlin, attract attention more for their stylish exteriors than for any special musical qualities (fig. 62). However, the Euphonicon, patented by John Steward of Wolverhampton in 1841 and thereafter manufactured by F. Beale & Co. in London, achieves a distinctive sound and aspect by replacing the normal soundboard with short, hollow sound boxes (fig. 63). Above the exotic Macassar ebony base, the strings are fastened to an iron frame, through which the performer can be seen. The back is decorated so that it need not face a wall.

62. UPRIGHT PIANO, Johann Christian Schleip, Berlin, about 1820–44. H. 88¾ in. (225.4 cm)

63. EUPHONICON, F. Beale & Co., London, England, 1843. W. 53 9/16 in. (136 cm)

64. REGAL, German, 1575. L. 27½ in. (69.9 cm)

Organs are no longer so numerous as stringed keyboard instruments but exist in even greater variety. Organ pipes form two main categories: whistlelike flue pipes, in which wind impinges on a sharp edge to make a sound, and clarinetlike reed pipes, wherein a flexible tongue vibrates against a surface that is pierced to admit puffs of air. Pipe size, shape, and material affect pitch and tone quality. Ranks of pipes with different characteristics can be made to sound together or separately by means of stops that turn the various ranks on or off. Bellows supply wind to the wind chest on which the pipes stand; in larger organs a reservoir ordinarily maintains the air pressure at a constant level. Within the wind chest are valves that, when opened by the key mechanism, admit wind to the pipes.

One person pumps the two bellows while another plays the Renaissance regal, a nasal-sounding organ having one rank of very short reed pipes. The Museum's "Bible" regal (fig. 64), dated 1575, bears the label of Georg Vell or Voll of Nuremberg, who is said to have invented this form, which resembles a large book when disassembled and

packed up. Also from Nuremberg, a tiny pipe organ built into a tabletop chest of drawers (fig. 65) was constructed by Laurentius Hauslaib in 1598 while the builder served at the court of Friedrich IV, elector of the Palatinate. Recalling the Ruckers "mother and child" virginal (fig. 18), this instrument incorporates a separate, small virginal above the organ's keyboard. The Deposition from the Cross is pictured on a door over the claviers, and a pair of bellows lies beneath the top. This claviorganum probably served in domestic circumstances; it might not have been loud enough for a church, where its high pitch would have been incongruous.

65. CLAVIORGANUM, Laurentius Hauslaib, Nuremberg, 1598. L. 26 in. (66 cm)

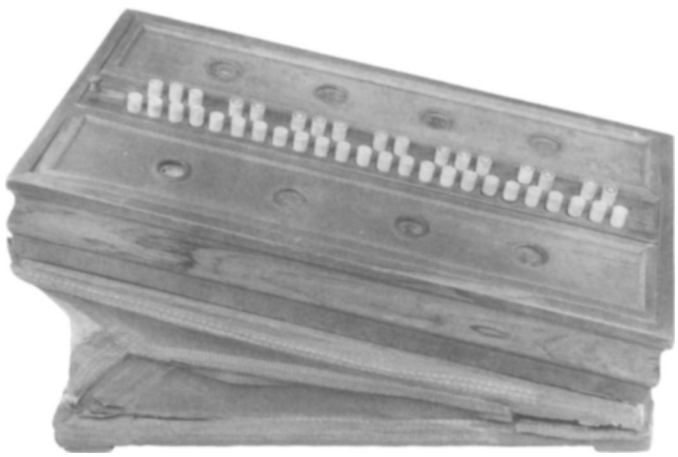
More suitable for accompanying voices and other instruments, a German chamber organ of 1700 (fig. 67) crowned with arms of Joseph Adam Freiherr von Lösch, chamberlain to the duke of Bavaria, and his wife, the countess of Hohenwaldeck and Maxelrain, also displays Franz Caspar Hofer's painting of Saint Cecilia, dated 1758. The player stands at the keyboard, while an assistant pumps bellows in the base. Levers at the right end of the keyboard control three ranks of pipes. This charmingly bedecked organ once graced its owner's castle of Stain in Upper Bavaria.

Chamber organs continued to be built during the nineteenth century, though their place was largely usurped in America by inexpensive melodeons having reeds, like a harmonica or accordion, rather than pipes. A rustic reed organ much used in New England to accompany hymns was called the "teeter," or "rocking melodeon," from the motion imparted to it by rocking the top to pump the bellows beneath; one typical example, built by the Baptist deacon Abraham Prescott in Concord, New Hampshire, around 1837, has ivory button keys and a much-worn, wedge-shaped bellows (fig. 66).

Less common and much more versatile were small pipe organs, such as a dignified rosewood example by Richard Ferris, made in New York about 1850 (fig. 68). In this chamber organ four ranks of wood and metal pipes are controlled by stop knobs flanking the keyboard; two ranks are divided so that bass and treble can be drawn separately. One pedal at the lower right pumps the bellows; its function is duplicated by a hand lever at the right side, for use by an assistant. A second pedal opens swell shutters (louvers) behind the facade to provide dynamic expression. A drawer at the lower left pulls out to expose a thirteen-note pedal clavier that duplicates the function of the lowest manual octave.

Contemporary with the Ferris organ is a smaller one by William Crowell of Mont [sic] Vernon, New Hampshire, dated 1852 (fig. 69). Festooned with rosettes, a rinceau on the cornice, and scrollwork including descending bellflowers applied to engaged pilasters, the Honduras mahogany and walnut case conflates Empire and Rococo Revival styles. Six stop knobs in jambs to the right and left of the fifty-eight-note keyboard control four ranks of quiet-sounding wooden pipes, two ranks being divided into bass and treble. Pedals operate the bellows and the swell shutters concealed behind cloth-backed grilles.

Because of their size and complex maintenance requirements, church organs are rarely acquired by museums. The finest example of its kind in a public building, a magnificent organ by Thomas Appleton of Boston dominates its present setting, a high balcony overlooking the Armand Hammer Equestrian Court (fig. 70). Built in 1830 for South Church, Hartford, Connecticut, the organ was removed in a trade for a new one in 1854 and was reinstalled in 1883 at Sacred Heart Church, Plains, Pennsylvania, where it was discovered, unused and neglected, in 1980. Practically unaltered except for the addition of a rank of pedal pipes and their flat, twenty-seven-note pedal board, this organ is the best-preserved and oldest extant example of its renowned maker's work. Appleton, the son of a housewright, modeled his organs conservatively after eighteenth-century English designs. His craftsmanship and materials were unexcelled, and in 1839 he won a gold medal from the Massachusetts Charitable Mechanic Association. The fifteen-foot-tall Honduras mahogany case of this organ, with its gilded façade pipes, shows in carved details the refinement of Appleton's Greek Revival style. Within, sixteen ranks totaling 836 pipes are governed by rows of stop knobs flanking the two GG-f^3 (omitting GG-sharp) manuals. The intricate mechanism, which includes hand-pumped bellows, is literally as good as new. Its tone enhanced by resonant acoustics, the organ demonstrates in performance a perfect union of artistry and technology.



66. ROCKING MELODEON, Abraham Prescott, Concord, New Hampshire, about 1837. L. 18⅞ in. (47.9 cm)

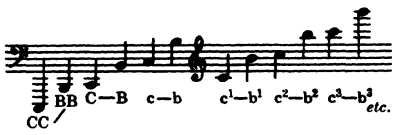
67. CHAMBER ORGAN, maker unknown, Germany, 18th century. H. 85⅜ in.(216.9 cm). The painting of Saint Cecilia inserted into the base is a later addition; its panel does not match the wood of the rest of the case.

68. PIPE ORGAN, Richard M. Ferris, New York City, about 1850. H. 104 in. (264.2 cm)

69. CHAMBER ORGAN, William Crowell, Mont [sic] Vernon, New Hampshire, 1852. H. 81 in. (205.7 cm)

CREDITS

Note: Throughout this publication, pitch and range are indicated according to the following system:



Where no specific octave is implied, capital letters alone are used; it will be clear from the context whether or not these refer to octave placement.

1. Overall: 70⅝×51¹¹⁄₁₆ in. (179.9×131.3 cm). Robert Lehman Collection, 1975 (1975.1.38)

2. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.2404)

3. Overall: 99×80½ in. (251.5×204.5 cm). Gift of the children of Mrs. Harry Payne Whitney, 1942 (42.57.5)

4. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.957)

5. Lent by Winifred Christie Moore, L 48.4

6. The Elisha Whittelsey Collection, The Elisha Whittelsey Fund, 1969 (69.651)

7. Gift of Richard S. Perkins, 1971 (1971.188)

8. 96×76½ in. (243.8×194.3 cm). Purchase, Enid A. Haupt Gift, Gwynne Andrews Fund and Purchase, 1871, by exchange, 1981 (1981.317)

9. The Elisha Whittelsey Collection, The Elisha Whittelsey Fund, 1951 (51.579.1)

10. 31½×25½ in. (80×64.8 cm). Mr. and Mrs. Isaac D. Fletcher Collection, Bequest of Isaac D. Fletcher, 1917 (17.120.210)

11. Gift of Miss Helen Sears, through Mrs. Alma Birmingham, 1944 (44.59)

12. 47⅞×40¼ in. (121.6×103.5 cm). Bequest of Mrs. H. O. Havemeyer, 1929, H. O. Havemeyer Collection (29.100.14)

13. Purchase, Rogers Fund; The Howard Bayne Fund, The Barrington Foundation, Inc. and Mr. and Mrs. Thatcher M. Brown III Gifts; The Crosby Brown Collection of Musical Instruments, by exchange; and funds from various donors, 1985 (1985.210)

14. X.253.6

15. Purchase, Gifts of George Bashlow, Helen C. Lanier, Mr. and Mrs. Jason Berger in honor of Angna Enters, Mrs. Harold Krechmer, Miss Erika D. White, Burt N. Pederson, Risa and David Bernstein, Miss Alice Getty, John Solum, Carroll C., Beverly, and Garry S. Bratman, and The Crosby Brown Collection of Musical Instruments, by exchange, and The Barrington Foundation Inc. Gift, and Rogers Fund, 1986 (1986.239)

16. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.1207)

17. Purchase, Joseph Pulitzer Bequest, 1953 (53.6)

18. Gift of B. H. Homan, 1929 (29.90)

19. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.1227)

20. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.1778)

21. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.1220)

22. Purchase by subscription, 1886 (86.20)

23, 24. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.2929)

25. Gift of Bernice Richard, 1980 (1980.146)

26, 27. Gift of Susan Dwight Bliss, 1945 (45.41)

28. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.1218)

29. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.2363)

30. Gift of Susan Dwight Bliss, 1944 (44.157.8)

31. Purchase, Rogers Fund and funds from various donors, 1976 (1976.177a,b)

32. Rogers Fund, 1944 (44.149)

33. Purchase, J. Aron & Company, Inc. Gift, Friends of the American Wing Fund, Sansbury-Mills, Dodge, and Pfeiffer Funds, and funds from various donors, 1976 (1976.229)

34. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.1678)

35. Gift of Helen C. Lanier, 1981 (1981.477)

36. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.3509)

37. Gift of The Chicago Historical Society, 1979 (1979.522.1)

38. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.2741)

39. Gift of Mrs. John G. Ralston, 1960 (60.51)

40. Gift of Laura LaForge Webb, in memory of Frank LaForge, 1979 (1979.523.1)

41–44. Thomas J. Watson Library

45. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.1219)

46. Gift of Bernardus Boekelman, 1911 (11.176.4)

47. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.2910)

48. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.3552)

49. Gift of Geraldine C. Herzfeld, in memory of her husband, Monroe Eliot Hemmerdinger, 1984 (1984.34)

50. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.3182)

51. Purchase, Rogers Fund; Mr. and Mrs Thatcher M. Brown III, Mr. and Mrs. Philip J. Hess, Carroll Music Instrument Service Corp., The New York Flute Club, Inc. and Piano Technicians' Guild Gifts; Gifts of Mrs. Etta M. Helmer, Alice Getty, Mr. and Mrs. Henry Wellman, Mr. and Mrs. Peter M. F. Sichel, Craig E. Steese, Hilda Katz, Mr. and Mrs. Arthur A. Travis and The Crosby Brown Collection of Musical Instruments, by exchange; and funds from various donors, 1982 (1982.138)

52. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.2965)

53, 54. Gift of Henry and Virginia Pleasants, 1982 (1982.76)

55. Gift of Mr. and Mrs. Jerome C. Neuhoff, 1957 (57.134)

56. Gift of Irvin G. Schorsch, Jr., 1980 (1980.428)

57. Gift of Professor Stoddard Lincoln, 1972 (1972.109)

58, 59. Gift of Mrs. Henry McSweeny, 1959 (59.76)

60. 44×34 in. (111.8×86.4 cm) Robert Lehman Collection, 1975 (1975.1.201)

61. Gift of George Lowther, 1906 (06.1312)

62. Gift of Mr. and Mrs. Theodore R. Sayers, 1968 (68.47)

63. Gift of Mrs. Greenfield Sluder, 1944 (44.58)

64. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.2883)

65. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.1191)

66. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.1194)

67. The Crosby Brown Collection of Musical Instruments, 1889 (89.4.3516)

68. Gift of Hans H. Schambach, 1986 (1986.197)

69. Rogers Fund, 1974 (1974.193)

70. Purchase, Margaret M. Hess Gift, in memory of her father, John D. McCarty, 1982 (1982.59)

Photographs by Sheldan Collins unless otherwise noted: Schecter Lee, pp. 14–15 (bottom); Metropolitan Museum of Art Photograph Studio, pp. 5, 6 (top), 8–11, 18, 21 (top), 22, 26–29, 34, 35, 37–39, 43, 46, 47, 51, 54, 56, inside back cover; Malcolm Varon, p. 4

Back cover: Interior of the Appleton organ (fig. 70)

70. PIPE ORGAN, Thomas Appleton, Boston, 1830. H. 16 ft. (4.87 m)