

Celebrating 300 Years of the Piano



The Piano

The piano is the most popular instrument in existence and continues to be the premiere instrument as we enter its fourth century. It is the most complex mechanical device in any home and is capable of fulfilling the player's every musical wish. With each development since its invention, the piano has increasingly been able to provide infinite nuance of expression, volume and duration of tone. A complex wooden machine with myriad felt coverings and metal springs is coupled with a structure that sustains an average of 20 tons of string tension. Where did it begin?

The history of the piano goes back three full centuries when an Italian harpsichord builder named Bartolomeo Cristofori produced a breakthrough technological advance, a new mechanism for the harpsichord which gave it the ability to be played with dynamic variations. He called this touch-sensitive invention "gravicembalo col piano e forte," or "harpsichord with soft and loud."

But for centuries before that, there were two keyboards widely in use during a parallel era that began in the 1400s. These were the clavichord and the harpsichord. Each had its own strengths, which made it popular for specific venues and music styles, and it was these, which eventually led to the piano.



Predecessors

Clavichords are constructed with bichord strings that are struck by tangents – usually brass – stuck into the end of each key. As a key is depressed, the tangent strikes the strings and remains in contact with them, acting as a fret. At the same time, the tangent sets the string in motion at its correct speaking length. Uniquely, a rapid varying of pressure on the key causes a vibrato effect. Dynamic expression is also possible on the clavichord, but the range is limited to the mezzo-piano level. Still, clavichords were extremely popular in domestic use and remained so for 300-400 years.

The harpsichord, which dates to 1505, was popular during the same period and had its own followers. Harpsichord strings are plucked by a quill or plectrum. A jack rises as the key is played, carrying the quill toward the string. A felt damper rises off the string, allowing the string to vibrate freely when it is plucked. Volume could be altered mechanically by adjusting the length of the plectrum and its flexibility, either individually on each jack or by re-positioning the complete register (or one row), moving the jack slide laterally. Yet the harpsichord could be played at a higher volume than the clavichord, which made it especially popular in churches, where it could be played along with the organ and still be heard.

A third instrument was also a forerunner to the piano, yet had no keyboard – that is the dulcimer. The dulcimer is a stringed instrument, struck with small padded hammers held in the player's hands. In 1690, a prolific German dulcimer player and showman named Pantaleon Hebenstreit designed a special dulcimer for himself. His dulcimer was four times the normal size – nine feet long, with an extra soundboard. He made hammers for striking the strings which had two sides with different covering materials, one side for soft and one for loud. This "Pantaleon" (so dubbed by Louis XIV) was a great success for Hebenstreit, but required his unique skills to play. It did not develop commercially, yet provided an important link to the invention of the piano.

Bartolemeo Cristofori

The time was right for the next step – a keyboard that could satisfy composers, who were clamoring for an instrument with a broad dynamic range. The answer came from Bartolomeo Cristofori. He was a harpsichord maker and keeper of musical instruments at the Medici court. In approximately the year 1700, he produced his great invention, the "gravicembalo col piano e forte." Though evidence points to earlier attempts, Cristofori's was the first successful keyboard instrument which used hammers to hit the strings. With a 1700 inventory listing Cristofori's invention found among his employer's belongings, the 1700 date is known to be close to the date of this invention and it may have come about in 1698-99.

There are three surviving Cristofori pianos: a 1720 which is in the Metropolitan Museum of Art in New York City; a 1722 from the Museo degli Strumenti Musicali in Rome (which was on display at the Smithsonian Institution's 2000 "Piano 300" showcase exhibit of the history of the piano); and a 1726 Cristofori which is in Leipzig, Germany.

For his new instrument's hammers, Cristofori used a small roll of parchment with a pad of leather glued on top, fitted into a wood molding. He also added something called the "escapement." This design allowed the hammer to be thrown freely at the string in the last part of its travel, then escape rather than stay against the string. This allowed the string to vibrate freely. Another innovation was a separate rail for mounting the hammers.

Years passed before Cristofori's invention was made public. In 1709, an Italian journalist named Scipione Maffei visited Cristofori, publishing drawings of the new design two years later. Instrument builder Gottlieb Silbermann saw the drawings and built his own version of Cristofori's design. J.S. Bach eventually appraised Silbermann's work, critiqued it, and caused Silbermann to make improvements, which Bach endorsed in the 1740s.

Political unrest and economic problems throughout Europe in the 1750s and 60s limited further development there, and many of the builders left for England, where keyboard instrument building took off. A separate and distinct English style of action evolved, arriving ca. 1766. By the 1780s, there were two schools of piano making, the Viennese, and the English. Maffei's article had by then been translated into several languages and large numbers of builders began to experiment with Cristofori's action.

The Viennese instruments are lighter, with lighter weighted and simpler mechanisms. Composers such as Wolfgang Amadeus Mozart were enchanted by the Viennese "harpsichord with soft and loud," finding it increasingly responsive to the player's wishes compared to the precision required to play traditional harpsichords. In 1777, Mozart wrote to his father praising Johann Andreas Stein's instruments. Stein is given credit for perfecting the Viennese action, ca. 1780-90. This style of action was made until 1905.

The English school added heft to the sound through various methods. Iron bars were added to the wooden framework, so that strings could be made heavier. But the action designs, while satisfying the need for greater volume, limited repetition.

Sebastian Erard

For several decades, from the late 1700s to early 1800s, instrument builders in both schools continued to improve the mechanics and the structures of their products. Yet no single innovation had the kind of impact of Cristofori's invention, until a Parisian named Sebastian Erard invented the "double escapement" or repetition mechanism. This revolutionary idea, patented in 1821, made it possible for a hammer to hit the string again before the key was returned to its original position, making rapid repetition possible.



With the romantic movement in composition, composers such as Franz Liszt increasingly wished for more power and expressiveness from the piano. Enlarging venues and concert halls brought about larger, and therefore louder, orchestras. Instrument builders throughout the 1700s and early 1800s continued Cristofori's quest for structural answers to the problem of producing more volume. Strings became heavier, adding tension to the frame. Iron bars were added to the wooden timbers of the cases, the whole structure becoming stronger and heavier.

The Iron Age

In 1825, a quantum change occurred – an early American piano maker named Alpheus Babcock was granted a patent for his invention of a full cast iron plate for a square piano, thus removing string tension from the wooden case.



Jonas Chickering, who had opened his piano company in Boston in 1823, further developed Babcock's work with a full iron frame for the grand piano. Another short-lived piano company was probably the first in America — Appleton, Hayt & Babcock.

From then on, innovations came fast and furious. Mechanized piano building was under way in England and America. Sizes and shapes over the previous century had ranged from small, light, rectangular boxes to wing-shaped, square, trapezoidal and upright.

Evolution of improvements eventually led clearly to the grand pianos we know today with their 88 keys. They encompassed the best in structural integrity and strength, producing the full, rich sound we now enjoy. Upright pianos were developed with similar strength characteristics in response to demand for quality pianos that could be placed in the average home.

In 1859, Steinway & Sons produced the first overstrung grand piano, and by around 1870 the piano was very close to that which we know today. Since 1885, the piano has not changed significantly in design. Finally, the instrument composers and musicians had been waiting for was here.

The twins, mechanization and marketing, took hold of the piano-making world late in the 1800s, and the piano became a household object. Sales rose from just a few thousand in 1850 to 365,000 in 1909. The middle class had arrived. The piano itself was in a refined form and factories flourished.



Automated Player Systems

Exciting developments came in the form of player mechanisms. The player piano, first popular in the 1890s, was a pneumatic device with the notes stored on paper rolls. A reproducing version came in 1904, and was capable of recording not only which notes to play, but also all aspects of dynamic expression of the performance.

Today's player pianos are computerized, producing some of the most exciting advancements imaginable for players and audiences. These instruments combine the best of everything available today, the full-fledged piano, with computerized player systems and the ability to connect to other pianos and other instruments through a MIDI interface.

The period often thought of as the heyday of piano making came to an end with the depression and the advent of radio. However, fine pianos are being produced today by many firms in America and abroad and the piano is regarded as one of the outstanding achievements of invention. Except for the large pipe organ, nothing rivals the piano's impact on the player, with its immense pitch range, tonal colors, responsiveness and aesthetic impact.

The Modern Piano Technician

Today's pianos have evolved as sophisticated, complex mechanisms. The modern piano technician must have knowledge in multiple aspects of piano service and there are many who specialize in particular areas. For instance, tuners must be capable of coping with 20 tons of string tension, and in understanding the structural stresses and environmental factors which affect a piano's tuning.

Others may specialize in the repair and regulation of the action, which has nearly 9,000 parts, all intricately interwoven. Pianos are so well designed that one can be in very poor condition and still play. But a competent action regulator can restore its vast range of responsiveness to varying touch, giving the player the utmost in musical control.

The rebuilding of fine pianos from 100 years ago has become a major specialty today, as there are many fine instruments that were excellently built but now have parts that are badly worn.



Finding a Qualified Technician

The best guide to finding a qualified individual to care for your piano is to seek a Registered Piano Technician (RPT) member of the Piano Technicians Guild. The Guild's RPT status is earned by those who pass a series of examinations in a broad range of piano service subjects, tuning and repair. Visit www.ptg.org to find a Registered Piano Technician in your area.

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