

Piano History

The following text, from the website www.pian-e-forte.de, was written by **Jörg Gedan**, who kindly provided it to us. His piano history encompasses not only the descriptions of the many different technological developments but also provides attractive portrayals of current events in the area of piano manufacture.

PIANO: A parlor utensil for subduing the impenitent visitor. It is operated by pressing the keys of the machine and the spirits of the audience.

(Ambrose Bierce, »The Devil's Dictionary«)

Term

The early meaning of the word **piano (German: Klavier)** has been preserved in the word **keyboard**. **Clavis** (lat., *key, bar, piece of wood*) was, as of the 12th century, the term for **key**, but also for the names of the notes as well as pitches. The **clef** shows in today's written music as G-, F- or C-key the position of the notes G, F and C.

Clavier originally described everything that had keys and thus also included the **clavichord**, the **harpsichord** and the **pipe organ**. This is why one of the most important works of Johann Sebastian Bach is called **The Well-Tempered Clavier**, although it was intended for the harpsichord or the clavichord. Up to the 18th century, piano music could be carried out on all keyed instruments; the kind of tone production was therefore secondary.

Today the word piano is used very often to differentiate from the **grand piano**, can be used however, depending upon usage, for both, just as the word **piano** or **pianoforte**, which were described in Beethoven's time as the grand piano or the **virginal**, while the upright piano, as we know it today, came into usage only gradually after Beethoven's death. It was called the **pianino**, i.e. »small piano«, while today one understands under the term **small piano** instruments of up to 110 cm in height.

When speaking about the piano today, one means the **piano forte** or the **hammer piano**, i.e. an instrument whose tones are created by striking hammers against strings. Nonetheless, no one today still uses the word *piano forte* for our modern instruments, as this term is currently used for a different instrument: it is used to name historical instruments from the time around 1800 and previous. Of all things, however, Beethoven's **Hammerklavier-Sonate** would scarcely be playable on one of these instruments, its dynamic requirements and those of the late Romantic Period led, after all, to the further development and completion of the instrument that was first finished up for the most part in the middle of the 19th century.

*The sound of a harpsichord – two skeletons copulating on a tin roof in a thunderstorm.
(Sir Thomas Beecham)*

An ORGEL is a musical instrument that requires more material than any other in its production and thus is on the average the most expensive, largest and unmanageable in the world, as it is the only non transportable instrument, although it consists only of pipes. It is installed in very large buildings in an unmovable fashion, so that village minstrels can kick it with their feet, in order to create a little wind.

Piano Predecessors

The history of the **keyed instruments** reaches back to ancient times: already in the 3rd century B.C., engineer Ktesibios of Alexandria invents the organ, and in the 1st century A.D. Vitruvius Pollio already describes a keyboard. The piano, however, not only belongs to the keyboard instruments but also to the **chordophones**, the *string sounders*, and their history can be traced back to primitive peoples. Over the whole world, for example, one finds the **music bow**, which carries back to the hunting bow, and can still be found in America, Africa and India.

In ancient times the **monochord**, the *single string*, is not only a music instrument but also a scientific aid: Pythagoras uses it to determine the vibrational relationships of diverse ton spacing, as well as the relationships of string lengths, as frequency values were still unknown at that time. We see the **dulcimer** today in Hungarian folk music, and we know the **psalterium** (Greek *psallein* = pluck) in folk music as the **zither**. And as a model for the frame form of the piano, we can definitely observe the **harp**, which, at any rate, through the continuous shortening of the strings follows up to the high tones alone.

To consider these manifestations of plucked or struck stringed instruments as predecessors of the piano may be stretching things a bit, and one can really only first accept the **clavichord** as the real predecessor, whose inventor is unknown and which arose between the 12th and 14th centuries.

The piano has the following in common with it:

- Note creation occurs by **striking the strings**, not through plucking or strumming.
- For every note there is – in contrast to string instruments such as the violin, guitar or mandolin – one single string, as long as one is not referring to a *bound* clavichord, where two notes share a string, which is possible because the striking point limits the resonating string length, whereby different keys can generate different pitches on the same string.
- The striking point – and this is the decisive commonality – occurs with the help of a **keyboard**.

Organs appeared earlier, but they are on the one hand not string instruments, and on the other hand the striking point does not create the note, but rather a stop mechanism and the keys only serve to admit a passage of air into the corresponding pipes.

However, the piano would not have developed from the clavichord, which due to its modest tone volume was only passable as a household instrument, on its own and de facto it developed predominantly out of the (Ital.) *Clavicembalo*, or the **harpsichord**.

The name shows how the terminology comes together, for *clavicembalo* actually means *key dulcimer*, and this description is basically incorrect, for the strings of a harpsichord are not *hit* but rather, they are *plucked*.

Next to the organ, the **harpsichord** is the most important keyed instrument of the Baroque. It is in use in two forms, namely, as the **harpsichord** and as the **spinet**. The difference between the two lies in the alignment of the strings, which lead away from the keyboard for the muselar and parallel to the keyboard for the spinet. The latter allows a more compact form of construction, so that the spinet represents the household musical instrument, the harpsichord the concert instrument. Both descriptions characterize the essence of the instrument: the strings are plucked with a plectra (*spina* = thorn; *spinetta* is the Italian diminutive).

In England the spinet is called a **virginal** (*virga* = jack – the part of the playing mechanics the plectra is attached to), and there one of the most important collections of early piano music arises: *The Fitzwilliam Virginal Book*

In France the harpsichord is called the **clavecin**, i.e. simply »piano«. This is why one distinguishes between the *harpsichordists*, *virginalists* and *clavecinists*, although they all do the same thing: play the harpsichord. We thank the clavichord as well as the harpsichord for a multitude of piano pieces that are still played today. What must be mentioned here is above all the piano work of Johann Sebastian Bach. His *Inventiones*, primarily composed for the clavichord, are justifiably included as a fixed component of the instructional repertoire, the same as his *Well-Tempered Clavier*, whose *Präludium* remains one of the easier instructional pieces as well as one of the most well-known: *Charles Gounod* turned it into his famous »*Ave Maria*«, by congenially laying down a measured melody on top of the preluding chords of Bach.

The harpsichord plays its most important role in the Baroque as **basso continuo** or **thorough bass**, which presents something similar to the *rhythm group* of piano, bass, drum set and guitar in jazz. In the baroque this continuous accompaniment consist of the cello (or the gambe) and the harpsichord, which both play the bass part, while the right hand of the harpsichordist improvises the accompanying chords, for as with jazz, the accompanying harmonies are not written as notes but in a short hand form, the **basso continuo figure**.

All keyed instruments of the Baroque have an inherent basic flaw: their notes either cannot be modulated well or not at all, i.e. dynamic differences can only be achieved block by block in the harpsichord and the organ by changing registers and not for every single note and for the clavichord in only a very limited breadth. Removing these flaws was not possible with the possibilities of sound generation available. A new construction was required for this: hammer action. With its invention begins the real development of the piano, and it becomes a success story comparably seldom for an instrument.

The first piano was built long after they didn't have any at all.
(Victor Borge)

The Development of the Piano

Around **1350 Rudolf von Nurnberg** develops the technique of wire drawing through hydraulic power – a requirement for the production of iron wire strings for zither, clavichord, harpsichord and piano.

1482: The Spanish composer and music theoretician **Bartolomé Ramos** describes in his book »*De Musica Tractatus*« a **tempered tuning**, which does not find a practical use until Bach's time.

1619: The German mathematician and astronomer **Samuel Reyher** discovers that the tone of a musical instrument contains, in addition to the tonic keynote, **partial tones** (harmonic tones).

1636: The French mathematician **Marin Mersenne** also discovers **partial tones**. Mersenne is one of the first scientists to assume a relationship between tone pitch and frequency.

1638: the »*Discorsi*« of **Galileo Galilei** appear, in which he introduces the term of **frequency** for a vibrating string and shows that the frequency is dependent upon the length, the tension and the mass of the string.

1709 is the year that many sources call the **birth year of the piano**. The Italian Harpsichord builder **Bartolomeo Cristofori** successfully constructs in Florence a **hammer action**, which makes possible the building of a piano he calls **Gravicembalo col Piano e forte**¹.

The first unique mention of the piano, however, can already be found in the inventory table of contents of the Medici in **1700:** »*Un Arpicembalo di Bartolomeo Cristofori di nuova inventione, ch fa' il piano, e il forte ...*«.

1711 is also mentioned often as well, the year in which in the first description of the instrument appears in the »*Giornale de'letterati d'Italia*«, by the Italian author Scipione Maffei.

The thought seems to have been in the air, as there were first attempts previously, and the existence of harpsichords with a struck tangential action has been demonstrated by written sources. But Cristofori's construction is the first example that is convincing enough. In France the Clavecin builder Jean Marius finds a similar solution, and in Germany the organist Cr. Gottlieb Schröter is also successful in his attempt; both, however, some years after Cristofori, so that he takes priority.

¹Further notations in the source literature: gravicembalo col forte e il piano, gravicembalo col forte e piano, gravicembalo col piano e col forte, gravicembalo con il pian e forte, Gravicembalo con il piano e il forte, gravicembalo piano e forte, cembalo a martelli, Cimbali con piano e forte, Cravo com Piano e com Forte.

50 years would elapse before the instrument establishes itself, during which time German piano builders make measurable contributions to its further development, among them the famous organ builder **Gottfried Silbermann** (Freiberg i. Sa.).

1711: The English trumpeter and lautenist **John Shaw** invents the **tuning fork** – for more than two centuries, the most important and singular acoustic aid, not only for piano tuners.

1713: The deaf French mathematician and founder of modern acoustics **Joseph Sauveur** describes **beat frequencies**.

1716: The English mathematician **Brook Taylor** (1685-1731) posits a universally valid formula for the calculation of the frequency of a string dependent upon its length, mass and tension. Knowledge of the **Taylor Formula** is later, in addition to other necessary knowledge, a requirement for the pre-calculation of piano measures. (Among mathematicians is the other, better-known *Taylor Formula* by the same author, with which one can converge functions through polynomials.)

1725: the first German piano forte from the workshop of Gottfried Silbermann. Silbermann's pupils carry the handicraft as refugees from the Seven Years' War to London and found there the tradition of English piano making.

1728: in London the oldest brand name still used today is founded: **Broadwood**, which will long hold European-wide prestige.

Around **1730** the Englishman **John Walsh** develops a form of the **music engraving**, which is finally flexible enough to also be able to play back complicated music in a typographically clean composition, which was nearly impossible before for piano music with several voices in one staff. The process later develops into an art whose mastery requires up to 10 years of study and for today's publishing houses has become too time-consuming and therefore too expensive. Music engraving is currently dying out, with the disadvantage that also the aesthetic quality of the sheet music is in decline; even in renowned houses one can find editions that show flaws in the computer composition.

(John Walsh released the Klaviersonaten op. 1 by Domenico Alberti in 1748, which gave the so-called **Alberti Basses** their name.)

1742 – The oldest known **square grand** originates in this year, built by Joh. Socher, Sonthofen. Up to then there are only virginals, which are mainly only modified harpsichords. As with the virginal the strings run parallel to the keyboard for the square, whereby considerably smaller instruments are made possible, at any rate at first characterized by being rather modest.

The square, for 100 years the preferred instrument in Europe, is developed further principally in England, where it becomes a real monster; after a long period of popularity it begins to delight America, where up to the Civil War 97 percent of all pianos produced are square grands.

1745: The German organist **Georg Andreas Sorge** and the violinist **Giuseppe Tartini** discover **difference tones** independently of one another.

1745: **Christian Ernst Friederici**, a pupil of Gottfried Silbermann, develops the idea of setting the piano **upright** for space-saving reasons, and builds a very vertically projected grand piano tilted upward, which he calls a **pyramid**. Probably the earliest upright instrument was built by Domenico del Mela in Italy in 1739. Further similar constructions from other piano makers follow and do indeed come into use, but these ca. two meter high monsters are still far removed from the modern upright piano.

1747: **Johann Sebastian Bach**, who was rather opposed to the first hammer action pianos at first, examines upon the request of Frederick the Great Silbermann's pianos in the Potsdamer Schloß and does indeed give them his recognition. Bach dies in 1750. Whether he would have welcomed the performance of his compositions on the hammer action piano must remain speculation, just as much as whether he would have rejected it...

1767: The now refined square grand is adopted in England for the first time as an accompanying instrument in concert.

1768: **Johann Christian Bach**, the »London Bach« and son of Johann Sebastian, holds the allegedly first solo concert on the piano and introduces the square grand to the concert hall. He thus contributes measurably to the popularization of the instrument as well as to its continuing development through his collaboration with the leading piano makers in London.

Up to ca. **1770** composers do not write for the hammer action piano, but rather still compose for the harpsichord or for both. A pronounced piano style and a new playing technique do not develop before the sons of Bach **Carl Philipp Emanuel Bach** and **Christian Bach**, with **Joseph Haydn**, **Wolfgang Amadeus Mozart** and **Muzio Clementi**, who will become active later himself as a piano maker.

1784: Still, Broadwood sells 38 harpsichords as compared to 133 pianos.
(Source: Broadwood's Website, where the company history can be seen).

1772-1777: the Englishmen **Backers** and **Stodart** improve the hammer action such that it becomes, accompanied by stronger strings, more robust and dynamically expressive up to a massive sound. This „**English Action**“ finally forms the basis of the modern grand piano mechanism, although many musicians still prefer the considerably smoother running **Viennese Action** at first, which continues to be produced and favored above all in Austria far into the 20th century. (The Viennese Action is a so-called **bounce** action, through which the hammer pin is located on the moveable key; the English Action is a **pedal** action, whose principles Christofori had already utilized.)

1774: In England, **John Joseph Merlin** introduces the **una corda**, or **shifting pedal**, which shifts the playing mechanism in such a way that the hammers only engage one string (*una corda*), in order to play more softly. During this time the knee levels, which had fulfilled the pedal function up to this point in time, are also gradually replaced by foot levers.

1775 is probably the beginning of American piano manufacturing. **Johann Behrent** produces the first square piano in Philadelphia.

1777 Stodart patents an instrument in London, which can be played as a harpsichord as well as a hammer action piano, as its action is switchable.

Since Cristofori the piano has increased considerably in volume, the strings are stronger, the string tension has increased, and the pitch range has been extended from its beginning 4 to 5 octaves.

1783: Broadwood introduces the **sostenuto pedal** and is recognized as its inventor. There is, however, a grand piano by **Backers** from 1772 that already includes 2 pedals in the alignment of today.

1788: A certain **systemization of string measurement** begins with J. Broadwood, i.e. the fixing of the string mass and the hammer points. It is the first attempt to base this area on scientific principles.

Around **1790 Erard** in Paris introduces **trichordal stringing**, through which in the soprano and mid-tones three strings are reserved for every note.

1793: Broadwood manufactures its **last harpsichord**. While Bach has been dead for nearly two generations and Mozart for two years and Beethoven is already 23 years old, then, the harpsichord is still being played.

1794: The **pitch range** of the piano changes from **C₁ to c^{'''}** and expands to 6 octaves.

1794: Johann Adolph **Ibach** in Beyenburg near Wuppertal builds his first square piano, in December 2007 the company closes its doors to production. Up to then Ibach was the oldest piano factory still existing that was still family-owned and still producing in Germany. Over more than 200 years Ibach manufactured more than 150,000 pianos, which were valued in the music world for their quality of sound and their craftsmanship.

1800: John Isaac Hawkins in Philadelphia builds the first instrument comparable to the upright pianos of today.

1800: In Lyons the **Jacquard Loom** is introduced, which is controlled by punch cards. Later punch strip controls make the automatic playing of mechanical pianos possible.

1802: Broadwood manufactures its pianos for the first time with the aid of **steam engines**. Piano manufactories gradually become industrial operations that now can produce several hundred instruments yearly. 20 years later Broadwood is manufacturing 1500 per year.

1804: The **range of pitch** is increased once again and runs from **C₁ to f^{'''}**.

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1811: Robert Wornum creates his **cottage piano** in London, which soon makes the small upright piano popular in Europe. It is called the **Pianino** or **Piccolo**. The name of the inventor is, incidentally, what musicians call a »crab«. If I were to explain that »otto« is the crab of »otto«, this would not be very enlightening, but possibly clearer with this example: »Otto« is the crab of »ottO«. A *W. Munro*, a member of the family, once came up with the idea of making *Munro.W* out of his name and, out of that, *Wornum*.

1816: J. N. Mälzel patents his **metronome**, although he owes the technical solution to another: namely, a mechanic from Amsterdam named **Winkel**. Proceedings of the Royal Academy in Amsterdam show that Mälzel would have to give credit to Winkel. Nonetheless, the initials **M.M.**, Mälzel's **Metronome**, adorn many compositions and give the players the tempo in beats per minute (bpm).

The first to make generous use of the new possibility of absolute tempo specifications is Beethoven. His *Hammerklaviersonate* appears in 1820; the work is considered unplayable and is first performed by Franz Liszt. Since then it has belonged to the standard repertoire of many top pianists. The metronome specifications set down by Beethoven are nonetheless still barely achievable.

1817: On the 27th of December, a piano in London goes on an ocean voyage. A quarter-year later it arrives at its receiver: Beethoven in Vienna. *Broadwood* makes the nearly deaf Beethoven a present of it. It is neither the first nor the last a prominent musician receives, for advertising its products with illustrious names soon becomes standard practice. Beethoven alone owns three grand pianos: one from 1803 from *Erard*, the

Broadwood from 1817 and a *Graf* grand piano from 1825. And in the Franz Liszt household, at the Altenburg near Weimar, it looks in 1861 like a piano showroom: there is a German *Bechstein*, a French *Erard* and *Boisselot*, a Viennese *Streicher* and *Bösendorfer* and a Hungarian *Beregszay*; fifteen years later a *Steinway* comes along. In addition, Liszt becomes the owner of Beethoven's Broadwood grand piano from 1817. The letter of thanks Beethoven sent in 1818 could be seen for many years on Broadwood's Internet site, just as the letter of thanks from Eugène d'Albert could be seen on Bösendorfer's site.

1821: The Parisian Sebastian Erard invents the **repetitive action**, whose specialty resides in the fact that the key does not have to first return to its resting position in order to be able to strike again, i.e. it allows considerably faster note repetitions. Here not only is the speed important, but also to allow for slower note repetitions, trills and for the smooth playing of many other techniques.

Over time Erard's invention pushes out other action types, but it still requires some time, for it can still be read in 1867, for example, in Heinrich Welcker's »Der Clavierbau«: *»It can scarcely be comprehended how it could become possible for such a sorry effort, which can combine neither durability nor precision, ever found imitation. The entire assembly shows that Mr. Erard had little Kopf for mechanical composition, but rather much money for eulogists.«*

The technique, originally reserved to the grand pianos has now found entrance into the action of the upright piano (where it is also rather dispensable; further information see »*Das Spielwerk von Pianos und Flügeln*«.)

Incidentally, what is seldom mentioned in relationship to Erard and the piano is that Erard was interested less in the piano than in the harp, to whose pedal action he contributed greatly.

1823: The **pitch range** reaches 85 notes von **A₂ to a^{'''}** for the first time. This range becomes the standard, even when it is expanded later by several notes.

1825: **A. Babcock**, Boston, utilizes an **iron frame** for the first time in his square grands. The increasing string tension, which made possible ever-increasing note volumes, had already made necessary the usage of additional metal struts, which, however, only fulfilled their purpose insufficiently: piano tuning held, under strong demands, seldom longer than an hour, so that the instrument had to be tuned again several times during a concert. The iron frame first made the construction stable enough.

1826: **Pape** in Paris introduces **felt** for the hammer heads in place of the leather that had been commonly used until then. The production of the hammer head felt becomes over time a production branch with specialized knowledge, just as the tonal finishing of the hammer felt, the so-called **intonation** carried out in the finished instrument becomes a special operation of piano technicians, which still not every tuner has mastered.

1826: **Wornum** develops an improved action for his **upright piano**, which is quickly adopted by others. The **Pianino** becomes, over the course of the century, the most-built keyboard instrument in music history.

1828: In the year of Franz Schubert's death, Ignaz **Bösendorfer** founds his company in Vienna.

1829: **Rawler** produces the first piano with **under-damping**, i.e. the dampers are no longer attached above the hammers. **Over-damping** remains, however, the standard construction until ca. 1900.

1830: The Parisian **Claude Montal** (1800-1865) begins working, as perhaps the first **blind piano tuner**. Piano tuning is a function that can also be practiced very well by the blind and thus offers many the possibility of becoming integrated into the workplace.

1833: **Frédéric Chopin** publishes as his Opus 10 the first volume of his **Etudes**. Ludwig Rellstab criticizes, *»... that whoever has crooked fingers may be able to straighten them again through these Etudes, who doesn't, should protect himself and not play them without having Herr von Gräfe or Diefenbach nearby«*. Gräfe and Diefenbach were two doctors in Berlin, *»who could very well, should this new type of piano play come into fashion, make a completely new practice as the assistants to famous piano instructors.«*

Not only in the 19th century were composers piano players. Chopin might be the only one, however, who wrote almost exclusively for the piano and, although he left behind no symphony, no opera or otherwise large work, counts among the most meaningful creators of his epoch. And this although his activities as a concert pianist are laughably slight: he gives in his entire life about as many concerts as Liszt does at his best during one single month.

1834: **Webster** in Birmingham produces the first **cast steel wire**, which outclasses by far the Eisenod brass wire used up to then in tensile strength, s requirement for the further optimization of the piano strings.

In the years **1838** to **1847**, **Franz Liszt** holds around three thousand concerts in Europe. He fills the halls like no other single musician before him and plays himself a fortune. *»I am in fashion... in 24 hours fifty copies of my portrait have been sold«*, he writes to Marie d'Agoult. The star cult is without argument comparable with that caused by pop musicians of the 20th century: enthusiastic ladies also faint at Liszt's concerts.

Around **1840** **Henri Herz** in Paris improves the grand piano action once again and gives it, in spite of insignificant changes, its final current form.

Henri Herz was incidentally not only a piano maker but also a pianist and a composer. And he was in no way the only multi-talent in these three areas, for the same is true of Clementi, Pleyel und Kalkbrenner.

1844: A good one hundred years after Bach's *»Well-Tempered Clavier«*, **Broadwood** introduces the **tempered tuning** for his piano. Up to the middle of the 19th century, incidentally, it hadn't been adopted by all tuners.

Up to ca. **1850** already more than a thousand patents in piano making can be counted. Many of them have largely been forgotten, as not a small portion of these patents make for a cabinet of curiosities.

1851: Representatives of piano manufacturers also present at the first **World's Fair** in London. At this time Erard and Pleyel were already producing 2300 instruments per year, German manufacturers only about 200.

1853: Three piano manufacturers found their companies: **Steinway** in New York, **Bechstein** in Berlin and **Blüthner** in Leipzig. Three of the brands still famous today are children of the same year. At any rate this is not especially surprising, as the following establishments of firms still existing today all fall into the time period around 1850:

1828 **Bösendorfer** in Vienna
1834 **Thürmer** in Meissen (today in Bochum)
1835 **Steinweg** in Brunswick (after 1865 **Grotrian-Steinweg**)
1845 **Rönisch** in Dresden (today in Leipzig)
1846 **Sauter** in Spaichingen
1849 **Seiler** in Liegnitz (today in Kitzingen)
1851 **Feurich** in Leipzig (today in Gunzenhausen)
1852 **Steingraeber** in Bayreuth
1853 **Bechstein** in Berlin
1853 **Blüthner** in Leipzig
1853 **Steinway** New York
1859 **Förster** in Löbau
1862 **Pfeiffer** in Stuttgart
1862 **Baldwin** in Cincinnati/USA
1875 **Euterpe** in Berlin (today at *Bechstein*)
1880 **Steinway** Hamburg
1885 **Schimmel** near Leipzig (today in Brunswick)

Henry Steinway had immigrated in 1851 to America, in 1865 his son Theodor follows and sells his business in Brunswick, where the family still called itself **Steinweg**, to three of his employees, who founded their company as *»Steinweg Nachf.«*. Among them is *Wilhelm Grotrian*. A legal dispute ensues around the usage of the brand name, which shall continue for more than one hundred years. Not until **1980**, when the family operation Steinway has already been taken over by *CBS*, is an agreement reached: in Europe Grotrian can sell his pianos as **Grotrian-Steinweg**, outside of Europe only as **Grotrian**.

1855: **Steinway** in New York introduces the **cross-stringed covering** in combination with a cast-iron frame, which finally becomes the modern base form of the piano. Steinway wasn't the first to experiment with this form; he was however the first to create a usable method of cross-stringing the grand piano.

The alignment is called cross-stringed because the bass strings cross over the soprano strings. This saves not only on space, but also allows longer bass strings and leads through a more efficient alignment of the sounding board bridge to a better resonance.

1856: In Warsaw the most successful piano composition up to that time appears – successful not *in spite of*, but rather *because of* its musical scantiness. The composer is **Thekla Badarzewska-Baranowska**, the »work« carries the background title of **Gebet einer Jungfrau** and seems today, as the epitome of triviality, as its own parody. Possibly comparatively beloved became only the **Melodie in F** by **Anton Rubinstein**, which once belonged among the most popular melodies of the shallow classic.

1863: The Russian Army storms Palais Zamoycki in Warsaw and throws Chopin's piano out the window.

1866: The Sachsen Pianoforte **Rönisch** introduces the **full cast-metal plates** for the grand piano. **Full cast-metal** means that the plate completely covers the pin block, i.e. the board in which the pins for tuning the strings are set. Rönisch's plate was more stabile than previous ones, and the principles of its construction were assumed by all piano makers; it is still the standard today.

1866: Broadwood builds its last square grand, which is being displaced more and more by the upright piano.

1866: On Halloween day the christening concert of the **Steinway Hall** takes place, a marble structure housing, in addition to showrooms for the instruments, the second largest concert hall in New York, with space for 2000 listeners. Steinway is not the first piano manufacturer to advertise for its instruments with concert venues. In Vienna, Johann Streicher had already constructed a public hall in his piano factory, in Paris Erard und Pleyel had their own halls, in Vienna Bösendorfer, in London Bechstein, in Leipzig Blüthner, in Berlin Stöcker. Today there is a modest Horowitz Hall for one hundred people in the Steinway branch in Hamburg. The producers do not use only concerts for publicity; many also organize piano competitions today for young pianists.

1868: The French instrument maker **Charles Victor Mustel** invents the **Celesta** (the »Heavenly«), a keyed instrument which creates sound not only with strings, but also with metal plates, whose higher tone compares to that of heavenly bells (at any rate this is what its eponym assumed, for up to then no one had been able to hear a heavenly bell). The instrument finds occasional use in Romantic orchestra music.

Around **1870**, through the work of the physicist **Hermann von Helmholtz**, science makes its appearance in piano making. **Theodor Steinway** works closely together with him, utilizes new methods of string calculations and develops the so-called **duplex scale**, through which the dead end of the string vibrates as well and contributes significantly to the brilliance of the tone. The invention is not new; **Collard**, London, was already using it in 1822.

Steinway also discovers a new alloy for the iron plate, which is double as hard as the traditional one, has a considerably lower natural frequency, thus bypassing the too tinny sound of pianos to that point and can withstand about three times the tensile force.

1872 Der Pianofortebau (Pianoforte Construction) by **Blüthner** and **Gretschel** appears. The systematic instructional book remains the standard work on piano making for many decades.

1874: the first grand piano with **three pedals** by **Steinway**. The third, middle pedal has a similar function to the right pedal: one can allow the tones to resonate further without having to hold the keys. In contrast to the right pedal, however, it affects only the tones already struck, not all tones, and adopts in other words the function of a third hand. There are, however, only very little areas in the piano music where one might utilize it, so that the third pedal remains about as unused as the last soprano notes.

The device goes back to the blind piano tuner **Claude Montal**, who publishes its description in 1856 under the title »L'Art d'accorder soi-même son piano«.

Towards the end of the 19th century there are single cases of »Improvements« in the key alignment:

1874: There is a **chromatic keyboard** by **Vincent**, by which the consequent of every second key is a sharp. In contrast to the traditional alignment, in which there are no sharps between the tones *e-f* and *h-c*, lie in the chromatic keyboard the tones *c, d, e, fis, gis* and *ais* are on sharps, *the tones des, es, f, g, a und h* on naturals.

1878: There is a double-register keyboard by **Mangeot**, by which the tones are aligned on the upper register in the opposite direction.

1883: The mathematician Paul von **Jankó** (1856-1919) patents a keyboard where six terraces of keys are ordered chromatically so that the scales of all tone types can be played with the same fingering, chords are harmonized and the hand has a possible span length up to the sixth octave. The idea wins some popularity; 27 manufacturers in Austria and Germany build instruments with Jankó keyboards, in 1906 the Jankó keyboard is introduced as a subject at the Scharwenka Conservatory in Berlin, in 1905 a Jankó organization is founded in Vienna dedicated to the dissemination of the idea, which is not disbanded until 1965 due to a decline in and ageing of the membership.

There are in addition attempts at different shape designs, for example bow-shaped keyboards. And there are basic approaches for making the piano into a pedal instrument, similar to the organ. **Erard, Pleyel** in Paris and **Pfeiffer** in Stuttgart build pianos with **pedal keyboards**.

As standards are broken only with great effort, none of these was accepted, and today the tradition of musical gimmicks is carried on in a different form on electronic instruments.

The mavericks don't ever really become extinct, and there are still single attempts at reforming not only the form of the keyboard but also the notation as well. An example of this is the system of Johannes Beyreuther: www.beyreuther-musikprinzip.de

A further curiosity is developed by **Pleyel**; namely, the **twin grand**.

As an instrument for piano duets, it takes the form of a box-like double grand piano, which has a keyboard on both ends so that both pianists sit opposite one another. Approximately 50 of these instruments were built up to 1930. Most of them were destroyed in the world wars. Nevertheless, a twin grand from 1904 is still being played occasionally in concert, namely from the piano duo *Egri & Pertis*, on whose website images of the instrument can be found: www.egri-pertis.com

1878: **Blüthner** patents his **Aliquot** System, through which in the soprano a fourth is added to the three strings per note, which is not struck but vibrates through resonance – a principle that others had already applied to old clavichords.

1880: The New York company **Steinway** founds a branch factory in Hamburg. There the European Steinway grand pianos are created to this day.

1880: A **World's Fair** takes place in Sydney. In contrast to the first fair in 1851 in London, when German piano production still lagged behind France and England, there are now 50 piano manufacturers represented, in comparison to 21 from France, 15 from Australia, 12 from England and 4 from the USA.

1882: The piano manufacturers **Fischer und Fritz** from Leipzig build a piano they call the »Unverstimmbare« (the "never out of tune"): an **Adiaphon**. No strings are used for creating sound, but rather tuning forks. As a result, the instrument really cannot go out of tune, nor can it be tuned, but its sound is too soft, cannot be modulated well and too boring to be of any musical use.

1883: The brothers **Bongardt** found the steel and wire works at **Röslau**, which still provides piano makers high quality string wire today.

1885: The **tuning conference** in **Vienna** attempts to introduce an international norm for tone pitch and sets the tuning pitch for *a'* at 435 Hz – urgently necessary, as the inconsistency in tuning leads to many practical problems for musicians as well as instrument makers and tuners.

1849–1854 – Broadwood uses a tuning pitch of 445,9 Hz, which is increased in 1874 to 454,7 Hz.

In 1877 Collard's tuning pitch stood at 449,9 Hz, Steinway's London branch used 454,7 Hz in 1879. Erard tuned to 455.3 Hz, Chappell to 455.9 Hz in 1877.

Nonetheless, even after this conference, the tuning pitch is in no way uniform and must be redefined again later.

1887: The Japanese watchmaker **Torakusu Yamaha** produces its first musical instrument, in 1900 the production of pianos begins, in 1902 grand pianos. A hundred years later, **Yamaha** is one of the largest piano manufacturers in the world, producing in one week as many as Steinway in a year, which comes in at 280,000 instruments yearly for a third of world-wide production. Incidentally, not only low-priced instruments: Yamaha made an effort to collaborate with Steinway and wanted to take over the Steinway representation in Japan. When Steinway finally refused, Yamaha decided to enter the concert grand piano market itself. Quite possibly the most brilliant (certainly the most controversial) pianist of the 20th century, Glenn Gould,

after his Steinway fell off a truck during a transport, recorded his records only on a Yamaha concert grand (among others, his legendary second recording of the Goldberg Variations).

1891: Steinway completes as a first the last soprano octave, so that the range of pitch now reaches from **A₂ to c^{'''}**. Although no one really missed the last tones, all manufacturers felt obliged to follow the example. Since that time all pianos have tones that almost no one uses, because they did not appear in music written later. Still, Chatchaturjan («Toccata») and Ravel («Jeux d'Eau»), for example, make use of them. Ravel is at any rate not afraid to use »false« tones, where the keyboard is not sufficient: In Jeux d'Eau he undauntedly specifies sub contra-A, where a sub contra-Gis would actually belong – perhaps the most famous false tone in piano music.

Toward the end of the 19th century three things bestow a major revival upon the piano:

- **Ragtime**, which ignites a piano boom as later *Rock'n roll* a guitar boom – **Scott Joplin's** *Maple Leaf Rag* becomes the first sheet music publication to sell more than a million copies;
- the invention of the **mechanical piano**, the **Pianola**, which represents, so to speak, the music box of this time; around ca. 1920, more than half of the instruments in America are mechanical pianos; and
- the **silent film**, which gives the pianist a new area of operation and includes the piano manufacturers with the movie theater in a new clientele.

1899: The American **Aeolian Company** presents the **Pianola** to the public, whose development began in 1895 with the *Aeriol*. In addition to mechanical pianos, there is the attachment option allowing every piano to become an automatic instrument. It functions via pneumatic vacuum, which is guided by holes in a paper roll; similar to punch cards from the early days of computers, the musical pieces are saved as patterns of holes. Further manufacturers follow with similar devices, e.g. the German piano maker *Hupfeld* with the **Phonola**. In 1930 **Igor Strawinsky** composes an etude for the pianola.

1900: **Bösendorfer** increases the pitch range once again with its grand piano model »Imperial« and expands it further down by a full 8 octaves (97 instead of 88 keys). The inspiration for this came from Busoni. For musicians confused by the sight of additional bass keys, a mask is devised with which one can cover them (today Bösendorfer has gotten rid of the mask and instead colors the last »superfluous« keys black).

Pianists who concentrate on the Bösendorfer can now play Ravel's »false« sub contra-A in the »Jeux d'Eau« (1902), which should be a sub contra-Gis, correctly – Steinway enthusiasts have to make do with Ravel's false tone.

With the Model 225, Bösendorfer builds an additional smaller grand piano whose bass still reaches to the sub contra-F, i.e. one third deeper than today's standard (92 instead of 88 keys).

The »Imperial« remains, at 290 cm, the longest modern grand piano in the world until the young Italian luxury company **Fazioli** builds one even larger, at 308 cm in length. Most of the concert grands of other companies have a length of ca. 270 cm.

1904: The Freiburg Orchestrion manufacturer Edwin Welte introduces the **Welte-Mignon Grand**, with which the playing of notable pianists could be recorded and replayed via pneumatic action. There are still many paper rolls in existence today that can be played on restored grands, among them recordings by Edvard Grieg, Richard Strauss, Claude Debussy and many others; just as many, at any rate, were destroyed during the Second World War.

On May 24th, 1904, numerous piano distributors and many observers meet in New Jersey to witness a bizarre spectacle: the public burning of old square grands. The reason behind this huge bonfire is the revitalization of the piano market.

(In 2009 the German government has the same strange idea and pays each citizen who allows his old automobile to be destroyed and buys another one, a *wreckage award*.)

At the beginning of the 20th century there are an abundance of piano brands and models and therefore a sound diversity in piano building as never before. Today only few manufacturers have mastered the sound character in the concert hall. Leading the pack is the Steinway sound, which has become the standardized ideal; the variety and colorfulness has fallen by the wayside.

Around **1900** there are:

Piano Factories in Population

Paris 3.5 Mil. **50** (one factory per 70,000 inhabitants)

London 7.0 Mil. **175** (one factory per 40,000 inhabitants)

New York 3.7 Mil. **130** (one factory per 28,000 inhabitants)

Berlin 2.0 Mil. **175** (one factory per 11.000 inhabitants)

Yearly piano production in Germany amounts to ca. 73,000, in England 35,000, in America 25,000 and in France 20,000 instruments. To every factory come multiple piano operations, and to a business branch not to be underestimated, the supplier operations: one can become rich on piano flambeau alone. And just as ample as the accessories business, the sale of sheet music is also flourishing.

In every household that could afford it stood a piano just as matter of course as a television set today. How would it have been otherwise possible to bring music into the house? And the piano was (and is to today) the musical instrument with which one can bring every kind of music into the house, for only with it can one reproduce the entire range of every instrument. And at the end of the 19th century there are still no other play back devices.

After 1920 this development is turned around, for now the **gramophone**, already invented in 1877 by **Thomas A. Edison**, moves in to the house. The mechanical piano becomes redundant and in order to listen to music one no longer needs the attendance of music-making people.

However, the negative trend does take a swing in the other direction soon, not least thanks to a modern piano instruction that places the playing of music in the background to the scale study detached from the music, and thanks to the conviction that musical education is character-building and practical music playing cannot be replaced by listening to a gramophone. In 1939 the American magazine *Fortune* reports that more children are taking piano lessons than ever before in history.

Between contemporary art music and music that is popular with many people develops a cleft that still threatens to move further apart: popular music becomes all the more flat and dilettante, art music all the more aloof and professionally blinkered. A sign of this is, for example, the development of the **fourth tone piano**, introduced in **1924** by **Förster** and in **1925** by **Grotrian-Steinweg**. Förster's solution uses two keyboards, on lying upon the other, Grotrian a keyboard in twenty levels. Today the only remaining specimen of a fourth tone grand piano stands in the National Museum in Prague.

In addition to fourth tone, there are experiments with other smaller subdivisions up to twelfth and sixteenth music. Already in **1906**, the composer and pianist **Feruccio Busoni** devises a subdivision of the octave into third and sixth tones, and as late as **1958 Sauter** comes up with a **sixteenth tone piano**, which has with 97 keys more notes than a traditional instrument, merely with the note range of a toy flute, namely one octave; it is still built today upon request.

The ideas for such new tonal systems arise in the same time period, namely after 1921, in which **Schönberg** begins consistently composing **dodecaphonically** (TWELVE-tone; not TWELFTH-tone, but with our traditional HALF-tone scale, which consists of twelve chromatic steps per octave); he had indeed already written atonally, now he began applying the strict regime of dodecaphony consistently.

Schönberg's attempt at modernizing music and leading it out of its late Romantic cul-de-sac is one of the most sincere and honorable in the history of music. But these attempts lead finally into a new cul-de-sac, for apart from a few intellectuals, barely anyone finds this music enjoyable.

After ca. **1930**, the development of the first electronic keyboard instruments begins, e.g. with the **Neo-Bechstein grand piano** and with **Försters Elektrochord**, by which the string vibrations are collected electromagnetically. In 1935 Laurens Hammond, a manufacturer of electric clocks in Chicago, builds the first **Hammond Organ**, which is a popular entertainment instrument into the 1960s. In 1959 Yamaha develops its first electronic organ, called the **Electone**. Later the synthesizer and the sample player are added. The current state of increasing electrification and digitalization is such that it is no longer even necessary to have a keyboard, since anyone who has never even written a note and never learned to write a clean sentence can click together music with a mouse on a computer thanks to MIDI, sequencer programs, sound synthesizing and sample libraries.

1934: **Challen & Sons** builds the largest grand piano in the world as a unique specimen »in Honour of the Silver Jubilee of their Majesties King George V and Queen Mary«. The instrument is 355 cm long, weighs ca. 1.3 tons and has a total String tension of over 30 tons. Its longest bass string measures 302 cm.

1935: The **Haddorf Piano Company** builds a piano that is, at 114cm in height, smaller than all earlier instruments. It is the birthing hour of the modern **small piano**, which is not only more elegant, but also about a quarter cheaper. The other manufacturers take up this idea quickly, but the piano tuners of many locations are not enthusiastic, because the shorter bass strings create impure tones and can only be tuned with difficulty, which is why some refuse to maintain such instruments. Improvements in the calculation of string measurements have alleviated this problem in the meantime.

1939: The **London Conference of ISA** (International Federation of the National Standardizing Associations) agree to an international tuning pitch of **a' = 440 Hz**. This is still the standard today, but is not always followed everywhere.

The troubles of the **Second World War** enmesh even the piano manufacturers in the intrigues of politics. The German branch of *Steinway* must produce airplane mock-ups, bunk beds, and, from precious beech supplies, rifle butts for the Nazi regime, while the parent company in New York keeps afloat making paragliders for the military. One and the same company thus supplies two opposing enemy states. No better off is Kōichi **Kawai** in Japan, whose factory is dedicated by the government as a supplier to the aviation industry and halts production of pianos for the duration of the war.

Around **1960** the attempt at using new materials in piano making fails: Steinway replaces the traditional pin sleeve with bushings made of *polytetrafluorathylene*, the **Teflon** developed by the chemical company DuPont for space exploration, which combines low friction with extensive moisture resistance. The wood, however, in which the bushings are set, remains moisture sensitive, so that the pins stick during rainy weather, more often than with the traditional, more flexible felt sleeve, and the bushings come loose and rattle during dry weather. Ruefully Steinway returns to the felt cloth as a pin sleeve.

1971: the **Council of Europe** passes a resolution in which all countries agree to adhere to the tuning pitch and to raise general awareness, e.g. by using a 440-Hz-Ton for telephone dial tones. 90 years after the Viennese tuning conference and 30 years after the London conference of the ISA it is still considered necessary, not without reason, for even today this norm is still not being followed reliably and the tuning pitch is usually exceeded; for many orchestras a tuning pitch of ca. 443 Hz has established itself as the standard in the meantime.

1975: **Kawai** has the first actions from **ABS plastic**, which has the advantage compared to wood of being insensitive to climate changes, and allows for a true to size production of components. The technology is being constantly refined, and today mechanical components made of ABS carbon are standard at Kawai.

1981 – in a time where one can rather speak of a consolidation of the piano market than from a founding epoch – **Paolo Fazioli** dares to open a new piano factory in Sacile near Venice. Fazioli produces nonetheless no run-of-the-mill product but finds himself from the very beginning among the list of the four or five top manufacturers worldwide.

1983: At the NAMM Show in the USA, the **Musical Instrument Digital Interface (MIDI)** is introduced, with which electronic keyboard instruments can be networked. Further developments lead to sample players and **digital pianos**, which piano manufacturers still utilize today. Almost everyone, namely, now offers pianos that can be toggled between digital and acoustic tone creation, so that a performer can turn to headset rendering so as not to disturb the neighbors. He must at any rate relinquish the real tone of an acoustical instrument, which cannot be replaced by a digital piano.

1986: **Bösendorfer** introduces a computer grand piano, model number **290SE**, which takes up the idea of the Welte grand once again: the pianist's playing is detected by sensors, saved electronically and can be played back in exactly the same way as it was played, thanks to technological advancement and computers significantly more exact than it was possible with the Welte grand. (The »**SE**« in the model description is an abbreviation for *Stahnke Electronics*, **290** indicates the length of the grand in cm.) After the electric piano, after the Welte grand and after the introduction of MIDI, which records only key commands and no audio data, the automatic piano has been reinvented yet again, this time in a high end version that leaves nearly no wishes open – except of course, being able to pay for it as well.

Bösendorfer develops this further into the **CEUS** system (with the meaning: **C**reate **E**motions with **U**nique **S**ound), that can also be built additionally into every grand piano.

More affordable is **Yamaha's** version of an automatic piano, the so-called **Disklavier**, which is introduced for the first time in 1986 as well and which combines the recording and playback of mechanical playing with numerous MIDI possibilities and gimmicks.

As the **CEUS master**, Bösendorfer also offers a digital piano in the meantime, which is, however, equipped with a real grand piano action. The instrument was in its test and development phase until 2008, since then nothing has been heard about it.

1987: Fazioli introduces, with a length of 308 cm, the largest modern concert grand in the world. In the same year the public was presented with a curiosity: the **Klavins Piano**, not with a *length*, but with a *height* of 370 cm. Whoever has two floors and is prepared to break through the ceiling in between can confidently turn to David's Klavins...

Why Klavins put it into his head to design an impractical piano with great effort must remain a secret. He does after all have a grand piano project in the works, and what he has to say about traditional playing actions and about wood, felt and leather in comparison to modern materials seems troubling to me (see www.klavinspianos.com).

1991: An additional small Italian piano maker, **Luigi Borgato**, together with his wife **Paola Bianchi**, introduces a concert grand piano whose soprano above the **f** is **four-stringed**, i.e. it possesses four instead of three strings per tone – an idea that goes back to Beethoven, who had a four-stringed piano made by the piano maker Graf, which can be seen in the Beethoven house in Bonn.

In addition Borgato attempts to resurrect the **pedal grand piano**, and builds with his **Doppio Borgato** an instrument that consists of two, namely, a normal concert grand piano and a second grand housing that lies under the first and is played through the means of a pedal keyboard (see www.borgato.it).

1995: The Dutch piano maker Cornelis Jacob de Baat, Jr. patents a **Crystal Soundboard**, namely a soundboard made of glass. The advantage of this unconventional material is its insensitivity regarding fluctuations in humidity which allows for a better tonal consistency of the instrument. These crystal soundboards are available through the firm **Stemco** in Monnickendam near Amsterdam, they can be installed in every piano (see <http://www.stemco.nl>).

1998: the American company **Steinbuhler & Co** (see www.steinbuhler.com) picks up on an old idea of an employee of the Institut für Musikwissenschaft in Leipzig, Prof. **Goldhammer**, and develops in the years 1998-2005 interchangeable **keyboards for small hands**, namely in 7/8- and 15/16 size, which can be installed in existing grand pianos.

(Whether such isolated applications and the abandonment of a standard make sense must be decided by the owners of grand pianos with small hands, who will not eschew the additional costs of the modification and only want to play on their own instrument. The keyboard cannot just simply be changed on regular pianos, which is why Steinbuhler offers only finished pianos.)

1999: The Australian piano maker **Ron Overs** patents a grand piano action through which the form and alignment of the moveable components are so optimized that friction is reduced by half as compared to customary actions.

2000: The *British Piano Manufacturing Company* takes over production of the English piano brands *Broadwood, Bentley, Knight, Welmar* et.al. and moves manufacturing to Stroud, Gloucester. With this move London, once the center of European piano making, now no longer holds any piano factories.

In **2003** the British Piano Manufacturing Company goes into receivership and is taken over by *Inter Music*, Pool Dorset, who moves production to countries in the Far East.

2002: A piano maker from Bamberg, **Josef Meingast**, together with **Steingraeber**, introduces the so-called **Bamberger Roller**, an improvement on the **hammer-shank roller** of the grand, which the *Süddeutsche Zeitung* pays great attention to in a long article, as this invention will supposedly »revolutionize« piano playing. Steingraeber builds the roller only upon request, and not at a mass level. Die hammer-shank roller is the part of the hammer on which the so-called jack engages, in order to propel the hammer against the string. Between hammer-shank roller and the jack a lot of friction is created. Meingast's development

transfers this sliding friction into rolling friction by making the previously fixed roller turnable. Through this, so to speak, the wheel has finally been invented in piano making.

The Berlineser piano maker W. Neuhaus had a similar idea some time ago: in a patent specification from 1886 he suggested equipping the rods of the piano (strangely not of the jacks, where the friction is much greater) with a turnable rubber roller (can be read in Walter Pfeiffer's Book »Vom Hammer« - "Of the Hammer").

Meingast's development is one of many other special solutions and patents of different companies. For example **Sauter** attempts to improve the repetition of the piano through his **R2 Action**, with which an additional spring should allow for a faster new striking; **Seiler** endeavors to do something similar with the so-called **Super Magnet Repetition**, which supplements the springs with ferrite magnets; in 2007 **Steingraeber** introduces a magnet construction, **Steingraeber-Ferro-Magnet**, which makes the jack springs redundant; the Italian company **Schroeder & Sons** owns an action patent, that gives the piano the playing feel of a grand piano.

2005: For the first time, **Sauter** has an invention called a **Titan Duplex**: the plate bridge, which border the length of the resonating duplex ends on grand pianos, are made out of titanium and no longer integrated fixed in the plate, but rather designed in an adjustable way, which should make it possible to better adjust the resonating tone.

2006: The English engineer **Richard Dain** presents his **Steg-Agraffen** to the piano manufacturer **Steingraeber**, a construction that relieves the sounding board from bridge pressure and should improve the relationship between energy and sound recovery by 50%. During piano play, only ca. 4% of the kinetic energy is transferred to sound, with the aid of the Agraffen (special screws through which the strings are coupled to the sounding bridge) should improve this value to 6%. Steingraeber adopts this system and offers it under the name **PHOENIX** as an option for their grand pianos.

Simultaneously, Steingraeber introduces a new pedal that shortens the hammer distance, so exactly the same thing as the left pedal with an upright piano. There has been a similar function at **Fazioli** for some time, but the original idea was conceived in the year 1897, developed then by Steingraeber for Engelbert Humperdinck.

2006: In Germany ca. 640 grands and 3700 pianos are sold from German production. This is only a fourth of the total instruments bought; the other three fourths are from cheaper Asian, Polish and Czech production. Many brand manufacturers make allowances for demand by selling secondary brands manufactured abroad (»Essex« und »Boston« at Steinway, »Irmiler« at Blüthner, »Euterpe« and »Steinmann« at Bechstein, et.al) in addition to their expensive pianos.

According to the Deutschen Musikrat (German Council of Music), the **number of piano students in German music schools** in 2006 amounted to around 130,000. They represent consequently, at 20%, the highest percent of instrumental students, whereby students of other keyboard instruments (Keyboard, E-Organ, et.al.) have not yet been included here. The next highest are: guitar with 90,000 students (14%), recorder 70,000 (11%), violin 50,000 (8%), flute 40,000 (6%), clarinet 25,000 (4%), trumpet 22,000 (3,5%), saxophone 21.000 (3%).

In 2007, in December, the traditional company **Ibach** stops its piano production. High costs, cheap competition from the Far East and a saturated piano market are, according to the company's press release, the reasons for this. Some of the best piano models of German origin thus disappear from the market, and the oldest piano factory in the world to remain in family hands closes its doors.

In the same month **Yamaha** buys the traditional Viennese company **Bösendorfer**. Yamaha agrees that the grand piano will continue to be made in Vienna and that Bösendorfer shall remain a free-standing brand. In the past years the production of ca. 600 grand pianos annually had decreased by more than half and Bösendorfer went into the red. The financially strong Japanese conglomerate has access to a world-wide distribution network and hopes to be able to increase production again and earn profits with Bösendorfer in as early as three years.

2008: **Steingraeber** introduces a **carbon-fiber sounding board**, which has already been installed in some grand pianos and sold to customers. According to old studies by the Physikalisch-Technischen Bundesanstalt in Brunswick, plastic fibers should have similar acoustical characteristics as wood. They also have the added advantage of being completely climate-insensitive, so that neither the tuning stability of an instrument is affected by variations in humidity, nor does the (nearly impossible to avoid) drying out of the

sounding board wood occur, which can lead after decades to decreasing bridge pressure and cracks in the wood. (In recent years there have been plausible attempts at carbon-fiber violins.)

2009: The piano celebrates its **300th birthday**. Other data are cited for the 300th birthday, since the first unique mention of the instrument can already be found in 1700. Steinway celebrates the birthday for this reason in the year **2000** and builds the »*Tricentennial Limited Edition Grand Piano*«, for this occasion, designed by the American furniture designer Dakota Jackson. Aptly, 300 copies are produced.

In August **2009** the piano manufacturer **Schimmel** goes into receivership. The company, founded in 1885 in Leipzig, moved to Brunswick in 1929, is Germany's largest piano making company. The reason for its problems is the financial crises, which has led to large breaks in foreign markets.

Since **2009** the piano manufacturer **Feurich**, Gunzenhausen, has been offering actions for its grand pianos made by the American firm **Wessell Nickel & Gross**, made not of wood but of composite materials (Nylon, Carbon) and which are insensitive to climate changes. Carbon materials should not be confused with cheap plastic components; stringed instruments and bows are already being produced today from carbon and have proven to possess magnificent qualities.