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The history and development of the piano

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OUTLINE

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THE EARLY STRINGED INSTRUMENTS.

(a) The Monochord
(b) The Virginal and Spinet

The first pianoforte was manufactured at Florence by Bartolomo Christofori about the year 1707. It was not an invention detached from all past endeavor, but represented the latest achievement in the evolution of stringed instruments. Its precursors were the Monochord, Clavichord and the Harpsichord. Of these, the oldest was the Monochord, concerning which Euclid had, in the third century, penned his treatise "sectio canonis."

(a) The Monochord

The Monochord comprised a single vibrating string which could be so divided by the pressure of the finger to give the different tones of the scale. Especially is the Monochord connected with the name of Pythagoras, for it was used by him in his experiments on the mathematical relations of musical sounds. This instrument consisted of a single vibrating string, presumably catgut, strung over a wooden box. Directly beneath the string and glued to the top of the box was a strip of paper, upon which were markings corresponding to the intervals of the scale. The first interval to be established was the octave sounded by one-half the vibrating string. The fifth was sounded by two-thirds the vibrating string; the fourth by three-fourths of the vibrating string.

The Monochord came into universal use among the Greeks. Also in Roman churches, it was generally used to sound the keynote for chorus singing. The highest note was alpha; beta was the fourth below with gamma as its octave. Delta was a sixth below with epsilon as its octave.

About the 11th century, Guido of Arezzo invented the moveable bridge under the string of the Monochord, in order to assure a quicker and especially more correct intonation. After this invention by Guido of Arezzo for the Monochord, further improvement came rapidly. The Clavis, which had come into use on church organs shortly after the year 1000 A.D., were applied to the Monochord then built with more than one string. Each Clavis had a "pricker" which, when pressed down, would prick the string on the proper division of the scale. The sounding of the correct tone was thus assured. As a result of the use of the Clavis, the number of strings were increased, and, during the 12th and 13th centuries, there were many experiments made to construct an instrument which would give all the notes of the scale correctly.

(b) The Virginal and Spinet

The Monochord was followed by the Virginal, Spinet, and Harpsichord. The strings of these three instruments were of brass with quill plectra attached to pieces of wood which were called jacks. The Virginal and Spinet were almost identical. The Harpsichord was much larger than either the Spinet or the Virginal and was sometimes built with two keyboards. The Virginal, it is said, derived its name from its association with hymns to the Virgin. Again it is said to have been the instrument named in honor of Elizabeth, the Virgin Queen. The range of old instruments was from great C to 3 lined C, which was four octaves, with one string to each note. Since there could be no effective agitation on these long strings by a striking tangent, the strings had to be set in motion by twanging or pricking. Thus we find on the Clavis of the Spinet a jack with centered tongue on its upper end. Into this tongue a quill is fastened into which a spring is inserted, and when the key is pressed the point of the quill twangs the string through the upward movement of the jack. As soon as the jack assumes its normal position, the string is dampened by a small piece of cloth fastened to the jack itself. The twanging of the string produces a wiry, nasal sound. The individual expression of which the Clavichord is capable is obviously impossible in the Spinet. Yet, because of its loud tone, - a tone much louder than that of the Clavichord - the Spinet became very popular.

Spinets were built varying in width from 3 1/2 to 5 feet. It was an easy matter, therefore, to carry the smaller instruments about. Usually they were played on a table which increased their resonance. Spinnetti placed the keyboard outside the case, but Rossi of Milan about 1550 built Spinets, the keyboards of which were in the case.

II.

THE MEDIEVAL INSTRUMENTS

(a) The Clavichord

The Clavichord was developed from the Clavicytherium, a covered box of triangular form bearing strings of catgut. It was made to sound by means of a quill plectrum attached to the end of the keys. It was thus through the efforts to improve the Clavicytherium that the Clavichord came into being. The first Clavichord of the 15th century was of but twenty or twenty-two brass strings. These were made to vibrate by means of a brass pin, flattened on top, which was fastened to the clavis.

The Clavichord resembled the small square piano without legs or frame. The strings were struck by a wedge made of metal. Soft tones and soft tones alone could it produce, but these were especially sweet.

The Clavichord improved considerably in the late 16th and early 17th centuries, and became the favorite keyed instrument of the period. Long after the appearance of the pianoforte in the 18th century, it maintained its supremacy.

Most Clavichords have two keys to each string; tone and pitch are given at the same time when struck by a tangent. Only the simplest compositions could be played on the early Clavichords, because of the difficulty in execution.

In 1725, Daniel Feber of Germany constructed a Clavichord which had a separate string and key for each note. A narrow strip of cloth was interlaced with the string to prevent the shorter part thereof from vibrating whenever the string was agitated by a tangent. Thus it is seen that the Clavichord possessed four of the most vital points of the modern pianoforte:

(1) The independent sounding board;
(2) Metal strings;
(3) Reproduction by percussion, and
(4) Application of the damper.

The greatest improvement was the new method of tone production by which the Clavichord became the first keyed instrument enabling the performer to express his individuality. The tone of the Clavichord was very weak. Yet the most delicate gradation of touch of the player could be reflected, and the most exquisite crescendos and decrescendos executed.

The Clavichord was the favorite instrument of John Sebastian Bach, who could produce charming and captivating effects by a trembling pressure of the finger upon the key holding the notes. A composition might in this manner receive unique and individual interpretation.

The Clavichord is said to have been the first keyed instrument with a soul; and it is not surprising, therefore, that Bach, Mozart, and Beethoven preferred the Clavichord to the more powerful Harpsichord and the early pianoforte. Mozart, while traveling about Europe as a piano virtuoso, carried a Clavichord with him for daily practice. He composed his "Magic Flute" and other masterpieces at the Clavichord.

(b) The Harpsichord

The Clavichord was followed by the Harpsichord. The adoption of this form was dictated by the desire for a greater volume of tone. The earlier Harpsichord was very much like the Spinet; indeed was only an enlarged Spinet. The case, however, was larger, and there were many more and longer strings and the soundboard was longer. These changes opened a new field of inventive genius. Whereas the tone produced on the longer string had a greater volume, it lacked the sweet sound of the Spinet. The tone was very raw, more nasal and almost offensive to the ear. This serious fault was not noticeable when the instrument was used with the orchestra. For solo purposes, however, the instrument was unsatisfactory. Many were the attempts to overcome this harshness. In desperation, a mechanical orchestra was even attached to it, compromising devices to imitate both the lute, and the flute in conjunction with percussion instruments. These were operated by stops and also by pedals. The number of pedals increased in accordance with the variety of these appendages; and Harpsichords with as many as twenty-five pedals are still to be found.

Of all these experiments, but four have proved of permanent value:

(1) The "Forte Stop", which lifted the damper;

(2) The "Soft Stop", which pressed the dampers on to the strings to stop the vibration;

(3) The "Buff Stop", interposing soft cloth or leather between the jacks and the strings; and

(4) The "Shifting Stop", which shifted the entire keyboard, a movement later applied to the transposing keyboard.

The size of the Harpsichord was increased from time to time until it reached the extreme length of sixteen feet. This was done in order to produce greater volume of tone.

The cases of the Harpsichords, being very frail, could not stand up under the increased tension of very heavy wires. Accordingly, very thin wires were used for strings. Had the heavy wires been used, it is a certainty that the flimsy quill plectra could not have made the heavy wires vibrate. The longer the thin wire, the less musical was the tone produced by twanging. For this reason, the best Harpsichord makers returned to a length of from eight to ten feet. That greater volume might be obtained, the number of strings for each note was increased from one to as many as four.

About the middle of the 17th century, Harpsichords with two keyboards and three strings for each note were built. The third string was shorter and thinner than the two main strings and was tuned an octave higher. This third string was usually attached to the soundboard bridge. With these two keyboards, the player could use the two or three strings of each note separately or together.

Because of these improvements: greater tone, forte, and piano pedals, musicians came to prefer the Harpsichord to the Spinet; and from the time of Scarlotti in 1670 to the time that Beethoven composed his "Moonlight Sonata" in 1802, many compositions were written for the Harpsichord.

About the last of the 18th century, the pianoforte began to take the place of the Harpsichord. It was at this time that the attempts were made to improve the tone quality of the Harpsichord by using, at the point of the jack - instead of quills - what is called buff leather. Suffice it to say that these attempts were unsuccessful.

Since the Harpsichord and the Spinet gave one no opportunity to reveal one's inner artistic nature, such as was possible on the Clavichord and on the Pianoforte, their utility was short-lived, and their importance soon became obsolete.

(c) The Pianoforte

At the beginning of the 19th century, the Harpsichord had completely lost its popularity. There arose a desire to combine the tone sustaining capacity of the Clavichord with the power of the Harpsichord, a desire shared alike by musicians and builders. This was accomplished by Bartolomo Christofori of Padua, a Harpsichord maker to the Grand Duke of Tuscany. He began to construct in 1709 an experimental instrument which he called the Pianoforte. In 1720 he gave to the world a real Pianoforte.

His case was much stronger than had been the case of the Harpsichord. This was necessary in order to withstand the increased strain of the heavier strings.

The hammer action showed an important improvement over his model in 1707. He added a backcheck, regulating the fall of the hammer; also an escapement device. He connected an individual damper for each note directly tothe hammer action. By this the performer was given a mechanism with which he could produce, through his touch, a delicate pianissimo and also a strong fortissimo. This was impossible on either the Clavichord or Harpsichord. It is evident, therefore, that the invention of the Pianoforte as an entire and complete instrument must be credited to Christofori.

It might be well to note certain French claims to the invention of the Pianoforte. In February, 1716, Marius, a maker of Clavecins, submitted, to the Academy of Sciences at Paris, engraved plans of three instruments which he called Clavecins a Maillett. These instruments were similar to the instrument invented by Christofori.

The Germans, too, claim that the first idea of this instrument orignated in 1717 with Christopher Gottlieb Schröter, a German organist. Schröter declared that the idea of the hammer action came to him after hearing the virtuoso, Hebenstreit, perform on his monster dulcimer called "Pantaleon." Schröter's action was simple and crude, but, however, the idea of having the hammer butt swing in a jerk must be considered the fundamental of what later on became known as the German, more particularly the "Vienna", action.

It is also claimed that an English Monk at Rome constructed an instrument of this kind in 1711, that it was brought to England by Fulki Grenville, and that it was the first of its kind in that country. These four instruments differed in their construction in certain details, but it is certain that the principles of construction were the same.

There was an article written by Marchese Scipione Maffei and published in Venice in 1711, which was translated by Dr. Rimbault. This article commented on Christofori's work as a Harpsichord maker, stating that he had made three Harpsichords and that the production of a loud or soft sound depended upon the player's force in pressing the keys.

Thus we get the origin of the name Pianoforte, - piano meaning soft; forte meaning loud. Here is an instrument capable of producing either loud or soft sounds. On Christofori's new instrument, it was possible, as has been stated, to produce loud (forte) and soft (piano) tones; hence the name pianoforte came to be applied to the instrument.

(d) The Square Piano

As has been said, Christofori finished his real Pianoforte in the year 1720. The action in this pianoforte was much stronger, and showed a great improvement over his model of 1707. Christofori added the escapement device, a back check, regulating the fall of the hammer, and connected directly with the hammer action an individual damper for each note. With this mechanism the performer was able to produce both a delicate pianissimo and a strong fortissimo. This had been impossible on either the Clavichord or Harpsichord. Christofori died in 1731, leaving, so far as we know, no pupils. There was little development of the pianoforte after his death. From 1758 to 1830, and again from 1855 to 1880, we witness periods of great activity in the development of the pianoforte.

There were many radical departures in form, mainly inspired by the desire to produce an instrument which would take up less room than the long grand piano. In the year 1758, C. E. Friederici of Gera, Germany, built the first square piano. About the year 1760, Johannes Zumpe built the first English square piano at London. Another square piano, copied from the English model, was brought out by John Broadwood in 1776. These square pianos were very weak in tone and could not be compared favorably to the Grand Pianoforte. The Christofori action was used in these.

Up to the year 1820, wood alone entered into the construction of the frame of the piano. Metal was introduced, but slowly. Metal was introduced merely for mechanical reasons. Manufacturers wanted to put such contrivances as the drum, the cymbal, etc., into the piano. The wooden beams, however, were unable to stand the strain of such contrivances. The chief reason, however, was to gain the greater strength and rigidity necessitated by a steady increase in the diameter and tension of the strings.

These contrivances had won a large popularity as attachments to the Harpsichord, and it is most likely that a purely artistic influence played its parts in the introduction of that reform which, in a few decades, was to grow into a revolution.

John Broadwood of London completed his new piano in 1781. In this, he placed the wrest plank along the back of the case instead of along the right, as it had been in the Clavichord. This idea was suggested to Broadwood by the use of the Christofori action, in which the hammer rose at the end of the key instead of at the center. This invention of Broadwood was an epoch-making one, for it revolutionized the construction of the Square Piano. The volume of tone was increased to an unexpected degree. So satisfactory did the invention prove that it was adopted by all of the leading makers. Further improvements by European makers there were none. It behooves us, therefore, to turn our attention to America where, for nearly one hundred years, the Square Piano was in fashion.

In the year 1789, we find Charles Albrecht making Square Pianos in Philadelphia. In 1792, Benjamin Crehore founded the Boston School at Milton, Mass. Among his most talented pupils, we may list John Osborne and Alpheus Babcock.

Babcock gave us a very important innovation in the invention of the full iron frame in 1825. There was a great demand for larger tone, which could be achieved only by heavier stringing. A wooden frame naturally prevented any such result. Babcock's full iron frame paved the way for further development. This frame, in turn, was changed in 1837 by Jonas Chickering to such an extent that he was granted a patent in 1840.

Jonas Chickering was employed in the piano making establishment of John Osborne in Boston. His name appears in the Boston Directory for the year 1822 as a piano maker, at which time he was still in the employ of John Osborne.

Most of the Boston Makers were inclined toward the English School and adopted the full iron frame. The New York makers were inclined toward the German School, objecting to the iron frame because of the metallic tone found especially in the upper notes of these pianos. Hence all the American makers of that day were devoting themselves to the manufacture of the Square Piano. It soon became superior to the Upright Piano of that period.

In New York at the World's Fair in 1855, a Square Piano, with the over-strung scale, was exhibited by Steinway & Sons. This piano had a full iron frame - designed on novel lines - to conform with the varied and much increased strain of the new scale. A new sensation was created by the instrument. The Steinways had succeeded in producing a much more sonorous tone than had ever previously been produced. Furthermore, they had entirely overcome the harsh metallic quality so objectionable in other pianos having the full iron frame.

The overstrung scale and full iron frame were very much objected to at first, but they were soon adopted by all American makers. This innovation of the Steinways gave a new impetus to the piano industry of America. With time came improvements, the most ingenious of which was the linear soundboard bridge, invented by Frederick Maltrushek in 1865.

The American piano manufacturer followed the example of the European makers after the Paris Exposition in 1867. Paris began to push the Upright Piano to the front, so that by the year 1880 the making of the Square Piano came to an end.

III.

THE MODERN PIANOFORTE

(a) The Upright Piano

The first Upright Piano was built about 1780 by Johann Schmidt of Salzburg, Austria. About the year 1800, an Upright Piano with vertical strings, full iron frame, and check action was patented in Philadelphia by John Isaac Hawkins. Although this piano had many ingenious devices, its tone was most unsatisfactory. An engineer properly termed it "a remarkable bundle of inventions, but not a musical instrument."

In 1807 the Cabinet Upright Piano was brought out by William Southwell of London. This was an instrument having a compass of six octaves.

In 1811 the first Upright Piano, with string running diagonally, was made by Robert Wornum of London. By the year 1826 Wornum had developed an action for his Upright Piano which, combining precision with durability, responded easily to a light touch.

From this time on, the Upright Piano began to be popular in Europe. About the year 1835, Germany began the manufacture of Upright Pianos in preference to the Square Pianos; by the year 1860, the Square Piano had been almost completely discarded. During this period, the Germans built heavier Upright Pianos than the French or English, using three strings for each note. Iron plates were applied as hitch-pins so that the tone was of greater volume than that of the instruments of their contemporaries. The German Upright Pianos had superior quality of tone and great durability.

About the year 1860 the American piano makers began once more to pay attention to the making of the Upright Pianos. At this time they adopted and perfected the Steinway System of overstrung scale and full iron frame - thus producing an acceptable instrument, though inferior in tone and touch to the best Square Pianos. Germany adopted the overstrung scale and iron frame for its Upright Pianos very quickly; and her instruments, as a consequence, became very superior. She captured much of the foreign trade which England had previously enjoyed. England was thus forced to adopt the overstrung scale and iron frame.

The American System was universally adopted for the uprights by the year 1880. The Upright Piano today, however, is not an instrument of praiseworthy value. In its entirety it is an open defiance of all the laws of acoustics and proper mechanical construction. Indeed, it may still be properly called "a remarkable bundle of inventions." The soundboard is necessarily almost boxed in between the back and the front, so that the sound cannot develop freely and fully.

The keys of the Upright Piano are short, rigid and stiff. This makes the touch non-elastic and tough. In addition, the action of the Upright Piano is very complicated.

The tone that the performer gets from the Upright Piano passes through obstructions which cut the sound short. The tone is thrown into the piano with no chance of escape, whereas in the open Square Piano or Grand Pianoforte, it travels comparatively free. Although it has been greatly improved, the Upright Piano does not satisfy the artistic temperament, either as to tone or facility in execution. The demand for a perfect Pianoforte, however, is great and is daily increasing.

The best makers of the world have been experimenting for many years to produce a small Grand Piano which in size and price will be excepted by music lovers. The reasons for its popularity are first, a cost lower than that of the Grand Piano; and secondly, its adaptability to small rooms, such as are to be found in apartment houses. The latter advantage has caused makers of the Grand Pianos to experiment in the construction of a Small Grand, occupying a minimum of space.

(b) The Grand Piano

The Square Piano was born of English commercialism; the Upright Piano started its career of success under pressure of the apartment house; but the Grand Piano has ever been the love of the artistic piano maker and the musical pianist. There was a craze for such attachments as the bell, drum, cymbal, triangle, etc., formerly used on the Harpsichord, which continued for a while with the

Grand Piano, but such attachments were not accepted by the real artist. There can be no doubt that there was a real popular demand, for as early as 1796, a Grand Piano was made in Bohemia. This was a monstrosity having 230 strings, 360 pipes, and 105 different tonal effects. This instrument was 3 feet 9 inches high; 7 feet 6 inches long, and 3 feet 2 inches wide. It had two pedals. The function of the pedals was to lift the dampers to produce lute, flute, French horn, and many other effects.

The Grand Piano had longer strings and a larger soundboard than the other pianos. To perfect the Grand Piano it was necessary to develop an action capable of bringing out greater tone. For many years, therefore, the English and Germans struggled unsuccessfully to solve the problem. It was eventually solved by two Frenchmen in Paris, Sebastian and Pierre Erard.

The Backers' Grand Action was completed about 1776. This was an inspiration for Robert Stodard in London to build his first Concert Piano which he himself named "Grand Pianoforte." This was the first time that the word Grand was used. Afterwards it was used by all English and American makers of the instrument. In 1820 a Grand Piano was patented by Allen & Thorn of London, which had a complete metal framing system. This was followed by Erard's in 1823, a Grand Piano with six resistance iron bars placed over the sounding board. In 1827 appeared a combination of iron resistance bars which came very near the full iron frame.

Meantime, Johann Andreas Stein and his daughter Nannette Stein Streicher - who was a practical and scientific piano maker - improved the Schröter Action. So materially indeed, was the improvement that the Grand Pianos made by them from 1780 on were very much liked by Mozart and Beethoven. The action produced a more sympathetic tone, more like that of the Clavichord, which had been much admired by all the great players of that time. It was possible to produce this sympathetic tone with the Vienna Action because the hammer, when striking, would draw along the string to some extent. The more forceful attack of the English "Jack Action" on the other hand, is a straight and direct percussion.

The Vienna Grand Pianos were supreme in Germany, Austria, and Italy, because they contained these two elements:

First, a pleasant, light, elastic touch, and

secondly, a charming musical quality of tone.

Mozart preferred the Stein Pianos to all the other pianos of his time, because of the escapement which lets the hammer fall back immediately after the strings are struck, The pedal which was pressed at the side of the knee, thus raising the dampers, was already a Universal feature. Mozart praised the quality of key action and the promptness of the escapement device.

The prices of pianos in Mozart's time were very high; Parisian Pianos with leather plectrums were sold for 3000 francs. The final victory of the piano over the Harpsichord would have never been realized if there had been no piano virtuosos, so Clementi in England, Mozart in Germany and Austria were the workers who won the decisive triumph of the piano.

The Stein Pianos in Mozart's time were copied everywhere. Especially were they copied by the Vienna makers. Stein may be called the father of the Vienna School; Stein always tried to meet Mozart's demands in making pianos.

The pianos used by Mozart for his compositions were not to the liking of Beethoven, so at tone time a piano of six octaves was built by Stein for Beethoven's special use. Although this piano served the master for many years, Beethoven soon found that six octaves were not a sufficient compass for his needs. So at Beethoven's own request in 1816, his friend Nannette Stein Streicher built a special Grand Piano of six and one half octaves.

Both Beethoven and Mozart were very fond of the Schröeter-Stein Action. It finally gave way, nevertheless, to the Christofori-Backers Action, which has remained to this day the fundamental model for the English Action in its various modifications. The great composer identified especially with the piano was Frederick Chopin.

The instruments that dominated the Concert Halls in Chopin's day were very sweet-toned. Chopin preferred the pianos with the stiff percussion of the English Action, refusing to play on the Erard Grand Pianos, which contained the celebrated repetition action. Chopin formed a very intimate friendship with Camille Pleyel; and, as a consequence, became an enthusiastic advocate of the Pleyel Pianos, playing them at nearly all his concerts.

In 1808 Sebastian Erard made an attempt to combine the elastic touch of the Vienna Action with the English Action. In 1821, Pierre Erard obtained for the invention of Sebastian Erard, - a double escapement action, a patent in England. This action made the Erard Grand Pianos famous the world over. In the Grand Pianos at that time the upward motion of the strings when struck by the hammer was very objectionable. To eliminate this, Erard brought out a device called the "Agraffe", which aided in bearing upon the strings. This prevented the objectionable upward motion of the strings.

These Agraffes, made of brass, improved the tone, especially in the treble part. They further assured proper counter-pressure against the stroke of the hammer. This idea of the downward pressure of the strings was conducive of further thought and finally led to the pressure bar and capo tasto. Today the capo tasto is used in varied forms in nearly all Grand and Upright Pianos.

In 1825 the Loud Brothers of Philadelphia built a Grand Piano of 7 1/2 octaves. The full iron frame for flat scale Grand Pianos was patented by Jonas Chickering in 1843. This was an improvement on Broadwood's combination of iron hitchplate and resisting bars. The frame of the Chickering Grand Piano was now established. In the year 1863, there was patented by Steinway and Son the full iron frame for Grand Pianos, with overstrung scale and disposition of the strings in the form of a fan. Today this system has been adopted by all of the prominent makers of the Grand Pianos.

The Concert Grand Piano of today is a model of mechanical construction. It has a proper regard for the laws of acoustics. It represents the most recent stage in the evolution of the greatest masters in the art of piano construction. The Grand Piano is free from all experimental and fanciful freaks.

The Modern Concert Grand Piano is usually 9 feet long with a compass of 7 1/3 octaves. There are some, however, that are 10 feet in length which have a compass of 8 octaves.

Beside the Concert Grand the largest of the Grand Pianos, there are smaller models of Grands in use today,- the Parlor Grand, and the Baby Grand. There are still smaller models designed to give the "Grand" tone and occupy the minimum of space. While it seems generally true that saving of space cannot be gained without sacrifice of sonority of tone, yet the small Grand will undoubtedly prove popular for many years to come, adapted as it is to the small rooms of modern dwellings and modern apartments. It is the Concert Grand, however, which alone satisfies the concert artist.

(c) Pedals on the Piano

The damper pedal on the piano is often miscalled the loud pedal. This pedal lifts all dampers from the strings, allowing the strings to vibrate freely. It does not effect the upper strings of the piano, for these strings do not require dampers. When the damper pedal is pressed, allowing the strings which have been struck to vibrate, sympathetic vibrations are caused in other strings. When the damper is used, the lower notes will last longer than the higher.

The operation of the soft pedal varies with the style of the piano. It is peculiar in the Grand Pianos, for when the soft pedal is used, the action is shifted to one side, and instead of the three strings being struck, only two are. In the Square Piano it is altogether different, for the tone is sometimes muffled by tongues of soft leather or felt coming between the hammer and the strings.

In other Upright Pianos, when the soft pedal is brought into use, the hammers are moved to close to the wires that their strokes lack the power obtained by long swings.

Some pianos have what is known as a Sostenuto Pedal. This pedal, pressed after a note has been played, sustains that note, merely by raising its damper. Some instruments have bass damper pedals which operate only in the bass and will not sustain the higher notes.

(d) The Player Piano

All useful inventions of any kind are the products of evolution, the result of the ideas of many minds. How true it is of the Player Piano! It is the result of long years of toil. Even now it is being developed and improved. Many believe that the Player Piano is destined to replace the piano in the home.

While the fundamental idea of the Player Piano is more than two centuries old, its history nevertheless is still in the making. The practical demonstration and development is not so old. It dates back only to the early seventies. Within the past forty years the most important improvements on the Player Piano have been made; and by such improvements, the Player Piano has been made a commercial possibility.

It is too early to give honors to any one for what has been achieved thus far, for many ingenious devices at present may prove to be only stepping stones to greater achievement.

Many of the Harpsichord and piano makers of the 18th century experimented with automatic playing devices without producing anything of practical value. The first practical automatic playing device was the Pianista, which was invented in 1863 by Furneaux in Paris. This device, which coule be attached to any piano, consisted of mechanical fingers. These were pressed upon the keys by a machine operated by a crank. This invention, not being further developed, soon became obsolete.

John McTammany constructed a mechanism for automatic playing of organs in the year 1868. He substituted for a crank a foot pedal action and narrow sheets of perforated flexible paper with winding and rewinding rolls. This invention was unlike the Pianista of Furneaux of Paris, for McTammany's action was inside the organ case and not without it.

The next step in the development of the Player Piano came in 1881 with Merrit Gally's device. Although it created a sensation, it was never commercially exploited.

A wind motor with slide valves opening and closing ports of pneumatic motors was invented by G. B. Kelly in 1886. This motor finally came into general use. The first self Playing Piano was constructed by R. W. Pain: Such an instrument, with a compass of 39 notes, was built in 1880 by Pain and Kuster. Pain constructed an inside Player with 46 notes in 1882; and in 1888 he produced his 65 notes Electric Player. A patent on an Automatic Piano was applied for by William D. Parker in 1891. A combination piano it was, adapted for either manual or automatic operation, having a pneumatic operating mechanism controlled by a perforated music sheet. There was a suitable wind-inducing motor and other mechanism introduced into the structure of the instrument, and this operated upon the rear ends of the manual keys. This was called an interior Player Mechanism and was manufactured by the Wilcox & White Company, of Meridan, Connecticut.

In 1896, White and Parker were granted a patent for a combination of the automatic upright piano and reed organ. This interior mechanism did not meet with the success that was expected, so in 1897 the same two men were granted a patent for an automatic piano player in cabinet form, which contained reeds and could be operated either as an automatic reed organ or as a keyboard instrument player. This kind of machine could be placed on the keys of any piano.

In 1897, Theodore Brown of Worcester, Massachusetts, was granted patents for an interior player mechanism which was sold under the name of the Aeriol Piano. This was highly successful. In 1898, Brown sold his patents to the Aeolian Company. He then constructed a cabinet player known as the "Simplex." These players were very acceptable to the public, but the piano manufacturers hesitated to add the player action to the upright piano action. They were afraid the public preferred the Simplex to the Player Piano.

Edwin S. Votey's Pneumatic Piano attachment was put on the market under the name of Pianola, for which he was granted a patent in 1900. Between 1898 and 1906, there were many patents granted for improvements in player mechanism. The transposing device was patented by Melville Clark in 1902, and it has been used by many manufacturers since that time. All players before the year 1898 had only 65 notes of the 88 of the piano scale. Modern composition could not be played successfully on these 65 note players, so the construction of an 88 note Player Piano was found necessary. In 1901 Melville introduced his Apollo Player of 88 notes. This has since been adopted by allmanufacturers of Player Pianos.

The interior action was at first very stiff. To overcome this stiffness, a stroke button was constructed and place in the front of the fulcrum of the piano key. In 1906, an auxiliary key was constructed by Paul B. Kluph with the same object in view.

The Player Piano in Germany went through about the same stages in regard to pneumatic mechanism as it did in other countries. Beginning with 36 notes, it was then increased to 61, then to 72, then to 76, and finally to 88. The Phonola was placed on the market in 1902 with only 72 notes, but today it has 88.

The power producing bellows of the Phonola are divided into two sections. This in order to get better control of the piano playing independently in bass or treble. Through the Phonola mechanism the performer has the opportunity to get the most delicate shading in piannissimo playing by exercising a certain pressure on the pedal. The latest Player Piano today is the Reproducing Piano, which reproduces the individual interpretations of the most renowned pianists with all the accentuation and expression, - even the subtle and delicate gradations of tone. These reproducing Players are very valuable in recording for posterity the superb piano playing of great artists like Paderewski, De Pachmann, Josef Hofmann and Rachimaninoff.

Conclusion

The mechanism of the Player Piano is still being improved and simplified that the amateur music lover may derive a greater share of pleasure from the piano than he has been wont to.

In 1901, the Metrostyle was invented by F. S. Young. By this device, the amateur can follow the intention of the composer as to proper metronomic rendering of his composition. About the year 1911, a device known as the Arti-Style markings for the music rolls, which indicated the tempo and volume of tone, was invented by P. K. Van Yorx.

All of these devices increase the usefulness and value of the Player Piano. They enhance the beauty and scope of the Player Pianos; they extend infinitely its scope of appreciation.

The working of "the expression and accentuating devices" is a most difficult matter which requires both practice and earnest, intelligent study. The pedaling is by far of greatest importance, for without the proper artistic use of the pedals, it is impossible to get the proper shadings and phrasing in rendering a composition.

The touch which is a very important factor in producing the various shades of tone on the piano is almost entirely controlled by the pedals.

The Player Piano is still in its infancy. The long cherished tone sustaining effects cannot be brought out on the Player Piano at the present time. The most objectionable feature of the Player Piano today is its mechanical character, but we must consider that much of progress of the human race has been accomplished through the development of mechanical devices.

We are looking forward to that future day, when the Player Piano will have evolved to the extent that its present-day mechanical character will be no more. The Player Piano is destined to be the instrument for many homes in the future; and, with the many improvements on the instrument that are sure to be made, it is not too much to predict that the Player Piano of the future will be a musical instrument par excellence.

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