MONOCHORD TO MOOG

A STUDY OF THE DEVELOPMENT OF STRINGED KEYBOARD INSTRUMENTS WITH SPECIAL REFERENCE TO POPULARITY TRENDS

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to
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Volume I.

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Harp Piano probably by Kuhn & Ridgeway
Three-quarter View

Photograph from The Smithsonian Institute,
Washington, D.C.

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INTRODUCTION

The object of the present work has been to trace the evolution of stringed keyboard instruments from the monochord to the present day pianoforte.

So many inventions have occurred that a chronology of these would be both tedious and of little added value to the existing literature. In the present work the emphasis has been on those innovations which achieved some measure of popularity and can be regarded as essential steps in arriving at the products and methods of modern piano manufacturers.

In order to bring this work up to date, visits have been paid to John Broadwood & Sons and the British Piano Museum in London; to the Essex Institute and Pingree House in Salem, Massachusetts; the Smithsonian Institute (Division of Musical Instruments) in Washington; the various Yamaha Factories in Hamamatsu, Japan; and the Piano Manufacturing Company in Wellington, South Africa.

Special attention has also been paid to the development and popularity trends of mechanical, pneumatic and electric pianos.

In the last Chapter of this study, the information gained is applied to the identification and dating of stringed keyboard instruments found in South Africa or referred to in newspapers or Africana.

CHAPTER I

EARLY STRINGED KEYBOARD INSTRUMENTS

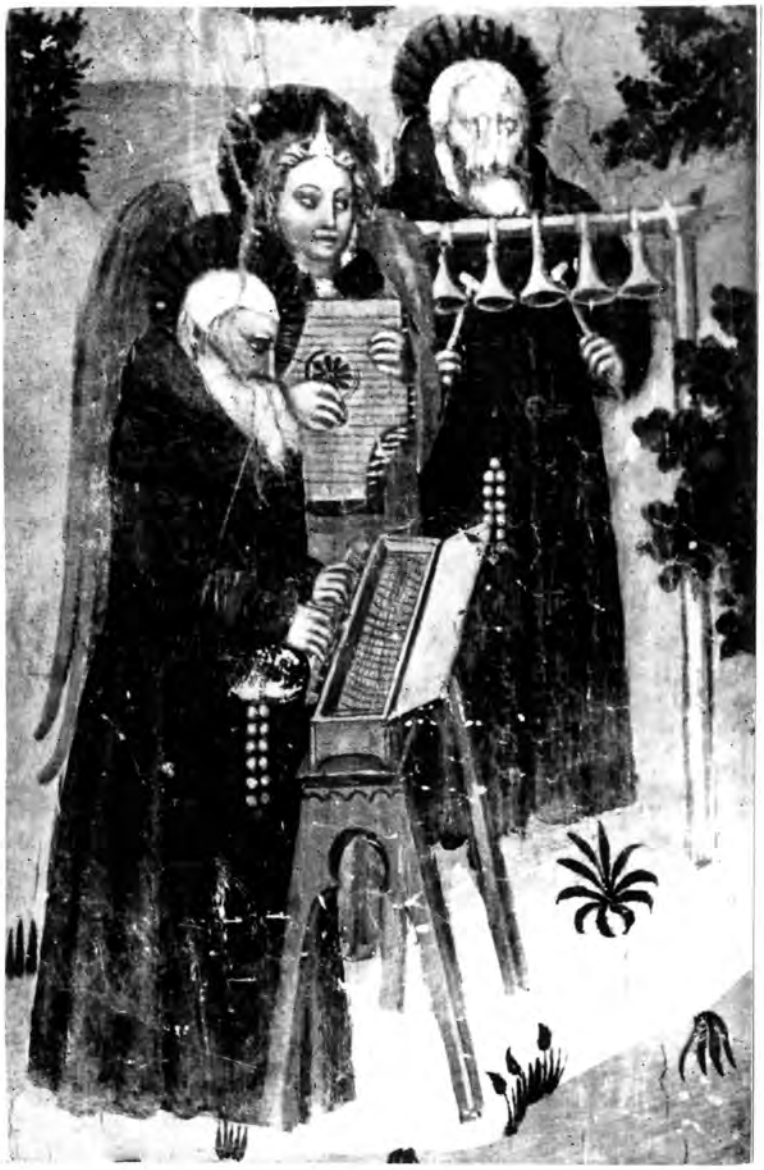
Plate 1

Woman Playing the Clavichord by Jan van Hemessen
(Worcester Art Museum)

"The Clavicorde hath a tunely kynde;
As the wyre is wrested high and lowe,
So it tuneth to the players mynde;
For as it is wrested so must it nedes showe,
As by this reason you may well know,
Any instrument mystunyd shall hurt a trew song,
Yet blame not the Clavycorde, the wrester doth wrong".

(a poet in Henry VII's reign)

Plate 2



Celestial Concert from 'Lives of the Hermit Saints'
by Perrinetto da Benevento

A portion of a fresco in The Caracciola Chapel of San Giovanni a Cabonara in Naples. It may be the earliest surviving representation of the Clavichord and was probably painted before 1435. The most characteristic features of the Clavichord are visible. A rectangular box with the keyboard projecting from one of the longer sides. The centre and left hand portions are occupied by the keys which pass beneath the strings and run at right angles to them. The soundboard at the right hand of the instrument is obscured by the near end of the case. There are no side pieces to the keyboard - a universal feature in earliest instruments. All surviving 16th Century Clavichords do have side pieces.

CHAPTER 1

EARLY STRINGED KEYBOARD INSTRUMENTS

The Clavichord and Harpsichord are the stringed keyboard instruments which preceded the invention of the pianoforte. They were popular from the 15th to the end of the 18th Centuries after which time they virtually disappeared from the scene. A century later a revival of old instruments took place and it is the fashion now to perform works written for these old instruments on modern replicas.

Basically all stringed keyboard instruments are boxes of some shape or size which house strings set over a resonating board. These strings are attached to turning pins at one end and fixed pins at the other. They pass over a bridge which transmits vibrations to the soundboard. The keyboard is the mechanical means of either hammering or plucking the strings.

1. Clavichord

The progenitor of the clavichord is said to have been the Monochord(Fig.1) which was used by Pythagoras about 550 B.C. It was an instrument with a single string stretched between 2 bridges over a hollow soundbox. Pitch was created by stopping the string with the finger or a movable bridge and sound was made by plucking with a quill or plectrum. This instrument was used mainly for scientific experiments in the physical laws of sound and in fact is still in use in Physics laboratories today. It was also used for giving the pitch to singers and instrumentalists(1).

Gradually, with the addition of more strings, the name changed to Manichordium and eventually with the addition of a keyboard, somewhere about 1404, the instrument became a Clavichord(2).

The instrument in its simplest form was a rectangular shaped box with a keyboard jutting out in front of the case, on its long side(Plate 2). Strings of

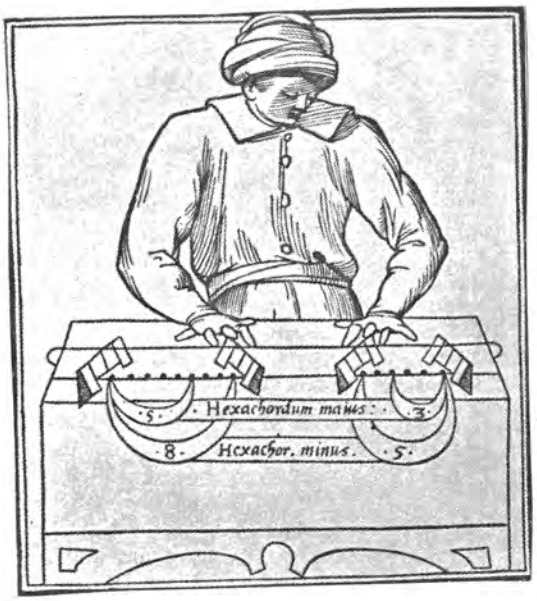


Fig. 1 a. Monochord, from a woodcut in the Musica theorica of Ludovico Fogliano, Venedig 1529.

Fig. 1 b. Monochord with movable bridge (di-chord) 19th Century (Musikhistorisches Museum Neupert, Bamberg).

Plate 3

The picture depicts a player depressing Middle C on a Clavichord. The tangent at the far end of the key lever has been raised so that it has struck the strings and has lifted them above rest position. The damping cloth on the left of the raised string can also be seen.

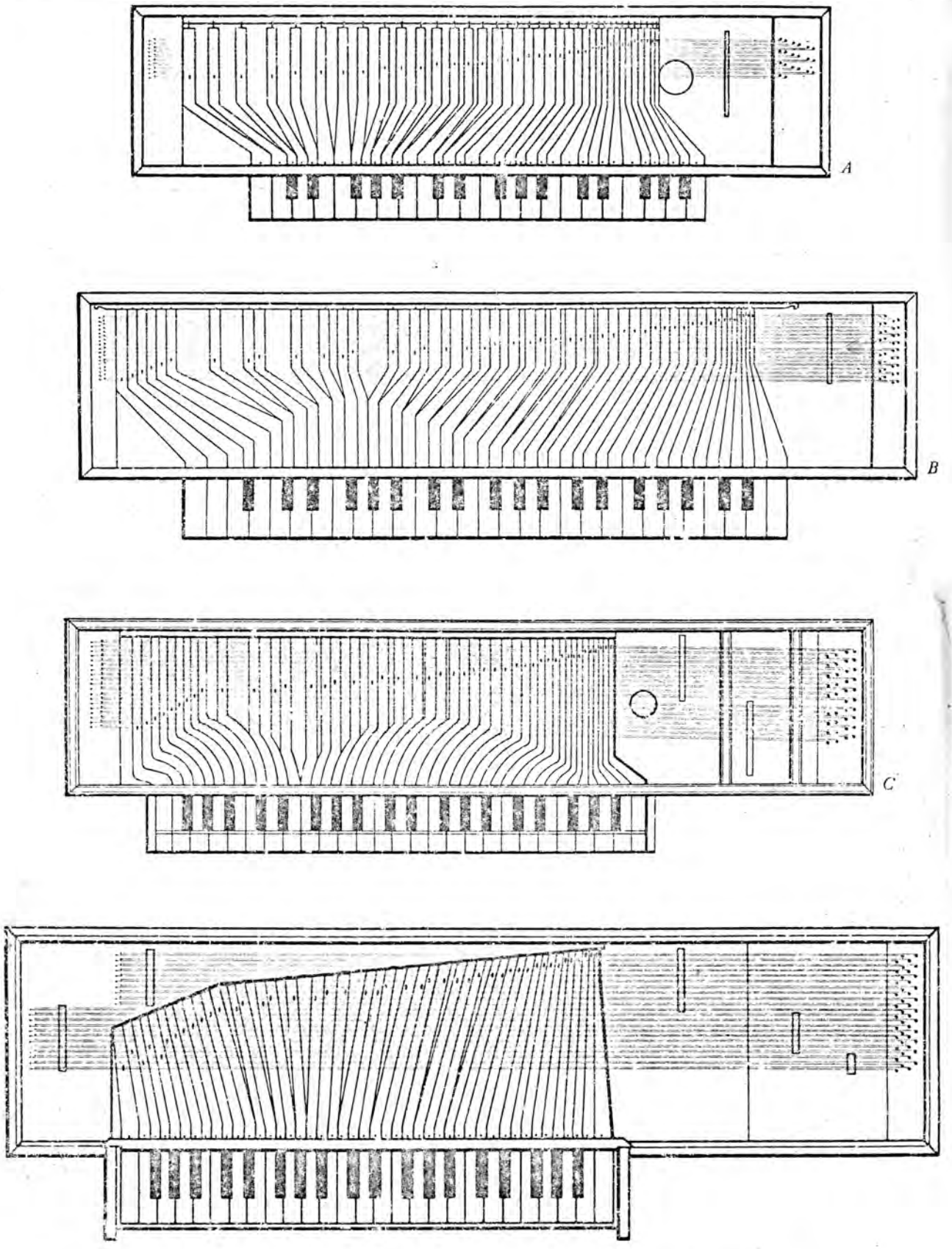
equal length stretched parallel between fixed pins at one side and tuning pegs on the other, passed over a bridge glued to the soundboard. Each key had a brass tangent fixed at its extremity and the simple see-saw action of the key caused the tangent to strike the string. The tangent continued to touch the string as long as the player kept the key depressed(Plate 3). The point at which the tangent struck the string also determined the pitch(Plate 4). Only that part of the string from the tangent to the tuning peg was able to vibrate, as a piece of felt woven into the strings on the left caused a damping effect on the other section of the string(3).

The Clavichord of the 15th Century had all its strings tuned in unison(Fig 2a & b). The keys were bent to some fairly severe angles in order to bring the tangents under the proper part of the strings. From 1440 - 1540 there are only pictures and writings to indicate the sort of Clavichords that were built but they followed the pattern of the Monochord, or rather the Polychord, in having strings tuned in unison. Musically, melody was all that was required of the instrument, so that it was possible to have three keys to one pair of strings e.g. there would be three adjacent notes C, C♯ and D, any two of which played together would have caused an unacceptable dissonance. The illustration(Plate 5) of a one stringed Monochord, dated 1465, shows the bent keys which were necessary to strike the strings at the particular spot for the desired pitch. The disadvantage of this can be seen very clearly by noticing the distances required to obtain different pitches. As the sounds get higher the intervals get closer and closer; keys have to be narrowed to accommodate the problem until eventually a limit is reached. In the lower registers the intervals get larger and although this leaves room for the keys, the angle would become so severe as to make the instrument unplayable. The solution to this difficulty was to straighten the key levers, but as this involved the question of pitch, the old method of tuning in unison was abandoned. By the end of the 15th Century strings were being tuned to certain pitches which enabled the keys to run parallel to one another and still

Fig.2 a, b, c, d.

Fig. 3. Layouts of Four Early Clavichords (one-seventh actual size)

A. Reconstruction of Arnaut's clavichord, c. 1440. *B*. Reconstruction of the clavichord of the Ur
intarsia, 1487-90. *C*. Anonymous clavichord, dated 1562, in the Musical Instrument Museum of the Karl-Marx-Universität, Lei
D. Clavichord by Onesto Tosi, Genoa, 1568, in the Museum of Fine Arts, Boston.



Layouts of Four Early Clavichords (one-seventh actual size)

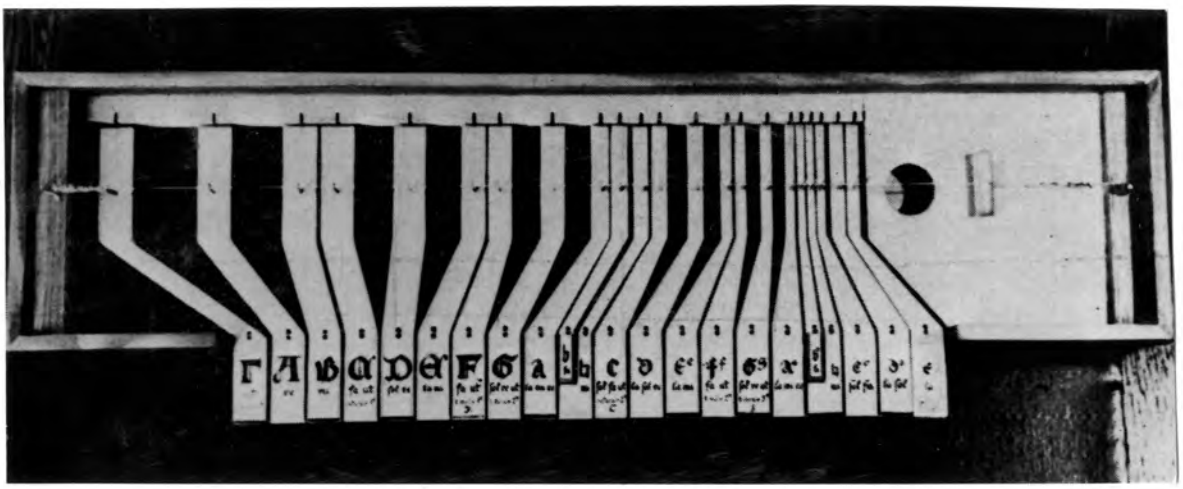
Plate 4

Fretted Clavichord about 1700

Tangents on Keys 16 and 17 strike the strings to produce the notes E^{b} and E

Keys 18 and 19 (F and F#)
Keys 20 and 21 (G and G#)
Keys 23 and 24 (B and B^{b})
Keys 25 and 26 (mid. C and C#)

Plate 5



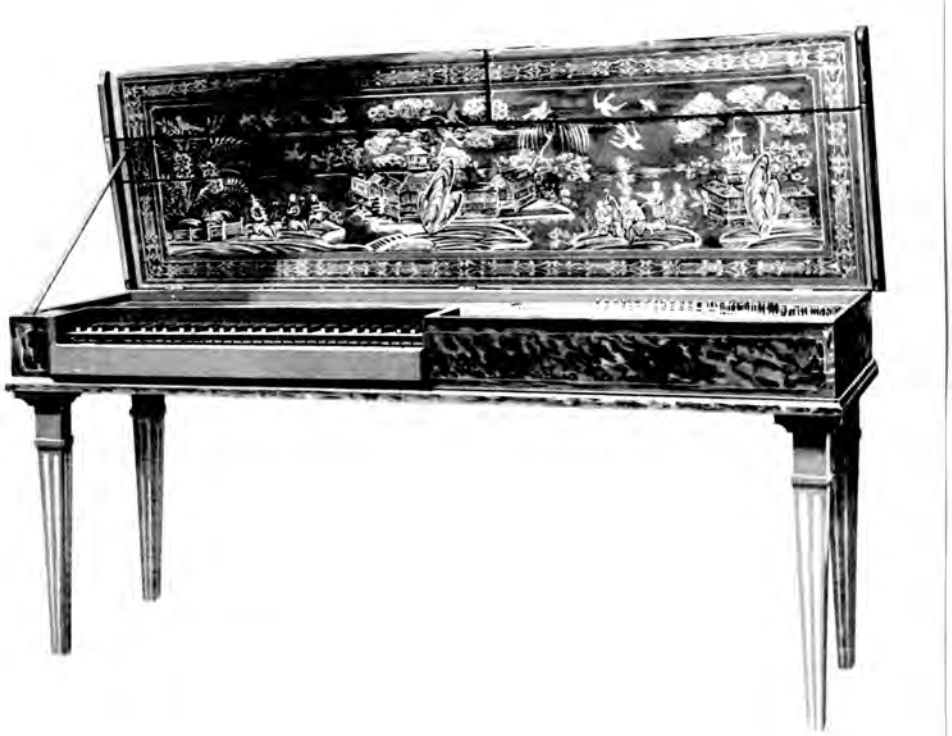
Keyed Monochord; after Conrad von Zabern
of about 1465
(Reconstruction by K.W. Gümpel and H. Neupert)

Plate 6

Woman With A Clavichord
By a follower of the Master of the Female Halflength
(Washington, D.C. Private Collection)

Plates 1 and 6 are paintings dating from the 1530's.
They show the soundboxes set low in the cases.
Plate 6 depicts the soundboard disappearing under the keys.
Both instruments have side pieces to the keyboard.
Keyboard range is only to A in the treble omitting G#.
The bent keys are clearly visible in both pictures and
the size and portability is also well illustrated.

Plate 7



Clavichord with Chinese Decoration

Two music parties are depicted playing European fiddles and guitars.
The "bebung" - analagous to the vibrato on the violin - was obtained by rocking the finger on the key without quitting it. "Care has to be used to avoid an undue sharpening of the pitch of the note so treated - indeed, a constant equality of touch has to be maintained in playing the Clavichord, to preserve an accurate intonation". (A.J. Hipkins)

Length 5'8½" Depth 6½"
Width 1'9" Width of Keyboard 2'9½"

allow the correct note to sound when struck by the tangent(Fig. 2c & d).

The Clavichord of the 15th Century was small and portable, able to be placed on the knees, a table or chair and it was remarkably cheap(Plates 1 & 6). However with the straightening of the key levers an extended keyboard was possible and a bigger instrument evolved. The soundboard was raised and moved to the right which caused the case to be enlarged to house it. The keyboard was then situated to the left of the instrument; it gradually grew to five octaves and was eventually recessed. In time the Clavichord became an elegant piece of furniture with a portable stand and was often decorated with paintings or inlaid ivory(4) (Plate 7)

About this time the Clavichord was enjoying great popularity in England where it remained fashionable till the end of the 16th Century. It was an instrument favoured by Kings and Queens and by teachers and composers. It was a valued instrument for accompanying singers and was also used in nunneries, where its soft tones were appreciated. In fact, it was a popular domestic instrument available to the highest and lowest in the land(5).

In the Privy Purse expenses of King Henry VII and of his Queen Elizabeth of York, the following entries are only some of many, which indicate their fondness for the Clavichord(6) :

"1502 (Jan) To one that sett the Kinge's Clevechords ... xiijs. ivd."

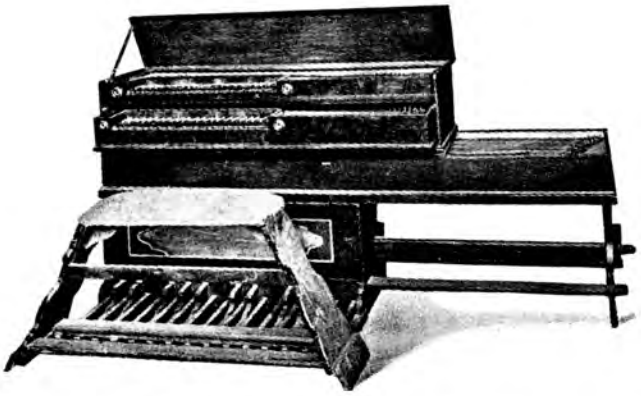
"1504 (March) For a pair of Clavycords ... xx. s"

"1502 (Aug) Item, the same day to Hugh Denys, for money by him delivered to a straungier that gave the Queene a payre of Clavycordes in crownes for his rewarde ... iiij li"

Clavichords were tuned by the players themselves, not always with complete success. A poet in Henry VII's time wrote the following advice :-

"Who playeth on a harp he should play trew;
Who singeth a song, let his voice be tunable;
Who wrestythe the Clavycorde, mystuning eschew;
Who bloweth a trumpet, let his wynd be measurable;
For instruments in themselves be firm and stable,
And of trowthe (would trouthe to every man's songe):
Tune them then trewly, for in them is no wronge."

Henry VIII, a knowledgeable and accomplished musician, performed on



12. Pedal clavichord by Gerstenberg, 1760
(Musikwissenschaftliches Instrumentenmuseum, Leipzig, University)

Pedal Clavichord by Gerstenberg, 1760
(Musikwissenschaftliches Instrumentenmuseum,
Leipzig University)

and owned clavichords. In the list of the Kings musical instruments, published after his death, "two payer of Clavichordes" are mentioned(7).

Between 1573 and 1678 the Clavichord was called by many different names and spellings. In English dictionaries of that period we find "clarichord", "monicordis","clavycordes", "claricords", "claricon" and "manicorde"(8). The use of the word "payer" is dealt with in Appendix 11, and implies a flight of keys.

All these early Clavichords were known as fretted or "gebunden" because some of their strings had to produce more than one pitch when struck at different points by adjacent keys - i.e. there were more keys than strings(Plate 9a). This system of using one pair of strings for more than one note lasted till the early 18th Century. The eleven lowest strings were used for one note each; the next two pairs for two notes a semitone apart and the rest of the remaining pairs of strings each gave three or four notes in chromatic sequence(9).

The popularity of these instruments began to wane in England, Italy, France and the Netherlands towards the end of the 16th Century. In Germany, however, they remained popular until the middle of the 18th Century.

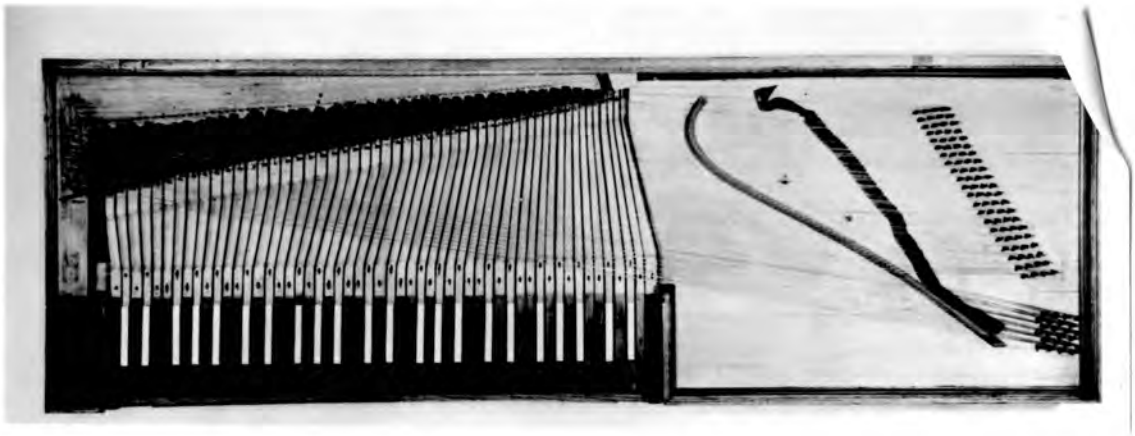
Improvements to the Clavichord had always followed in the wake of the organ. Traditionally the Clavichord was the organist's practice instrument so it is not surprising to find a single manual pedal Clavichord described as early as 1460. In the early 18th Century two manual Clavichords were made with a pedal board which operated its own set of strings(Plate 8). Music was written specially for them. Today, however, this music is performed on an organ.

J.J. Froberger (1616-67) is said to have been the first Composer to write specifically for the Clavichord. Prior to this, music was composed for keyboard instruments in general. Buxtehude, Kuhnau and J.S. Bach, all organists and composers, were amongst those who helped to establish Germany's unquestioned lead in the organ and its music from about 1650 - 1750. This, combined with the ties between the organist and his Clavichord are certainly responsible for the fact that Germany became the home of Clavichord making and

Plate 9a

Fretted Clavichord (Gebunden) - plan view -
about 1700
Constructed in Germany by an unknown maker.
The bent levers in the lower registers and narrowing of the top keys is well illustrated.

Plate 9b



Unfretted Clavichord (Bundfrei) - plan view -
18th Century
Constructed in Germany by an unknown maker.
This Clavichord is typical of the large unfretted instruments that became standard in Germany by the mid 18th Century and for which Carl Philip Emanuel Bach wrote many solo keyboard compositions.

of its music.

The fretted Clavichord was proving totally inadequate to meet the increasing harmonic and tonal needs of composers as well as the new idea of tuning in equal temperament and the competition of the harpsichord. The need was met by the introduction of a separate pair of strings for each note. The term unfretted or "bundfrei" was used to describe this new development (Plate 9b). The first Clavichord of this type made in 1726 by Daniel Faber, an organist of Crailsheim, fulfilled a long felt need[10].

By the second half of the 18th Century Johann Hass was building large Clavichords with a musical range, both in compass and tone, far exceeding the gentle qualities of the smaller instruments. Hass' large Clavichords coincided with the wave of romanticism which swept Germany at this time. A school of composers led by C.P.E. Bach composed simple pieces only suitable for the Clavichord[11]. Played on the piano or harpsichord they sound too thin and feeble. This attempt to produce more sonorous Clavichords was undoubtedly made to combat the rising popularity of the piano.

Bach's biographer Forkel[12] records that "it was the Clavichord which he, Bach, loved to play. For him the Harpsichord, as well as implying a totally different interpretation, lacked soul, and the pianos of his time were still in their primitive state and much too heavy to satisfy him." Also he considered the Clavichord the best instrument for musical study as well as for domestic use. He preferred it for the interpretation of his most delicate inspirations, and did not think that such diversity or subtlety of tone could be obtained on the harpsichord or piano as on the Clavichord, "so poor it is true in intensity of sound, but so supple in its poverty" (See Appendix 1).

Jacob Adlung,[13] a contemporary of Bach's, stated in Musica Mechanica Organoedi "A good Clavichord well played, is sweeter and more heart stirring than any other instrument ..... some people despise it because its tone is faint ..... but although they be fainter than other instruments, their 'delicatesse' remains and none can express the graces so well".

Plate 10

Modern Clavichord by Johannes Morley, London
(in possession of Mr. T. Radloff, Grahamstown)

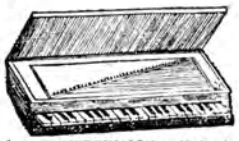
About 1780, Schubart[14], a music critic, maintained "He who does not like to rumble, to rage and to storm, whose heart prefers often to pour itself into tender feelings will pass by the harpsichord and fortepiano and choose the Clavichord".

The Clavichord had an undoubted advantage over both the other stringed keyboard instruments in its extreme sensitivity. The player can influence the amount and kind of tone by subtle finger adjustments - a sort of vibrato called 'bebung' is possible by alternating finger pressure on a single key. In fact the instrument has an amazing range of dynamics within its gentle and intimate scope.

By 1800, however, the Clavichord had disappeared from the scene. The revival of old instruments in the 20th Century has produced the earlier type of Clavichord[Plate 10], the smaller, portable instrument so beloved by Bach and Mozart. The latter, though he gave up the harpsichord for the piano, still played the Clavichord and used one for practising on his many journeys[15].

Dolmetsch[16], who has done so much to popularise old instruments for performance of the music once written for them, sums up very neatly when he says:-

"The Clavichord can be heard by large audiences when occasion arises, for it fascinates them into a keen receptivity. But it cannot consort with any other instrument; in its efforts to equal even the meekest opponents its delicate beauty is lost. The Clavichord is above all an intimate instrument".



1. EARLY VIRGINALS (from Virdung's *Musica Getuscht*, the earliest printed work on musical instruments, Basel, 1511. See *Harpsichord Family* 2)

2. VIRGINALS by Ruckers, Antwerp, 1610 (See *Harpsichord Family* 2, 5)

3. VIRGINALS. Engraving by Goltzius, c. 1600 (note the manner of holding the hand)

4. THE LESSON ON THE VIRGINAL (Unknown Dutch master of 17th century)

5. HANDEL'S SPINET (See *Harpsichord Family* 4)

6. HARPSICHORD by Shudi and Broadwood, 1770 (See *Harpsichord Family* 5)

Various examples of the Harpsichord family

2. Harpsichord

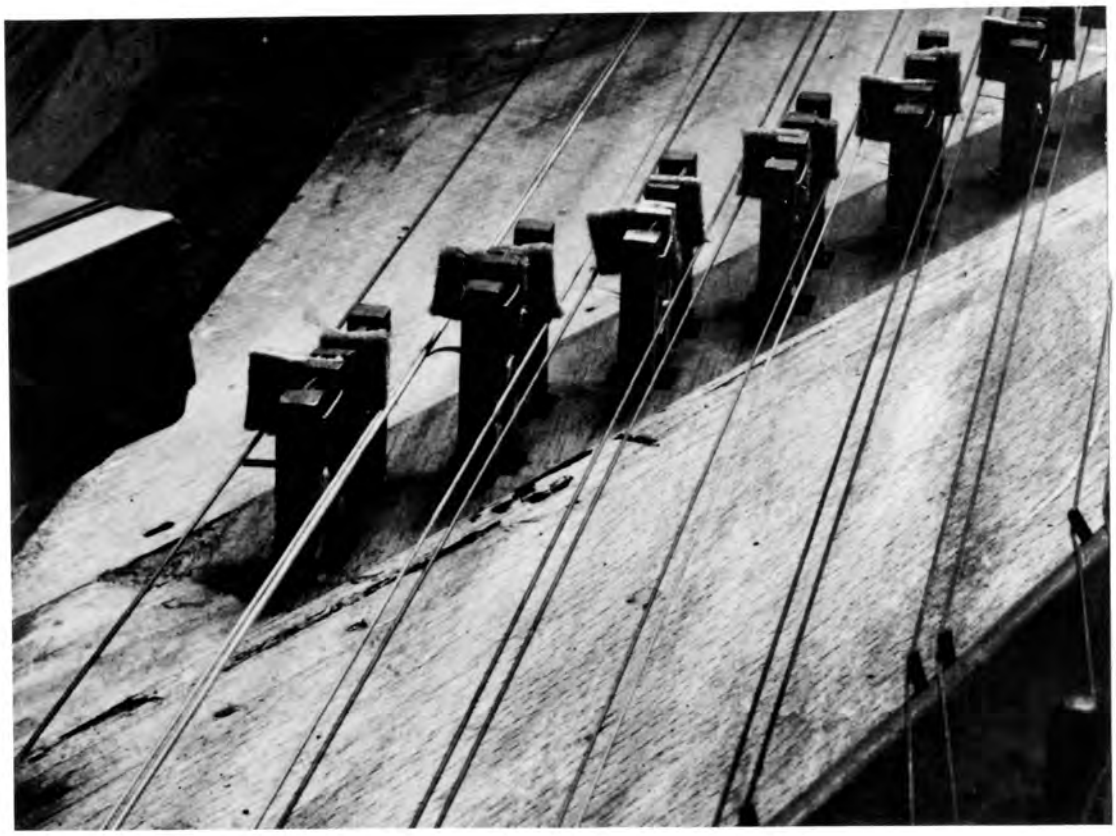
Harpsichords and their smaller relations, the virginals and spinets, are keyboard instruments with strings sounded by a plucking mechanism. They appear to have been derived from the ancient psaltery which was a hollow trapezoidal shaped box with strings of different lengths fixed to pins and strung over bridges. Sound was produced by plucking the strings with the fingers or plectra. By the addition of a keyboard and a mechanism with quills fixed to jacks it was possible to pluck the strings by the simple process of depressing the keys(Plate 12).

The Harpsichord is harp shaped and resembles the design of an early grand piano. The Spinet (from spina - a thorn or quill) is a smaller instrument(17), polygonal or 'leg of mutton' in shape,and the Virginal an oblong model closely resembling the Clavichord case(Plate 11).

The Harpsichord originated in Italy about the beginning of the 16th Century. It was known as a Clavicembalo. Smaller instruments were always called spinetto(18).

At first the range was 4 octaves with 1 string to a note and the shape ngular like the Clavichord. As the strings were different lengths, the hape of the case often followed this line and became asymmetrical like the spinet and eventually the harp shape became the classical design of the Harpsichord. It developed into an independant piece of furniture with its own legs and had another keyboard superimposed, which was tuned an octave higher than the lower one. As time went on, more strings were added to each note, a longer keyboard emerged and various stops, or pedals, were used to couple the keyboards or change the tone quality.

The Italians produced mainly harpsichords and spinets. Their instruments were very lightly constructed, usually in cypress wood 1/8" thick(Plates 13 & 14). The instrument was housed in an elaborately decorated outer case which could be removed(Plate 15). Their harpsichords were very



Harpsichord Action - photo by Robert Lautman

The picture shows the jack arrangement in an 18th Century English Spinet. The second jack from the left on the front row has been raised so that its quill is just about to pluck the string. Note that the quill has lifted the string above its rest position.

Plate 13

Harpsichord by Nicholas De Quoco, Italy - 1694
The restored instrument removed from its case.

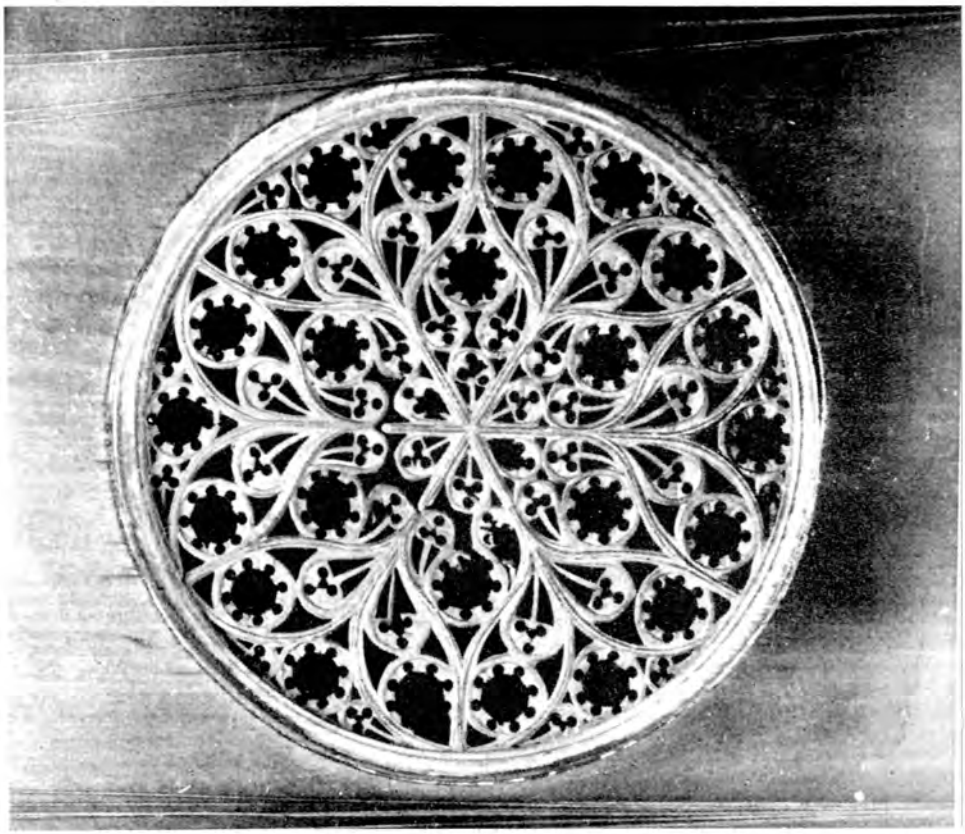
Plate 14

Harpsichord by Nicholas De Quoco, Italy - 1694
Inscription on the wrest plank.

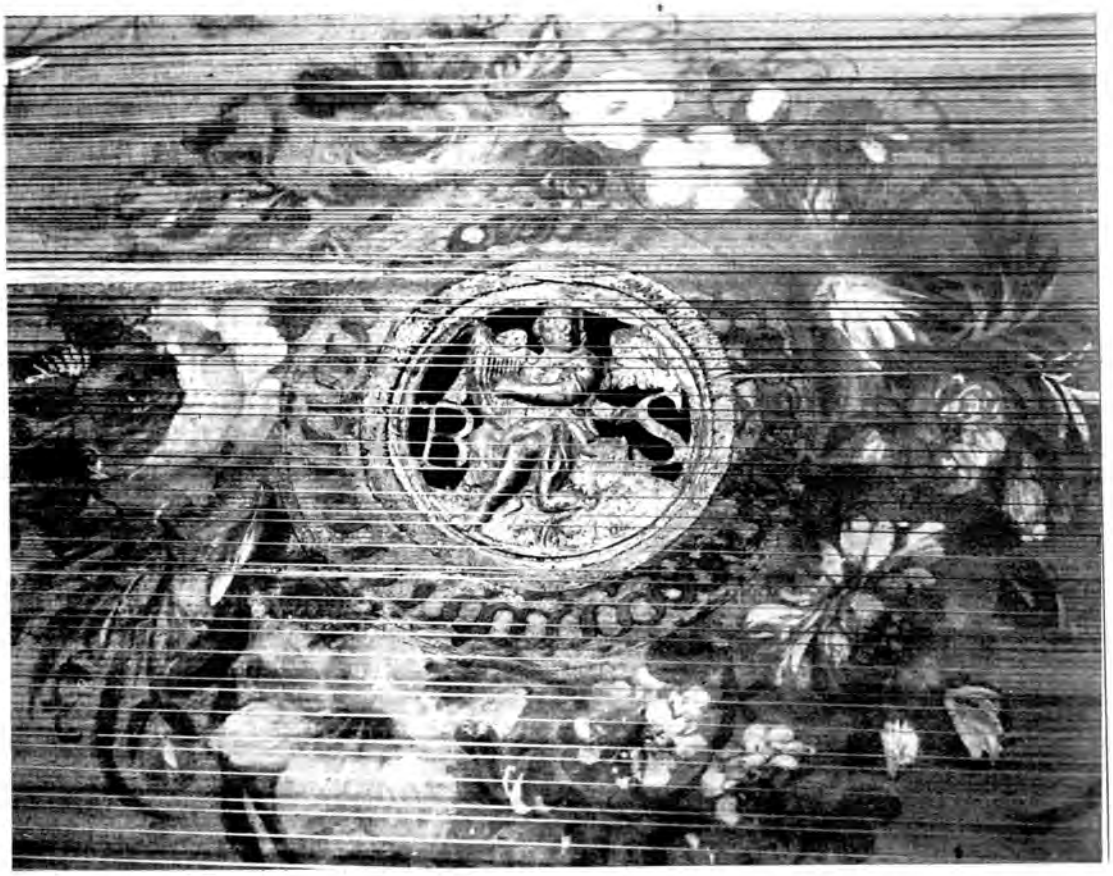
Italian Harpsichord, 1693. Maker unknown.

A typical large Italian harpsichord. The original nameboard is missing; however, as was the common practice, makers marked the date on the tail of the lowest and highest keys. It has one manual. The range is GG - C''' (no GG♯). Size is 2' x 8'.

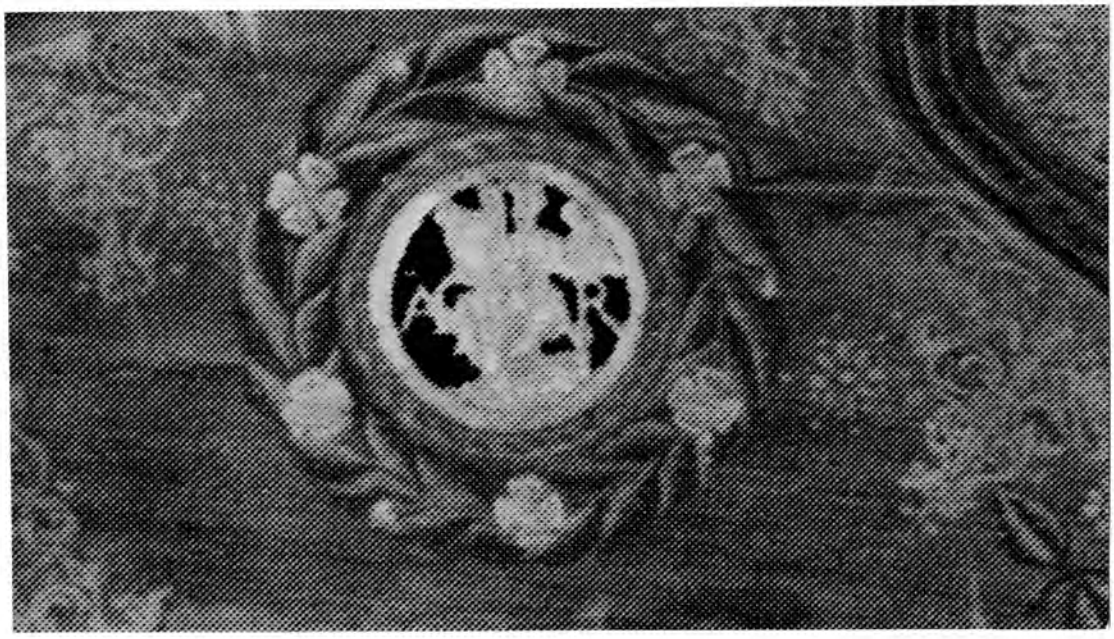
Plate 16a



Typical decorative device, known as rose, that appeared in soundboards of virginals and harpsichords.



Detail of a rose in a French harpsichord by Benoist Stehlin.
The date, 1760 is painted on the left side of the soundboard.



Virginal, 1620 made by Andreas Rucker, Antwerp
Plan view - showing the rose with the maker's initials

simple, usually constructed with 1 keyboard and two 8' stops. A typical Italian harpsichord had 2 choirs of unison strings with 2 jacks for each key. These instruments were ideal for basso continuo as they blended so well in orchestral combinations. Examples of Italian harpsichords have survived in considerable quantity. They have a unique and characteristic tone quality due to the prominence of the 3rd harmonic. This quite often causes a suggestion of Clarinet tone[19].

The influence of the Italian School was most strongly felt in the Netherlands and the centre of the Harpsichord industry was established at Antwerp, where from 1575 - 1667 the Ruckers family became famous for their harpsichords. The resemblance to Italian models is quite marked. The Flemish ones are easily identified however, by the leaden rose in the soundboard. (Plates 16a & b) This decoration depicts an angel playing a harp and the initials of the father Hans or of one of his sons, André or Jean - HR, AR, IR[20] (Plate 16c).

The Ruckers harpsichords were very durable and became famous throughout France, Germany and England during the 17th Century. Handel's will mentions one made by Andreas in 1651 and another by Andreas was sold to Charles V of England for £30.

France imported great numbers of Flemish harpsichords. In the early 17th Century, Louis XIV, who took an active interest in music, is said to have owned a "great Harpsichord". The Harpsichord was highly esteemed in good society and formed part of most musical combinations. It was also used as a solo instrument and the social value attached to being a good performer was considered an entreé to high society[21].

Hans Rucker was responsible for the first important reform in harpsichord building. He added a third range of shorter and finer strings, tuned in unison, to the upper octaves of the other two strings. By means of a stop it was possible for them to be sounded together or separately. He used both cat gut and steel wire strings and added a second keyboard to the instrument 'the object of which', in Rimbaults opinion[22], 'was to allow three strings to be heard

Plate 17

28. Stehlin harpsichord: Full view.

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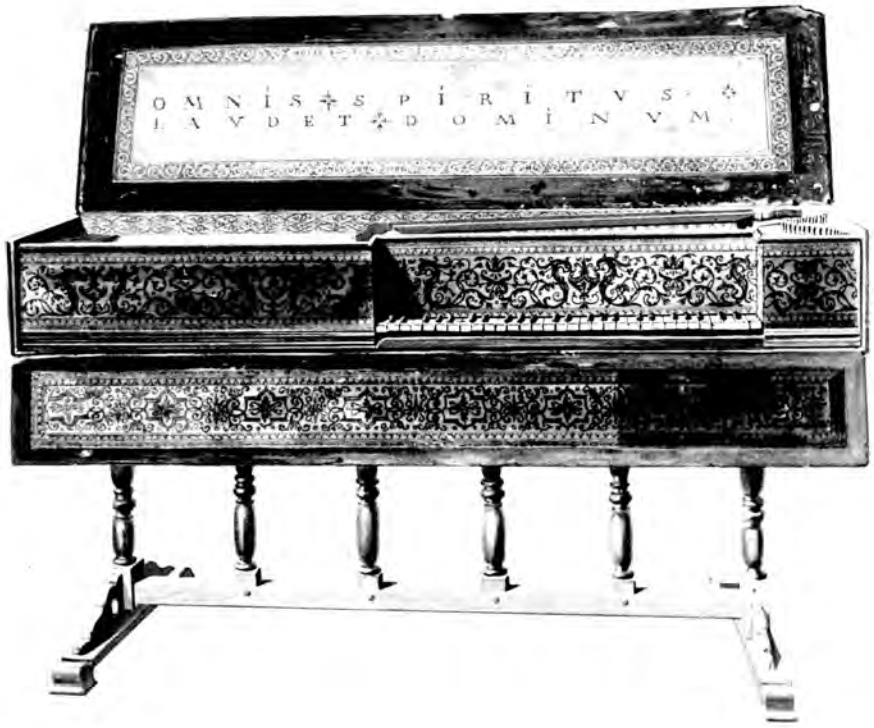
Harpsichord by Benoist Stehlin, Paris 1760.

at once, or only a single one at pleasure'. He also extended the keyboard to four full octaves (from C to C). Russell[23] says there is good reason to think that the double manual harpsichord was developed to facilitate transposing. The two manuals both used the same 8 foot and 4 foot sets of strings, thus four sets of jacks were necessary. The upper keyboard had a four octave compass from C - C^{III}. The lower keyboard had a visual keyboard from F - F^{III} but its acoustic range was identical with the top keyboard so consequently any F on the lower key would sound C - the same transposition would of course apply to all the notes. Hence the lower manual transposed a fourth. The idea became obsolete towards the end of the 17th Century and the lower keyboard was a replica of the top one with a coupler and a second eight foot added. With the addition of another eight foot and a four foot on the lower keyboard and one eight foot on the upper, the basic harpsichord of the early 18th Century was established.

The French workshops of Nicolas Blanchet, his grandson Francois (d. 1766) and Pascal Taskin were responsible for enlarging large numbers of Flemish harpsichords. This they did by lengthening and widening the instrument to increase the range from four to five octaves. This operation, called "ravalement", was necessary for the performance of the keyboard music of Couperin and Rameau. Although "ravalement" tended to make the instrument less percussive there was not much alteration of the tone. They were certainly more brilliant and richer than the Italian instruments which were not always suitable for the 18th Century literature. The few Ruckers harpsichords, which escaped "ravalement", have the tone quality of Italian instruments - it is very rare, however, to find any which escaped alteration and only one of Ruckers transposing harpsichords has survived unaltered. It is housed in Edinburgh University[24].

The large French harpsichords made by the Blanchets and Taskin are copies of the enlarged Antwerp instruments (a similar instrument is illustrated in Plate 17). In 1768, Pascal Taskin, originally a foreman, and later the owner of the Blanchet workshops, replaced one set of quills with leather which gave a

Plate 18



Virginal by Jean Rucker
(in Brussels Conservatoire)

Painted with floral devices in Netherlandish fashion.
Gilt rose in soundboard incorporates the initials IR.
In ink nearby is ANNO 1662.
The Latin quotation on the inside of the lid reads:
"Let all that breathe praise the Lord".

Plate 19 .

Double Virginal by Hans Rucker.

The left hand keyboard is removable - the right hand one a fixture.
The fixed keyboard is four octaves „C - C"
The other one is one octave higher throughout.
This additional octave string was used to gain a more brilliant effect. In later harpsichords an additional row of strings was placed beneath the ordinary unison strings and attached to the soundboard as a permanent fixture.

Clavicytherium

This rare upright virginal is probably the oldest stringed keyboard in existence. It has wire plectra and a keyboard range of three octaves plus a minor third "E - G"
It is 4'10½" high at the base and 5-5/8" at its peak
2'3" wide with a 2' keyboard.
The case is 11" deep - table 2' high and 2'11" wide.

sweeter tone than the hard dry twang of the quill. He retained two rows of quilled jacks which were controlled by knee levers (eventually replaced by foot pedals) to give a graduated series of stops. He called this harpsichord 'à buffle' and it became so popular that most existing harpsichords substituted leather for the quills. The sound was not so loud and therefore it was unsuitable for playing with an orchestra. The buffle spread to other countries and in modern harpsichords there is a special buffle stop[25].

In England, virginals (see Appendix II) are first mentioned in the time of Henry VII. Fètis[26] in his history of the pianoforte, suggests that their invention was motivated by a desire to improve on the Clavichord which had been the popular instrument up to this time.

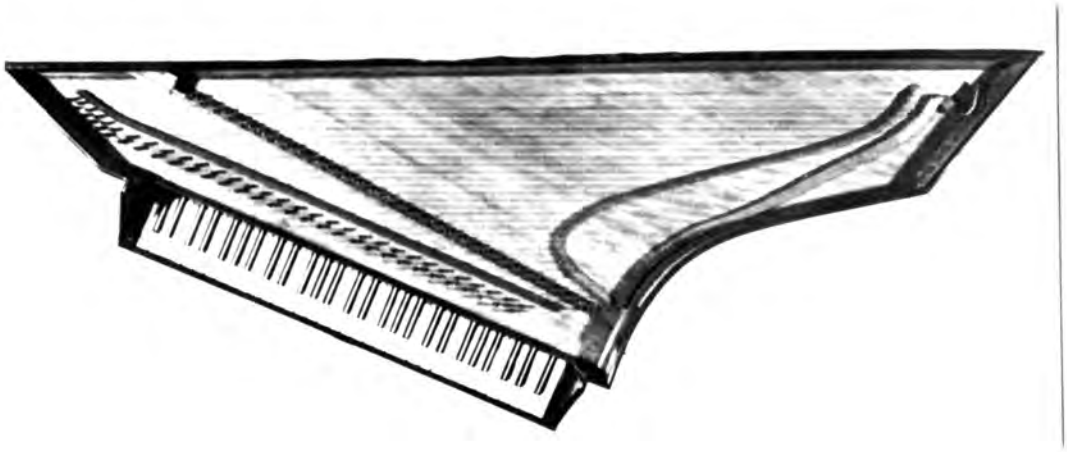
Like Germany and France, England relied on Italy for most of the supply in the early 16th Century. By the end of that Century virginals were certainly more popular than clavichords and were to be found in every educated person's home. Henry VIII, one of the first patrons of the Virginals, not only played but composed for the instrument. It appears to have been the fashion to have music after dinner, and Rimbault[27] records that after dinner at the Palace on May Day 1515, Sagudino, the Secretary to the Venetian Embassy, performed on the virginals with much success.

In the effects of Henry after his death, numerous pairs of virginals (both single and double)(Plates 18 & 19) are listed. One is described as 'Virginals made harp fashion' which Rimbault suggests was probably an upright instrument(Plate 20). Henry's daughters, Elizabeth and Mary, were both accomplished musicians and devoted a great deal of time to the study of music even after they became Queens[28]. It was customary to employ virginal players at the Court. Edward VI, Mary, Elizabeth and James all had 3 Virginal players on their payrolls. John Heywood, the only Virginal player in Henry VIII's household was paid £6.13.4d per quarter - presumably "all found". He was retained by Mary on her accession to the throne as she enjoyed his "mirth and

Spinet by Thomas Hitchcock - about 1710

The plectra are made from crow quills - a common material at that time.

Plate 21 b



Plan view of Spinet by Hitchcock - about 1710

Plate 21 c

Top view of Spinet by Hitchcock about 1710

Plate 22

Spinet by Stephan Keene, London - late 17th Century.

This instrument has one string to a note.
The wrest plank with tuning pins is immediately above the keyboard. ("B - D")
The two lowest sharps are divided - each division being a different key. The front halves are tuned A and B for dominant basses like G and the back halves C# and D# - necessary for the chromatic system then beginning to be recognised.
The instrument is 5'6" wide and 1'9-1/4" deep.
The six legged stand is original.

quickness of conceit" but when Elizabeth became Queen he retired and left England'.

Rimbault[29] writes that there are several pairs of Virginals in existence which once belonged to Queen Elizabeth. One of these he describes in some detail and Hipkins[30] gives a picture of it in his book Musical Instruments. The Queen's Virginals are certain to have been extra specially beautiful, but painted scenes and inlay work were so much admired that this type of decoration was a feature of early keyboard instruments and contributed greatly to their value and beauty as pieces of furniture.

In the 17th Century virginals were still tremendously popular. Pepys[31], describing the flight of Londoners on the Thames during the 'Great Fire' says "I observed that hardly one lighter or boat in three that had the goods of a house in, but there was a payre of virginals in it".

It is during this Century that the first sign of a National School in England is to be found. About 20 oblong virginals, made between 1641 and 1679, have survived and appear to have been modelled on Ruckers designs[32]. The virginals remained popular until about 1675 but during the 18th Century the graceful wing shaped spinet entirely superceded the earlier oblong shape[33]. Three generations of the Hitchcock family working from c.1660 - 1774 are especially associated with the making of spinets of high quality[34] (Plates 21a, b, c).

Other esteemed makers were Charles and John Haywood and Stephen Keen[Plate 22]. Harpsichords were not common until the latter half of the 17th Century and appear to have been used in public theatres for the first time in 1667. At a performance of 'The Tempest' in the Duke's Theatre, Lincoln's Inn Fields, the 'band' of 24 violins with the Harpsicals and theorbos, which accompany the voice, were placed between the pit and the stage. Rimbault suggests that this was probably the first time an orchestra was positioned between the audience and the stage. In England Harpsichords were usually known as Harpsicons or Harpsicals[35].

Pepys[36] writes "I had a mind to a small harpsicon, but this (spinet) takes up less room". The triangular shape of the spinet fitted neatly into the corner of a room and was an inexpensive £5 compared to a "pedal" costing £20 - £50. Nevertheless, the spinet was "a makeshift compared to the harpsichord with its combinations of registers which are the glory of the latter".

The 'Pedal' [37] appears to have been the work of John Haywood of London. Mr. Thomas Mace, a clerk of Trinity College, Cambridge, describes the pedal harpsicon as "the absolute best sort of consort harpsicon that has been invented; there being in it more than 20 varieties, most of them to come in with the foot of the player, without the least hindrance of play (exceedingly pleasant)".

In 1676 Mr. Mace in offering the 'pedal' for sale describes it in great detail:

"In shape and bulk just like a harpsicon only it differs in the order of it, thus, viz. There is made right underneath the keys near the ground a kind of cupboard, a box which opens with a little pair of doors, in which box the performer sets both his feet, resting them upon his heels (his toes a little turning up) touching nothing, until such time as he has a pleasure to employ them; which is after this manner, viz. there being right underneath his toes four little pummels of wood,under each foot two, any one of these four he may tread upon at his pleasure; which by the weight of his foot drives a spring and so causeth the whole instrument to sound either soft or loud, according as he shall choose to tread any of them down: for without the foot so used nothing speaks. The outside of the right foot drives the one and the inside of the same foot drives the other; so that by treading his foot a little awry, either outward or inward, he causeth a various stop to be heard at his pleasure; and if he clap down his foot flat, then he takes them both at the same time (which is a third variety and louder). Then he had ready under his left foot, two other various stops, and by the like order and motion of the foot, he can immediately give you 3 other varieties, either softer or louder, as with the right foot before mentioned, he did.

The Empress Harpsichord - Shudi and Broadwood

Made for the Empress Maria Theresa - shipped on 20th August 1773 - the day after Shudi died.
The instrument is attributed to John Broadwood, son-in-law and partner of Shudi.
It has a lute, octave and buff or harp stop.
The upper keyboard has the first unison and lute only while all the registers come under the players control on the lower keyboard.
The machine stop at the left of the keyboard permits an agreeable change to lute and buff by using the left pedal and both sets of keys.
The instrument is 8'9-3/4" long and 3'4" wide.

So that thus you may perceive he has several various stops at pleasure, and all quick and nimble, by the ready turn of the foot.

And by this pritty device, is this instrument made wonderfully rare and excellent so that doubtless it excells all harpsicols and organs in the world, for admirable sweetness and humour, either for a private or a consort use".

The price of this 'pedal' was usually £20, considered rather high for ordinary people.

From time to time instrument makers from Europe emigrated to England and set up workshops in London. Gradually the English names disappeared as more and more foreign craftsmen took over.

The first of these men was a Fleming, Herman Tabel(38), who had been trained in the Ruckers workshops. He set up business sometime before 1721.

In 1718 Burkhart Tschudi, a Swiss carpenter, arrived in London and some time later apprenticed himself to Tabel. In 1740 he set up his own shop and in 1742 moved to Great Poulteney Street, Golden Square, by which time he was already "Harpsichord Maker to His Royal Highness, the Prince of Wales". In order to make it easier for his English clients to pronounce his name, he now became Burkat Shudi. His work was highly esteemed and many of his harpsichords were exported to the East and West Indies (Plate 23). Burney(39) records seeing an ingenious 2 manual harpsichord in the Potsdam Palace made for the King of Prussia. He describes it as a most magnificent harpsichord with hinges, pedals and frame of silver, an inlaid case and front of tortoise shell. It cost 200 guineas but was so badly damaged, on its journey by sea, that "it has been useless ever since". He insinuates that jealousy may have been the reason for the local makers being unable to restore it and goes on to observe that "the German workmen work better out of their own country than in it'. "

Jacob Kirchmann(40), later Kirkman, came to England from Germany about 1740 and also worked for Tabel. He managed to persuade Tabel's widow to marry him, a month after her husband's death, thereby becoming the owner of

the materials and tools necessary for his trade. He became a pawn broker and money lender as well as the most esteemed harpsichord maker of his time. In about 1750 this astute business man saved many harpsichord makers from ruin. A vogue for guitar playing became the rage amongst the people of England. Ladies were selling their harpsichords for a third of their price in exchange for guitars. Kirkman(41) almost ruined himself by buying up as many of his instruments as he could. He then proceeded to supply cheap guitars to street ballad singers and girls in millinersshops, and taught them to accompany themselves with chords and triplets. This expedience had the desired effect of making the ladies ashamed of their 'vulgar and frivolous taste' and return to the harpsichord - no doubt at considerable profit to Kirkman'.

Shudi and Kirkman(42) soon dominated the harpsichord trade. Their instruments were larger, louder and of better workmanship than most of those produced on the Continent. They often made 9' long instruments with a keyboard range of five to five and a half octaves. Double keyboard harpsichords usually had five to seven stops worked by a couple of pedals (See Plate 26).

Often such stops as the 4' lute, harp, 'machine' or 'Venetian Swell' were added(43). Both the latter appear in harpsichords built after 1760. The 'machine' was a composition pedal which could change the stops instead of using the hand. The 'Venetian Swell' was a set of shutters above the strings which could be raised and lowered by means of a pedal - a device to increase and decrease the amount of tone. Many of the Shudi and Kirkman harpsichords are still in existence today. The last surviving ones from these famous workshops are dated 1793 and 1800 respectively.

An interesting comparison of the work of these two men is recorded by Burney(44) who says "Shudi's work was extremely neat and his tone and touch refined and delicate while his instruments were new, but neither so full nor so durable as Kirkman's". In any event, when Shudi died in 1773 and Kirkman in 1778, both men left sizeable fortunes.

Spanish harpsichords of the 18th Century were considered excellent instruments. Burney[45] writing about his visit to Farinelli in Bologna describes the harpsichord given to Farinelli by the Queen of Spain - incidentally she was Scarlatti's pupil and it was for her he wrote and dedicated his first two books of lessons. Burney also mentions a transposing harpsichord - one with movable keys (keyboard!). The instruments had black keys with mother of pearl for the sharps and flats. These instruments were modelled on Italian styles - all cedar wood except for the bellies and enclosed in a separate case. The shape was very graceful - "far superior to the English or German harpsichords of the same date".

In Germany, Hieronymus Hass and his son Johann became famous for their harpsichords built between 1710 - 1770. Working in Hamburg they made elaborate instruments; three surviving ones each have a 16 foot stop.

The Grabner family in Dresden, were producing harpsichords with two eight foot and one four foot stops. Their instruments are dated between 1722 and 1782. About the same time spinets were being made by Johann Silbermann (1727 - 1799) - a famous organ builder living in Strassburg. The few surviving German spinets are almost all from Silberman's workshops.

Russell[46] makes a special point of mentioning that the early German instruments never included the 4 foot stop on the upper manual, although they are often included in modern German harpsichords. Many people still erroneously believe they are an original feature of the old harpsichords.

The manufacture of harpsichords, in Germany, declined in the last quarter of the Century and, apart from becoming collectors pieces, little musical interest was shown in them for 100 years.

In America[47] by 1700 people were beginning to take an interest in the arts. The Quakers and Puritans were opposed to music in churches but apparently allowed the "private exercise of music". In Boston the first mention of the virginals is recorded in Judge Samual Sewall's diary of December 1st, 1699 -

Plate 24

Spinet by Samuel Blythe of Salem, Mass. 1785 - 1790
Essex Institute Collection, Salem, Mass. America.

he says he was "at Mr. Hiller's to enquire for my wives virginals". In 1716 a Mr. Edward Eustone advertised his wares and announced that "Any person may have all instruments of music mended, or Virgenalls and Spinnets strung and tuned at a reasonable rate, and likewise may be taught to play on any of these Instruments abovementioned". There must have been a fair number of virginals in Boston at this time to warrant such a statement. By 1730 in Philadelphia a Miss Ball "lately arrived from London" offered to teach "singing, playing on the Spinet, dancing, and all sorts of needlework".

Concerts were first advertised in Boston on December 30th, 1731 - in Charleston in 1732 and New York in January, 1736. The last was given by Charles Theodore Palchelbel who performed on the harpsichord himself - allowing others to sing and play the flutes and violins'. Orchestras were established and light operas performed. The use of a harpsichord for the singers must have been included.

An enormous population increase - over a million inhabitants by 1743 and two and a half million at the beginning of the Revolution - led to greater cultural activity and more imports, which included musical instruments. Harpsichords arrived from England but were even more costly than in London. Only the wealthy could afford such instruments and most of them were purchased by Southerners, mostly Virginians.

There appears to be no record of harpsichords being built in America but is is not unlikely that smaller and cheaper instruments were made for the home market. A Spinet made by Samual Blythe, of Salem, between 1785 - 1790(Plate24) is in the Essex Institute Collection in Salem. It closely resembles the English models as one can see by comparing the photographs of the Keene and Hitchcock instruments(Plates 21 & 22).

At the Paris Exhibition in 1889(48), Erard and Pleyel exhibited some new harpsichords which they had constructed on old French models. Arnold Dolmetsch soon followed their example and produced his first harpsichord in 1896. This enthusiastic man has been responsible for a great deal of the interest

Plate 25

Modern Harpsichord by Sperrhake of Passau

Five octaves F - F'''. One 16' register, two 8' and one 4'.
The 16' and one 8' on the lower manual and the other 8' and the 4' on the upper manual.
There is a lute stop for the 16' and both 8' registers.
The five pedals are from left to right:-
8' bass, 16' bass, coupler, 4' treble, 8' treble.

(Rhodes University Music Department)

Plate 25 a

Plan of Sperrhake harpsichord

Four sets of jacks.
The bridge and hitchpins of the 4' register are clearly visible under the 16' and 8' registers.
The rose is made of wood and has the initials Sp incorporated in the design.

(Rhodes University Music Department)

Modern Harpsichord by Sperrhake of Passau

Single keyboard of $4\frac{1}{2}$ octaves.
There are two sets of jacks; one 8' and one 4' register.
A knee lever which is situated centrally below the frame, is clearly visible - this is the 4' stop.
On the fascia board can be seen the two lute stops - each one works half the key levers.
The lower lever, on the right, is the 8' stop.

in old instruments which prevails today. He and his family make replicas of old instruments and play old music on them. They give regular concerts and are recognised experts in this field. Many other workshops are producing old keyboard instruments very successfully. Unfortunately, however, the tendency of modern harpsichord makers is to build bigger and more elaborate instruments, using heavier strings and cases, which detract from the sound. Modern composers have not been enthusiastic about solo harpsichord pieces. However, Manuel de Falla, Poulenc, Frank Martin and Vittorio Rieti have been successful in writing concertos for Harpsichord as solo instrument. These large instruments besides being expensive are certainly not the harpsichords of Bach and Handel's time, let alone of those earlier men - Byrd, Bull, Purcell, Farnaby and Gibbons. The 20th Century revival of the old harpsichord was meant to provide performers with the instrument for which harpsichord music was written. Many musicians agree with Dolmetsch and prefer to play on instruments modelled on early 18th Century harpsichords (Plates 25 & 26). There seems to be no justification for performing old harpsichord music on instruments modelled on anything later than 1750, as by this time composers were already writing for the piano.

3. Deficiencies of the Harpsichord

The Harpsichord had the advantage over the Clavichord in its greater volume and use in ensemble. However, besides lacking the expressiveness of the Clavichord it had no sustaining power and no means of achieving a crescendo or diminuendo. Composers wrote such directions in their works and players claimed to produce it in their touch. By facial expressions and other contortions they tried to convey the illusion to their audience(49).

The lack of sustaining power in stringed keyboard instruments seems to have been a problem from the beginning. As early as 1500 Leonardo da Vinci(50) is said to have examined the problem of bowing the strings.

In 1600 John Heyden(51) contrived a mechanism which consisted of "cylindrical bows made to act, by means of a pedal, upon an ordinary harpsichord with metallic strings" and in 1664 both Evelyn and Pepys recorded in their diaries the advent of a new instrument(52). Evelyn writes "There was brought a new invented instrument of music, being a harpsichord with gut strings, sounding like a concert of viols with an organ, made vocal by a wheel and a zone of parchment that rubbed horizontally against the strings". Pepys, more garrulously described the instrument in much the same way but went on to say "... but so harshly and so basely, that it will never do. But after three hours stay, it could not be fixed in tune; and so they were fain to go to some other musique of instrument".

More than 50 types of bowed harpsichords were constructed between Heyden's "Clavecin Viole" and the 20th Century but none proved successful. Geiringer(53) says that "the mechanically operated bow is always rigid, lifeless and unsatisfying". Various attempts were made to provide the harpsichord with the means of crescendo and diminuendo. In 1741, a Swede, Nils Brelin(54) invented an upright harpsichord with eight pedals and 61 keys which gave eight shades of volume from piano to forte. There is no explanation of how this was achieved.

In 1765 Berger, of Grenoble[55], received an elogium from the Acadamie des Sciences for his harpsichord which could produce crescendi and diminuendi by means of a lever. Unfortunately details of the mechanism have been lost.

Kirkman, of London, invented a lid which opened and closed, and Shudi in 1769 was the designer of the 'Venetian Swell'[56], a sort of venetian blind which covered the strings and was opened and closed by means of a pedal.

The invention of the piano in 1709 appears to have spurred harpsichord makers to greater heights of inventiveness. The struggle for supremacy was probably a factor; on the other hand there may have been a real belief that the harpsichord was the better instrument, if a way could be found to overcome its obvious deficiencies. Nevertheless the harpsichord was already as perfect as its mechanism would allow,while the piano was still in its infancy. It must also be remembered that a new technique was necessary to play the piano to advantage. Maffei[57] in describing the instrument in 1711 says "the greatest opposition that this new instrument has suffered consists in the fact that people in general do not know how to play it at the first encounter, since an ability to play the ordinary keyboard instruments will not suffice here". Furthermore people were used to the plucking sound and were probably as conservative as most of us are about radical changes.

CHAPTER II

HAMMERED INSTRUMENTS WHICH LED TO THE PIANO

DULCIMER AND PANTELEON

15th Century carving in Manchester Cathedral, England.

Plate 27

Dulcimer

The photograph shows a dulcimer in a painted case - probably Italian. The instrument is removed for performances. There are seventeen notes and four brass wire strings tuned in unison for each note.

3'4½" wide in front - 1'1" narrowest width
1'1½" angled sides - 3½" - 2'2", height of stand.

CHAPTER II

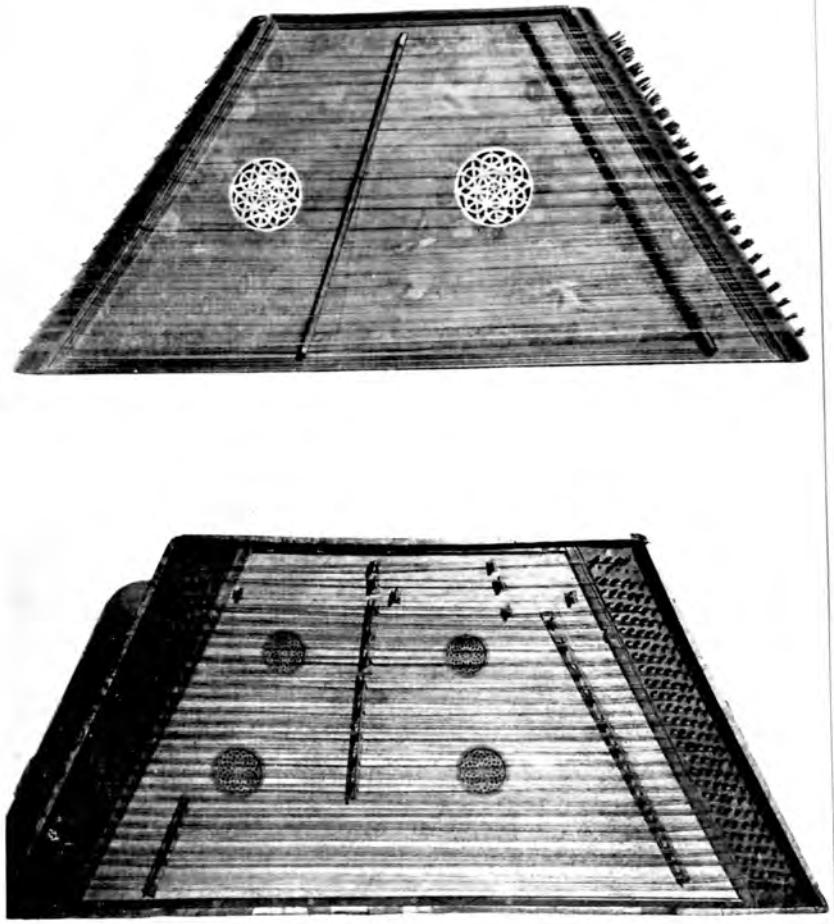
HAMMERED INSTRUMENTS WHICH LED TO THE PIANO

Dulcimer and Panteleon

It must have been fairly evident by 1700 that the idea of bowing the strings to sustain sound in the harpsichord was not likely to be effective.

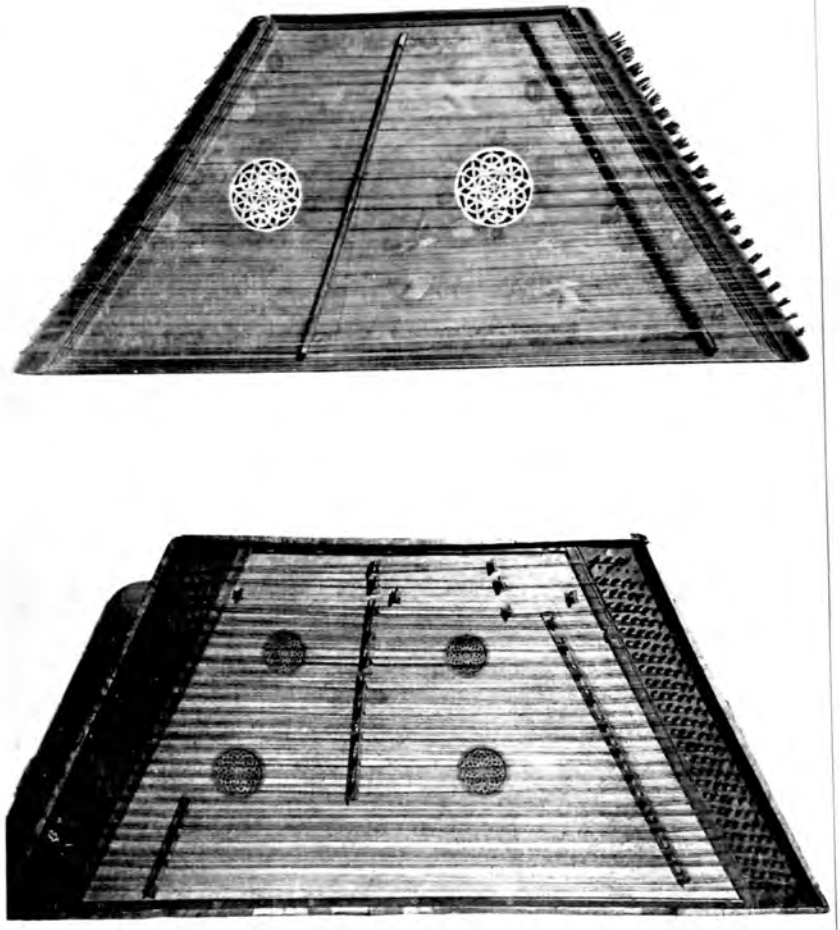
While all the experiments were going on in the 17th Century, the age old Dulcimer was still being played by the poorer people in Germany. This ancient instrument is simply a trapezoidal box with strings stretched over it, parallel to its base and is struck by hammers held in the hands(Plates 27 & 28). It is a crude instrument of small range with barely a diatonic scale. The Germans called it 'Hackbrett"(58) - literally a hacking board for chopping up sausage meat'. Nevertheless, this humble instrument had the fundamental requisites of the present day piano - strings tuned to certain pitches, a resonating board and the sound produced by hammers. The hammer heads, covered with soft and hard leather, combined with the force of the blow, were capable of producing forte or piano. The addition of a keyboard was needed to increase the effective number of hammers from two to ten (fingers instead of hands).

At the end of the 17th Century a German, named Panteleon Hebenstreit(59), is said to have heard a hackbrett played in a tavern in Saxony. He was so impressed with its musical possibilities that he had an enormous double Dulcimer built to his own design(Plate 30). The instrument had two sound boards, six feet long and about two hundred strings - one sound board covered with metal strings, the other with gut strings, some of which were triple and double strung. There were at least five octaves and it was tuned chromatically in equal temperament. Hebenstreit used two double faced hammers with hard leather on one side and softer leather on the other. His instrument was capable of producing tremendous tone and resonance. According to



Pantaleons

Plate 28



Pantaleons

Kunau[60], the labour of striking the strings was herculean but the power of expression and nuance was greatly admired. Hebenstreit travelled all over Europe giving concerts and his skill as a virtuoso was remarkable. He is reported to have practised at night, as well as in the day, owing to the excessive difficulty of playing the instrument.

News of Hebenstreit travelled far and wide. His improved Dulcimer was the first realisation of the pianoforte idea. In France, Louis XIV [61] was so impressed, by a performance given by the inventor, that he suggested naming it Panteleon or Patalon. By 1714 Hebenstreit's reputation was such that he was appointed 'Pantalonist' at the royal Saxon Court in Dresden at an annual salary of twelve hundred thalers. Twenty years later J.S. Bach's entire earnings were only seven hundred thalers per annum!

Johann Kunau[62], Bach's predecessor at St. Thomas' School, in a letter dated December 8th, 1717 gives a description of the Pantalon as follows:

"Especially when one strikes a bass tone, it sounds for a long time afterward, like one that is held upon an organ, and many passages and resolutions of dissonantia may be absolved before it fades completely - to the great delectation of the feelings ... nor does the harmony suffer by the pleasant after humming of middle and upper voices, since even in the fastest things all notes are heard distinctissime. But when one arpeggiates in chords - which can be accomplished here in the fullest manner - and since also when one ceases, the sound diminishes little by little as if from afar, the delightful buzzing of the harmony goes right into the quick".

He also records an occasion [63] when Hebenstreit "made his leaps, and after he had shown us his musical treasure in various kinds of preluding, improvising, fuguing, and all sorts of caprices with the bare sticks, he finally bound up the sticks with cotton and played a partita". Count Logi, a good lute player, was "quite beside himself" and remarked to Kunau " I say, what is that? I have been in Italia, I have heard all the beauties there are in musica, but

CIMBALOM (with sticks)

Modern Dulcimer

Early in the 20th Century Schunda of Budapest invented a system of dampers for the instrument - note pedals.
Kodály, the Hungarian composer, used this instrument in his suite Háry János.

something like this has never come to my ears".

Here was an instrument capable of the expression and power required of the stringed keyboard instruments. The Florentine Camerata[64] at the end of the 16th Century, John Wesley's[65] religious movement, Pietism's[66] free religious expression and the great Italian Violin School[67] with its emphasis on expression have all been suggested as contributory stimuli to the need for a new instrument with the necessary qualities. The obvious popularity of the Panteleon and the interest shown in it was tremendous.

However, it was probably the difficulties involved in playing it which encouraged inventors to devise a keyboard hammer action to bring its glorious sustained effects within the reach of the amateur.

Plate 30

Modern Dulcimer

Moravian Gypsies in Czechoslovakia in 1930's.
Modern dulcimers are commonly called
Cimbalom, Czimbalom, Cymbalom or Zimbalon.
Rumanian, Bohemian and Hungarian Gypsies
still use this instrument in its modern form.

CHAPTER III

INVENTION OF THE PIANOFORTE

Plate 31

Cristofori's Pianoforte 1726.

"The piano is the social instrument par excellence. It is drawing room furniture, a sign of bourgeois prosperity, the most massive of the devices by which the young are tortured in the name of education and the grown up in the name of entertainment. It is a rallying point for the convivial when letting off spirituous fumes through song and for the amorous conducting a romance with the aid of romances. At the same time, too, the piano is the individualist's instrument for nursing the illusion that he is a host in himself" (150).

Jacques Barzun.

CHAPTER III

INVENTION OF THE PIANOFORTE

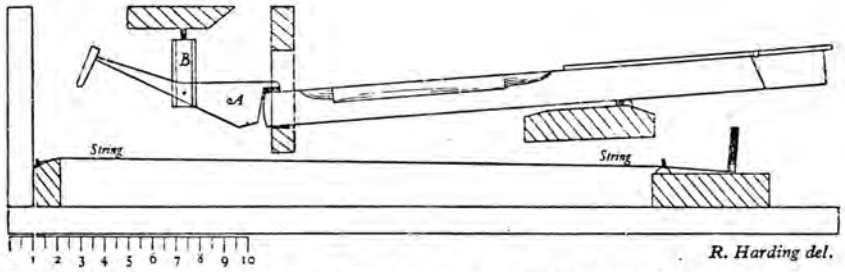
By the beginning of the 18th Century Hebenstreit was an accomplished performer on his enormous double Dulcimer. When he played to Louis XIV in 1704 he had achieved the object of his long journey to Paris; not only was he favourably received but the instrument was named after him by the King. The Panteleon, or Pantalon, as the French called it, had gained royal approval. His skill as a virtuoso and the fame of the Pantaleon soon spread throughout Europe and, as Loesser(68) says "he was universally praised and accepted in the musical world".

In view of this, it is perhaps not surprising to find that Jean Marius in Paris, Cristoph Gottlieb Schroeter in Germany and Bartolomeo Cristofori in Italy were all imbued with the idea of applying the hammer principle to stringed keyboard instruments.

These three inventors were not the first in the field, for there is a manuscript in the Bibliothèque Nationale of Paris which describes an instrument on the hammered principle(69). The book contains full descriptions, plans and diagrams of all three types of keyed stringed instruments - the Clavichord, Harpsichord and the Pianoforte. Dolmetsch(70) claims that two small undated Dutch pianofortes in London are earlier than 1700 and he also describes a small piano of Dutch origin dated 1610. This instrument with small hammers attached to the keys has no dampers and is said to have been made for a French Nobleman. The delicate paintings which decorate the piano appear to confirm the date. This piano he saw in Rene Savoye's collection. It is now in the Belle Skinner collection in Holyoke, Massachusetts, and Loesser(71) says competent authorities have cast some doubt on the authenticity of this date. Scholes(72) in acknowledging Dolmetsch's claims for earlier pianofortes suggests that they were occasional experimental instruments of the pianoforte type, which were subsequently forgotten. This interpretation applies equally well to both the French and German attempts to produce a hammered instrument.

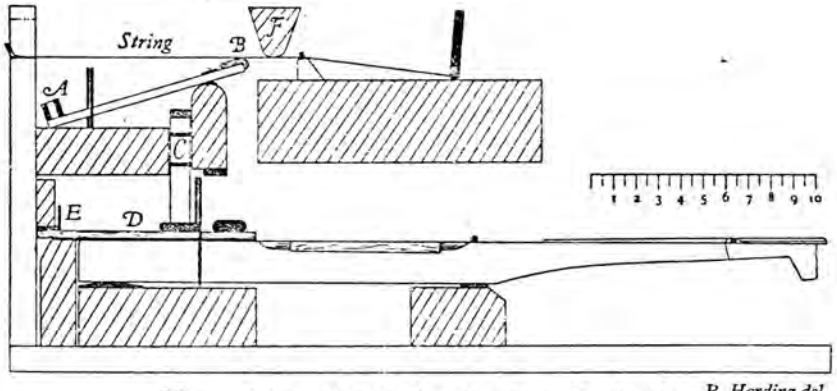
Marius(73) probably heard Hebenstreit perform in Paris in 1705.

Fig. 4



~~Fig. 8.~~ Down-striking action[1] attributed to Schröter by Welcker (Stuttgart, No. B 35). *A*, hammer; *B*, Kapsel or fork in which the hammer is pivoted.

Fig. 3



~~Fig. 9.~~ Schröter's pianoforte (Stuttgart, No. B 25). *A*, the hammer of very light wood no thicker than a harpsichord jack having a head clothed with leather; *B*, the damper padded with satin or plush; *C*, the jack, made of light wood and no thicker than those used in a harpsichord, is kept in position between two rows of pins: this jack is purposely unattached to the hammer in order to prevent what is technically known as blocking, *i.e.* the jamming of the hammer against the string; *D*, a lever pivoted at *E* serving to transmit motion from the key to the jack; *F*, an iron bar pressing on the strings for the purpose of giving brightness to the tone: this foreshadows the Capo Tasto bar of later days.

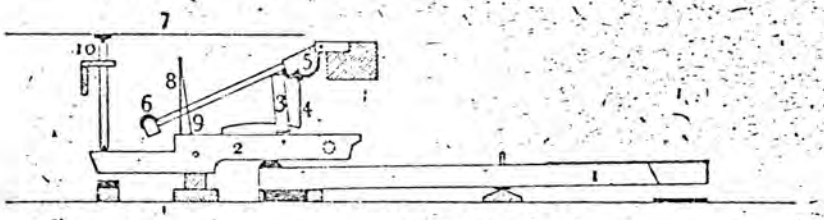
In 1716 he presented models of four "Clavecins à Maillets". These were obviously influenced by the Clavichord as there is no escapement or damper action and the hammers act directly against the strings. However he varied the thickness of both the strings and hammers which was a step in the right direction. A down striking action in one of his models may have been inspired by the Pantaleon.

Schröter[74], born in 1699 in Hohenstein, Saxony, eventually went to Dresden where he acquired a distinguished reputation as a theoretical and practical musician. He trained his pupils on the Clavichord, as was customary, but was upset when they complained that they could not put expression into their music on the Harpsichord. He tried using the type of Harpsichord (Nürnbergisches Geigenwerk) which required the use of treadles to keep the resined wheel revolving to bow the strings, but disliked being obliged to work like a "linen-weaver".

In 1717 Schröter heard Hebenstreit play in Dresden. This performance evidently excited him for he wrote[75] that after hearing the "world famous virtuoso, I considered it certain that it would be possible for me to invent a keyboard instrument upon which one could play soft or loud at will". He designed a double model showing both an upstriking[Fig. 3] and a down striking hammer action[Fig. 4]. The preferred "upstriking action" consisted of a hammer-shank with a hammer at one end and a damper at the other. In its position of rest the damper was against the string. A see-saw action resulted when the key was depressed, which caused the hammer to strike the string. With this system each sound was immediately damped so that sustained sound was impossible on Schröter's design. The King promised that a full sized pianoforte should be made with the upstriking action, but for some unknown reason the instrument did not materialise. Schröter left Dresden, but never had enough money to further his ideas. He eventually laid claim to the invention of the pianoforte[76] - first in 1738 and again in 1764 - and accused Silbermann

Fig. 5

Cristofori's primitive action . 1712



1 Finger key
2 Intermediate lever
3 Escapement
4 Escapement spring
5 Hammer butt
6 Hammer head
7 String
8 Silk strings
9 Shanks to which strings are attached
10 Damper

When the key (1) is pushed down it raises the intermediate lever (2) which, in its turn, raises the escapement (3) which acts upon the hammer (5, 6). At the moment when the hammer is jerked up and strikes the string (7) the escapement 'escapes'. After this, the hammer does not fall back directly upon the escapement, but upon the spring (4), which keeps it nearer the string. When the finger releases the key, the hammer drops into the sheath formed by the two silk strings (8) – later replaced by wood – which are maintained by shanks.

The damper (10) normally presses against the string, but frees the string to vibrate when the key – and hence the intermediate lever to which the damper is attached – is lowered. When the key is released the damper again presses against the string.

and Cristofori of imitating his models. However, not only was the Cristofori pianoforte made at least eight years earlier than Schröter's models, but it was also the model on which some of the early German makers based their instruments.

Cristofori[77] (1654 - 1731), a harpsichord maker of Padua, became keeper of the musical instruments, some forty harpsichords and spinets, which belonged to Prince Ferdinand de Medici of Florence. In 1709, he produced his 'Gravicembalo col piano e forte'. By means of a single, yet ingenious mechanism, he substituted hammers for jacks[Fig.5]. The hammer was hinged and independent of the key and an escapement device on the key allowed it to fall back after striking the string. There was a hammer, check and a damper for each string. By 1729 he had invented the soft pedal action of the grand piano. This moves the entire mechanism to one side so that the hammers strike one string instead of two (hence the name 'Una Corda'). Two stops, situated at one side of the instrument, were available to operate the Una Corda. It is clear that Cristofori used the harpsichord as the working basis for his invention[78]. He used the shape, the strings and keys and transformed one row of jacks into dampers. He also called it "Gravicembalo col piano e forte" - Harpsichord with soft and loud.

There is no evidence that Cristofori ever heard Hebenstreit play. However, the fame of the Pantaleon was so widespread that it would be surprising if the news had not yet reached the musical circles in Florence. Indeed the word 'Pantalon' was often used, late into the Century, to describe down striking pianofortes[79].

Perhaps the most remarkable feature of Cristofori's instrument is, that, unlike the models of Marius and Schröter, it contains all the elements of the modern piano.

CHAPTER IV

FROM HARPSICHORD TO PIANOFORTE

Plate 31 a

Harpsichord by Johann Daniel Dulcken - Antwerp 1745.

"Never will this newcomer dethrone the majestic harpsichord" - Balbastre.

CHAPTER IV

FROM HARPSICHORD TO PIANOFORTE

Although the pianoforte was the outcome of a need for a more expressive instrument, there was a surprisingly long period of rivalry with the harpsichord. From the time of Cristofori, almost a century elapsed before the pianoforte became the accepted stringed keyboard instrument.

Cristofori only made about twenty pianofortes(80), but by 1726 his instruments had all the essentials of the modern pianoforte - the double action, a check, an escapement and the una corda mechanism. Two of the later instruments are still in existence and compare favourably with any others made until the end of the century. In spite of this remarkable achievement, Cristofori was not famous in his lifetime and piano making in Italy petered out within a few years of his death in 1731. The first pianoforte pieces ever published appeared in Florence a year after his death -a set of twelve sonatas by Ludovico Giustini of Pistoia. Sometime during the next ten years, five Florentine pianofortes were delivered to the Spanish Court, one of them by Ferrini, a pupil of Cristofori. Scarlatti is said to have played these instruments and Clutton(81) says that although he never specified which instrument he was writing for, the style of some of his sonatas suggest that he intended them for the pianoforte. If this is the case, then he would be the first of the great composers to write for the new instrument. Interest in the Italian instrument was short lived and some of the Spanish Court pianofortes were rebuilt as harpsichords. The Italians displayed an equal lack of interest. Their addiction to singing, and to making and playing violins completely overshadowed the possibilities of an expressive keyboard instrument. Cristofori's pianoforte would probably have gone the way of the other hammered inventions if the Germans had not discovered and appreciated its potentialities(82).

The name of Silbermann is the first to be associated with piano making and there were two famous Silbermann workshops - Gottfried

Silbermann[83] in Freiberg, near Dresden, and his elder brother Andreas in Strasbourg. It was in Strasbourg that Gottfried learnt his trade; later to set up on his own in Freiberg. In view of the key role of the Silbermann family in the history of the piano, it is surprising to find that many authorities use the name of Silbermann without discrimination, particularly as two different types of action were developed, both of which gained wide popularity. For example, Rimbault[84] explains that Gottfried Silbermann of Freyburg is so called because he built the organ in the Cathedral of Freyburg, and refers to John Andrew Stein[85] (developer of the Viennese Action) as a pupil of Silbermann. Brinsmead[86] writes that Godfrey Silbermann of Strasbourg copied Schröters design - he also states that Stein was a pupil of Silbermann. Clutton[87] refers only to Gottfried Silbermann; Harding[88] indexes Jean Henry Silbermann of Strasbourg, but in the text[89] refers only to Silbermann - she also refers to Andreas Stein as a pupil of Silbermann. Sumner[90] speaks of that ingenious man of Dresden and of Andreas Stein, a pupil of Silbermann. Scholes[91] only describes Gottfried Silbermann and refers to him as the intelligent exploiter of Cristofori's invention. Closson[92] describes Johann A. Stein of Heidesheim as a workman and disciple of Silbermann, and states[93] that the Viennese School was notable for the improvements it brought to the primitive instruments of Cristofori and Silbermann.

Although Grove[94] classifies the important members of the Silbermann family in correct relationship, only Loesser[95] appears to have used this information to distinguish between the two schools of piano making.

It was left to the initiative of Gottfried Silbermann, (1683 - 1753), an organ and clavichord maker of Freiberg, to develop and exploit the building of pianofortes for profit. Living only 25 miles from Dresden, he kept Hebenstreit's Panteleon in repair and constructed any new ones he required. Apparently he also built and sold pantalons on his own account, an infringement of ethics which was strongly objected to by Hebenstreit, who managed to obtain an edict

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Bremerhavn.
Wilhelmsh.
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Bremen
Oldenburg
Lüneburg
Celle
Niedersachsen
Hannover
Hildesheim
Braunschw.
Bielefeld
Münster
Osnabrück
Rostock
Stralsund
Greifswald
Mecklenburg
Schwerin
Wittenberge
Stettin
Swinemünde
Kolberg
Köslin
Stolp
Gdynia
Hela
Danzig
Marienbg.
Elbing
Königsberg
Ostpreußen
Pommern
Stargard
Pyritz
Neustettin
Jastrow
Schneidemühl
Bydgoszcz
Torun
Grudziadz
Inowroclaw
Wloclawek
Plock
Kutno
Gniezno
Poznan
Kalisz
Lodz
Piotrkow
Czestochowa
Brandenburg
Berlin
Potsdam
Frankfurt
Küstrin
Landsberg
Cottbus
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Sachsen
Anhalt
Dessau
Halle
Magdeburg
Leipzig
Dresden
Freiberg
Chemnitz
Zwickau
Plauen
Bautzen
Görlitz
Liegnitz
Breslau
Schlesien
Glogau
Hirschberg
Schweidnitz
Waldenbg.
Oppeln
Beuthen
Hindenbg.
Katowice
Ratibor
Sosnowiec
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Mainz
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Mannheim
Worms
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Saarbrücken
Kaiserslaut.
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Heidelbg.
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Stuttgart
Württemberg
Baden
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Ulm
Württ.-Hohenzollern
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Augsburg
Würzburg
Bamberg
Erlangen
Fürth
Nürnberg
Bayern
Regensburg
Landshut
München
Kempten
Coburg
Bayreuth
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Steiermark
Graz
Kärnten
Klagenfurt
Burgenland
Bratislava
Györ
Budapest
Sopron
Szombathely
Nagykanizsa
Kaposvár
Pécs
Ungarn
Maribor
Ljubljana
Zagreb
Jugoslawien
Osijek
Triest
Udine
Italien
Bergamo
Como
Schweiz
Zürich
Basel
Bern
Luzern
Lausanne
Genf
St. Gallen
Frankreich
Paris
Versailles
Reims
Metz
Nancy
Strasbourg
Colmar
Mulhouse
Belfort
Besançon
Dijon
Lyon
St. Etienne
Clermont-Ferrand
Orléans
Tours
Bourges
Limoges
Rouen
Le Havre
Amiens
Lille
Roubaix
Calais
Boulogne
Dieppe
Belgien
Brüssel
Antwerpen
Gent
Brügge
Lüttich
Namur
Ostende
Niederlande
Amsterdam
Haag
Rotterdam
Utrecht
Haarlem
Leiden
Groningen
Leeuwarden
Arnhem
Eindhoven
Tilburg
Vlissingen
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Croydon
Brighton
Hastings
Dover
Canterbury
Southend
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Colchester
Ipswich
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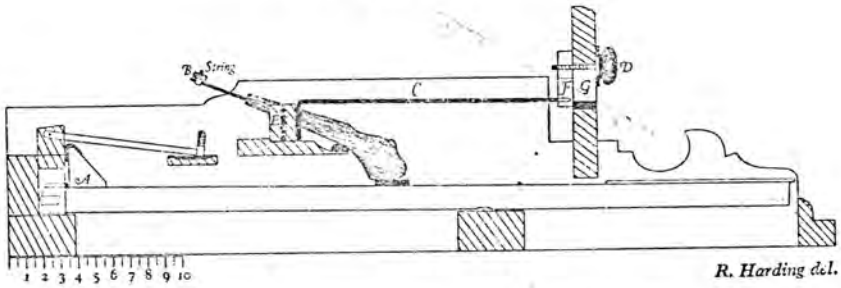
from the King[96], in 1727, which prohibited anyone from constructing Pantaleons - the penalty was fifty Rhenish gold florins, evidently sufficient to deter Silbermann. This may have been just the stimulus needed to start Silbermann thinking about making a hammered keyboard instrument. After all, the idea had been in the air for some time. By 1730, he had made his first two pianofortes. There may be some grounds for believing the Brinsmead[97] and Closson suggestion[98] that Silbermann used Schröter's designs for his first models. The fact that Schröter lived in nearby Dresden and also his later claims that Silbermann had copied his models and the fact that Silbermann changed his ideas later on, are quite reasonable premises for these assumptions. These first two pianos, apparently the first ever to be built in Germany, were shown to J.S. Bach on his visit to Dresden in 1736[99]. He is reported to have found them difficult to play and complained that the treble was too weak. Silbermann was extremely annoyed and is said to have destroyed the pianofortes. However, he continued to experiment but by now he certainly knew of Cristofori's action. Harding[100] relates that after Cristofori's death, his pupils either worked on their own or in other workshops, especially in Dresden, a popular place for Italian workmen. Besides this, Silbermann had a friend Johann König, "Master of Ceremonies, Court poet and official flatterer to the King at the Court of Dresden", who had translated Maffei's description of Cristofori's 'Gravicembalo'. So it was that in 1745, Gottfried Silbermann was able to offer Frederick II, one of his new pianofortes. The King was so impressed that he ordered several more, and it is on these instruments that J.S. Bach played during his visit to the Potsdam Palace in 1747. Bach praised the so called 'Forte and Piano' but as Loesser[101] points out it would hardly have been polite to "make derogatory remarks about a host's new toy'." In any event Bach, who was 62 at this time, never showed any further interest in the piano. His son, Carl Phillip Emmanuel, however, although a confirmed lover of the Clavichord, wrote in his essay on the right

Plate 32

Oldest Known Example of a Square Pianoforte.
Johann Söcher, 1742.
(Musikhistorisches Museum, Neupert in Nuremberg).

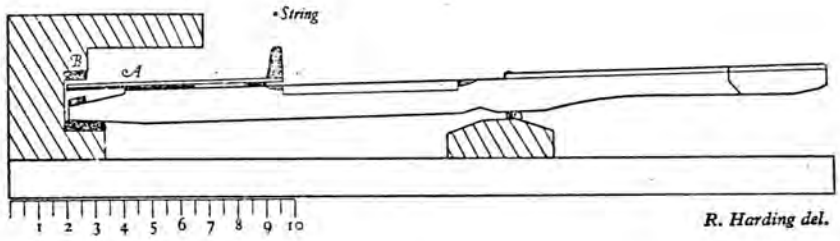
Fig. 7a



Primitive Anglo-German Action in a Square Pianoforte by "Johann Söcher im Obern Sonthofen, Allgau 1742"

A. Jack which transmits motion to the hammer.
B. Damper pressed against the string by its heavy counterweight resembling the butt of a rifle.
C. Length of iron wire embedded in a block supporting the damper on the left and into a lever F on the right.
D. Handle of the forte stop which moves the lever F : to use this stop push down D through the space G.
E. Iron pivot (fixed to frame) upon which the block supporting the damper swings.

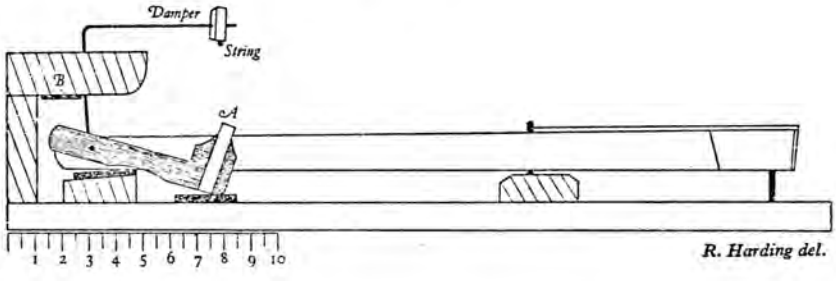
Fig. 6



Primitive Prellmechanik

A, the hammer shank attached to the key by a leather hinge; B, the Prelleiste.

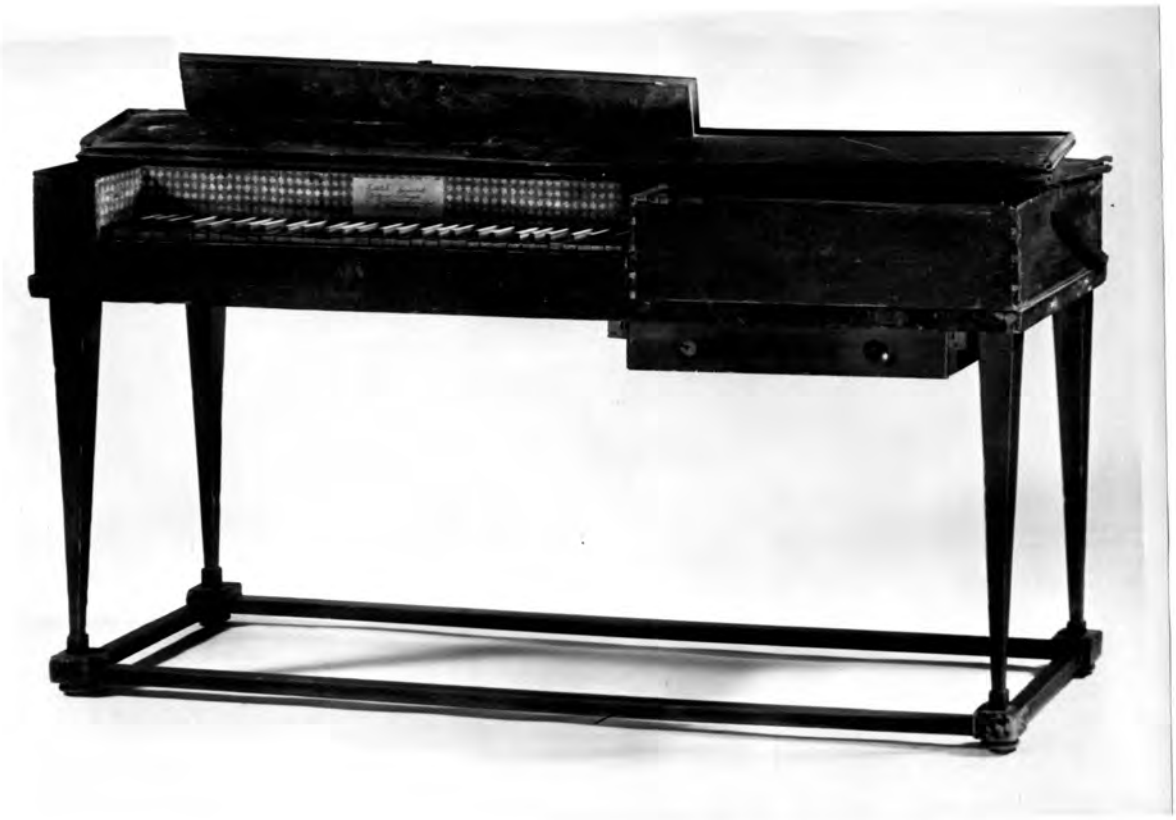
Fig. 7



Primitive Prellmechanik; second half of the eighteenth century. A is the hammer around which is glued a strip of soft leather; B is the Prelleiste.

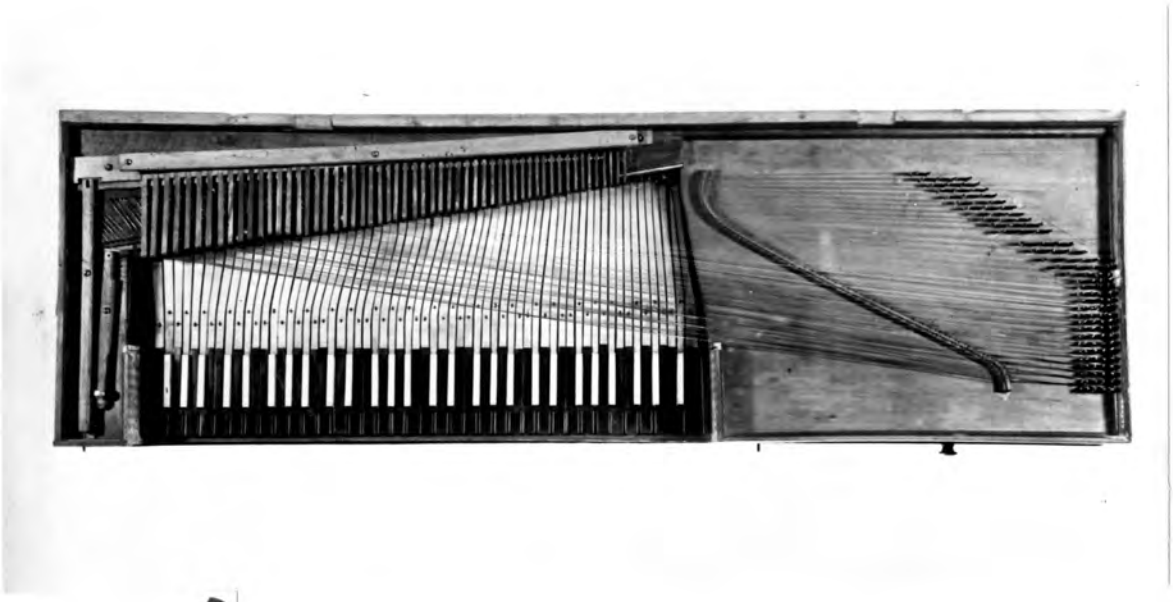
Fig. 6 shows an action similar to the Rüfner Square. The difference is in the method of hinging. The Rüfner has a kapsel at the end of the key with a pin through the hammer shank - similar to Fig. 7 but the hammer lies along the key as in Fig. 6.

Plate 33 a



Square Piano by Johann Gottlieb Rüfner - Nürnberg

Plate 33 b



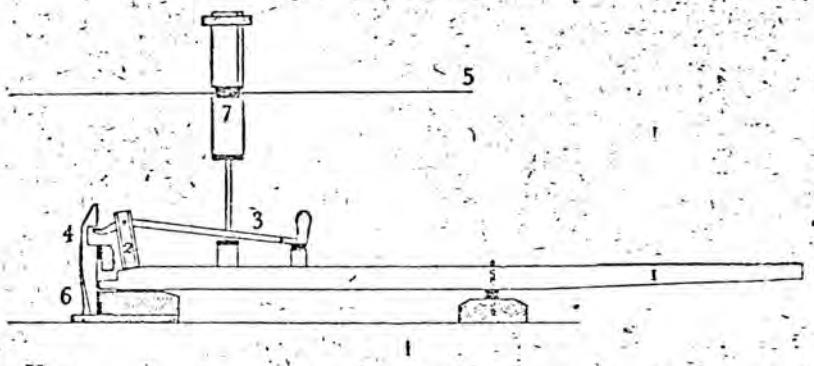
Plan View of Rüfner Square.

way to play the Clavier "they are useful and expressive if durable and well constructed". Quantz, Fredericks flute instructor, wrote that "this instrument has more of those virtues necessary to a good accompaniment than any that is called by the name of Clavier : here everything depends upon the player and his judgment"[102].

The name of Silbermann was so much associated with piano making that for many years he was credited with the invention of the pianoforte. Beethoven wrote Op.101 in 1816 and used the word hammerklavier in early 1817, under the impression that the new instrument was a German invention. Der Neue Brockhaus[103] and the French Encyclopèdie des Metiers[102] (1778) also state that Gottfried Silbermann invented the pianoforte (hammerklavier)[102]. One of his pupils, Christian Ernst Frederici, set up as an organ and clavier builder in Gera, West Germany, sometime in the 30's.[102] After Silbermann's death he became the foremost builder of keyboard instruments in Germany. The first upright piano is attributed to him and until recently he was credited with the first square piano. However, in 1933, a square pianoforte was found, dated 1742. Made in Bavaria by Johann Söcher, this is the oldest known example in existence[104] (Plate 32). Another old square pianoforte has been found and was acquired by the Smithsonian Institute in 1970. This instrument was shown to the writer in a recent visit to Mrs. Helen Hollis at the Smithsonian. It is by Johann Gottlieb Rüfner of Nürnberg and unfortunately is not dated (Plate 33). The very primitive action known as the Prellmechanik (Figs. 6 & 7) is clearly based on the tangent idea. A simple wooden hammer is hinged at the end of the key lever and is tossed up against the string when the key is depressed. There are no dampers and no escapement. The keyboard is five octaves plus F# and G which is considered unusual in pianofortes of the early 18th Century. (Mozart's piano only had five octaves[105]). In view of the fact that it was not unusual to find more than five octaves in Clavichords, by the middle of the 18th Century,

Fig. 8

Stein's action . 1786



1 Key
2 Sheath (or Kapsel)
3 Sleeve of the hammer
4 Escapement
5 String
6 Spring
7 Damper

The key (1) is prolonged by a wooden sheath, technically called the 'Kapsel' (2) in which the hammer (3), which is very light, is pivoted and rocks freely. The escapement (4) is at the extremity of the key. It moves freely being attached independently from the rest of the action. When the key is depressed, the end of the hammer shaft catches in a slot cut out of the escapement. The hammer, thus raised, strikes the string (5) and then falls back again. But the end of the hammer-shaft rests against the escapement, above and outside the slot. When the key is released, the escapement draws back, permitting the hammer again to take its place in the slot of the escapement. This is pushed forward by the spring (6).

The damper (7) merits particular attention. It is independent of the rest of the action being worked by a separate jack glued to each key. The felt is in the shape of a wedge. As the strings are double for each note, the point of the wedge penetrates between the two strings, damping them equally. When the damper is raised, it withdraws from both strings at once and falls back between them by its own weight.

and the obvious influence of the Clavichord on this piano, it would certainly appear to be earlier than 1750. However, the curator and restorer of the collection in the Germainsches Nationalmuseum in Germany regarded the compass, which extends to g^3, as important and thought 1750 too early. Mrs. Hollis on closer examination of the instrument found that the g appears to have been added later, although the f# looks original. Dr. van Meer in Nürnberg has now found an obscure reference to Gottlob Emanuel Rüfner indicating that he was living in Nürnberg as late as 1799, so considers that the piano could have been made as early as 1780 and as late as 1800. Mrs. Hollis also remarks that "our Herr Rüfner, or someone else who may have installed the piano in one of his Clavichord cases, was a poor craftsmen and/or not in touch with what was being done by others at the time. The Johann Söcher Square, on the other hand, is an example of a very sophisticated craftsmanship with the type of action developed by South German manufacturers totally independent of Gottfried Silbermann(106)."

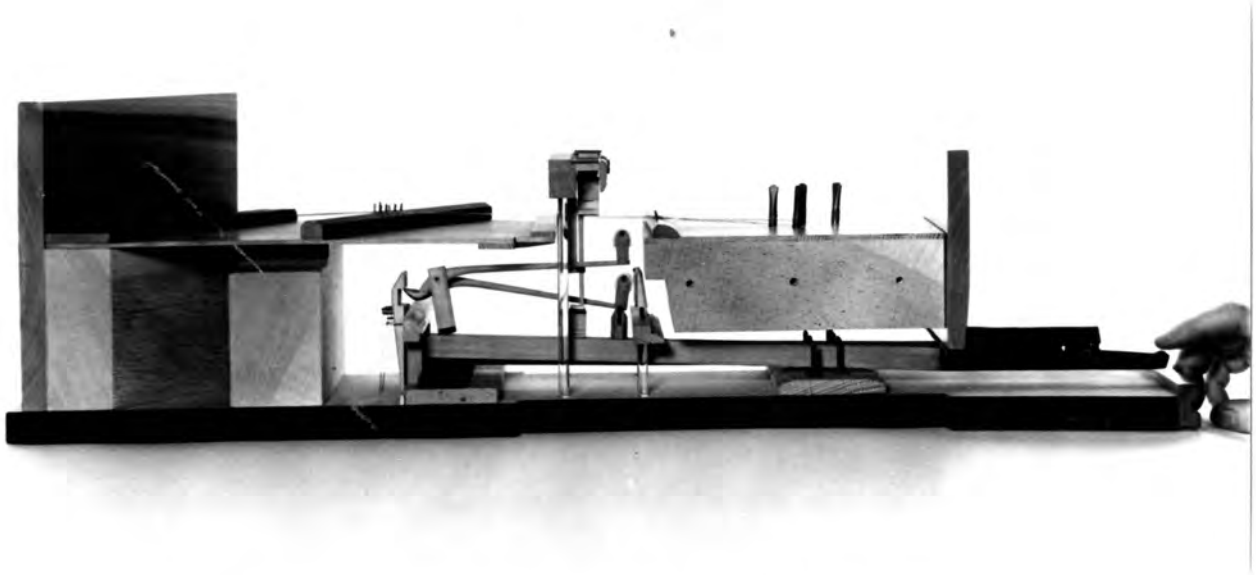
However the name on the piano case is Johann Gottlieb - who in the opinion of the writer was probably the Father, or some earlier relation, of Gottlob Emanuel. This would date the piano much earlier than 1780.

The Rüfner and Söcher pianofortes are examples of the kind of instruments being made in the middle of the 18th Century by a group of piano makers in Bavaria. While Gottfried Silbermann was working on Cristofori's principles of an expressive harpsichord these others were clearly aiming at a more powerful clavichord.

The fundamental difference in the two actions is that in the Cristofori pianos(Fig. 5) the hammer is pivoted, or hinged by leather or parchment to a rail forming part of the action frame, while in the so called 'German or Viennese action'(Fig. 8), the hammer is pivoted within a kapsel (sheath) fixed to the key, or is sometimes directly hinged to the key itself(107).

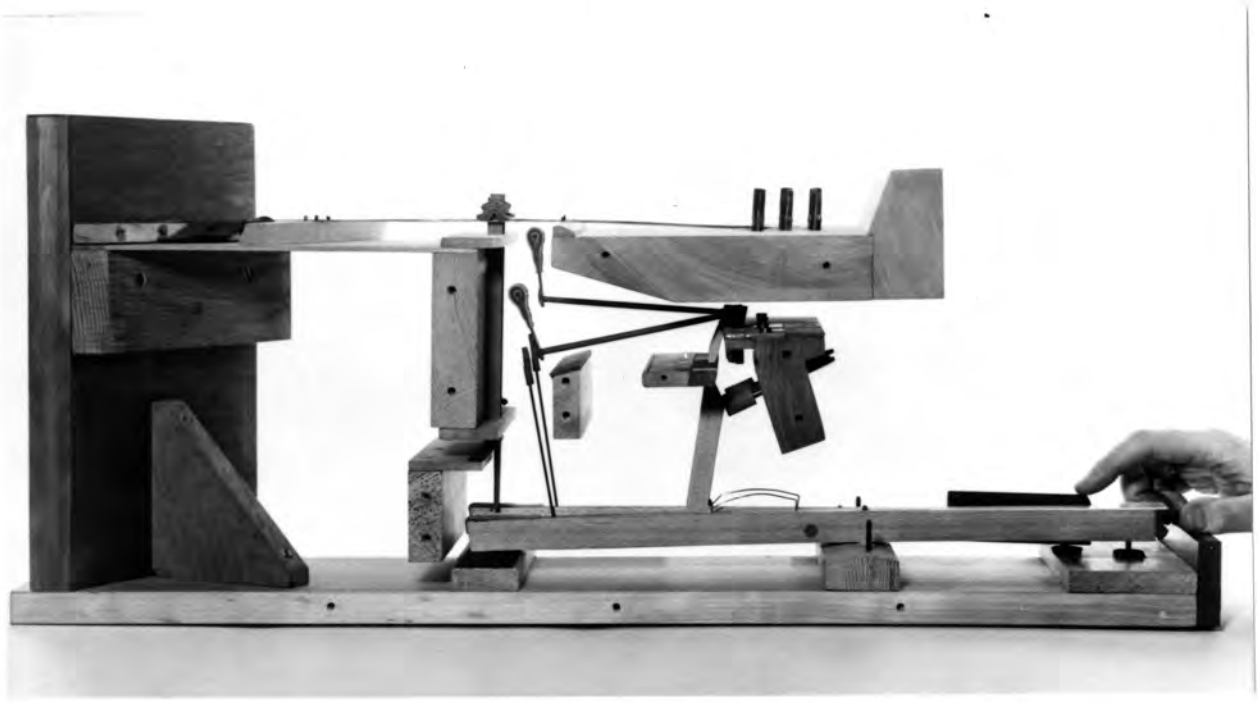
In 1750, Johann Andreas Stein settled in Augsburg(108). He was an organ builder trained in Strassburg by Johann Andreas Silbermann, a nephew of

Plate 34



Model of Viennese Piano Action - one hammer arrested just before final toss - other hammer at rest

Plate 35



Model of English Piano Action - one hammer arrested just before final toss - other hammer at rest

Models made and photographed by Smithsonian Institute, Washington, D.C.

the famous Gottfried. Stein built his pianos with the German action. Most of the literature on pianofortes gives the impression that both actions sprang from the same Silbermann workshop, but this in fact was not the case. Gottfried learnt his trade from his elder brother Andreas who lived in Strassburg. It was only when he established his own workshops in Freiburg of his native Saxony, that he met Hebenstreit and came across Cristofori's designs. Stein in the meantime was trained by another Andreas, the son of the elder brother, and there is no evidence that Cristofori's ideas were known to him. On the contrary, Stein, often credited with the invention of the German action, set to work to improve an action already in existence. He was responsible for the addition of an escapement and a check action which were to bring him fame and fortune in the next 20 years(Plate 34). In the latter half of the 18th Century Hass was building his large Clavichords and it is remarkably significant how closely the tone of the Stein piano and the Hass Clavichord resemble each other - "The Stein piano is perhaps only twice as loud as the Hass"(109).

Stein's pianos were extremely sensitive and tonally far superior to the others and the balance of the bass and treble was better matched - a problem still not wholly overcome in modern pianos. Stein's pianofortes were much sought after, and he supplied most of Southern Germany's wealthier musical society. Mozart who admired Stein's instruments says in a letter to his father written from Augsburg on October 17th, 1777:(110)

"I must now tell you about Stein's pianos - .... If I strike hard, whether I let my fingers rest on the notes or lift them the tone dies away at the same instant that it is heard. Strike the keys as I choose, the tone remains even, never either jarring or failing to sound. ..... The instruments have a feature of their own; they are supplied with a peculiar escapement. Not one in a hundred makers attends to this; but without it, it is impossible that a piano should not buzz and jar".

By 1780 the Viennese piano had reached perfection(111), and for

Fig. 9

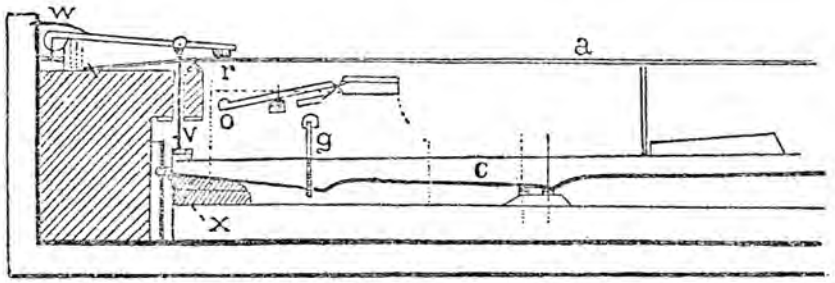
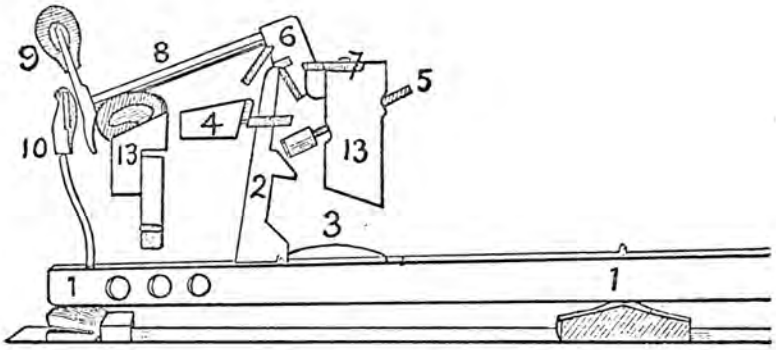


Fig. 25. Zumpe's First action, 1760. By courtesy of the Metropolitan Museum of Art, New York. From the *Handbook of Keyboard Instruments*.

a, string; *C*, key; g, jack; *O*, hammer; r, damper (Hebeldämpfer); *V*, damper stick; *W*, whalebone spring to facilitate the return of the damper and keep it pressed against the string; *X*, whalebone piece working in a groove serving to keep the key steady.

Fig. 10



DIRECT LEVER ACTION FOR GRAND PIANOS — BROADWOOD.

From "Piano Tuning and Allied Arts". W. B. White.

FIG. 4/1.—Direct lever action for Grand pianos. Broadwood. (String and damper not shown.)

1. Key
2. Jack
3. Jack spring
4. Rail and cushion limiting travel of Jack
5. Button and screw regulating escapement of hammer
6. Hammer-butt
7. Flange
8. Hammer-stem
9. Hammer
10. Back-check
13. Action-rail

Mozart's music is the ideal instrument. Unfortunately it cannot stand up to the dynamics of a modern string ensemble in pianoforte concertos. Although eventually virtuoso technique became too much for the light and shallow touch of this remarkably beautiful instrument, there were still some performers such as Backhaus who preferred it. Bösendorfer continued to make them as late as 1914(112).

The Stein piano(113) proved so popular, it was soon copied by Viennese makers, two of the best being Anton Walter and J. Wentsel Schanz. Mozart, unable to afford a Stein, bought a Walter while Haydn owned a Schanz which he preferred for its lighter action and gentler tone. After Andreas Stein died in 1792, his sons,and daughter Nannette, now married to J.A. Streicher, set up a business in Vienna. Nannette soon separated from her brothers and started the firm of Nannette Streicher, née Stein. Production increased to about 50 pianos a year, a substantial increase on her father's annual output of 17 to 18.

The seven years war resulted in many of the German workshops closing down and about 1756 twelve workmen came to England to look for employment(114). Some of them are said to have been from Gottfried Silbermann's workshops and one in particular, Johannes Zumpe, became very famous. He joined the harpsichord maker Tschudi and began building pianos. Soon he left to set up on his own and began to make the small compact square pianoforte which became so popular in England until about 1785(115). Zumpe used a much simpler mechanism than the Silbermann double action(Fig. 9). However, the convenient shape and reasonable price must have influenced people to buy,for the tone of the instrument was slight, not much louder than that of a large Clavichord. It will be remembered that the Clavichord was not a popular instrument in England at this time and the possibilities of being able to play expressively, on a reasonably priced instrument, may have been responsible for its enormous popularity. Zumpe's chief claim to fame was the

Plate 36

Square Piano by Johannes Zumpe; London 1767

$4\frac{1}{2}$ octaves, bicord, 2 hand stops (damper and lute). Trestle stand. One of the earliest surviving English pianos. (Victoria and Albert Museum).

introduction into his pianos of two to three levers (or hand stops) on the left of the keyboard which raised the dampers off the strings, one for the bass and the other for the treble, the third lever was a lute stop. (Plate 36)(Plate 117b) Many of his instruments were exported to France where it was considered the done thing to own an English pianoforte[116].

Zumpe's arrival in England, is significant, for after joining Shudi, the art of piano making began in earnest. A year later, 29 year old John Broadwood came from Scotland to work for Shudi[117]. This young carpenter waited eight years before he married Shudi's daughter, Barbara. He became a partner and eventually the owner of the firm. Broadwood & Sons has been famous in the pianoforte trade all through the history of the instrument's development, right up to the present day. Broadwood improved on the Zumpe squares by rearranging the works to allow more resonating space - provided brass wire dampers and was the inventor of the pedal mechanism to raise and lower the dampers. He also devised a soft pedal by applying a piece of cloth to a portion of the strings.

A Broadwood apprentice, Robert Stodart[118], helped by an instrument maker named Backers, worked out an action suitable to large harp shaped pianofortes. In 1777, by a simple and ingenious device he adapted the Cristofori, Silbermann and Zumpe ideas to produce the "English Grand" action, soon to become known simply as the "English Action" (Fig. 10, Plate 35). Stodart abolished the secondary lever. Instead he fitted the jack into a notch at the butt of the hammer in such a way as to allow it to escape after the stroke. The jack was hinged, an improvement on the fixed one by Zumpe, as it allowed increased velocity and control by the player. The hammers[119] were covered with buck skin and the strings, brass in the bass, steel in the treble, had three strings to a note throughout the entire range. A check caught the hammer on its rebound and a screw regulated the escapement. This action was improved as time went on but it retained its basic principles and was standard for many years.

Broadwoods went from strength to strength and from 1782 - 1802 turned out 7000 square and 1000 grand pianos - an average of 400 a year[120]. During this period Nannette Streicher in Austria was producing 50 instruments annually, while on the other hand Britain had a wealthy market and better manufacturing methods. Their instruments were better made and apart from the mechanism, such enterprising developments as pedals, extended keyboards, and later,metal bracings were all copied by the Viennese. The North Germans also tended to take English pianos for their models - in fact the word 'English' at that time had a 'cachet' which 'German' has to musicians today[121].

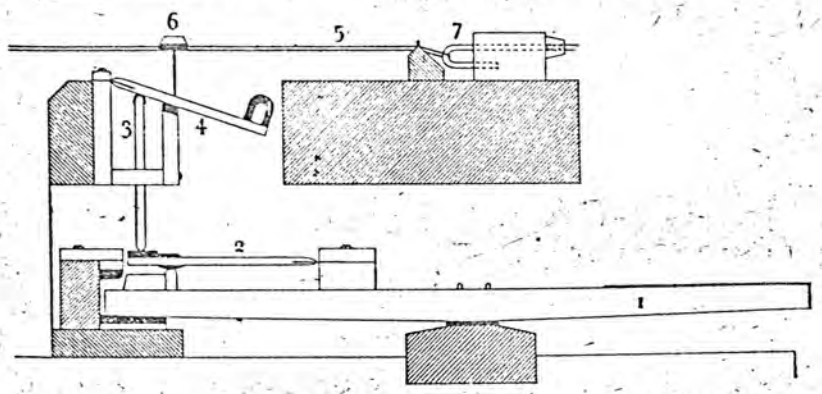
The piano made its first public appearance in England in 1767[122]. At Covent Garden Theatre Royal, a benefit concert was given for a Miss Brickler, who sang a favourite song from 'Judith'. She was accompanied by Mr. Dibdin ON A NEW INSTRUMENT CALLED THE PIANOFORTE.

The following year J.C. Bach introduced the piano as a solo instrument at a concert "for the benefit of Mr. Fischer"[123]. He used a Zumpe square pianoforte, which had cost him £50, and this concert started a social fashion of considerable snob value. J.C. Bach arrived in England in 1762 and soon became so famous as a teacher that he was invited to give lessons to the Queen[124]. He is certainly responsible for stimulating interest in the new instrument. He began writing music "for the harpsichord or pianoforte" , a new departure - previously where an instrument was specified it was always 'for the harpsichord'[125].

The piano had become the fashionable instrument[126], approved of by the Queen's own music master, and soon Zumpe was unable to keep up with the demand. By 1790 foreign musicians had flooded England in overwhelming numbers. Infant prodigies were common - the most famous being Hummell & Mozart (1764). Dussek was a popular concert pianist for 10 years, Haydn conducted his first orchestral concert from a piano in 1791 and he became a famous teacher although he was not a distinguished pianist. In 1794 a 6 octave grand was played by Dussek. Clementi and his pupil Cramer, aged 13,

Fig. 11

Taskin's action . 1787



1 Key
2 Intermediate lever
3 Jack
4 Hammer
5 String
6 Damper
7 Hook for tuning

When the key (1) is depressed, it rocks and raises the intermediate lever (2), which acts upon the jack (3), which impels the hammer (4) against the string (5). At the same time the damper (6), which is fixed obliquely to the shank of the hammer and normally rests against the string, is raised. When the key is released, the hammer falls again by its own weight and the damper again rests against the string.

played a "Duetto for two pianofortes" in 1784 - the first public performance of a duo-piano on record.

John Field and Daniel Steibelt were popular in 1793. By the end of the 18th Century London was the hub of the world's leading concert pianists.

Johann Andreas Stein visited Paris in 1758 and very probably exhibited some of his pianos(127). There appears to have been no demand for the new instrument until a Mademoiselle Lechantre gave a concert in 1768. J.C. Bach had given his London concert a few months earlier and, as anything English was considered good, it is not surprising that Zumpe's pianos exported to France at the end of the 60's proved so popular.

In 1776, Taskin, the famous harpsichord maker, built his first piano(Fig. 11) and played it before the Queen at a concert in the Tuilleries. Balbastre,(128) an organist of some repute said to him: "You are wasting your time; never will this newcomer, this bourgeois instrument, dethrone the majestic harpsichord", while Voltaire writing in 1774 referred to the piano as "that Coppersmith's instrument"(129).

Canon Trouflaut wrote in 1774 : "If you glance attentively at its construction its complexity terrifies. If the treble is charming the bass hard, muffled and false, sickens our French ears"; and in 1785 the Encyclopèdie (Art of the Instrument Maker) devotes much space to the construction of the harpsichord and organ but the only reference to the Pianoforte reads: "Forte-piano or hammer-harpsichord : a small harpsichord of an oblong form, in which each finger key raises a kind of hammer of cardboard covered with leather, which strikes against two unison strings or a single string"(130).

In spite of all such derogatory remarks the manufacture of pianos continued.

Sebastian Erard arrived in Paris from Strassburg in 1768 and worked for two different harpsichord makers. After constructing a harpsichord

with a most sensitive touch, his reputation was established, and at the invitation of the Duchesse de Villeroi he set up his workshops in her Chateau and there he built his first pianoforte(131). His first attempts were copies of Zumpe's, still the most favoured instrument, but his own models were excellent and soon became so famous that he was inundated with orders from the nobility. Jean Baptiste, his brother, was sent for in order to help cope with the overwhelming influx of orders. Luthiers, local importers of pianos, were directly affected by Erard's success(132). They were so concerned by the adverse impact it had on their trade, that they seized the Erard factory on the pretext that it did not belong to the Corporation of Fanmakers (a kind of craftsman's Union). Luckily Sebastian Erard managed to avoid being prosecuted by obtaining a brevet (licence) from Louis XVI(133).

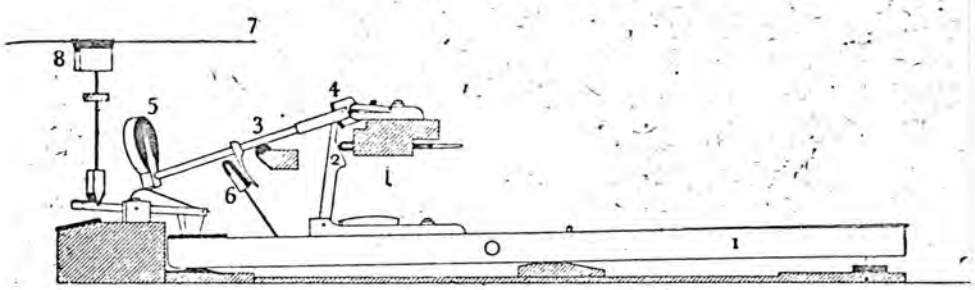
This remarkable inventor also constructed a two manual combination of organ and piano.(134) Designed for the Queen, whose voice had a limited range, he made it a transposing instrument. By moving the keyboards sideways it was possible to play up or down a minor third.

When the revolution broke out, Erard opened a manufactury in London where he operated very successfully. At this time (1780) he devised the so called double action harp which allows one to play in all keys. As a lady's instrument the harp was a serious domestic rival to the pianoforte for about 30 years.(135)

In France the revolution was the death knell of the harpsichord. On May 3rd, 1794, the Committee of Public Safety commissioned the National Institute of Music to collect the best musical instruments from the houses of the émigrés and the condemned. Antonio Bruni started collecting and listing these instruments immediately and finished on August 18, 1795(136). He visited 111 houses of which only 78 had keyboard instruments. Of these, 63 were harpsichords and 64 were pianofortes. Eleven of the harpsichords were Ruckers, at least 150 years old, and were probably valued as antiques. Another eleven

Fig. 12

Erard's single escapement action . 1795 improved 1816



1 Key
2 Intermediate lever forming the escapement
3 Sleeve of the hammer
4 Hammer butt
5 Hammer head
6 Check
7 String
8 Damper

When the key (1) is depressed, it raises the lever (2), which, acting on the butt (4), causes the hammer (5) to strike the string (7). Immediately afterwards the head of the lever escapes from the butt, slipping in a groove.

The distance between the hammer head and the string, thus depends directly upon how far the key is pressed down. When the key is released progressively, the hammer drops away from the string, but also progressively. When the key is completely released, the hammer falls back into the position sketched, after having brushed against the hammer check (6), which acts as a sort of brake.

The damper (8), which, at rest, is kept against the string by means of a spring, drops when the key is pushed down.

were 40 to 170 years old. Thirty two houses had harpsichords only, while the other 46 had pianos as well. There were twenty French made pianos - twelve by Erard. The other forty four were English made, some 16 by Zumpe the rest by various other makers.

The instruments were housed in the old offices of the Menus-Plaisirs du Roi and when, years later the Conservatoire decided to form a museum of the confiscated instruments, not one was to be found. Loesser[137] quotes examples of various high ranking officials who are known to have helped themselves to instruments - evidently taking literally the Revolutionary Decree declaring them 'property of the nation'. Closson[138], on the other hand, maintains that the hard winter of 1816 caused people to break up the instruments for firewood'. Surprisingly enough 94 instruments have been found in museums and private collections in Europe and America - perhaps Loesser and Closson are both right'.

After the revolution, a Statute in October 1793[139], prohibited anything made in Britain to be allowed on French soil. People were expected to declare the possession of any such goods and in 1796 British imports were forbidden. The English piano had had its day. In the same year Erard returned to Paris. He constructed large wing shaped grands with the new escapement device which he had brought with him from London[Fig.12] - the first grand pianos to be known in France[140]. However, in 1801, when Napoleon ordered a piano, Erard made it with the Viennese action[141], and as was customary in Viennese pianos at that time, he included the una corda, sustaining, bassoon, celeste pianissimo and 'Janizary Music' pedals. (See Page 55)

The wing shaped pianoforte was a symbol of the new regime. Compared with the old squares the elegance of the grand was highly esteemed and it was the only piano favoured by the bourgeoisie.

In 1795 there were still six professors of harpsichord at the Conservatoire de Paris. A prize for the best harpsichord performance was

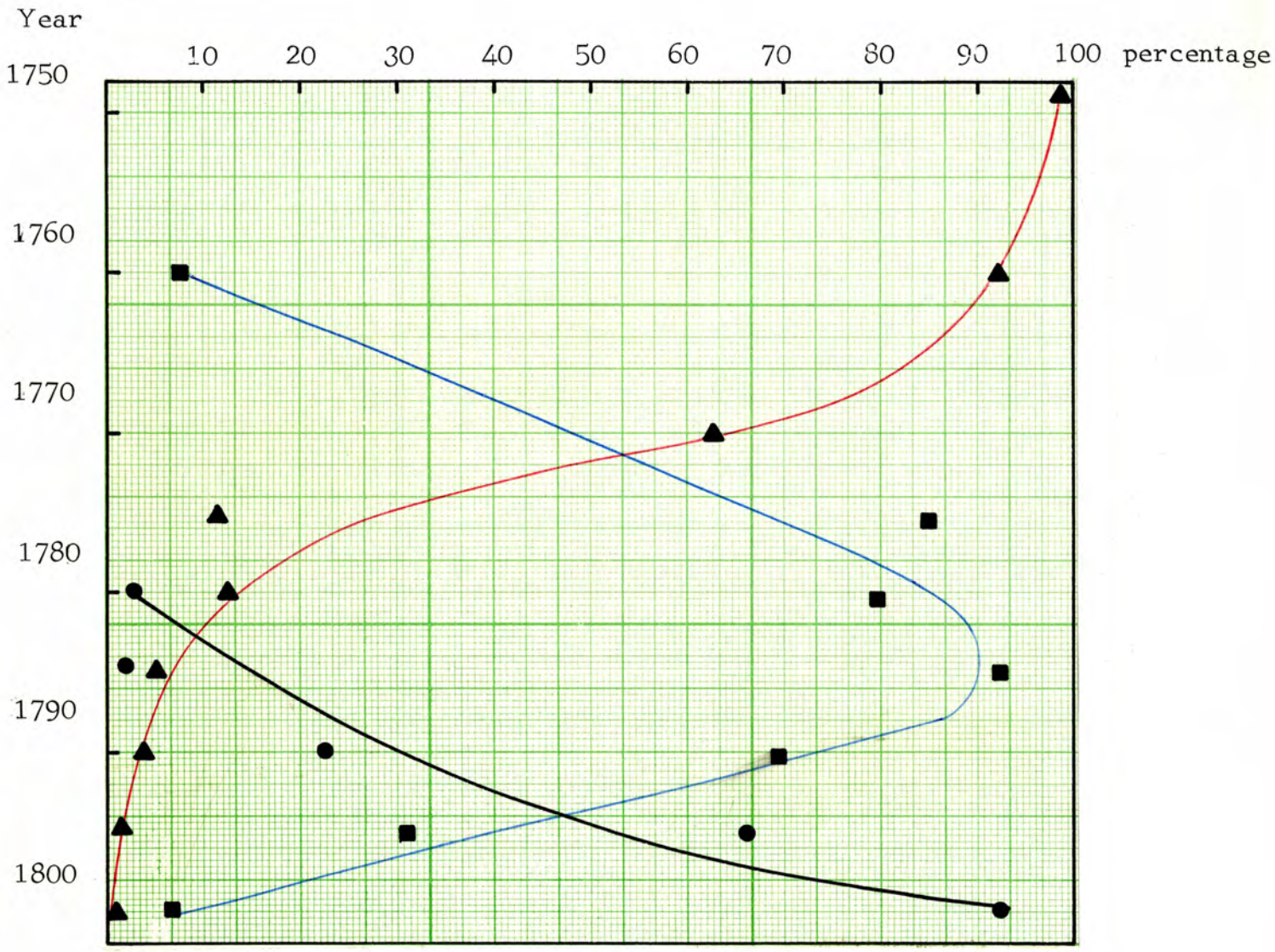
awarded for the last time in 1798. The following year a professor of pianoforte was appointed and the prize given to the best pianist[142]. In 1804 the Conservatoire published a Méthode de pianoforte and in the preface states: "The Fortepiano is the most widely cultivated of all musical instruments. It has obtained preference over the harpsichord because it gives forth its sounds with whatever degree of force or gentleness one wishes, ..., something for which one could look in vain in the one it has replaced"[143].

In England, by 1794, the term grand pianoforte had been in use for a few years. No one could match Broadwood's pianos for strength, sonority and range. "The harpsichord had gone into a dignified decline throughout the eighties"[144]. After 1793 Shudi and Broadwood ceased making them, but kept a few on hand for special occasions such as the annual performance of the King's Birthday Ode by the King's band at St. James Palace. On June 4, 1795 the harpsichord was sent, as usual, but was used for the rehearsal only - a grand piano taking its place at the actual performance. This, according to the Broadwood records, was the harpsichord's ignominious public farewell. In the same year, Shudi's name disappeared from the firm and Broadwood and Son became the sole owners. Jacob Kirkman seems to have made the last recorded harpsichord as late as 1809.

Clearly the harpsichord was the preferred instrument until the middle of the 18th Century. For the next fifty years, rivalry between the two instruments existed but despite the resistence to the pianoforte, the newcomer had triumphed by the end of the Century[145].

Harpsichord players had difficulty adjusting to the technique required to play the piano. Having to consider the speed of depression for every note was quite contrary to the touch employed in every other keyboard instrument, except the Clavichord. However, even the Clavichord was different. The clinging to the key and slight rocking movement which produced the "bebung", so characteristic of the Clavichord, was impossible on the piano, although this habit of squeezing the keys persists in many players to this day.

Fig. 13



The graph has been compiled from Music published for specified instruments in England 1750 - 1800.

Solo harpsichord
Solo pianoforte
Solo harpsichord or pianoforte.

During the years of transition, many composers inscribed "for harpsichord or pianoforte" on the title pages of their works - a convenient expedient to satisfy both camps. It is significant, however, that by 1800 composers were specifying "for pianoforte only". Beethoven wrote his first piano concerto in 1795 and his first solo sonatas for pianoforte only, Op. 14 Nos. 1 and 2, were composed in 1799. The first eight sonatas are written for pianoforte or harpsichord(146).

A graph(Fig. 13) compiled from data of music published in England from 1750 - 1800, shows the change in popularity from harpsichord to pianoforte in 50 years.(147)

Although the piano had taken over from the harpsichord, it was still not regarded as an adequate solo instrument for an entire concert. It was customary to incorporate the orchestra in concerted items. However, in 1837, Moscheles took the unusual step of dispensing with the orchestra but still felt it was necessary to vary the programme by including some singing and harpsichord items. A writer in the "Musical World" was doubtful of its success as he "thought a whole evening of pianoforte would be found wearying"(148). Contrary to expectations, the concert proved a success. This may have been partly due to the fact that Moscheles acted the various characters of the style of music he played. For example, the Cat's Fugue by Scarlatti " ... was received with considerable interest by the audience. The cautious manner in which the performer introduced the subject was like a piece of good acting, and indeed it excited no small amusement amongst the company. It was encored!"

So complete was the swing from harpsichord to pianoforte that when Moscheles was giving his Soirées Musicales in England in 1837, he had the greatest difficulty in finding a harpsichord on which to perform the "lessons" of Scarlatti, Handel and Bach(149).

CHAPTER V

THE PIANOFORTE

Plate 36 a

Broadwood Grand given to Beethoven 1818.

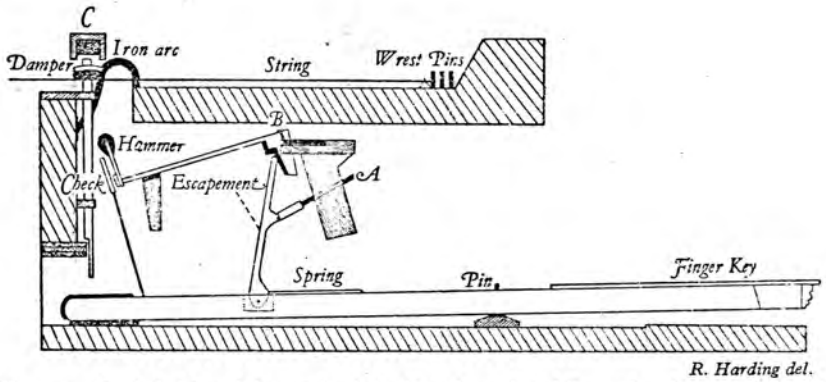


Fig. 43. English Grand Action by John Broadwood and Sons, dated 1795 (formerly in the possession of Messrs Miller and Son, Cambridge).

A, screw to regulate the play of the escapement or hopper; *B*, screw binding the hammer to a wire pivot: by unscrewing it the hammer can be removed; *C*, ruler or rail to regulate the action of the dampers (a relic of the harpsichord ruler to prevent the jacks from jumping out). The check catches and holds the hammer after it has fallen from the strings, to prevent it from rebounding against them. The check acts only so long as the key is pressed down.

CHAPTER V

THE PIANOFORTE

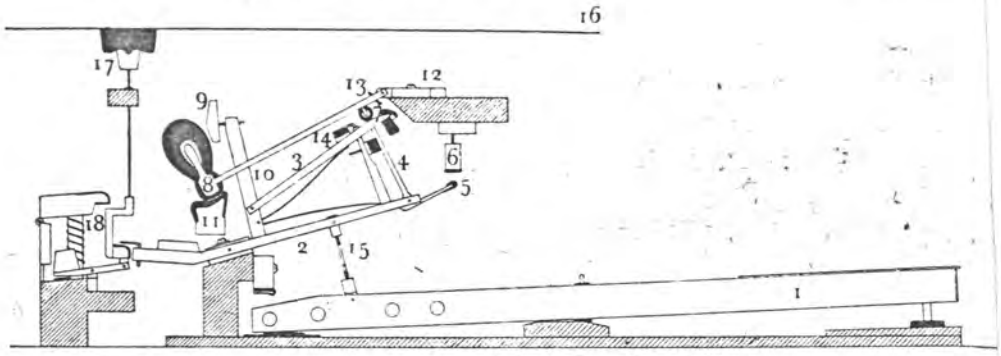
By 1800 the pianoforte had ousted its rival the harpsichord and was the accepted solo stringed keyboard instrument. As early as 1780 the Viennese pianoforte had reached perfection whereas the English action continued to improve substantially until about 1850(151).

Two distinct schools of pianoforte playing had developed as a result of the different types of piano action available in 1824. The English action(Plate 35) with its fullness of tone, had a heavier touch than its Viennese counterpart. The tone of the latter was poor in comparison, although the quality was sweeter and its very light touch gave rise to a fluent and rapid technique. The Viennese School is associated with Haydn, Weber, Mozart and his pupils Hummel and Czerny. The English School founded by Clementi culminated in Dussek, Field and Cramer. Clementi's Sonata No.2 is the first piece of music written which is suitable for the piano and his Gradus ad Parnassum the first instruction book(152). Hummel, a brilliant pianist, says in his pianoforte method of 1827: "The German action(Plate 34) can be played easily by the most delicate fingers. It sounds clearly and promptly ... As for instruments with the English action, it is fair to say that they are solidly built and produce a great volume of sound; but they are not so voluble as the German pianos since the touch is heavier and, the keys going down further, a certain time is required for the escapement when one wishes to repeat a note"(153).

Gradually a new school of playing emerged, a combination of cantabile and bravura. Such virtuosos as Thalberg, Kalkbrenner,

Fig. 15

Erard's double escapement action . 1822



When the key (1) is pushed down, it raises the intermediate lever (2) by means of a wormed shaft (15), which regulates the course of the hammer. The intermediate lever acts simultaneously upon the repetition lever (3) and the hopper or escapement (4).

The repetition lever acts upon the butt (7) and jerks the hammer (8) against the string (16), while the hopper 'escapes' from the butt, its spur (5) having struck against the escapement button (6).

When the key is not completely released, the hammer is held by the check (9), in this way falling back from the string only a fraction of an inch which permits quick repetition of a note. If, on the contrary, the key is completely released, the hammer falls back to its original position (11).

The damper (17) in repose is held against the string by a counter-weight. It releases the string when the key is depressed and rocks the intermediate lever. Independently of this separate damper action, all the dampers can be raised at once by the sustaining pedal, the spring of which is shown in the sketch (18).

1 Key
2 Intermediate lever
3 Repetition lever
4 Hopper or escapement
5 Hopper spur
6 Escapement button
7 Hammer butt
8 Hammer head
9 Check
10 Shank of hammer check
11 Hammer rest
12 Hammer rail
13 'T' of the double-escapement
14 Screw to regulate the double-escapement
15 Screw to regulate the arc described by the hamm
16 String
17 Damper
18 Pedal spring

Plates 37 a & b

Action of the Erard Grand at Kingswood College
showing hammer in rest position and with the key depressed.

Gosschalk and Liszt represent the type of pianists where technique often overshadowed musical intent. These pianists tended to perform their own compositions which required the sonority of the English action plus the light easy touch of the Viennese pianos[154]. The fashion for playing orchestral transcriptions on the piano produced music full of figures with repeated notes in imitation of violin tremolandos - a possibility on Viennese pianos as long as no rhythmical accent was needed[155]. Manufacturers had tried unsuccessfully to unite the good qualities of the two actions in the so called Anglo-German action. The square piano of Johann Söcher has this action[Fig. 7a) (156]. Somehow, a way had to be found to keep the hammer nearer to the string in order to get a controlled restrike.

The answer was provided by Sebastian Erard who spent thirteen years perfecting his 'double escapement' action, patented by his nephew in 1821[157]. Its virtue lay in its lightness, rapidity and responsiveness, all achieved without loss of firmness or strength[(Plates 37a & b)(Fig.15)]. The 'double escapement', usually referred to as the "repetition action", was approved by Moscheles who had kept an eye on its progress from the first. After trying it out he reported[158] "The quicker action of the hammers seems to me so important that I prohpesy a new era in the manufacture of pianofortes". He was right. It was recognised and used by all the leading manufacturers and has had a far reaching effect on modern piano technique. Harding[159] considers that "without this action the art of piano playing could not have attained the state of perfection to which it has now risen; in fact we may say that the modern piano technique was built upon it".

The piano industry in and around London at this period, was without doubt the most prolific in the world[160]. Even the famous Erard family had factories in the City from 1786 - 1933 and Pape worked in New Bond Street

Plate 38

Illustration of the Broken Belly Bridge
invented by Broadwood in 1788

Broadwood Grand - owned by Mr. M. Rushmere,
Grahamstown.

from 1839 until 1846. By 1850 the sales figures for the English Broadwood factory were 2,300 pianos a year and the entire British output was 23,000. Although French pianos were highly regarded, the total annual production in France was but a third of the British. In Vienna in 1845, there were 108 pianoforte makers but even the largest of these only managed to turn out 200 instruments a year.

In the second quarter of the 19th Century there was a tremendous increase in the inventions relating to the pianoforte. Rosamund Harding[161] records 1,098 patents granted between 1825 and 1851. Compared with the 264 patents of the hundred years up until 1825, this indicates the enormous interest displayed in the pianoforte during that period. Most of these inventions were abandoned, but mention should be made of those which were retained and still feature in the modern piano.

Tone quality was a prime consideration and it was known that the striking place of a string had an effect on the tone produced. In early stringed keyboard instruments, such as Clavichords and Harpsichords, there appears to be no uniform or fixed rule, although it was known by harpsichord makers that varying tone quality could be obtained by plucking a string in different places. This knowledge was responsible for the lute stop of the 18th Century. Harding[162] points out that the striking place affects the tone, since the hammer abolishes the node at the striking place and with it the particle belonging to it throughout the string.

In about 1788, John Broadwood, aided by two scientists, shortened the bass strings by dividing the belly bridge, (i.e. the bridge which is glued to the soundboard)(Plate 38). This shortened the excessive length of the bass strings and permitted the establishment of a striking place proportionate to the length of the string[163]. Before this time it was customary to use the single belly bridge, copied from the harpsichord(Plate 26a - harpsichord, Plate 44 - square piano). He adopted 1/9 of the vibrating length of the string as his

Plate 39

Erard Grand Piano at Kingswood College, Grahamstown.

6½ octaves $_{,,,}$C - F$''''$. Lowest 1½ octaves bi-strung - all the rest tri-strung. Vertically strung with six metal bracing bars. Wooden frame with bars screwed into wrest plank and metal hitch pin plate. Agraffes are used on all the strings. The pressure bar over the treble 2½ octaves is probably an early attempt at the future harmonic bar for added sonority. Brass plate on the lid of the instrument states:- "constructed 1829 - repaired 1881 - formerly the property of Mr. John Hullah. Played upon by Mendelssohn, Moscheles, Sterndale Bennett, John Parry, Benedict (Sir Julius, pupil of Weber) Charles Hallè, Sullivan and others".

Plate 40

Grand Pianoforte by William Harper in Settlers' Museum, Grahamstown.

(Harper worked at 49 Red Lion Street, London, 1834 - 1887).

A form of the 'Capo Tasto' bar (invented by Bord in 1843) is illustrated in the picture. The piano has a wood frame - wood wrest plank - metal hitch pin plate (with decorative cut outs to allow the sound to escape freely) and five tension bars. $6\frac{1}{2}$ octaves - tri-strung, except for thirteen bass notes which are bi-strung. The hammers are leather covered and the instrument has under dampers.

Plate 41

Grand Piano by Ernst Kaps, Dresden - 1872.
owned by Mr. Albert Honey, Grahamstown.

Illustration of a heavy pressure bar in the middle and upper range. It is bolted through the soundboard. Agraffes are used for the lower strings. The instrument has a composite steel frame with four metal transverse bars, a metal hitch pin plate and a wooden wrest plate.

striking place and although the actual proportion is not necessarily the same in all pianos, the division of the belly bridge was universally adopted, allowing, as far as possible, for equal striking points on all strings.

Another problem of the early piano builders was the necessary opening in the soundboard to allow the hammers to reach the strings. This was believed to reduce a good deal of the resonance. The upward striking action also had the disconcerting effect of causing the strings to be struck up and off the bridges. In 1808, Sebastian Erard provided a solution to the latter difficulty by introducing a metal stud, one to a note, with as many holes perforating it as there were unison strings. This stud he called an 'Agraffe' and each one was screwed into the wrest plank behind the tuning pins, so that each string could pass through a separate hole(164) (Fig. 16) (Plate 39)(Plate 46)

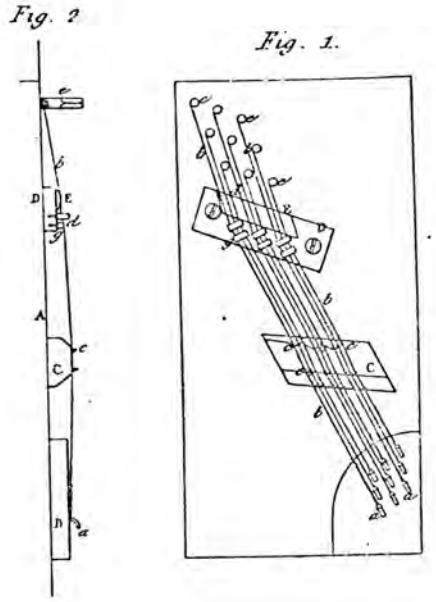
In 1838 Pierre Erard produced a harmonic bar for the upper treble notes. This metal bridge through which the strings passed was used for the same purpose as the Agraffe, but added more support, thus giving greater sonority where it was needed(165). The name 'Harmonic Bar' suggests added resonance, the lack of which is the main problem in the short thin top strings of the piano(Plate 39)(Plate 46)

In 1843 Antoine Bord produced the 'Capo Tasto Bar'. This metal bar was screwed across the strings to form a bridge on the wrest plank. Its function was the same as the Agraffe, but it also added to the rigidity of the instrument which in turn increased the volume and quality of the tone (see Plates 40 & 41).

Some combination of these three inventions is always used in modern pianofortes.

The desire to improve the sonority of the instrument by eliminating the gap in the soundboard caused piano makers in Vienna, Germany, England, America and France to experiment with down striking actions. Nanette Streicher, in Vienna, produced such a piano in 1825 and it is said to have

Fig. 16.



Agraffe by Jelmini 1842 - from the patent.

A soundboard.
B Hitch pin plate.
C ordinary bridge.
D wrest pin bridge.

The strings b,b, fixed to the points a and a, go round the points c,c of the ordinary bridge C - pass over the rounded bridge g,g and then enter the agraffe d,d and are directed by the round bridge E towards the wrest pins e.e.

inspired Pape's patent of 1839. This became famous enough to be called the French Grand Action.(166) Manufacturers throughout Europe and America were influenced by Pape's idea of using a spring to return the hammer. The type of down striking action in which the hammer is returned by weight is rare, although Kollmann in 1825 patented and built a piano on such a design, and gave two successful concerts to promote it(167).

In spite of the fact that it was claimed that the solidity and tone of the instrument was improved by not having an opening in the soundboard, this method has not survived. The reason was that the weights or springs used to return the hammer to its place of rest created a difficult mechanical operation, and this, combined with the problems of a workable repetition action, seem to have prevented its development.

Yet another means of overcoming the opening in the soundboard was to place the strings below the soundboard(168). However, a broken string necessitated the removal of the entire soundboard - an occurrence so frequent that it was not unusual for Liszt to have two pianos on the stage, so that one could be repaired while he performed on the other.

The objections to the opening in the soundboard became obsolete with the invention of the iron frame. (see Page 62)

Strings on early 19th Century pianos were much thinner than those in use today. The lowest string was about as thick as the highest bass note in a modern upright piano and the tensile strength was not sufficient to withstand pianists' demands(169). Reicha, a Czech composer, describes an occasion when he turned the pages for Beethoven at a performance of a Mozart concerto:(170) "At every moment the strings of the instrument kept snapping and jumping into the air, while the hammers got entangled in the broken strings. Beethoven, wishing to finish the piece at all cost, begged me to disengage the hammers and remove the broken strings whenever he paused. My job was harder than his, for I had constantly to jump to the

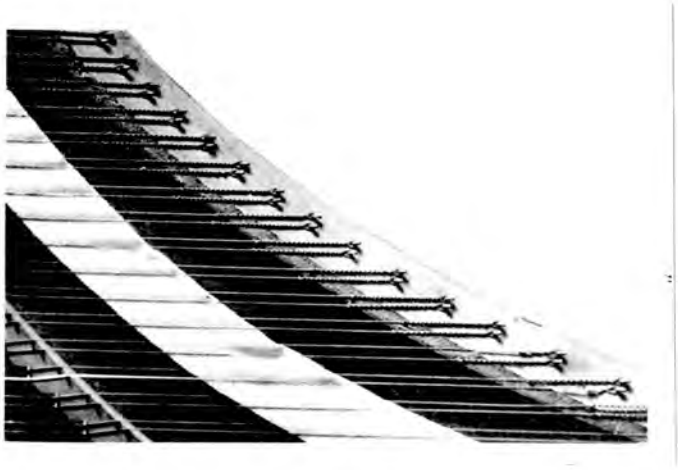
right, to the left, to run around the piano to get to all the troubles". Even the Broadwood 'Grand' - the gift of the English firm to Beethoven in 1818 (Plate 36a) (Fig.14) Appendix III was a wreck in 1824. Stumff, a London harpsichord maker on a visit to the Master says "What a spectacle offered itself to my view. There was no sound left in the treble and broken strings were mixed up like a thornbush in a gale". Beethoven was never satisfied with the pianos available to him and constantly urged and worked with his friend Streicher to improve the instrument. He had a special preference for Streicher's pianos and 90% of his piano music is written for Viennese instruments. When he was twenty six years old, in a letter to J.A. Streicher, he wrote "the piano is still the least studied and developed of all instruments; one often thinks that one is merely listening to a harp". Beethoven continued to express his concern about his instruments even after he could no longer hear them. As late as 1826, a year before his death, he is still saying that the piano "is and remains an inadequate instrument".

It is frequently stated in historial accounts of the piano that Beethoven preferred the more powerful Broadwood with its English action to the Viennese type of instrument. A recent re-examination of the evidence by W.S. Newman[171] shows that the Broadwood reached Beethoven after he'd written nine tenths of his piano music and was almost totally deaf. Furthermore his music had already exceeded the six octave range of the Broadwood. (See Appendix II). Liszt, playing in Paris in 1824, had to stop several times so that a broken string could be removed or replaced[172].

Although Beethoven and Liszt were known for their 'attacks' on the pianoforte, there was a universal need and desire for greater sonority, which required the strength of modern tempered steel. In 1810, Pleyel patented the idea of tempered steel wire and Broadwoods made use of it in 1815. However, it was not until 1826 that Pape applied it extensively, after which it became the universal practice in piano making[173].

Webster, in Birmingham, brought out his cast steel wire in 1834. By

Fig. 17a



The Old Method of Stringing Pianofortes

Each string has its end twisted into an eye for the purpose of looping or "hitching" it over the hitch pin.

Fig. 17b

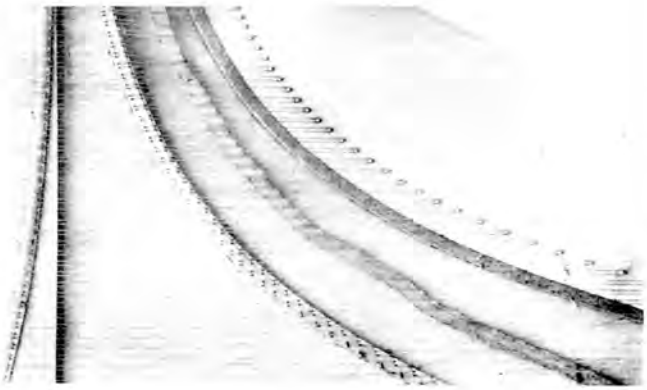


Illustration of Stewart's patent for improved stringing.

Instead of two strings each looped over its own hitch pin, (as above) one string double the length is passed round a single hitch pin. The loose ends are fastened to two wrest pins.

1843 the best brass strings were also being made in Birmingham, and the next best in Vienna. The coiling of wire strings with copper had been used early in the Century.

The invention of cast steel wire had a beneficial effect on the major problem of keeping pianos in tune, and in fact Hipkins[174] claims that the modern piano was made possible by the great improvement in piano wire. In all the early instruments every single wire was attached by means of an eye twisted at one end, over its own hitch pin, and the loose end attached to the wrest, or tuning pin[Fig. 17a]. In 1827, however, James Stewart of London found that it was possible to use one wire to serve as two strings[175] by fastening the two ends to two separate wrest pins, and looping it over a hitch pin at the opposite side[Fig.17b]. When the string is drawn to a certain degree of tension, the friction on the hitch pin prevents any alteration of the pitch from one side to the other. Stewart stated that where there were three wires to a unison it was necessary to make the third unison string continue to the first tuning pin of the next note, which forms the first unison of that note. The only disadvantage to this system is that if a string in the higher three unison string section breaks, it destroys two notes. However, this is a rare occurrence with modern wires. The weakness of the old method was that the twisted eye was liable to break, and also as the three separate unison strings were not necessarily of uniform length or tension, this was liable to cause tuning problems in changing temperatures. In spite of later inventions, Stewart's method is the universally accepted one still in use at the present time.

With increased string tension it was possible to have heavier hammers, and endless inventions to find a suitable covering are recorded. The tone produced by the traditional leather covered hammers tended to become dry and sharp as the leather became brittle and hard with age. Materials[176] such as cloth, tinder, sponge, sheepswool mixed with rabbits hair, cloth over

Plate 42

Square Pianoforte by John Broadwood and Sons (No.62813) - 1855
in Settlers' Museum, Grahamstown.

The picture shows an application of Thom and Allen's patent to a square pianoforte. The iron tubular brace is 67" in length and has a diameter of 1".

leather, leather over wool, India rubber and even hammer heads covered with leather, which could be loosened or tightened to achieve the required tone, were some of the many experiments which came to nothing. In Germany deer skin was being used as late as 1856 but Henri Pape's felt covered hammer, patented in 1826, gradually became accepted as the best, and today is standard material for all modern piano hammer heads.

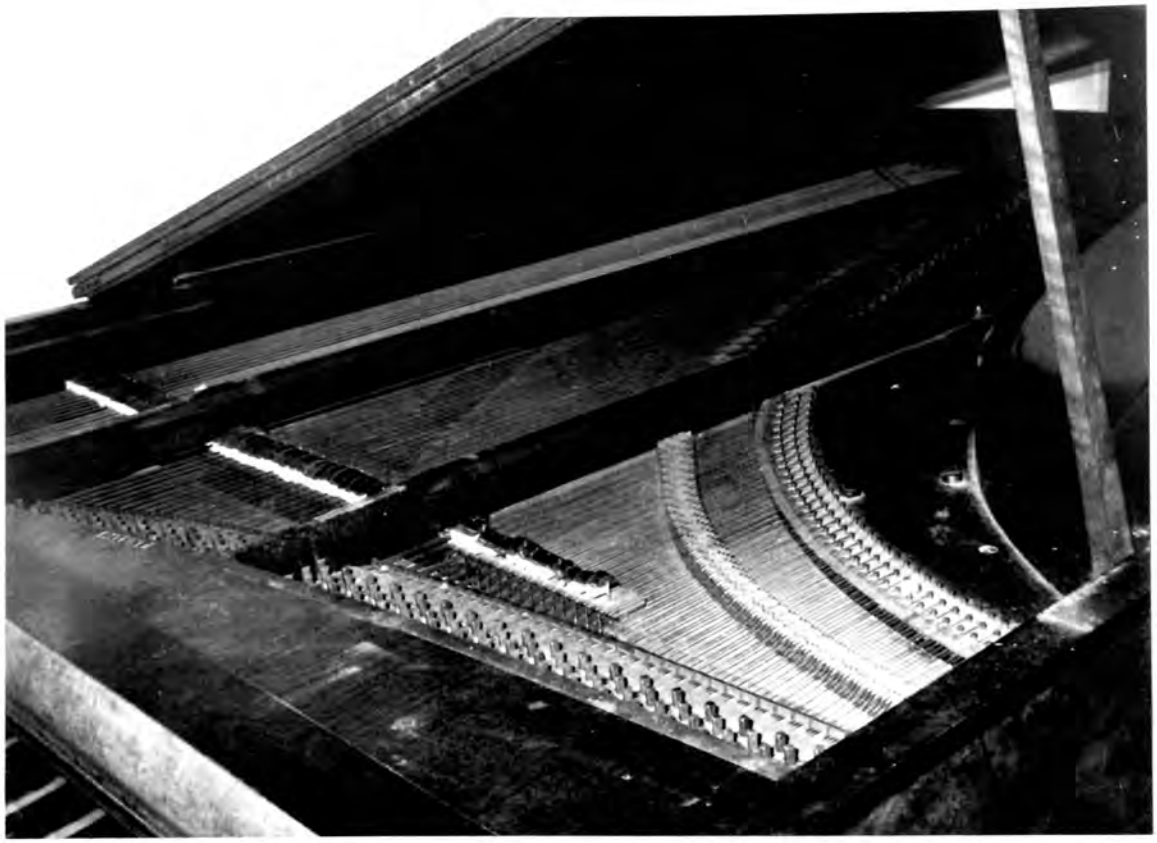
With the increased strain of heavier strings it became more and more necessary to brace the frame of the instrument. Piano makers were reluctant to use metal.(177) They considered that wood was necessary for good tone, but wooden braces proved clumsy and heavy. Cross stringing helped to equalise the tension on the frame and keep the instrument in tune.(Plate 42)

At that time there was a trend towards an increase of pitch to create extra brilliance and to match similar developments in wind instruments. Mozart's A was 421 vibrations per second while the London Philharmonic Society in 1828 was tuning A to 435 v.p.s.(178) This, plus the need for additional keyboard length forced the reluctant piano makers to use metal braces.

The old idea that metal spoilt the tone died hard, and although Stodart built metal arches(179) across from the wrest plank to the soundboard in his grand pianofortes as early as 1788, and Broadwood applied tension bars to the treble of grand pianofortes in 1808, it was not till the 1820's that the use of metal became universally incorporated in varying forms.

Initially two types of metal bracing were used. These were compensating tubes and metallic bars. In 1820 Thom and Allen invented a compensation frame(180), designed to combat the fluctuations in pitch caused by changes in atmospheric temperature. Parallel tubes 3/4" in diameter were fixed above the strings, brass over brass, and steel above the steel strings. This caused the whole frame to coincide with any fluctuations in temperature and the result was improved tone and more constant pitch(Plate 42).

Plate 43



Grand Piano by Broadwood and Sons (No. 7501) - 1871
in possession of Mr. M. Rushmere of Grahamstown.

The picture illustrates the metal bracing bars used by Broadwood from 1821. They are bolted through the soundboard to supporting rods underneath. The instrument has a composite metal frame, vertical stringing and agraffes for all the strings.

Plate 44

Square Pianoforte by John Broadwood and Sons
(Makers to their Majesties and the Princesses) (1830 - 1837).

The gilded metal hitch-pin plate is perforated to allow the sound to escape freely, and is strengthened by a transverse suspension bar bolted to the wrest-pin block. The tubular brace is also a strengthening device. The instrument has a six octave compass, and crank-dampers. The fretwork decoration is brass.

Plate 45

Square Pianoforte by John Broadwood and Sons - 1842
(Manufacturers to her Majesty) (No 54883)

Illustration of a metal hitch-pin plate - strengthened with a suspension bar bolted to the wrest-pin block.

(Settlers' Museum, Grahamstown).

Plate 46

Grand Pianoforte by Erard - 1829 - Kingswood College, Grahamstown.

Illustrating longitudinal steel bracing bars (patented 1824) which are bolted through apertures in the soundboard (patented 1825).

Plate 47

Grand Pianoforte by Broadwood
in the possession of Mrs. B.P. Palmer, Grahamstown.

Illustrates the special concert grand iron framing with diagonal tension bar and transverse suspension bar.

The following year Broadwood[181] was using three to five metal bars in grand pianos[Plate 43] and also incorporating the first metal hitch pin plate to square pianos from that year onwards[Plates 44 & 45].

In 1824, Erard produced "steel bracing bars which extended longitudinally over the strings" and in 1825 patented "a method for fixing iron bars to the wooden braces of the pianoforte by means of bolts passing through apertures cut to receive them in the soundboard"[Plate 46] [182].

Wrest pin blocks had to be strengthened as the increased string tensions tended to loosen the pins in their sockets. Various solid metal wrest pin blocks were invented and patented between 1823 and 1850[183]. However, a combination of wood and metal was found to be more effective and is the one in use today.

Owing to the increasing string tension, the solid metal bars were preferred to the compensation tubes. This led to the important step of uniting the various metal parts into a single casting.

Alpheus Babcock, in Boston, was responsible for the first complete cast iron frame, with hitch pin block, in one casing, for a square pianoforte in 1825[184]. This invention was not taken seriously at first. Twenty six years later at the Great Exhibition of 1851, the only countries to exhibit complete cast iron frames, were America and Denmark - the other makers, Broadwood, Erard and Pape showed varying types of metal bracings, and Stodart produced the only compensation frame, in a grand pianoforte. One of Broadwood's exhibits was their special concert grand iron framing with diagonal tension bar and transverse suspension bar[Plate 47]. Invented in 1847 it was used by them until 1895[185].

Eventually the American idea proved the most successful method of strengthening the frame and sustaining the tremendous tensions of modern stringing - Steinway and Broadwood string tensions in 1850 were twelve tons; today they claim thirty tons.

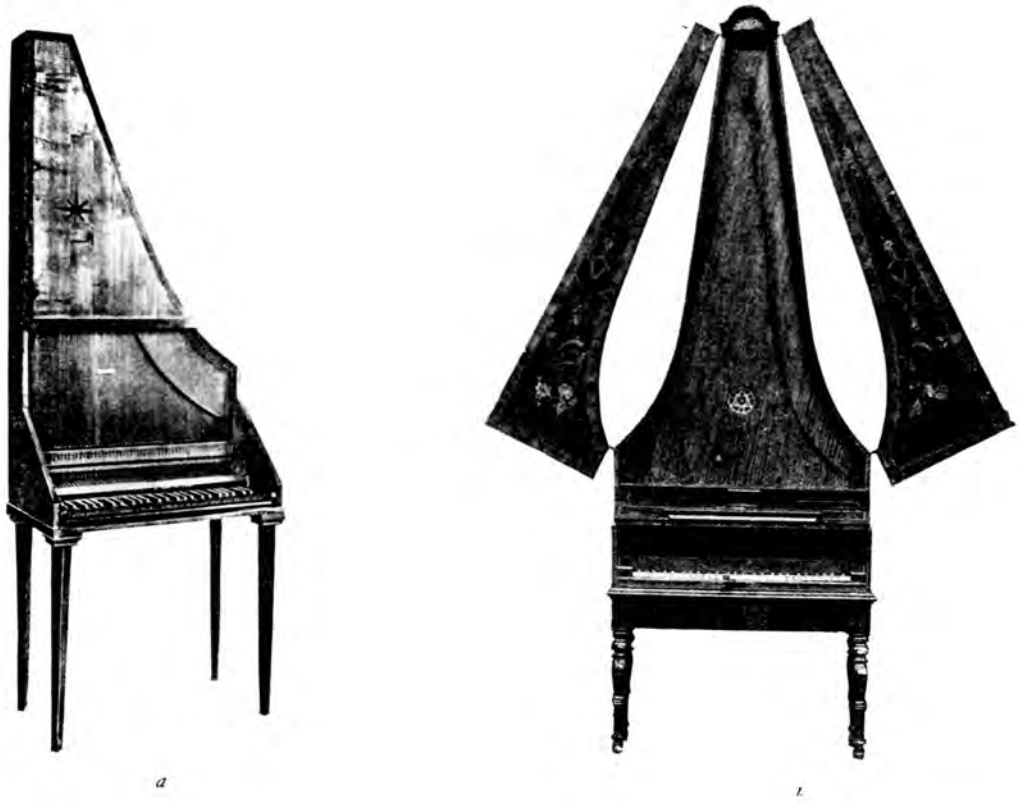
Nalder[186] points out that "It was not until Steinway and Sons, in 1855, demonstrated at New York that overstrung scaling with a solid iron frame could yield the desired volume and quality of tone, that the battle for the iron frame was won".

Thus, by the middle of the 19th Century all the essentials of the modern piano had been achieved. Further improvements were in the general direction of detail development, use of new materials and contemporary design of cabinets.

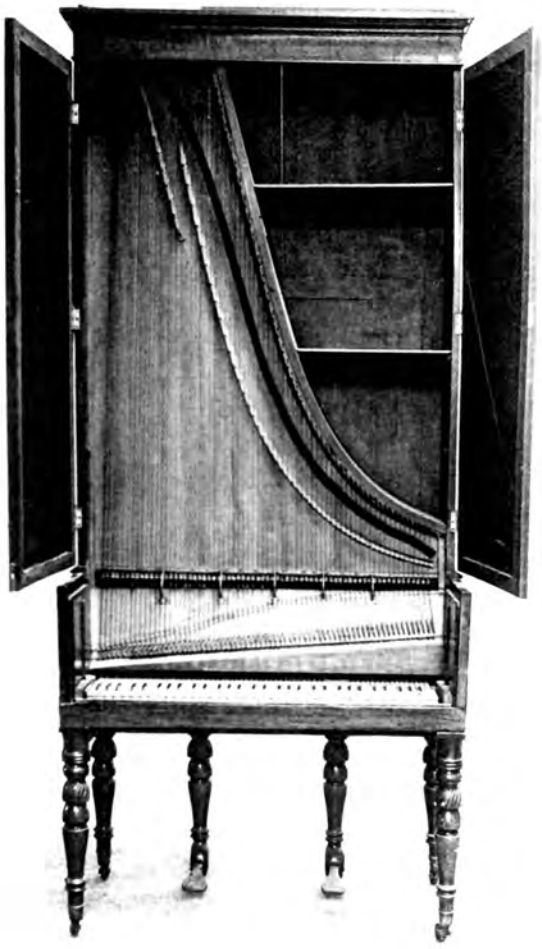
CHAPTER VI

THE UPRIGHT PIANOFORTE

Plate 48



a. Upright Pianoforte - 1735
b. Pianoforte by Friederici - 1745



Stodart's Upright Grand Pianoforte.
Berlin, Hoschule für Musik.

CHAPTER VI

THE UPRIGHT PIANOFORTE

In spite of the elegant appearance and manufacturing advantages offered by the harp shape of the horizontal grand piano, it was an impractical piece of furniture for small rooms. Harpsichords had presented a similar problem but, for domestic purposes, virginals and spinets had provided an adequate substitute. The so-called square piano had served a similar purpose, but, as time went on, manufacturers began turning out even bigger and clumsier squares to improve the sonority. From the makers point of view the square was an awkward shape, not only was it difficult to strengthen, but the oblique position of the action and keyboard created mechanical problems(187).

The obvious solution was to copy the Clavicytherium, a fancy name for a harpsichord placed vertically on a stand, with a suitably modified mechanism. The firstattemptat an upright piano was therefore nothing new in design. The action was behind the soundboard with the hammers striking up through it to the strings(188). While the idea of an upright piano was a solution to the problem of space, the question of mechanical manipulation presented new difficulties.

The earliest known model is housed in the Neues Grassi Museum, Leipzig. It is by an unknown maker and dated 1735(Plate 48a). It has the grand shape with a modified Cristofori action(189).

Ten years later, Christian Ernst Friederici, an organ and piano builder in Saxony, produced his first upright(Plate 48b). This model survives in the Brussels Musée du Conservatoire Royal de Musique. It is also a vertical piano on a stand, but perhaps for aesthetic reasons, is triangular in shape. The shape possibly accounts for his use of oblique stringing - an idea not used again for over 60 years. He also used the Cristofori action, but with a fixed jack instead of an escapement(190).

Plate 50

Hawkins "Portable
Grand Pianoforte"
Height 138 cm.

Plate 51

Muller's
'Ditanaklassis'
Height 154.4 cm.

The first half of the nineteenth century is remarkable for the variety and ingenuity of piano design displayed in England, France, Germany and America. It seems that rooms were smaller, but ceilings still reasonably high enough to take the strange new ideas of upending pianos.

Stodart, of London, produced a new type of 'upright grand' in 1795[191]. This piano looked like a cupboard placed on a stand with four legs[Plate 49]. It had doors which hid the grand piano shape and allowed room for bookshelves. A forte and a una corda pedal were suspended under the stand. The action was interesting, in that both the hammer and damper, after performing, were returned by weighted levers - a necessary adjustment from the grand action where gravity plays a natural part in the return of the hammers and dampers. Haydn is said to have seen this piano and been impressed with the idea.

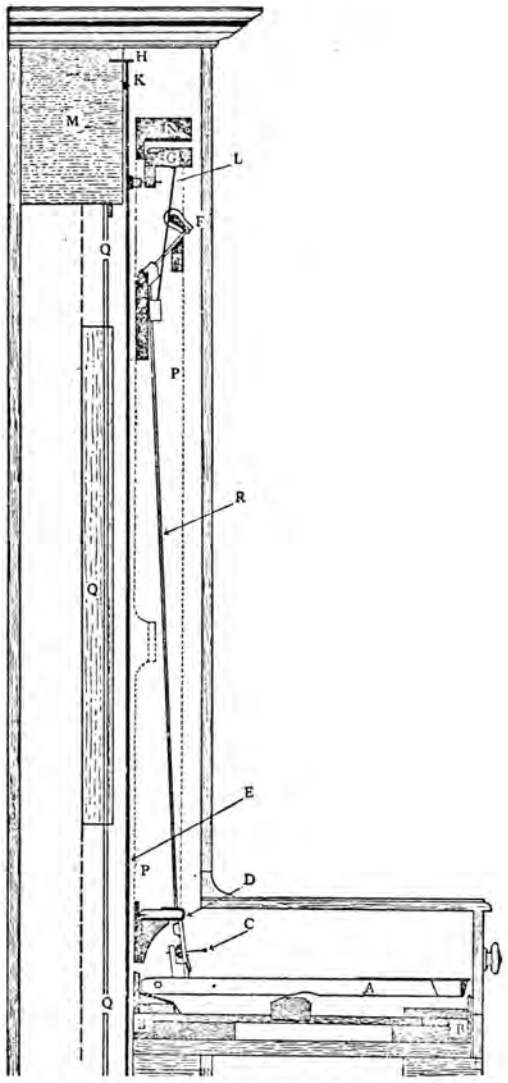
Broadwoods soon copied the 'Upright Grand' which was more costly than their horizontal grands. They were in good demand for many years and it was only in 1840 that Broadwood ceased to catalogue them[192].

In 1800, a remarkable coincidence occurred[193]. Two inventors, Isaac Hawkins of Philadelphia and Mathais Müller of Vienna, independently, developed methods for doing without the stand. They placed the piano on the floor with the keyboard higher up, thus effectively reducing the height of the earlier top heavy and clumsy uprights.

Hawkins 'Portable Grand Pianoforte' was only 4'7" (138 cm) high.[Plate 50] It had a soundboard suspended within a metal frame braced from behind with metal rods. The strings, coiled with springs to give them weight and thickness, were attached to mechanical wrest pins worked in a metal wrest pin block, and the hammers and dampers were pivoted within a light brass frame. These were all remarkable innovations at this time.

Müller called his piano the 'Ditanaklassis'[Plate 51]. It stood about 5'2" in height, and, like the Hawkins model, had a down striking action which avoided the weakness of having a gap in the soundboard with hammers striking from behind.

Fig. 18



R. Harding del.

Fig. 3. Sticker Action of a Cabinet Pianoforte by George Wilkinson (in the possession of Mrs R. T. Barnes). Length of the sticker [*R*] is 68·5 cm.

Sticker Action, bass aspect, by George Wilkinson, between 1816 and 1829.

When the key *A* is depressed the hopper *C*, engaging in the crank *D*, causes the hammer *F* to strike the string *E* by means of the sticker *R* which connects the crank with the hammer butt. A stout wire *L* raises the damper *G* which is hinged to the damper rail *N* with parchment. (All other joints are of leather.) *H*, wrest pin. *K*, bridge from which project bridge pins. *M*, wrest-pin block. *Q*, *Q*, sound-board. *P*, *P*, action frame. *B*, *B*, levers and blocks under the keys which form part of the mechanism for shifting the action. Two iron bars strengthen the action frame, otherwise there is no metallic bracing.

The instrument had 5 octaves F - f''' and bi-chord (two strings to a note) perpendicular stringing. The striking point was almost in the middle of the vibrating length of the strings and this was said to be the reason for the beautiful tone for which the piano was famous.

Neither of these two pianos was successful. Maybe they were too expensive and unusual looking.

Two years later Thomas Loud of London produced an upright grand piano 6'3" (109.5 cm) high. This he did by removing the stand and making the vertical strings reach the ground(194). However, for greater portability, he suggested that the bass strings could be fixed from the upper left hand corner to the lower right hand corner, with the rest of the strings running parallel. Thus an instrument 5' high and 4' wide would enable the bass strings to be 5'2" (157.5 cm) long. This appears to be the first attempt at oblique stringing since Frederici's pyramid in 1745. The piano builders seem either to have ignored or failed to appreciate the advantages of this invention, as small vertically strung instruments continued to be made for a good many years. Loud's piano and others of this type used the English Sticker Action(Fig 18) A primitive form of this action had been developed in 1798 by Southwell of Dublin, who had placed a square on its side upon a stand(195). He used a rod to connect the hammers to the keys and another rod at the back end of the key, to work a damper through a hole in the soundboard, behind the string. In Loud's piano(194), the action was similar to Southwell's, except that an escapement took the place of a jack, and the dampers acted in front of the soundboard instead of through it, while the dampers were fixed to wires attached to the stickers.

In 1807, Southwell, designed his "Cabinet" piano - a 6'6" tall instrument - with vertical strings reaching to the ground(196). He appears to have been inspired by Loud's tall piano. In this instrument he completed his invention of the "English Sticker" action by adding an escapement and having

Plate 52 a

Cabinet Piano
by Alfred Bateman

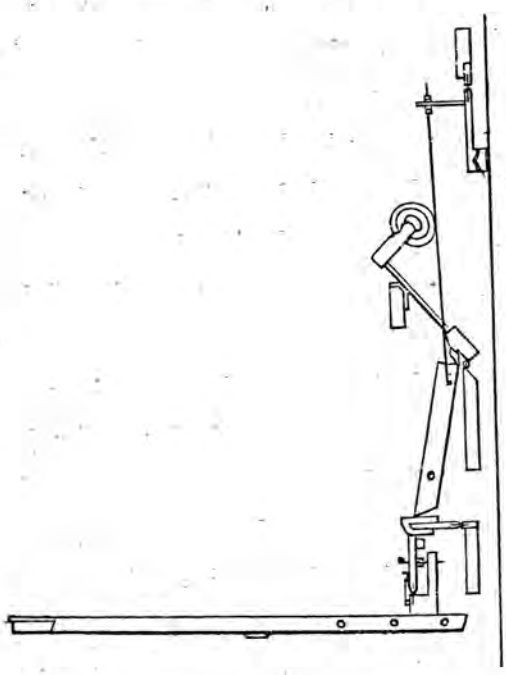
in Settlers' Memorial
Museum, Grahamstown.

Plate 52 b

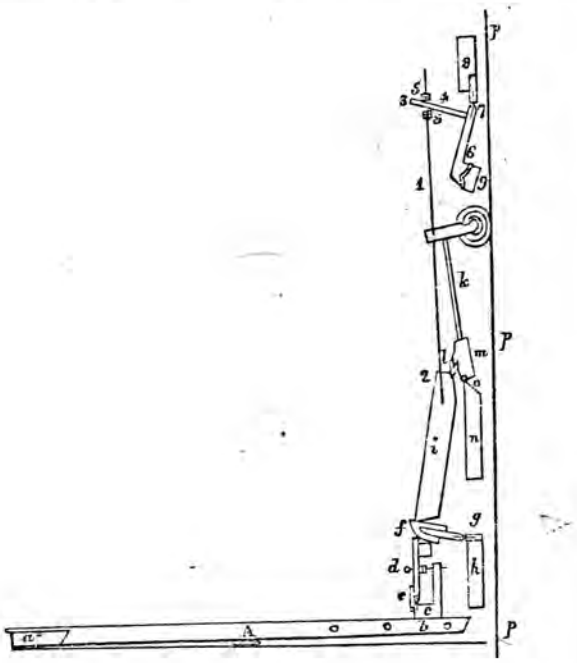
English sticker action and vertical stringing. Wooden frame with a metal hitch-pin plate and metal wrest-pin plate.
Compass ,,,C - A'''
Height 5' 1" (there should be a plinth on the top of the instrument which would add at least 4").

Fig. 19a

The Action while the Key is at Rest.



The same with the Key pressed down.



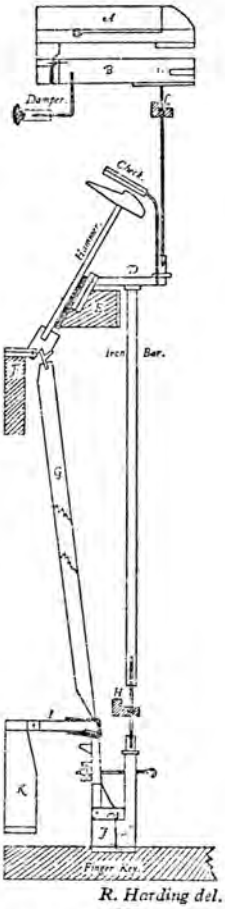
The key (A) forms a lever, one end of which (*a*), being pressed down, raises the other end (*b*), which in turn pushes up the hopper (*c*). (The regulating pin (*d*) and spring (*e*) determine the touch). The hopper is met by the lever or under hammer (*f*), which by a hinge (*g*) is fastened to the lever rail (*h*). Above this is the sticker (*i*), to which the hammer (*k*) is hinged at (*l*) by a fastening of wash-leather. The butt (*m*) of the hammer being hinged to the hammer rail (*n*), in the point (*o*), it is obvious that the pressing down of the key (A) must drive up the sticker (*i*), and consequently cause the hammer (*k*) to strike against the string (*p p p*).

The damper wire (1) is fastened sideways into the sticker at (2), so as to pass upright between the butts (*m*). The top of the wire forms the screw (3), passing through the arm of the damper (4), which is secured to it by buttons (5 5). The damper (6), which is fixed by a hinge (7) to the damper rail (S), being thus elevated with the sticker (*i*), raises its felt surface (9) off the string (*p p p*), and leaves the sound clear and open. Immediately upon the hand being taken off the key, the weight of the sticker (*i*) causes the wire to fall, and consequently presses it against the string, muffling and stopping the vibration. Thus, as long as the hand is held on the key, the vibration will continue, and no longer.

Action of a Cottage Piano by Rimbault.

This diagram shows the damping method used in Plates 53 a & b, i.e. the damper wires fastened sideways into the sticker - the dampers, however, are on Wornum's design.

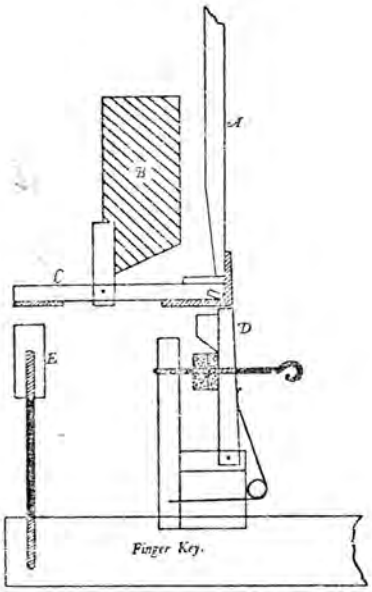
Fig. 19 b



R. Harding del.

Wornum's Single Action for upright pianoforte, 1826. Drawn from the patent (drawing No. 2 with dampers added from drawing No. 1).

A, 'damper hammer'; *B*, damper; *C*, socket for damper wire; *D*, check lever; *E*, hammer ruler; *F*, hammer rail; *G*, 'strikers'; *H*, socket; *I*, lever; *J*, hopper (escapement) with centre and mortise for the pin to work in, both brushed with cloth; *K*, lever rail and back touch.



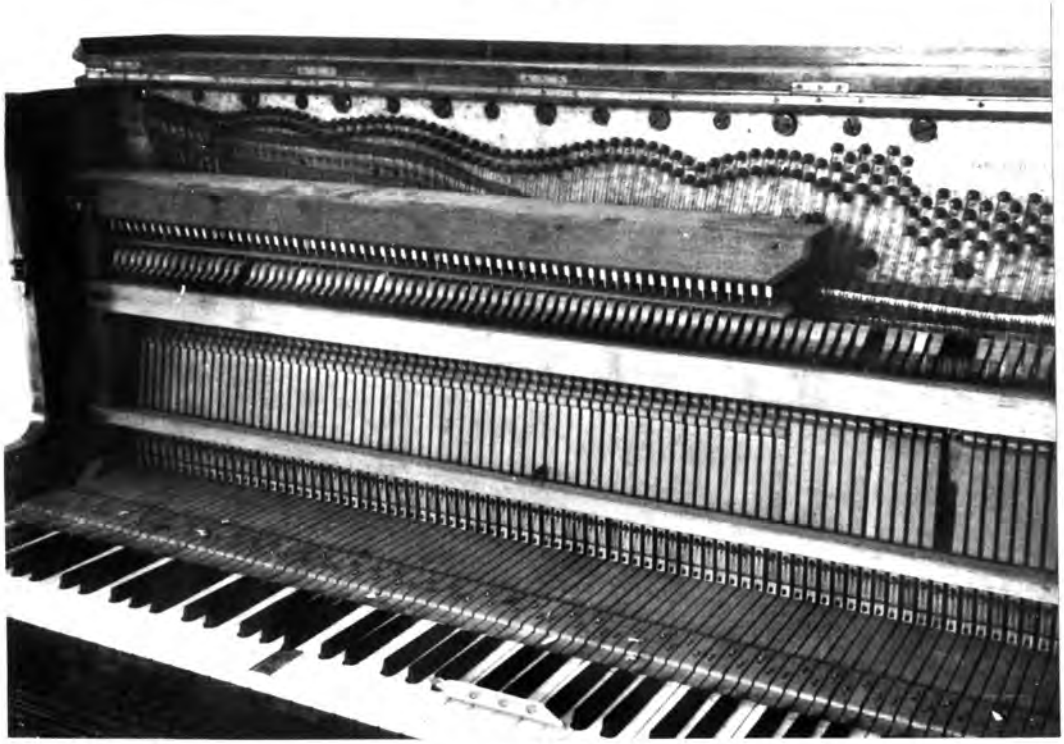
R. Harding del.

Wornum's improved check for upright pianoforte, 1828. Drawn from the patent.

A, sticker; *B*, lever rail; *C*, lever; *D*, hopper (escapement); *E*, "wooden-headed upright".

The patent of 1828 probably incorporated the damper wire in the sticker lever.
See Fig. 19 a.

Plate 53 a



Collard & Collard - Cottage Piano (Presbyterian Hall, Grahamstown).

Sticker action - a weighted sticker lever can be seen lying on the keys. The red dots are lead inserts.

Plate 53 b

Broadwood Cottage Piano - in possession of Mr. H. Bloemfield (Carlisle Bridge, C.P.).

Sticker action similar to Collard & Collard.

The dampers (in both plates) are attached to wire uprights each of which is fixed to the side of a sticker so that when a key is depressed the damper is automatically lifted off the strings.

Plate 54

Pyramid Piano - Pedals: Forte, piano, pianissimo (lute), una corda, bassoon & Janissary music. The Janissary pedal sounds the drum and bells, and causes the automata to play their instruments.

Plate 55

Lyre Piano by H. Ostermann, Berlin.
Circa 1840
Pedals: Una corda & Forte. Ht. 225 cm.

Plate 56

Giraffe Piano by Joseph Wachtl - Vienna.
Height 255 cm. Breadth 120 cm.
Thickness 58 cm.
Pedals: Forte, piano, piano (cop.), una corda, bassoon.
Mahogany case with bronze caryatides and bronze ornaments.
(Price about R162)

the action entirely outside the soundboard. In this way, both the hammers and dampers could act on the strings without any apertures being cut in the soundboard(Fig.18). Many piano makers used the action until almost the end of the century. Southwell's achievement strengthened the structure of the instrument and helped to keep the piano in tune for a longer period of time. In appearance, the piano looks top heavy. The front is covered with silk and has a carved cornice around the top supported on side pillars. Two heavy carved legs support the keyboard. An example of a cabinet piano (by Alfred Bateman) has been given to the Settlers Museum by Mr. Manley of Grahamstown (Plates 52a & b) Rescued from an outside store room it is sadly in need of repair. The silk front has been substituted by plywood and the cornice is damaged. However, the long sticker action is the one devised by Southwell and used by manufacturers in the 20th Century.

Another interesting sticker action is shown in Fig. 19 a and can be seen in a cottage piano by Collard & Collard in the Presbyterian Hall, Grahamstown(Plates 53a & b). This action was patented by Wornum in 1826(197) (Fig. 19 b)

Now that the idea of upending the piano had been accepted, manufacturers produced all manner of designs. Pfeiffer et cie,(198) in France, made a tall highly ornamented upright which they called Harmomelo, and in Germany and Austria an amazing collection of tall ornamental upright pianos appeared. Lyre and pyramid shapes(Plates 54 & 55) were made, some mounted on stands and others straight onto the floor. The Giraffe piano, (Plate 56) invented by an unknown maker about 1798(199) proved so popular that it was manufactured until about 1850. This monstrous piece of furniture was at least 7 ft tall. It was simply a grand piano placed with its broad end on the floor and its tail up in the air. The tail usually ended in a curved scroll, and occasionally a shelf holding some figure or vase was added on the short side.

In Vienna people were living in apartments in ever increasing numbers

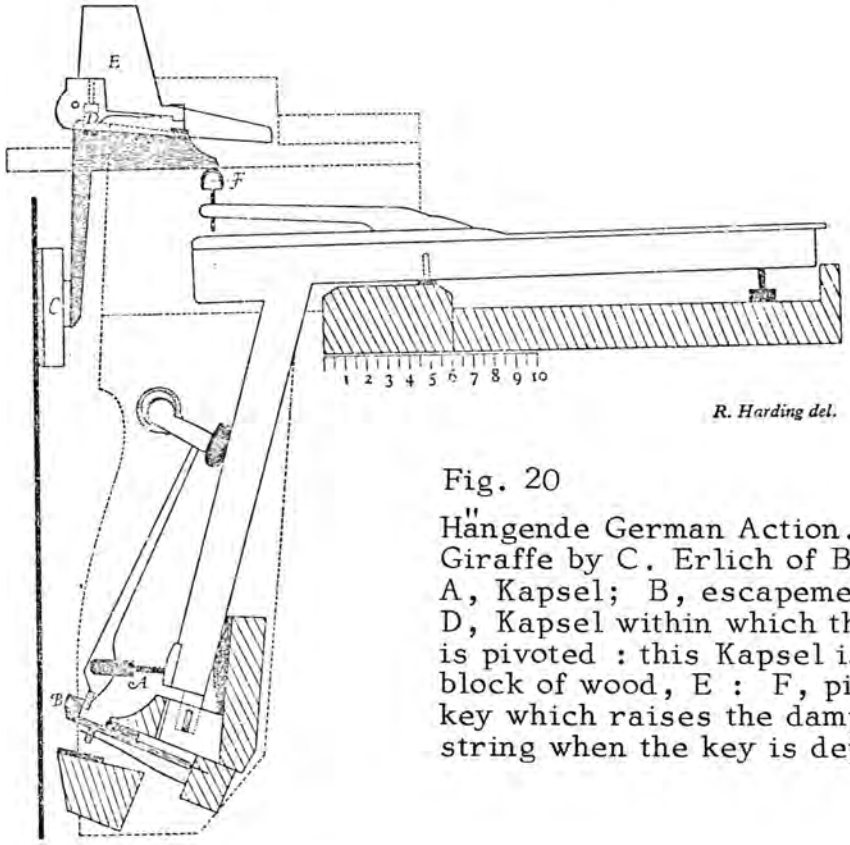


Fig. 20

Hängende German Action. From a Giraffe by C. Erlich of Bamberg.
A, Kapsel; B, escapement; C, damper; D, Kapsel within which the damper C is pivoted : this Kapsel is fixed to the block of wood, E : F, pilot on the key which raises the damper off the string when the key is depressed.

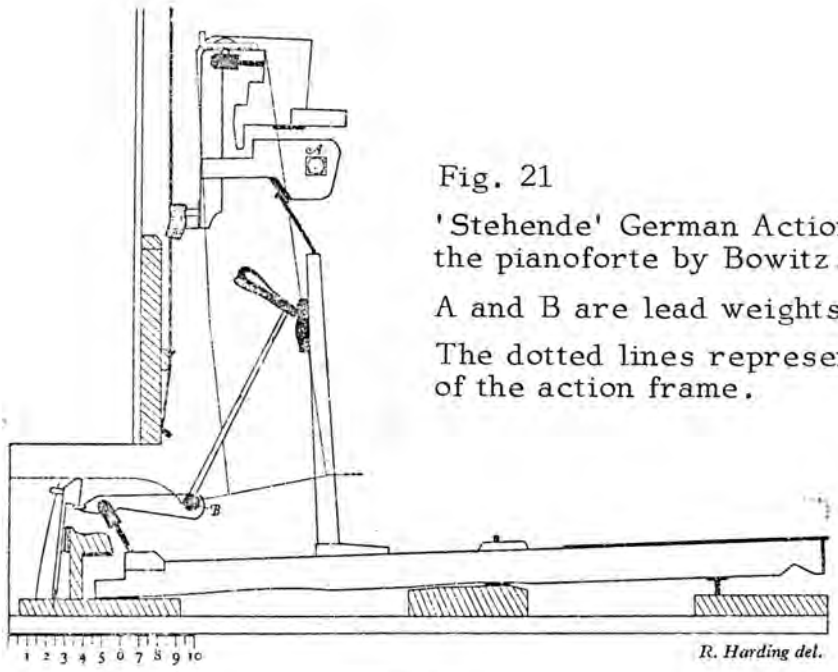


Fig. 21

'Stehende' German Action. From the pianoforte by Bowitz.

A and B are lead weights.

The dotted lines represent a part of the action frame.

and these tall, ornate instruments not only suited the high rooms with limited floor space, but appealed to the taste of people who admired "Empire" styled furniture(200).

Giraffe pianos normally used an adaptation of the Viennese action known as the "Hängende" German action because the hammer is suspended below the key(Fig.20). Smaller Giraffe pianos made about 1830, were set obliquely on a stand and these used the "Stehende" German action. Also a Viennese adaptation, but with the hammer kapsel at the end of the key lever so that the hammer is above the keyboard level(Fig.21)(201).

The Giraffe piano is generally associated with the addition of a number of pedals designed to produce certain desired effects. These pedals replaced the stops of the harpsichord and early pianos, and were mainly attempts to copy certain orchestral instruments. The idea was not a new one and the Giraffe was by no means the only type of piano to be used for this purpose. A grand with six pedals, owned by Dr. Kanko of Prague, was played on by Beethoven on his visits to the Doctor(201). Rossini is said to have owned a square with six pedals(202) and Napoleon possessed an Erard grand with five pedals, made in 1801(203).

However, it was mainly in the tall uprights of the Giraffe variety that anything from four to eight pedals were used(204). The forte, una corda, piano, bassoon and drum were more or less standard, but often the lute, harp, triangle, bells and cymbals were added refinements.

The drum pedal worked a large padded hammer which struck behind the soundboard. The basson pedal caused a parchment covered strip of wood to be pressed against the strings, which created a nasal sound when the hammers hit the strings - this pedal only affected the lower half of the keyboard. The so-called forte pedal was the sustaining pedal of today, the una corda, a shifting mechanism to enable the hammer to hit one string instead of two, as in modern grand pianos, and the piano pedal which moved the hammer nearer to the strings

Plate 57 - 59

Collard & Collard Cottage Piano (Presbyterian Hall, Grahamstown). Walnut case with beautiful fretwork decoration. Candle holders missing but brackets can be seen on the sides. Height 48".

Plate 58 - 59

Broadwood Cottage Piano - 1861 (No. 22929) in possession of Mr. H. Blomfield (Carlisle Bridge, C.P.). Rosewood case with fretwork decoration. Height 49".

Plate 60a

Small upright French Piano
by K. Bord - Paris - 1878
(No. 51211)

Similar to the piano-écran of Debain, it has a folding keyboard, is 40" high and 51" wide.

Brass pedals and brass handles on each side of case.

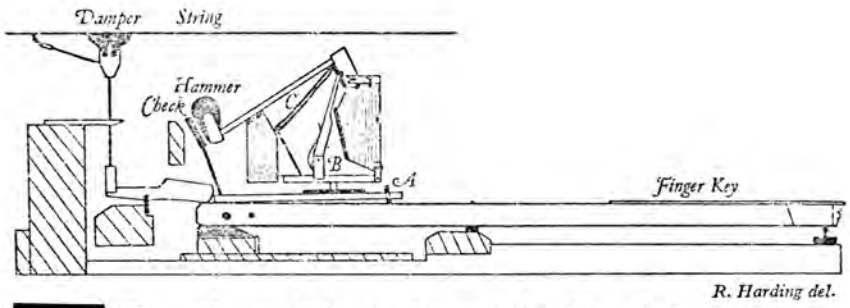
7 octaves ,,,,A - A''''

Plate 60b

Showing action of the Bord piano. Vertical stringing
22 copper would strings in bass
$2\frac{1}{2}$ octaves bi-strung
2-2/3 octaves tri-strung -
all strings attached separately to hitch pins on a metal hitch pin plate.

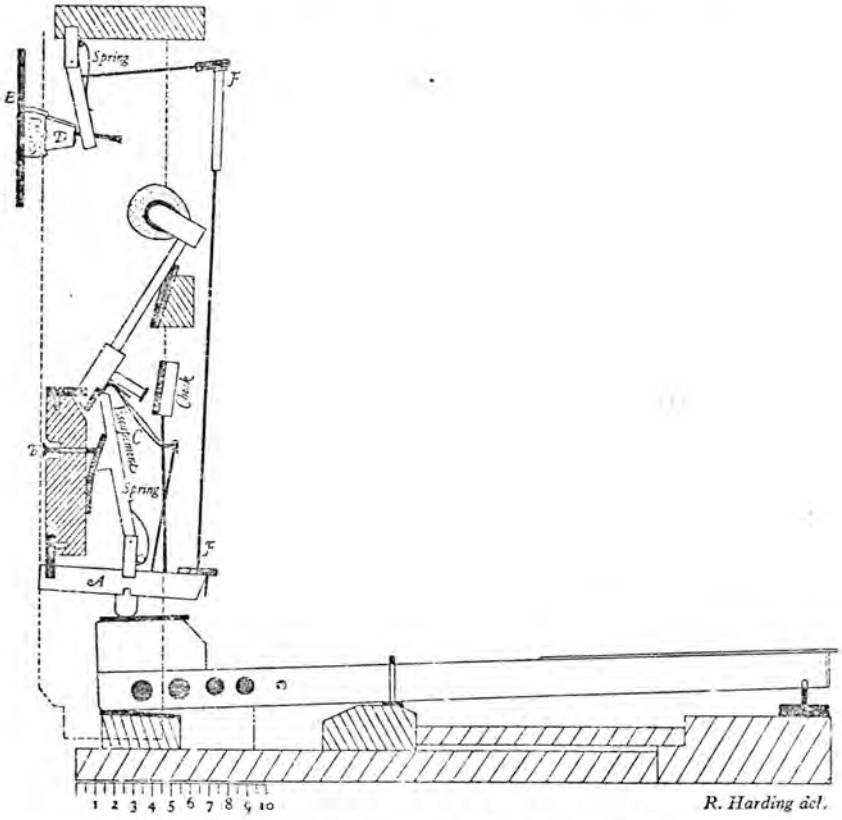
In possession of Mrs. Peters,
Sea Point, Cape.

Fig. 22



Wornum's tape-check action for grand pianoforte, 1838. (From 'The Imperial Grand Pianoforte', Plate I, Part II, Sect. II.

A, screw to regulate the check; *B*, escapement; *C*, tape.



Wornum's tape-check action, about 1842–52.

A, "a rocking lever moving on an axis" (Wornum); *B*, screw regulating the movement of the escapement (hopper); *C*, tape; *D*, damper; *E*, string; *F*, damper lifter or wire.

similar to the present arrangement for upright pianos.

These pedals were added to the piano to give the illusion of an orchestra. Until 1837, when Moscheles ventured to give piano recitals without the addition of an orchestral accompaniment, it was common practice to have at least one concerted item in the programme. Amateur pianists who wished to perform these works at home were obliged to use arrangements for two or four hands, and the addition of numerous devices helped to provide the necessary illusions so dear to their hearts(205). Although these pianos seem strange to us today, they were extremely popular in Europe. It would have been quite normal to find them in a French, Dutch, Austrian or German home of the first half of the 19th Century.(206)

To add to this, Turkish music which had been introduced into bands in the 18th Century, became so popular that it eventually influenced compositions for the piano. Even Mozart and Beethoven were affected by the prevailing taste. Mozart's 'Alla Turca' from Sonata K331 and Beethoven's Turkish Marches, are examples of a style which became very fashionable. In the hands of great composers any composition is a work of art and such compositions did not require the crude realism provided by Janissary pedals. Composers and teachers like Clementi, Hummel and Czerny did their best to teach the possibilities of the normal piano. They considered the forte, piano and una corda pedals all that were necessary - even the una corda was suspect, for as Czerny pointed out, it changed the quality of the tone(205).

However, a rising wealthy middle class musically uneducated and determined to own and play the piano, were probably largely responsible for the descriptive type of music written at this time. Battles, storms and pastoral scenes were the favourite choices(207) (See Appendix IV).

In England, the Giraffe piano never became popular. However, there was a great deal of interest in furniture making and the piano came in for its share of decoration. Silk fronts of red, blue or green were pleated or gathered

to the centre where a brass knob, a rose or miniature hand was set. Brass candlesticks, fretwork, ornate carving and inlay work were the joy and pride of most middle class homes. (See Plates 57 & 58)

The height of these instruments was still a problem. Performers objected to singing into the silk fronts or playing with their backs to the audience, and as pieces of furniture they were both clumsy and difficult to transport.

In 1811 Southwell attempted to overcome the difficulty of the singer by placing a square piano on legs, very like his old model, only this time the front sloped away from the player(208).

In the same year both Wornum and Collard produced small uprights; Wornum's with strings going to the ground and Collard's a square on a stand, both designed for small rooms.

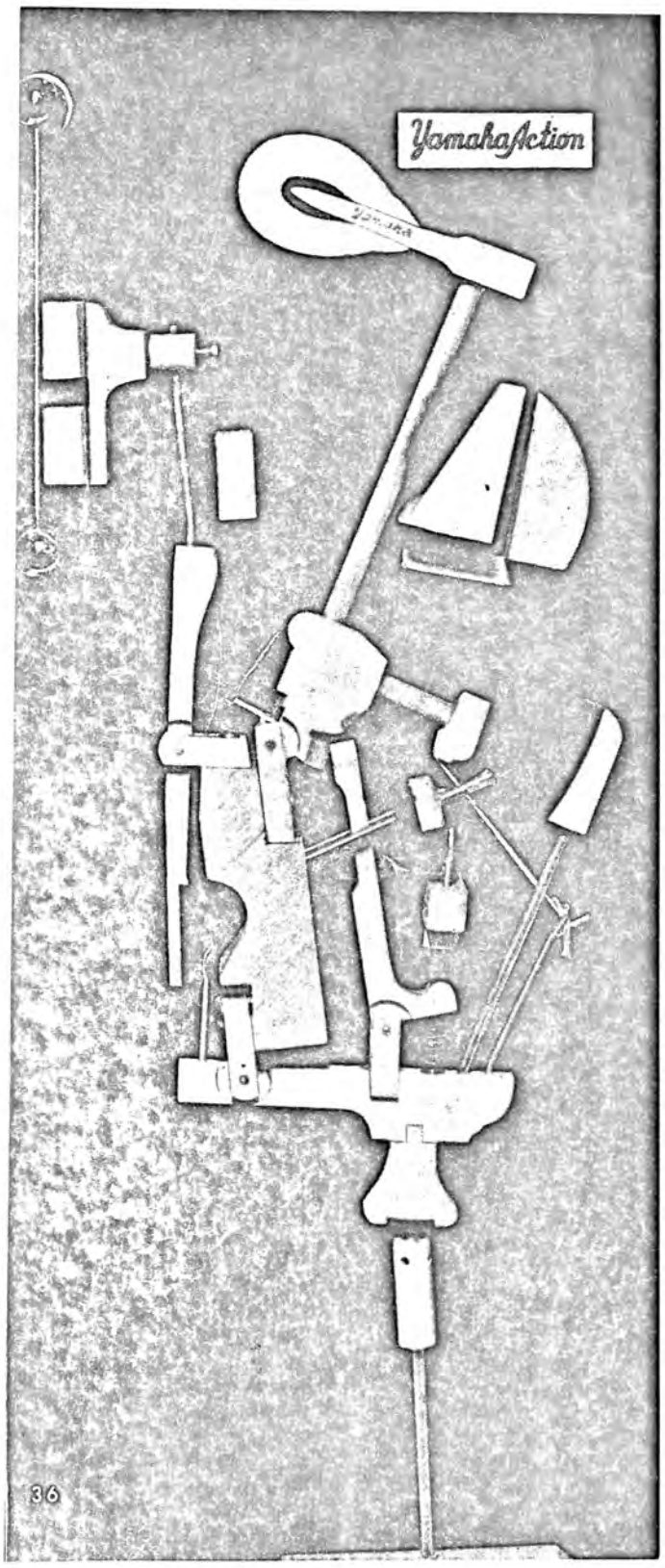
In 1813 Robert Wornum produced the famous 'Cottage' piano, vertically strung(Plate 59). This small upright, 3'10" high,proved enormously popular and became the prototype for this style of instrument. Pleyel, in Paris, became interested and encouraged Pape to work on Wornum's ideas(209).

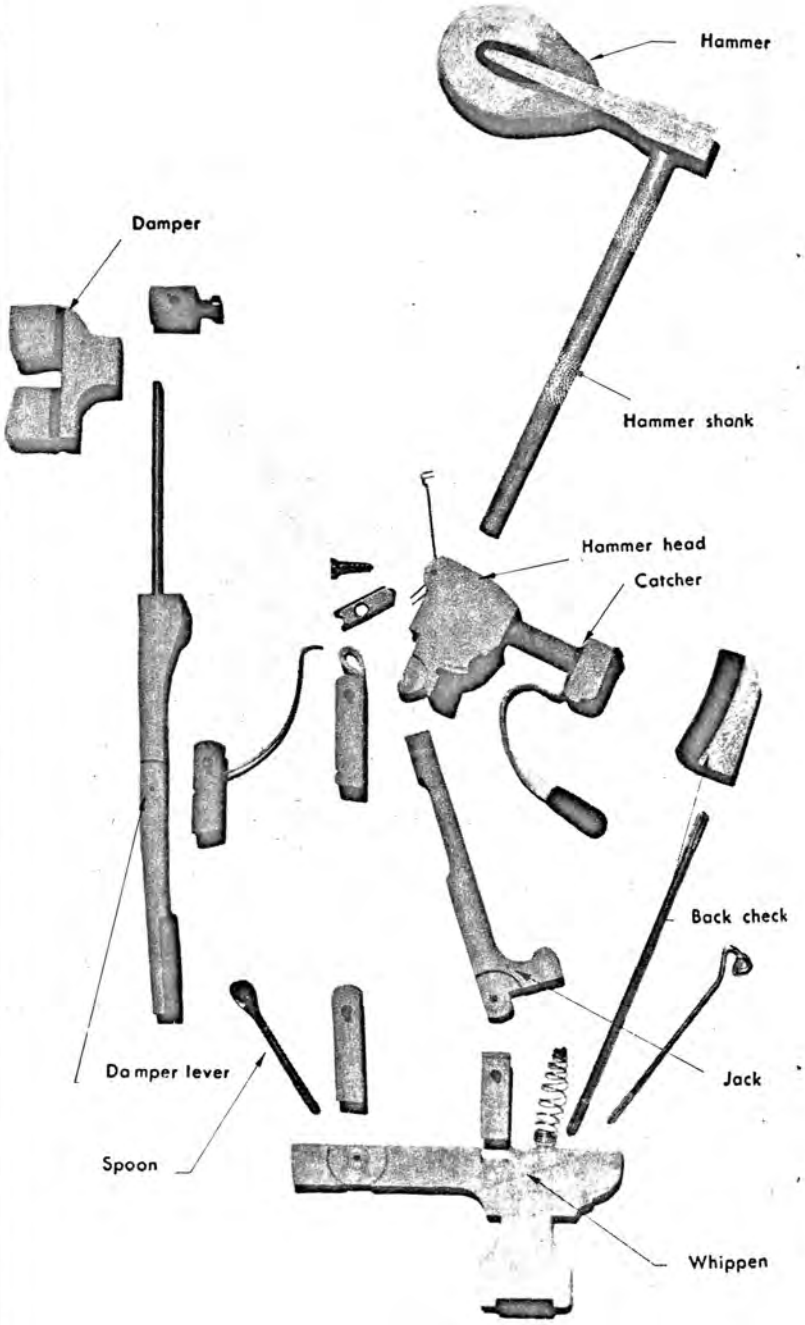
Sebastian Erard's son, Pierre, decided that squares were too large for apartments of the less wealthy people, so in 1824 he designed a 6 octave upright.(209a)

French makers generally were becoming interested in small pianos and in 1827 Alexander Debain made a diminutive piano called the piano-écran(Plate 60). It had a folding keyboard, weighed 100 lbs., measured $3\frac{1}{2}$' x 3-1/4' x 7" and when closed acted as a screen(210). In the same year the 'piano droit' of Blanchet and Roller in Paris, created a sensation at the exhibition in the Louvre. It was obliquely strung and had a hollow semicircle in the frame for the feet.

Small upright pianos became so popular in France that the square, though still being made, went out of fashion. At about this time too, the uprights became a cheaper form of piano(211).

Fig. 23





This is the "heart" of the piano. Compared to those of the 19th century, today's action mechanisms are far advanced in their capability for tonal volume and coloring. They are also made to respond to fast, repetitive action. All piano manufactures take great pride in the performance of their action mechanisms.

The following year, 1828, Henri Pape's first 'console-piano' appeared; a small upright with cross stringing and resembling a chiffonier in shape. It was 2'9" high and the bass strings passed over the treble strings on a higher bridge. This gave extra bracing to the case and longer bass strings in a more compact space.(212) Within five years an American firm had exhibited a piano with cross stringing. The Germans and Austrians followed suit in 1834 and England in 1835. The first English cross strung pianoforte was made by Broadwood in 1835, after a design drawn in 1831 by Theobald Boehm - inventor of the modern flute(213).

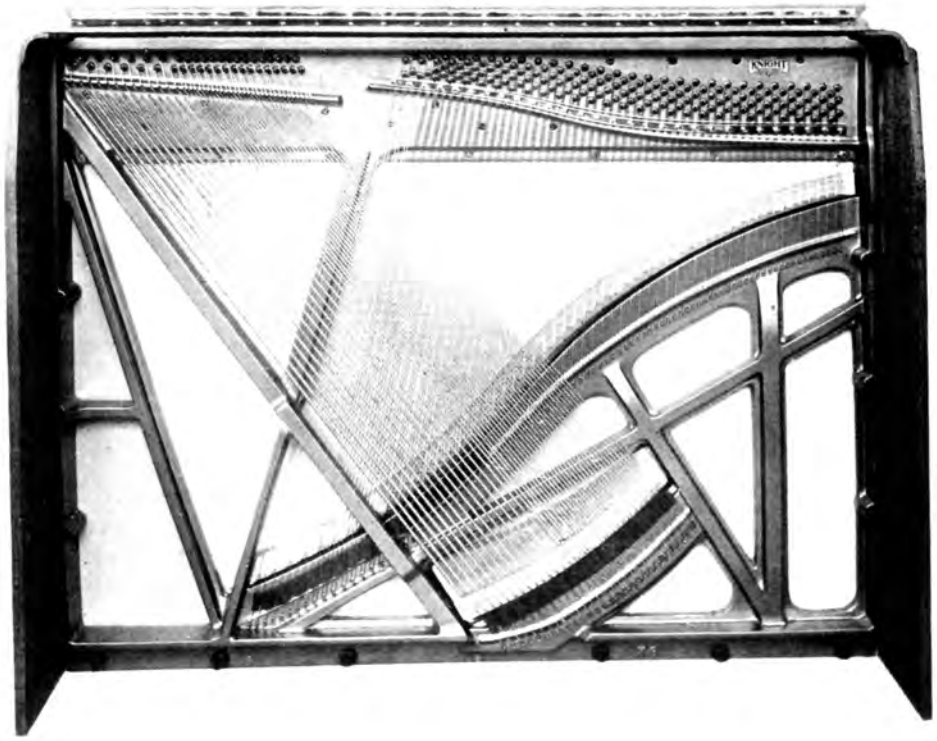
In May, 1836 Wheatley Kirk in England patented the first complete metal frame (cast iron) for an upright piano, and in Vienna in June, Seufert produced a 'piano-droit' which he claimed was an improvement on the French model. This instrument had an iron frame, and appears to be the first small instrument to have been made in Austria and Germany.

In the 1840's the Germans also began making small pianos and Ibach managed to produce one only 1.15 m. high.(214) Two years later (1842), Wornum patented an action for uprights(215) that he had used for at least five years in Grands. Known as the 'tape-check' action, it is especially important as it forms the working basis of all modern upright pianos. As Harding says " In the same sense that Sebastian Erard invented the modern grant pianoforte action so also did Wornum invent the modern upright pianoforte action"(Fig. 22).

Soon Pleyel in France copied Wornum's action. His new models were imitated and modified by German makers and within a few years the Americans were also using it.

Another development which is to be found in almost every upright piano of the present day was invented by Antoine Bord in 1846(216). This was the use of a spiral spring which is clearly illustrated in the diagram of the Yamaha upright(Fig. 23).

Plate 61



Interior View of a Modern Upright Piano
showing cast iron frame and over stringing.

An example of a Bord piano is illustrated in Plates 60, a, b, c, d.

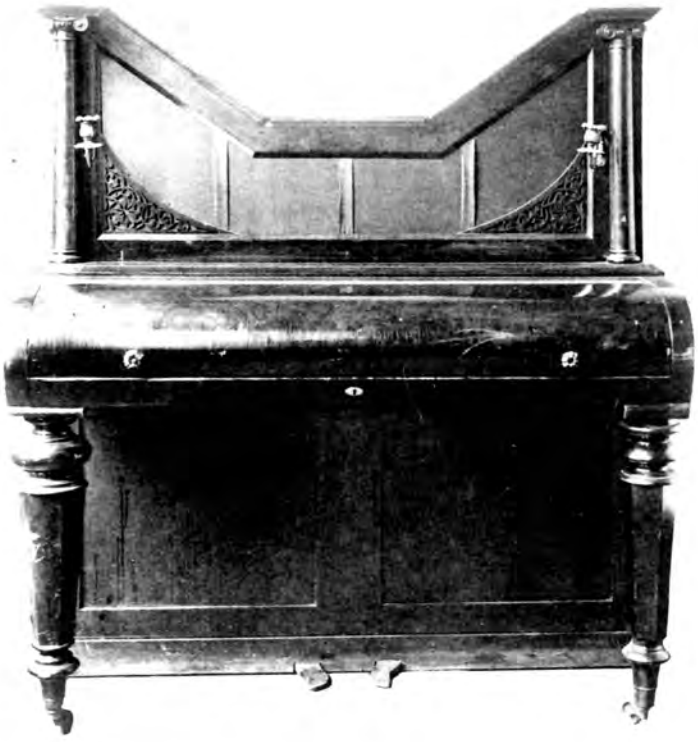
Cross stringing, which is commonplace in all present day pianos, was only patented in America in 1851. Although the method was based on Pape's patent of 1828, the reasons were different(216). The iron frame having solved the problem of string tension on frames, emphasis was now placed on obtaining greater string length(Plate 61).

It took time for these new ideas to be used universally. In Grahamstown and the surrounding districts there are a number of interesting cottage pianos with wooden frames and vertical stringing which were made well into the latter half of the 19th Century. Most of these pianos are Broadwoods and almost all of them are English.

Inventors continued to come up with ideas for smaller and space saving instruments, but none proved as popular as the console and cottage pianos, which met the requirements of the singer as well as being more portable.

Apart from such odd looking uprights as one with a dip in the centre front for the benefit of the singer(Plate 62) there were many other ideas for saving space. Smaller horizontal grand pianos were introduced in England about the middle of the 19th Century. In Germany the ungainly looking "Querflügel", a cross between a Square and a Grand, was another attempt to reduce the Grand.(217) The French makers turned out various shapes to suit domestic utility. In 1806 a triangular piano was made to fit into a corner, and oval, hexagonal and round table pianos were produced for drawing rooms. The table pianos had down striking actions to save space. Other types include a piano-secrétaire intended for a lady's bedroom - a writing table piano for a composer, such as Massenet owned (now preserved in Musée de l Opéra in Paris). Conductors or childrens pianos of about 3 octaves were also made.(218) A small upright found in Durban has 3-3/4 octaves(Plate 63). Such a piano was seen in an orchestra pit in London and used for recitative. A childs square piano of three octaves was seen by the writer in the Nursery of a Museum

Plate 62



Pianoforte by Broadwood about 1835.

Brussels Musée du Conservatoire Royal de Musique.

The dip in the middle is probably to enable the performer to be seen and permit his voice to carry into the room.
Height 1.27 m, breadth 1.18 m.

Plate 63

Small upright piano by Nott

in Salem (Mass.)(Plate 64). Perhaps the most amazing patent for an instrument adapted to domestic use is the one by J. Millward of July 10th 1866(219). This incredible piece of furniture was a piano supported on a hollow base which hid a couch on rollers able to be pulled out in front of the piano. A hollow space in the middle of the frame made it possible for the performer to reach the pedals and the cupboards on either side of this space housed the bed clothes, a bureau with drawers and another closet for housing the wash hand basin, jug and towels. The stool contained a work box, looking glass, writing desk or table and a small set of drawers.

In spite of such foibles the upright piano became a 'best seller'. At the World's Fair in London in 1851, the English factories production of uprights was 80 - 90% of their total output, 5 - 10% were grands, and squares were virtually obsolete in England and Europe - only about 1500 being made and exported annually to India(220).

Plate 64

Child's Piano by Ellis, Britten and Eaton in Nursery of Pingree House, Salem, Mass., U.S.A.
All wood - height 21" - 3 octaves, C - C"

MONOCHORD TO MOOG

A STUDY OF THE DEVELOPMENT OF STRINGED KEYBOARD INSTRUMENTS WITH SPECIAL REFERENCE TO POPULARITY TRENDS

By
Betty Shuttleworth

A Thesis presented Ad Eundem Gradum
to
Rhodes University.

Volume II.

December, 1971.

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CHAPTER VII

A SURVEY OF PIANOS AND PIANO MANUFACTURERS IN AMERICA, GERMANY AND JAPAN

Plate 64a

CHAPTER VII

A SURVEY OF PIANOS AND PIANO MANUFACTURERS IN AMERICA, GERMANY AND JAPAN

America

Comparatively little is known of the early history of the piano in America. The tendency to import and copy English pianos was prevalent right up till 1830. However, the contributions of American inventors and workmen have been so spectacular that a brief account of their progress is a very important part of the piano story.

America started importing pianos from England about 1771[221]. On March 7th of that year, the Massachusetts Gazette announced the postponement of a concert at which the new instrument was to have been performed on, and at the end of that some month Thomas Jefferson ordered a fortepiano for his fiancée. His original order for a clavichord was cancelled after seeing the more modern instrument, and he sent the following precise instructions:- "let the case be of fine mahogany, solid, not veneered; the compass from double G to F in Alt, a plenty of spare strings; and the workmanship of the whole very handsome and worthy of the acceptance of a lady for whom I intend it"[222].

Although harpsichords had been made in Philadelphia as early as 1744 and later in New York, it is only in 1774 that the first American made piano is recorded[223]. This piano made by John Brent in Philadelphia seems to be an isolated case, probably due to the American War of Independence which broke out at this time. During the 1780's only a few instruments were made in New York and Philadelphia, and American home trade continued slowly for thirty to forty years after the Revolution[224]. However, in 1789 Charles Albrecht in Philadelphia started producing good copies of English

Plate 65

Square Piano by Benjamin Crehore in Milton, Mass., U.S.A. 1800 - 1805.

Mahogany case, decorated on inside of nameboard. The piano is constructed entirely of wood.

Picture by courtesy, Essex Institute, Salem, Mass.

pianos, and managed to establish a trade for twenty years. Nevertheless, prejudice against the locally produced article continued. In 1791 a newspaper reported that there were twenty seven piano owners in Boston and all the instruments were London made, most of them by Clementi. This preference for the imported article is reflected in the advertising of the American piano makers. In 1791, a New York firm persuaded a concert pianist to announce that he was performing on their "Grand Concert Pianoforte, entirely of a new invention", while another New York maker claimed his instruments were constructed "on the best London principles". In 1792 attention was drawn to "the means they have taken to prepare their wood to stand the effects of our climate which imported instruments never do, but are sure to suffer from the saline quality of the seas". Eventually the very real claim that the many varied American climates affected imported pianos, proved the necessary stimulus to the American buyer.

In 1800, the English engineer, John Isaac Hawkins, working in Philadelphia, produced his famous upright piano(225). This radical instrument probably had too many innovations to make it popular. Thomas Jefferson is said to have seen it and although tempted to buy one, does not appear to have done so. This piano did not 'take on'. Maybe it's shape was too strange and its tone unacceptable.

In Boston, about 1800, a carpenter, Benjamin Crehore, turned his hand to piano making(Plate 65). He was the first to start in that city which was to become famous for its development of new ideas in the next fifty years. In 1813 John Parker was beginning to turn out uprights on the old English Cabinet design. For a time he produced two a week, but the demand for squares still prevailed and eventually he closed the manufactury. One of his workmen, Alpheus Babcock,(Plate 66) went into partnership with a sea captain, John Mackay, who was interested in pianos and had money to invest. Babcock solved the problem of bracing the instrument by means of a cast iron

Plate 66

Square Piano by Babcock (circa 1830)
owned by Lowell Mason, said to have been
the piano he used to compose "Nearer my God to thee".

In pencil on the soundboard is written "This Piano Forte belongs to Henry Mason given to him by his Father April 23, 1865".

The piano is all wood except for a metal hitch pin plate. It has 68 notes "F - C'''.

Picture by courtesy of Essex Institute,
Salem, Mass., U.S.A.

frame[226]. This invention for a square piano, patented in 1825, was the break through everyone was looking for. Babcock and Mackay dissolved their partnership about 1826 and an "up and coming" piano maker called Jonas Chickering persuaded Mackay to join him and together they produced and marketed the best American piano of the time.

Chickering improved on Babcock's design of a one piece iron frame for a square piano and patented it in 1840. By 1843, he had patented a cast iron frame for grand pianos, and for some years after that he was one of the very few Americans to manufacture Grands. Chickering pianos became tremendously popular and were distributed far and wide. The extra support of the iron frame must have added greatly to their safe transportation. It is also possible that the use of Chickering pianos by touring artists contributed to their success. Until 1845 it had always been the custom for pianists to give concerts on the large American square pianos[227].

This preference for the square shape, which lasted for fifty years, after they ceased to be popular in Europe, may have been due to the fashion established by the imported instruments in the first quarter of the century. By 1890, squares were just about finished and at the beginning of the 20th Century they were obsolete. Closson relates[228] that it became so difficult to wean the American public from these ugly, unwieldy instruments that, in 1903 the American piano manufacturers at a Congress in Atlantic City decided to put a stop to it. He says they bought up enormous numbers of square pianos at a cost of hundreds of thousands of dollars and "piled the pianos in a pyramid 50 feet high on the heights of Chelsea and there they set their huge bonfire alight". A lovely story - however, enquiries[229] reveal that the intended bonfire turned out to be a fiasco owing to the insurance companies threats to the Mayor, who therefore refused to permit the fire. The result was a clandestine affair held outside the City limits where only a few small boys enjoyed a short lived burning of an undisclosed number of

pianos. The affair became a standing joke.

There are reported to have been a number of bonfires of old upright pianos in America during the depression years of the 30's. However during the war years, these fifty year old pianos, which previously were hardly worth the price of cartage, climbed in value to $ 600.[230]

The use of squares in public performances came to an end in 1845, when Leopold de Meyer, the first of a series of touring artists, arrived to give concerts in the United States[231]. Disdaining the American pianos, he brought with him two Erard Grands[232]. This became the general trend of visiting pianists until the 1850's. Thalberg came in 1857 with no less than seven Erards, but after playing on a Chickering in Boston, he seems to have given up the inconvenience of taking his own instruments on tour, and played on the local products. Gottschalk came to New York with a Pleyel and after five concerts changed to Chickerings. He then used them exclusively.

Although Boston was famous for its piano making, other centres were becoming known. In Albany, Baltimore and New York piano making was beginning to flourish. All of them had to contend with imported instruments until about 1830. Most of the imported pianos were English,but during the late 40's and 50's French imports were fairly considerable[233]. The tours of de Meyer, Herz, Thalberg and Gottschalk with their French grands may have been responsible for this short lived fashion. By 1860, however, the number of imported pianos was negligible.

Pianos were being made and sold in ever increasing numbers, and Chickerings were the acknowledged leaders[234]. In 1850 they were selling about 1,000 instruments a year and in 1851, at the London Exposition, their iron framed exhibit was favourably received. At that time New York manufacturers were still using the composite iron frame.

During this period, German immigrant piano makers began arriving. They started their own workshops in New York and were very successful.

The most notable of all these Germans was Henry E. Steinway, who arrived in 1850[235]. By 1853, with two of his sons, he had created the firm of Steinway and Sons, a business which was to overshadow all others in the short space of fifteen years. They adopted the idea of a one piece cast iron frame, and to improve the tone they devised a cross stringing in a fan shape and lengthened the bridge by increasing its curve. Both these devices gave the vibrations more sounding board area. They also increased the general tension on the frame. Heavier hammers were needed to achieve the tone made available by greater string tension, and therefore much thicker felt was added to the hammer heads. By modifying the Erard double escapement action, a lighter touch was achieved - a necessary adjustment to cope with the extra weight of the hammers. All these improvements took some years to perfect, but even as early as 1855, at the 'Crystal Palace' in New York, Steinways exhibited their first overstrung square. This was an arrangement by which the bass strings are crossed over the treble strings to obtain greater vibrating length, and to couple them through the bridges to more senstitive parts of the soundboard. At the same time - if the pedal is raised - the close proximity of the strings increases the wealth of overtones, and therefore the volume of sound[236]. It created a sensation and was given the highest award. By 1859 they were applying their ideas to grand pianos and effectively achieved an instrument of greater string tension and more efficient string placement, resulting in a more powerful instrument for its size[237].

In 1862 Steinways were enjoying good sales in America and decided to extend their activities overseas. They exhibited their instruments at the London Fair, where the Viennese music critic and musicologist, Dr. Hanslick, saw them. He wrote an article in the Wiener Musikzeitung[238] praising the instrument and predicting its future supremacy. Streicher of Vienna, may have been influenced by Hanslick's article, for he began altering his old designs in favour of the new American ideas.

Steinway Grand (1896) showing "Duplex Scaling"

Duplex scale patented in 1872 was developed to enhance the tonal quality of the upper register. The portion of the string which is usually damped, is left free to vibrate in sympathy with the other notes.

Note the Capo D'Astro Bar inscribed with the name and patent date of 1875.

Piano in possession of Mr. E.A. Heunis of Pretoria.

An event of great importance took place in 1865[239]. Theodore Steinway, the eldest son, arrived to join his family. He was a physicist and accoustician who applied his scientific knowledge to help guide the building of the wonderful instrument Steinway had produced by 1867. In that year, when both Steinway and Chickering exhibited their instruments at the Paris Exhibition, Steinways proved their supremacy. A distinguished panel of judges, amongst them Dr. Hanslick, Ambroise Thomas - composer of Mignon, Gevaert, a Belgian composer and Schiedmayer - a German piano manufacturer awarded the first gold medal to Steinway[240]. Rave notices were received from musicians like Liszt, Berlioz and Gounod. Rossini is reported to have become lyrical on hearing a Steinway and said "It is a nightingale cooing in a thunderstorm".[241]

It was after the exhibition that the American ideas of a one piece frame and overstringing were finally accepted and adopted by manufacturers the world over. Loesser[242] maintains that "the end result of the Steinway effort was a tone producing tool of matchless strength and sensitiveness. It was a structure that could withstand the most passionate punches of the most furious virtuoso. No latter day Liszt could smash it ..... Moreover, the unheard of volume was combined with a noble quality of sound".

In 1872 Steinway patented a method of enhancing tonal quality of their grand pianos. The "Duplex Scale",[243] as it was called, is a device which leaves the portion of the string, which is usually damped, free to vibrate in sympathy with the other notes.(Plate 67)

Two years later they perfected a pedal mechanism to sustain selected sounds while others were damped. The Sostenuto pedal, as it is called, is the standard middle pedal on all Steinway grands and is occasionally found on other grands[244](Plate 68).

Steinways began exporting pianos to Britain in 1877 and in 1880 built a factory in Hamburg. They also began a deliberate advertising campaign by

Plate 68

Steinway Grand in Grahamstown City Hall.

L - R: Una corda pedal - sostenuto pedal - damper pedal.

inviting world famous pianists to come and give concerts on their pianos[245]. For example, in Sept. 1872 Anton Rubenstein arrived to give 215 concerts in 239 days. He started in the Steinway Hall in New York - travelled to a number of the larger centres in the States, to Montreal and Toronto and back to New York to give 7 farewell concerts in 9 days at Steinway Hall.

A new development in piano making began in 1870. Three of Steinways employees set up a factory to manufacture "parts" only.[246] Soon iron foundries were casting frames. Alfred Dolge became famous for his method of turning out 6 full sheets of tapered felt in one operation. This was sufficient for a 100 sets of hammers. He then turned his hand to producing soundboards by machine, and claimed that his cylinder planer enabled two men to turn out 300 soundboards per day. He started the American trend of having special factories to make separate parts for sale to manufacturers.

Steinway appears to have been the only firm which continued to manufacture its own components and it was their custom to advertise this fact. One of their most gratifying tributes[247] came from Thomas A. Edison, the inventor. In 1890 he wrote: "Gents I have decided to keep your grand piano. For some reason unknown to me it gives better results than any so far tried. Please send bill with lowest price".

Since that time Steinway has developed new soundboards, faster and more responsive actions and other improvements, including a minuscule plastic bushing which replaces less durable felt. Their researchers are constantly testing new materials and manufacturing processes.

One aspect which has not changed is the pace at which the craftsmen work. It takes 400 men and women a year to produce one piano. There are 12,000 component parts - most of them tiny, complicated, precision-turned pieces of wood which must interact perfectly and endure endless abuse. To achieve this combination, literally tens of thousands of minute adjustments are made on each piano. After this a 'muscle man' using a felt padded stick hits

each of the keys with all his strength - anything broken is replaced and the banging continues till the piano remains in adjustment. Then it is tuned seven times, and is regulated for tone and action before being examined by three super-inspectors.

The slow process of turning out a piano - especially a concert grand, seems odd in our modern world of mechanisation. John Steinway says[247] there is still no better way than the present system of using highly skilled men and women to make the fine adjustments to each part of every one of the 88 keys. It is therefore not surprising that there are never two identical models of the same make.

Every piano is numbered so that performers can have their favourite instruments for their concerts[248]. Glen Gould who always played Steinway's No. 174, was so emotional about this piano that he became very depressed when it eventually collapsed. There were four other well known pianists who loved "Old 199", and they managed to pass it round among themselves so that each could have it for major concerts. Dame Myra Hess regarded her pianos as husbands and once cabled Steinway: "I am thinking of divorcing No.2 and taking on No.3".

The only serious rival to Steinways was the Baldwin Piano Company[249]. This firm, which began in Cincinnati during the Civil War, made little impact till 1900 when it received an outstanding award at the Paris Exhibition. Both Packman and Raoul Pugno used their pianos on tour in America. The Baldwin Piano Company became more and more ambitious and made great efforts to improve their product[250]. They have been serious rivals of Steinways since the 1930's, but were still not considered as good. In 1966, after ten years of experimenting, a new Baldwin Concert Grand was presented to the world. The length, size and layout of the strings was altered, the bridge redesigned and new tuning pins devised. This new model they called SD-10 and it was introduced to the public in a Manhattan concert by the

Plate 69

Ibach Grand Piano in Music Department, Rhodes University.

pianist Jeanne-Marie Darre. The tone was described as round, warm and full, singing and long lasting. Baldwins hoped to have 100 concert grands in halls of major American cities by the end of 1967. Then they planned to begin adapting the improvements to domestic and school-type grands.

Although the concert Grand is the prestige instrument of any piano manufacturer, it is the domestic piano which must be produced in really large numbers if a factory is to show any profit(251). In 1910, the United States was by far the largest piano manufacturing country. The annual output was 360,000 pianos of which the majority were mass produced domestic instruments.

The status of respectability which had symbolised the piano for so long reached its height in 1914. The war was responsible for a new way of life; the emancipation of women created less leisure time in which to indulge such ladylike pursuits as piano playing - women were earning their own livings, travelling and going out unescorted - a completely new standard of behaviour was in vogue. Outside entertainment increased and the old fashioned idea of getting together round a piano no longer appealed to the young in their new found freedom - the 'musical evenings' of the Edwardians was 'out', and with it the piano lost its hallowed position. Many articles appeared forecasting the end of the piano. An American editor wrote "In this age of victrolas and radios the piano is fast becoming a rare article in the ordinary home. Few persons now strum the abused instrument, the once ubiquitous instrument is now silenced, for only students of real talent are encouraged".(251a)

The depression in the early 1930's reduced the piano manufacturers to thirty six. In an effort to revive the market they began bringing out small pianos with straight modern lines. These were 2'10" - 3'9" high, had short strings and often only 72 notes instead of 88. The new shape was called Console and many other old names were revived - even "spinet" was used to describe certain models. These new designs were both practical and attractive and suited to modern living conditions. They were successful enough to save

the situation and by 1937,170,000 pianos were being produced. World War II reduced all piano production owing to a shortage of critical materials but by 1950 business had revived and America was exporting 175,000 instruments a year.

Strangely enough, the radio which had done so much to stop piano playing in the home became the means of educating the very people who had turned their backs on it. In 1953 five out of every seven Americans owned a radio set. Live programmes and broadcasts of recorded music set a high musical standard and so it became fashionable to learn the piano again. Children are being taught in groups all over America. The results are amazingly good and as the fees are reasonable, the smaller pianos cheaper, and the methods of teaching so cleverly devised - a new generation of musically educated people can be expected within a decade or two. As for the piano manufacturers there is no doubt that the backbone of their industry is the small, compact, low priced piano for the average home.

Germany

In Germany the piano makers made a comeback around 1850. The economic growth and exploitation of their coal and iron gave rise to a wealth and industry which in turn affected the revival of piano manufacture.

John Lorenz Schiedmayer(252), who had started a piano business in Stuttgart in 1809, appears to have been an isolated case of a successful piano maker in Germany, for at that time most pianos were imported from Vienna, France or England. In 1854 the four Schiedmayer Sons separated, developing two independent firms. This stimulated a healthy rivalry and improved instruments resulted. They dominated the German trade for some years and won the Grand Prix at the Paris Exhibition in 1900. Hans Richter, the famous conductor, favoured the Schiedmayer piano above all others.

Johannes Adolf Ibach(253) started piano building in 1794(Plate 69). In spite of the general poverty of the time, he managed to keep going, and in 1834, was able to hand over the business to his sons. The Ibach sons gradually built up a good reputation for fine durable instruments. By 1880

Plate 70

Grand by Grotrian - Steinweg
In Music Department, Rhodes University.

they had opened a branch in London and in 1962 they started manufacture in South Africa.

In 1835, the firm of Grotrian Steinweg was established[254]. Frederick Grotrian and Heinrich Steinweg (alias Henry Steinway who emigrated to the United States of America in 1850) joined forces to produce a piano which many German pianists preferred to all others. Clara Schumann used one exclusively for all her piano recitals after 1870. Theodor Steinweg moved to Brunswick where he continued making pianos with Grotrian. When he left to join his father in America, the firm became the sole property of the Grotrian family. The firm is still in existence and produces superb instruments[Plate 70]. They are known for their "homogeneous sound boards". These are made from pieces of wood which exactly match each other in similarity of reaction to sound waves. Previously wood from the same tree, or wood of the same age, was used, but today the sound is measured scientifically to produce perfect matching. They also patented a violin shaped frame and soundboard surface to ensure a perfectly harmonious oscillation of the soundboard over the whole area. Great attention is paid to the exact striking place of each string and to the use of crossed, centralised bracings for stability and an even resistance to tension. The upper surfaces of the black keys have been remodelled to aid greater certainty in performance.

Ignaz Bösendorfer founded his famous firm in 1828[255]. He obtained the "Golden" Medal at the Industrial Exhibitions in Vienna in 1839 and 1845 and was appointed 'Piano Maker to the Royal and Imperial Court' by the Austrian Emperor - a distinction no other Austrian had ever achieved. In the early days of the firm's history, Liszt was giving recitals in Vienna. He is said to have used pianos of a well known make which were unplayable after a few pieces. On the advice of some friends he decided to try out a Bösendorfer grand. At the end of the concert the piano was still intact and this created a tremendous sensation. Liszt's reputation for strength and his enormous

Plate 71

Grand Piano by Blüthner in Music Dept., Rhodes University.

Illustration of "aliquot scaling" - a fourth string is added above each of the three treble strings - tuned an octave higher but not struck by the hammers. Its function is to vibrate in sympathy with the treble strings.

technique demanded more than pianos of that period could cope with, so that this display established Bösendorfer's reputation.

In 1860, Ignaz' son, Ludwig, succeeded him. He established a larger factory and a concert hall. When after ten years he found the premises too small, a new concert hall was created from the converted riding school of Prince Liechtenstein. The new Bösendorfer Hall was inaugurated in 1872, with a piano recital given by Hans von Bulow and became the favourite concert hall in Vienna for forty years.

The Bösendorfers are associated with experiments in connection with extended keyboards. In the Port Elizabeth Feather Market Hall is a model with a range which reaches $_{\prime\prime\prime}F$ - a lid fits over $G^{\#}$ G $F^{\#}$ and F so that visually the keyboard remains the same as others, if so desired. Experiments are still being made in this direction. The Bösendorfers have gone through periods of economic and political difficulty. They have experienced two world wars and a division of their Country and City, but the ideals, artistic vision and competence of this firm have remained constant and today is honoured by the musicians of the world as a producer of the best in art. Wilhelm Backhaus, in paying tribute to the Bösendorfer piano, on the occasion of the Jubilee of Bösendorfer House, said .... "The medium section has a subtle, delicious sound, regaling as the early dew, supported by a mighty bass register and a brilliant glittering treble .... I see in the Bösendorfer more than a merely magnificent piano; for me, it represents straight away the ideal embodiment of Viennese Musical Culture".

In 1853 Julius Blüthner of Leipzig, and three years later Carl Bechstein of Berlin, opened factories(256). They were still at a stage of development which enabled them to benefit from their visit to the 1862 Exposition, where the obvious advantages of Steinway's new piano were displayed. These two makers incorporated and developed the new ideas and very soon were producing the finest instruments in Europe, and they became the

respected leaders of the industry. All the older firms such as Schiedmayer, Ibach, Steinweg and Bösendorfer also began to show signs of increasing prosperity and in general German pianos were the favoured instrument amongst world pianists. Soon Germany was producing more pianos than her people could buy and an export industry developed, dominating the Swiss and Roumanian market and supplying a large proportion in Europe and overseas(257).

In 1879 Bechstein built a concert hall in London and established warehouses there and by 1900, half their annual output of grands and uprights went to Britain and her Colonies. In 1896 Blüthner opened a branch of their firm in London. A distinctive feature of their more expensive grands was introduced in 1873. Known as "aliquot scaling", (Plate 71) this device consisted of a fourth string added above each of the three treble strings. It was tuned an octave higher and was not struck by the hammers. Its function was to enhance the beauty of the treble section by means of sympathetic vibration. It contributed to the fame of the Blüthner but does not appear to have been universally approved.

By 1910, Germany's annual piano production of 150,000 was second only to that of America (360,000). Britain was third with 75,000 and France (25,000) a bad fourth.

After the 1914 - 18 war however, the decline in piano production, described in the previous section on America, was also apparent in Germany. Kurt Luethge(257 a) writing in "Die Musik" in 1924 maintained that the piano had not proved itself suitable for the expression of modern musical trends and referred to its "rigid objectivity" not allowing it to become pliable to the "art will of our generation". He thought it was finished. Luckily he was wrong, but it took an Austrain to suggest the solution. Carl Haselbrunner(257 b), as early as 1931, wrote an article for the Oesterreichische Musiker-Zeitung entitled "Is the piano still a domestic instrument?". He expressed concern

at the diminution of Vienna piano production and the amalgamation of eight firms so that they could "vegetate honorably" - he said that the piano was too expensive and too loud but that it might be rescued by reducing its size, its tonal volume and its price.

This suggestion was taken up by piano manufacturers all over the world and although Germany has maintained its high reputation for its concert grands it has also participated in the production of the popular small uprights.

Plate 72.

Japan

At the time that Germany was experiencing the beginning of her boom period in piano making, Japan was still completely cut off from Western civilisation. After keeping out all European ideas till almost the last quarter of the 19th Century, the Emperor ordered an elaborate re-education of the Japanese. A programme of training was initiated in every field, from toys and cameras to railroads and guns. Soon schools were established on American lines and as this included music, the Japanese imported an American Musician,

Plate 73

Yamaha Grand Piano Model C.F.

named Luther Whiting Mason, to come and introduce the new music to Japanese teachers and pupils. In 1879 he began the task of teaching the Japanese Western scales and notation and also introduced them to simple Western tunes(258).

In 1885 a Government School of Western music was established in a suburb of Tokyo and Germans engaged as instructors.

Even before all the official interest taken in music, a Japanese square piano was exhibited at the Paris Exposition in 1878. The keyboard of the piano was the only musical device copied from the West, a necessary part of the new educational programme. Its tuning was unfortunately completely useless for their indigenous music. However, the Japanese produced good performers and composers in the Western style and inevitably it became necessary to make pianos to supply the demand.

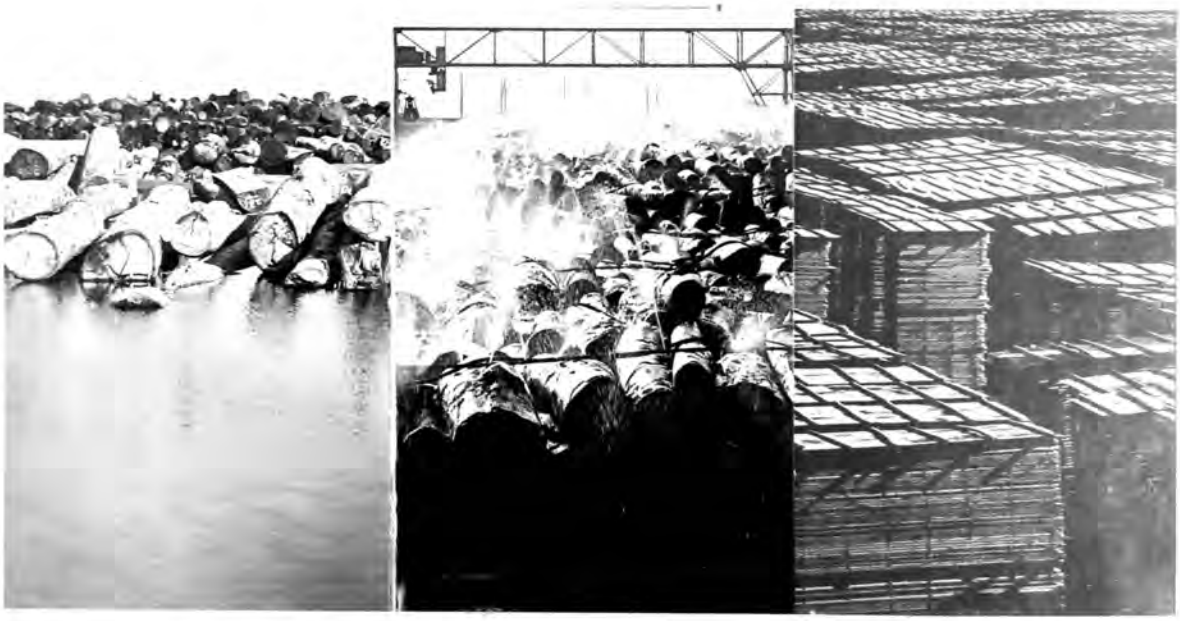
In 1880 Koman Yamaha started a piano making shop, probably making copies of imported models. In 1897 the firm was reorganised and named Nippon Gakki Company, Limited(259), and three years later produced the first Yamaha piano. The same year Torakusu Yamaha, the President, visited the United States of America to study manufacturing techniques, and in 1916 the firm began exporting pianos for the first time.

All production was stopped in 1944, due to worsening war conditions, and only began again after the war (1946). By 1947, however, full scale manufacture was resumed and exports to the Phillipines began.

Modelled on the Beckstein, the first grand piano was produced in 1950 and in 1956 Yamaha grand pianos took part in the 200th Mozart Festival in Vienna.

In June, 1960, Los Angeles Education Board approved the purchase of Yamaha pianos for the City Schools and since then have acquired three hundred and fifty(Plate 72). In 1964 the University of Michigan bought 25 pianos and in 1967 the Yamaha Concert Grand (Model CF) (Plate 73) was unveiled at

Plate 74



1 2 3

Timber yard of Nippon Gakki Co., Ltd. Hamamatsu - Japan.

Wood is kept wet to prevent cracking and rotting and removes resin.
1. Wood in the lake waiting to be sawn.
2. Wood in the lake being sprayed with water.
3. Sawn wood stacked to dry naturally for 7 - 8 years.
20% moisture content is required.

Fig. 24

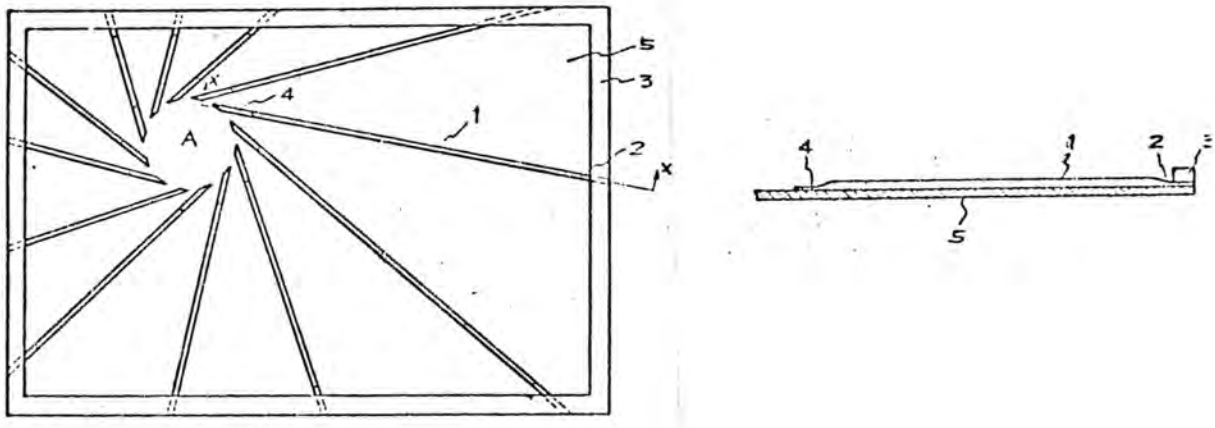


Diagram of Kinya Yamamato's invention using spiral instead of parallel sound bars. The ends of each bar are free at the centre of the spiral.

the Frankfurt Music Show, where it was universally acclaimed.

Statistics of their exports show incredible annual increases. In 1958, 735 pianos were exported and by 1969 the number was 34,900 with an expected 500 more in 1970.

During a visit to the Nippon Gakki Company in 1970, the writer was informed by the overseas manager, Mr. Danbara, that the approximate total world production of pianos was 500,000. Of these Yamaha make 180,000, South Africa 3,500 and of the 3,000 imported into South Africa 1,500 were Yamahas.

The Yamaha (Nippon Gakki Company, Limited) have seven factories in Hamamatsu. This huge city situated half way between Osaka and Tokyo is easily accessible on the Bullet train. It is an incredible experience to visit the factories and timber yards - all vast and using the most up to date machinery. Beautiful office buildings and artistically displayed Yamaha instruments in elegant rooms, richly carpeted - a row of slippers for prospective buyers and visitors to change into before entering any factory or office, and the inevitable green tea during conversation.

A drive round the timber yards has exotic and romantic associations. Birch, maple, silver fir, the Judas tree, oak, tamo, camellia,shide, ebony, mahogany and walnut are among the thirty different kinds of wood used for various Yamaha products. Many of these are indigenous, but some of them come from other countries. The spruce from Alaska is especially imported for sounding boards. A constant stock of wood is maintained, sufficient for 150,000 pianos. In a lake with a storage capacity of 500,000 cubic feet the logs are kept wet by spraying - this prevents cracking and rotting (Plate 74). After being sawn into logs they are stacked for 7 - 8 years to season and dry naturally to a moisture content of 20% or less. The next step is artificial drying in sealed chambers, till the required degree of moisture is obtained.

Plate 75

Assembly line of Upright Piano Factory, Nippon Gakki Company, Hamamatsu. Photo by writer 1970.

Plate 76

Assembly line of Grand Piano Factory, Nippon Gakki Company, Hamamatsu.

Each factory specializes in some part of the manufacture - making soundboards, frames, lids, cases, spraying or constructing some of the 4,576 parts of a modern piano. The assembly plants are enormous, one factory for upright pianos(Plate 75) and another for grands(Plate 76). Pianos are placed on slow moving belts and skilled workers make adjustments to the moving parts - each piano has one person who completes an entire operation(Plates 77 & 78). Even in Japan, where mechanisation is so far advanced, it is still necessary to use human skill for the final stages in piano making - no wonder no two pianos are ever exactly the same.

The Yamaha (Nippon Gakki) is the largest piano factory in the world. The Company spends lavishly on advertising. This includes instruction courses in their shops and Yamaha Schools of Music in some Countries. They have also published primers for Class teaching and individual pupils. In the upright piano factory 1,490 employees produce 8,000 pianos a month. These employees are mainly young people with an assured annual salary rise and security after retirement. This is the general rule in Japan, so labour is no problem.

Every part of the instrument is constructed in Yamaha factories and the selling price of their pianos is so competitive that it is causing concern to every other piano manufacturing country.

Japanese pianos are modelled on Western designs. They produce a variety of the small console and spinet type uprights in which they use the traditional action(Fig. 23) (Plate 79).

Recently, however, a Japanese inventor, Kinya Yamamato(260), developed what is claimed to be an upright piano with tonal quality equivalent to the grand. This has been achieved by using spiral instead of parallel sound bars and leaving one end of each bar free at the centre of the spiral(Fig. 24). This piano has received praise from Casals who described it as 'mellow, yet full and brilliant at the same time'. In 1970, the new piano was being turned out

Plate 77

Assembly line in the Grand Piano Factory of Nippon Gakki Company, Hamamatsu. Photo by writer 1970.

Plate 78

Tuning using an electronic aid, Nippon Gakki Company, Hamamatsu. The operator works in a soundproof glass fronted cubicle. Photo by writer 1970.

at a monthly rate of 100 units by one of the smaller factories in Japan.

Other piano factories in Japan are Nishikawa and Sons - the Ono Company, and Kawai. They produce good pianos but none can stand up to the overwhelming production standards of the Nippon Gakki Company, Limited.

Plate 79

Yamaha Spinet - Contemporary Modern.
7-1/4 octaves, 36" high, 58" wide, 27" deep, 425 lbs.
Piano case finished in Satin American Walnut.

CHAPTER VIII

KEYBOARD DEVELOPMENTS

Plate 80

De Quoco Harpsichord - detail of keyboard.

Photo : Robert Lautman.

The Hurdy-Gurdy

"With dead, dull, doleful, heavy hums,
With mournful moans, with grievous groans,
The sober hurdy-gurdy thrums"

Anon.

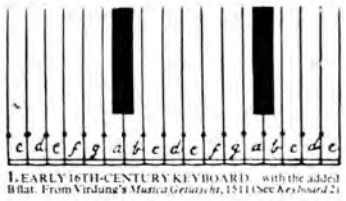
CHAPTER VIII

KEYBOARD DEVELOPMENTS

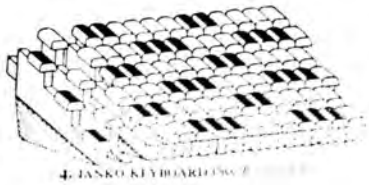
Keyboards are known to have been used on organs centuries before they were applied to stringed instruments[261]. Scholes says that the first keyboards designed for simple melodies had such broad and heavy keys that it required the blow of a fist to depress them (hence the name 'organ beater' for organist). The use of fists, however, is doubted by some authorities who believe that the flat of the hand was employed. Sumner, for example, says that crude keyboards actuated by the whole hand, were probably known before the time of Christ.[262]

The Hurdy-Gurdy[263] (Organistrum) is probably the earliest known stringed instrument to have a form of keyboard[Plate 81]. This instrument used since the 10th Century had two melody strings and two to four drones. The melody strings are stopped by keys touched by the left hand while the right hand turns a crank which revolves a rosined wheel, the latter scraping the strings and producing rough musical tones. The pattern of the keyboard was evolved from the small portative and regal organs of the 12th Century onwards. The first illustrations of Clavichords appear in the beginning of the 15th Century. In Germany, Belgium, France, Spain, Sweden and England there are in existence various writings and wood carvings dating from this period. The first keyboard consisted of white notes only. These had been given letter names by Guido of Arezzo in the 11th Century and enabled the use of the four authentic and playal modes which were the basis of all musical composition at that time.

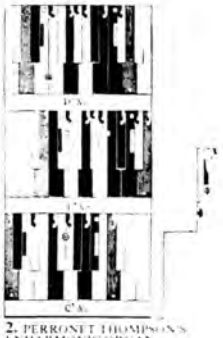
The unacceptable augmented interval F - B (often called 'the Wolf')[265] caused singers to flatten the B and inevitably someone thought of the idea of inserting a narrower shorter raised key, in a contrasting colour, between A and B[Plate 82]. With the extension of this idea to F♯, E♭, C♯ and G♯



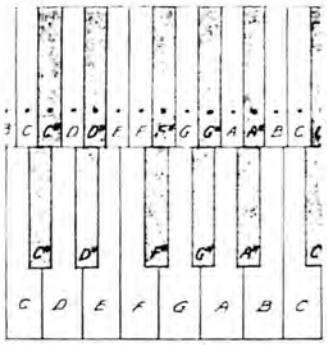
1. EARLY 16TH-CENTURY KEYBOARD with the added B flat. From Virdung's *Musica Getutscht*, 1511 (See *Keyboard* 2)



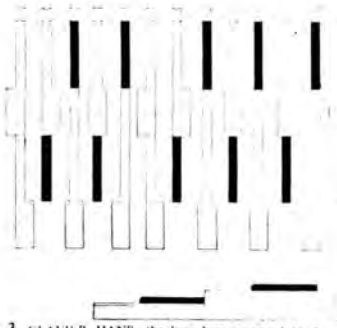
4. JANKO KEYBOARD (See *Keyboard*)



2. PERRONET THOMPSON'S ENHARMONIC ORGAN with 72 notes to the octave (See *Keyboard* 3)



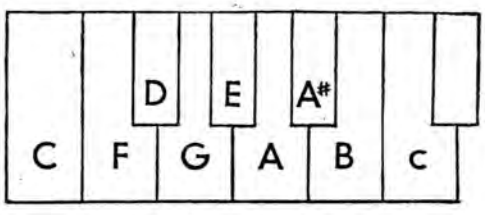
5. STOEHR QUARTER-TONE KEYBOARD (1924) (See *Microtones*)



3. CLAVIER HANS—the keys here separated to show the system (See *Keyboard* 4)

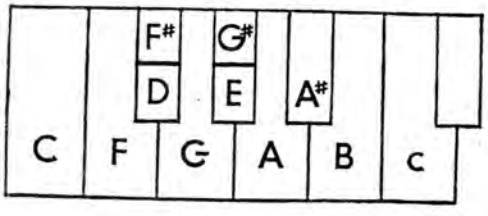
6. THE CYCLISAM KEYBOARD, curved and concave, taking account of the fact that the arms move in arcs on two planes

Fig. 25



The Short Octave

Fig. 26



The Broken Octave

the modal system began to break up and the key system of two modes to each key took its place. These two modes, Ionian (Major) and Aeolian (Minor), applied to each key, made it possible to have twenty four scales. This entirely new key system, with its traditional keyboard arrangement, was established by the middle of the 15th Century at the latest.

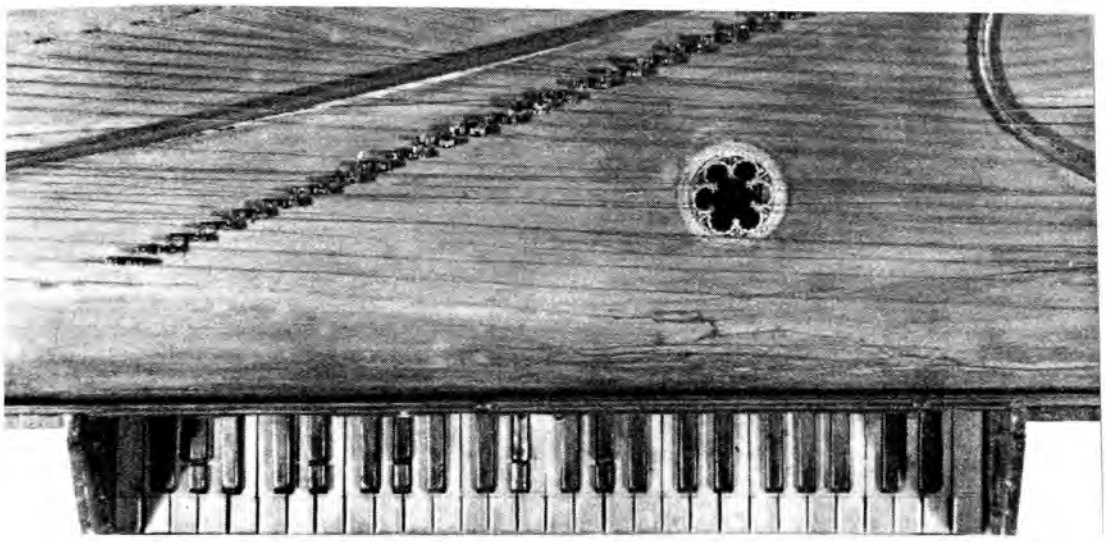
The earliest keyboards had only a single octave, but by 1540 had reached a maximum of three[266]. As the years went on the compass gradually increased and the keyboard was recessed. In the Middle Ages the lowest note was F but after 1500 was extended to C. In the 17th Century four octaves (from C) were common, and by the 18th Century most keyboard stringed instruments had at least five octaves (from F - F''''). This was known as 'Grand ravalement'. In harpsichords a five and a half octave compass from C was not unknown. However, it was possible to find many variations of compass between four, and five and a half octaves[267]. In order to extend the keyboard compass and at the same time economise in keyboard width and mechanism, it became the normal practice to rearrange the lowest octave, a custom which persisted in harpsichords until about the end of the 17th Century. As $C^{\#}$, $F^{\#}$ and $G^{\#}$ were not often required as bass notes in earlier times, it was possible to use their raised keys for other notes. The resulting arrangements were known as short and broken octaves[268]. The short octave was achieved by adding a key for the note C and making D and E raised keys. $C^{\#}$ and $D^{\#}$ were omitted since it was impossible to use them as 'root' tones with the systems of tuning then employed. Thus the arrangement of the "short octave" (Fig. 25) shows that the keys which seemed to be E, F, $F^{\#}$, G, $G^{\#}$ and A actually sounded C, F, D, G, E, A. It was possible to have other versions of the "short octave".

From 1600 onwards the "short octave" was modified chromatically and this was known as 'ravalement' (see Page 10). In order to extend the compass downward to G, additional keys were introduced, so that notes

Plate 83 a

Boni Virginal - view of keyboard showing broken keys.

Plate 83 b



Boni Virginal - Plan View.

Photos : Robert Lautman.

B C C# D D# E actually sounded

G C A D B E.

In the "broken octave" (Fig. 26) the raised keys were divided into two transverse portions, each playing a note (Plate 83). Thus missing notes were filled in or enharmonic notes provided. When "equal temperament" began to be adopted in the 18th Century the need for these enharmonic notes fell away (see Appendix V).

Although a five octave span was commonly used in harpsichords of the 18th Century, Cristofori's two extant pianos from the early years of that century had four, and four and a half octaves respectively. This was probably due to the compass of the harpsichords available to him in Prince Ferdinand's collection (see Page 26).

By 1813, Streicher of Austria was producing pianos of five, five and a half and six octaves and by 1818 he had made both a six and a half and a seven octave instrument (269).

The Germans were clearly ahead of their English and French competitors, for although Broadwood had produced a five and a half octave piano in 1790 and was the first with six octaves in 1794, there was no further increase, and six octaves remained the normal range until 1830.

It is interesting to consider the keyboard range of some of the pianos of famous composers and pianists (270). Mozart's Concert Grand Pianoforte in the Mozarteum, Salzburg, has five octaves - the Erard given to Beethoven in 1803 had five octaves plus five notes, and the Broadwood gift to Beethoven in 1818 was a six octave grand. The latter must have proved a disappointing limitation in view of the fact that Beethoven had already exceeded the six octave range in Op. 101 (1816) and Op. 106 (1818). (271)

In 1824 Liszt was using an Erard Grand of six octaves and Chopin and Schumann's works require no more than six and a half octaves.

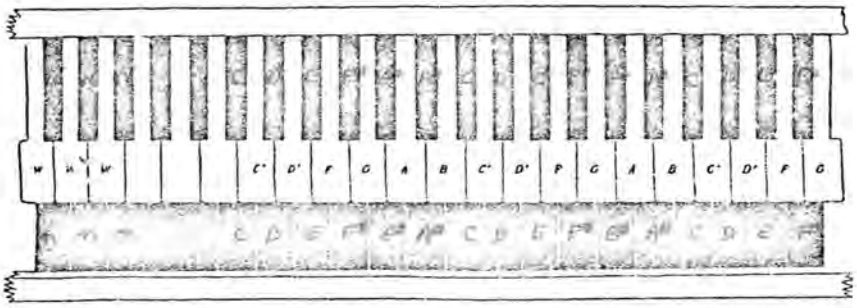
Today seven octave pianos are still made, but the usual keyboard

span is seven and a quarter octaves. Eight octave instruments have been constructed but they are exceptions. Bösendorfers are known for their work on extended keyboards in the low range (see Page 71). The keyboard of the present day has undergone no fundamental change since 1450[272]. Decorative changes such as the long and short keys respectively being black and white or white and black, carved or decorated with inlaid metals and covered with ivory, bone, tortoise shell, ebony, china or mother of pearl, have been fashionable at different times. Until the beginning of the 19th Century, the length of the natural keys from their fronts to those of the sharps, was shorter than at present and until the time of Bach, when thumbs were not used, all the keys were shorter in length. Also, the width of the keys has varied and therefore the octave span, which in early keyboard instruments was about 16 cm (6-1/3"), about .17" less than the present octave[273].

The twelve note octave is within the range of the average hand - in fact Chopin said that the size and arrangement of the black and white notes of the piano were so convenient that they might have been conceived in terms of the anatomy of the hand[274]. There were others, however, who considered the keyboard to be a complicated and unpractical means of playing with ten fingers, and the list of inventions to improve the situation is formidable.

One of the difficulties of the pianist is the anatomical problem presented by the arms, which move in a curved line, yet have to carry the fingers across a straight keyboard. For children and people with small hands it is a real hazard playing at either extremity, and the idea of curving the keyboard was first used by Neuhaus in 1780.[275] In 1824 the idea was revived by Stanfer and Heidinger, of Vienna, with a concave design in what was called "Hohlflügel" (Hollow pianoforte). By 1840, Wolfel of Paris, had produced a concave keyboard and in America a concave design for six or seven octaves was patented in 1841. The last and best known of the concave keyboards was produced in 1907 by Clutsam in Germany[276]. These were built into the pianos

Fig. 27



(*b*)

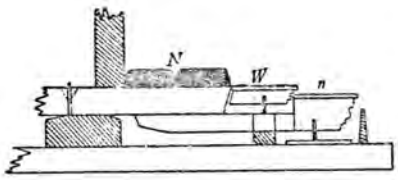
Fig. (*b*). The 'range' of narrow black keys *N, N, N* belongs to the notes *C, D, E, F* sharp, *G* sharp, *A* sharp, which are produced beyond the white keys at *n, n, n*. The level of the keys *n, n, n* when at rest may be below the plane of the keys, *W, W, W* 'so that the same effect will be produced whether the part *N* or *n* of any individual key be touched; but the performance of fingering will be rendered more easy by the advantage given to the player of touching either of these parts of the key at pleasure.' The 'range' of white keys *W, W, W* belongs to the notes *C* sharp, *D* sharp, *F, G, A, B*.

The table below is intended to show the new arrangement of the keys compared with that commonly in use. *I* and *K* show the order of the keys in the ordinary instrument; *L* and *M* the order in Trotter's instrument.

The table also shows the fingering to be used for both the major and the minor mode.

		1	2	3	4	5	6	7	8	9	10	11	12
The 12 Semitones in regular succession in one range	*H*	*C*	*C♯*	*D*	*D♯*	*E*	*F*	*F♯*	*G*	*G♯*	*A*	*A♯*	*B*
The Diatonic old arrangement of the keys in two ranges	*I*	*C*	.	*D*	.	*E*	*F*	.	*G*	.	*A*	.	*B*
	K	.	*C♯*	.	*D♯*	.	.	*F♯*	.	*G*	.	*A♯*	.
The Chromatic or my arrangement of the keys in two ranges	*L*	*C*	.	*D*	.	*E*	.	*F♯*	.	*G♯*	.	*A♯*	.
	M	.	*C♯*	.	*D♯*	.	*F*	.	*G*	.	*A*	.	*B*

By which disposition of uniformly alternate keys in two distinct ranges any one certain note taken as a Fundamental or key note together with the two succeeding Notes ascending in the same range of Keys and the four succeeding Notes ascending in the other range and the Octaves to all the said notes comprize all *the notes of that Key in the Major mode. And the same certain Key note together with the one succeeding note ascending in the same range of Keys and the five succeeding notes ascending in the other range and the Octaves to all the said notes comprize* all *the ascending notes of that Key in the Minor mode; by which constant uniformity it may be said that there are but one Key Major and one Key Minor to be learnt instead of 12 Keys Major and 12 Keys Minor as heretofore so very perplexing to the pupil.*



(*a*)

Fig. (*a*) represents a section of the keys.

Trotters Keyboard.

of several leading manufacturers, played on at concerts by prominent artists, and even used at the Königliche Hochschule für Musik in Berlin. The Germans called it the "Sunray Keyboard"(Plate 82).

Child prodigies inspired designs specifically intended for children. In 1837 Obendrauf of Vienna, made a keyboard with narrow keys and, in Paris, a Madame Soria invented an additional keyboard with narrow keys designed to fit over the ordinary keyboard, to enable children to play large intervals(277).

The existing arrangement of the black and white keys often creates problems of manipulation. The necessity of fingering each scale differently is one, and the narrow space between the black keys - a physical hazard for fat fingers, is another. Varying attempts, since about 1560, have been made to overcome these difficulties.

In 1790 Johann Rohleder constructed a keyboard with regular alternating diatonic and chromatic notes,(278) while about the same time the Englishman, Clagget, arranged a keyboard in which all the keys were the same length, breadth and level(279). They were rounded at the top, like a fan, 1/6" apart, and the same distinguishing colours as usual. This was meant to ease the playing of shakes, eliminate the danger of touching one key for another, and most important, one fingering would do for all scales.

In 1811 Dr. Krause of Dresden had an instrument made for him with keys on the same level and of the same breadth and colour.(278) In the same year in London, John Trotter created a keyboard which made it possible to play all the major scales with one fingering and all minor scales with another.(280) For this he used two ranks of keys, but instead of the customary grouping of black and white keys, the black keys form a continuous series and are prolonged beyond the white keys(Fig.27). A black key could be played either above or below the white key. All the black keys are a whole tone apart and so are the white keys. The diagram and description are reproduced as they incorporate the germ of the future Janko keyboard (see Page 83).

Allison and Company exhibited a piccolo upright at the exhibition in 1851, which had a special keyboard with alternating grey and white keys which enabled learners to form a major or minor scale in any given key[280]. The major scale required a sequence of three successive keys of the same colour followed by four of the other colour, while a minor key required two keys of the same colour and five of the other. The keys were arranged in the following manner:

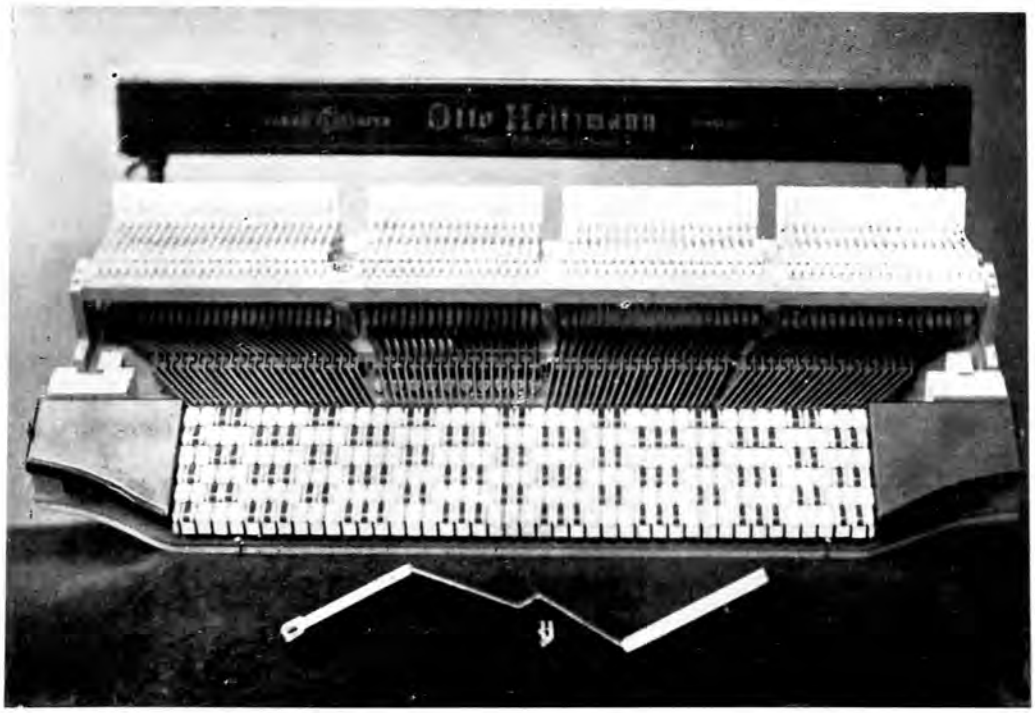
C Grey	F# Grey
C# White	G White
D Grey	G# Grey
D# White	A White
E Grey	A# Grey
F White	B White

In 1829 Gaussin created a chromatic keyboard called 'Isotone" - it had all white keys. Schiedmayer - a German maker - alternated black and white keys so that all scales could be played with one of two fingerings, depending whether it started on a white or a black key[281].

Harding states [282] that Tonnel, in 1837 "patented a keyboard disposed in three levels. The upper level gave the chromatic scale, the middle level the natural scale and the lowest level the chromatic flat scale. This arrangement did not make any new mode of fingering necessary, whilst by its use the student preserved his correct sense of pitch".

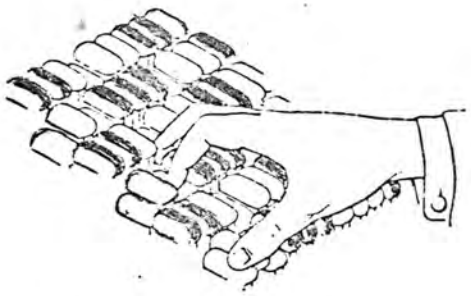
An interesting modification of the existing keyboard was invented in 1844 by Hewitt of London. He raised the back portion of the white keys to the same level as the black to avoid the uncomfortable depression between the keys[283].

Many ideas were dreamed up - most of them too complicated to be practical. However, at the Paris Exhibition in 1878, E.J. Mangeot created a sensation by producing an enormous grand piano with two manuals - one for each hand[284]. Wieniawski specified this piano which consisted of two superimposed grand piano actions. The keyboards were placed one above the other and the notes were mirrored so that each hand could play with the same



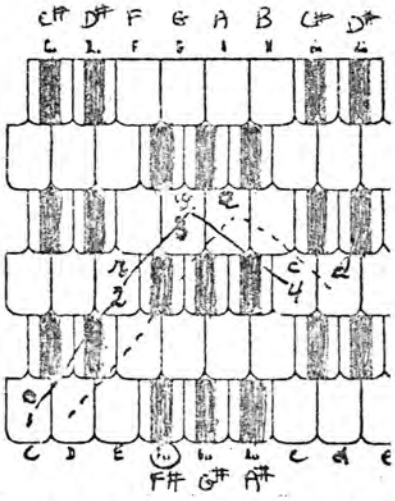
Keyboard and Action of a Jankó Piano.

a



In this way you play
C major chord.

b



The positioning of the
major triads over
4 rows of keys.

fingering. The right hand keyboard had ascending tones from left to right and the opposite for the left hand keyboard. This also allowed the pianist to play bass notes with the right hand and vice versa. Mangeot built six specimens and one is in the Brussels Conservatoire.

Perhaps the most famous and ingenious of all the keyboard inventions was that of Paul von Janko, an Hungarian musician and Mathematician.(285) Working on the suggestions of a Viennese musician, H.J. Vincent, he produced a patent in 1882(Plate 84). The keyboard was designed to correct the obvious disadvantages of the traditional keyboard. The fact that the star shaped hand has to operate in a straight line is particularly unnatural when the thumb has to strike a black key and the other fingers the white keys. The thumb, being a strong finger, is not always able to be used for rhythmical purposes, as the black keys are unequally positioned in different keys. Also the positioning of the five black keys leads students to a wrong mental picture of interval relationships which are equal musically, but physically look so different on the normal keyboard.

At a first glance the Janko keyboard looks complicated, but in fact, it is a very clever, simple and comfortable arrangement(Plates 82 & 84). The six rows of keys, raised one above the other, resemble a typewriter. Each horizontal row is a series of whole tones, and alternate rows start on C and C♯. Each note has three striking places so that the performer can use any one which happens to be closest to his fingers.(Fig. 28 a & b) Each rank has an equal number of keys of equal width, striking alternate semitones. The lower rank reads C D E F♯ G♯ A♯ - the upper C♯ D♯ F G A B. As a concession to old habits, the sharp keys are painted with an unfunctional black stripe. Although the arrangement looks like three keyboards, it is in fact only a single one playable on three close levels.

To play a scale one can depress C D G on one row - F G A B on the

Plate 84a

Janko Keyboard on a Decker Upright in
Smithsonian Institute, Washington, D.C.

lower row and back to C on the upper or lower row. Starting on any note this pattern will always produce a major scale. It will be seen that transposing requires no concentration - as long as one has acquired a particular pattern technically, the original note is all that is necessary to repeat that pattern in any key. Being able to use the thumb under the little finger is tantamount to having an extra finger.

The octave stretch is shortened by one note which combined with narrower keys makes an enormous difference to the playing of chords and wide intervals. A child who can stretch a 6th can play an octave on von Janko's keyboard. The entire 7 octave keyboard is the width of the old 5 octave one, and enables one to play any sort of composition without moving the body out of its' position of rest. Hand and arm movements are smaller, which can mean increased velocity.

In his book "Eine Neue Klaviatur" von Janko says ".... before it was the job of the piano teacher to adapt the hand to the piano, but I have sought to adapt the piano to the hand".

In 1885 R.W. Kurka built the first grand piano incorporating this keyboard. This enabled von Janko to demonstrate the instrument to the public at a piano lecture recital. Critics in Vienna were impressed by the way in which the pianist in Chopin's Harp Study, could play the broadest chords without breaking them. J.S. Bach's organ fugue in C min. was played exactly as written, including the pedal voice. His teacher, Prof. Hans Schmidt, was convinced that a victory had been achieved, although he realised the difficulty of launching a new invention, which required a new skill to use it.

In Budapest it was felt that pianists would achieve greater freedom by meeting less difficulties.

Later on von Janko visited half of Europe, and in 1891, America. Decker Bros. and Otto Heitzmann applied the mechanism to their own instruments.

Plate 84 b

Plan View of a Janko Keyboard on a Decker Upright
in Smithsonian Institute, Washington, D.C.

A Conservatory of Music called the Paul von Janko Conservatory of Music was run by Emil Winkler who serialized articles on the subject in 'Musical Courier' that year.

W. Bradley Keeler wrote a manual on 'How to play the new Keyboard'.(286) Everywhere people were interested and criticism was favourable. The invention was introduced at various conservatories, but interest gradually declined. One of the drawbacks of the invention was the problem of balance in the action, due to the increase of material in the keys. A somewhat sluggish touch resulted. In 1910, Paul Perzino, a German piano maker, remedied this defect and actually made an instrument which had available a Standard and a Janko keyboard,able to be folded up and set in position alternately. Even this did not help to resusitate interest and von Janko's life became a tragedy. His piano cost him his fortune and he ended up by becoming a Civil Servant in Constantinople. His hopes of reviving interest in his invention never came to anything, and he died in 1919 alone and far from the scene of his victories and defeats.

His pupils did what they could to boost the idea. The Norwegian woman pianist, Thekla Nathan Bjerke, gave concerts in Norway and England and created a good deal of interest. A critic in London voted it 'the greatest experience of a century'.(285) There is a Janko keyboard on a Decker upright in the National Museum, Washington, D.C.(287) Other pianos are to be found in the Norwegian Folk Museum, Oslo, the Music Historical Museum, Copenhagen and the Smithsonian Institute, Washington.(Plate 84a & b) (In Vienna there is still a Society whose members work for von Janko's ideas and hope for a revival).(285)

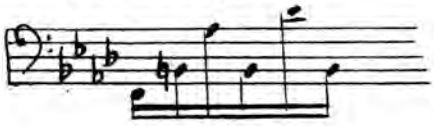
Scholes lists other attempts after Janko such as the Adam Keyboard, 1901; Durand Keyboard, 1904; Kuba Keyboard, 1907 and the Nordbo Keyboard, 1915. A Belgain engineer produced the 'Clavier Hans' in 1917(Plate 82). This was on the main principles of the Janko but had only two rows of keys and kept the long and short key arrangement of the traditional keyboard.(288)

In 1921 Emmanuel Moor, an Hungarian, living in England, produced his "Duplex Coupler" or "Moor Keyboard".[289] This piano, suggested by the harpsichord, had two keyboards. The upper one sounded an octave higher than the other. This was achieved with only one set of hammers and one set of strings, but the key levers on the upper keyboard were bent to the right at an angle of about 75° so that they propelled the hammers against strings of a higher pitch. The two keyboards were coupled by pressing down a 3rd pedal which separated them immediately, on being released. Mr. Gilbert Webb[290] in describing E. Moor's piano at a meeting of the Musical Association in 1922, said that the real novelty and value of the invention lay in the last inch of the visible part of the lower keys being raised. This brings the keys of the lower keyboard into convenient distance to be struck by the thumb when the hand is on the upper keyboard, and it also allows a new capacity for the piano - a chromatic glissando. Moreover the thumb is able to move up and down in a natural manner. This idea was not a new one, as we have seen in the invention by Hewitt of London in 1844 (see Page 82). By coupling the keyboards, octaves can be played as single notes - extended chords may be sounded simultaneously,and chords covering 4 octaves can be struck easily. The interval of a tenth can be played as a 3rd, and crossing of hands is no longer necessary. In contrapuntal music the crowding of the fingers is avoided by being able to play the bass parts an octave lower on the upper keyboard.

The Aeolian Company, Schmitt-Flohr (Berne) and Blüthner (Leipzig) manufactured this instrument, and it cost from £30 - £40 more than the equivalent standard piano. Winifred Christie[291] the inventor's wife, an excellent pianist, was largely responsible for the interest it aroused. She performed at concerts and lectures in England and America and had a brief success.

Prof. Donald Tovey,[292] a champion of the 'Duplex-Coupler', felt that its acceptance had been inhibited because it was never demonstrated widely

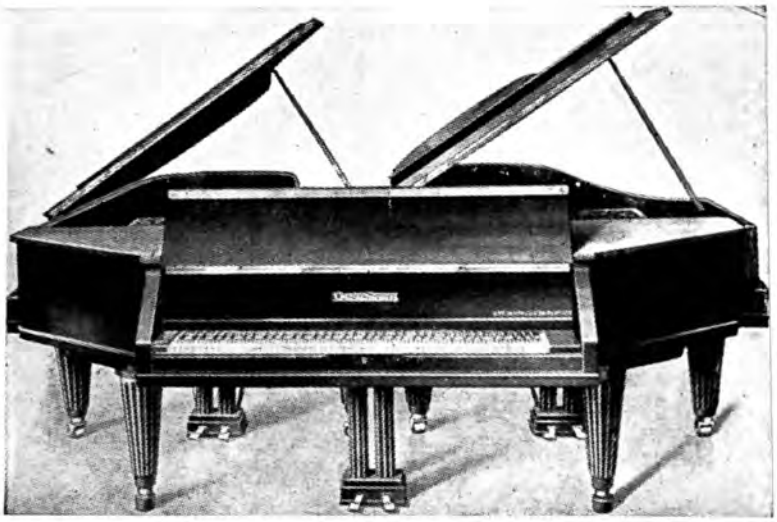
or effectively. Loesser[293] claims it had limited musical purpose, was bulky in shape and heavy to play. Scholes[294] puts its failure down to the depression, but Sumner[295] clearly dislikes the idea of the "mechanical uniform addition of an octave to its note". He prefers the variety of tone and timing available by a good pianist. Tovey points out that if such rhythmic enlivenment is desired, cross manual technique need not be used. It's purpose is to simplify such technical difficulties as the extended 'Alberti basses' where the jump of a tenth is not always able to be played legato.

e.g.  Chopin Etude Op.10 No.9

Keyboards involving intervals smaller than the semi-tone have been experimented with since the 16th Century. These experiments were aimed at reviving the Greek musical theory with its three types of notes, diatonic, chromatic and enharmonic. Attempts were made to adapt the harpsichord to these subtleties. In 1546 the Abbé Vicentino invented a multiple keyboard instrument capable of enharmonic distinctions. This is incorrectly described by Closson as a quartertone harpsichord[296]. In 1548 Zarlino had a clavicembalo constructed which also contained keys for all major and minor semitones[297].

In 1555, Vicentino described his arcicembalo and in 1561 his arciogano, each with six manuals containing 31 keys to the octave. The arcicembalo had 132 keys - the first two manuals took care of the usual three sharps (F♯C♯G♯) and two flats (B^b, E^b) which were tuned to the generally used method of tempered instruments. The third manual contained an additional four sharps and three flats. The fourth, fifth and sixth manuals were tuned in tempered fifths to the three other rows. Consequently every tone on the lower manuals could be accompanied by "good consonances". Vicentino also constructed a similarly tuned organ with 126 keys and proposed a unified tuning in order to enable different instruments to play together. According to "Die Musik in Geschichte und Gegenwart", Luzzaschi and Gesualdo composed for or played these instruments[298].

Plate 85



Grotrian Steinweg Quarter-tone Piano, with extra notes intercalated throughout the keyboard.

Plate 85 a

Hans Barth at the Quarter-tone Piano, 1929.

Italians were building similar harpsichords till the end of the 17th Century. In 1782 Jacques Germain, a Parisian harpsichord maker, was known to be constructing such instruments. One hundred years later G.A. Behrens-Senegaldens of Berlin patented a quarter-tone piano. A number of quarter-tone pianos have been made in the present century(299) including those by Dr. Moritz Stoehr of New York (1924), the Russian Vyschnegradsky of Paris and such well known piano builders as August Förster and Grotrian Steinweg(Plate 85).

The composition of quarter-tone piano music obviously requires a keyboard with smaller divisions than our traditional twelve tone one. In Prague Alois Haba constructed a piano with two keyboards, one normal, the other tuned a quarter tone higher. In 1923, a class was created at the Prague Conservatory for Haba to teach quarter and sixth tones(300).

About the same time, the American, Hans Barth had a quarter tone piano made for the performance of his own music and other composers' works(301). It is really two pianos made into one with a double keyboard. (Plate 85a) The two sets of strings are tuned a quarter-tone apart. He travelled all over America with this instrument and introduced some novel music. In 1930 he played his Quarter tone Concerto with the Philadelphia Symphony Orchestra, which proved an interesting experiment but apparently to ears unused to the smaller intervals it sounded like two pianos not in tune with each other, being played at once.

Modern jazz pianists have shown some interest in the Quarter tone piano of Barth(302). In 1955 Leonard Levinson tried to revive the piano which had been billed originally at Barth's concerts as "the piano of Yesterday, Today and Tomorrow".

In spite of all the modifications and ingenious arrangements, the traditional keyboard of the 15th Century still remains the standard keyboard on the piano of today.

Geiringer blames the "tenacious conservatism of the pianist" for this state of affairs and points out that the habits and traditions of centuries are

difficult to overcome[303]. Sumner, however, takes the view that "the new devices did not become general because pianists did not find them necessary". He considers that the vast quantity of music written for the traditional keyboard has grown up in relation to this keyboard[304].

In the writer's opinion Sumner's latter agrument is not valid because all the devices and inventions described in this Chapter were equally suited to the performance of any keyboard music.

The very fact that there were so many attempts to devise new keyboards indicates a need for improvement. In order to overcome the natural resistance to the cost of purchasing and learning a new instrument, what was lacking was perhaps the vigorous promotion techniques which popularised the Player Piano in America.

However, any change now, after all this time, seems most unlikely.

CHAPTER IX

MECHANICAL AIDS TO PIANO TEACHING

Plate 86

"Digitorium" or Dumb Piano owned by Mrs. N. Manley, Grahamstown.

Plate 86 a

John Bernard Logier.

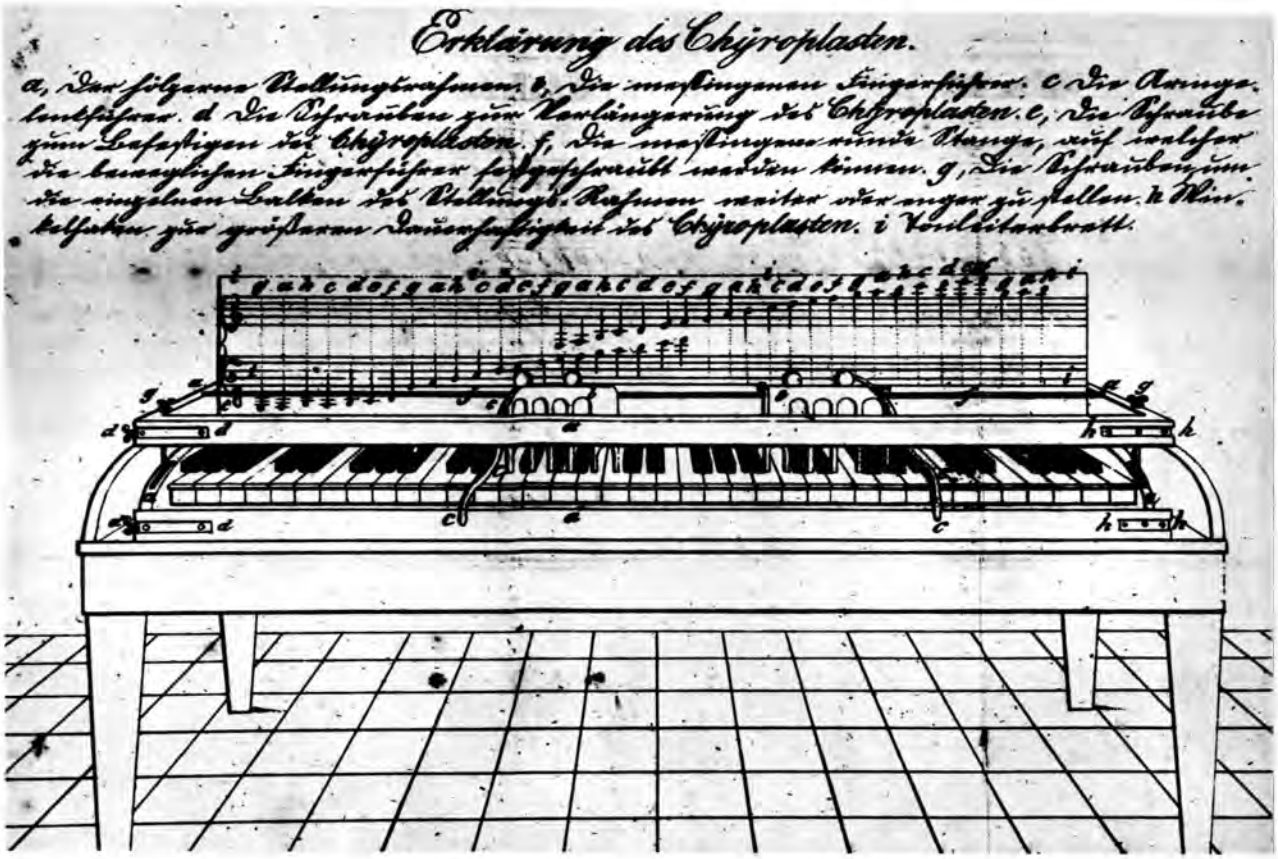
CHAPTER IX

MECHANICAL AIDS TO PIANO TEACHING

Individual piano lessons have seldom proved a profitable means of making a living. The earliest teachers were composers, organists and employees of noblemen,who implemented their incomes by giving lessons. Later we find concert pianists and composers such as J.C. Bach, Clementi and Moscheles relying on their reputations and connections to acquire wealthy pupils. Later still, poorly qualified teachers cashed in on the market, as it was considered a necessary accomplishment for every refined young woman to be able to play the pianoforte. When it became acceptable for girls to go to school, a male teacher paid a weekly visit and heard each pupil for fifteen minutes. For the rest of the week an unqualified, underpaid governess watched over the daily practice. This method probably earned a reasonable salary for the itinerant teacher, while still retaining the old time honoured conception of individual tuition.(305) In 1813, however, an astute business man revolutionised this old fashioned idea of piano teaching.

John Bernard Logier,(Plate 86a) born in Alsace in 1774, came to Dublin and set up a music saloon at 27 Lower Sackville Street(306). He was a military band master and played the piano enough to set himself up as a teacher of that instrument. He composed piano sonatas and wrote a text book on harmony, which became internationally known, and from which Wagner received his first instruction(307).

Logier worked out a plan in which groups of pupils could be taught at the same time(308). The classes consisted of twenty pupils - two hour sessions in which half the students did rudiments or harmony - the other half having 'individual' lessons on the piano. After one hour the groups changed. By these means he was able to take two hundred and forty pupils a week. At £21 a year and with an entrance fee of £1.1.0 per pupil he earned £5418 per



Description of the Chiroplast.

a. Wooden positioning rail
b. Brass finger plates.
c. The wrist controller.
d. Screws for adjusting the width of the Chiroplast.
e. Screw to fix the Chiroplast in position.
f. The brass guiding rail to which the finger plates are attached.
g. Screws to adjust the depth.
h. Brace to strengthen the frame.
i. Gamut board.

annum. Even if he employed assistants, probably at about £200 a year, he still made a good income for those times.

In 1814 he invented and patented an apparatus designed to facilitate acquirement of the correct position of hands on the piano[309]. The Royal Patent 'Chiroplast', as it was known, was a wooden framework, the same length as the keyboard, which screwed onto the piano[Plate 86b]. The hands were placed between the two parallel rails, in front of the keyboard, which allowed only a lateral movement of the wrists. A brass rod carried the finger guides. These were brass plates with 5 divisions through which the thumb and four fingers passed, and they were placed at a suitable height above the keys, about 6 inches away from the parallel bars. The player was able to slide them freely along the brass rod to any position up or down the keyboard. Attached to the top of each finger guide was a strong brass wire with a regulating screw which pressed against the wrist to keep the hand in a correct position relative to the arm. A 'Gamut Board' placed against the back of the keyboard had staves and notes written precisely above each key to aid the teaching of notes. Grove[310] suggests that the Chiroplast was evolved to teach the inventor's daughter, but Loesser[311] regards it as the "snake oil" to make his kite fly'. Whatever the reason, the Chiroplast became famous. Logier called his music saloon 'Chiroplast Hall' and organised a Chiroplast Club. The members wore a distinctive costume fastened with buttons embossed with a crown - indicating the Royal patent - the figures 3, 5, 8 - intervals of the tonic triad and a scroll with two scales. Mr. Logier, however, made the bass clef curl round the third instead of the fourth line'. As the craze developed, more academies were opened in Dublin and by 1817 Logier had started one in Edinburgh and also in London.

Clementi warmly recommended the Chiroplast - a doubtful testimonial in view of the fact that Clementi and Company manufactured and sold them, with an instruction book, for five guineas. However, John Cramer

approved and also Kalkbrenner, who opened an academy in London.

Mendelssohn derided the machine - he called it "teaching by steam". Other critics included some of Londons finest musicians. Logier was in the habit of giving examinations or public demonstrations of his system. One of these was attended by various well known musicians, who asked some pertinent questions and afterwards published a pamphlet practically calling Logier a fakir. His prospectus certainly bears this out for he advertised "that pupils of ordinary capacity and ordinary industry can be rendered capable of emulating Corelli, Handel, Haydn and Mozart". He also sold his "secret" system of teaching, for one hundred guineas, to other teachers who had to promise to keep the secret'.

By 1818 there were twenty eight academies in various parts of Britain and Ireland, and by 1819 there were eighty two. There was also one in New York, one in Philadelphia and one in Calcutta. A certain Miss Brown in New York advertised, in the 'Centinel' of Oct. 4th 1817, that she was offering to sell a pamphlet describing the Chiroplast for twenty five cents at her house and also at Franklin's Music Warehouse, other music stores and a circulating library(312).

The fame of the Chiroplast was obviously very widespread(313). In 1821, the Prussian Government sent Franz Stoepel to England to examine the system. His report was so favourable that in 1822 Logier was invited to Berlin, where he spent three years. During the first five months he gave lessons to sixteen pupils after which he gave a public demonstration. This secured him the job of instructing 20 professors for the next two and a half years.

The main drawback to Logier's Chiroplast was that when the support was withdrawn the hands tended to fall into a bad position. Also the thumb could not be passed under the hand or fingers over the thumb.

After Logier left England, Kalkbrenner returned to Paris, where

he tried to promote the general idea of the Chiroplast. Realising it's limitations, he abolished the finger guides, replying only on the hand rails which he called a 'guide-mains', and it sold in this form until 1877. Liszt called it a 'jackass guide' - nevertheless it had some success.(314)

Another modification was a sliding wooden mould which fitted the palm of the hand. This was fastened by means of a strap over the back of the hand, allowing free lateral movements and passage of the thumb under the hand.

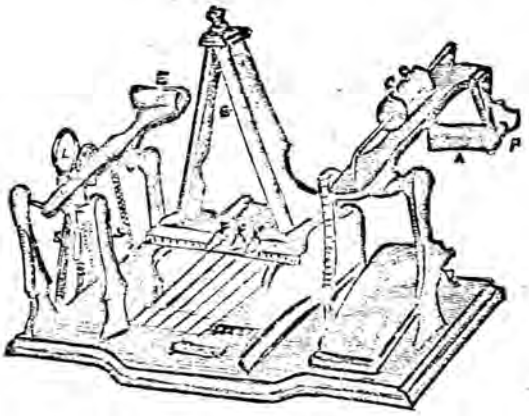
In 1836 Henri Herz produced a device called a "Dactylion".(315) This was a set of 10 vertical springs hung upright over the keyboard. The player inserted each finger into a ring at the end of each spring, which, as he exerted each finger, stretched the spring which sprang back to give the finger the 'quick lift necessary for clear articulation'. A book of 1000 exercises was issued at the same time.

A piano practising aid called the 'Chirogymnaste' invented by a piano dealer Casimir Martin, was supposed to have the advantage of "educating the hand and the fingers without tiring the ear", and "cuts down two thirds of the study time that the piano requires today".

Piano technique was considered so important in the latter part of the century that various implements of torture appeared(316). In 1880 Theodore Presser, the editor of the Etude Magazine, devised a contraption to hold the hand in the correct position. It looked like a little ancient rack with multiple thumb screws. He copied Herz in naming it the "Dactylion" and it cost $ 3.50.

A New York piano teacher, F.L. Becker, brought out his 'Manumoneon' price $ 10 "5 keys with adjustable touch ... combining ... the greatest number of gymnastic appliances 'directly' useful to the hands of pianists". C.H. Bidwell of New York came up with the "Pocket hand exerciser" - "cheaply made with finger loops and rubber bands, and supported from the floor by means of a foot stirrup". Its purpose was to prepare the hands for the keyboard.

Fig. 29



Brotherhood's Technicon.

Mr. Ridley Prentice described the manner in which he used this instrument as follows:-

"Each motion is to be repeated rather slowly and steadily about twenty times, first with the right and then with the left hand, thus avoiding any undue strain on either hand. The weight or spring is to be so adjusted that the pull shall feel quite light, the best results being obtained by frequently repeated motions with a light weight. The attention must be firmly fixed upon the particular muscle which is being exercised so that the conductive power of the motor nerve may be also increased.

Taking first the right-hand lever. The weight C is (as you see) easily adjustable. The roller A rests sometimes on the backs, sometimes on the tips of the fingers. The various movements develop both flexor and extensor muscles, but the latter have to do more work, inasmuch as besides straightening the wrist and fingers, they have to lift the weight of the roller.

The use of the triangle G develops the small muscles of the hand, and also stretches the ligaments which join the large knuckles and which constitute a frequent cause of stiffness. By means of the grooves F, F, F, at its base, we develop the muscles used in imparting a sideway motion to the fingers.

The resistance of the left-hand lever is regulated by two springs, S, S, and can be increased or lessened at will by simply inserting their hooks in other eyes. By means of the leather loop L the thumb and each separate finger can be exercised independently. Here only one spring must be employed. Insert the first finger in the loop, hold the whole hand straight out, raise it an inch and a half, then slowly and steadily lower and raise the first finger, taking care that there is no sympathetic action of the muscles of the other fingers. This motion appears simple, but if you will try it, even without the Technicon, you will find it not easy to control the small muscles so that there shall not be the least trembling of the other fingers. To use the further end of this lever E the hand must be held palm upwards, and the lever drawn down by the fingers.

Mr. Brotherhood, a civil engineer and amateur player of the pianoforte, had a very stiff hand. He spent six to seven years experimenting with ideas to improve this situation, and his Technicon was the eventual outcome.[317] This was an elaborate looking construction in balck walnut or Mahogany, costing £5.[Fig.29] It aimed to develop and train each set of muscles individually and in a scientific manner. Mr. Ridley Prentice gave a lecture to the Musical Association in 1888. He called it "Brotherhood's Technicon: The Necessity of a Systematic and Scientific Development of the Muscles of the Hand and Arm for Pianoforte Players". He was a pianoforte teacher and used the Technicon in his work. He claimed that the time devoted to technical study could be cut down which in turn reduced muscular and nervous strain and a deadening of artistic perceptions and faculties. He maintained that the artistic nature of the player suffered, owing to a lack of scientific mechanical training, and that the keyboard was not a suitable apparatus for this scientific training. The 'digitorium' or 'dumb piano' was condemned for the same reason, i.e. that the flexor muscles are exercised more than the extensors, but the lack of sound gives no guide to the amount of energy required which makes it even worse than an ordinary piano. Both Robert and Clara Schumann condemned the use of dumb pianos. In fact Clara said that technical exercises are used to the extent of dragging all the music out of the brain of a pupil. Ridley contended that concentration on each individual set of muscles was essential, and the fact that these exercises could be done without tiring the ear after a day's teaching and practising was a boon to musicians.

The 'Technicon' enjoyed a vogue of about 10 years.

At about the same time, in England, a Mr. Macdonald Smith[318] produced an invention which concentrated on the necessity of raising the finger very rapidly. When this was achieved, a small bell sounded which had the effect of keeping the pupil's mind from wandering.

Loesser claims that the best of all these practising aids was A.K. Virgil's 'Practice Clavier'[319] - a development of the earlier dumb piano 'Digitorium'. (Plate 86) This small box on a stand with a keyboard in front was advertised as a silent piano. It was neither silent nor a piano. When a note was firmly depressed, it gave a click and on using a certain lever a different click sounded on the release of the note. This made it possible to see that each finger was doing its work - a useful aid to legato playing and concentration. In addition, by turning a knob, key resistance could be altered from 2 - 20 oz. per key - helpful for acquiring finger strength. A 7 octave model cost $ 60. This instrument was in great demand from 1888 - 1913 - such men as Joseffy and Rosenthal, both virtuosos and teachers, used it extensively.

The use of such aids seemed to die a natural death in the succeeding years. Loesser's explanation for this is that "the naive zeal for 'technique' as a separate aim in itself - especially the striving for fleetness of finger articulation - seems to have subsided and interest in the Clavier drooped along with it".[320] The "Naive Zeal" was surely not altogether true. It appears to be the result of ignorance, because as new ideas on technique developed, the mechanical aids disappeared.

Since all the devices described above were designed to strengthen the fingers, it seems clear that the emphasis in piano playing was mainly in this direction. The arms and hands were kept as quiet as possible and, apart from hours of scales and exercises, very little attention was paid to the teaching of technique. The great virtuosi such as Liszt and his contemporaries probably acquired their tremendous skill from experiment, hard work and a natural ability. However, they were not good teachers, as is so often the case with great pianists, most of whom are unable to analyse their achievements.

As late as 1830 touch and technique were still not being taught in the Leipzig Conservatory. Plaidy, who had definite ideas on the subject,

quarrelled with the authorities and left the Conservatory to set up on his own. He was considered the best teacher of the time. Kullak, in 1876, produced his work on 'Aesthetics of Pianoforte Playing' explaining the importance of hand and arm weight and the avoidance of needless pressure after sound had been made. This was also a tenet of Plaidy's(321).

In 1903, Tobias Matthay in London produced his revolutionary ideas on technique in "The Act of Touch" and a year later the German, Dr. Steinhausen described similar ideas. He arrived at his conclusions by applying his surgical knowledge to study muscular movements connected with playing various instruments(322).

Having discovered muscular freedom, the old mechanical strengthening devices became unnecessary. The modern ideas on touch take into account the total physiology of the fingers, hand and arm, which must be used in the correct combination to achieve the desired result, without strain.

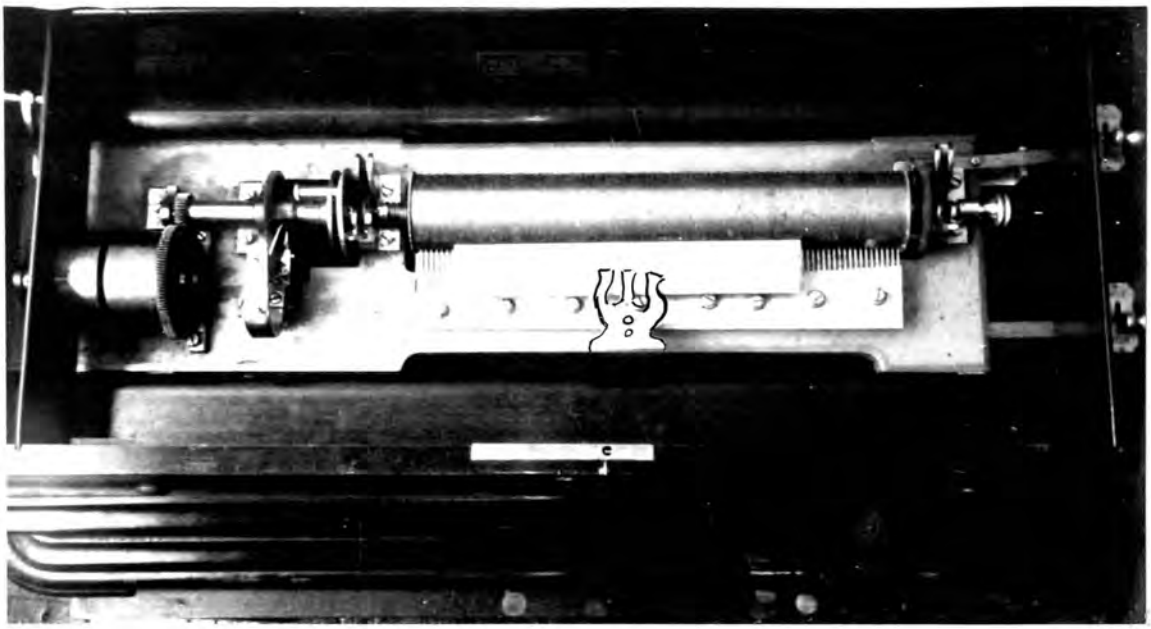
CHAPTER X

MECHANICAL STRINGED KEYBOARD INSTRUMENTS

Plate 86 c

Droz's Mechanical Harpsichord, 1774.

Plate 87



Close up of cylinder in playing position. The plate situated above the comb is adjustable. It can be moved back from the cylinder to increase the volume of sound.

Plate 88

Musical box made in Switzerland, 1880. In possession of Mr. Hamburger, Grahamstown. Made of Rosewood - it plays two tunes. Pins are clearly visible on the brass cylinder. 5" x 3½" x 1-3/4".

CHAPTER X

MECHANICAL STRINGED KEYBOARD INSTRUMENTS

The skill required to play a musical instrument has always been limited to relatively few gifted people. Prior to the Industrial Revolution more sophisticated instruments were too expensive for the average man to own, so that the main source of musical enjoyment was probably maintained in listening to Church music and strolling players. Mechanical forms of reproducing music date back to the 15th Century. What inspired these inventions is not clear. Maybe the novelty of a self playing instrument to please a King - perhaps in the hope of monetary gain or for prestige - or again just the natural desire to invent something new. Mechanically operated gadgets have always amused people and seem to fascinate both old and young alike.

Historically the clock is the oldest known mechanical instrument(323). Built in Europe before 1300, the idea of toothed wheels being driven by springs appears to have been sufficient inspiration for inventors to apply similar ideas to musical instruments. The introduction of a revolving barrel with pins operating a chiming apparatus led in time to the performance of more elaborate tunes(324). All manner of instruments were based on this idea, from barrel organs and musical boxes to mechanical harpsichords and pianos.

The barrel and pin principle is a cylinder with projecting pins, made to revolve by means of a spring or a hand crank. Each pin is placed to engage a lever in a predetermined sequence. (Plates 87 & 88) In organs the levers operate valves to allow air to pass through tubes; in musical boxes a metal comb with teeth of varying lengths is used. As the barrel revolves, a pin impinges the tooth in its path and causes it to vibrate. The harpsichord only needed the jacks to be activated to enable the quills to pluck the strings and similarly in the piano it was necessary to set the hammers in motion to strike the strings.

From the 15th Century onwards; reproduction instruments have passed through the phases of the barrel and pin principle, pneumatic or electric perforated paper operated player pianos and organs,to the present day transistorised radiograms and tape recorders.

The first known evidence of the barrel and pin principle applied to a stringed keyboard instrument, appears to be "a virginal that goeth with a whele withoute playing uppon"(325). This was listed in the inventory of Henry VIII's musical instruments, compiled after his death in 1547. According to Scholes, it is not known whether it was a unique specimen or the representative of a class. However, the idea must have persisted because, by the 17th Century, references become more frequent. Lady Arabella Stuart writing to the Earl of Shrewsbury on June 17, 1609 says "But now from doctrines to miracles; I assure you that within these few dayes I saw a paire of virginals make good musick without the help of any hand..." (326). In August 1623 the Master of the Revels to James I issued a license to Bartholomew Cloys "to make show of a musical organ with divers motions in it ..... and a virginal with machinery"(327). The British Museum has a rare broadside which announces a fireworks display at Lincoln's Inn Fields, on Nov. 5th 1647, where virginals are described as "musically playing of themselves"(328).

The 18th Century was famous for mechanical toys, musical clocks and musical boxes in many different forms. Musical clockwork instruments became so popular in Austria that famous composers wrote music for them(329). For example Haydn composed a series of pieces, and arranged movements from his symphonies and quartets. These were published in 1932 entitled "Werke für das Laufwerk". Mozart wrote two fantasias for "Flötenuhr". Other composers for this type of instrument included Michael Haydn, Emanuel and Friedemann Bach, Quantz, Graun and Kirnberger. In London, Handel composed and arranged a large number of pieces for a musical clock made by Charles Clay. This clock was exhibited to Queen Caroline in 1736.

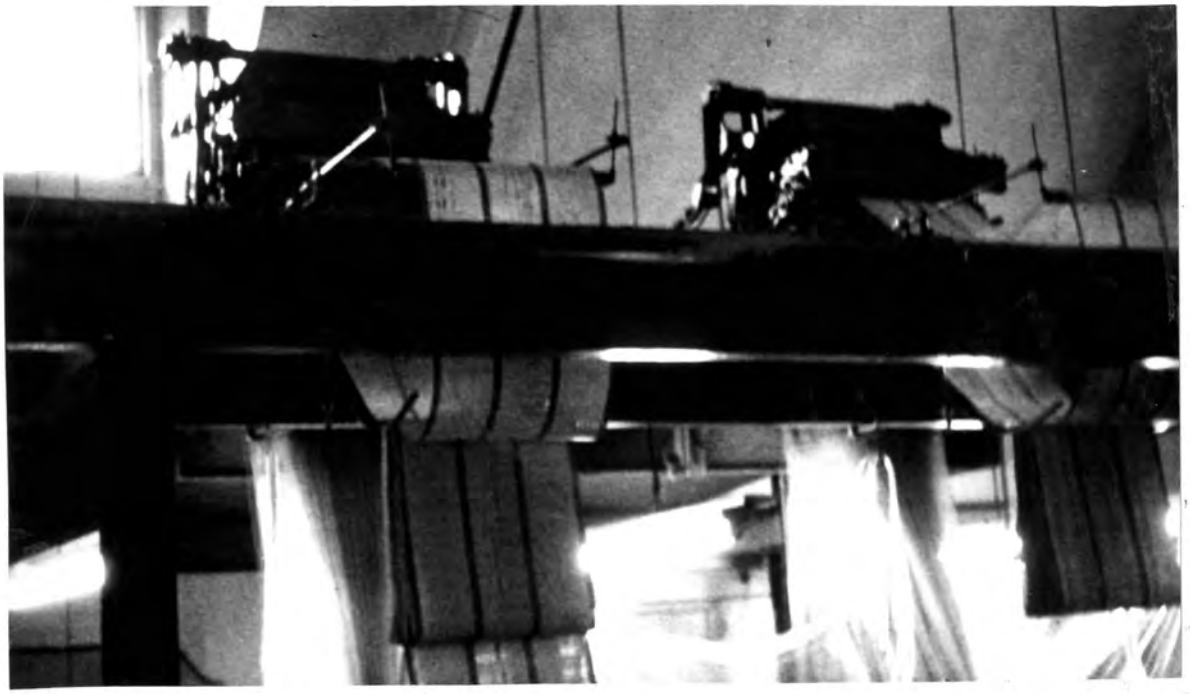
Switzerland was also noted for this type of mechanical device. Self playing harpsichords were occasionally constructed. An interesting addition was a clockwork doll made in 1774 by a famous Swiss inventor, H.V.J. Droz[330]. He created a sensation in Paris and London when he presented his young woman harpsichordist. This doll with "an incredibly complicated jungle of clockwork for entrails" was able to move her fingers to strike the right notes for a number of compositions. She was also able to nod her head, follow the music with her eyes, sway her body, simulate breathing and at the end get up and bow to her audience[331] (Plate 86)

At the beginning of the 19th Century, Hicks of London is said to have made the first 'street piano'[332]. This was a barrel and pin machine operated by a hand crank. There were hard leather covered hammers, no dampers and no means of grading the tone. Rosamund Harding[333] states that forte and piano were obtained by making the pins higher or lower. These Street pianos, popularly called barrel organs, appear to have been manufactured in Italy. For almost a century, Italian "organ grinders" were a familiar sight in the streets of England and America. (In 1922 Mussolini recalled all the Italian street musicians. He felt that this method of earning a living created an undignified impression of his race.)

In 1816, William Simmons[334] patented a barrel with movable pins, which the performer could take out and rearrange to make other tunes. The barrel was revolved by a handle or alternatively by clockwork.

Clementi and Collard and Co., produced a 'self acting pianoforte' in 1825[335]. It was similar to a barrel organ, with a horizontal cylinder set in motion by a steel spring. On being wound up, it acted for half an hour and could be rewound in half a minute[336]. According to Scholes,[337] varying dynamics were made possible by hand operating a sliding ball at the side of the instrument. Unfortunately the nature of the sliding ball mechanism is not described. This piano had two separate mechanisms entirely independent of

Plate 89



Jacquard Loom.

Plate 90

Jacquard Loom.

Both plates illustrate the perforated cards joined in an endless chain passing over the four sided cylinder.

Photos by
John Stuttaford.

each other, so that it was possible to play the keys while the machine was operating.

In the same year Courcell invented the 'Cylindrichord' [338]. This was a separate structure which was wheeled up to the pianoforte and positioned so that a set of mechanical fingers struck the keys. Advertisements stated that a child or servant could operate it, that it could be accommodated to the height and dimension of any pianoforte, and when not in use formed a piece of elegant furniture. Scholes[339] considers that it was almost certainly a barrel and pin mechanism, the normal method in all such instruments at that time.

None of these pianos produced any real interest in their day and were certainly not found in the homes of educated people. Perhaps the musical limitations and mechanical effects plus the association with the Street piano were responsible.

All ideas relating to the barrel and pin principle appear to have been exhausted, for it was many years before the next patent was registered. Clearly some new system was needed.

The solution was found in an application of an invention which had revolutionised the weaving industry. In 1801, Joseph Jacquard[340] had exhibited his improved loom in Paris. He used perforated cards to determine the pattern which it was desired to weave. One card was needed for each repeat of the pattern and the cards were joined together to form an endless chain. (Plates 89 & 90) The cards passed round a perforated, four sided, revolving cylinder, so that each card in turn came opposite a set of horizontal needles, each of which was connected to a vertical wire, which in turn was connected to a warp thread at its lower end. As the drum revolved, so some of the horizontal needles on it passed through the holes in the card, raising the wire and in turn some of the warp threads. A spring within the drum ensured the return of the needle to its original position immediately the pressure of the card was released, thus lowering the warp threads. By suitably punching the cards, any required pattern could

"Debain's Piano Méchanique" - 1851.

"... Once in possession of one of these pianos-mécaniques, any person, however ignorant he may be of matters musical, has it in his power to perform, with a correctness which probably no amount of practise could ever confer upon him, all the more difficult and complicated pieces that have ever been written. Nay, he may be still more lazily luxurious, for he may, in a few minutes, instruct a servant, or even a child, to rival Liszt or Thalberg for his especial gratification". Daily Telegraph, Oct. 31, 1860.

Without keyboard 55 guineas; With Keyboard from 90 guineas.

be produced. This "pattern selecting" mechanism started a new phase, and inventors began applying Jacquard's ideas in organs and pianos.

In 1842, Claude Félix Seytre of Lyons,[341] appears to have been the first person to apply Jacquard's ideas, and he obtained a patent for "pianoforte and organs which may play airs by means of pierced cardboard".

Alexander Debain of Paris[342] produced his "Antiphonel" in 1846. This was an attachment that could be fitted to either pianos or harmoniums. In 1851 he showed an improved model at the Paris Exhibition; it was called "Piano Mécanique". (Plate 91) The apparatus was made to fit into the top of a cottage piano and could be removed to allow normal performance by the fingers. A tune sheet, which consisted of a series of pins fixed to a plane surface of a thin oblong tablet of wood, much resembling a curry comb, was drawn by a rack and pinion through a frame which operated a second set of hammers. The entire mechanism was worked by a crank and was the most perfect mechanical contrivance at that time[343].

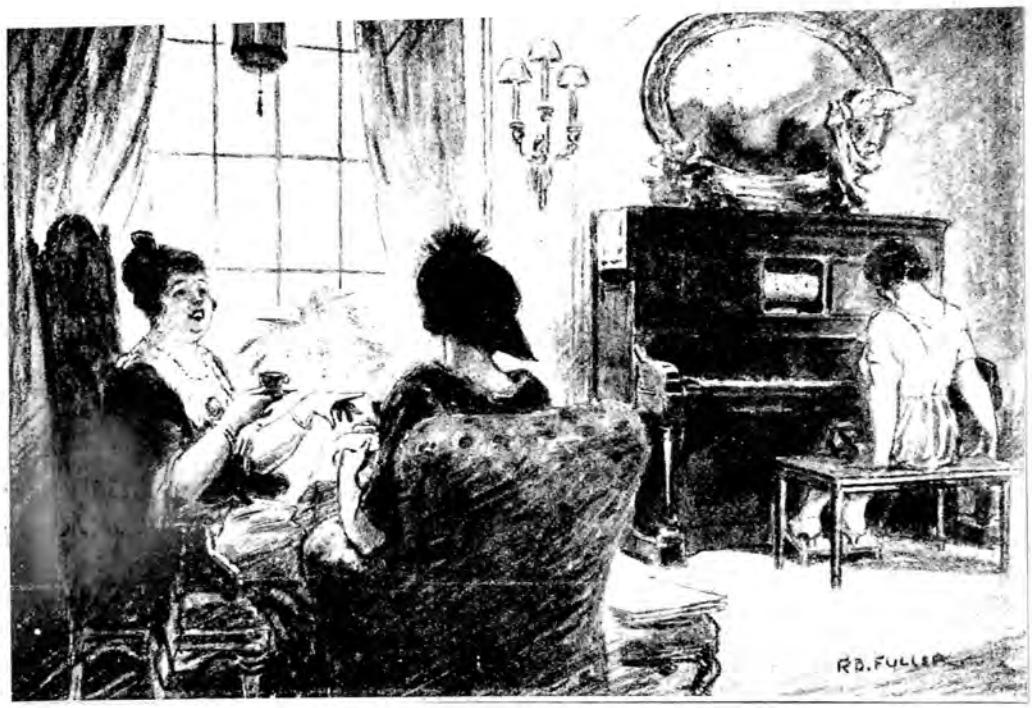
William Martin, in 1849, produced an improved patent based on the Jacquard machinery[344]. He incorporated the barrel principle plus the perforated roll. Moveable pins on the barrel were selected by the perforated paper band and caused the pins to assume suitable positions as they fell through the holes to act upon the keys. As the barrel rotated away from the paper, the pins were returned by gravity, or by springs[345]. (Two different length pins were provided for each note to allow for a change in dynamics).

This invention would appear to be the last of the pin operated type of mechanism which had evolved originally from the clock.

CHAPTER XI

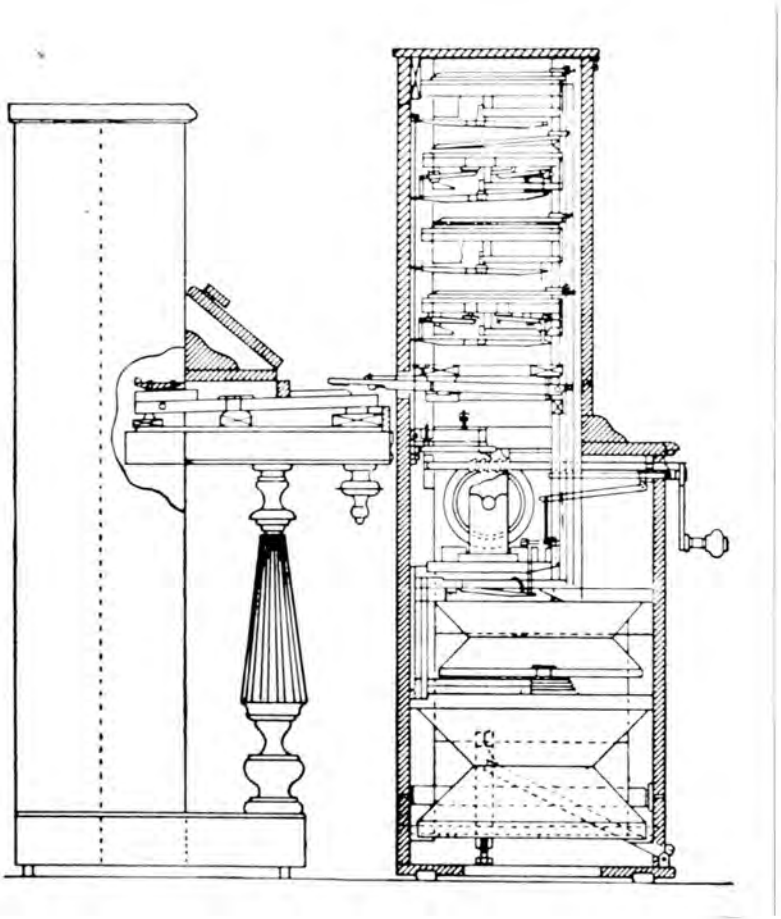
PLAYER PIANOS

Plate 92



Mrs. Neurich - "Yes, My Daughter Has a Great Foot for Music".

Plate 93



Fourneaux's Pianista.

CHAPTER XI

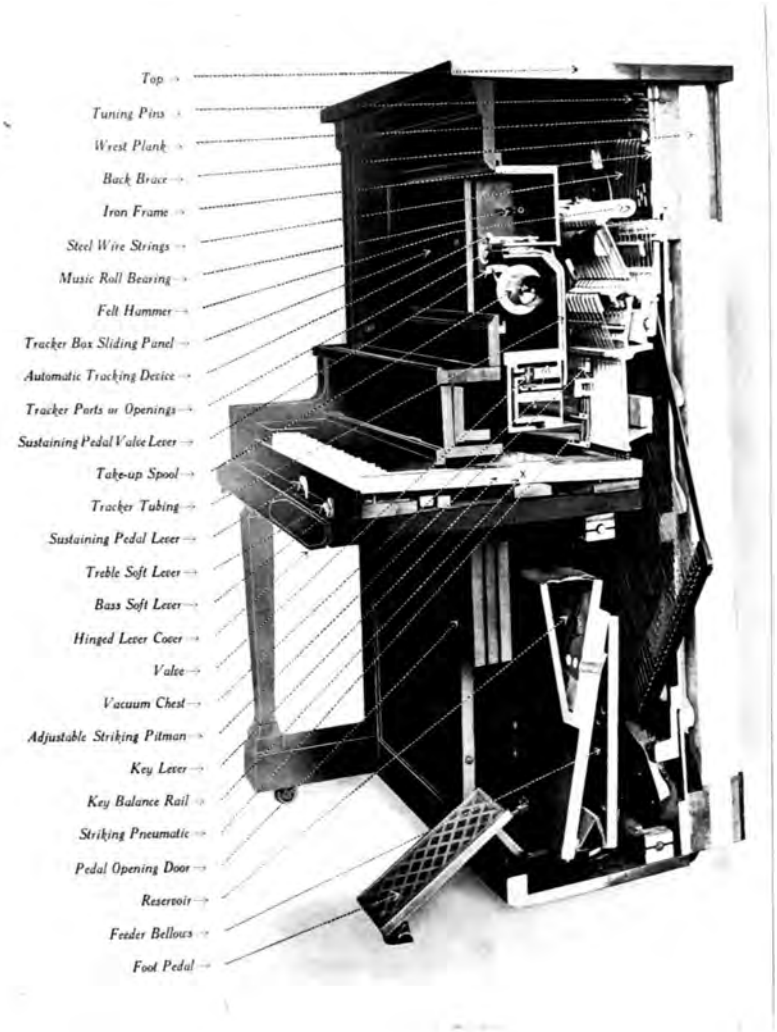
PLAYER PIANOS

Mechanical devices for operating the piano had exhausted their potential in the early 19th Century and about 1827, when the pneumatic lever replaced the old tracker action in organs, people began to think about using air instead of pins(346).

Eventually in 1863, Fourneaux of Paris, patented the "Pianista", the first player to operate on pneumatic principles(Plate 93). A cabinet type apparatus, it was wheeled up to the keyboard of a piano and operated in the same way as the cylindrichord(see Page100)except for its pneumatic feature(347). A perforated roll passed over a series of holes in a tracker bar, each of which was connected by a tube to a suction device, operated by a hand crank. Whenever a hole in the paper roll coincided with one of these tubes, air was sucked through the tube and operated bellows connected to a lever, which in turn caused a wooden finger to depress a piano key. A serious defect of the system lay in the fact that the suction, as well as the speed of the paper roll, were both dependent on the speed of turning the handle. Consequently the rate of this operation affected the volume and tempo simultaneously; fast turning produced loud and quick music, while slow turning did just the reverse.(348) (The general principle of the pneumatic action is illustrated in Fig.30 and Plate 94).

About the same time in America, a Scottish immigrant, John McTammany of Ohio was trying to make a living as a music teacher and mechanic(349). While fixing broken pins on a music box barrel, he had a brainwave. The idea of a paper roll played on a reed organ took shape in his mind, and he spent ten years perfecting it. He eventually produced three automatic air organs and in the following year, 1875, he exhibited a player

Plate 94.

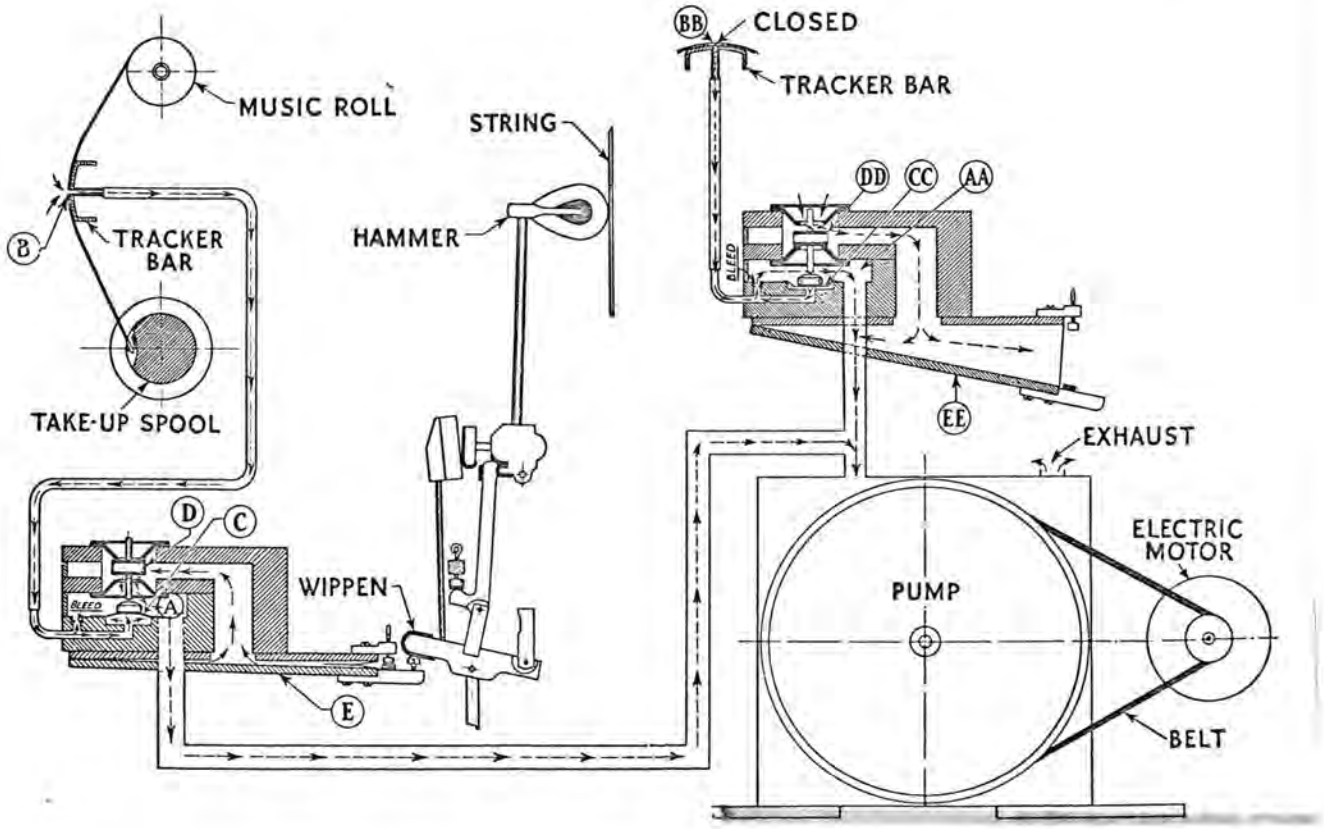


Operation of the Pneumatic Player Action.

Fig. 30

DIAGRAM OF PNEUMATIC PLAYER OPERATION

Illustration "D"



OPERATION OF THE PNEUMATIC PLAYER ACTION

Refer to Illustration "D"

The first operation necessary in getting ready to play the pneumatic player action is to insert a music roll in the spool box, thus sealing all holes in the tracker bar so that no outside air may enter. If the instrument is electrically operated, we now turn on the switch starting the electric motor and the pneumatic pump is put into operation. The function of the pump is to reduce the pressure within the action and create what is termed a vacuum. With the tracker bar closed by the music roll, as at "BB", we have a vacuum in the action and tube right up to the tracker bar. There is a small bleed or vent which is set in a small channel connecting vacuum chamber "AA" to the tube leading to the tracker bar. This vent is about one-sixth the size of the hole in the tracker bar and it is very important in the operation of the pneumatic action.

At point "DD" is seen the valve down upon its seat and outside air passing over the top of the valve and down into striker pneumatic "EE".

Now to play a note on the piano, we must cause the striker pneumatic "EE" to collapse. This is done by a hole in the music roll exposing a hole in the tracker bar "B" which allows the outside air to rush into the tube leading down to the bleed and the underside of the thin leather pouch "C". Outside air is admitted in such quantity to the tube at point "B" that the small bleed at the front of low pressure chamber "A" cannot reduce it quickly, and the air pressure in the tube and under the thin leather pouch is raised nearer to the outside atmospheric pressure. We now have a low air pressure above it. As explained on page 11, atmosphere will always try to equalize itself in space, so the thin leather pouch "C" is now raised to a convex position by high pressure below trying to equalize with the low pressure above. As the pouch assumes a convex shape, it raises the valve "D" to its top seat, thereby cutting off outside air to striker pneumatic "E". The air within pneumatic "E" is now connected to low pressure chamber "A" and it also rushes to equalize in pressure. This operation allows the outside air to get in its work on the movable leaf of striker pneumatic "E" causing it to raise and hit the piano action wippen and the hammer to hit the string.

Operation of Pneumatic Player Action.

The Needham Paragon

A Song Without Words

Cabinet Type Piano-Player..

piano at the St. Louis Fair. The public ridiculed him and his ideas and, although he died penniless, he lived to see the player piano become a household hurdy-gurdy(350).

There was no great enthusiasm for these first instruments and sales were slow. Piano playing for girls was still a middle class prestige symbol - probably a factor in the lack of interest shown in the Pianista. Turning a handle must also have savoured too much of the organ grinder. In 1897 however, an American named E.S. Votey patented the "Pianola". This was a separate unit, designed to turn any piano into a player-piano(Plate 95). A small cabinet could be wheeled up to the keyboard of a piano and a set of felt covered hammers, which projected from the back of the cabinet, could be adjusted to fit over the keys of the piano. Foot operated bellows caused a perforated music roll to move across a tracker bar, actuating small pneumatic devices which in turn pushed levers down to press the piano keys. This invention was taken up by the Aeolian Company, whose founder, W.B. Tremaine, was responsible for manufacturing the first automatic playing musical instruments in America(351). Before the advent of the "Pianola", there was neither competition nor encouragement from the piano trade, but he was a keen enough businessman to make a success of the new enterprise. In 1899, his son Harry B. Tremaine, took over from him and began an advertising campaign which stunned the piano industry. He was wise enough to employ the best men in the piano making world, and gradually absorbed many of the older piano firms such as Steck and Weber. Eventually he persuaded Steinway and Sons to build instruments to house his pianola mechanism. He built the Aeolian Hall on 42nd Street in New York City, a twenty story building with a magnificent concert hall, show rooms and offices. To add stimulus to the home market, he engaged famous artists to perform on his pianos in this hall. He was entirely responsible for the eventual popularity of the player-piano and the fact that, although 'Pianola' was the trade name of the Aeolian Company, it became the generic name applied to all makes of player-

Plate 96

Player-Piano with Mechanism Built in.

The Gulbranson Baby was a famous trademark. Dealers often had a papier-maché model in their show window.

Easy to play—easy to sell—easy to keep in good order.

Nationally priced—nationally advertised—nationally esteemed.

GULBRANSEN
Player-Piano

GULBRANSEN-DICKINSON CO., 3242 W. Chicago Avenue, CHICAGO

Plate 97

Gulbranson
Player Piano
in possession
of
Mr. Claude Dredge
of
Grahamstown.

Photo by
G. Walters.

pianos. Even when, in 1914, there were 42 other makes with their own names, to the man in the street they were all pianolas.

The earliest models of piano players started off with 65 notes, which often involved changing and mutilating composers scores. However, they served a purpose in introducing mechanically produced music to the public. Their popularity lasted from about 1900 - 1905. The apparatus was clumsy. It was awkward to move each time one wanted to play it, and great care had to be taken not to break the wooden fingers. On the other hand, it was also a nuisance to remove it when one wanted to play manually, so there was a general tendency to neglect it. The obvious solution was to incorporate the mechanism into the piano itself and the name Player-piano refers to these instruments, as opposed to the earlier designation piano-player for the separate cabinet.

In 1902, one of the first 88 note player units was introduced in America, and nearly all the piano manufacturers in Britain, United States of America and Germany were equipping their pianos with player-piano mechanisms, hiding the controls behind sliding doors(352). The instruments looked exactly like ordinary pianos, especially the upright models(Plates 96 &97). The only clue to their dual purpose was the presence of the sliding panels in the lower front, which concealed the pedals controlling the bellows and another pair of doors at eye level, which, when opened, revealed the place in which one placed the roll. The horizontal grand was the final form and, with the exception of a small cabinet to contain the pedals, it looked exactly like any other grand piano. All the player pianos could be used as ordinary manual instruments. By 1910 the player piano was established. It was no longer a question of whether one should buy one or not - the only question was which one?

In 1915, G.C. Ashton Jonson gave a lecture in London in which he described the latest model of a Pianola horizontal Grand(353). "The music" he said "is produced by placing a roll of perforated paper in the mechanism and blowing the bellows by means of pedals, which in appearance resemble those of

Plate 98

Gulbranson Player Piano belonging to Mr. Claude Dredge of Grahamstown. Bought for R400 in 1965 - large number of rolls included in the price.

1. With front covers removed to show the works. Bellows in left hand bottom corner. 6 levers below keyboard - see text for explanation. Space in upper section for inserting player roll which is hooked to the lower cylinder - chain drive can be seen to the right. The six control levers are visible below the keyboard - L to R:- sustaining pedal, una corda pedal, volume control for Bass 44 notes, volume control for treble 44 notes - Tempo and winding and rewinding lever.

a harmonium. The perforated paper passes over a tracker board in which there are 88 holes, each hole controlling the sounding of the corresponding note. When the perforation in the paper goes over one of these holes the note is sounded loudly or softly in accordance with the amount of pressure you place upon the pedals. There are 6 little levers placed in a convenient position just below the keyboard to be used by both hands(Plate 98). The first on the right is the one by which the music is rolled and rerolled. Once the roll is adjusted in the mechanism this lever is not touched until it is required to reroll the music to remove it. The next lever controls the tempo. The mechanism is all pneumatic throughout the instrument, and the control of the time is so perfect that you can do anything with this lever that you can do with your hand in the matter of fluctuations in the time." The two levers on the extreme left work the sustaining and una corda pedals. The middle two levers control the pneumatic pressure and therefore the volume of half the keyboard notes, one for the lower 44 bass notes and the other for the upper 44 treble notes. When used together they control what is known as the 'Themodist' or device for bringing out the melody.

There is probably no element in the player that has been made the subject for so much patient investigation and clever invention as that of theme or solo expression, and from about 1906 to 1916 some very ingenious devices were tried out(354). Basic to all these devices is a separate set of suction tubes to control the individual dynamics of each note or group of notes. This is realised either by varying the air pressure on the lever mechanism actuating the hammer, or by moving a hammer stop nearer or further from the key, to alter the distance and therefore the velocity of the hammer stroke.

The most sophisticated of these methods uses perforations of varying widths on the music roll, the narrow holes actuating only one suction tube and the wider holes actuating two suction tubes, the second suction tube controlling the position of the hammer stop.

On the roll itself the dynamics of the piece are indicated. Dots on

Plate 99

Gulbranson Player Piano - with roll inserted ready to play.

Metrostyle can be seen pointing across the roll - it is controlled by the second lever from the right.

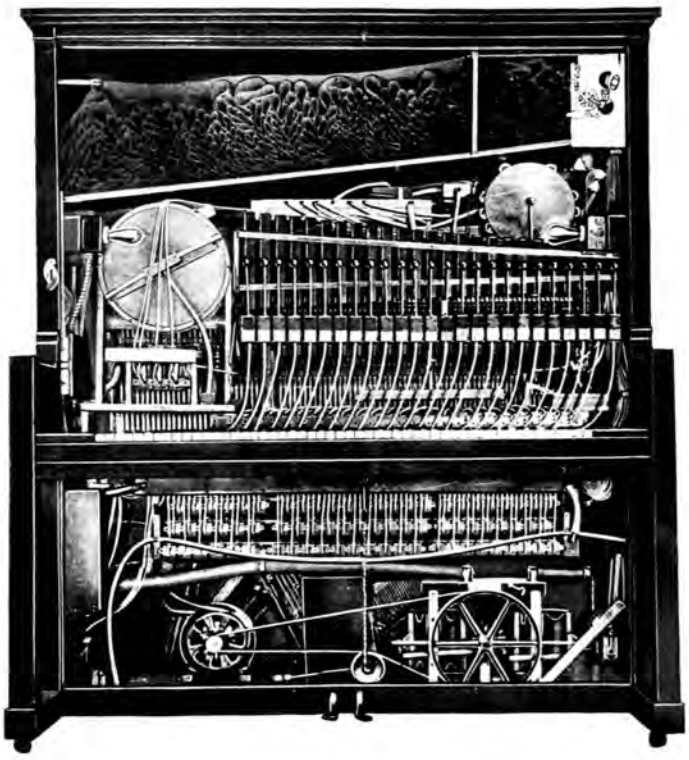
the extreme left indicate pianissimo, on the extreme right fortissimo and when they are in the middle mezzo-forte. Dots sloping to the right, indicate a crescendo and to the left, diminuendo. Musical accents are marked against the perforation controlling the note.

Attached to the time lever is a pointer known as the Metrostyle (Plate 99). This indicator lies across the roll and, by manipulating the time lever, can be made to follow the printed red line which zig zags backwards and forwards on the roll. By following the line the music will be played in the exact time indicated by the composer or editor.

As has been explained above, there are two kinds of perforations used in rolls - one consisting of a row of continuous little holes and the other of slits - the latter being the melody notes. Running down the middle of the roll is a fine blue line which is an indication of the division of the bass from the treble, to enable the performer to use the correct control lever. There is a little lever placed near the music roll which, if so desired, can be turned to make the sustaining pedal automatic. On the extreme left of the roll, a row of little holes opens additional bellows by which the dampers are lifted off the strings automatically, as the roll revolves.

Parallel with this growth of the player piano was the development of "Yesterday's Juke Box"(355). This was a pianola with a slot for a nickel, which set the machine in motion (Plate 100). Machines such as the Wurlitzer Pianino were among the better types, known as Nickelodeons, and between 1900 and 1915 there were great improvements in the mechanical workings, plus added joys in the way of sound effects, which gave the impression of a small orchestra. Sounds of the piano, mandolin, castanets, triangle, tambourine, zylophone or marimba, violin, a snare and bass drum gave rousing performances especially suitable for people to dance to.

An interesting and entertaining couple of hours can be spent in a



Style A-X—Piano, Mandolin, Marimbaphone, Snare Drum, Triangle, Tom-tom, Tambourine, Chinese Wood Drum

IF DOLLARS ARE HARD TO GET
GO AFTER PROFITABLE NICKELS

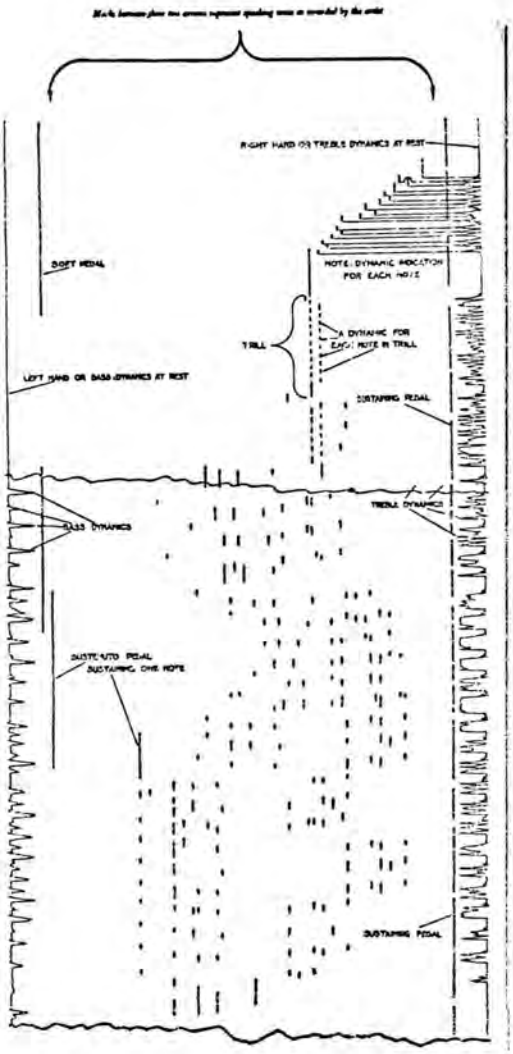
Plan View of a Nickelodeon.

British Piano museum at 368 High Street, Brentford, London. Here, in an old Church, is housed a rare and valuable collection of automatic pianos, organs, orchestrions, violins, nickelodeons, a street piano and organ - musical boxes and a hurdy-gurdy. All are in working order and for 20 p the owner, Mr. F.W. Holland, gives a lecture and demonstration of all the instruments which he and other dedicated men have restored to their original condition.

The climax of all the inventions relating to the player piano was the amazing reproduction piano invented by Welte and Company. As early as 1887 this German firm had patented a pneumatic paper roll mechanism for the piano.

Plate 101

Fig. 30a.



This photograph of a section from an original recording of Chopin's Etude in F Major shows how every detail of the artist's playing is graphically recorded while he plays. ¶With this absolutely authentic "tone picture" as a guide, the making of records for Welte Mignon (Licensee) Reproducing Pianos is free from every vestige of guesswork. Nothing is added or substracted that the artist does not himself put into his music, so that the record is not a mere approximation, but an exact reproduction of his playing. ¶What may be called the "film of the music camera" receives impressions of every detail of both his fingering and pedaling. ¶The exact position of every note played is fixed by faint vertical lines corresponding in number to the keys on the piano. The staggered lines on the extreme right and left are the means by which the mechanism, like the delicate needle of the seismograph that records the slightest tremor of the earth, graphically indicates exactly the degree of pressure with which the artist struck the keys, thus faithfully recording the finest shading of his interpretation.

The Welte organisation of Freiburg, Germany, was started in the first half of the 19th Century. They were famous for their music boxes and orchestrions which consisted of sets of pipes, drums and reeds, operated from a glorified music box cylinder - or, in its later development, paper rolls. By 1900, the market for these had almost evaporated, so Edwin Welte and his brother-in-law, Karl Bokisch, worked together to find a machine to keep their business alive. The result was the famous Welte-Mignon reproducing piano. (Plate 101) The new idea was to use the playing of a pianist to create the master roll. Up to this moment all rolls had been cut mechanically - often by people who were not musicians. A special piano was made with electrical contacts under each key(356). This instrument was wired to an adjoining machine, so that every time a key was pressed down on the piano, a mark was made on a moving paper roll. Thus, every note that a pianist struck could be precisely recorded in proper length and sequence, giving a perfect record of his tempo, rhythm and phrasing. At first dynamics were a problem, since there was no known way to record the exact weight of each finger stroke. To overcome the difficulty, another musician, using a separate music score, marked in the dynamics as the pianist played. These were then transferred to the music roll by punching an extra row of perforations on the side. The tracker bar on the player piano had a corresponding set of suction tubes to control the dynamics. The problem of marking the dynamics was eventually overcome and an example of a section of an original recording is shown in Fig.30a. By 1905, the Welte Company had managed to persuade a number of artists and composers to record for them. Grieg, Debussy, Saint-Saëns, Scriabin, Richard Strauss, Fauré, Glazounov, Leoncavallo and Ravel are some of the famous names to be found on their rolls(358). By 1911 they had recorded a priceless collection of nearly 3000 piano pieces, many of which have been recorded on discs by Columbia in the last few years(359).

Plate 102

An Ampico Chickering Grand made for Jackie Coogan - a famous juvenile film star.

Plate 103

Mr. & Mrs. I.J. Paderewski, listening to one of Mr. Paderewski's Duo-Art recordings.

The Welte Company established a factory in New York in 1906. They had to close in 1914, but after the war they started up again and began using their mechanism in American pianos. They made the last reproducing piano in 1931[360]. Although the Welte-Mignon had been developed at the beginning of the century, it was not until 1913 that the Americans followed the Germans' example. The Aeolian Company was the first to produce a reproducing piano[361]. Later that same year, the American Piano Company, developed a similar reproducing mechanism. They named it "Ampico" and housed it in Chickering and Knabe pianos(Plate 102). The Aeolian Company called their model the "Duo Art" and installed the mechanism in Steinway pianos specially made for the purpose(Plate 103). These instruments were very expensive, the cheapest cost $4500. However the Aeolian Company also installed the reproducing mechanism in their own pianos - Weber, Steck,(Plate 104) Wheelock, Stroud and Aeolian and the price and quality were graded in that order.

To record the playing of an artist, a specially devised Duo-Art piano was used. As the pianist played, perforations were punched in the moving roll. In this machine everything the artist did was faithfully reproduced - tempo, rhythm, pedalling and dynamics. As soon as the performance was over the roll could be rewound and replayed immediately on a Duo-Art piano. The Aeolian Company used the same techniques as Welte had done in engaging famous musicians to record for them. Paderewski, Hofmann, Bauer, Ganz and Grainger are among those who contracted to record exclusively for them.

Competition between manufacturers reached great heights, and it was part of the advertising war to be able to claim specific use of certain makes of pianos and to persuade great pianists to play on them. Between 1916 and 1925 almost every concert pianist of any consequence made record rolls for Duo-Art or Ampico.

On Feb. 3rd 1920, the American Piano Company staged a demonstration of their 'Ampico' reproducing piano in the Carnegie Hall[362].

Plate 104

Steck Pianola owned by the Rev. Howard Kirkby, Grahamstown.

Five well known pianists performed before a large guest audience. Between their items, the Ampico played selections from rolls. As a finale to the concert, Levitzki played the Liszt Hungarian Rhapsody No.6. At the end of the first section he stopped playing but the Ampico had taken over. He waited until the last fast and furious section, when he joined in, to finish with a flourish. The audience were clapping before the end - to them it was an impressive feat'.

Although this demonstrated the fidelity of the Reproducing piano there were mechanical drawbacks, such as incomplete reproduction of repeated notes. However, the greater clarity of sound caused pianists to prefer it to the old acoustic recordings on discs. It was also possible to alter or add dynamics to the roll and to correct wrong notes and pedalling. Speed was easily attained by running the roll faster without the rise in pitch so discernible on a disc.(363)

Famous conductors also took part in concerts at which player- or reproducing pianos were the attraction(364). In 1912, at the Queen's Hall, the London Symphony Orchestra, conducted by Nikisch, accompanied Mr. Easthope Martin, who played the solo part of the Grieg piano Concerto on a player piano. Later in the programme a Miss Elena Gerhardt sang songs to the accompaniment of a player piano. The following year a similar concert took place in Paris with Chevillard conducting the Lamoureux Orchestra. In London, in 1922, Sir Henry Wood conducted the Queen's Hall Orchestra in a performance of Saint-Saën's second piano Concerto. Harold Bauer's recording of the piano part was played on a Duo-Art Pianoforte. The Musical Times reported it as follows:-

THE MUSICAL TIMES—DECEMBER 1 1922

HAROLD BAUER

Apart from his appearance with our foremost orchestras, Mr. Harold Bauer has been heard twice *in persona* and once *in absentia*, by which I mean that his rendering of Saint-Saëns's second Pianoforte Concerto was heard at Queen's Hall on Friday, October 27, on the Duo-Art pianoforte, accompanied by the Queen's Hall Orchestra under Sir Henry Wood. It took a few minutes to get accustomed to hearing the sounds proceeding from a pianoforte with no visible human agency. The only non-mechanical part of the process was the appearance of the gentleman who fixed the roll in its proper place.

. We had a very faithful reproduction of the artist's style, except for just those little shades of colour which are heard from a living player. An adventitious interest was added to the performance by wondering whether or no the pianist would come in at the right moment after the *tutti*, or whether the orchestra would come in where it should do after a solo passage. But in all respects the timing was impeccable. We reflected that to direct an orchestra in these conditions must require a new kind of technique on the part of the conductor. The performance showed that a great advance has been made in the perfecting of the instrument; whether it will become popular as part of a concert programme remains to be proved.

At his recital on Armistice Day Mr. Bauer showed that since he was last heard here he has lost none of the admirable solidity of his style, and has gained in lightness and charm. A. K.

An opportunity to judge the quality of a Reproducing Piano occurred during a visit by the writer to the Music Museum of Reproducing Instruments in London. The owner, Mr. Holland, has three of these pianos. A roll recorded by Hoffman was played on a Steinway Duo-Art. It was an incredible experience - unbelievably lifelike as long as one did not look! No difference in tone could be detected when the same piano was played manually.

The list of composers who wrote works specifically for the pianola is impressive. A new world of sound was opened up,as it was no longer necessary to think of what only ten fingers could do. There was no limit to the aspirations of twelve tone and serial composers, and the two extremes of the piano began to be used for the first time. Ernest Newman cites Ravel's use of the upper registers in Jeux d'Eau as an example. Amongst the composers who have contributed to the player piano repertoire are Malapiero, Casella, Goossens, Hubert Howells, Hindemith and Eric Satre(365). Stravinsky

arranged a great deal of his work for the instrument, a marked improvement on the usual poor orchestral arrangements, which roll manufacturers copied from existing piano scores written for ten fingers(366).

Strauss, Elgar, Max Bruch, Fauré, Humperdinck, Mascagni, Max Reger, Max Schilling, Balakirew, Glazounov, Liaponov, Rimsky-Korsakoff and Sinding are all said to have praised the instrument while pianists Harold Bauer, d'Albert, Backhaus, Carreno, Dohnanyi, Gabrilowitsch, Mark Hambourg, Josef Hofmann, Frederick Lamond, Wanda Landowska, Pugno, Sauer, Rosenthal, Percy Grainger and Paderewski warmly recommended it.

Henry Wood used the player piano to try out the effects of tempi and Sir John B. McEwen (one time principal of the Royal Academy of Music) produced a useful piece of research on rubato, by comparing rolls made by different pianists and reproducing them diagrammatically(367).

In spite of its enormous popularity, there was a good deal of opposition to the Player-piano. Ernest Newman says(368) "The truth is that the opposition to the Player Piano comes largely from people who have no practical experience of the best it can do and from the pianoforte teachers who are afraid that their vested interests are in danger".

Mr. Newman, a staunch advocate of the instrument and the author of a book on the subject, was accused of being in the pay of the makers, his sanity and honesty doubted, and musicianship questioned. Newman's reply to this sort of attack was that "he did not mind being damned in the company of the most imminent conductors, composers and pianists of our time".

George Dyson(369) writing in the Musical Times in 1935 stated ".... Fortunately for some of us, perhaps, the player-piano is very expensive and it can become very monotonous in unmusical hands. It has never become widely popular". A strange statement. Its popularity was proved by its sales and the reference to unmusical hands applies equally well to any musical instrument.

One of the main objections to the player-piano was the mechanical sound which was so often produced by unskilful players. In'Tono-Bungay' by H.G. Wells[370], someone asks about a player-piano - "Does this thing play?" and the answer is "Like a musical gorilla with fingers all of one length and a sort of soul". The implication that every note was sounded with the same degree of intensity was certainly not true. It was possible to bring out a melody line but not to emphasise single notes in a chord. Newman admits to certain limitations. Pianists for example are able to use the pedal in subtle ways to obtain effects not possible to pianolists. The pedal lever provided is a clumsy affair and somewhat erratic and it is to this defect that he attributes the "mechanical effect". However, he points out that it is possible to detect differences in the performance of players on the player piano and suggests that it doesn't much matter how an effect is made, as long as it is made, and that technique in itself is not enough to make an artistic performance. He goes on to say that the added mechanism of the player piano spares the average performer hours, even years of the tedium of learning to play well and artistically. In fact the player piano, giving a reasonably good performance, is a more artistic affair than nine out of ten amateur pianists. On the other hand, the piano playing of a front rank performer will certainly be better than a performer on a player-piano, but not necessarily so if compared with an average pianist.

There were many who agreed with Mr. Newman. Sidney Grew[371], in 1922, wrote a text book for students and teachers entitled "The Art of the Piano Player". He maintained that the player piano was a musical instrument and that its control was an art and the performer an artist. The art, he said, lay in the pedalling and in the tempo control lever and he believed that in three years a person of average intelligence could become a pianolist as against seven years required by a pianist. He also explains that a pianolist understands the larger aspects of music and works down to small details, the reverse of the normal method of learning any other musical instrument.

Plate 105

Player-pianos were used for the entertainment of soldiers during World War I (1914-18).

Agnes Saville M.D.[372] in her book "Music, Health and Character" describes her complete lack of interest in music, an active dislike and feeling of boredom on hearing it and an impatient scorn of the musical temperament. By chance at the age of thirty she attended a concert and heard Busoni playing the Chopin Etudes. She was persuaded to exchange her piano for a player and was interested enough to buy the rolls of the Etudes. This set her off on a musical voyage of discovery. Her knowledge of music was enlarged by the purchase of rolls and regular attendance at concerts. Piano transcriptions of orchestral works widened her experience and she became familiar with a vast literature. During the 1914 war she hired a Pianola for the convalescent soldiers in a hospital in France. Strangely enough, during World War II an Army Welfare Officer wrote a letter to the Musical Times appealing for rolls for a Pianola which he had been given for the entertainment of troops[373] (Plate 105)

The teaching profession was very worried that it might affect their livelihoods, but their fears were groundless as the widespread interest in music created by the player-piano caused most people to want to play[374].

Prejudice against the pianola was probably enhanced by the makers who advertised that it could be played by a child. It is true that anyone can sit and pump the pedals, but it requires a certain degree of skill to acquire a lissom ankle in order to adjust the supply of wind pressure by the feet. It is also necessary to understand the phrasing and musical intent in order to interpret the roll.

Cheap player-pianos did nothing to help the cause. The 'honkey-tonk' effect was blamed on the mechanics of the player pianos, whereas in fact, the tone of the instrument remained the same whether it was played manually or not. All that a player can do is to decide when to depress a key, how much tone to give it, and when to release it - after all the tone of the instrument is not created by the player - it is there already.

The delusion that individuality disappeared with the use of a player piano was hotly denied, and in fact it was claimed that one could distinguish between different players quite easily.

The advantage of not being concerned with technical problems, allowed a greater freedom for attention to interpretation and in schools and colleges it enabled pupils to become acquainted with literature which is normally missed, due to the lack of an adequate technique.

Jonson(375) in a lecture states that "When I was in America in 1912,I found the younger generation especially, extremely alive and enthusiastic about music, and they seemed to take naturally to works that the average amateur in England is rather apt to consider ultra-modern, such as Debussy's 'Peleas and Melisande', and after careful enquiry I could not but attribute this open-minded appreciation of the new in music to the fact that in leading Universities such as Harvard and Yale and the Women's Colleges, and in over two hundred of the leading Schools, the Pianola is being systematically used to familiarise not only the musical students but all the pupils with the best music". The use of reproducing pianos in English Schools and Colleges took place much later. The Royal Academy and Royal College, Guild Hall and Oundle School were among some of the more well known institutions which used them for educational purposes.

Newman considers that piano technique is often confused with musical culture and the average student who learns a few pieces moderately well (usually his entire repertoire), would do better to combine his efforts to master his technical problems with listening to the rest of the composers works. This can be done with the aid of a player piano in a comparatively short time and is an immense stimulus to further study. Newman maintains that four hours of listening to Bach's "48" would give one a far better idea of a fugue than spending four hours in trying to master certain technical difficulties.

The advocates of the player piano all stress its educational value,

which is undoubtedly of the greatest importance. The only other available means of reproducing music at this time was the phonograph which was not as acceptable[376]. Pianists and composers certainly preferred the player piano, and there is no doubt that it was the pioneer instrument in bringing musical appreciation into the home.

Mr. Ashton Jonson,[377] a Stockbroker by profession, with limited time at his disposal to perfect or even to keep up what technique he had, was able to make himself familiar with every note that Chopin wrote from Opus 1 to 74. He proceeded to do the same with Schumann and Beethoven and keep abreast of modern compositions. As a result, he became more interested in attending concerts, his reading ability improved, which encouraged him to play many of the works himself. At a meeting of the Musicians Association in Dec. 1915 Mr. Ashton Jonson addressed a gathering of distinguished musicians on 'Mechanical Piano-Players'. He stated " I simply love playing the Pianola. I cannot describe to you the joy of feeling fine music rolling out from under one's feet with an effortless concentration on the emotional content of the music as opposed to the harassed inefficiency that one feels when attempting to play something just beyond one's technique".

For the amateur music lover who could not play the piano, the Pianola was a fantastic means of enjoyment and opened up a new world. Keen Pianolists were able to cut their own rolls[378]. By means of inexpensive perforators it was possible to use wallpaper or oilcoth to make a unique single copy of some piece not available from catalogues. Unfortunately no details are specified as to how these cutting devices worked.

To illustrate how much the Player piano meant to people, Mr. Jonson[379] cited the case of a friend of his who could not play a note and whose sole knowledge of music in 1905 was a few Handel Choruses and 'God Save the King'. "Now he owned four different mechanical player pianos and had built a beautiful music room to house them. The panelled oak walls hid a library of

Plate 106

Cover of Q.R.S. Catalogue - 1970.

thousands of rolls for each of which he had the equivalent score. Every week he gave recitals of the best music to his friends, which he played with considerable artistry".

Few instruments have ever made such an impact on the public[380]. In America, especially, it was the King of instruments. It is claimed that children almost stopped taking lessons. Mechanical players were the voice of the silent movies - they accompanied the Jazz age - everybody, young and old fell under their spell.

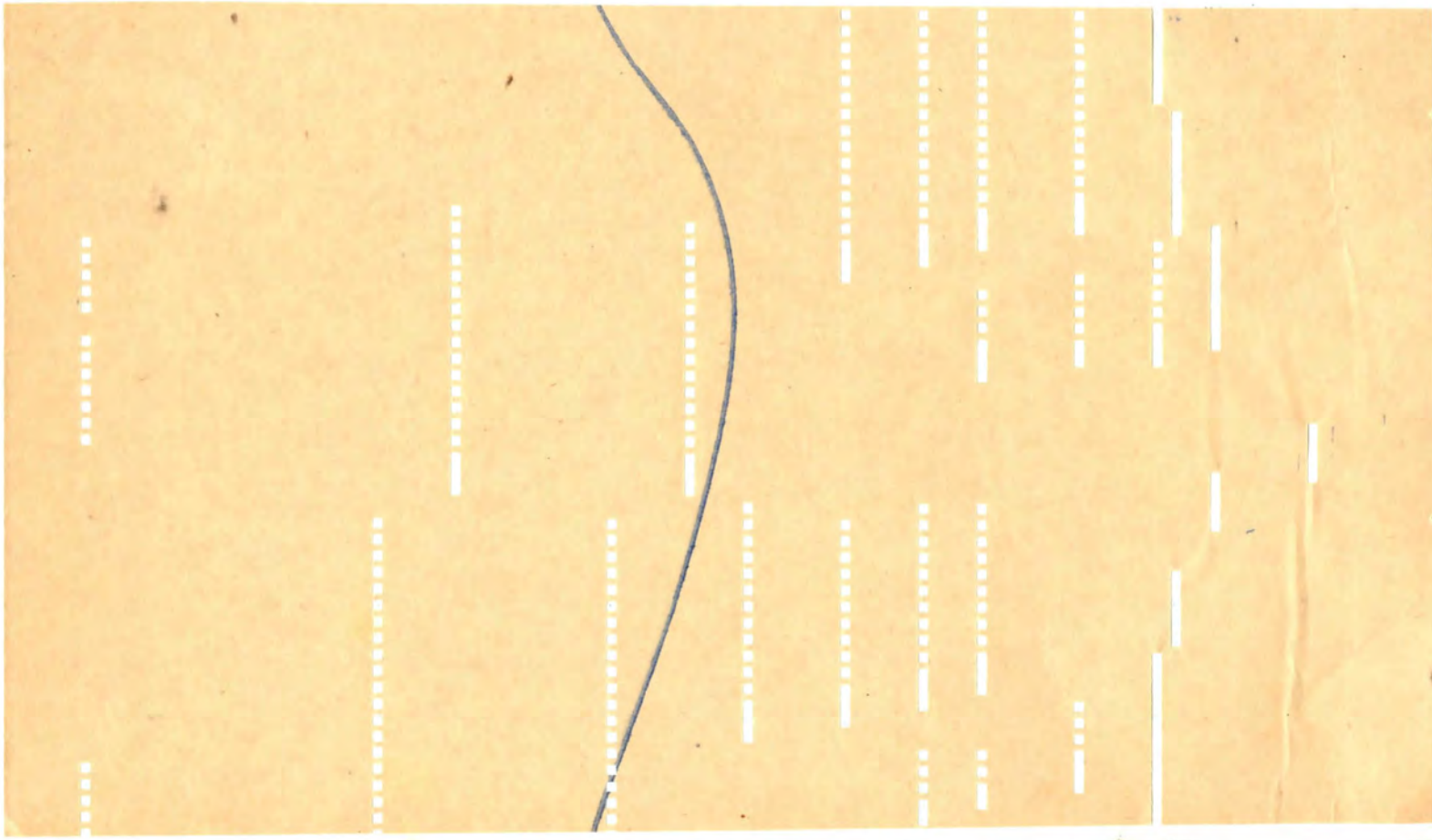
Lionel Barrymore is reported to have said "When I first sat down before a Player Piano I did not get up for 3 hours. I was Hoffmann playing a concert in The Carnegie Hall". This quotation sums up one of the strongest reasons for the unparalleled success of the Player Piano. Most people enjoy playing a musical instrument and so often one hears "I wish I could play the piano". Lack of time and skill and even opportunity are the chief enemies of would be pianists. To be able to play a Chopin Etude or a Bach Fugue or late Beethoven Sonata, and to learn to read at sight, requires years of hard work and a real aptitude in keyboard technique. This aspect of the Player Piano puts technical dexterity in its proper place. Virtuoso pianists are no longer accepted unless their technique is used as a means to achieve musical and artistic interpretations. The last and probably the most important function of the player piano was its undoubted value as an educator. Properly used it could not fail to enlarge musical horizons.

The manufacture of player pianos rapidly developed into a flourishing business. A summary of the statistical records shows the amazing growth in popularity of the player piano since its earliest appearance. In 1906 only 6% of all American pianos were mechanical players, in 1915 one out of every four, and by 1919 the player piano outnumbered standard pianos and constituted 53 per cent of the total output. In 1923, peak sales year, production was 343,050 of which 240,135 were piano players - 70 per cent of all American pianos[381].

Fig. 31

A roll inserted in a player piano shows the punched holes passing over the tracker bar - the metrostyle line is on the right and the centre dividing line for treble bass are visible. Fig. 32 is a piece of hand played roll (Mendelssohn's Spring Song played by Haase). The blue line is a guide to tempo variations.

Fig. 32



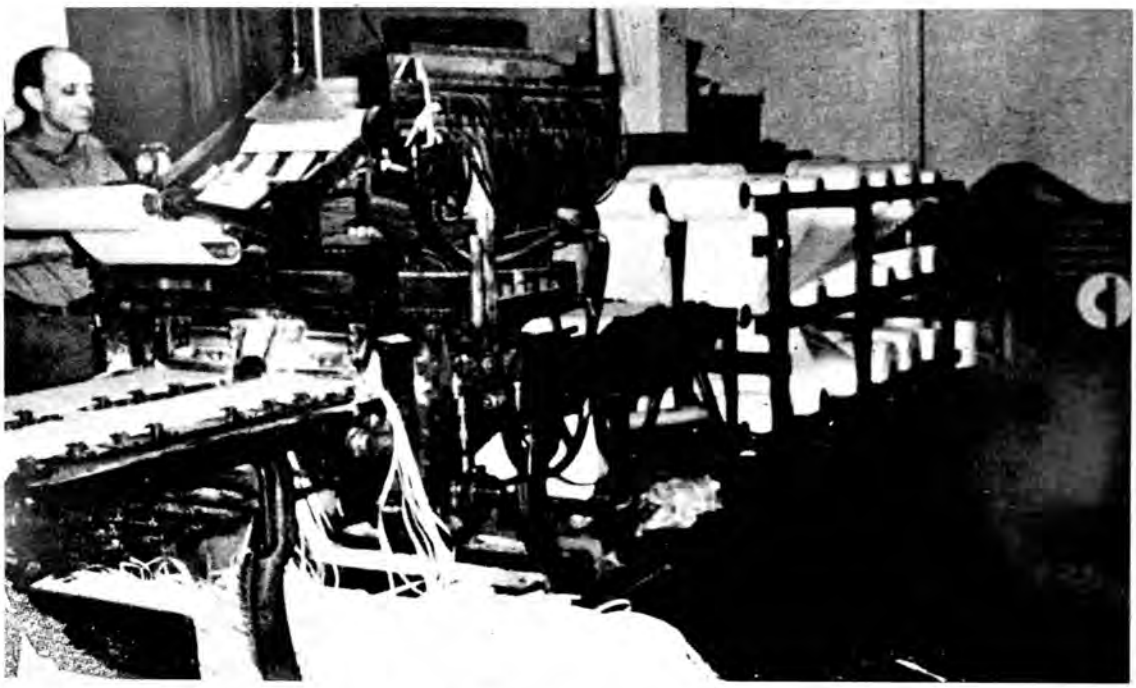
The London Directory of 1922 showed fifty two different makers and agents of player piano type pianos in Britain. This proved the existence of a considerable demand in a country where sales were far less than in America(382).

In 1916, Steinway Pianola Grands cost R840, while it was possible to buy other models for about R360. Upright pianolas ranged from R180 upwards and cabinet players could be purchased for R146. Early secondhand models were available at between R20 and R30.

Player piano rolls were manufactured by the Orchestrelle Company in London and well over 50 companies operated in America. Their catalogues included almost all the piano literature - arrangements of symphonies, operas, song accompaniments plus a full range of popular music and current "hits". (Plate 106) Two types of roll were available - those that were made exactly as the music is written, with the dynamics and other expression marks indicated as in the original score(Fig.31). The others were 'artist' or'hand played'rolls cut according to the playing of some famous pianist(Fig.32). Many people preferred the first type of roll as they enjoyed interpreting the music themselves(383).

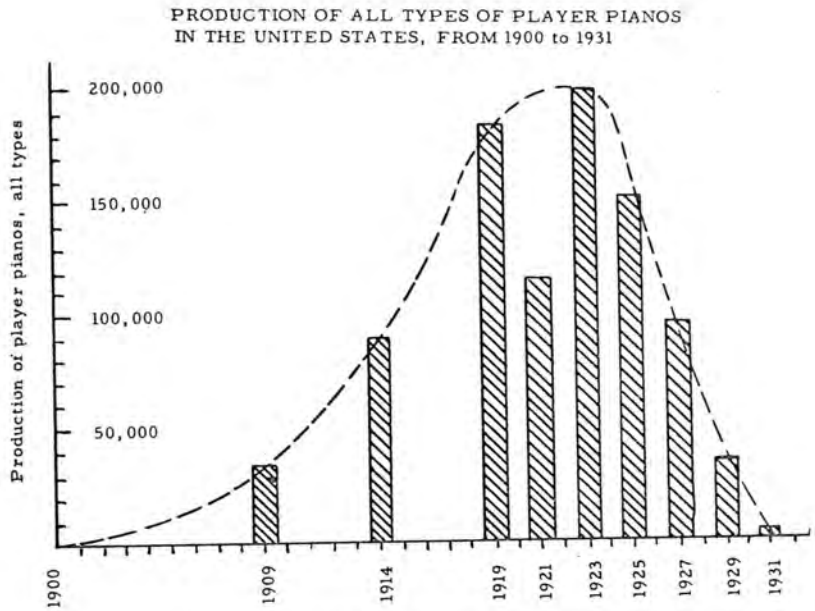
Another market was concerned with the actual teaching of how to play the piano the old fashioned way'. The QRS Company put out a set of six 'Educator' rolls. This contained 132 lessons for $11.50 - a reasonable enough price if it worked'. The QRS Music Company started in 1902 in Illinois and by 1920 was the largest concern of its type in the world, and managed to keep going when all the others closed down. The peak year for piano roll sales was 1926, three years after the players' peak year. QRS produced and sold almost ten million rolls from their factories in America, Sydney, Australia, Toronto, Canada, and Utrecht in Holland. The origin of the name "QRS" is obscure, although evidently the originators of the title intended that it refer to "Quality Real Service",since a rare piece of advertising material bears this slogan(384).

Plate 107



An operator in the QRS factory watching the progress of the master roll as the machine punches out a total of over 30 production rolls, divided between two tracks.

Fig. 33



The curve represents the level of popularity of the player piano; total production in this period was about 2,500,000 machines of all types. The drop in production in 1921 was a result of the post-World-War-One business recession.

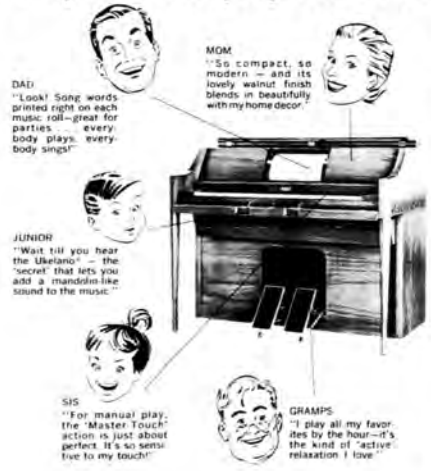
Source: U.S. Department of Commerce.

New rolls were turned out every month. Big machines, resembling newspaper printing presses, used master rolls to guide the production of thirty rolls at a time(Plate107). The process was less costly than phonograph records, and in the case of rolls made from music scores there were no royalties to add to the cost, so they were reasonably cheap - costing a dollar or less. On the other hand, a disadvantage of the Reproducing piano was the high cost of rolls. In the case of the Welte-Mignon many rolls were sold for as much as $10, $15 and $17. These prices were for single rolls, so a long work requiring more than one roll was very expensive. The Duo-Art managed to sell their rolls at a much lower price, never higher than $4.

The sales of the player pianos reached their peak in 1923,(Fig.33) when 205,556 were produced in the United States alone. Within a few years the industry was just about out of business and by 1931 production had dropped to 418 instruments. The phonograph had been making inroads on the piano and player piano market during the late teens and early 20's, but there is no doubt that radio was the real cause of the rapid drop in player piano sales. Ironically enough, it was on the roof of the Aeolian Hall that the first radio transmitter antenna was established. Harry Tremaine(385) did not realise how dangerous it would prove to his player piano trade and in fact, thinking it a mere toy, he actually turned down an offer to buy the radio station for $50,000. A series of liquidations, mergers and bankruptcies followed in the next few years and eventually the depression of 1929 dealt the player piano its final blow. In 1909 there were 294 factories in the United States and they sold 230,000 pianos. In 1929 only 81 firms were left and 92,000 pianos sold, and it was in this latter year that a record number of radios were sold(386).

By this time both radios and gramaphones were being produced reasonably cheaply, and they had the advantage of being smaller with a greater and more varied repertoire than the player piano. They replaced the player piano in the same way that the latter had usurped the position of the standard piano in the home.

Everyone can play the All-New PIANOLA!



You're looking at the most revolutionary piano in generations — the piano **everyone** can play.

THE SPINET THAT IS A PLAYER-PIANO: an exciting new player-piano with magic fingertip and pedal controls. Now play all your favorite songs — even if you've never had a lesson in your life!

AND THE PLAYER-PIANO THAT IS A SPINET: yes, a manual spinet for regular play — a beautifully compact spinet, rich in tone, responsive to the touch.

The all-new Pianola is a triumph of modern engineering and design. You have to see it, play it yourself, to appreciate the exciting new world of entertainment that's yours with the piano your **whole family** can play!

THOUSANDS OF ROLLS AVAILABLE: Choose from the newest hits, Broadway show tunes, old favorites, classical music — all on rolls.

*Optional at extra cost

Why not come in Now for a Free "Play-it-Yourself" Demonstration.

Modern Pianolas.

Two generations later, in 1950, articles began to appear in magazines recalling the bygone days of the player piano. Max Kortlander,(387) owner of QRS, reported that an interest in these instruments began again during World War II. Old instruments were restored, but the few piano manufacturers left were afraid to start making players again. There were dealers, on the other hand, who bought up old player pianos for twenty to twenty five dollars. They found them stored away in old attics and barns, and after resusitating them they included some new rolls and sold them for 400 - 500 dollars. Soon 200,000 old instruments were back in use. In Australia they became a craze and dealers could not find enough of them.

Nickel operated player pianos were installed in "ice-cream houses" and ousted the former juke-box. Rolls of the latest "hits" appeared in shops before discs could be produced. Luckily for player piano addicts, the production of rolls had never ceased. QRS had kept going with a staff of eighteen all through the depressed years, so they were ready to meet the increased demand.

Nevertheless, the piano business was badly in need of something to give it a "shot in the arm". The idea of reviving the player piano may have been influenced by the thought of enormous sales, which, in its heyday, had produced 364,000 instruments(388). At that time there were 200 manufacturers whereas in 1954 the number had dropped to 23. Three of these firms began experimenting with new types of mechanism, and in 1956 Winter and Company manufactured the first mass produced player piano for twenty five years(389). In that year they sold 400 'Hardman Duo" player pianos. In 1960 they added the 'Pianola' and in 1962 the 'Musette', 'Cable' and 'Ivers and Pond'. The selling price ranged from $1,055 - $1.475 - one third to one half more than standard pianos of comparable size, and by 1962 sales had risen to 72,000. The modern players are more compact than the original bulky, heavy uprights and concert grands, but they operate on the same principle.(Plate 108) They can also

be played manually and the sales talk is that a 'player' encourages children to learn to play a standard piano. The Aeolian Music Roll Inc. planned a special series of music roll lessons. The Winter models are all pedal-powered : "Pumping the player is part of the fun". It gives the player a sense of participation and allows him to interpret the music. Some manufacturers such as Kohler and Campbell made electric models which cannot be played manually. Their Auto-piano sells for $ 1.390. Other makers are Kimball, Wurlitzer and Lowrey. Electric models would appear to defeat the object of the player piano, which seems to fill a need for people to experience the sense of participating. A report in the Wall Street Journal Nov. 5th, 1962(390) with headlines

"Look Ma, No Hands;"
Player Piano Stages
Resounding Comeback.

tells the story of a Mrs. Vivian Manucia who received a player piano for her thirty sixth wedding anniversary. Now, instead of watching television, she and her granddaughter indulge their love of piano music by pumping out old favourites on the instrument.

This was an example of the growing number of American families who were finding pleasure in 'doing' instead of 'watching'. Sales of remodelled and new player pianos continued to rise, and the sale of rolls increased by 50 per cent in the next five years.

In May 1969, in a letter to the writer, QRS Music Roll Inc. stated that their firm was the largest manufacturer of player piano rolls in the world. They produce half a million rolls a year, a figure which has been maintained for three years. No records are available for the previous years. There are two other firms in the States - the Aeolian in Oregon, Illinois and Melody in Wexford, Pennsylvania. In England there is a firm called Artona, in Sydney Australia, Mastertouch, and one other roll manufacturer in Mexico. The total of all the Companies is probably near the 750,000 mark. In addition to these companies there are individuals who specialise in copying old Duo-Art rolls and

Ampico expression rolls. There is also one small company called Music Box Productions which pirates rolls from QRS and other Catalogues to sell to Shakey's Pizza Parlour chain.

The Aeolian Company is the largest piano manufacturer in the United States today. Their trade names 'Chickering', 'Knabe' and 'Mason and Hamlin' are well known; however, they also make the Pianola which has a larger sale than any other piano.

Mr. John Steinway(391) feels that recent attempts to revive the player piano have proved very limited in appeal and he does not see any great possibilities for the future.

The revived interest in player pianos appears to have been confined to America and Australia. In Europe and South Africa there has been no evidence of any market developing. It is hard to believe that the pianola, so famous in the first quarter of this century, has not been seen nor even heard of by most of the present generation. The pianola was an important piece of furniture in literally hundreds of thousands of homes, yet nowadays only a few enthusiasts such as Mr. C. Dredge of Grahamstown and Mr. Holland in London acquire and restore old models as a hobby.

CHAPTER XII

ELECTRICAL PIANOS

"Can Bach be synthesized without becoming ersatz"

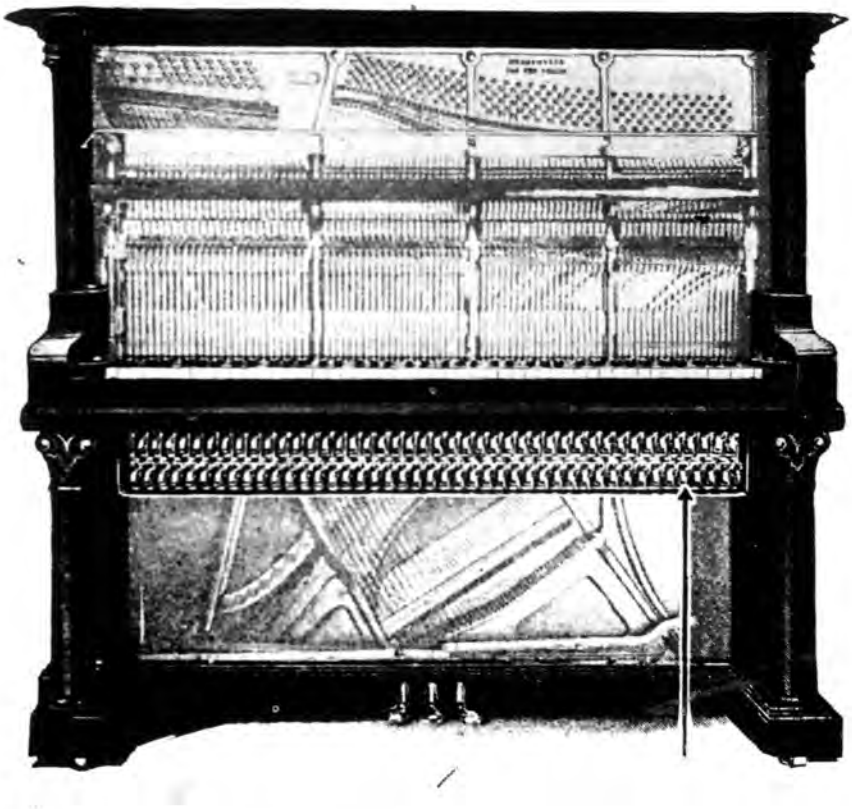
Ivan Berger.

Fig. 34

—*Edward Koren.*

The prophetic cartoon above, which is utilized by R. A. Moog, Trumansburg, N.Y., in its promotional material, first appeared in *SR*, February 17, 1962.

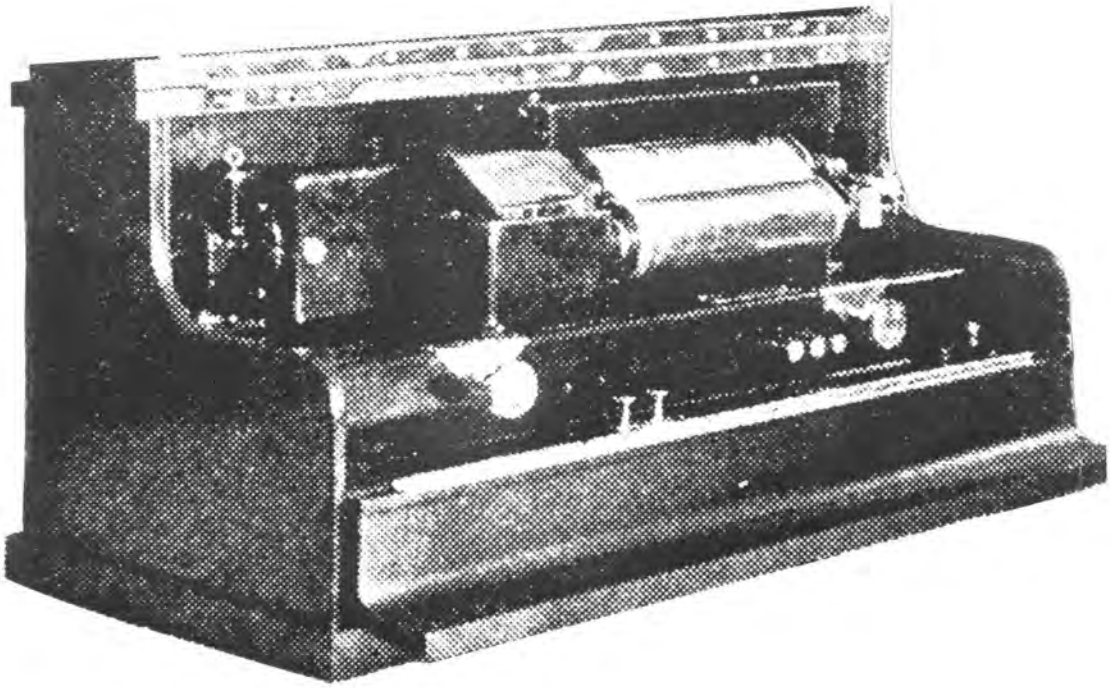
Plate 109



The Telektra.

Photograph shows a piano with a bank of magnets beneath the keyboard - operated from a roll in a separate cabinet.

Plate 110



Metal Roll in Separate Cabinet.

CHAPTER XII

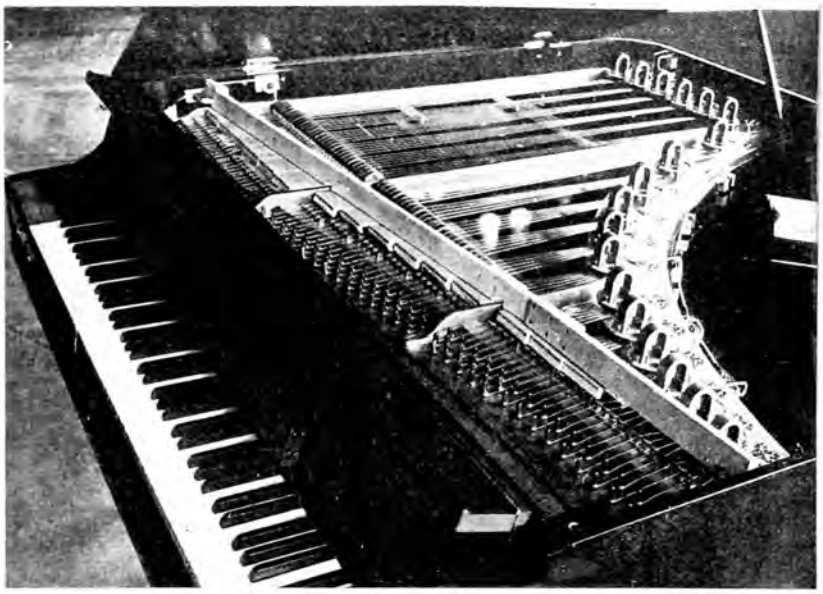
ELECTRICAL PIANOS

The earliest forms of electrical piano evolved from the player piano and reproducing piano. These instruments enabled music scores to be recorded on paper rolls which conveyed this information by a pneumatic system to the lever mechanism of the standard piano. Substitution of an electrical system for the pneumatic system, was made possible by the use of rolls which were perforated to correspond with electrical contacts in a tracker bar. These operated electromagnets which activated the piano mechanism.

Electrically operated player pianos were made as early as 1905 but seem to have been most popular round about 1914. The Electrelle, Telektra and Tel-Electric were the three best known makes, the selling price ranging from $ 300 to $ 450[392]. All the models were attachments which had to be added to existing pianos[Plate 109]. They were operated from thin sheet brass music rolls placed in a separate control cabinet which could be moved from place to place at the end of a cable[Plate 110]. A bank of electromagnets was attached to the piano under the keyboard. The cable connected it to the control cabinet where the perforations in the music roll switched on electric currents to energise the magnets. The keys were depressed "with a soft velvet like touch or with thunderous force" according to the strength of the electric impulse which the person had under his control. Speed was controlled by a variable speed motor operating the music roll. The Telektra was used for several years on naval ships and private yachts. The metal music rolls were an advantage in a damp atmosphere as they did not shrink or swell. The other advertising selling point was that it was the one player that convalescents and elderly folk could operate. These electrical piano manufacturers were forestalled by M. Speiss, a 19th Century Swiss instrument maker[393]. An extensive search in the available literature on mechanical player pianos, has failed to reveal any reference to this Swiss inventor or his piano. His

Plate 111

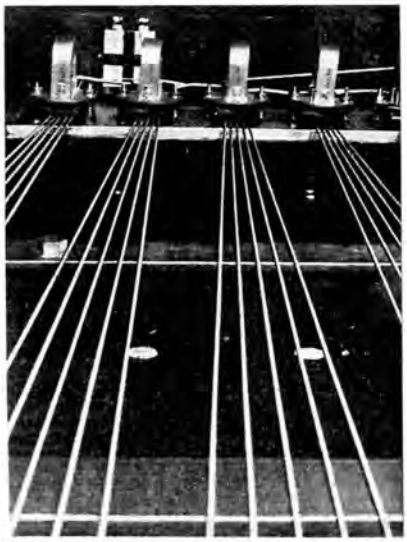
a



Interior of Professor Nernst's Electric Piano.

The mechanism of this 'piano' closely resembles that of an ordinary "Grand". The most conspicuous difference is the row of electro-magnets mounted at the upper end of the strings and the light damper strip at the front of the strings.

b



Strings of the Electric Piano.

Concentrated in groups of five, the strings when struck produce, according to their vibration, weak electrical alternating currents in the electro-magnets. These currents are amplified and made audible through the loudspeaker.

instrument could be played as an ordinary piano, or by means of a battery which set in motion a mechanical device for producing tunes. This device used electromagnets to drive the hammers against the strings, the electromagnets being operated by remote control from a perforated paper roll similar to the Jacquard loom. A similar system was used in the Telektra, except that the rolls were of thin brass. In these systems the keyboard, strings and soundboard were preserved, but the keyboard could be substituted by a perforated roll of paper or thin sheet brass. (See Chapter X).

The second group of electrical pianos features the elimination of the soundboard. Credit for this is attributed to Prof. W. Nernst, a German physicist and Nobel prize winner(394). He developed an electric piano in which the mechanical string vibrations excite weak alternating currents in the spools of the electromagnets incorporated above the strings(Plates 111 a & b). After amplification, the electric oscillations are transformed by means of the loud speaker into acoustic oscillations. In order to eliminate the disturbing sound of the hammer blows when the strings are struck Nernst used a special micro-hammer which hits the string with only a twentieth part of the force of a normal piano hammer had. Popper says "The string is therefore set vibrating only lightly thus contributing to the enhancement of the tonality especially in the depths and in the descants. The reduced tension of the strings results in the reduction of the load of the notches, boxes and iron plates - which therefore now can be constructed very lightly, and has the advantage that the die away time is increased three to five fold. In order to reduce this to the normal degree, a special damper rail has been built in, in addition to the ordinary damper device. When raising the damper rail the bass tones will be longer than a minute in dying away. If now the audibility regulator connected with the left pedal is also used, harmonium like sounds can be obtained on the instrument". This instrument, built by Siemans and Halske

EXTRACTS.

ELECTRICAL PIANO.—M. Speiss, electrical instrument maker at Sumiswald, Switzerland, has invented an excellently combined electric piano, which can be set in movement either in the ordinary way or by means of a battery, giving a current of electricity which acts upon a most ingenious mechanical arrangement. Thus any air can be played automatically. They are written by means of a contrivance on a band of paper similar to those on a Jacquard loom. The apparatus, as it stands, consists of two different sections, which can be separated from each other at a considerable distance. The first portion or controlling agent, is a mechanism of clock-work, the uniform motion of which can be modified at will, which passes a roll of strong paper from one cylinder to another. Between these two the paper is stretched against a brass roller put in contact with one of the wires of an electric battery. Above these three rollers there is a small keyboard, the hammers of which, of very thin brass, are in communication with the other pole of the electric battery. The band of paper prevents the passage of the electricity except where it is pierced with holes of different lengths corresponding to the notes of the air to be played on the piano: the neatness of the execution, and the rapid "fingering," are most astonishing; although the battery which performed before our eyes and years was only composed of thirty-six elements of Daniel's, the force of the piano can be set in movement in two different ways, one by means of the ordinary touch of the pianist, another by a small vertical rod of wood, which can lift the lever and strike the note when it is lifted upwards. In the execution of the music this traction is effected by electro-magnets, equal in number to the notes, which are set in motion as soon as the small copper or brass hammers connected with them come opposite to the holes in the governing paper roll, and establish a current. Thus, every note marked by a hole in the paper roll sets to work and animates the electro-magnetic coil, which raises the wooden lever and makes the notes speak. Other details of contrivance work the pedals; and buffers so as to give the necessary intonation to the instruments have been adopted.—*Builder.*

in co-operation with Bechstein in 1931, became known as the Neo-Bechstein[395]. It has been described by Galpin[396] as "This truly wonderful instrument of Grand piano shape". Extremely sensitive to the touch, it produces a delicate beauty of tone comparable to the Clavichord, but with fuller resonance. A harpsichord effect is obtainable by putting the electrical part out of action so that only the gentle percussion impact of the hammers on the strings is heard. It is possible to cut off the loud speaker and use head phones, and also to attach or build in electric gramophones for practice in accompanying singers or playing concertos[397].

In commenting on the Neo-Bechstein, Galpin says "Such details of pianoforte expression were required by classical composers of the last century, for instance by Beethoven and Schumann, but they have never been attainable before. Owing to the ease of amplification in forte passages there is also no need for the tremendous display of muscular energy which is often so distressing to behold".

The Vierling Piano[398], developed by the Hertz Institute in Berlin, is in general principles and effects similar to the Neo-Bechstein. Scholes says "It is claimed that the most thin toned, worn out piano with a Vierling attachment can be made to sound like one of the finest grands. This is reasonable enough, since the tone quality of the original sound producing medium must be quite lost under the electric amplification".

The Electrochord[398] built by Förster is similar to the Neo-Bechstein, but according to Scholes, "besides applying the Vierling patents, differs in that it uses separate sets of electro-magnets for fundamental tones and harmonics". This instrument appears to work on the principle that the various components of the original sound are amplified separately before being combined to produce the final output.

The Meissner Piano[398], also built on the Neo-Bechstein principle, has the addition of unlimited possibilities of varying tone colour by means of

touching buttons or turning dials which control the amplification of particular sets of harmonics.

This type of electrical piano has the advantage of achieving effects denied the traditional piano. The tonal quality will depend on the sophistication of the electrical circuits, amplifiers and loudspeakers. In spite of these advantages the problem of an exact duplication of a good quality soundboard by electrical means is regarded as unsolved by some authorities such as G.A. Briggs(399). Writing in the Music Trade Forum "R.N." considers that a true piano requires all vibrations to be transmitted to the air by means of a soundboard(400).

The third group of electric pianos dispenses with both the soundboard and strings and in their early form also dispensed with a keyboard. They have been described by Scholes(401) and Popper(402) as "truly electric" in that the sound is produced by an electrical audio oscillator. In this system an electric current is made to oscillate round a circuit. As long as the frequency of the oscillator is similar to that of an audible sound wave, all that is needed is to connect this circuit to a loud speaker. However, the output frequency is not continuously variable and this complicates the tuning. Alternatively, two oscillating circuits of much higher frequency can be made to beat with each other, giving oscillating currents of frequencies in the audible range. It is this second more complex type of electrical system which Scholes describes as the basis for electronic music. Usually one of the two oscillators is operated at constant frequency and the pitch of the sound varied by altering the frequency of the other oscillator. Thus a single dial can control the whole range of audio frequency.

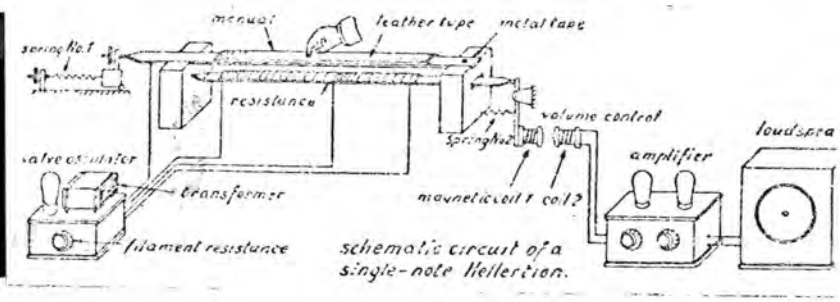
In order to give each piano note its individual character and also to enable any combination of several notes to be played simultaneously, there should be eighty eight pairs of oscillators, but an economy can be achieved by restricting the combinations of notes available and/or by using several manuals.

Plate 112

Professor Theremin 'Ether Wave Piano'.

When the hand is moved towards or away from the small rod aerial protruding from the apparatus, all notes of the scale can be heard in succession from the loudspeaker. On this instrument it is possible not only to play full and half tones, as, - for instance on the piano - but also much smaller tone intervals.

Plate 113



The Hellertion - the keyboard on this instrument serves only to facilitate the finding of the notes, which are played on strips of tape. Five of these strips of tape (or manuals) must be worked simultaneously.

One of the earliest attempts to use a low frequency valve oscillator system for the production of electric notes was made by the German, Jörg Mager in 1924[404]. His 'Spherophone' was specially designed for the use of quarter tones and even smaller intervals besides the usual tones and semitones. The keyboard was so highly developed mechanically, that it was possible to influence overtones and harmonics of the notes produced. This instrument was purely melodic in that it was only capable of producing single tones.

The 'Ether Wave Piano' or Thérémin as it is usually called, was the design of a Russian Scientist Prof. Leon Thérémin[405] (Plate 112). He demonstrated his invention from 1927 onwards. His idea was to free the performer of the mechanical manipulation needed on the traditional keyboard. The keyboard is really suspended in mid-air. He uses "hand capacity" for the adjustment of pitch - the right hand moving nearer to, or farther from the rod, becomes part of the apparatus and by its movement alters its frequency by one of the two high frequency oscillators. The left hand controls the volume by similar movements over a metal loop. At a radio exhibition in Berlin in 1932 the first electrical orchestra was assembled and amongst the instruments was a Thérémin. A Thérémin performer requires a good ear as there is no means of fixing the pitch; however a slight vibrato is a help in this direction.

In 1937 Percy Grainger wrote out some of his own compositions for the Thérémin but felt it only satisfied pitch requirements of gliding intervals, and had no resources for the solution of rythmic problems[406]. This remote control instrument evolved into a keyboard type where the keys operated as switches, bringing in electrical currents of different vibrations to alter the sounds from the pair of oscillators. Early forms[407] such as the Martenot (1928), the Emicon (1930) and the Mellertion (1933) were melodic instruments, due to the fact that the pair of oscillators could only deal with one note at a time. This problem was partly solved in the Hellertion (1936)

Fig. 35

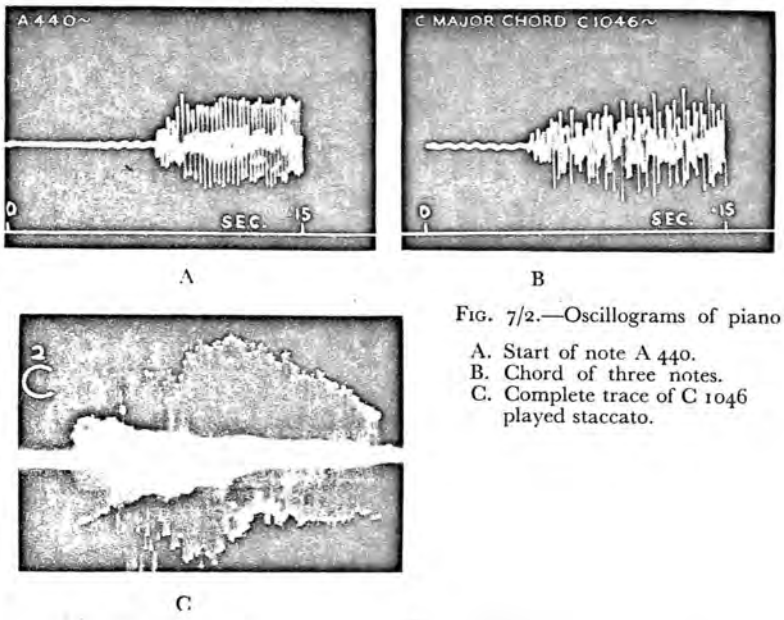


FIG. 7/2.—Oscillograms of piano

A. Start of note A 440.
B. Chord of three notes.
C. Complete trace of C 1046 played staccato.

Complexity of Piano Tones

Fig. 36

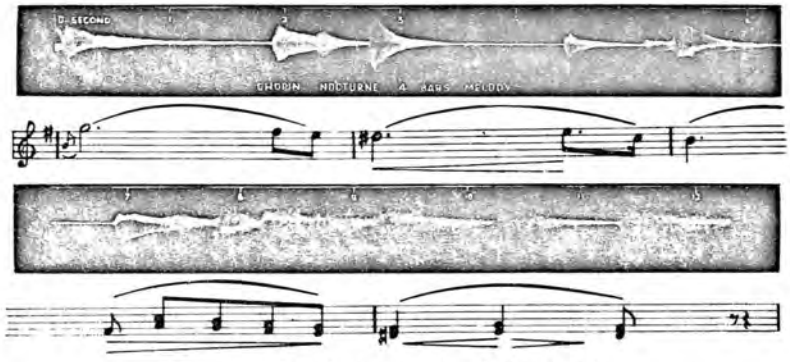


FIG. 7/4.—Sound picture of melody played on 7 ft. 6 ins. Grand. Sensitivity 150 m.v.

"Piano tone ... is in every way superior to any electric imitations I have heard".

G.A. Briggs.

by the use of four manuals accompanied by four pairs of oscillators(Plate 113).

Similar principles are involved in the modern Wurlitzer. One of the advantages claimed is that the substitution of strings and soundboard by electronic devices enables the size to be reduced very considerably. In 1954, Wurlitzer(408) introduced a sixty four note electric piano weighing only eighty lbs., while in 1955 a new Gulbranson(409) sixty four note piano was announced, which weighed only one hundred and thirty lbs., and could be fitted into the boot of a car.

This third group of electric pianos, having neither strings nor soundboards, can best be described as piano noise simulators and, although capable of a far wider range of sound effects, has not seriously challenged the rôle of the traditional piano in the home or concert hall. Its popularity has mainly been achieved in the form of low priced and portable instruments for simulating organ and orchestral music.

In 1951, G.A. Briggs,(410) an electronic engineer who has made an extensive study of the characteristics of piano sounds, concluded that all efforts to imitate the piano(Figs. 35 & 36) by electronic means had proved unsuccessful and expressed the hope that the piano would continue to defy the scientist and halt the drift towards synthetic mass production. He pointed out that, like the human voice, each piano has its own individual characteristics, and was fascinated by the fact that no two pianos have the same tonal character. His reasons why the piano had become the most popular of all musical instruments are:-

(1) Its wide frequency range, surpassed only by the organ.
(2) A combination of brilliant and mellow tone, pleasing to the human ear.
(3) The wide dynamic range - 60 decibels compared with 90 decibels of a full orchestra.
(4) The infinite variety of colour available by the velocity of key depressions.
(5) The fact that it is equally effective as a solo instrument and for accompanying other instruments.
(6) That it stays in tune for a long time, and
(7) That it is reliable, durable and ready to use.

Plate 114

Walter Carlos at his Moog Electronic Music Synthesiser.

At left is an 8 track recorder which tapes directly from the Synthesiser's output. Above the synthesiser keyboards are the circuit modules which can be inter-connected (as shown here) to generate tones with any desired qualities. Tones are monitored through the loudspeaker, barely discernible at the right.

EASTERN PROVINCE HERALD, THURSDAY, SEPTEMBER 4, 1969

'Moog' stirs musicians

Herald Correspondent

NEW YORK.

A NEW electronic instrument is causing quite a stir of excitement in the music industry. Some say it looks like being the greatest invention since the piano 260 years ago. It's called a Moog after its inventor, 35-year-old engineer and former piano student, Robert A. Moog.

The Moog can very nearly do the work of an entire symphony orchestra, and it only needs one musician to do so. It is not really a replacement for an orchestra, however.

At present the Moog is still monophonic, meaning that it plays one note at a time. To strike chords several instruments played by several artists simultaneously would be needed. In fact that is exactly what composer-conductor Gershon Kingsley is going to do when he gives, what he calls "a serious Moog concert" in New York. Music arrangers, sound studios and film companies have bought the 200 Moogs.

Comments Mr Ingsley: "Mo or combination of Moog live artists with the usual struments already are pro ing most of the new taped recorded music for motion tures and television film."

What does the Moog look li It's more like an electronics oratory than a musical ins ment except for the keybo which resembles that of organ. All the sounds are m by an electric oscillator, single musician can pro the equivalent of an orches accompaniment for a solois he can play compositions sounds which have never b heard before.

In 1953, Leon Katz,[411] described an electronic system which might be capable of imitating a piano. He details the characteristics of a piano note and the devices needed to cater for each of these. His proposed system consists of no fewer than eighty eight combinations of "oscillators", "distortion amplifiers" and "keying tubes" fed into a "linear amplifier". No proof is provided that this expensive and complex device would be satisfactory in practice, nor whether the cost of servicing by an electronics engineer would not be prohibitive in comparison with owning a piano.

The ultimate in electronic methods of producing music was developed in 1969 by an American engineer and former piano student, Robert A. Moog[412] (Plate 114). A battery of oscillators and other electronic equipment is made to record sounds on a multitrack tape recorder, from keyboards which resemble those of an organ. These keyboards operate as general convenient switching devices embodying no specific musical significance. While one hand is playing notes on the keyboard, the other can be playing loudnesses or other effects on separate control devices. However, as only one tone is able to be produced at a time, each component part of the music is separately recorded, and ultimately combined by an electrical instrument known as a synthesiser. The Moog is not a direct performing instrument, but is capable of imitating a piano, or other single instrument, or of achieving a final recording which combines a wide range of sound effects in the manner of an orchestra.

The Moog has a major advantage over the piano in the performance of contrapuntal music, where it is often extremely difficult to achieve the correct emphasis in different voices. The separate recording of these voices and the use of different sound effects to distinguish them, helps to clarify the interpretation of polyphonic music.

MONOCHORD TO MOOG

A STUDY OF THE DEVELOPMENT OF STRINGED KEYBOARD INSTRUMENTS WITH SPECIAL REFERENCE TO POPULARITY TRENDS

By

Betty Shuttleworth

A Thesis presented Ad Eundem Gradum

to

Rhodes University.

Volume III.

December, 1971.

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CHAPTER XIII

SOUTH AFRICA

Plate 115

An Employee at Work in the South African Piano Manufacturing Company, Wellington, Cape.

Plate 116 a

Spinet by Longman, Lukey & Company (1771 - 1777) owned by Mrs. Pauline Mudge, Chiltern Farm, Elgin, Cape.

Plate 116 b

Plan View of Spinet by Longman, Lukey & Company.

CHAPTER XIII

SOUTH AFRICA

An astonishing number and variety of stringed keyboard instruments have been preserved in museums and private homes in South Africa. These indicate very clearly the popularity trends of the past three centuries, and also illustrate most of the developments discussed in the previous Chapters.

Many rare antique instruments have been found in junk shops, outside sheds and attics, or picked up at sales for a song. Their histories have usually been lost by the time they are discovered and they are always sadly in need of repair. The task of restoration is not only expensive, but is also a highly skilled job,requiring time and patience and the correct materials.

Most of these instruments are incorrectly dated and sometimes even wrongly described, and Museum Curators and private owners have proved eager to discuss methods of identification. It has been possible with some well known makes to get accurate dates from the manufacturer's number inscribed inside the case, but often both name and number have disappeared. Other methods have included an examination of the frame, the action and the shape and style of the case.

A search through the Museums and private collections of the Cape has failed to reveal any instruments preserved from the period of the Dutch occupation (1652 - 1815). Only one 18th Century spinet has been found. It was discovered in Wales five years ago by Mrs. Pauline Mudge of Elgin who purchased it for £4. (Plates 116 a & b). This spinet made by Longman, Lukey & Company (1771-1777) has an elegant rosewood case with decorative brass hinges. Mr. John Juritz has restored it and replaced a number of the jacks and plectra. For the latter he has used various materials, such as vulture quills or teeth of a nylon comb. The tone of the spinet is richer and fuller than any modern equivalent heard by the writer.

Plate 117 a

Square by Johannes Zumpe and Buntebart dated London 1772
owned by Mr. David Morrison, Saxonwold, Johannesburg.

Plate 117 b

Part of Plan View of Zumpe and Buntebart Square.
Note whale bone springs on back of overdampers, guide pins in hammer shanks and the three hand levers. (two dampers, one lute).

Plate 118 a

Square by Johannes Broadwood (494) 1786
presented by Lady Beattie to College of Music,
Cape Town.

Plate 118 b

Plan View of Johannes Broadwood showing underdamper action of Broadwood (Fig. 38). Note the position of the wrest pins at back of soundboard, (compare Plate 117 b). No damper levers.

1st April

Not the oldest piano

SIR, — You published a photograph on March 11 of a piano which the owner thought might date from 1795. The instrument shown in the picture appears to be about 50 years old. What probably lead to the owner's conclusion that it was made in 1795 is that the firm of Ritmuller was established in that year. The first upright piano was made circa 1810.

It would be interesting to know which is the oldest piano in South Africa. I have an English "square" piano which dates from 1863, and I have seen at least a dozen others of similar age.

Wilhelm Gertz, the eminent harpsichord manufacturer and restorer of antique pianos, told me that the oldest he had seen in South Africa was an Erard grand, with black naturals and white sharps and flats, which was the type of instrument upon which Chopin would have played. Gertz considered that it dated back to the early 1820s.

ANTONY BRITTEN

Mr. David Morrison of Saxonwold, Johannesburg, with his early "square" piano dated 1772 which could well be the oldest piano in South Africa.

FINDING THE OLDEST PIANO IN S.A.

To the Editor of The Star

SIR, — In The Star of April 1, Antony Britten says it would be interesting to know which is the oldest piano in South Africa. I believe I can help him to some extent.

In 1964 Messrs. Phil Morkel of Cape Town organized a competition for "The oldest piano in South Africa." The prize was won by Mrs. O. Jackson of Houhoek, Cape, for having a family heirloom which she believed was made "before 1760." The piano was made — according to the name on the fall (lid) — by Broadwood & Son, makers to His Majesty, Golden Square, London. (Incidentally, Mrs. Jackson's family ancestors lived in Golden Square.) Mrs. Jackson obtained this dating from John Broadwood & Sons Ltd., in 1957.

On learning the result of the competition I was doubtful about the piano having been made "before 1760" since the original John Broadwood was married in 1769 to his employer's daughter, Barbara Shudii and the son was born in 1772.

Although the present firm of Broadwoods maintains that the firm's name was changed to Broadwood & Son in 1775, it does not appear to have been registered as such until 1785, when the son actually became a partner.

In correspondence the present firm's director was unable to say why an obviously wrong date had been given to Mrs. Jackson as the person responsible was no longer with the firm, and as their records had been destroyed by fire about 1843 it was not possible to definitely date the instrument.

Even supposing that Mrs. Jackson's piano was built circa 1775 I know of an older instrument. It is an early "square" made by Zumpe & Buntebart of London, dated 1772 and is owned by Mr. David Morrison of Saxonwold, Johannesburg, and this might very well be the answer to Antony Britten.

HAROLD STEAFEL.

In Groote Schuur there is a spinet made by Arnold Dolmetsch of London - found by Sir Herbert Baker, architect of Groote Schuur and artistic adviser to Cecil Rhodes. The date of the instrument would appear to be about 1900[413].

Four 18th Century pianos have been identified; one in Johannesburg and three in the Cape. These are of particular interest, as they show the three different actions characteristic of the early piano developments in England. One of these, reported to be the oldest in South Africa, is dated 1772, and was made by Johannes Zumpe and Buntebart (see press cuttings opposite). It is at present in the home of Mr. David Morrison of Johannesburg, who bought it in a junk shop about ten years ago for £5[Plate 117 a]. It has been beautifully restored by Harold Steafel of Durban, who took great pains to use the correct materials for the job - even going to the trouble of finding whale bone for the springs. The piano is a shallow rectangular box and was originally made to rest on a trestle stand. This model is set on an opera table and held in place with large screws. The action is the simple Zumpe action shown in Fig. 37 and the compass is almost 5 octaves - standard until about 1795. Stringing is bicord throughout and the strings pass diagonally over the case from hitch pins along the back, behind the keyboard, to wrest pins set in the small square soundboard at the right hand end of the case. Dampers are provided for every note. These project on arms from the back of the case and rest on the strings just above the hammers. Each damper is raised when a key is pressed, by a little ivory push rod resting on the tail end of the key. There are three hand stops at the side of the case near the bass keys[Plate 117 b]. Two of these raise the dampers - but in two sections - one each for treble, and bass. The third stop is the lute which pushes a leather covered strip against the underside of the strings to act as a mute for soft effects. The inscription on the piano is Johannes Zumpe et Buntebart Londini Fecerunt 1772.

Buntebart is referred to by both Harding[414] and Sumner[415] as Buntlebart,

Plate 119 a

Square by Longman and Broderip c.1790
in Groot Constantia, Cape.

Plate 119 b

Plan View of Longman and Broderip Square.
Two of the three hand levers are visible - action described in Fig. 39.

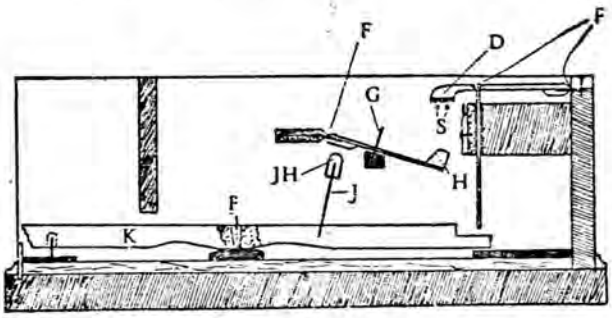
Plate 120a

Square by Adam Beyer, Londini, Fecit 1793
Compton Street, Soho.
owned by Brigadier P.L. Graham,'Vierthof',
Augusta's Way, Constantia, Cape.

Plate 120b

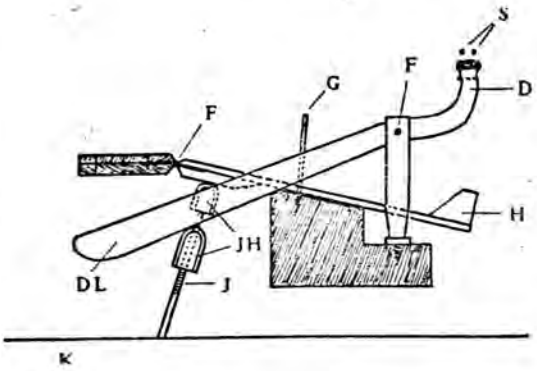
Plan View of Adam Beyer Square showing overdampers and three hand levers. L - R: Damper for Treble notes, damper for bass notes, lute (sourdine). A damper can be seen lying on the hammer rail. Action described in Fig. 39. Note the wrest pins on the right of the soundboard.

Fig. 37



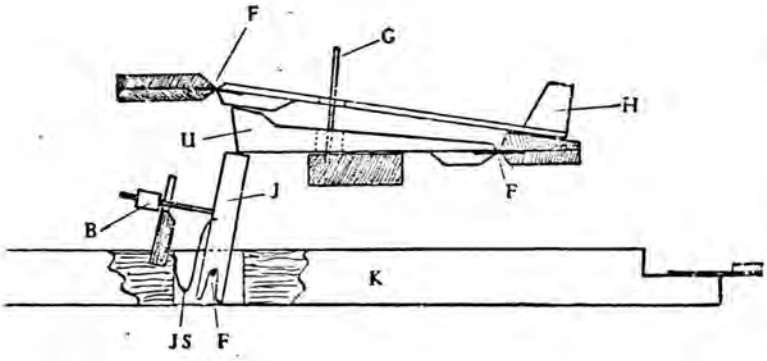
Cross-Section of a Square Piano, *c.* 1760 (after Zumpe). Showing Action Unit. A wire jack rigidly fixed in the key merely pushes the hammer towards the strings. At the same time the damper is lifted from the strings by the key tail.

Fig. 38



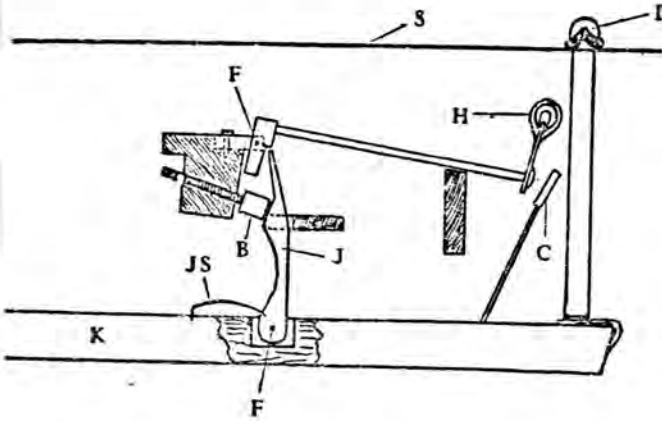
Square Pianoforte Action (Broadwood, 1783), with gravity-return Underdamper. The hammer is operated as in Fig. 2, by a rigid jack, the lower head of which also lifts the weighted damper lever. The damper unit is made of brass.

Fig. 39



Square Pianoforte Action, with Spring Jack (after John Geib, 1786: from an instrument by Longman and Broderip, *c.* 1790). The principle of the moving jack enables it to drive the hammer towards the string until the last possible instant, when it clears, or 'escapes', thus letting the hammer fall away on rebound though the key remains down. The Geib action also includes a separate 'underhammer' lever which allows the motion to be transferred very close to the hinge of the hammer proper, and improves velocity and touch. This action is a late adaptation of that used by Christofori, the inventor of the piano, *c.* 1709–20.

Fig. 40



The English Grand Pianoforte Action. Evolved after 1770 by the pioneer makers of the English grand, Backers, Broadwood and Stodart, this type of action was still in use at the end of the nineteenth century. The jack acts directly on the hammer butt. As it rises it is thrust aside by the set-off button, thus effecting 'escapement', and leaving the hammer free to fall. While the key remains down the hammer is held by the check to prevent a ricochet and aid quick repetition of the note if required.

Key to Figs. 37 - 40

B. Set-off Button.	G. Guide Pin.	K. Key.
C. Check.	H. Hammer.	
D. Damper.	J. Jack.	S. Strings.
DL. Damper Lever.	JH. Jack Heads.	
FF. Fulcra or Pivot-Points.	JS. Jack Spring.	UH. Underhammer.

but Rimbault[416] spells the name as it is inscribed on the piano. Another interesting aspect in the inscription is the date 1772, implying a partnership at that time. Harding in her list of pianoforte makers in London dates Zumpe's piano making period as 1767 - 1784. Rimbault states that Zumpe and Buntebart were in partnership in 1784 but later quotes the London Musical Directory of 1794 which lists "Buntlebart and Sievers, instrument makers, 7, Princes Street, Hanover Square"[417]. These variations in spelling were not unusual at that time.

Another strange inscription occurs on a Broadwood of 1786 where "Johannes" is used instead of "John" on the nameboard.. This attractive old piano was presented to the South African College of Music by Lady Beattie in 1913 and has been partially restored by John Juritz[Plate 118 a]. It has a rosewood case and the nameboard is a honey colour satin wood. The action of this instrument is interesting, for it has the Broadwood 1783 patent for an improved underdamper action for squares[Fig. 38] [Plate 118 b]. This enabled the wrest pins to be placed at the back of the case instead of on the soundboard, but, strangely enough, although the patent provided for a damper pedal, neither this nor hand stops appear to have been fitted to surviving specimens, and the design must therefore be considered reactionary in this respect[418].

The third piano is a Longman and Broderip Square in Groot Constantia, Cape. The case, made of rosewood, rests on an opera table, and the name is engraved on an oval ivory plate inserted in the satin wood nameboard. [Plate 119 a] The action is shown in Fig.39 and the arrangement of the strings and wrest pins is the same as described earlier for the Zumpe piano[Plate 119 b].

The last and loveliest of all these 18th Century pianos is a square by Adam Beyer - Londini - Fecit 1793[Plate 120 a]. Its action and string arrangement are identical with the Longman and Broderip described above[Plate 120 b]. It is interesting to note that the inscription on the fall (lid) is Beyer, spelt in this way by Sumner[419], who describes him as one of the more distinguished of

The Lounge of the Lord Milner Hotel,
Matjiesfontein, Cape, showing a
Square Piano by John Broadwood & Sons (48667)
Makers to their Majesties and the Princesses
c. 1830

Wood frame - metal hitch pin plate - transverse bracing bar. 6 Octaves $^{III}F - F^{IIII}$.
(36" x 72" x 13½").

The hotel has been restored to its former Victorian grandeur by Mr. David Rawdon. This illustration shows the place of honour accorded the piano, and how the design fits into the style of the period.

the so called 'Twelve Apostles' who came to England with Zumpe. Harding, however, lists among her piano makers, Adam Bleyer of Compton Street, Soho from 1774 onwards[420].

This very beautiful Sheraton styled piano was inherited by Brigadier P.L. Graham from Miss Graham, an old Aunt, in 1957. It is of particular interest to Grahamstown to find that the owner of this piano is a direct descendant of Colonel Graham, the founder of Grahamstown. His Uncle, Sir Thomas Graham, Judge President of the Eastern Cape, lived in Grahamstown and Adv. K. Graham his cousin, was also a well known resident of this City.

A piano claimed to be made before 1760 is mentioned in the press cutting referred to above. However, Harold Steafel has shown that this could not have been possible, as it was made by Broadwood and Son, a company only registered in 1795. Further evidence, which confirms Mr. Steafel's opinion, will be discussed in the appropriate sequence.

A large number of early 19th Century square pianos have been located, and the trend towards bigger instruments is quite marked. The dainty 18th Century pianos were superceded by increasingly heavier models, and the Victorian years produced some handsome specimens of that era. These styles suited the furnishings of the period as shown in Plate 121. It is in the 19th Century pianos that the pedal makes its first appearance. Although Broadwood had invented the pedal in 1793, it was not used, as we have seen. Loesser says that Sheraton "balked at this lumpish intrusion on his elegant lines"[421].

So far, practically all the 18th and 19th Century pianos located by the writer have been of English origin. Unfortunately it has not been possible to trace any of those which were brought out by early English Settlers. Nevertheless there is evidence that missionaries of the London Missionary Society, who crossed the Orange river in January 1806, had brought a piano with them. Moffat[422] describing an attack on the Missionaries by Africaner, a notable Hottentot Chief, says that "Finding the town (Warmbath) abandoned,

Plate 121 a

Square by John Broadwood and Sons (c.1830)
Makers to His Majesty and the Princesses.
Owned by Dr. Wilkinson, Grahamstown.

Plate 121 b

Broadwood Square as above, with nameboard removed to show the added keys. The piano has a wooden frame and leather covered hammers. The pedal is missing but the action has been restored.

Plate 122 a

Square Piano by Wood and Company c. 1830
in Old House Museum, Durban.

Brought to Natal by Major George Marcus -
believed to be the first piano to arrive at Port Natal.

Note the unusual positioning of the pedal towards the
left of the instrument.

Plate 122 b

Plan View of the Wood & Company Square.

Wooden frame and action as in Fig. 39.
Note the crank dampers resting on top of the
strings.

Plate 123

Square by Clementi & Company, 26 Cheapside, London (14547).

Owned by the late Professor P.R. Kirby, now in the possession of his daughter, Mrs. Nan Parnell.

This instrument has a Spanish mahogany case and has been completely restored. The frame is all wood - brass strings are wound with copper wire and it is bistrung throughout the 68 notes, of which the last twenty are "additional keys".

his followers commenced a rigid search for any articles which may have been concealed for safety in the earth, and were but too successful. .... one of the Chieftain's attendants strayed into the burial ground, ... stepping over what he supposed a newly closed grave, he heard to his surprise, soft notes of music vibrate beneath. He stood motionless, gazing over his shoulder, with mouth and eyes dilated, hesitating whether to stand still, and see the dead arise, which he had heard the missionaries preach about, or take to his heels. After no little palpitation of heart, in order to assure himself, he mustered courage to make another trial, for the tones he had heard had died away. His second leap again roused the sepulchral harp, which now fell in soft but awful cadence on his ear. Without casting an eye behind, he darted off to the camp, and, with breathless amazement, announced to Africaner the startling discovery he had made of life and music in the grave. ... The Chief was not to be scared and ordered his men to follow him to the spot. One jumped and another jumped, and at each succeeding leap, succeeding notes of the softest music vibrated on the ear from beneath. Recourse was soon had to exhumation. The mysterious musician was soon brought to light. It proved to be Mrs. Albrecht's piano-forte, which she had taken with her from London, and which was the first ever conveyed into the Transgariepine regions. Being too cumbrous to be taken in a hasty flight, it had been buried in a soil where, from the entire absence of moisture, it might, but for this circumstance, have remained unscathed. Africaner, whose martial spirit made him a fitter associate for Mars than for the Muses, allowed the instrument to be dissected, parts of which I have seen, from which those fingers now silent in the grave had called forth divine harmony".

The available literature also proves that pianos came out with certain 1820 Settler families. In her diary, Sophia Pigot[423] records that they went on shore at Algoa Bay on Tuesday, May 2nd 1820. Only three days later, Friday May 5th, she writes " ... got the pianoforte out, quite out of tune" and on

Plate 124 a

Square Piano by Gunther and Horwood (5201)
Camden Town, London.
Owned by Mr. Morrison, Bellingham, Cape.

Plate 124 b

Detail of Gunther and Horwood Square showing one key depressed and crank damper raised. (Action as in Fig. 39).

Plate 125 a

Square by Goulding D'Almaine (in business 1785 - 1851) 20 Soho Square, London.

Plate 125 b

Plan View of Goulding D'Almaine. All wood frame - 6 octaves ,,, F - F"". Bistrung throughout - each string separately wound round hitch pin - crank dampers - action as in Fig. 39.

Plate 126 a

Square by William Stodart & Son (8805)
Makers to His Majesty and the Royal Family
Golden Square, London.

Owned by the Lady Elizabeth Tyler, Teviot,
Firgrove, Cape.

Plate 126 b

Stodart Square with nameboard removed to show the additional keys. Tuning key is visible top left. Wood frame, ivory key plates, mahogany frame, 6 octaves $_{\prime\prime\prime}$F - F$^{\prime\prime\prime\prime}$ - bistrung throughout. Instrument measures 67" wide, 26½" deep, 33" high and the keyboard is 39-3/4".

Tuesday May 24th says "Walked down the hill to seek for a man to tune the piano". After moving to their land, known as 'Pigots Park', near Grahamstown, Sophia makes frequent references to piano playing, practising, copying music and musical evenings. In 1821, on Friday August 3rd we read "A very rainy day - Dale tuned the piano - the old Sow pigged 12 pigs - Saturday 4th - very nice day - Dale went".

A further reference to "Piano-forte tuners" is made by Cowper Rose, when he describes Grahamstown in a letter to his brother in the 1820's.(424) In another of his letters he indicates the social importance attached to the accomplishment of piano playing by young women of that time. A visit paid to an impoverished family living on the banks of the Fish river is cynically described. The owner of the 'decrepit hovel' received his guests in the entrance where he kept them talking till his wife had completed her toilette behind a ragged blanket. "The time "he says" had been well spent, and her appearance was admirable; a tarnished white satin Spencer contrasing well with a face and bosom scorched by exposure to an African sun". They talked " of education, of the march of intellect, of music, when the lady informed me that she was teaching her children music, by making them play on a table, until an instrument could be procured".

Other Settlers appear to have been more fortunate. Phillips, an 1820 Settler, in a letter dated 15th July 1821, writes " The bedroom is partitioned off with sawed boards and our bookcase covers up half of it, the pianoforte under it"(425). On the 7th February, the following year he visited the Biggars who had eleven children - "Four of the young ladies play on the piano extremely well, but I am sorry to say they are not yet housed, still living in tents"(426). This symbol of prestige and gentility must have been regarded as a vital part of a young girl's education - more important than baths one suspects - imagine the effort of transporting such an extravagance as a piano to a wild and unknown country.

Plate 127 a

Square by Erard (2415) Patent Harp and Pianoforte Maker, London, in South African College of Music - Cape Town.

Walnut case decorated with inlaid satin wood - the pedal is missing. 80 notes ,,,C - G'''' - broken belly bridge - oblong shaped tuning pins. Erard's repetition action, invented for Squares 1827, is used in this instrument.

Plate 127 b

Detail of metal rose in cast iron hitch pin plate in Stodart Square.

At the beginning of the 19th Century pianos were still being made entirely of wood and quite a number of such instruments have been photographed and examined in Museums and homes in South Africa. The earliest of these appears to be the piano owned by Mrs. O. Jackson of Houw Hoek who was incorrectly informed that it was made in 1760 (see press cutting opposite page 131). This instrument was made by John Broadwood & Son which means that it was constructed sometime between 1795 and 1820. Also it's serial number is 27380, while the Johannes Broadwood of 1786 described on page 132 is 494. Furthermore the use of six turned legs would appear to place it in the early 19th Century. It has five octaves and is made of rosewood.

Another early piano is a John Broadwood and Sons owned by Dr. M.A. Wilkinson of Grahamstown (Plate 121 a). This piano cannot be older than 1820, as Broadwood & Sons was registered in that year[427] and, according to the Broadwood firm[428], cannot be later than 1830, after which time metal was invariably used. The keyboard range is five and three quarter octaves, including ten additional keys. This method of extending the keyboard was invented by William Southwell of Dublin in 1794[429]. The additional keys can be seen in Plate 121 b, where the levers disappear under the soundboard and are partly separated from the others by a partition. A hole is made in the soundboard for the hammers to pass through to the strings which are differently arranged. Those strings which belong to the additional keys are often hitched over pins embedded in a cavity cut out in the back of the case, while the keys themselves are attached to a separate frame. The action is the English Double Action for squares by John Broadwood & Sons, about 1815. It is the same as shown in Fig. 39. The case is mahogany and an elegant example of this period. Except for the missing pedal, this six legged piano has been restored and has leather covered hammers.

Another six legged wooden framed instrument is attractively displayed in the "Old House Museum", Durban. It was the first piano to arrive at

Plate 128

Square by Challen & Son (2865) 1847

Owned by George C. Osler, 182 Dorp Street, Stellenbosch.

The case is rosewood and measures 150 cm x 75 cm. It has a wooden frame with a metal hitch pin plate and 81 Keys „C - A''''. The instrument was reconditioned in 1970 by Mr. Wolfgang Ihle, Wellington.

Port Natal, and is said to have been brought in by Mr. George Marcus in 1849. D.H. Strutt describes it incorrectly as a "Mozart type" piano(430). Mozart however, used an 18th Century, five octave grand with a Viennese action(Plate 35), whereas this instrument made by Wood and Company(Plates 122 a & b) about 1830, is a 19th Century square with six octaves and an English action.

Other six legged pianos which are almost identical, include a Clementi ca. 1820 in the Cultural History Museum, Cape Town; a Clementi owned by the late Prof. P.R. Kirby(Plate 123) and a Gunther and Horwood, London, in the possession of Mr. Morrison at Groot Drakenstein, Cape.(Plates 124 a & b).

Two similarly styled wooden framed pianos with four legs, appear to date from about the same period. Both have six octaves, with additional keys, a damper pedal and the same action as above. One of these is a Goulding and D'Almaine, London, in the 1820 Settlers Museum(Plates 125 a & b). The other is a Stodart, owned by the Lady Elizabeth Tyler of Firgrove, Cape, who bought it in Southampton, in 1954, for £20(Plates 126 a & b). The piano had been restored when it was purchased, and is kept in tune and played on regularly by the Lady Elizabeth herself. A tuning key can be seen on the top left of the instrument. The sweet and mellow tone appears to confirm the belief of the early piano makers that wood was important to the quality of the sound. There is a marked similarity in all these wooden framed pianos, as can be seen by a comparison of the pictures. They are larger than their Georgian forbears, but still retain an elegant appearance in spite of their size. The design of the case is reminiscent of Regency styling, while the turned legs show a trend towards 'early Victorian'. Decoration in the form of brass fretwork on the nameboards and different coloured inlaid wood, feature in the designs.

The reluctance of the piano makers to use metal is demonstrated by the above examples. However, as we have seen in Chapter V, page 48 the use of metal became necessary to help withstand the greater strain imposed by enlarging keyboards and increasing string tension. In square pianos,

Plate 129 a

Square by John Broadwood & Sons (04 883) 1842
Manufacturer to Her Majesty.
In 1820 Settlers Museum.

Plate 129 b

Broadwood Square (04 883) showing the metal hitch pin plate and transverse bracing bar. Action as in Fig. 39.

Plate 130a

Square by John Broadwood & Sons (1830 - 1837)
Makers to their Majesties & the Princesses.

Donated to the 1820 Settlers Museum by the Kannemeyer family.

Plate 130b

Plan View of Broadwood showing gilded hitch pin plate with six oval holes. Transverse bar from hitch pin plate to wrest pin block and tubular bracing bar. Action - Fig. 39.
(69½" x 27-3/4" x 12") 6 octaves.

Plate 131 a

Square by John Broadwood & Sons (62813) 1855
Manufacturers to Her Majesty.
In 1820 Settlers Museum.

Plate 131 b

Broadwood (62813) showing metal hitch pin plate and tubular bracing bar. Action - Fig. 39. (73" x 33½" x 14½") 82 Keys.

metal hitch pin plates were first applied by Broadwood in 1822[431] and to date three instruments have been located with a metal hitch pin plate, and no other form of bracing. These are squares by Broadwood & Son, Erard and Challen & Son. The first is in the Open Mine Museum, Kimberley and was made between 1830 - 1837. It is inscribed "Makers to their Majesties and the Princesses" - is made of mahogany and has six octaves.

The Erard is in the South African College of Music(Plate 127 a). This large six and a half octave is very decorative, and even the gilded hitch pin plate has an ornate raised open work rose included in the metal casting(Plate 127 b). The purpose of the rose is to allow sound to escape freely. The action is a double escapement and has crank dampers - unfortunately the pedal is missing, but otherwise it is in good condition. The stringing is on Stewart's patent of 1827 - one string being used to form two unisons to a note, (see Fig. 17 b Chapter V).

The third piano is a six and three quarter octave Challen & Son owned by Mr. G.C. Osler in Stellenbosch (Plate 128). It has been reconditioned and is for sale at R1,000.

In 1827, Broadwood's patented a combination of a metal string plate and bars[432]. An example of this is to be found in a Broadwood Square of 1842 in the 1820 Settlers Museum, Grahamstown - this is the only example so far located of a transverse bar from a metal hitch pin plate to the wooden wrest pin plank, with no other additional bars(Plates 129 a & b).

Square pianos with metal hitch pin plates and tubular or rectangular bracing bars appear to have been fairly common in South Africa. The 1820 Settlers Museum has two Broadwoods - one, 1830 - 1837(Plates 130 a & b), the other 1855,(Plates 131 a & b) both of which have this form of bracing - the former has a metal hitch pin plate and transverse bar as well as tubular brace, while the latter is strengthened only by a tubular bar and metal hitch pin plate.

Plate 132

Square Piano by Unknown Maker.

Donated to Rhodes University Music Department
by Mr. H. Schauder of Port Elizabeth.

This mahogany piano has been badly damaged through exposure to the weather. However, it still has a remarkably sweet tone and the action (see Fig. 39) is reasonably good.
The frame is wood with a metal hitch pin plate and long rectangular bracing bar. The keyboard range is six octaves.
The stand is made of plywood and is obviously not original.

Plate 133

Square by John Broadwood & Sons (54270) c.1840
Manufacturer to Her Majesty.

Donated to the George Museum by the Cornish family.

Mahogany piano with four turned legs and a damper pedal. Wood frame with a perforated metal hitch pin plate. Transverse bar from hitch pin plate to wrest block and a tubular bracing bar. Single copper wound bass strings, otherwise bistrung. Black keys slope towards the back to the level of the white keys - see Keyboard Development, page 86. Compare Emmanuel Moor's keyboard.
The oil lamp on the left is a rare piano lamp - the music on the stand a first edition of Haydn's Creation and the metronome belonged to Mr. Sayers, father of the Museum's curator.

Plate 134

Square by an Unknown Maker in Kloof Hotel, Joubertina.

It was bought by Mr. R. Horn for R60 and restored by Mr. Ihle for R290.

It is the largest square piano so far observed in South Africa. 76" x 34½" x 12½". The keyboard is 43½" and it is 35" high. The leg was broken in transport.

Wood frame - metal hitch pin plate - transverse bar from hitch pin to wrest block and a rectangular bracing bar. Music stand and pedal not original.

A piano with a perforated metal hitch pin plate and rectangular bracing bar has been donated to Rhodes Music Department by Mr. H. Schauder(Plate 132). It is a square, by an unknown maker - has 6 octaves - the action of the 19th Century squares and needs extensive restoration as it was damaged in the Port Elizabeth floods of 1969 and 1971.

In the George Museum, is a John Broadwood donated by the Cornish family(Plate 133). The curator, Mr. Charles Sayers, has gone to a great deal of trouble to find out all he could about this instrument. A label inside the piano is inscribed "supplied by T. Hitchcock - No. 8 Heerengracht, Cape Town". In 1850, Heerengracht changed to Adderley Street in recognition of Charles Bowley Adderley - a British parliamentarian who opposed the threatened introduction of convicts into Cape Town in 1849. Hitchcock arrived in Cape Town in 1829 to finish building the Jan Hoets organ in the Groote Kerk in the Heerengracht. The original builder, E.K. Green, having died the previous year. On completion of the organ in 1830, he remained in Cape Town and started a music business. In 1840 this venture evidently ran into difficulties for it was offered for sale by public auction. It is possible this piano was sold then.

In his efforts to date the piano Mr. Sayers sent the serial number to Broadwood's and received the following reply "We made over 80,000 of these instruments and records we had of these were destroyed by fire in 1843, but we conclude that your numbered instrument (i.e. 54270) was made by us in 1840". This seems strange as Hitchcock sold his shop in 1840. Furthermore the dedication to Their Majesties and the Princesses dates it prior to 1837. The piano has six octaves with black keys shaped in an unusual way - they slope down towards the back to the same level as the white keys. There is a transverse suspension bar from hitch pin plate to wrest pin block - a tubular brace and a perforated metal hitch pin plate. Perforations permitted sound to escape freely and were often shaped to add decorative interest. (Plates 127b & 130b)

Plate 135

Square by Adolf Meyer - Hamburg, c.1820
in Stellenbosch Museum.

Wood frame - metal hitch pin plate with a transverse bar to wooden wrest block. Tubular bracing bar. Keyboard span is C - F''''. Kloof Hotel piano bears a strong resemblance to this instrument - the size, legs and pedal support are very similar.

Sometimes these plates were painted as in a Small, Bruce & Company Square, c. 1840 in the Cultural History Museum, Cape Town. This piano also has a tubular bracing bar and six octaves.

Gilded plates were also featured. Examples of these are found in the Erard described above and in a large square, by an unknown maker in the Kloof Hotel, Joubertina (Plate 134). The latter is constructed entirely of wood, with the addition of a metal hitch pin plate, a transverse suspension bar to the wrest pin block, and a rectangular bracing bar. The owner, Mr. R. Horn, called it a "hammer flugel" but had no explanation for the assumption that it was a German piano. It was found in the veld on a farm and bought in 1967 for R60. Mr. Ihle, of Port Elizabeth, imported parts from Germany and put it into working order for R290. It has been restored with modern dampers and materials, but sounds very good. The case is mahogany - 76" wide, 34½" deep and it has six and a half octaves ,,,C - F''''. The music stand and brass pedal appear to be new.

A 6 octave Square by Adolf Meyer - Hamburg ca. 1820 is in the Stellenbosch Museum (Plate 135). This is also fitted with a metal hitch pin plate, a transverse bracing bar from the hitch pin plate to a wooden wrest pin block and has a tubular bracing bar. It is a large square very similar in appearance to the English squares described earlier.

Two Collard and Collard Grand Squares are owned in the Graaf Reinet district. One of these, belonging to Mr. and Mrs. E. Kroon of Graaf Reinet, is an example of the next stage in the development of the use of metal (Plate 136 a). This instrument has a tubular bracing bar and both the wrest and hitch pin blocks are covered with metal plates (Plate 136 b). The piano was bought from the Jonker family in Graaf Reinet about 1960 and has been restored. It has over dampers and the action seen in Fig. 39. There are 17 copper wound, single bass strings, the rest of the strings are 2 to a note,

Plate 136 a

Grand Square by Collard and Collard (11870)
in possession of Mr. & Mrs. E. Kroon, Melrose,
Graaf Reinet.

Fretwork panels in name board are missing, also
5 ivory key plates, otherwise completely restored -
The case is mahogany and measures 75" x 32" x 13½"

Plate 136 b

Plan View showing the
metal hitch pin and
wrest pin plates and the
tubular bracing bar.

One wire is used to
serve two unison notes.
(Stewart's patent, 1827)

Plate 136 d

View of Collard & Collard (11870) showing rounded black keys. The method of using one string fixed to two wrest pins and looped over the hitch pin, can be seen in this picture.

Plate 136 c

Pedal of the Collard & Collard (11870)

Plate 136 e

Detail of fretwork covers on Collard & Collard (11870)

Plate 137 a

Square Piano by Heinrich Hüni - 1828
Claviermacher in Rappeschweil.

This Swiss paino was imported by Mr. Heuer in 1967.

Plate 137 b

Plan View of Hüni Square.

Wood frame - only metal is the so called "half size iron frame" inserted in the top of the soundboard. The action is an upstriking repetition action - there are 6 octaves $_{III}F$ - F^{IIII} and the case is walnut - note the two pedals.

using the Stewart patent of 1827.[433] There is the usual one wooden pedal (Plate 136 c). The black keys are rounded in front, often a feature of Collard and Collard pianos(Plate 136 d). The other instrument is identical in size, is made of Spanish mahogany and has similar fretwork covers over the mechanism. The earlier number indicates a slightly earlier model - the only difference, however, is a rectangular instead of a tubular bracing bar. It is at present owned by the Te Water family of Graaf Reinet. A receipt in their possession relating to its purchase states "received of Mr. F. Te Water £70 sterling - sold to him 20th April 1855".

Four years ago, Mr. Heuer, a piano dealer and repairer in Stellenbosch, imported an unusual Swiss piano. It is a square made by Heinrich Hüni, Claviermacher in Rappeschweil, 1828(Plate 137a). An all wood framed instrument, it has the soundboard above the strings and mechanism. It is braced by what, Mr. Heuer calls, a half size iron frame encased in the top of the soundboard(Plate 137 b). The soundboard was screwed down, so it was impossible to see the action. However, he informed the writer that the action is an upstriking one with a double escapement.

The dimensions of the square pianos increased quite considerably as the years progressed. The Zumpe, measuring 49-3/4" x 18½" x 6-3/4", is just about half the size of the square by an unknown maker in the Kloof Hotel, Joubertina - 76" x 34½" x 12½". This last piano is the largest of all the squares examined. The 18th Century squares are approximately the size of the Zumpe, while the early 19th Century ones increase in width as the keyboard is extended, and an even more marked increase in size takes place in the middle of the 19th Century. Some typical dimensions are as follows:-

Plate 138 a

Upright Grand by
Joseph Kirkman
Maker to His Majesty
No. 19 Broad Street,
Golden Square, London
in Stellenbosch Museum.

Plate 138 b

Inside view of Kirkman's piano. The two upright metal bars, to the right of the frame, appear to have been added later.

Height 8'4" (3'2" + 5'2")
Widht 46"

Fig. 41

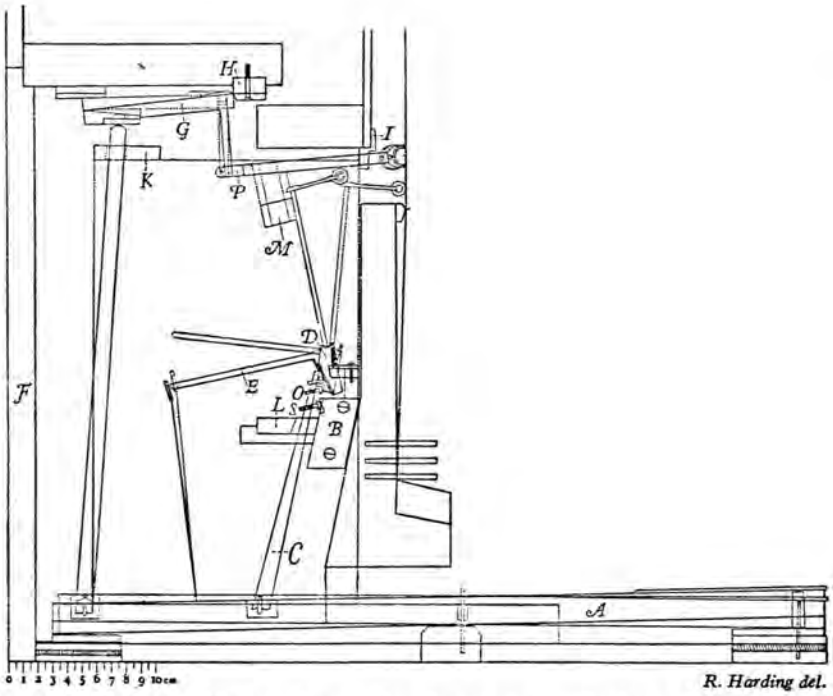


Fig. 47. Upright Grand pianoforte action by Stodart, 1795.
(The gauge gives the *approximate* size.)

Here follows description as on the patent.

A is a Key precisely upon the usual Principle. *B* a Rail upon which the Hammers are centred. *C* a Lever the means of raising the Hammer *D* to its acting Elevation from whence it is again relieved by the Button *O* (which Button is regulated by a Screw or by a similar Button represented by the Letter *S* the Hammer being thus relieved returns to its inactive Position by virtue of the Weight *E*; the Weight is formed of Wood, Metal or any other Substance the Inventor may prefer; its Form that described by *E* or any other that Experience may point out as most convenient.
F a Lever commanding the Damper *G* which Damper is annexed to the Rail *H* by means of a Hinge of Vellum, Leather, Parchment or any other similar Material or Substance or by a Centre.
P a Joint of the Damper covered with Leather to prevent noise and acting upon a centre or Hinge of Leather, Vellum &c^{a} similar to that described by the Letter H The Damper after acting is returned by the Weight of that part marked *G* and like the Weight *E* is both in Form and Substance under the Control of the Inventor; thus the grand Principle of Action is that both the Hammers and Dampers after performing are returned by Weight.
L a Socket the means of regulating the Lever *C*.
K a Ditto for the Lever *F*.
I a Ditto for the Damper *C*.
M a Rail upon which the Hammer *D* rests. (*William Stodart.*)

Plate 139 a

Cabinet Piano by
Alfred Bateman

1, Richmond Place,
East Street,
Walworth, London.

Plate 139 b

Plan View of Bateman's Piano showing vertical bi-stringing except for 7 bass strings - metal hitch pin plate and the long stickers used in Cabinet Pianos.

1830 - 1837	Broadwood (Open Mine Museum, Kimberley)	50" x 25" x 10½"
1830	Wood & Company (Old House Museum, Durban)	60" x 20" x 10½"
1847	Challen & Company (Stellenbosch Museum)	59" x 29½" x 12½"
± 1820 - 1830	Stodart (Firgrove)	67" x 26½" x 10½"
1830 - 1850	Gunther & Horwood (Groot Drakenstein)	68½" x 26½" x 10-3/4"
1830 - 1850	Goulding & D'Almaine (1820 Settlers Museum)	68" x 25½" x 10"
1842	Broadwood & Sons (Makers to Her Majesty) (1820 Settlers Museum)	64" x 28" x 11½"
1830 - 1837	Broadwood & Sons (Makers to their Majesties and the Princesses) (1820 Settlers Museum)	69½" x 27½" x 12"
Ca.1850	Collard & Collard (Kroon) Graaf Reinet)	75" x 32" x 13½"
Ca.1850	Collard & Collard (Te Water) Graaf Reinet)	75" x 32" x 13½"
	Unknown Grand Square (Joubertina)	76" x 34½" x 12½"

Parallel with the production of squares from the end of the 18th Century onwards, the experiments taking place on upright pianos are reflected in the representatives of those instruments which have been found in many parts of South Africa. In Stellenbosch Museum there is an almost exact replica of Stodart's upright grand of 1795(Plates 138 a & b). It is a Joseph Kirkman 8'4" high and has been perfectly restored at a cost of R500. Tri-strung throughout, it has a wooden frame, a una-corda pedal which shifts the mechanism to the right, and an action which is arranged so that the hammers strike through to the strings from the back of the soundboard(Fig. 41). The piano is incorrectly described as a cabinet piano. However Mr. Marius le Roux, the curator, was very gratified to learn that he had an even more rare and valuable treasure in his museum. The confusion probably arose out of the fact that the cabinet piano - invented by Southwell in 1807 - is also a tall top heavy looking instrument.

Cabinet pianos appear to be almost as rare as Upright Grands, for only two have been located. One is in the 1820 Settlers Monument Museum Grahamstown, and the other in the C.P. Nel Museum Oudtshoorn. The Grahamstown piano is a Bateman,(Plate 139 a & b) rescued by the writer from an outside shed on a Grahamstown property - it has since been presented to the Museum by its owner, Mr. Manley. The Allison(Plate 140) in Oudtshoorn is

Plate 140

Cabinet Piano by Ralph Allison & Sons, London
in C.P. Nel Musuem, Oudtshoorn.

Plate 140a

Cottage Piano by Collard & Collard in Presbyterian Hall, Grahamstown.

Wooden frame and vertical stringing are illustrated. Other views of this piano can be sen in Plates 53 and 57.

Plate 141 a

Cottage Piano by Rudall, Rose & Carte & Company
20 Charing Cross, London.
Owned by Mr Chamberlain of Grahamstown.

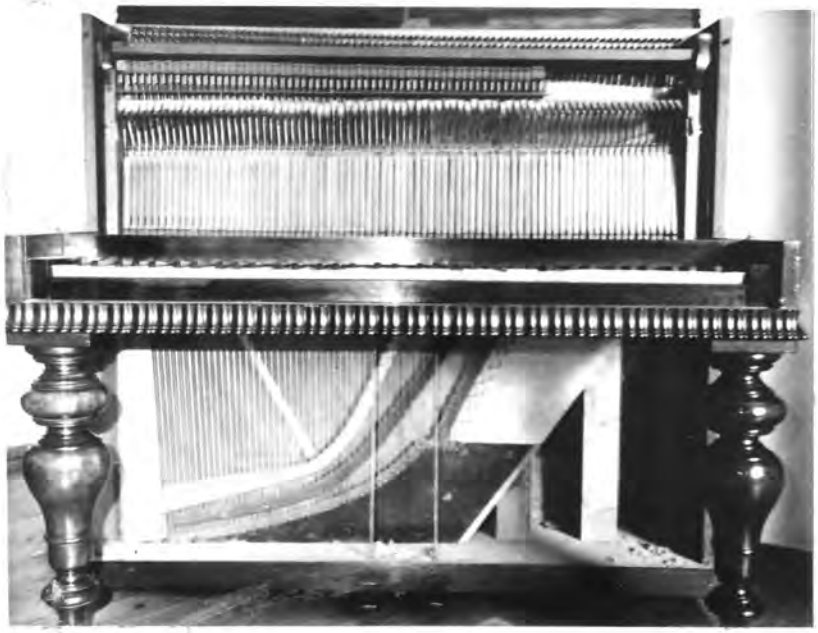
Plate 141 b

Plan View of Rudall, Rose & Carte Company piano showing vertical bi-stringing - sticker action and wooden frame. Measurements are 48" high x 51" wide. Keyboard is 44-3/4" - 6-3/4 octaves.

Plate 142 a

Cottage Piano by William Stodart & Son
Makers to Her Majesty and the Royal Family
Golden Square, London
in Reinet House Museum.

Plate 142 b



Plan View of Stodart Cottage Piano showing vertical bistringing - wooden frame and metal hitch pin plate for lower octaves. Note beautiful case and heavy turned legs.

on loan from the Edwin Edwardes family. Both these instruments have vertical stringing, a una corda pedal and the English sticker action(Fig.18).

Cabinets were made until 1856(434), so it is not too surprising to read the following in the Argus of Thursday, July 4th 1861 :- "The effects of Captain Spence will be submitted to public competition on the eve of his departure from the Colony, his house and furniture amongst which are listed two pianos - a Semigrand pianoforte by Collard and a Cabinet pianoforte by Allison - also AN EXCELLENT MILCH COW".

It is not impossible for these two pianos to have been the ones described in this Chapter.

The long sticker action of the cabinet piano was adapted by Wornum as a basis for the cottage piano(See Fig.19b), and so far eight of these delightful little pianos have been discovered. Two are in Grahamstown - a Collard and Collard (Plate 140) in the Presbyterian Church hall - still being used for accompanying hymns, and a Rudall, Rose, Carte and Co., (Plates 141 a & b) which Mr. Chamberlain bought in Fort Beaufort in 1967 for £5. This piano has been in the Fort Beaufort Masonic hall for as long as anyone can remember, and now, it too is played each Sunday, to accompany hymn singing for a Sunday School class. Both these pianos have broken hammers and missing dampers but could be restored very easily, as the actions are still in excellent working order - the main problem is keeping them in tune, as the wrest pins are in wooden blocks.

In Reinet House, Graaf Reinet, is a perfect and most elegant example of a William Stodart Cottage piano.(Plates 142 a & b) It was presented to the Museum by the nieces and newphews of Miss Annie Murray and is a treasured piece.

At the farm Rockhurst, Carlisle Bridge, Mr. H. Blomfield has a Broadwood Cottage piano in his billiard room(Plate 143). This piano has had an interesting life and been the source of much fun at many a party - it has been

Plate 143

Cottage Piano by John Broadwood (22929) 1861
Owned by Mr. H. Blomfield, Rockhurst,
Carlisle Bridge, C.P.

View of piano showing stickers. The frame which supports the action is clearly illustrated. On depressing the una corda (left) pedal the entire action moves to the right. For other pictures of this piano see Plates 53 B and 58.

pounded on by countless players and still gives out tolerable sounds - a wonderful testimonial for Broadwoods! After a sea voyage of some weeks, it became the property of Mr. Tom Bowker's father who during a depression swopped it for a ram from Mr. Blomfield's grandfather - a ram at that time being worth about £3! The piano was made in 1861 and it is just possible that there is some connection between this piano and an advertisement in the Grahamstown Journal of March 6th 1874 which reads "Just landing ex Edinburgh Castle, a consignment of six superior Cottage pianos in Walnut and Rosewood manufactured by John Broadwood and Company".

In the East London Museum is a Henry Tow cottage piano with decorative filigree front and unusual curved fall (lid over keys) somewhat resembling the Blomfield Broadwood.

The Mountain Zebra Park Farm Museum, Cradock has a Caperoe and Company, owned by Mr. Christian Kokett. It is inscribed:

> Made Caperoe and Co., from Broadwoods
> Hackney Road, London.

Caperoe is listed in Harding's Catalogue,(435) but there is no suggestion of a link with Broadwoods. Perhaps Caperoe was an ex Broadwood employee, as the piano is certainly very similar to a Broadwood model. It has a fretwork front with a silk backing and two heavy legs carved and curved resembling the Bateman cabinet legs. It is 3'6" high and made of Mahogany.

The last two cottage uprights are in the Open Mine Museum, Kimberley. A "C.J. Quandt", 4' high and 54" wide has a plain walnut case with brass candlesticks and two carved front legs. The other piano is a Collard & Collard, and is known as the 'Pub Piano'. It was presented to the Kenilworth School by Cecil John Rhodes before the seige of Kimberley (1898), and is said to be one of the few donations he ever made in his life!

All these cottage pianos are wooden framed with metal hitch pin plates for the lower octaves. They are vertically bistrung throughout - each string is separately fixed to a hitch pin - the left pedal has the una corda action -

Plate 144 a

Small French Upright by F^{cois} Berden et C^{ie}
Owned by Mr. de la Mare, Grahamstown.

Plate 144 b

Plan View of Berden Upright.
7 Octaves ,,,A - A.''' $51\frac{1}{2}$" x $45\frac{1}{2}$" x $22\frac{1}{2}$"

Plate 145a

Upright Piano by K. Bord
Paris. 1878 (51211)

40" high x 51" wide.
7 octaves $_{,,,}A - A^{''''}$

Plates 60 a & b show
different views of this piano.

Plate 145 b

Detail of Bord piano
showing the metal hitch
pin plate bolted to the
wooden frame.
Vertical stringing.

Owned by Mrs. Peters,
Sea Point, Cape.

Plate 146

Small Upright Piano by Aucher Freres
Presented by Mrs. Redding to the Old House Museum, Durban.

a sticker action as illustrated in Figs. 19 a &'b), wooden pedals, between six and seven octaves, and are approximately four ft. tall.

The Eastern Cape appears to have done a fair trade in upright pianos in 1874, for in the Grahamstown Journal on Friday, January 9th, Richard Glanville and Company offered for sale one Rosewood semi-cottage pianoforte (7 octaves) crimson silk and fretwork front by Chappell and Company, - also one Royal London Model Pianoforte in polished walnut - 7 octaves - green silk and fretwork front by Allison and Sons. Both these pianos "expressly imported for this climate", and in February, the Journal advertises two more sales of pianos.

Four small upright French pianos are housed in Grahamstown, Cape Town, East London and Durban. Mr. De la Mare of Grahamstown owns a F^{cois} Berden et C^{ie} (Plates 144 a & b). It has an ebonised case and was sold by Harris & Company, the agents for Algoa Bay.

Mrs. Peters in Cape Town is the owner of a K. Bord (1878), which she obtained from her Uncle, who acquired it from Mrs. Everton by means of a 'trade in' for a new upright. Mrs. Peters has had the white painted case restored to its original mahogany colour and it is now a pretty piece of furniture (Plates 145 a & b).

In East London is a Debain with an interesting history. Originally it belonged to the Denys Reitz family and was in their Free State farm house at Reitz. The home was burnt down about 60 years ago, but the piano was saved by a neighbour, Mr. Latimer, who tied a chain round one leg of the piano and pulled it out of the burning house. The piano was given to him in gratitude for his help. Dr. C. Latimer, curator of East London Museum, says, she and all her brothers and sisters learnt to play on this instrument. It is at present in the Newhaven Old Age Home in East London.

The Durban piano was donated by Mrs. Redding to the Old House Museum. It is an Aucher Freres and said to be c. 1870. (Plate 146) These

Small Upright Piano by Francis Nott - 1896
Owned by Mrs. Pat Lyons, Durban.
3'7" high x 2'6" wide.

Plate 148 a

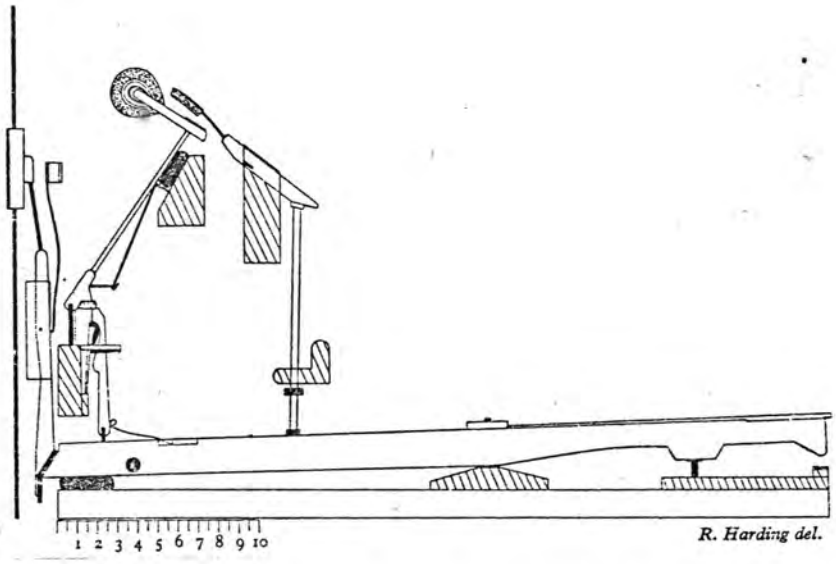
Upright Piano by
Wanckel and Temmler,
Leipzig.

In Local History Museum,
Durban.

Plate 148 b

View of Wanckel and Temmler showing wooden wrest pin block and oblique stringing. Candle bracket holder is visible on the left. Hammer heads can be seen at top edge of front panel.

Fig. 42



'Stehende' englische Action about 1825.

Plate 149 a

Carol Otto - Berlin (19137) - owned by Mrs. van Rensburg, Oudtshoorn.

Black piano with gilded designs etched in the wood - iron frame - cross strung - tape check action.

Plate 149 b

John Broadwood & Sons (244965) - in possession of Mr. de Jager, Oudtshoorn.

Mahogany piano - candlesticks are missing. Floral inlay in satin wood. Cast iron frame - cross strung - tape check action.

French pianos have handles on the sides of their cases and they are small and light enough to be moved easily. Their measurements are:

Berden	45½" high,	51½" wide
Bord	40" " ,	51" "
Debain	44" " ,	51" "
Aucher	46" " ,	50" ".

They are wooden framed with metal hitch pin plates, are vertically strung, have tape check actions and a soft pedal each. The soft pedal raises a bar with red felt attached to it.

A 3-3/4 octave Francis Nott, 1896, found in a Durban antique shop and bought by Mrs. Pat Lyons for R100, causes some speculation(Plate 147). The compass is "E - C" which makes one wonder whether it could have been intended for recitative, as suggested by Mr. A. Honey, who says he saw such an instrument used in the pit of a London theatre. It's height is only 3'7" - width 2'6½" and depth 1'1" plus 9½" for the keyboard. There are two pedals with brass foot pads. It has bichord vertical stringing and each string is separately fixed.

An unusual looking upright, said to be over 100 years old, is housed in the Durban Local History Museum(Plates 148 a & b). Made by Wanckel and Temmler, Leipzig, it has obliquely-placed strings, strong wooden struts and a total absence of metal framing. The action appears to be an adaptation of the English action known as the "Stehende" englische Action(436) (Fig. 41). This action is interesting because it is a German adaptation of the English Grand Action to the upright pianoforte in which the hammer is checked from above and a spring attached to the hammer ruler is inserted into a tape on the hammer which precipitates the return of the hammer from the string.

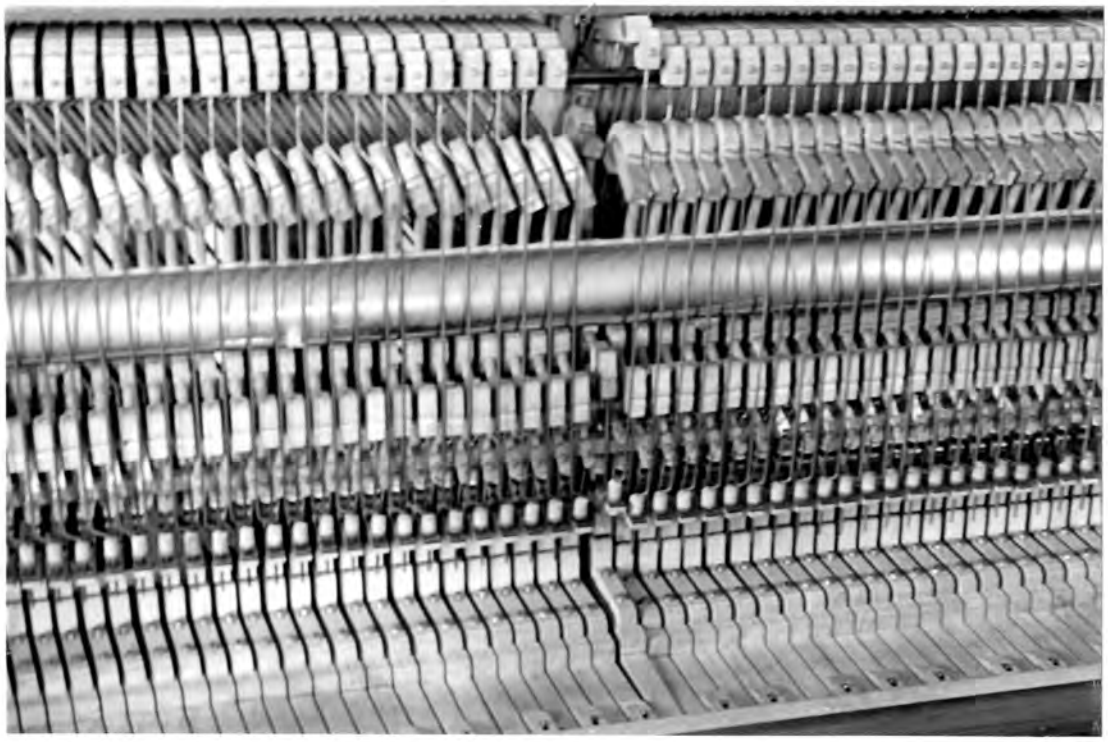
Gradually these wooden framed pianos gave way to a bigger type of upright with a cast iron frame, and, judging by the instruments which have been seen, German and American pianos began to appear more frequently in South Africa about the beginning of the 20th Century. These pianos had a full

Plate 150a

Upright Piano by H. Wolfram, Dresden (12778)
Owned by Mr. Amm, Salem, C.P.

The piano is on loan to Mr. A. Mullins who owns the 1820 Settler child's chair pictured here.

Plate 150b



Tape check mechanism - one key depressed - on Wolfram Upright (12843) in Salem Church.

Plate 151

Grand Piano by Erard, 1829.
Patent Harp and Pianoforte Maker to the Queen.

In Kingswood College, Grahamstown.

Plate 152

Grand Piano by John Broadwood & Sons, London
(1871)

Owned by Mr. M. Rushmere, Grahamstown.

7-1/4 octaves and were a good deal heavier than the previous models. They still tended to be ornamented with etched gilded engravings or inlaid patterns in contrasting wood. Walnut was often a favourite wood for the case and the functional brass candlesticks attached to the front of the piano were still part of the decoration. Many of these instruments are available; makes such as Fritz Kuhla, Gors and Kallmann, Carol Otto, Wolfram, Kallmeyer, Zimmermann, Frauerich, Duysen and Hoffman and Kuhnau are to be seen in homes all over the country.

In Salem there are three almost identical Wolframs in walnut cases. One in the Church, another in the Hall and the last in the possession of Mr. Amm. (Plates 150 a & b) All the last mentioned instruments have cast iron frames, cross stringing, a tape check action, a soft pedal and full octave span and are typical examples of this vintage piano.

Two Oudtshoorn pianos illustrate two different types of decoration - A Carol Otto in the possession of Mrs. van Rensburg shows gilded etching on an ebonised black case, while a Broadwood belonging to Mr. de Jager has a lighter coloured wood inlay on the front of the mahogany case. Floral designs were very popular.

Today the trend is for smaller, more compact pianos of the so called Spinet or Console type and designs are more streamlined to fit in with modern ideas of decoration.

The Grand piano, which ousted the harpsichord as a concert instrument, began to make its appearance in South Africa in the last half of the 19th Century. Some wonderful examples survive in and around Grahamstown which is perhaps not surprising when one considers that Grahamstown was the second City in South Africa in those days, and that the Settlers had come from a country at a time when the piano makers were leading the world.

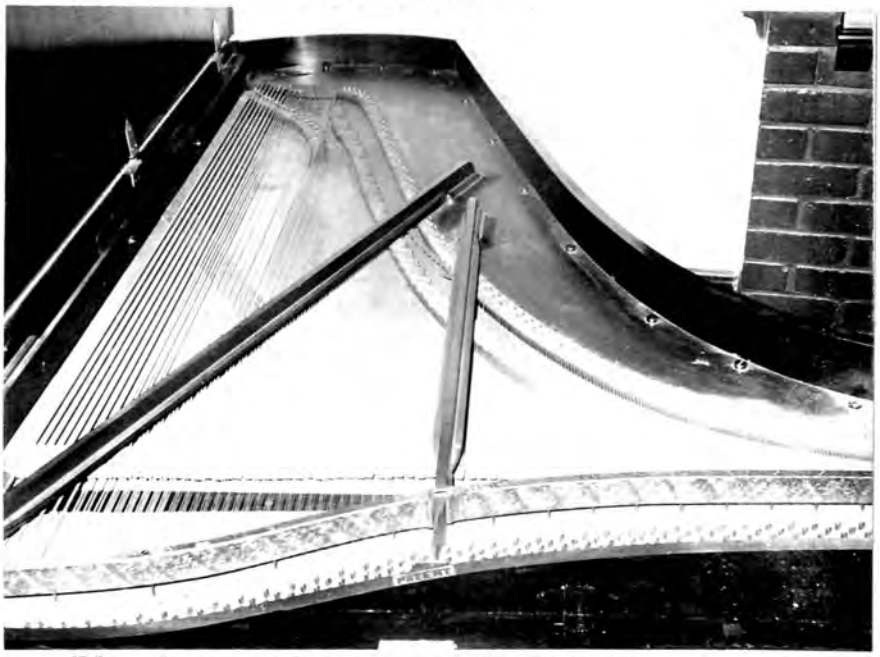
The earliest of these grands is to be found in Kingswood College. (Plate 151) It is an Erard which has been played on by many distinguished people - for a brass plate on the lid bears the following inscription: "Constructed 1829,

Plate 153 a

Grand Piano by John Broadwood & Sons, London (21600)

Owned by Mrs. B. Palmer, Gletwyn, Grahamstown.

Plate 153 b



Plan View of Broadwood (21600) showing the diagonal tension bar with transverse suspension bar patent 1847 - used in Broadwood grands until 1895. The front curved bar, supported on metal pins does not touch the strings.

Plate 154

Short Grand piano by Broadwood & Sons, London
(43551)

In Salem School.

It has agraffes throughout plus a harmonic bar in the treble - a composite iron frame - four bracing bars - metal hitch and wrest pin plates - wooden pedals and is vertically strung with seven octaves $_{IIII}A - A^{IIII}$.

Plate 155 a

Grand Piano by
William Harper
Maker to the King
49 Red Lion Street,
Red Lion Square,
London.

c. 1835

Plate 155 b

View of Harper piano showing the narrow metal strip screwed down over the strings - a type of Capo Tasto bar.

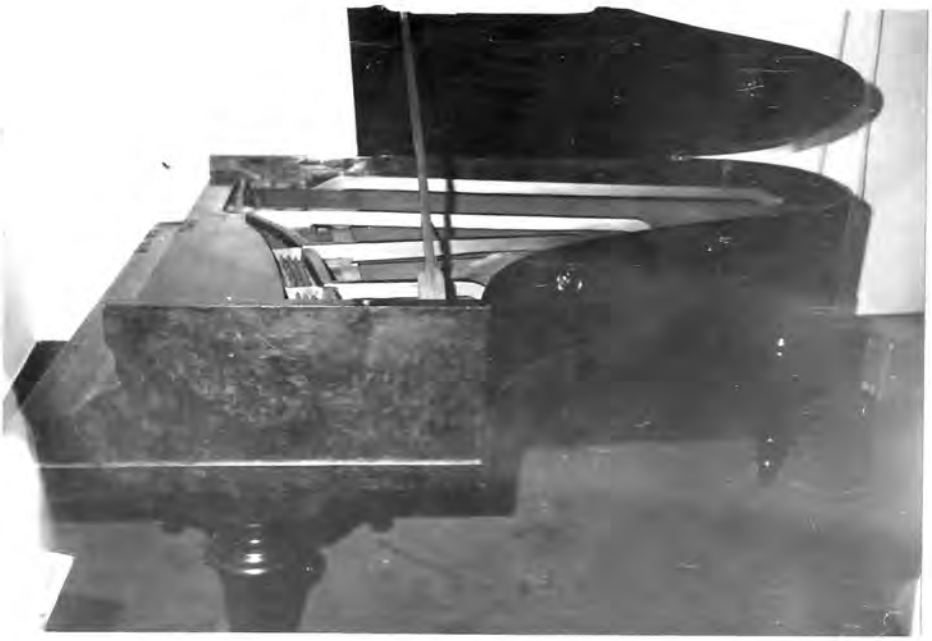
The wooden frame has five longitudinal tension bars - a steel hitch pin plate - a wooden wrest pin block - two wooden pedals and a repetition action with underdamping.

repaired 1881, formerly the property of Mr. John Hullah played upon by Mendelssohn, Moscheles, Sterndale Bennet, John Parry, Benedict, Charles Halle, Sullivan and others". Prof. Kirby informed the writer that Mr. Hullah had taught his father, and that Benedict refers to Sir Julius Benedict, a pupil of Weber. This concert grand is 8 ft. long, 4 ft. wide, has 78 notes $_{III}C - F^{IIII}$ ($6\frac{1}{2}$ octaves) and Erard's famous double escapement action (see Page 42 and Fig. 15). The wooden frame is strengthened with six longitudinal metal bracing bars screwed into the wooden wrest plank, and metal hitch pin plate. Metal bolts pass through apertures in the soundboard to wooden braces underneath. It has oblong tuning pins - a broken bridge for the 20 bass notes - is vertically strung with separately wound strings - bistrung in the bass, otherwise tristrung. It has agraffes throughout and a treble harmonic bar.

It is interesting to compare the Erard with a Broadwood (1871) which belongs to Mr. M. Rushmere of Grahamstown(Plate 152). They both have exquisite walnut cases and beautiful lines and the use of bracing bars is very similar. The Broadwood uses 3 bracing bars (patented 1823) fixed in the same way as the Erard. Both have agraffes throughout but the Broadwood has no harmonic bar. Also the Broadwood has over dampers while the Erard is underdamped. The Broadwood is 91" long and 53" wide and has 7 octaves (85 notes).

Two other Broadwood Grands near Grahamstown are equally interesting. Both have mahogany cases, but are less decorative. However, they are beautifully designed with the fretwork music stands and pull out side pieces of earlier models. The one belonging to Mrs. B.P. Palmer of Gletwyn farm, Grahamstown, is a concert grand (Plate 153 a) which incorporates the Broadwood patent of 1847 - a diagonal tension bar with a transverse suspension bar, used until 1895 in concert grands(Plate 153 b). The other is a "Short Grand" by Broadwood and Sons, London.(Plate 154) This piano is 5 ft. 7 ins. long, but is still too big for the Salem School room in which it is kept. It has

Plate 156 a



Grand by Ernst Kaps - Grosse Goldne Medaille - Moskau 1872
Owned by Mr. Albert Honey, Grahamstown.

Plate 156 b

Plan View of Kaps Grand showing heavy pressure bar over middle and upper registers. Bass strings have agraffes.

seven octaves $_{,,,,}A - A^{''''}$, agraffes throughout; a composite steel frame with four bracing bars and is vertically strung with tristringing in the treble, bistringing for the middle strings and eight copper wound bass strings.

The Cultural History Museum in Cape Town also has a Grand Piano by Broadwood (17616), 1852. This instrument has a wooden frame and metal hitch pin plate with five bracing bars. It has a $6\frac{1}{2}$ octave range $_{,,,}C - F^{''''}$.

The 1820 Settlers Museum has a William Harper Grand Piano beautifully displayed in the main entrance hall of the building (Plate 155a). A mahogany case with two wooden pedals - $6\frac{1}{2}$ octaves $_{,,,}C - F^{''''}$ - wooden frame with a metal hitch pin plate and 5 longitudinal tension bars. The most interesting feature of this piano is a form of Capo Tasto bar which is used to keep the strings in place. The strings run in narrow grooves over a wooden bridge with a narrow ribbon like metal plate screwed down over them (Plate 155b). The history of this piano is told in a letter to the donor, a Mr. Parkin, from H.E. Neal, dated 3 March '51. It reads " Mr. Tilt informs me he has had this piano from 1906 - 1951. He also informs me that he bought it from Mr. Edwin Potter of the Bathurst Railway Station Hotel. The said Mr. Potter had it in his possession for 40 years, which he bought from the Bathurst School, who in turn had it for about 40 years. It was presented to the Bathurst Village School by a lady who came out with the British Settlers of 1820 who brought it with her". This is not quite accurate as William Harper worked at 49 Red Lion Street, Red Lion Square, London from 1834 - 1887. The 1820 Settler story is probably a wild guess or wishful thinking. The sequence of events is probably accurate and the tell tale marks of wet beer mugs and hob nailed shoes on the piano lid, bear witness to the truth of it once having been in a pub.

Two elegant walnut grands by Ernst Kaps - Dresden, are in the vicinity of Grahamstown. Mr. Albert Honey brought his piano from England five years ago (Plate 156a). Dated 1872 it has a heavy pressure bar bolted through the soundboard on most of the strings (Plate 156b) - agraffes are only

Plate 157

Concert Grand by Steinway & Sons - Hamburg - 1894. (82602)

This elegant dark walnut piano is housed in the Cradock Town Hall.

Plate 158 a

Grand Piano by
Steinway and Sons - 1896
Hamburg (85139)

In possession of
Mr. E.A. Heunis,
Lynwood, Pretoria.

Plate 158 b

Plan View of
Steinway Grand
showing the over-
stringing - the
Capo D'astro bar
and Duplex
scaling.

Plate 159

Grand Piano by Carl Bechstein (109451)
in South African College of Music, Cape Town.

Known as "The Painted Lady" this ebonised piano has pastoral scenes painted on the lid, fall and sides. It is seven feet long.

used for the bass strings. The frame is of wood, and there is a metal hitch pin plate with holes and four metal transverse bars. The strings are under-damped. The other Kaps is possessed by Mr. John Bowker - a grandson of the Bowker who exchanged the Broadwood Cottage piano for a ram.

The earliest Steinway Grand so far located is in the Cradock Town Hall(Plate 157). Dated 1894 it is 7'6" long and has a dark walnut case. Mr. Schler who repaired it in 1949 disengaged the sostenuto pedal. It is in very good condition, due to Mr. Schler's regular attention, and is used and admired by visiting artists.

An 1896 model Steinway Grand is owned by Mr. E.A. Heunis of Pretoria. This black piano with heavy turned legs, shows a number of interesting Steinway patents:- The sostenuto pedal,(Plate 158 a) overstrung cast iron frame, the Duplex scaling and the Cape D'Astro bar(Plate 158 b). An inscription on the soundboard claims that Steinways were "makers to His Majesty the King of Prussia and Emperor of Germany, H.M. the Queen of Spain, H.M. the Queen of England, H.R.H. the Prince of Wales, H.R.H. the Princess of Wales, H.M. the Queen of Italy.

Fashion in piano design is very often a clue to the period of the instrument and an interesting example of this is shown in a Bechstein Grand in the South African College of Music Cape Town. It is known as the "Painted Lady" because the black case is painted with pastoral scenes - all round the sides - on top of the lid and on the lid of the keyboard cover(Plate 159). The shape of the instrument - the legs and the romantic style of the paintings, seem to point to a late 19th Century. The name Grondahl Christiana is engraved on the back of the music stand and it is believed to have been imported from Sweden. The South African College of Music bought it in 1950 and it was thought to be 60 years old then. It has an iron frame.

Perhaps this would be the place to include the story of Lady Whiteside of Grahamstown, who lent her Bechstein for a concert in the City Hall.

Plate 160

American Organ in Reinet House.

This instrument is usually called a 'wagon piano'. The pedals resemble those on a piano but they work the bellows which are under the organ.

Plate 161

Another so called 'wagon piano'. Housed in a very primitive case it is a type of keyed glockenspiel. Metal hammers, on metal tongues, strike the iron plates. The front plates are missing.

This instrument was found in Swellendam and presented to the '1820 Settlers Museum' by John Stuttaford.

In thanking her, in a speech from the platform the Speaker said "we would like to thank Lady Whitestein for the loan of her Bechside".

Incorrect naming of keyboard instruments is not uncommon. In South Africa this is often the case with so called wagon pianos. For example in the C.P. Nel Museum, Oudtshoorn, a small American organ which has no mechanism, apart from the bellows, is called a wagon piano. Mr. Meyer of Port Alfred has also claimed to own a wagon piano, but on investigation it has turned out to be the same. The error probably arose from the fact that the pedals resemble those of a piano rather than the usual harmonium foot plates. In Reinet House there is an identical instrument, correctly described, which is in working order (Plate 160).

A so called "ossewa" piano was recently found by Mr. John Stuttaford in the junk room of a store in Swellendam. He purchased it for R 25 and presented it to the 1820 Settlers Museum. The case is a primitive shallow box - 24½" x 19½" - and although the instrument has a 2-1/4 octave keyboard, there are no strings. The keys activate metal hammers attached to simple metal tongues which strike metal blades resembling those of a zylophone (Plate 161).

However, a genuine travelling piano is in the East London Museum. (Plate 162) This instrument was purchased by the Government to please H.R.H. the Prince of Wales when he made a tour of South Africa in 1925. He apparently insisted on having a piano available in the Royal Train, as he enjoyed playing during the journey. The System Manager of the Railways presented it to the Museum in 1935.

Another piano of historic interest is a Grand in the Cultural History Museum on which M.L. de Villiers composed "Die Stem van Suid Afrika".

Rhodes University Music Department has a pedal piano for the use of organ students. As can be seen in Plate 162 a, the pedal attachment is very easily applied to an upright piano. This particular apparatus has been attached to a Wohlfahrt upright. The strings and springs are fastened to a

Plate 162

"Dulcitone" folding travelling piano.

Bought by the South African Government for the Royal Tour of H.R.H. the Prince of Wales in 1925.

In East London Museum.

Plate 162 a

Pedal board attachment to a Wohlfahrt upright

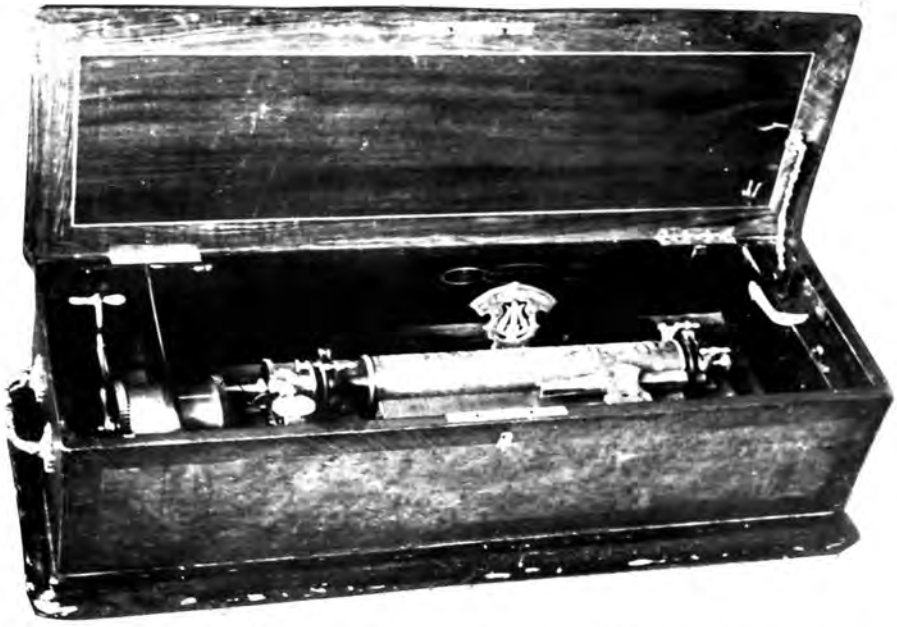
In Rhodes University Music Department.

Plate 163

Musical box in possession of Mr. F. White, Grahamstown.

The open drawer shows two of the three cylinders. An index of tunes is pinned onto the lid and a hinged glass lid covers the mechanism. The measurements are $33\frac{1}{2}$" wide x 14" deep x $18\frac{1}{2}$" high.

Plate 164



Musical Box in Reinet House, Graaf Reinet.
Very similar to Mr. White's, but has only one cylinder and no storage drawer.

Plate 165 a

'Polyphon' donated to the 1820 Settlers Museum, by Miss K. Moser, Grahamstown.
A type of Nickelodeon - the slot for the coin is on the right. An adaptation of the musical box idea. The plates are perforated and the pieces pushed through to the back. These protruding bits of metal are caught by the teeth on the comb (situated on the top right) and the resulting sound is similar to a musical box.

Plate 165 b

Polyphon open to show one plate in playing position.
The metal plates on either side are struck by hammers to make bell like sounds.
The machine is spring operated and set in motion when a coin is inserted.

bar of wood which is screwed under the keyboard case. Holes are bored through the case under the keys to enable the strings to be hooked on to the underside of the key levers. They are positioned half way along the black keys and each key is activated when the equivalent foot pedal is depressed. The range is $_{I}F - _{III}C$.

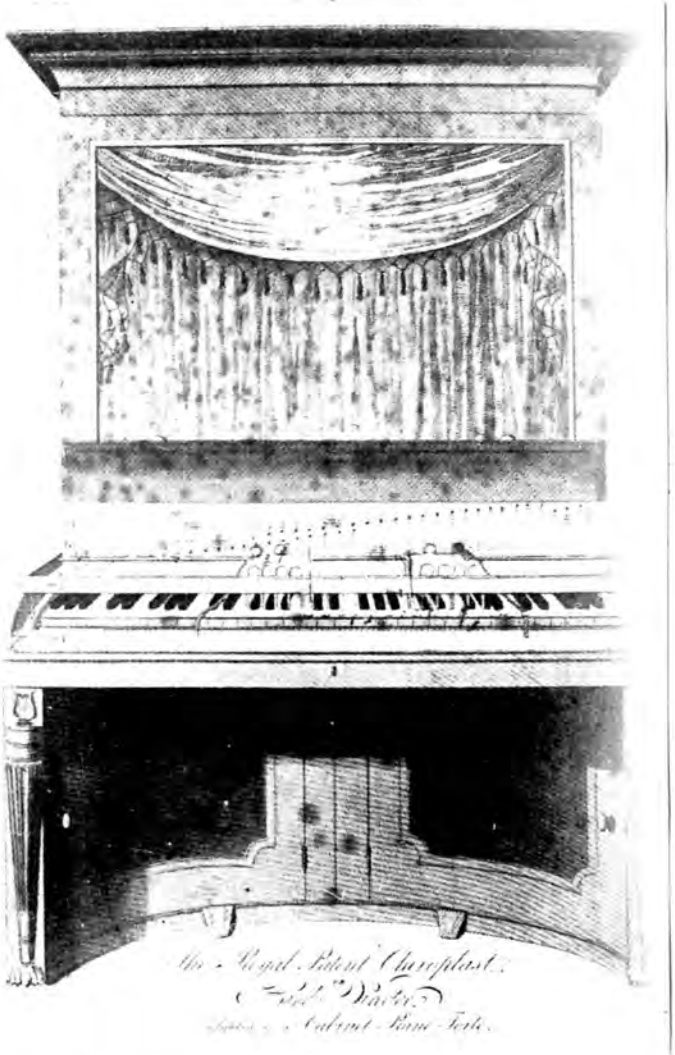
"Wagon pianos" imported about the middle of the 19th Century were probably so called because of the itinerant nature of much of the pioneering population of South Africa. Grahamstown was the centre from which most of these journeys took place, and was South Africa's foremost trade and industrial centre at that time. Business was booming and musical novelties were among the various imports.

A musical box in the possession of Mr. Frank White of Grahamstown was sold by Henry Castledon, Hill Street, Grahamstown. It was a present for a 14 year old girl (ancestor of Mr. White) who lived till she was 70, and has been dead about 30 years. This instrument, imported from Switzerland, has a beautiful walnut case inlaid with mother of pearl. The inside is lined with ebony and has a silver inlay in the frame of the glass lid which covers the mechanism.(Plate 163) The box is $33\frac{1}{2}$" long and 14"wide - it has three brass cylinders, each able to produce 8 tunes, and a drawer to hold the cylinders. A replica of this musical box is in Reinet House, but has only one cylinder and no extra drawer as in Mr. White's model(Plate 164).

Another interesting mechanical instrument is a type of Nickelodeon donated by Miss K. Moser to the 1820 Settler Museum. It is called a Polyphon and has a coin slot. Ten large circular brass discs about 2 ft. in diameter have small raised projections which engage the teeth of a comb in the manner of a musical box. Any one of these discs can be selected and elevated to the playing position, and the insertion of a coin enables the clockwork motor to rotate the disc and produce the tune(Plates 165a & b).

J. B. LOGIER, 1777-1846

whose system of class-teaching of the instrument was long maintained in some parts of the country (see p. 325). At the right is seen a special apparatus of his devising which enjoyed considerable fame, British and Continental—'THE CHIROPLAST or HAND DIRECTOR.' We get an idea of its popularity from the fact that Samuel Lover was able to count on the readers of his *Handy Andy* (1842) understanding his allusion in the following passage, descriptive of a horseman's mishap in crossing a decayed wooden bridge—'As for the horse, his legs stuck through the bridge as though he had been put in a chiroplast, and he went playing away on the water with considerable execution as if he were accompanying himself in the song which he was squealing at the top of his voice.'



'The Chiroplast or Hand Director' attached to a Cabinet Piano.

Some other popular musical developments found their way to South Africa. One of the strangest is perhaps the evidence of a Chiroplast being introduced into the musical life of the Cape (Plate 166)(436a). In 1826, Mr. E.K. Green (see page 139), who owned a music shop in Bree Street, Cape Town, imported a music teacher from England. This proved to be no less than Mr. Frederick Logier, son of the famous inventor. On March 3rd he opened "an academy on his father's system for pianoforte playing and theory of music". Much criticism ensued and acrimonious correspondence appeared in the S.A. Advertiser. Frederick copied his father's technique and held a demonstration or examination in the hall of the Commercial Exchange - site of the old Post Office - and evidently had some success, for a correspondent said "that in the opinion of those who are the best judges, Mr. Logier is considered to be a valuable acquisition to this Colony".

However, after Logier's father's departure for Germany, the Chiroplast's popularity waned, teaching returned to its old ways and 50 years after it's invention the only hope of seeing a Chiroplast was the possibility of a rusty one in a secondhand shop.

A Digitorium is owned by Mrs. N. Manley, Grahamstown (Plate 86). These practice instruments were popular up till thirty years ago. They were also used in the Piano Teachers Licentiate examinations of the University of South Africa. Candidates were allowed the use of a "dumb piano" for an hour before the examination took place, during which time they were expected to edit a piece of music and finger certain prescribed tests. Nowadays an audible piano is allowed!

In 1873 the first self playing piano was imported into the Colony and presented at a Grand Concert in Grahamstown. Grocott's Penny Mail of April 25th, carries a large advertisement of the forthcoming attraction and on May 2, 1873, reports on the entertainment as follows: " .... the most novel feature of the evening was Mr. H. Benjamin's self playing piano, which

Plate 167

Steck 'pianola' piano in possession of
Rev. H. Kirkby, Grahamstown.

Plate 168

Mr. Richard Laing of Grahamstown, playing
his Pruchner Player Piano.

performed with great success". (The name H. Benjamin appears on a label in the Rushmere Broadwood described in Page 148.) There is no further information about this reproducing instrument, but the claim 'A new Self Playing Piano equal to a full band' may well mean an orchestrion type and could have been a spring or battery operated pneumatic paper roll mechanism.

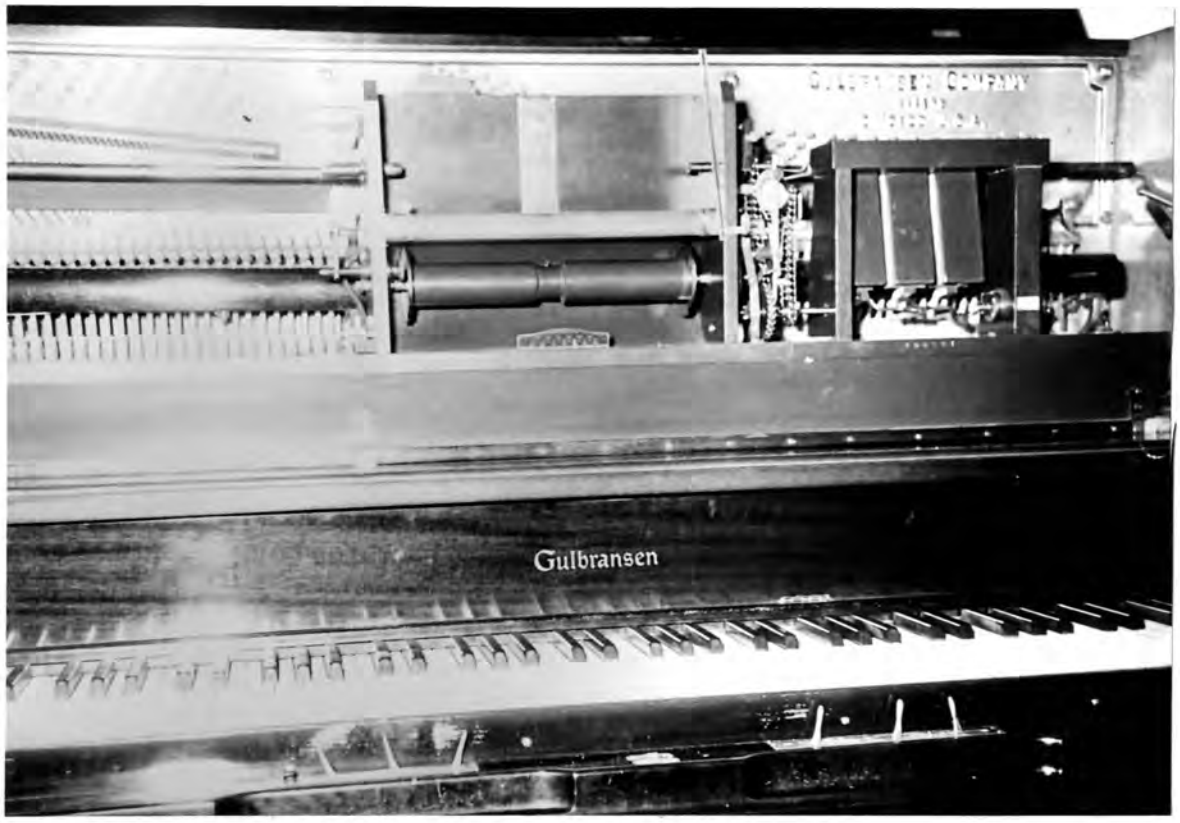
This paper roll mechanism developed into the piano-players, player-pianos and reproducing pianos of the early 20th Century. In this country the only reference to a piano-player which the writer has come across, was a verbal account by the late Prof. P.R. Kirby. He said he had seen a piano-player cabinet in Pietermaritzburg, which did not fit the grand piano it was expected to operate. However, a part of the keyboard frame of the grand was cut away and all was well!

It has not been possible to acquire statistics for player piano imports into South Africa. However, there is no doubt that there was a considerable vogue for the instrument during the 1920's. Almost any person who remembers those years recalls having seen and played what they call a pianola. Most people appear to have enjoyed the experience of actually pumping a player piano - especially those who could not play the instrument manually. However, almost all insist that the resulting sound was brash and mechanical. This leads one to suspect that some of the player pianos were of the cheaper variety and also that E. Newman(437) and S. Grews(438) were right when they stated that a certain skill and musical understanding were necessary to manipulate the so called pianola with any real success.

Grahamstown has several player pianos in working order. The Rev. H. Kirkby owns a Steck Pianola(Plate 167), formerly in the possession of Adv. Back of Grahamstown.

Mr. Richard Laing recently acquired a Pruchner with an American player mechanism(Plate 168). This piano is interesting for it has a transposing

Plate 169



Detail of Gulbransen Player Piano
Owned by Mr. C. Dredge, Grahamstown.

Transposing lever can be seen at left of cylinder - it shifts the cylinder to the left or right so that the holes in the roll come opposite a lower or higher pitch on the cylinder.
The chain drive and three little bellows are on the right - the six control levers can be seen below the keyboard.

(A full description is given on Pages 104 -5).

device. By moving a certain lever, the roll is shifted across the tracker bar, causing the holes in the paper roll to come opposite a different set of holes. Five keys, a semitone apart, are available. It also has only four levers which serve the same purpose as the first four in the usual player piano and a button for the damper pedal - no soft pedal lever at keyboard level but there is a lever next to the roll which can alter the amount of volume from loud to normal or soft. This instrument with a number of old rolls cost R250 in 1970. It is a very good piano.

Mr. Claude Dredge owns a Gulbransen player-piano which he bought with a collection of old rolls for R400 in 1965 (Plate 169). It is an excellent instrument in perfect working order, and also has a similar transposing device. These pianos are about twice the depth of standard pianos and are extremely heavy. Mr. Dredge is a keen pianolist and buys new rolls from Q.R.S. He has had an interest in players since he was a boy when he was fascinated by hearing one in a tea room in Bathurst Street, Grahamstown.

Bothna's in Port Elizabeth had a few old reconditioned players for sale in 1969, and a hall in Schoombie near Middeldrift uses one for dances and concerts.

Player-piano advertisements appeared frequently in South African newspapers in 1922 and 1923. The following is an example copied from a Cape Town newspaper:

" The 'Pianola' Piano
The World's Greatest Musical Instrument.

You <u>can</u> play the "Pianola" piano - play it infinitely better than any so-called player-piano. And your progess in developing playing ability will be far more rapid with the 'Pianola' piano - you will ultimately arrive at a degree of proficiency utterly impossible to you with any other instrument.

You can easily afford a "Pianola" piano, for you may purchase on convenient monthly payments. If you already have a piano, well we'll make you a very liberal allowance on it, in exchange for a "Pianola" piano.

It is, therefore a duty which everyone owes to himself or herself to see and hear a genuine 'Pianola' at FORRESTS the only accredited sole agents, 133 Longmarket Street. "

Mr. George Forrest was the sole agent for the Aeolian Company; he was also interested in promoting the sale of the company's Duo-Art Reproducing Piano. This he did by persuading Mr. Theo Wendt, conductor of the Cape Town Orchestra, to give a concert to demonstrate the instrument. The concert took place on August 7th, 1923, and Mr. Forest arranged to lend a Duo-Art Pianola piano for the performance - Harold Bauer was billed as "The Absent Pianist" and advance notices stated "First time in South Africa". The Cape Times published an account of Harold Bauer's pianistic talents the day before the concert, and the day after, this historic event was duly acclaimed in the Cape Times:

"Music and Drama

Yesterday at the Tea Matinee in the City Hall, Saint Saëns Concerto in G. minor as rendered by the famous pianist Harold Bauer was heard on the Duo Art Piano in conjunction with the Cape Town Orchestra. The result was extremely interesting - the solo portions of the concerto stood out clearly and definitely and Mr. Bauer, one of the sanest and most scholarly pianists of today must have given a splendid interpretation of the work to have produced so outstanding a record. As conductor Mr. Wendt's task was necessarily more exacting than if the solo pianist had actually been present - but in these unusual circumstances he obtained an admirable ensemble performance and the Concerto was both effective and enjoyable.

It is the first time that the Duo Art has been exploited at a public performance at the City Hall. That it is possible today is due to the enterprise of Mr. George Forrest with whom Mr. Wendt has collaborated, the Cape Town representative of the inventors, the Aeolian Company Limited. Mr. Forrest's schemes for the future include a 9' concert grand Duo Art piano instead of the small Grand that was heard yesterday. In point of time Cape Town is not far behind London, for the same record was presented at the Queen's Hall for the first time last November in conjunction with Sir Henry Wood's Orchestra. Later in the concert records of Harold Bauer's renderings of a Chopin Nocturne and Beethoven's Ruins of Athens March were heard - with rather less striking effect than the concerto which naturally was much enhanced by the orchestra. .... The attendance was considerably larger than usual and it is quite probable that Harold Bauer in the flesh would not have created as much interest as did Harold Bauer represented by a Duo Art Pianola Piano".

The concert was repeated on the following Saturday night - giving the 2nd Movement of the Saint Saëns Concerto and the short pieces played by Paderewski. The Cape Argus advertised the two concerts by drawing attention to the fact that both Paderewski and Harold Bauer would perform on the Duo-Art. This tendency to publicise the artist's name as a box office draw is an old trick,

Capetown Orchestra.

Conductor - - THEO. WENDT.

Leader - - - - - - J. SPINK.
Assistant Conductor W. J. PICKERILL.
Accompanist - GEOFFREY MILLER.
Business Manager - A. N. DICKSON.

CITY HALL.
TEA MATINEE,
TUESDAY, AUGUST 7th, 1923,
at 4 p.m.

1. Overture, "Mignon" .. *A. Thomas*

This piquant example of light French music forms the overture to Ambroise Thomas' (born 1811, died 1896) *opera comique* "Mignon," based on Goethe's novel. After an introduction, one hears the well-known aria "Connais-tu le pays." Then the *Allegro* commences, based on the famous Polonaise.

2. Suite from "Sylvia" .. .. *L. Délibes*

(1) The Huntresses.
(2) Valse Lente.
(3) Pizzicato.
(4) Bacchanalian Procession.

The French composers have always been noted for their graceful, artistic and vivacious ballet-music, and none has been so happy in this particular form as Délibes, the composer of such ballets as "Coppelia" and "Sylvia." The latter deals with a charming Grecian subject, in which Amazons and followers of Diana, the goddess of hunting, nymphs, satyrs, and other figures of mythology figure.

(1) The first movement opens with a theme for full orchestra, which appears also in the last movement. Then, as from a far distance, the call of a hunting-horn is heard twice. The music gradually gathers in speed and force as the huntresses appear in the Sylvan glades. There is a fine, open-air swing about the rhythm which makes the scene very attractive.

(2) The Valse Lente which follows is heralded by a short introduction.

(3) There is no need to describe the famous Pizzicato; it is one of these pieces which seem destined to remain for ever popular.

(4) The last movement, a procession of Bacchus and his riotous Bacchantes, is of appropriate character. Strongly marked dance and march rhythms succeed each other until the theme which opens the whole suite appears to form an effective conclusion.

3. Piano Concerto, G minor (No. 2). With Orchestra .. *C. Saint-Saëns*

1. Andante Sostenuto 4/4.
2. Allegro Scherzando 6/8.
3. Presto 2/2.

HAROLD BAUER
the celebrated Pianist
on the
DUO-ART.

INTERVAL

4. Gavotte & Musette in D, *J. S. Bach*

5. Piano Solos:
   (a) Nocturne Op. 48 No. 1. *F. Chopin*
   (b) Ruins of Athens Op. 113 (Turkish March). *L. v. Beethoven*

HAROLD BAUER
on the
DUO-ART.

6. Selection from "Coppelia," *L. Délibes*

GOD SAVE THE KING.

Capetown Orchestra.

Conductor - THEO. WENDT.

CITY HALL

TUESDAY NEXT
at 4 p.m.

Tea Matinee

FIRST TIME IN SOUTH AFRICA

HAROLD BAUER

THE ABSENT PIANIST.

Concerto in G major .. *Saint Saëns*
on the
DUO ART
PIANO
WITH ORCHESTRA

ADMISSION - - - 1/8

and in this instance it was used to add status to the Duo-Art. The suggestion that all such concerts were advertising stunts is cynically made by Arthur Loesser, who quotes Walter Damrosch, Josef Stransky, Leopold Stokoswki, Alfred Herz and Eugène Ysaÿe as being some of those conductors "who lent themselves to this commercial proposition".

Nevertheless, the Argus critic's views are worth repeating : - After the second concert he remarked "... at the end of it nobody knew whether to applaud or not. It does seem a bit odd to applaud a piano although the interpretation was mechanically perfect". (W.J.M.).

His critique on the first concert is given in full:

"Cape Argus - Wednesday, August 8, 1923

ROBOT MUSIC

A Piano Concerto - WITHOUT THE PIANIST

At the present moment one reads in the English Papers a good deal about Robots. Robots are mechanical humans created by scientists to do the work of the world while the human aristocracy lives in luxurious leisure. Towards the end the robots revolt against their human masters and destroy them utterly. This is the theme of a play called R.U.R. by Capek, a dramatist from Czechoslovakia. With the play we have nothing to do here, except to note that it has introduced a new word to the English language - Robot, inhuman or mechanised.

Yesterday afternoon in the City Hall, we had Robot music. An electric piano conducted Mr. Wendt and the Orchestra in the Concerto in G. by Saint Saens. It was a revelation, a revelation of the extent to which we are now under the sway of mechanical music, and a revelation of the high level of achievement to which mechanical music has been brought.

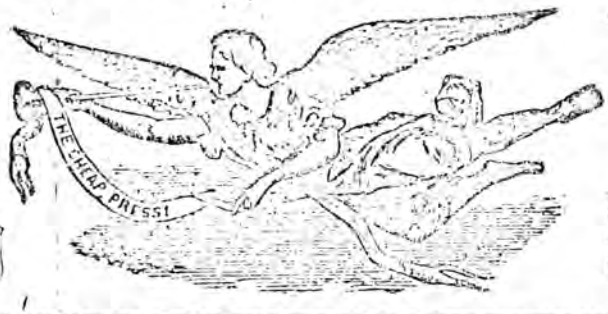
A Soulless Affair

You may say that this Duo Art Piano Playing itself is a soulless affair. It certainly looks so. Nevertheless there was no doubt that this was Harold Bauer playing. One could feel the tempo, the striving for effect, the little subtleties of playing quite as well as if Harold Bauer had been playing there in the flesh - It was a marvellous reproduction.

Yet this piece of mechanism standing so solidly on the platform absolutely dominated the whole concerto. The personality of the conductor and orchestra was of necessity subordinated to the playing of the piano. It may be argued that this is invariably so when a pianist like Harold Bauer is present. Still, one felt that here was the human element being dominated by a piece of mechanism.

Later the Duo Art Piano perfectly played a Chopin Nocturne and Beethoven's Ruins of Athens' Turkish March. Here again the reproduction was wonderfully accurate, the piano did in some subtle way, reflect the personality in the playing of Harold Bauer.

PENNY



And Family

Vol. 3. GRAHAMSTOWN, CAPE COLONY, ERIDAY, APRIL 25, 1873.

Same as the Cinema

I suppose there is no reason why concert audiences should not welcome this form of music in the same way that an average audience welcomes the cinema. Charlie Chaplin is as real as Whit Cunliffe to Cape Town theatre-goers, even though the former is merely a flickering shadow on the screen. The drama of flickering shadows grips as intensely as the speaking puppets of the stage. That it is so may be deplorable - but it is so. People laugh, cry and cheer at the cinema.

Why, therefore, should not a musical audience feel intensely the playing say, of Paderewski on the Duo-Art Piano even though instead of Paderewski with that fine, mobile face and wonderful hand, there is merely an undistinguished gentleman to replace the roll of music and start the mechanism? Personally, I would always accept Robot music as a good second best - but only as a second best.

Personalities

To put away all cant, it has to be admitted that concert audiences are as intensely interested in the personalities of the platform artists as they are in the music - generally more so. Who would listen to a Duo-Art piano when it is possible to see M. Pachmann steal on to the stage like the miser in Les Cloches de Cornville crouch over the piano as the miser crouched over his treasure, borrow a handkerchief from some member of the audience to dust the keys, fuss about the piano stool and have the lights turned on or off according to the fancy of the moment.

Nor would one listen to the Duo-Art when there is the possibility of seeing Busoni march to the piano like a little Napoleon and play Beethoven as the Emperor of Music should be played. Or the decadent looking Mark Hamburg, or -. But why continue? The Duo-Art Piano will give you all these artists playing perfectly in their own perfect fashion.

The audience that heard this playing in the City Hall yesterday afternoon must have been astonished. It is a distinct innovation for Cape Town music and one is pleased to hear that it is likely to become a regular feature at the Orchestra Concerts. On Saturday evening the middle movement of this same concerto will be given.

Mr. Forrest

This innovation is due to the enterprise of Mr. George Forrest, of Cape Town who is the representative here of the Aeolian Company Limited, of London, the inventors of the Duo-Art piano. Mr. Forrest arranged for the same concerto that was played recently in the Queen's Hall, London, and it is understood that he has even more ambitious ideas for Cape Town regarding the Duo-Art Piano.

Now that we have the Robot in music, it only remains to have the Robot in criticism. In the future, music critics will merely allocate marks instead of writing - so many marks for tempo, so many for rythm, so many for tone - and so on. But then there will probably be a machine to do this. If so, I for one will be grateful.

W.J.M.

Proof of the success of the concerts is indicated by George Forrest's proposal to provide the City Hall with a 9' concert grand Duo-Art Piano for

Capetown Orchestra.

Conductor - - THEO. WENDT.

Leader - - - - - - J. SPINK.
Assistant Conductor W. J. PICKERILL.
Accompanist - GEOFFREY MILLER.
Business Manager - A. N. DICKSON.

CITY HALL,
SATURDAY, AUGUST 11th, 1923,
at 8.15 p.m.

1. Miniature Overture .. .. *Eric Coates*
2. (a) Demande et Reponse,
S. Coleridge-Taylor
(b) Sonnet d'Amour,
S. Coleridge-Taylor
(c) La Fèe Tarapatapoum,
J. H. Foulds
3. Song: "I hear you calling me,"
Chas. Marshall

Mr. F. HAMILTON.

4. Second Movement "Allegro Scherzando" from Pianoforte Concerto, G Minor (No. 2) with Orchestra,
C. Saint-Saëns

Allegro Scherzando 6/8 (2nd movement)

HAROLD BAUER
on the
DUO-ART.

5. Ballet Music from "Le Cid,"
J. Massenet

The most striking feature of Massenet's opera "Le Cid," the celebrated Spanish paladin, is the series of national dances occurring in the 3rd Act. The composer has infused into these the atmosphere and the brilliancy of the national Spanish Dance rhythms. The picturesque orchestral colouring helps to render this fine example of ballet music most exhilarating.

INTERVAL

6. Selection, "Aida" .. .. .. *G. Verdi*
7. Song: "If I might only come to you,"
W. H. Squires

Mr. F. HAMILTON.

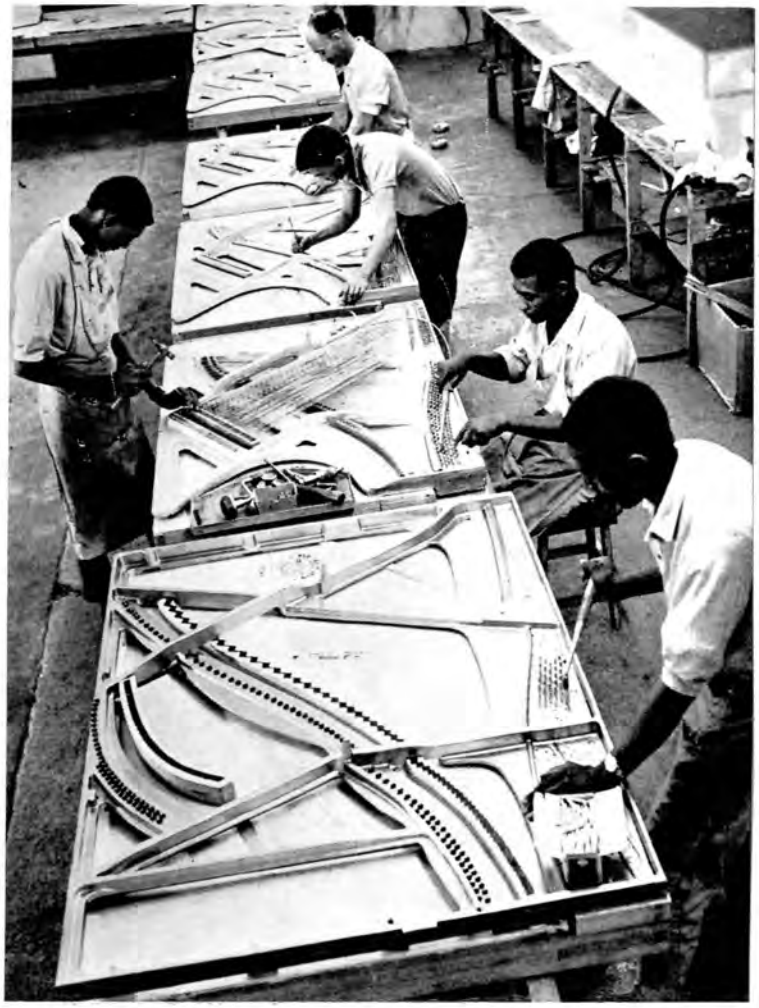
future performances. There is no evidence to suggest that this ever happened, presumably because it was already the end of 1923, and the decline in the piano industry overseas had started.

It is clear from the evidence quoted above, that the reproducing type of player-piano had reached a stage of perfection where it was able to perform the function of the modern radiogram, in providing music lovers with faithful recordings of their favourite artists. Unfortunately for the future of the instrument, it reached it's peak at a time when the whole piano industry was disintegrating, due to changing social customs combined with a world wide depression and the sales of more compact and less expensive radio sets and phonographs. A revival of the reproducing player-pianos is very unlikely. The modern electrical recordings of piano playing and of every musical instrument, singly and in varying combinations is so good, and relatively inexpensive, that it would be absurd to contemplate the luxury and expense of reviving a reproducing instrument for the piano alone. In fact, the only Duo-Art found in South Africa is one which the Grand Hotel, Port Alfred, acquired from a "pop group" who had bought it from an American in Port Elizabeth. It has since been bought by Mr. Slocum, General Manager of an American Motor Company, and taken back to the United States of America. The Duo-Art mechanism had been removed; perhaps Mr. Slocum intends to restore it to it's former condition.

Until the middle of the 20th Century, South Africa relied solely on imported pianos. As one would expect from the history, both of the piano and the Colony, the earliest instruments were made in England. German and American pianos became popular towards the end of the century, and during the first half of the 20th Century sold in far greater numbers than those of any other country.

After importing pianos for at least a hundred and fifty years, South Africa began local manufacture. As in the case of most other countries, a German was responsible for the foundation of the first piano factory.

Plate 170



Employees at work in the Piano Manufacturing Company of South Africa.

Phillip Dietmann began making pianos in Wellington in 1954(439). He was a son of Phillip Heinrich Dietmann, an expert piano maker and connoiseur, who emigrated to South Africa in 1903 and settled in Wellington. One of the workman named Schindhelm designed a piano which he called "Dietmann", and managed to produce four instruments a month(440). Gradually the number increased, to six, then eight and eventually twenty five .

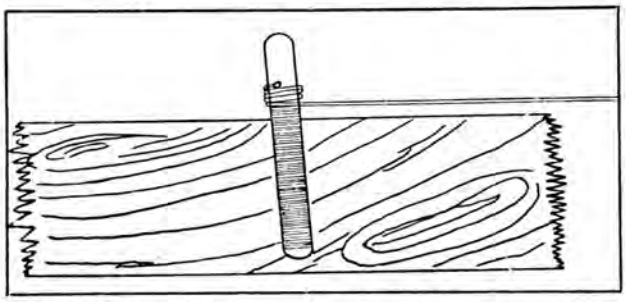
In 1962, Rud. Ibach and Sohn, of Schwelm, Westfalia, Germany bought a 50% interest in Dietmann's concern and a factory was built. Mr. Rudolf Christian Ibach joined the firm as director of sales and buying, and Mr. Dietmann became managing director. Business grew slowly and in 1968 Phil. Morkel Limited closed their Otto Bach factory in Johannesburg for a 50% interest in the Wellington firm, which now became known as the Piano Manufacturing Company of South Africa(Plate 170). In September 1971 the factory became a wholly owned subsidiary of Phil Morkel Limited.

The factory produces 3,500 upright pianos annually. Grand pianos are imported by the factory and sold locally - the demand is too limited to warrant local manufacture. Ten different makes of piano are manufactured, the best known are the Ibach, Fritz Kuhla, Otto Bach, Görs and Kallman, Carl Otto and Dietmann. "Dietmann" is their export piano and in 1970 nearly 300 were sent to West Germany, Switzerland, the Netherlands, Italy and Sweden. Israel and Greece are also showing signs of interest in the South African product.

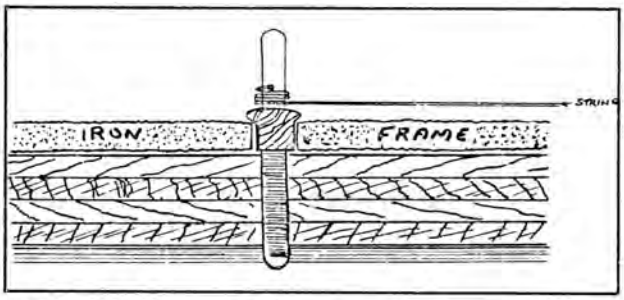
About 80% of the materials used are imported. Wood comes from Malaysia, United States of America, the Phillipines, West Germany and Canada. The latter country supplies the pine required for the sound boards. Local wood is not suitable as the moisture content is too high. The hammers and action come mostly from West Germany, some from England, while the copper and the steel strings are from West Germany.

The cast iron frames, pedals and some smaller items are locally

Fig. 43



THE OLD wrestplank consisted of one solid piece of wood, with the result that the tuning pins were gripped from two directions only.



THE NEW wrestplank consists of a laminated structure containing varying amounts of laminations, the principle being that the pin is held firm in the grip of the end-grain of the wood, acting on the shallow thread of the tuning-pin. Thus, the various laminations in combination effect a radial grip on the pin, gripping it "around the clock".

made and the assembling, tuning, making of strings and cabinets varnishing etc. is the work of about 200 employees.

The Wellington factory produces 80% of all locally manufactured pianos.

Görs and Kallman, one of the pianos made in Wellington, claim a number of improvements in piano design. To prevent warping and splitting of the case parts, laminated blockboard is used and it is veneered and counter-veneered for added strength. They say their soundboard is unequalled in the world. Using close grained spruce and a special flexible lacquer the necessary 6% moisture is locked in. A fifteen year guarantee is given to support their claim. The wrest-plank is made of rock maple and has several layers with the grains running in different directions (Fig. 43). The keys are covered with 'ivorene', which has the feel of ivory without its disadvantages of yellowing and cracking.

The advantages of locally made pianos are similar to those of America at the end of the 18th Century. Local conditions are taken into consideration by the manufacturers - long sea journeys are eliminated and price is a major consideration in a society of rising costs.

A steady increase in piano sales is reported since 1965. In that year 5,000 pianos were sold. In 1968, 6,500 were marketed of which 3,500 were locally made. 1970 shows the same import figure, but an enormous increase in Yamaha imports - half of the overseas supply, 1500, were from the Yamaha factory. Japanese prices are very competitive and a major threat to the local manufacturer - however, the local products compare favourably with their competitors and manufacturers are keeping up a satisfactory standard of progressive development.

In concluding this survey of South African pianos, several aspects seem worth of comment. Firstly it is evident that the cultural and social

significance of owning and playing a piano during the 19th Century had its parallel in South Africa in spite of transport difficulties. Secondly that, as in overseas countries, South African interest in pianos and piano playing has survived and benefited from the impact of the radio and radiogram.

CONCLUDING COMMENTS

The evolution of stringed keyboard instuments, from the Clavichord to the present day piano, has been characterised by a blend of mechanical ingenuity with artistic craftmanship. The craftsmen have provided suitable styles for each period, while countless inventors have applied mechanics, physics, metallurgy, pneumatics and electronics to expand the potential of these performing instruments.

The popularity of the clavichord, harpsichord and piano as domestic instruments is easy to understand. They are decorative, ready to play and easy to learn in the initial stages. They are complete in themselves, and in the case of the harpsichord and piano, are solo concert instruments. Until the 20th Century all the great pianists were composers and all composers were pianists, and even the composers who wrote for other instruments used the piano.

During the 18th Century, the piano displaced the earlier instruments, because it combined the expressiveness of the clavichord with the brilliance and greater tone volume of the harpsichord. Throughout the 19th Century it developed through various actions, metal bracings, shapes and sizes to the modern instrument we know today. Various keyboard designs were explored and discarded. Wooden frames were replaced with cast iron, and the actions of both upright and grand pianos evolved to the complicated series of levers, which provide a lightness of touch and speed of action, suited to the technique of the most skilled performer.

Having evolved through two and a half centuries to the glorious all purpose instrument valued by both professional and amateur musicians, all we need now is an assured source of pianists. This, however, is a problem for musical educators, and as such, a topic for another investigation ....

APPENDIX I

BACH'S KLAVIER

J.S. Bach specified the Clavichord for only three of his works, namely the Italian Concerto, the French Overture and the Goldberg variations. The other works, including the "48," are written for the klavier, an ambiguous term meaning keyboard. This has given rise to much speculation about the instrument intended for the klavier works of Bach and other composers of the period. Bodky is of the opinion that many of the more intimate compositions of Froberger, Fischer, Palchelbel, J.C. Bach, Kuhnau and even Haydn ought to be played on the clavichord.

Although Forkel writes of Bach's love for the clavichord, this is ignored by Schweitzer who is in favour of dynamic opposition pure and simple, as on the organ, which for him "represents the real style of Bach's music". Schweitzer, Carl Nef and Wanda Landowska agree that the harpsichord is the correct instrument for the klavier works. Landowska argues that the clavichord in Bach's time was still fretted, making equal temperature impossible. Dolmetsch, on the other hand, believes the whole '48' were written for clavichord.

The inventions, the little notebooks for Anna Magdalena and Friedemann and the French suites, are certainly possible on a fretted clavichord and surely intended for it. Having written these pieces as lessons, it would seem sensible to use the more musical instrument. However, the first book of the '48' written in 1722, and the second about twenty years later were written to prove that equal temperament was acceptable. The Preludes and Fugues are so varied in character, that the choice of "klavier" most suited to the style of each composition, seems an obvious solution.(441)

APPENDIX II

"PAIR OF VIRGINALS"

According to the Oxford English Dictionary, it is not known why the word virginals is used to denote a single instrument. The row of keys may have suggested a flight, or pair, of stairs and in fact Brinsmead[442] states that a "Payre of Clavycordes" was applied in the old sense of a pair of steps being a series of degrees.

The name virginals has itself caused speculation. The word is often attributed to the association of the Virgin Queen's fondness for the instrument, but this seems unlikely as the name was in use before her time. Other suggestions are that the instrument was popular amongst young women and nuns. This is also not adequate evidence, as men played the virginals in taverns for amusement and the diary of Pepys refers on many occasions to himself and his men friends, who found enjoyment in the performance on such instruments. Henry VIII and the early composers were all expert virginalists too[443].

Curt Sachs[444] traced the word back to 1463, long before the time of Elizabeth I. He surmised that 'Virginal' came from the Latin 'Virga" - a jack - an important part of the mechanism.

The term 'double virginals' refers to the rarer instrument with two keyboards. Rimbault[445] says, a single harpsichord of two unisons and one set of keys, was in effect, a double spinet or virginal. A double harpsichord had two sets of keys and three strings, two unisons and an octave, to each note.

APPENDIX III

BEETHOVEN'S BROADWOOD

It is frequently stated in historical accounts of the piano, that Beethoven preferred the more powerful Broadwood with its English action to the Viennese type of instrument. This had become an accepted fact, until William S. Newman(446), in 1970, re-examined the known evidence in regard to Beethoven's choice, preference and ideals in pianos. His conclusions are quite contrary to those usually stated. A great deal of importance has been attached to Beethoven pianos extant today - an Erard, a Broadwood and a Graf. The evidence shows that he disliked the Erard which presented insurmountable action problems from the start. Incidentally, it was a gift from the Erard firm.

The Broadwood reached Beethoven in July 1818, by which time he had written nine tenths of his piano music. Op. 101, written in 1816, and Op. 106, almost completed, had already exceeded the six octave keyboard of his new Broadwood. The range was also not high enough to encompass his last three sonatas, written after its arrival. By this time, too, Beethoven was almost totally deaf, and his friend Stein, in 1820, was trying to find a means of making the Broadwood louder. Wieck recalls how Beethoven played to him with the Broadwood on a "resonance plate" with his ear trumpet also fixed to the plate. It would appear that the importance of the Broadwood was the honour of international recognition - he wrote a grateful note before its arrival, but all further reference to it was only to imply dissatisfaction.

The Viennese Graf piano, made in 1825 to Beethoven's own specifications, was designed to make it audible to him. It had quadruple stringing and a special resonator. Among all the pianos he is known to have used, this is the only one that encompassed all his writing. However, it arrived at the end of that writing, and was neither satisfactory to Beethoven, nor to those who could hear!

APPENDIX IV

PROGRAMME MUSIC OF THE LATE 19th CENTURY

The pseudo - programme music so popular at the turn of the century is beautifully illustrated by the activities of a certain Abt Vogler.(447) The Abbot was an excellent musician, a master of harmony and counterpoint, and also the teacher of Carl Maria von Weber and Giacomo Meyerbeer. He is said to have played a clavier in an art gallery in Dusseldorf - sitting in front of different pictures and interpreting them for the benefit of his audience'. Later in 1807 in Frankfurt, he gave an organ concert, presenting the following programme:-

Part I

1. Chorale: How brightly shines the morning star.
2. Song of the Hottentots, which consists of three measures and two words: Magema, Magema, Huh, Huh, Huh'.
3. Flute Concerto : Allegro, Polonaise, Gigue.

Part 2.

1. The Siege of Jericho
   (a) Israel's Prayer to Jehovah
   (b) Sound of the trumpets
   (c) Crash of the walls
   (d) Entrance of the victors.
2. Terrace Chant of the Africans, when they seal their flat roofs with lime, during which one chorus alternately sings while the other one stamps.
3. The Pleasure Ride on the Rhine, Interrupted by a thunder storm.
4. Handel's Hallelujah, treated as a fugue with two subjects and counterpointed with a third subject.

The battle pieces which became so popular are said to have been caused by the wars from 1789 - 1815. Even Beethoven wrote a battle symphony called 'Wellington's Victory' for a huge clockwork panharmonicon made by P.J. Maeltzel. It was orchestrated and played at a concert in Vienna, where it received terrific acclaim, and eventually in 1813 it was arranged for piano(448).

Instructions and signs were clearly indicated in scores of battle music[449]. Canon shots appear to have been the pièce de résistance. "The flat of the hand depressing the lowest notes on the keyboard, loudly and all at once, and held till the sound has died away", are directions in a German piece of this period. A French composer, going one better suggests using both hands flat on the lowest 3 octaves, while a young lady in Boston using a square piano, which had a pedal for opening the short flap of the lid to produce a swell, used to raise the lid and let it drop with a crash in order to fire her canon![450]

The piano is admirably suited to descriptive music - Tremolos and arpeggios are easy substitutes for thunder or waves, and with the addition of drum and Janissary pedals, the meanest pianist can make a good showing!

In Britain in 1790, a Bohemian called Kotzwara, wrote and published a piano composition called "The Battle of Prague"[451]. It contained everything a pianist could wish for - marches, bugle calls, the word of command, the hail of bullets, canon shots, attack with swords and cries of the wounded. It proved a phenomenal success amongst English speaking people all over the world and was the most popular piece of music for fifty years at least. It seems appropriate that the composer hanged himself in a brothel in 1791!

APPENDIX V

EQUAL TEMPERAMENT

Until the middle of the 18th Century composers were hampered by the tuning problems presented in a twelve note octave. So called "Just intonation" was not practical as it allowed performance in only one key. A system of "Mean tone" tuning, based on the major thirds being tuned accurately and the other intervals adapted, made it possible to use six major keys and three minor ones. This was still not completely acceptable as composers found such restrictions very limiting. The adoption of "equal temperament" provided a means of equating the enharmonic notes, so that only one key was necessary for two different notes - while the octave was tuned perfectly - the rest of the notes were equally divided so that each half tone was equal.

J.S. Bach is usually regarded as the first composer to employ equal temperament and the 48 Preludes and Fugues for 'Das Wohltemperierte Klavier' is cited as the proof.(452) However, there were much earlier attempts in this direction. In 350 B.C. Aristoxenus is said to have proposed it - Spaniards used it on their fretted guitars around 1480 - Zarlino in Italy explains its application to the lute in the late 16th Century. John Bull and Handel's use of keys suggest some such tuning system and other people besides Bach wrote sets of works in every key - Matheson in 1719 is one example, and as early as 1550, Willaert, a Flemish composer, had pleaded for the system.

Britain appears to have been remarkably tardy in applying equal temperament. Zumpe must have found the mean tone system still popular in England, in 1766, for in that year he manufactured a piano with divided black keys.(453) Almost another century went by before many large firms adopted equal temperament. Broadwood's are said to have applied it only in 1846.(454) Perhaps this accounts for Beethoven's Broadwood being so 'out of tune' after its arrival in Germany in 1818.

REFERENCES

1. Scholes - Monochord
2. Sachs, p. 331
3. Dolmetsch - Listener
4. Ripin, p. 527
5. Rimbault, p. 46
6. ibid., p. 43
7. ibid., p. 45
8. Dart, p. 71
9. ibid., p. 70
10. ibid., p. 72
11. Closson, p. 26
12. ibid., p. 25
13. Dolmetsch - 17th and 18th Century Music, p. 435
14. Loesser, p. 111
15. Closson, p.32
16. Dolmetsch - 17th and 18th Century Music, p. 435
17. Rimbault, p. 66
18. Russell, p. 80
19. ibid.
20. Sumner, p. 31
21. Loesser, p. 308
22. Rimbault, p. 72
23. Russell, p. 81
24. ibid., p. 82
25. Rimbault, p. 81
26. ibid., p. 48
27. ibid., p. 52
28. ibid., p. 54
29. ibid., p. 58
30. Hipkins Mus. Inst. Plate VIII
31. Rimbault, p. 64
32. Russell, p. 83
33. Dolmetsch - 17th and 18th Century Music, p. 427
34. Russell, p. 83
35. Rimbault, p. 85

36. Loesser, p. 202
37. Rimbault, p. 84
38. Loesser, p. 215
39. Rimbault, p. 89
40. ibid., p. 90
41. Brinsmead, p. 106
42. Loesser, p. 215
43. Russell, p. 83
44. Rimbault, p. 81
45. ibid., p. 83
46. Russell, p. 83
47. Loesser, p. 433
48. Russell, p. 85
49. Closson, p. 63
50. Geiringer, p. 258
51. Rimbault, p. 197
52. Strutt, p. 231
53. Geiringer, p. 258
54. Closson, p. 64
55. ibid., p. 46
56. ibid., p. 64
57. Loesser, p. 33
58. Loesser, p. 24
59. ibid., p. 25
60. Closson, p. 78
61. Loesser, p. 25
62. ibid., p. 26
63. ibid., p. 27
64. Harding, p. 4
65. Loesser, p. 216
66. ibid., p. 58
67. Harding, p. 4
68. Loesser, p. 26
69. Dolmetsch - Truth About Piano
70. ibid.
71. Loesser, p. 36
72. Scholes - pianoforte 2
73. Harding, p. 13

74. Harding, p. 17
75. Loesser, p. 28
76. Harding, p. 18
77. Closson, p. 78
78. Harding, p. 8
79. Loesser, p. 47
80. Clutton, p. 89
81. ibid., p. 90
82. Loesser, p. 35
83. Loesser, p. 37
84. Rimbault, p. 112
85. ibid., p. 115
86. Brinsmead, p. 112
87. Clutton, p. 89
88. Harding, p. 429
89. ibid., pp. 35. 36, 37
90. Sumner, p. 41
91. Scholes - pianoforte 4
92. Closson, p. 86
93. ibid., p. 87
94. Grove Vol. II 1954
95. Loesser, p. 101
96. ibid., p. 38
97. Brinsmead, p. 112
98. Closson, p. 82
99. Loesser, p. 39
100. Harding, p. 5
101. Loesser, p. 41
102. ibid., pp. 42, 36
103. Enclyclopaedia Der Neue Brockhaus, 1941.
104. Loesser, p. 98
105. Dart, p. 73
106 Letter from Helen Hollis, Smithsonian Institute.
107. Harding, p. 30
108. Loesser, p. 101
109. Clutton, p. 91
110. Harding, p. 28
111. Clutton, p. 93

112. Clutton
113. Loesser, p. 125
114. Harding, p. 54
115. Clutton, p. 94
116. Loesser, p. 315
117. ibid., p. 224
118. ibid.
119. Clutton, p. 96
120. Loesser, p. 234
121. ibid., p. 235
122. Rimbault, p. 133
123. Harding, p. 67
124. Loesser, p. 220
125. ibid.
126. ibid.,pp. 221, 237
127. ibid.,p. 315
128. ibid., p. 317
129. Closson, p. 64
130. ibid., p. 65
131. ibid., p. 102
132. Loesser, p. 320
133. Rimbault, p. 124
134. ibid., p. 125
135. Loesser, p. 320
136. ibid., p. 322
137. ibid., p. 324
138. Closson, p. 74
139. Loesser, p. 327
140. ibid., p. 328
141. ibid., p. 329
142. Closson, p. 66
143. Loesser, p. 325
144. ibid., p. 227
145. Closson, p. 65
146. Clutton, p. 100
147. Hess
148. Harding, p. 88

149. Brinsmead, p. 106
150. Loesser - Preface
151. Sumner, p. 46
152. Harding, p. 152
153. Closson, p. 96
154. Harding, p. 153
155. ibid., p. 156
156. ibid., p. 39
157. Loesser, p. 339
158. Harding, p. 158
159. ibid.
160. Loesser, p. 387
161. Harding - Appendix C
162. ibid., p. 64
163. ibid., p. 66
164. ibid., p. 187
165. ibid.
166. ibid., p. 164
167. ibid., p. 170
168. ibid.
169. ibid., p. 183
170. Closson, p. 99
171. Newman
172. Closson, p. 101
173. Harding, p. 183
174. Hipkins, p. 53
175. Harding, p. 186
176. ibid., p. 179
177. ibid., p. 198
178. Loesser, p. 301
179. Clutton, p. 101
180. Harding, p. 206
181. ibid., p. 200
182. ibid.
183. ibid., p. 199
184. ibid., p. 204
185. ibid., p. 202
186. ibid., p. 208

187. Brinsmead, p. 135
188. Harding, p. 226
189. ibid., p. 30
190. ibid., p. 32
191. ibid., p. 60
192. Loesser, p. 249
193. Harding, p. 222
194. ibid., p. 225
195. ibid., p. 65
196. ibid., p. 226
197. ibid., p. 231
198. ibid., p. 225
199. ibid., p. 233
200. Loesser, p. 141
201 a. Harding, p. 235
201 b. ibid., p. 136
202 Grove, Vol. III p. 450
203. Harding Exp. pianos
204. ibid.
205. ibid.
206. Harding, p. 136
207. Loesser, p. 165
208. Harding, p. 226
209. ibid., pp. 229, 232
209 a. Loesser, p. 345
210. Harding, p. 243
211. Harding, p. 236
212. Loesser, p. 402
213. Harding, p. 238
214. ibid., p. 242
215. Harding, p. 247
216 a. ibid., p. 163
216 b. ibid., p. 239
217. ibid., p. 260
218. ibid., p. 264
219. Loesser, p. 402
220. ibid., p. 390
221. ibid., p. 441

222. Slonimsky, p. 4
223. Harding, p. 79
224. Loesser, pp. 458, 460
225. ibid., p. 461
226. ibid., p. 463
227. ibid., p. 477
228. Closson, p. 109
229. Music Trades, June 1951
230. Music Trades, September 1970
231. Loesser, p. 483
232. ibid., p. 510
233. ibid.
234. ibid. p. 492
235. ibid. p. 494
236. Geiringer
237. Steinway
238. Loesser, p. 512
239. ibid., p. 495
240. ibid., p. 512
241. ibid., p. 513
242. ibid., p. 495
243. Scholes - Pianoforte 16
244. Loesser, p. 564
245. ibid., p. 515
246. ibid., p. 524
247. Steinway
248. Time
249. Loesser, p. 574
250. Time
251. Loesser, p. 590
251 a. ibid., p. 62
252. Sumner, p. 119
253. ibid.
254. ibid., p. 124
255. ibid., p. 125
256. Loesser, p. 588
257. ibid., p. 590
257 a. Musik 1954
257 b. Loesser, p. 610

258. Loesser, p. 597
259. Yamaha Brochure
260. Japan Information Bulletin
261. Scholes Keyboard 2
262. Sumner, p. 20
263. Neupert, p. 13
264. Neupert, p. 16 - 17
265. Scholes Keyboard 1
266. Ripin, p. 530
267. Sumner, p. 28
268. ibid.
269. Newman
270. Scholes, p. 13
271. Newman
272. Scholes Keyboard 2
273. Sumner, p. 29
274. Scholes Temperament
275. Harding, p. 284
276. Loesser, p. 403
277. Harding, pp. 284 - 5
278. Closson, p. 123
279. Harding, p. 67
280. ibid., p. 283
281. Closson, p. 123
282. Harding, p. 284
283. ibid., p. 285
284. Closson, p. 124
285. Arntzen
286. Loesser, p. 567
287. Loesser, p. 569
288. Scholes Keyboard 4
289. Geiringer
290. Webb
291. Loesser, p. 566
292. Sumner, p. 193
293. Loesser, p. 566
294. Scholes Keyboard 4

295. Sumner, p. 193
296. Closson, p. 54
297. Reese, p. 530
298. Die Musik ... (Vicentino)
299. Scholes - Microtones
300. Closson, p. 125
301. Howard, p. 578
302. Variety
303. Geiringer
304. Sumner, p. 194
305. Loesser, p. 293
306. ibid., p. 295
307. Scholes, p. 520
308. Loesser, p. 295
309. Grove
310. Grove
311. Loesser, p. 297
312. ibid., p. 299
313. Grove
314. Loesser, p. 383
315. ibid., p. 384
316. ibid., p. 541
317. Prentice
318. Prentice
319. Loesser, p. 542
320. ibid.
321. Scholes - Pianoforte Playing 7
322. ibid.
323. Loesser, p. 577
324. Scholes (Mechanical Reproduction 9)
325. ibid.
326. Loesser, p. 578
327. Rimbault, p. 64
328. ibid.
329. Scholes (Mechanical Reproduction 5)
330. ibid.
331. Loesser, p. 242
332. Scholes (Mechanical Reproduction)

333. Harding, p. 280
334. ibid.
335. Rimbault, p. 205
336. Loesser, p. 578
337. Scholes (Mechanical Reproduction)
338. Loesser, p. 579
339. Scholes (Mechanical Reproduction)
340. Hall
341. Harding, p. 281
342. ibid., p. 282
343. Hobbies, August 1951
344. Harding, p. 282
345. Ostick
346. Scholes (Mechanical Reproduction)
347. Roehl
348. Scholes (Mechanical Reproduction)
349. Antrim
350. Saunders
351. Roehl
352. Saunders
353. Jonson
354. Roehl
355. Saunders
356. Leonard
357. Roehl
358. Saunders
359. ibid.
360. Roehl
361. ibid.
362. Loesser, p. 585
363. Holcman
364. Newman
365. Antrim
366. Newman
367. Scholes (Mechanical Reproduction)
368. Newman
369. Mus. Times, p. 117

370. Newman
371. Grew
372. Saville
373. Musical Times V. 82, p. 270
374. Jonson - (Webb, G.)
375. Jonson
376. Mc Callum
377. Jonson
378. ibid.
379. ibid.
380. Antrim
381. Music Trade Review, October 1954
382. Scholes (Mechanical Reproduction)
383. Roehl
384. Roehl, p. 151
385. ibid.
386. Loesser.
387. Antrim
388. Music Trade Review, October 1954
389. Wall Street Journal, November 5th, 1962.
390. ibid.
391. Steinway
392. Roehl
393. Speiss
394. Popper
395. Scholes (Electric Mus. Instruments)
396. Galpin
307. Geiringer
398. Scholes (Electric Mus. Instruments)
399. Briggs
400. Music Trade Forum, February 1963
401. Scholes (Electric Mus. Instruments)
402. Popper
403. Drakes Cyclopedia (Oscillators and Audio Frequency)
404. Scholes (Electric Mus. Instruments)
405. Popper
406. Juilliard Review, 1955

407. Scholes (Electric Mus. Instruments)
408. Music Trade Review, June 1954
409. ibid., August 1955
410. Briggs, p. 15
411. Katz
412. Berger
413. Lemmer
414. Harding, p. 409
415. Sumner p. 63
416. Rimbault, p. 132
417. ibid., p. 147
418. Halfpenny, p. 161
419. Sumner, p. 63
420. Harding, p. 387
421. Loesser, p. 246
422. Moffat, pp. 87, 88
423. Pigot
424. Rose, pp. 119, 120
425. Phillips, p. 102
426. ibid., p. 116
427. Harding, p. 405
428. Letter from Broadway
429. Harding, p. 68
430. Strutt Africana, p. 112
431. Harding, p. 200
432. ibid., p. 200
433. ibid., p. 186
434. Argus, July 4th, 1861
435. Harding, p. 389
436. ibid., p. 235
436a Kirby.
437. Newman
438. Grew
439. Panorama, December 1970
440. Personal Interview with Mrs. P. Dietmann
441. Closson, pp. 24 - 34
442. Brinsmead p. 90

443. Loesser p. 194
444. Sachs
445. Rimbault p. 82
446. Newman
447. Loesser, p. 165
448. ibid., p. 169
449. ibid., p. 170
450. Harding - Exp. pianoforte
451. Loesser, p. 243
452. Scholes - Temperament 5
453. Harding, p. 66
454. Hipkins Musical Times, September 1898

PLATE REFERENCES

1.	Rippon, pl. 3
2.	ibid., pl. 1
3.	Hoover
4.	ibid.
5.	Neupert, pl. 3
6.	Rippon, pl. 4
7.	Hipkins Mus. Instr.
8.	Neupert, pl. 12
9. a & b	Hoover, pls. 34 & 36
10.	Mr. T. Radloff, Grahamstown
11.	Scholes, pl. 73
12.	Hoover, pl. 1
13.	ibid., pl. 16
14.	ibid., pl. 18
15.	ibid., pl. 11
16a.	Hoover, pl. 29
16b.	ibid.
16c.	ibid., pl. 2
17.	ibid., pl. 28
18.	Hipkins Mus. Instr.
19.	ibid.
20.	ibid.
21a.	Hoover, pl. 22
21b.	ibid., pl. 23
21c.	ibid., pl. 24
22.	Hipkins Mus. Instr. Pl. XXII
23.	ibid., pl. XXXV
24.	Essex Institute - Salem, Mass.
25.	Rhodes University
25a.	ibid.
26.	ibid.
27.	Hipkins Plate XVII
28.	Grove, Vol. II pl. 18
29.	ibid., pl. 17
30.	Scholes, pl. 56

31.	Harding frontispiece
31 a.	Smithsonian Institute, Washington, D.C.
32.	Harding, p. 52 pl. VI
33.	Smithsonian Institute, Washington, D.C.
34.	ibid.
35.	ibid.
36.	Connoisseur Guide
36 a.	"Pour la Musique"
37 a & b.	Kingswood College, Grahamstown.
38.	Mr. M. Rushmere, Grahamstown.
39.	Kingswood College, Grahamstown.
40.	1820 Settlers Museum , Grahamstown.
41.	Mr. A. Honey, Grahamstown.
42.	1820 Settlers Museum , Grahamstown.
43.	Mr. M. Rushmere, Grahamstown.
44.	1820 Settlers Museum, Grahamstown.
45.	ibid.
46.	Kingswood College, Grahamstown.
47.	Mrs. Palmer, Grahamstown.
48.	Harding, p. 30, pl. II
49.	ibid., p. 64, pl. VIII
50.	ibid., p. 224
51.	ibid., p. 222
52 a & b.	1820 Settlers Museum, Grahamstown.
53 a.	Presbyterian Church, Grahamstown.
53 b.	Mr. H. Blomfield, Carlisle Bridge.
54.	Harding, p. 118, pl. III
55.	ibid., p. 236, pl. VIII
56.	ibid., p. 106, pl. II
57.	Presbyterian Hall, Grahamstown.
58.	Mr. H. Blomfield, Carlisle Bridge.
59.	See 57 and 58
60 a & b.	Mrs. Peters, Sea Point.
61.	Briggs, p.26
62.	Harding, p. 268 pl. XIV
63.	Mrs. Pat Lyons, Durban.
64.	Pingree House, Salem, Mass. U.S.A.

64a. Yamaha
65. Essex Institute, Salem, Mass., U.S.A.
66. ibid.
67. Mr. Heunis, Pretoria.
68. Grahamstown City Hall.
69. Rhodes University, Grahamstown.
70. ibid.
71. ibid.
72. Yamaha, Hamamatsu, Japan.
73. ibid.
74. ibid.
75. ibid.
76. ibid.
77. ibid.
78. ibid.
79. ibid.
80. Smithsonian Institute, Washington, D.C.
81. Hipkins, pl. XXXI
82. Scholes, pl. 90
83. Smithsonian Institute, Washington, D.C.
84. Geiringer
84a. Smithsonian Institute, Washington, D.C.
84b. ibid.
85. Scholes, pl.103
86. Mrs. N. Manley, Grahamstown.
86a. Deutsche Staatsbibliothek, Berlin
86b. ibid.
86c. Scholes, pl. 106
87. Mr. F. White, Grahamstown.
88. Mr. J.L. Hamburger, Grahamstown.
89. Mr. J. Stuttaford, Grahamstown.
90. ibid.
91. Musical Directory, 1859 - 61
92. Roehl. H. p. 15
93. ibid., p.3
94. ibid., p. 244
95. ibid., p. 10
96. ibid., p. 21

97. Mr. C. Dredge, Grahamstown.
98. ibid.
99. ibid.
100. Roehl, p. 112
101. ibid., p. 72
102. ibid., p. 65
103. ibid., p. 51
104. Rev. H. Kirkby, Grahamstown.
105. Roehl, p. 32
106. Catalogue of Q.R.S.
107. Roehl, p. 156
108. ibid., p. 42
109. ibid., p. 38
110. ibid.
111 a. Popper
111 b. ibid.
112. Scholes, pl. 57
113. Popper
114. Berger
115. Panorama
116 a & b. Mrs. P. Mudge, Elgin, Cape.
117 a & b. Mr. D. Morrison, Saxonwold, Johannesburg.
118 a & b. South African College of Music, Cape Town.
119 a & b. Groot Constantia, Cape.
120 a & b. Brigadier P.L. Graham, Constantia, Cape.
121. Matjiesfontein, Lord Milner Hotel
121 a & b. Dr. M.A. Wilkinson, Grahamstown.
122 a & b. Old House Museum, Durban.
123. The Late Prof. P.R. Kirby, Grahamstown.
124 a & b. Mr. Morrison, Groot Drakenstein, Cape.
125 a & b. 1820 Settlers Museum, Grahamstown.
126 a & b. The Lady Elizabeth Tyler, Firgrove, Cape.
127 a & b. South African College of Music, Cape Town.
128. Mr. G.C. Osler, Stellenbosch.
129 a & b. 1820 Settlers Museum, Grahamstown.
130 a & b. ibid.
131 a & b. ibid.
132. Rhodes University, Grahamstown.

133.	George Museum, C.P.
134.	Mr. R. Horn, Joubertina, C.P.
135.	Stellenbosch Museum, C.P.
136a & b.	Mr. & Mrs. E. Kroon, Graaf Reinet, C.P.
137a & b.	Mr. Heuer, Stellenbosch, C.P.
138a & b.	Stellenbosch Museum, C.P.
139a & b.	C.P. Nel Museum, Oudtshoorn, C.P.
140.	ibid.
141a & b.	Presbyterian Church, Grahamstown.
142.	Reinet House, Graaf Reinet, C.P.
143.	Mr. H. Blomfield, Carlisle Bridge, C.P.
144a & b.	Mr. De la Mare, Grahamstown.
145a & b.	Mrs. Peters, Sea Point, Cape.
146.	Old House Museum, Durban.
147.	Mrs. Pat Lyons, Durban, Natal.
148a & b.	Local History Museum, Durban, Natal.
149a.	Mrs. van Rensburg, Oudtshoorn, C.P.
149b.	Mr. de Jager, Oudtshoorn, C.P.
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154.	School, Salem, C.P.
155.	1820 Settlers Museum, Grahamstown.
156.	Mr. A. Honey, Grahamstown.
157.	Town Hall, Cradock, C.P.
158a & b.	Mr. E.A. Heunis, Pretoria, Tvl.
159.	South African College of Music, Cape Town.
160.	Reinet House, Graaf Reinet, C.P.
161.	1820 Settlers Museum, Grahamstown.
162.	Museum, East London, C.P.
163.	Mr. F. White, Grahamstown.
164.	Reinet House, Graaf Reinet.
165a & b.	1820 Settlers Museum, Grahamstown.
166.	Grove.
167.	Rev. H. Kirkby, Grahamstown.
168.	Mr. R. Laing, Grahamstown.
169.	Mr. C. Dredge, Grahamstown.
170.	Panorama.

FIGURE REFERENCES

1.	Neupert, Plates 1 and 2.
2. a, b, c, d.	Ripin, pp. 528 - 529.
3.	Harding - History p.19.
4.	ibid., p. 19
5.	Closson, p. 129
6.	Harding - History p. 23
7.	ibid.
7.a	Harding - History, p. 39
8.	Closson, p. 131
9.	Harding - History, p. 37
10.	Briggs, p. 58
11.	Closson, p. 132
12.	ibid., p. 133
13.	Hess
14.	English Grand Action (Broadwood, 1795)
15.	Closson, pp. 134 - 5
16.	Agraffes - Harding, p. 188
17.	Harding, p. 182, Plate II
18.	Harding, p. 65
19.a	Rimbault, p. 187
19.b	Harding, pp. 231, 232
20.	Harding, p. 233 "Hängende" German Act.
21.	ibid., p. 234 "Stehende" German Act.
22.	Wornums Tape Check Actions, Harding p. 247
23.	Yamaha Upright
24.	Yamamato's Spiral Sound Bars (Japanese Bulletin)
25.a & b	Short Octave - Sumner, pp. 27 & 28
26.	Broken Octave - ibid.
27.	Harding - Trotters Keyboard, p. 292
28.	Arntzen
29.	Prentice
30.	Roehl, p. 244
30.a	ibid., p. 168
31.	Mr. R. Laing, Grahamstown

32. Portion of Player Piano Roll
33. Roehl, p. 44
34. Berger
35. Briggs, p. 49
36. ibid., p. 55
37. Connoisseur Period Guide, pp. 162 -163
38. ibid.
39. ibid.
40. ibid.
41. Harding opp. p. 63, Fig. 47
42. ibid., p. 235
43. Mostert.

BIBLIOGRAPHY

Antrim, Doron, K. "The Player Piano is Back", Musical Journal 11 : 9 Sept. 1953.

Arntzen, S.B. Paul von Janko, et. 100-ars minne Nordisk Musikkultur 6 : 44-6 June 1957. G.E.C. Gads Forlag, Copenhagen, Denmark.

Berger, I. "The Switched on Bach Story".

Briggs, G.A. Pianos, Pianists and Sonics. Bradford, Yorkshire, 1951.

Brinsmead, E. The History of the Pianoforte Simpkin, Marshall & Co., London, 1889.

Brockhaus, S.A. Der Neue Brockhaus (Encyclopaedia) Leipzig, 1941.

Chase, America's Music, New York, McGraw-Hill Book Co., Inc., 1955.

Closson, E. The History of the Piano (translated by Delano Ames), Paul Elek, London, 1947.

Clutton, C. "The Pianoforte", Musical Instruments through the Ages, Cox and Wyman Ltd., London, Reading and Fakenham, 1969.

Dart, T. "The Clavichord", Musical Instruments through the Ages, Cox and Wyman Ltd., London, Reading and Fakenham, 1969.

Dent, E.J. The Pianoforte and its Influence on Modern Music Musical Quarterly, April, 1916.

Die Musik in geschichte und gegenwart.

Dierche Welt Atlas Pub. by Westermann, Braunschweig, O.D.

Dolmetsch, A. The Interpretation of the Music of the XVIIth and XVIIIth Centuries. Novello, 1915.

Dolmetsch, A. The Truth about the Piano, The Listener, 27 December, 1934.

Drake's Cyclopedia of Radio and Electronics, Chicago, Frederick J. Drake & Co., 11th Edition.

Dwight, O.G. "Old Pianola is Staging a Come Back" Piano Technician, May 1950.

Dyson, G. "The Future of Music" Musical Times, Vol. 76, Feb. 1935, p. 117.

Enclycopaedia Brittanica : "The Pianoforte", 2nd Edition.

Galpin, F.W. A Text Book of European Musical Instruments, Williams and Norgate, 1937.

Galpin, F.W. — Old English Instruments of Music, Methueun and Co., 1932.

Geiringer, K. — Musical Instruments: their History from the Stone Age to the Present Day. Allen and Unwin, 1943.

Goldman, R.F. — Percy Grainger's "Free Music" Juillard Review 2: 42-7, Fall 1955.

Grahamstown Journal — First Electric Piano by M. Speiss, Feb. 3rd, 1869.

Grew, S. — The Art of the Player Piano, K. Paul, London, 1922.

Grove's Dictionary of Music and Musicians — Mac Millan and Co., New York, 6th Edition, 1954.

Halfpenny, E. — "Music and Musical Instruments" The Connoisseur Period Guides (late Georgian Period).

Hall, A.J. — The Standard Handbook of Textiles, London National Trade Press Ltd., 1959.

Harding, R.E.M. — A History of the Pianoforte, Cambridge University Press, 1933.

Harding, R.E.M. — "Experimental Pianofortes and the Music Written for Them", Proceedings of the Musical Assocation, 17th Feb., 1931.

Hess, A.G. — "The Transition from Harpsichord to Piano" Galpin Society Journal, Vol. VI, London, July 1953.

Hipkins, A.J. — A description and history of the Pianoforte, London: Novello, 1896.

Hipkins, A.J. — Musical Instruments, Edinburgh: Adam and Charles Black, 1838.

Hipkins, A.J. — Musical Times, Sept. 1898.

Holcman, J. — "Rolls and Records", Saturday Review, March 25th 1961.

Hollis, H.R. — Personal Correspondence.

Hoover, C.A. — Harpsichords and Clavichords, Smithsonian Institute Press, Washington, 1969.

Howard, J.T. — Our American Music, New York, Thomas Y. Crowell, 1965.

Ives, C.E. — Music and its Future.

Japan Information Bulletin — No. 2/70, Feb. 1970 : "New Type Piano and Its Inventor".

Jonson, G.C.A. — "Mechanical Piano-Players", Dec. 15, 1915.

Katz, L. — "Simulating Piano Tones Electronically", Electronics, Oct. 1953.

Kirby, P.R. — South African Journal of Science, Vol. XL, Nov. 1933.

Leonard, R.A. — "The Glorious Age of the Player-Piano", Hifi/Stereo, March, 1961.

Loesser, A.	Men, Women and Pianos, Simon and Schuster, New York, 1954.
Mac Callum, F.K.	"About the Player-Piano", Hobbies, March 1950.
Mac Dougal, A.K.	"Look Ma, No Hands", Wall Street Journal, Nov. 5th, 1962.
Mason, H.L.	Letter to the Director of Essex Institute, Salem, Mass., U.S.A. 13th Sept. 1948.
Michel, N.E.	Michell's Piano Atlas - 9123 Terradell Avenue, Pica Rivera, California.
Moffat, R.	Missionary Labours and Scenes in Southern Africa, John Snow, Paternoster Row, London, 1842.
Mostert, J.	"Clavicembalo", Opus. Vol. II, No. 1, July 1967.
Musical Directory	Register and Almonack for the Year 1859, Rudell, Rose, Carte & Co., London.
Musical Times	Harold Bauer by A.K. Dec. 1st, 1922.
Musical Times	Vierling Piano, May 1936, Vol. 77, p.417
Music Dealers	"Is the Player-Piano Coming Back", March 1950.
Music Trade Review	Columnist Visits Heaton, Dec. 1951.
Music Trade Review	Dealers Express their Views on Revival of Player-Piano, Nov. 1954.
Music Trade Review	New Gulbransen Pianoforte Piano, Aug. 1965.
Music Trade Review	Wurlitzer Introduces Electronic 64 Note Portable Piano, June, 1954.
Music Trades	"50 Golden Years of Service", June, 1951.
Neupert, H.	The Clavichord, (English Translation by Ann P.O. Feldberg), Barenreiter - Kassel, 1965.
Newman, E.	The Piano-Player and its Music, G. Richards Ltd., London, 1920.
Newman, W.S.	"Beethoven's Pianos Versus his Piano Ideals", Journal of the American Musicological Society, Fall, 1970.
Ostick, E.	Textiles for Salesmen, Pittman, 1931.
Panorama	Piano Manufacture in South Africa, Dec. 1970.
Pigot, S.	Unpublished Journals of Sophia Pigot.
Popper, P.	Wonders of Electrical Music, The Listener, 20 Sept., 1933.
Pour la Musique	Janvier, 1970, No. 13.
Prentice, R.	"Brotherhood's Technicon", The Proceedings of the Musical Association, Nov. 5th, 1888.

Q.R.S.	Catalogues of Rolls, Correspondence to Writer.
Reese,	Music of the Renaissance.
Rimbault, E.F.	The Pianoforte, its Origin, Progress and Construction, Cocks, London, 1860.
Ripin, E.M.	"The Early Clavichord", Musical Quarterly, 1967, Vol. 53, pp. 518 -538.
Roehl, H.M.	Player-Piano Treasury, Vestal Press, New York, 1968.
Rose, C.	Four Years in Southern Africa, Henry Colburn and Richard Bentley, New Burlington Street, London, 1829.
Rowe, P.	"An Unusual Piano", Musical Opinion, May 1961.
Russell, R.	"The Harpsichord, Spinet and Virginal", Musical Instruments through the Ages, Cox and Wyman Ltd., London, Reading and Fakenham, 1969.
Sachs, C.	The History of Musical Instruments, N.W. Norton and Co., New York, 1940.
Sanders, A.H.	"Yesterday's Juke Box", Hobbies, August 1951.
Saville, A.(M.D.)	Music, Health and Character, John Lane, London, 1923.
Scholes, P.A.	The Oxford Companion to Music, O.U.P. 1950.
Slonimsky, N.	"Musical Miscellany", Etudes, Vol. 68, Feb. 1950.
Speiss, M.	Grahamstown Journal, 3rd Feb. 1869.
Sumner, W.L.	The Pianoforte, Macdonald : London, 1966.
Steinway, J.H.	The Piano : Tradition or Progress? Music Journal Anthology, 1963. Letter to Writer.
Strunk, O.	Source Readings in Music History, W.W. Norton & Co., Inc., New York.
Strutt, D.H.	Notes on the Old House Museum and its Collection, Africana Notes and News, Vol. XI, p. 112.
Strutt, J.	Sports and Pastimes of the People of England, Methuen & Co., London, 1903.
Time Magazine	Instruments, Sept. 9th, 1966.
Webb, G.	"The Emmanuel Moor New Duplex-Coupler Pianoforte", The Proceedings of the Musical Association, March 14th, 1922.
Wolff, K.	"The Instrument of Composers", American Record Guide, Feb. 1961.
Variety	"Progressive Jazz Eyes Quartertone Piano as the new Sound in Music", March 30th, 1955.
Yamaha	All About the Yamaha Piano, Nippon Gakki Co., Ltd., Hamamatsu, Japan.

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