The Pianola Journal

The Journal of the Pianola Institute

No. 13 2000

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British Library Cataloguing in Publication Data

The Pianola Journal - Vol.13
1. Player-piano - Periodicals
I. Pianola Institute
789'.72ML 1070
ISSN 0952-6323
The Pianola Journal is published by the Pianola Institute Ltd, registered office, 111a Station Road, West Wickham, Kent. Registered in England number 1937014. Registered Charity number 292727.

Website: www.pianola.org

**The aims of the Institute**
A small number of pianola owners and musicians have been concerned for some time at the unnatural break between the world of music rolls and the world of music. Few members of the musical public know much about player pianos, and the Institute aims to bring about a better understanding and appreciation of the instrument in a number of ways.

The Institute publishes a regular journal, puts on public concerts, and has plans for a lending library of rolls, a travelling exhibition, and in addition a roll and information archive, with a small collection of player pianos for listening and study purposes.

The Pianola Institute will endeavour to preserve, research and document the pianola’s history, to improve the instrument’s present standing, and by the commissioning of new compositions, to ensure that it remains an important musical force for the future.

**The directors of the Institute are:**
Louis Cyr, Keith Daniels, Mike Davies, Denis Hall, Rex Lawson, Claire L’Enfant.

It is possible to support the work of the Institute by joining the Friends of the Pianola Institute. Membership of the Friends includes a copy of the journal. Enquiries should be sent to Mike Davies, The Granary, Wharf Road, Fenny Compton, Southam, Warwickshire, CV47 2FE, England.

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Institutional subscriptions in the UK: £15
Institutional subscriptions overseas: £25

Overseas subscriptions should be made payable in sterling.
Editorial

Authentic performance, and the study of performance practice, in the last thirty years or so, has become an accepted and respected part of our musical culture. It has, in the main, been applied to periods and styles prior to the advent of sound recording. That is to say, little scholarship has been brought to bear on the period from the mid-nineteenth century to the present day. A very real advantage of concentrating on earlier times is that the student or performer has only the score, instruments and written evidence as to how the works were performed, but is not constrained by actual sound recordings. There is thus considerable freedom for the modern artist to play the notes as he or she thinks correct, but with the brain and ears influenced by late twentieth century practice.

In the last ten years or so, interest has started to focus on the period where sound recordings do exist. We have recently had occasion to refer to Robert Philip’s book Early Recordings and Musical Style (Cambridge University Press, 1992). This is a fascinating and extremely well researched publication in which disc recordings of orchestral and instrumental performances are analysed and compared in considerable detail. And yet Philip does not appear to have listened to a single reproducing piano roll recording. In fact his only reference to rolls is to quote from Tempo Rubato or Time-Variation in Musical Performance by J. B. McEwen. McEwen uses examples of Duo-Art rolls to show the freedom in interpretation by measuring the lengths and positions of the perforations on the rolls of several performers, comparing them with the score.

A new book on performance practice, A Century of Recorded Music – Listening to Musical History by Timothy Day (Yale University Press, 2000) has just reached us. The author is ‘Curator of Western art music at the Sound Archive of the British Library, London.’ Day must have a vast library of recordings readily available to refer to, and the result, as one would expect, is a study addressing in some considerable detail the way in which recordings have influenced interpretations. His field encompasses orchestral, vocal, chamber and instrumental music – including piano music. And yet, in spite of the fact that there exist at least 10,000 classical reproducing piano roll recordings, in a book of 306 pages, he dismisses them in 3½ pages, concluding that ‘it would be unwise to rely too heavily on piano rolls as sources of information about performance practice.’ To be fair to him, he concedes ‘but then it would be unwise to rely uncritically on acoustic discs for such information.’ He concludes his chapter ‘Certainly the reproducing piano recordings can
provide useful supplements to the evidence of performing styles captured on gramophone records.' However there is not a single example of his quoting a reproducing piano roll recording which he has listened to live. He is very ready to be sceptical about the qualities of reproducing pianos without apparently having sought out and listened to the best of surviving examples. For the curator of Western art music at the National Sound Archive to adopt this attitude seems to us inexcusable and very disappointing.

We tend to think that player and reproducing pianos are commonplace, since our circle of Friends mostly have an example of at least one, or if they are not the owners, then they have come to the Institute because they have an interest in them. It is therefore salutary to face the fact that most young people have never seen a player piano, let alone a music roll. In this Journal, we publish an article describing a most imaginative project which is the brain-child of Dr. Arthur Jones of Nottingham University.

Several years ago he challenged a group of mechanical engineering students to make an exact copy of an 88 note music roll. None of the students had any idea of what this strange long sheet of paper with slots cut in it was; they had never seen a player piano or heard a recording of one. The design and building of the roll perforating machine, an essential part of the overall project, was the first part to be tackled, and that has been successfully completed and refined over the years. What has attracted Dr. Jones and his fellow authors of the article has been the development of the hardware and software necessary to read a music roll and from that information provide data for the perforator to make the copy. It is this aspect which is the subject of this technical article, a first of its kind for the Journal.

This autumn sees the issue of the first of a series of CDs devoted to recordings made for the Welte-Mignon reproducing piano. The recordings have been prepared with infinite care by Kenneth Caswell of Austin, Texas, and made using his own Feurich piano recorded at his home. The great advantage of such an approach is that Caswell has had complete control of the whole recording process and has not been bothered by time constraints which usually encroach when a recording session takes place in a commercially rented studio where every minute costs.

The results need no apology, but may strike the Steinway-orientated listener of 2000 as being somewhat different from the run of the mill CD of a modern pianist, recorded by a producer used to giving the record-buying public what it has become accustomed to expect. The reproducing piano was conceived to be listened to in people’s homes, albeit in the early days very grand homes; it is therefore a legitimate approach to use a piano smaller than a concert grand, and to have it recorded in relatively intimate surroundings. And it should be remembered that the first Welte pianos were Feurichs – not Steinways; these came a little later.
Edwin Welte and Karl Bockisch were the inventors of the reproducing piano. Until the introduction of the Welte-Mignon around 1904/5, there had been no such device to enable an artist to be heard actually playing by means of a self-playing mechanism live on one’s own piano. These two men between them developed the technical means of recording the playing of a pianist, and storing sufficient information so that they could, without any further input from the artist, produce a record roll which contained the note positions and additional perforations subsequently added to enable the replay action in the piano to produce a complete performance. To be able to listen in good recorded sound to interpretations from 80 or more years ago is a rewarding experience. We wish this new series of CDs every success. The first, the complete recorded output of Claude Debussy, is reviewed by Roy Howat.

In Europe, among the finest player pianos are those from the Steck factory in Gotha, built from around 1905 until production was stopped by the Great War. We are delighted to include in this Journal a history of the firm, written by a local historian in Gotha, Manfred Schöler and translated by Rex Lawson. Very little has been documented about the company, and Schöler’s researches place the Gotha Steck piano in its rightful place in the history of the Pianola.
Application of Mechatronics and Image Analysis Techniques to the Archiving of Piano Rolls

Arthur Jones, Dan Austin, Andrew Coffin and John Kennedy

Introduction

The close parallels between reproducing piano technology of nearly a century ago and today’s application of information technology to self-playing musical instruments (notably the sequencing of synthesisers etc. via MIDI techniques) are well known, and the technology has come full circle with computers having been used to control roll perforation equipment for many years now. However, despite numerous successful examples of the application of computer-related engineering technology (mechatronics) to mechanical music, not all the possibilities have been explored. One of the challenges facing the world of reproducing piano conservation is the production of accurate copies of original rolls; this task is made much easier where original equipment and master rolls exist (as in the case, for example, of Keystone’s original Ampico perforators and masters); where neither equipment nor masters exist, the challenges are clearly much greater. However worthy the objectives, there is little commercial incentive to develop the techniques and equipment required and roll manufacture has often become a sideline to other operations such as instrument manufacture or restoration. The possibilities for roll manufacture presented by new technologies are nonetheless well worth exploring even though the resources for formal research projects or commercial development are rarely available. This article introduces a number of educational projects which have used the archiving and copying of piano rolls as a vehicle for studying mechatronics and digital imaging within the context of a Mechanical Engineering degree course at the University of Nottingham. It goes on to describe (without, it is hoped, excessive mathematical detail) some of the possibilities explored for the application of digital imaging techniques to the archiving of piano rolls without the use of any specialised hardware. The projects are supervised by the first-named author, a mechanical engineer with strong interests in mechatronics, software engineering and digital image analysis.

Roll perforation projects

This sequence of projects was conceived primarily as an exercise in mechatronics, defined as ‘the science of the combination of electronics and mechanics in developing new manufacturing techniques’. All the versions of this project have been based upon the same physical hardware, which was designed by the initial team of four students as an exercise to devise a low-cost system for the
one-off production of piano rolls on a non-commercial or ‘paying hobby’ basis. The project team (along with all the subsequent students) did not have any initial knowledge of piano rolls or their manufacture, so considerable guidance was given towards a solution known to be feasible. The implementation was however the work of the students. Indeed, the team impressed all concerned with the enthusiasm and commitment with which they tackled what must have seemed a very unusual project, and with their initiative in applying their range of skills to the construction of an effective perforating machine. The resulting machine follows quite closely the design described by Malcolm Robinson\(^2\). Like Robinson’s machine, the present design uses four solenoid-operated punches for the note holes (with space for two additional punches for the accenting ‘snakebites’, which in the present version have not yet been implemented), mounted on a traversing carriage to enable the punches to cover all note tracks on the roll. One stepper motor is used to traverse the punch head and another to increment the music roll position using typewriter platen and pinch rollers. Unlike that used in Robinson’s machine, however, the traversing mechanism is based upon a lead screw rather than a tangential cable drive. This gives a very positive and accurate positioning of the carriage, but is very slow in operation. The computer interfacing was achieved at minimal cost using a surplus 80386 PC and an existing interface board based around the 8255 parallel interface IC. Stepper motor control was implemented simply by software-based generation of high and low outputs on the relevant lines of the 8255 interface.

The initial project proved to be a highly effective vehicle for the team of four students to undertake a project covering mechanical design and computer interfacing, including the writing of some attractive and effective Windows-based software to control the machine. There was even some (limited) scope for marketing research, and a simple questionnaire-based survey was undertaken. A subsequent project involved the writing of more flexible software and the construction of a more permanent set of electronic drivers for the hardware. The problem with slowness of the traversing mechanism remained, however, and a current project is exploring the use of modern motion control technology (notably the use of a servomotor with optical position encoder along with a self-contained motion control chip) to achieve much more rapid positioning. It is intended that the work undertaken on the software and servo control system will be published at a later date.

Archiving and copying of piano rolls using digital imaging: background and objectives

The second strand to the projects is based upon the archiving of piano rolls using digital imaging techniques, the aim being to create the manufacturing
data required for exact punch-for-punch copies of original rolls. In order to achieve a faithful copy of a roll, it is generally accepted that the exact pattern of punch strokes present in the original roll should be replicated. In other words, the roll is regarded not as consisting of slots with certain positions and lengths but as a grid of possible hole locations, some of which are perforated and others (the majority) left as blank paper. The importance of considering rolls in this way was clearly recognised by at least some of the original roll manufacturers; for example, Givens\textsuperscript{9} shows an example of a three-to-one Ampico master roll with synchronisation perforations to enable rolls to be made to an exact punch pattern, and Lawson\textsuperscript{4} discusses a patent by Charles Stoddard which includes the mechanism for synchronising the perforator with these perforations.

A number of enthusiasts have reported success in scanning rolls, either punch-for-punch or merely in terms of note positions and durations; however, little has been published in mainstream academic literature on the subject. The following is not intended to be an exhaustive catalogue of scanning methods, nor is it intended as a discussion of the relative merits of the various approaches used, but is instead intended to give a flavour of work being done elsewhere. For example, Zoltan Janosy\textsuperscript{5,6,7} used commercially-scanned images of rolls in conjunction with his own image analysis and expression system emulation software to extract the data required to convert Welte rolls into MIDI files for performance. He makes special mention of the need to distinguish between discontinuous perforations which do or do not correspond to repeated notes; however, no mention is made of any attempt to reconstruct the punch grid for roll replication purposes. A broadly similar objective lies behind Wayne Stahnke’s scanning of rolls for reproduction on a computer-controlled Bösendorfer piano, but this time punch-for-punch reading is undertaken. One scanning method used by Stahnke is understood to be pneumatic, using a tracker bar with narrowed holes and individually-calibrated pouch sensors to detect the bridging of chain-perforated slots\textsuperscript{8}. The switches are sampled at intervals determined by the pulses of an optical encoder whose rotation is linked to the paper throughput. A phase-locked loop\textsuperscript{9} is then used to reconstruct the punch grid from the captured data. More recently, Stahnke is understood to have used an optical scanning method. Richard Stibbons\textsuperscript{10} and Spencer Chase\textsuperscript{11} are also understood to have worked on punch-for-punch scanning of piano rolls, using components from line scanners; Stibbons’ system also uses a phase-locked loop\textsuperscript{12}. A general description of Stibbons’ approach is presented in reference 13. More direct optical methods have also been used. For example, Robinson’s perforating machine\textsuperscript{2} was originally designed with a dual function as a roll scanner by substituting light emitters and sensors for the punches, although when the first author saw the apparatus shortly after the publication of reference 2 a
pneumatic sensing system was being used instead.

The present article describes a somewhat different approach which places the emphasis upon using standard equipment without modification to perform the scanning. It must be emphasised that this approach is not intended to be a replacement for, nor necessarily an improvement upon, existing roll scanning systems already described. The authors have not had the opportunity to see these systems in operation nor to comment on their effectiveness, and are therefore in a position only to commend their creators on their enthusiasm and ingenuity. However, the authors believe that the system to be described provides a useful alternative where, for instance, a collector is unwilling to lend a roll for copying and where a portable roll-scanning device is unavailable. It also has advantages over techniques based upon a physical tracker bar (either pneumatic or optical) if non-standard rolls are to be scanned – provided the width of a roll fits within the scanner frame (typically A4, 297 mm top-to-bottom), all that is needed to reconfigure the system is a data file defining the position and function of each note track.

The educational justification for the project is that it provides an interesting vehicle for studying the issues of binary file access, image manipulation and signal processing. It also involves some specific challenges related to the roll scanning problem:

1. The roll must be scanned ‘page by page’, making it a slow process. Using standard office scanning software, an 80-foot roll would take perhaps three or four hours to scan.
2. The data resulting from these paged scans must be reassembled correctly without gaps or overlap.
3. The roll will not necessarily be aligned with the scanner; it may be positioned anywhere within the A4 window and may be skewed
4. The edges of the roll may be ragged due to wear, but this must not confuse the scanning system
5. The punch step is known approximately, from prior knowledge or by measuring the roll, but it may (and does) vary slightly along the roll due to machine wear and its exact value may change with humidity.

Surprisingly, the issues relating to alignment and torn edges are relatively easy to solve using standard engineering mathematics and image processing techniques. The slowness of the scanning process is clearly a major disadvantage of the present method over those that merely involve ‘playing’ a roll on a scanning device. However, the availability of the TWAIN standard for scanners makes it quite possible that a streamlined version of the scanning process could be written into the present software at a later date. This leaves the issue of the punch step determination as the most difficult issue to be addressed via suitable signal processing techniques, and the issue of
reassembly of the roll which is primarily an inconvenience.

**Overview of roll scanning process**

The following description aims to avoid undue technicality whilst presenting an overview of the roll scanning process. A range of references at the end of the article presents some of the mathematical background drawn upon within the work.

1. The roll is scanned, an A4 page at a time, allowing typically moderate (typically 20mm) overlap between successive pages. For convenience, and simplicity, the monochrome (1-bit) Windows bitmap (*.bmp) format is used to store the data. The format of such files is defined by (for example) Swan\(^{15}\). A typical scan image is shown in Figure 1, seen from underneath the roll. A bitmap consists of a large number of ‘pixels’ (in this case, typically 300 per inch in either direction) whose colour is defined by a numeric value. Monochrome bitmaps use a single binary digit for each pixel.

2. In order to prepare for correcting for misalignment of the roll on the scanner, the edges of the roll are detected. For each pixel position along the top and bottom of the roll image, the program steps inwards towards the roll centre until the paper is detected. A consistent change from

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*Figure 1: Typical scan image of a roll (Meloto No. 55124C).*
3. The straight line lying along each edge of the roll is found. An approach initially attempted was to perform linear regression\textsuperscript{16}, a standard mathematical technique for fitting a straight line to a sequence of points on a graph. The output from linear regression is an equation of the form:

\[ y = mx + c \]

where \( x \) and \( y \) are horizontal and vertical position, \( m \) is the gradient of the edge (or for practical purposes, the angle to the horizontal measured in radians, since the angle to the horizontal is small), and \( c \) the vertical position of the point at which the edge starts at the left-hand side of the image (Figure 2(a)). However, any spurious data (tears, dust etc.) will affect the calculation so that, for example, it would be hard to find accurately the edge of a very worn roll. The approach taken therefore is to use a simplified version of an image analysis tool known as a Hough transform\textsuperscript{17}. In the present (simplified) form, each point along the roll edge is considered in turn, and every feasible combination of edge position (given by \( c \)) and edge angle (\( m \)) is explored (Figure 2(b)). There is a theoretically infinite number of combinations of \( m \) and \( c \), but

![Figure 2](image_url)

**Figure 2**: (a) Edge of roll expressed via the equation \( y = mx + c \), where \( m \) and \( c \) are the parameters defining the line.
(b) A point on the edge of the roll has an infinite number of possible lines passing through it.
(c) All other points on the edge are also associated with an infinite number of lines, but only the true edge is shared with all other edge points.
only one of these combinations corresponds to the genuine edge position. If a sequence of points really do lie on a straight line, the only combination of $m$ and $c$ which is shared by all the points is the combination corresponding to the true values of $m$ and $c$ describing the line (Figure 2(c)). In practice, combinations of closely-spaced values of $m$ and $c$ are obtained, and the ‘most popular’ combination (voted for by the majority of edge points) is assumed to correspond to the true combination of position and angle of the edge. If the edge is damaged at one point, that point will vote for spurious combinations of $m$ and $c$; however, this merely means that the genuine combination of $m$ and $c$ will lose a few votes and will still remain the overall winner. The normal implementation of the Hough transform is actually slightly more complex since it can cope with lines of any orientation and position, not just those close to horizontal; however, this additional power is unnecessary here and would waste computing time.

4. Knowing the positions and orientations of the top and bottom edges of the roll within the image, it is now possible to ‘un skew’ the image to make it lie orthogonal to the rows and columns of pixels in the bitmap. This is achieved in practice by defining a new bitmap with height equal to the true distance between the roll edges, and rotating the image around the centre of the roll area (Figure 3). The well-known engineering mathematical technique of coordinate transformations

\[\text{Figure 3: Deskewing of roll image using coordinate transformation.}\]
used to perform this rotation mathematically. The system can now be made self-calibrating because if the distance between roll edges is known in physical units (for example, if the roll is assumed to be 11¾ inches wide), the actual number of pixels per inch can be calculated. This has the following advantage over using an assumed pixel spacing: if the paper has swollen or contracted widthways, the note track positions can be calculated relative to the paper, not to a fixed hole spacing which may no longer be accurate.

5. The hole centres are found by a simple pattern-matching technique. One or more bitmap files are created to define the area of a hole with which the different parts of the roll (notes, accenting perforations etc.) are cut. The hole bitmap (the 'mask') is then tried superimposed upon the roll image at every possible position and the percentage match found between the two patterns. If there is more than, say, a 90% match, it is assumed that the centre of the mask corresponds to a point at or near the centre of a hole in the roll. A further, temporary bitmap is created to contain these hole centres. A portion of a typical hole centre bitmap is shown in Figure 4 (a complete bitmap would not reproduce clearly in the reduced size required for publication).

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{hole_center_bitmap.png}
\caption{Portion of the hole centre bitmap corresponding to the right hand side of Figure 1.}
\end{figure}
6. The most complex task is the determination of the 'punch grid', the underlying matrix of possible hole positions covering the roll. This is defined both by the tracker bar layout (easily defined in terms of the position across the roll width), and by the punch step (the distance moved by the paper between successive punch strokes). This varies from manufacturer to manufacturer, and indeed varies slightly along a roll due to slack in the paper and backlash etc. in the perforator mechanism. It would be possible, with considerable care, to measure the punch step sufficiently accurately that the resulting grid could be superimposed onto the hole centre bitmap, but any inaccuracies would result in hole centres (of finite size in the hole centre bitmap) straddling two possible positions. The approach taken is therefore a more complex one and is based on Fourier analysis, the mathematical technique used for breaking an arbitrary waveform down into its constituent sine waves. (This is effectively the opposite of synthesising an arbitrary waveform from a sequence of harmonics). In this context, the waveform to be analysed is the total number of pixels set across the width of the paper at a given position along the roll (Figure 5). The spatial frequency of this waveform is then analysed, and the largest frequency component is then identified to obtain automatically an estimate of the punch step.

Figure 5: Creation of a tally of pixels across the roll width to create a waveform which is then analysed for spatial frequency and phase.
7. Unfortunately, knowing a good estimate of the punch step is not sufficient to reconstruct the punch grid! Not only is the practical error on such an estimate likely to result in the estimated punch grid being one or more steps out of synchronism with the true grid, but the grid varies and drifts a certain amount due to perforator imperfections. A further level of analysis is therefore required. A pair of symmetric and antisymmetric ‘wavelets’ (Figure 6) of spatial wavelength equal to the estimated punch step is superimposed onto the pixel total waveform, starting at the left-hand side of the image. The degree to which each wavelet matches the waveform enables the true position of each punch step to be found, effectively by nudging each punch step into a position which more closely matches the longitudinal position of the hole centres. (In practice, it is found more effective at this second stage to use the totals of the unskewed roll image bitmap rather than the hole centre bitmap). This second stage serves a very similar purpose to the phase-
locked loop used within the physical scanning systems of Stahnke\textsuperscript{8} and Stibbons\textsuperscript{10}. For the mathematically inclined, the wavelets used in this case were respectively the products of cosine and sine waves with a Gaussian (normal) distribution, the aim being to bias the ‘nudging’ (or phase-correction) effect towards notes in the immediate vicinity of the punch step being considered. If no notes are present at a particular punch step, notes further away will have some influence, and if no (or few) notes are present at all in a particular region of roll (for example, the start or end of a roll, or a pause) then no phase correction is attempted. Wavelet analysis within the context of signal processing is introduced by Newland\textsuperscript{19} and the so-called Morelet wavelet used here (and the accuracy of classifying it as a wavelet) is discussed further by Holschneider\textsuperscript{20}.

8. Since the note track positions and the punch step positions are now known, it is straightforward to divide the area covered by the roll image into rectangles, each of which corresponds to a possible hole position, and to determine if a hole centre is present in that rectangle. By this means, the original punch pattern information is reconstructed, initially as a bitmap for ease of viewing. Such a bitmap is shown in Figure 7. In this case the punch pattern appears to be error-free except at the extreme edges; some other scans exhibited minor errors e.g. in the bridging.

9. The final two stages are to link successive punch pattern sections together to form the punch pattern for the complete roll, and then to output the punch pattern information in a useful format. Various different roll manufacturers have their own internal formats for storing roll information. However, a more open standard for storage of piano roll data is a subset of the MIDI file format, used not in this case as a means of storing directly-playable musical data but used instead for storing the perforator control data using the MIDI file format as a convenient framework. The facility has therefore been implemented to convert the punch data bitmap into this format. Such a MIDI file can be edited within a general-purpose commercial MIDI editor e.g. Cakewalk or Cubasis, or within a specialist roll editing program such as Wayne Stahnke’s ‘View’ program\textsuperscript{21}, prior to using it to drive a perforator.

**Effectiveness of roll scanning approach**

The aim of this method is to achieve ‘punch-for-punch’ scanning of a roll in order to achieve 100% accuracy in reconstruction of the punch pattern. For a fully-automated process requiring no dedicated hardware, the results (e.g. those in Figure 7) are certainly very encouraging. However, accuracy and reliability depend upon a number of factors:
Figure 7  Punch pattern bitmap; compare with Figure 1 to assess accuracy.
The resolution of the scanned images has proved to be crucial. 150 dpi (dots per inch) scans demonstrated the feasibility of the method, but tended to result in sufficient flaws to destroy the aim of producing punch-for-punch recognition of the roll. Much better results were obtained with 300 dpi scans, but at the expense of much increased scanning time.

The need for a ‘busy’ pattern of holes is essential for the system to be able to latch onto the punch grid. In practice this means that scanning of rolls with chain perforations is likely to be much more effective than those with slot perforations.

Irregularities in the punch grid, which were particularly noticeable at the start of the roll used for test purposes, tend to confuse the scanning system and lead to incorrectly resolved chain perforations. The system behaves much more reliably where the punch grid has settled down to a regular spacing.

A crucial factor is the large number of parameters (such as the range of punch spacings to explore, the percentage overlap required in identifying hole centres, the threshold below which phase-correction is disabled etc.) which need to be set. The system has proved to be rather sensitive to these parameters, and an unwise choice of values will result in a scan which is perhaps no worse than a conventional ‘length-for-length’ roll copy but is a poor representation of the true punch pattern.

Conclusions

A description has been presented of a sequence of projects which have provided an entertaining and challenging vehicle for studying some quite complex engineering and software concepts. Moreover, the description presented here provides an overview of the various aspects of image processing and engineering mathematics which can be used to provide a ‘soft scanner’ for digitising piano rolls. This approach is certainly more time consuming on a per-roll basis than passing a roll through a dedicated scanning system, but totally avoids the need for dedicated hardware, with the only (optional) specialist hardware being some kind of spool mechanism to aid in traversing the roll over the scanner. It therefore brings roll scanning within reach of individuals who have neither the facilities nor the skill to construct their own scanning system.

It is quite possible that other workers in this field have explored the approaches described in this article, although no detailed description of such work has been found. Although the analytical techniques have been developed to allow this system to be used on an experimental basis, considerable further development will be required to make the system easy to use. Plans include the creation of an interactive user interface particularly for
the reassembly of the pages and the cleaning-up of any residual errors, and streamlined and speeded-up roll scanning. It is also hoped to produce a proper assessment of the capabilities of the system once it has been refined and given a suitable practical trial.

Acknowledgements

In addition to the authors and their colleagues, a significant number of people have been involved in the projects described in this article. In particular, the authors would like to acknowledge the efforts of the original team of students (Gavin Rex, Robert Fitzjohn, Jamie Crossland and Lee Wells) who designed and built the perforator, subsequent students who have worked on the hardware and software (Simon Miles and Richard Keogh) and a number of enthusiasts (including Rex Lawson, Denis Hall, John Spencer, Francis Bowdery and Everson Whittle) who have provided practical support and encouragement. The authors would also like to thank Wayne Stahnke for providing samples of software and roll data.

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14. Details of the TWAIN specification are available from http://www.twain.org


Ernst Munck

Piano Manufacturers by Appointment to the Court of Gotha
Founded 1857

Introduction

This article was originally published in German by URANIA Kultur-und Bildungsverein Gotha e. V, 99867 Gotha, Hauptmarkt 17.

Manfred Schöler (trans. Rex Lawson)

In any survey of the history of pianoforte manufacture in mid-nineteenth century Thuringia, the names of Bechstein, Agthe and Munck stand out. All three have this in common; that they were born in Gotha and achieved international renown through the construction of pianos. By 1854, however, Bechstein and Agthe had already moved to Berlin, where they laid the foundations for their later successes. Ernst Munck, on the other hand, remained faithful to his home town. His life and works therefore form a natural part of this series of studies in local history.

Ernst Munck was born in Gotha on 11 February 1827, the second son of Georg Wilhelm Munck, cabinetmaker, who owned a well-known furniture workshop at 615, 'Hinter St Margarethen' (Behind St Margaret's), a building that stands today as 21, Margarethenstrasse.

After successfully completing his studies at the local grammar school, Munck began as an apprentice in his father's own workshop. But the construction of furniture was not really his métier, and he felt much more of an affinity towards music. So it is hardly surprising that he had already become interested in the manufacture of pianos by the end of the 1840s. To that end he set out to acquire the necessary specialist knowledge and skills at the well-known piano firm of Seuffert in Vienna, and later at the factory of Kriegelstein & Herz in Paris. His outstanding dedication to work soon brought him recognition as a regulator and action finisher.

In 1857 Ernst Munck returned home, and in the same year founded the piano factory that carried his name. Taking over part of his father's joinery workshop, he produced grand and upright pianos based on American and German models. Munck laid down exacting specifications for the quality and up-to-date design of his piano actions (the mechanisms for relaying the movement of the keys to the strings), which even today are made quite separately and delivered to the manufacturer as pre-assembled units. He placed similar demands on his suppliers of felt, and of the cast-iron frames that were mounted over the soundboard. The fame of Munck's pianos soon spread far and wide. Even at the Gotha court the good reputation of his
products did not go unnoticed, and in due course Ernst Munck received official recognition of his efforts by his appointment as 'Hofpianofabrikant' (Piano Manufacturer to the Court).

At various Thuringian trade exhibitions, such as those in Weimar in 1860 and 1861, his exhibition instruments received a 'First Prize of Honour' and a 'Gold Medal'. From then on, a brass plate with a display of the medals and exhibition dates adorned Munck's pianos.

By 1864 Ernst Munck was already employing 8 to 10 full-time workers. At that time an upright or grand piano sold for between 100 and 600 Thalers, depending on the model. But in the midst of all his success in business, Munck never lost sight of the future development of his firm. He made certain that his eldest son, Ernst (born 22 March 1863), had the benefit of a technical education every bit as good as his own. After finishing grammar school, the young man studied the craft of piano manufacture both at home and abroad, and for some considerable time worked as a tuner and action regulator at Steinways in New York. On 1 April 1893 Ernst Munck junior took over control of his father's factory, the older man retiring from the business at the age of 66, and devoting himself to his favourite pastime of gardening.

The demand for Munck uprights and concert grands continued unabated. Constant improvements along the lines of the proven Steinway pattern, as for example the use of the latest piano actions from Paris, were the daily bread of the Munck factory.

The manufacture of associated products, such as Pianola mechanisms, was also undertaken. World famous piano virtuosi, such as Hans von Bülow (1830-1894) and Carl Heymann, spoke in glowing terms about Munck's concert and boudoir grands.

The pianos continued to achieve distinction at trade exhibitions, and in 1893 they were awarded the 'State Gold Medal', as well as a silver medal.

In time the existing factory in Margarethenstrasse was no longer adequate, and the employment of additional staff became an absolute necessity. So in 1897 plans were put in hand for a factory extension on the existing site, up to Gartenstrasse. During the three years of building work, Ernst Munck jr rented a large number of rooms in the residential hotel, 'Zum Mohren'. Once the premises were ready, vacancies for about 45 more workers became available. And for the display and sale of his products, Munck opened new showrooms in the former court building at 2, Erfurter Strasse.

But all this was still not enough. On 7 July 1902 excavation work began for a new piano factory on part of the former Arnoldi Sugar Factory site between Oststrasse and Leopoldstrasse (the latter no longer in existence today). A good position was chosen, with room enough not only for the new buildings and for the laying down of an enormous stockpile of wood for work already in hand, but also to cover any possible expansion in the future. The Gotha
construction firm of Franz Brack was awarded the building contract. Already by 11 October of the same year the topping out ceremony had taken place. A modern, centrally-heated, three-storey building with extended loft space, occupying an area of some 35 x 35 metres square, stood almost at the point of completion.

Alas, Ernst Munck senior did not live to see this topping out of the new factory. He died on 22 July 1902, at the age of 75, after a long illness. He was buried at Cemetery V in Gotha, in a grave immediately next to that of the engineer Hugo Mairich, just behind the crematorium.

**NOTICE OF DEATH**

This afternoon, after a long illness, my dear, never-to-be-forgotten husband, our beloved father, father-in-law and grandfather, Ernst Munck (retired), died at the age of 75 years.

Gotha, Santiago (Chile), Erfurt,
22nd July 1902,
The grieving family.

The interment will take place on Friday afternoon at 3.30 pm at Cemetery V.

With the completion of the new building in 1903, the Munck Court Piano Factory was now able to employ about 120 men. In 1904 Ernst Munck jr announced somewhat diffidently in an advertisement about Pianolas (mechanical musical instruments that work by means of coded perforations on paper rolls), that he was taking on the agency for the Choralion Company, hardly a major publicity coup, but of great importance for the future of his firm.

...The undersigned has the honour to announce to the music-loving public of Gotha and district that he has taken on the representation of the Chorrallian Company (sic) ...

Ernst Munck - Court Pianoforte Factory

In 1905 Ernst Munck jr sold his factory to the German/American Steck-Piano-Gesellschaft. According to the Company foundation documents, the Steck-Piano-GmbH (Gesellschaft mit beschränkter Haftung = Limited Liability Company) was registered in Gotha on 6 July 1905. The managing director of the firm was Frank William Hessin, chief of the Aeolian Co. mbH, makers of Pianolas, whose main agency in Germany was the Choralion Co. in Berlin. In this way the Pianola agency already held by Munck for over a year was continued and placed on a more formal footing. Amongst Hessin's business connections was the New York Steck factory.

Aeolian's acquisitions included the factory site, with all buildings and contents, such as machinery, stock-in-hand and materials. According to the
The Steck factory at Gotha in its hey-day prior to the Great War of 1914-18.

registration papers, the object of the new enterprise was the manufacture and sale of musical instruments and accessories of all kinds. Steck uprights and grand pianos were specifically mentioned, as were Pianolas and music rolls.

But what became of Munck’s own products? An advertisement from the Steck-Piano-GmbH provides the following information:

Steck pianos are produced by the undermentioned company, which has taken over and substantially expanded the Ernst Munck Court Pianoforte Factory, founded in 1857, and which is continuing its traditions in a thoroughly sound manner.

We guarantee a pure, full tone, a high-quality instrument that will last a lifetime, and we should like to assure our esteemed patrons of our reasonable prices. Our catalogues and terms are freely available upon request.

Steck-Piano-Gesellschaft m.b.H.,
Court Pianoforte factory, Gotha.

Along with the foundation of the Steck-Piano-GmbH came new development plans for the years to follow. The most immediate step was the purchase of the complete Arnoldi Sugar Factory site. The first new building to be constructed was an extension almost as far as Oststrasse, running parallel to the existing Leopoldstrasse building, and matching it in both size and style. 58 specialist firms tendered for the finishing-out work, according to published specifications. The main construction contract was awarded to a firm from Berlin.
The opening of the sealed tenders for the major extension to the local Steck Piano Factory (formerly E. Munck) took place this morning at 10 am. For the timber construction work, 9 firms laid tenders, the highest priced at 3782 M(arks), 36 Pf(ennigs), and the lowest at 2187 M. 73 Pf; for joinery work there were 7 tenders, highest 982 M. 78 Pf, lowest 779 M. 2 Pf; for structural ironwork 8, highest 16,993 M. 50 Pf, lowest 12,695 M. 50 Pf; for locks and metalwork 5, highest 429 M, lowest 313 M. 75 Pf; for roofing work 5, highest 1489 M. 33 Pf, lowest 1152 M. 92 Pf; for asphaltng work 3, highest 6481 M. 50 Pf, lowest 5509 M. 27 Pf; for glazing work 5, highest 4775 M. 31 Pf, lowest 3094 M; for plumbing work 7, highest 619 M, lowest 506 M. 90 Pf.

By February 1906 sufficient progress had been made in the construction that concrete flooring could be laid on each of the four storeys. Once the building reached completion in April 1906, the factory had places for over 100 new workers. The sale of the company's products continued to boom. Each week saw an increase in the number of instruments ready for delivery. The special factory extension of the Leinefelde Railway track assured an excellent despatch service. Most of the instruments went to England, and some continued onwards to America. Ernst Munck jr was personally in charge of the showrooms at 2, Erfurter Strasse, which he had expanded in March 1905 by renting the neighbouring premises as well. At the same time he worked as one of the two directors of the Steck firm. The initial capital of the Steck-Piano-GmbH amounted to roughly 300,000 Marks. In 1906 between 200 and 300 people were employed at the factory, and in general there was a good relationship between management and workforce. Management was able to accede from time to time to workers' demands, such as, for example, the introduction in October 1906 of a nine-hour working day (previously 9½ hours), without any reduction in wages.

During the years 1907 to 1909, the final buildings on Oststrasse were erected. An imposing factory complex on the east side of Gotha was now complete. The capital of the firm increased to 440,000 Marks in 1907, and in 1909 to 734,000 Marks. The latter increase came about as a result of the Orchestrelle Company of New Jersey, whose chief place of business was in London, acceding to a request from the Steck-Piano-GmbH for a further 294,000 Marks. In 1910 Ernst Munck was appointed Joint Managing Director alongside Frank W. Hessin. In the same year the Steck-Piano-GmbH opened a branch in Erfurt at 20, Neuwerkstrasse, under the direction of Carl Aemilius, but this establishment only lasted about three years.

As a regular part of their duties of state, the Duke and Duchess of Gotha made inspection tours of the town's major enterprises, and so it was with the Steck Piano Factory on 17 March 1910. Ernst Munck, Managing Director, showed his noble guests round all the factory departments, during which time they were able to talk with both management and workers. Herr Munck could
take considerable pride in showing his visitors one of the largest factories in Gotha, equipped with all the very latest machinery.

Yesterday afternoon, the Duke and Duchess made an extended visit to the Steck Piano Factory, where they undertook a very thorough inspection of the whole plant, which has been expanded, and which now employs about 500 workers. The Duke and Duchess took a most particular interest in all the manufacturing processes, which were explained to them by the Managing Director, Ernst Munch, and by the foremen of the respective departments, and they found time to talk with a large number of the workforce. The Duke and Duchess also expressed their most heartfelt gratitude to the management of the firm.

The factory site covered some 20,000 square metres, and the buildings around 5,000 square metres of space. Over 500 employees worked for the firm. Each year Steck produced up to 4,000 uprights, grands and Pianola pianos of varying size and design. Exports formed around 90% of the total, taken mostly by the American-owned parent company.

The relationships of the various parts of the business to America and England will not have been lost on the observant reader. This was not unusual for the time, but it proved highly significant for the Steck-Piano-GmbH in the years that followed. In May and June 1914 a series of severe strikes shook the Steck Piano Factory and brought production to a standstill. On 20 June 1914 a tellingly anonymous author penned the following commentary for the Gothaer Tageblatt (Gotha Daily News):

**A Member of the Public Speaks Out**

(The accuracy of the author’s expert opinions is his own responsibility)

**Concerning the Strike at the Steck Piano Factory**

For several weeks now there has been a strike at the Steck Piano Factory in town. From the very beginnings of this firm, there was always a good relationship between the workforce and management. But time has seen this spirit of unity change into its very opposite. The larger the factory has become, the more the unions have held sway. The unions always find a subtle way to stir up differences, in order to keep their people on the right war footing. It is all too clear that a commercial enterprise cannot sustain such squabbling in the long term. But in the end the unions, who have for years made considerable sacrifices, want some reward for their efforts. And so they summon up all their strength, in order to bring the firm to its knees. They begin in a small way, until their ‘grand’ design is fulfilled.

There has been no lack of meetings and forceful speeches. Since this is the first time that the unions at the Steck Piano Factory have really shown their teeth, one has to be very concerned at the possible outcome of the strike.

Economic conditions are not always the reason for strikes, and this is probably true in the present situation. For it is a fact that the majority of the workforce were quite happy with their conditions of work. The famous solidarity of the unions (or more exactly, their irresistible pressure) has forced the workers into
this battleground. That the present time is a very bad one for strikes needs no underlining. In such a situation, how anyone can drum up a thirst for victory is quite incomprehensible. Up until now neither the Volksblatt (People’s Newspaper) nor the strike leadership has published a detailed report, and one can only suppose they feel very uncertain about a favourable outcome for the strikers.

It seems almost unbelievable that even those workers who did not belong to any organisation, all at once attached themselves to the coat-tails of the unions. Naturally enough, most of them have finally seen the light, and they would rather return to work now than later. If the Volksblatt is hoping to keep up the spirit of the strikers by its almost laughable efforts, then it really is wasting its time.

B.

In an announcement on 27 June 1914, the factory management offered all striking workers the opportunity of recommencing work.

**Public Announcement**

We shall re-employ those workers who wish to return to work as soon as possible after 4th July.

The more polishers there are who recommence work, the more people there will be for whom we can find work in other departments.

To those people who have not reported to our office by 6th July in order to take up work, we can offer no guarantee that we shall hold their positions open any longer.

If we are forced into engaging people from outside, we cannot in any way be held responsible for the consequences.

*Steck-Piano-GmbH*

But the beginning of the First World War was close at hand. The enlistment of the male population soon started up. For the present there was not to be any systematic return to production at the Steck factory. The factory itself was turned over to a recruiting centre on 17 August. It was not long before the Ministry of State placed those firms whose capital came from countries that found themselves at war with Germany under state control, or into liquidation. The Steck-Piano-GmbH in Gotha found itself in just such a situation. The Gotha chartered accountant, R. Christ, was appointed commissioner of the firm, and recommended very strongly to the Ministry of State that it should be put into liquidation: ‘The sole proprietor is the British firm, the Orchestrelle Co., London ..’ In a letter of 7 January 1915 to the Ministry, Ernst Munck protested that he had sold not to a British firm, but instead to the Orchestrelle Co. of New Jersey in America. The arguments over British or American ownership lasted for several months. On 30 November 1915 the Ministry of State informed the municipal authorities that the Reichs Chancellor had decided against any liquidation. But the Steck-Piano-GmbH
remained under state control, simply with a change of superintendent. Herr Christ had been called up to the army, and henceforth Herr Dieckmann took control. Despite production being almost at a standstill, the firm reported reasonable business in 1915/16. In the war years less than 10 men were employed. Further weakening of the firm came about as a result of the confiscation of materials useful to the war, such as its electric motors, or in 1918 its stockpiles of wood, which were taken for a co-operative enterprise in the Duchy of Cobourg that made furniture and household appliances.

The condition in which the Steck Piano Factory found itself at the beginning of 1920, and what chances there were of production restarting, can be seen in an official notice from the Gotha municipal authority.

On 3 January 1920 Herr Munck was called to appear and gave evidence as follows. Formerly the Steck-Piano-GmbH employed some 500 workers. Just before the War there was a strike that lasted for four months, and at the outbreak of war factory production was still at a standstill for this reason. Throughout the War we employed 4 - 8 men, which for one short period was increased to 30 men. The general management of the firm in London has forbidden us to work until peace is formally ratified. At that point a commission will come to Germany to decide whether the factory should be put back into production. Quite apart from that we have no coal. In 1913 we needed 6 - 7 300-ton wagons every month, primarily for our heating and drying plant, but also for the 150 horsepower steam engine. In my opinion, the commission (which consists of Americans), when it sees how we have to deal with works committees and so on, will certainly not give permission for any recommencement of work, but will instead confine itself to production in America. Our local factory is wholly subordinate to the mother company in America.

In the same year W. Hessin resigned as Managing Director. In his place came Jöns Löfmark. In 1923 both directors, Ernst Munck and J. Löfmark, were relieved of their authority. John Albert Edward Findley in London became the sole director, and two years later Myers Waymann, based in Berlin. Despite all these changes, however, production at the Steck-Piano-GmbH did not get going. Already in 1920 the firm had given up its sales and display rooms at 2, Erfurter Strasse. In 1924 all trace of Ernst Munck in Gotha disappeared. Only a notice on the occasion of the death of Luise Wönne in 1934 pointed to the family of Ernst Munck in East Rochester, New York State. Ernst Munck’s wife, Bertha, came from the Wönne family.

In October 1924 the well-known piano firm of Hupfeld (company reg no. B 358), from Böhlitz-Ehrenberg near Leipzig, acquired the former Steck Piano Factory, and thereby took over one of the largest and most modern piano factories in Europe.

The factory and site of the Steck-Piano-GmbH, with its extensive and ideally organised manufacturing facilities, has been commercially acquired by the
renowned firm of Ludwig Hupfeld in Leipzig, and will henceforth be known as the Hupfeld-Gotha Piano Factory, a subsidiary of Ludwig Hupfeld AG, which will be used exclusively for the manufacture of upright pianos and Phonolas. The mother firm, which already has subsidiaries in Dresden (C. Rönisch) and Johanageorgenstadt (A.H. Grunert), will manufacture a special upright piano of exceptional quality and moderate price, and it hopes to employ as many workers as before, and in this way to make a contribution to the reduction of unemployment.

At this time the Steck Piano Factory was valued at about 3,000,000 Reichsmarks. Under the name of the Hupfeld-Gotha Piano Factory, a subsidiary of Ludwig Hupfeld AG, the production of good pianos at reasonable prices was planned. Up to 6,000 instruments were to be produced each year and the workforce restored to its pre-war total, a good prospect for a region beset by unemployment. There remained one cause for sorrow, because Hupfeld produced pianos according to its own specifications. The long and successful tradition of building pianos to Ernst Munck's original designs had come to an abrupt end.

Two years later Hupfeld AG, along with its subsidiary in Gotha, fell upon hard times. It only managed to avoid being forced into liquidation by amalgamating with the Leipzig piano factory of Gebr. Zimmermann AG (Zimmermann Brothers Ltd). With the transfer of capital from Hupfeld to Zimmermann, the enterprise in Gotha also passed to the new company. Formal announcements to this effect, made on 1 November 1926 and 30 April 1927 under the name of Leipzig Pianoforte and Phonola Factories Hupfeld - Gebr. Zimmermann AG, Gotha Subsidiary, were received by the Chamber of Commerce. The overall capital of the firm stood at least at 4,500,000 Reichsmarks. In the meantime, however, the Chamber of Commerce for mid-Thuringia in Weimar had closed down Hupfeld-Gotha on 1 April 1927. An announcement on the subject gave the following details:

‘... all stocks and fixtures have either been disposed of or removed. What remains in Gotha is an empty factory building with a caretaker and a night watchman ... Rumour has it that the factory site is to be sold ...’

As a result, Zimmermann AG retracted its previous statements. In July 1928 it sold the whole factory plant, as well as the site, to the Schlutius Cardboard Factory in Saalfeld, which later became Gotha-Druck (Gotha-Print).

The new major enterprise in Gotha

In Saalfeld, a subsidiary of the Emil Schlutius Paper Processing Works has been founded, to be known as Schlutius Cardboard AG. According to the Saalfelder Kreisblatt (Saalfeld Regional News), the newly founded company has acquired the Gotha plant of the Hupfeld Pianoforte Factories in Leipzig, in which it will set up its own subsidiary plant. The foundation capital of 100,000 Marks is divided
into 100 shares of 1,000 Marks each, all of which have been taken by the
founders. The founders of the company are the factory owner, Emil Schlutius,
Mrs Käte Schlutius, and Heinrich Röder, a director, all of Saalfeld.

Today, the imposing factory buildings remain at 51, Oststrasse, a multi-
purpose commercial centre on the east side of Gotha, with shops, restaurants,
doctors' practices, apartments and automobile showrooms.

Chronology

1827 11 February - Ernst Munck senior born in Gotha
1857 Ernst Munck founds his piano factory at 21, Margarethenstrasse
1863 2 March - Ernst Munck junior born
1893 1 April - Ernst Munck jr takes over his father's piano factory
1897 July 1897 until 1900 - extension of Margarethenstrasse factory up to
Gartenstrasse
1902 7 July - Building works begin for a new piano factory on part of the
Arnoldi sugar factory site along Leopoldstrasse and Oststrasse
22 July - Ernst Munck sr dies
16 October - Topping-out ceremony
1905 Sale of the Munck factory to the German-American Steck Company
1 July - Ernst Munck jr becomes director of Steck-Piano-GmbH
Building works begin for the first factory extension along
Leopoldstrasse, up to Oststrasse. Ready 1906
1908 Second, final extension along Oststrasse. Ready 1909
1914 May/June - strikes at the Steck factory
Beginning of the First World War
17 August - Steck Piano Factory taken over as recruiting centre
1915 July - Steck Piano Factory placed under state control
1924 Ernst Munck loses position as Managing Director
Steck Piano Factory sold to Ludwig Hupfeld AG in Leipzig, becoming
Hupfeld-Gotha Piano Factory, Gotha subsidiary
1927 1st April - Hupfeld-Gotha Piano factory closed down
1928 Sale of the empty factory buildings and site to the Schlutius
Cardboard factory in Saalfeld

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Steck “Pianola” grand No. 54797 from the factory at Gotha.
Piano showing “Pianola” spool box and pedals.
‘Steck’ name cast in frame.

Ornate casework was a feature of some early Gotha-Steck pianos.
A Pianola for a Musician, and a Camera for an Artist

Frederick H. Evans

This article first appeared in Amateur Photographer, vol.43, no. 1112 (23 January 1906), pp. 75-76. Responding to Frederick Graves’s condemnation of the pianola and the camera as equally mechanical, Evans defends them both as vehicles for artistic expression.

It will be noted that I do not say a Pianola for the Musician, or a Camera for the Artist, as that might be taken to imply that in the future the musician will be restricted to the Pianola, or the artist to the Camera – which the Fates forbid! But your contributor of January 2, Dr. Fredk. Graves, does not take good ground when he complains of the inability of the Pianola to play the Forest music in ‘Siegfried’; and he takes worse ground still, and makes one doubt his possession of any practical musical skill or knowledge, when he writes: ‘For a piano reading of such a score can only come from the brain inspired with tender memory of the orchestral, and the player could not tell you probably what combination of notes he used for that particular enchanting passage.’ If I am to hear Wagner on the piano (which I never really enjoy), whether by fingers or Pianola, for the composer’s sake let me hear his notes, and not the pianist’s! To say that the pianist’s version is not actually Wagner, means that he is playing by ear the ill-digested, crude, imperfect remembrance of his visit to the opera, far too painful for any Wagner lover or decent musician to tolerate, and at once disposes of Dr. Graves as a sound critic. For my own part I rarely play orchestral transcriptions by my Pianola, and then only to recall the subject matter. To attempt other than this, by fingers or Pianola, is futile. The entire fascination of this Forest music is in the wonderful orchestral colour by which Wagner’s genius enabled him to simulate, suggest, not merely imitate, the woodland sounds and atmosphere. I have heard this music at, and since, its first London performance, as well as at Bayreuth, so I do not speak wholly without knowledge, and I would not dream of asking my Pianola or any pianist to do other for me than by the mere notes refresh my memory of what I had heard the orchestra do. Years ago a German pianist came over to do exactly this thing; he was famous for his piano renderings of Wagner, but I found them frankly boring; no piano tone-colour can at all suggest or recall the original, and Dr. Graves has absolutely no case when he uses it as a point against the Pianola.

No; the one lack of the Pianola (and I use that word as meaning the particular instrument it belongs to, and not merely as a generic title of all or any piano-players; there are players and players, some are incredibly bad, but I know of none to equal the Metrostyle-Pianola in individuality or
responsiveness) is not that it fails to do the impossible, but that it very seriously needs the means of specially accenting any single note while softening the rest of the notes struck at the same time. This is apparently an insoluble problem in any fashion that is simple enough to be usable by the average performer. When it is accomplished, it will, I am afraid, be very costly in construction, and appeal only to the expert, those who can and will devote much time to its mastery. But without it the Pianola is already an immeasurable boon and joy; with it it would be so human that no piano playing would be endurable save from the most accomplished fingers and brains. I want my Pianola to give me piano music, pianistic effects, and it does so to an extent not credible save to those who have proved it by patient learning. Dr. Graves instances the modern school as most in revolt against the Pianola; how comes it then that Paderewski not only approves it, but owns two and uses them? Why should Joachim express his marvelling astonishment at and satisfaction with it? It is, in fact, in the modern showy music that its technical facility is most in evidence; it is when it comes to a delicate Mozart piece, or a passionate Beethoven sonata that one sighs for the fingers of a Raoul Pugno or a Eugen D’Albert; though, as one cannot have such players as these at one’s hand to order music from at will, the Pianola makes a substitute to be contempted only by those who are practically ignorant of it.

As to the machine aspect; I fully agree with Dr. Graves in his description of the only performer he seems familiar with, that when this bumpkin (not pumpkin; I like pumpkins, but I don’t like bumpkins) sits down and pumps away (not grinds, there is really no handle to turn in the Pianola!) unintelligently, the result is pure ‘mechanisation.’ But is that the fault, pray, of the instrument or of the bumpkin who misuses it? Does Dr. Graves suppose that the bumpkin’s version is the only one possible? I would soon convince him to the contrary if he would pay me a visit! No, it is the man behind the Pianola, as it is the man behind the Camera, who is the machine. When we deplore some empty academic painting, or condemn some ill-drawn piece of black-and-white work, is it the brushes, pencils, pigments, burin, etc., that we blame, or the man who has used – or mis-used – them?

No; the great value of the Camera is that it has made an art expression possible (and a very definite and valuable one in very many cases) where there would otherwise have been a total denial of it, a total incapacity for it. The great value of the Pianola is that it has made the dumb piano speak, the ill-used piano speak coherently and musically; unlocked the literature of music, where it was, and must have remained, a dead letter; made compositions that would otherwise have remained unknown to us become tried friends, recreating joys no familiarity can stale. I had a potent instance of this recently. The Pianola repertory contains a composition by Schubert, some Variations in A minor posthumously published; they were unknown to me by title, and
though I have been a diligent concert goer since 1870 I have never yet heard a public performance of it. I found it one of the most lovely, intimate, inspired and inspiring works of this great master, and I play it constantly with increased satisfaction. Now, as I am quite unable to play so advanced a composition with my fingers, though I am as open to its fullest musical value as though I could play it perfectly, it would have remained a dead letter to me for ever but for this contemned machine, the Pianola. And it is worth while stating that it is only the really marvellous library compiled by the Orchestrelle Co. for their Pianola that includes this composition; so that my debt of gratitude to them is impossible of expression; the greatest of music is at my command by this most sensitive, individual, and responsive of players. I really would enjoy convincing such a malcontent as Dr. Graves with just this one composition! Of course, if I were suddenly to acquire the technique of a D’Albert¹, or that of Mr. Sargent, or Mr. Peppercorn², or Mr. Clausen, I would delightedly discard my Pianola and my Camera – but would I? I ‘hae ma doots,’ for I am quite certain of one thing, and that is that my Camera enables me to do things, and things worth the doing, that no other art method can do; and that my Pianola gives me music unattainable to me in any other way, besides being enormously useful for getting a first idea of a composition in ‘trying-over’ – it is a great gain to be able to do that apart from all fumbling, getting a first idea of a piece intelligently founded on perfect technique.

Yes; there will always be great pianists, not in spite of – there is no rivalry here – but in addition to Pianolians; for the musical genius can only fully express himself by his own fingers; and what is the percentage of such geniuses, and what are all the other equally music-loving people to do?

Yes; there will always be artists, not in spite of – there should be no rivalry here either – but in addition to photographers; for one man sees most in colour, and must paint to express himself; another man sees most in line, and must draw or etch to express himself; while others, with a full art sense and desire, but lacking the special gift of personal expression, or the time or opportunity to evoke or train it, can not only be content with the Camera and its lenses, but be assured that he can do worthy things, individual to himself and his tools.

Notes
1. Joseph Joachim, Raoul Pugno, and Eugen D’Albert were composers at the turn of the century.
2. Arthur Douglas Peppercorn (1847-1924), landscape painter often called the ‘English Corot’
Robert Casadesus (and Ravel) and the Duo-Art – a postscript

Denis Hall

As a postscript to the article in Pianola Journal No.12, Gerald Stonehill has kindly written to advise that the Duo-Art roll of ‘La Vallée des Cloches’ (72750) is in fact a genuine Ravel recording, and is the result of a visit by the composer to the Aeolian studio in New York during his North American tour from the end of December 1927 (he spent New Year 1928 on board the liner ‘France’) until the end of April 1928. An entry in the Aeolian American payment records, a copy of which is in Gerald Stonehill’s possession, confirms the session.

The roll was published in November 1928 and was announced in the American Duo-Art Bulletin for the same month. Stonehill comments: ‘Aeolian American studiously ignored all mention of the London recordings’!

A list of the works Ravel planned to play during his tour includes ‘La Vallee des Cloches’, and he did in fact programme it for the Rice Institute in Houston, Texas on 6th April 1928.

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**Maurice Ravel in Recital and Lecture-Recital**

Under the Auspices of the Rice Institute

Lectureship in Music

April 6th and 7th, 1928

Assisting Artists:

**Esther Dale, Soprano** :: **Barbara Lull, Violinist**

### PROGRAMME FOR THE RECITAL

April 6th

1. **Sonatine**
   1. Modéré
   2. Mouvement de Menuet
   3. Animé
   **Maurice Ravel**

2. (a) **Sainte**
   (b) **Nicolette**
   (c) **Air de l’Enfant**
   **Esther Dale and Maurice Ravel**

3. **La Vallée des Cloches**
   **Menuet** (from “Tombeau de Couperin”)
   **Maurice Ravel**

4. **Chansons Hébraïques (Voice and Piano)**
   (a) **Kaddisch**
   (b) **L’Enigme Eternelle**
   **Esther Dale and Maurice Ravel**

5. **Sonata for Violin and Piano**
   Allegretto
   Blues
   Perpetuum Mobile
   **Barbara Lull and Maurice Ravel**

Recital in Houston, Texas, April 6, 1928
Review:

Claude Debussy, The Composer as Pianist: all his known recordings – The Caswell Collection, vol. 1; Pierian Recording Society, Pierian 0001

Roy Howat

Debussy's recordings are naturally fascinating material, comprising both audio discs and piano rolls. Although there's no duplication of repertoire across the two genres, the juxtaposition is still revealing. The audio recordings (from 1904) have Debussy accompanying Mary Garden in the tower song ('Mes longs cheveux') from Act 3 of Pelléas et Mélisande, and in three of the six Ariettes oubliées Debussy composed in the 1880s and then revised for a new edition in 1903. Born, bred and buried in Aberdeen, Mary Garden hit stardom in Paris in 1902, premiering the role of Mélisande in Debussy's one completed opera. Debussy dedicated his 1903 re-edition of the Ariettes oubliées to her in gratitude for her 'unforgettable' performances.

Despite the obviously superior recorded sound from the Welte recordings, it is the audio recordings that really take us into the room with Debussy and Garden, regardless of flutter and frying bacon. That edit-free era preserves human moments like Mary Garden clearing her throat during the piano's introductory bar in 'L'ombre des arbres', before coming in on the wrong note. (Debussy unobtrusively sounds the right note for her, and she recovers quickly, as with another off-note entry in the song 'Green'.) Debussy plays much as he always told people to play, in pretty strict time except at the marking un poco stringendo in 'L'ombre des arbres', which both artists turn into molto stringendo, to superb effect. His extremely virtuosic playing in 'Green' (taken at a very fast lick) draws attention away from itself by the way he keeps it all very quiet (as marked), in time and at the service of the singer. He consistently avoids left hand anticipations or rolled chords except where marked in the score, and only one, momentary rhythmic unevenness is audible, at the pianissimo start of 'Il pleure dans mon cœur', a place where microphone nerves could be forgiven from anyone. At times one can hear him gently keeping Mary Garden moving, avoiding sentimental lingering or rubato. Towards the end of 'L'ombre des arbres' Debussy slows down in such a way that the quavers of the third last bar audibly become the crotchets of the last two bars. This makes for maximum audible (rather than visible) continuity and relates interestingly to one of the Welte rolls, of which more below.

This transfer can be compared with one by Keith Hardwick included in the 1988 EMI CD reissue of Désormière's 1941 recording of Pelléas et Mélisande.
Caswell has applied much more background noise suppression, but happily manages it without any of the harsh edge on the sound that often results from such treatment. Preference here is really a matter of swings and roundabouts: the quieter Caswell background makes for more agreeable listening, but a tiny touch of Mary Garden inevitably goes out with the bathwater, and specialists might want to tolerate the greater background din on the Hardwick transfer in return for slightly more audible vocal sibilants and suchlike. Not that they were very audible anyway, and it makes little difference to the piano sound.

I am not sure if it was EMI or Pierian that inadvertently reversed the order of the three songs relative to the original G&T matrix numbers. EMI puts the songs in the same order as the printed score, crediting them respectively as nos. 33449 – 51. The Pierian disc has the songs in reverse order and tells us only that they were recorded in 1904 for G&T, omitting matrix references and leaving us to guess that G&T means Gramophone & Typewriter rather than aperitif time. An earlier private release (1991) of the same disc by Kenneth Caswell lists the matrix numbers, but in the same order as the EMI disc (thus contradicting the latter's musical order).

Despite the low-fi, the audio recordings do give us un-tampered Debussy, with built-in safeguards like pitch confirming the speed of the original performances. It is not hard to hear from them why Debussy's contemporaries praised his playing so highly. I've dwelt at some length on this, to give a context for the Welte rolls, which haven't always left such a happy impression. For example, Debussy's stepdaughter, the late Mme de Tinan, repeatedly used to bemoan that only the roll of 'La soirée dans Grenade' gave even a vague idea of how he used to play. (She grew up in the Debussy household, and like her mother became a good singer who later performed domestically with such distinguished accompanists as Poulenc and Reynaldo Hahn.)

Debussy recorded at least fourteen piano pieces for Welte: 'La soirée dans Grenade' from the Estampes (roll no. 2735), D'un cahier d'esquisses (2734), the six pieces of his Children's corner (2733), the humorous waltz La plus que lente (2736), and five Preludes from Book I (rolls 2738 – 9). Enigmatically, we're left to wonder if he recorded anything else under Welte's serial numbers 2737 and 2740 – 1, for which no rolls were ever issued and no archive records seem to exist. (Or do they? If anybody knows, please contact The Pianola Journal.)

The rolls reveal some crucial information better than audio recordings could – of which more below. Their problem is that in places they have always sounded rhythmically sloppy, with dislocations across hands and uneven spread chords (not always just straight up or down), quite at odds with the audio recordings. The dynamics on the rolls also have long seemed to take frequent leave of the letter or sense of the score. Past recordings of the rolls, notably the Telefunken LPs of the '60s and '70s, raised many problems, several of which Caswell's disc solves¹. For example, some rogue discords on the
Telefunken LP, near the end of D’un cahier d’esquisses, must have resulted from a maladjustment or damaged roll, since Caswell’s CD (and all copies of the rolls that I’ve seen) are free of the problem. Caswell’s mechanism also has enough steam (or air) to produce a gutsy fortissimo at the main climax of ‘La Cathédrale engloutie’ (where many earlier recordings of the roll suddenly deflate to a disappointing whimper), and likewise at the end of ‘Doctor Gradus’ from Children’s corner. It also manages to minimise a nasty-sounding sudden ballooning of dynamics at bar 16 of ‘La Cathédrale engloutie’ (in contradiction of the score) that troubles most playbacks of the Welte roll.

Much interesting documentation comes from the accompanying 14 page booklet, with technical explanations by Caswell plus an informative essay on ‘ Debussy and the piano’ by Charles Timbrell (author of the book French Pianism) – though it must be by oversight that the serial numbers of the original Welte rolls (given above) are left unlisted. Caswell starts with a tribute to the late Richard Simonton, who passed on all the technical skill he had learnt from Edwin Welte and Karl Bockisch, much of it not published in Welte’s technical or service manuals. According to Simonton, Welte considered that his rolls played back best on a Steinway A or B or a Feurich; Caswell uses his own restored Feurich, with a nicely clear and mellow sonority, especially in the bass, troubled only by some inexact tuning. Caswell goes on to say that Welte, unlike Ampico or Duo-Art,

always recorded the dynamic level of each note as the artist played for the recording machine. From that point on the pianist had no editorial say, and no editing of the basic recorded data was allowed even by the Welte engineers. The only exception – wrong notes were always corrected.

If only life were so simple. It’s just as well that the Welte editors didn’t correct the dozens of wrong notes on Debussy’s Welte rolls, for had they done so, they might also have ironed out many other interesting divergences from the printed scores which recently provided crucial evidence for the Paris-based new complete Debussy edition\(^2\). Some of the variants answered questions about suspected missing accidentals and even missing chords in the scores; other variants provided viable alternative readings. As Debussy’s own printed scores of these pieces are lost, this is as near a record as we have of how he may have corrected and annotated his scores after publication.

It is also unsafe to claim that ‘no editing of the basic recorded data was allowed even by the Welte engineers’, for the Children’s corner roll shows that something very odd happened somewhere. Six pieces (the content of Children’s corner) are an unusually high content for a single roll, and when that single roll, played back at the indicated mechanical speed, reveals abnormally
fast tempi relative to the composer’s tempo headings, it must raise suspicion. (The first and fourth pieces, headed by Debussy’s ‘Modérément animé’, go very fast, despite Debussy once telling Maurice Dumesnil that these two specific pieces were not meant to be fast.) My strong suspicions were long ago increased by the very audible way that several nuances and pedal applications on this roll often didn’t engage properly, because the roll wasn’t allowing time for the pneumatics to take effect at the right moment. Although the roll itself says nothing of this, if the Welte mechanism is set to play it back more slowly, the musical and pneumatic problems solve themselves.

Surprise, surprise, when the Children’s corner was reissued in the USA in licensee format in the 1920s, spread over 3 rolls (2733, 2733a & 2733b), playback at the indicated machine speed yielded musical tempi as much as 30% slower than on the 1913 red roll (though obviously from the same original performance). This mostly makes better sense of the composer’s printed tempo indications – except for the second piece, ‘Jumbo’s Lullaby’, which is oddly slow even on the red roll and slows down again in the closing bars, contradicting Debussy’s instruction ‘sans retarder’ in the score.

Regardless of what’s claimed, then, either the 1913 red roll or the later licensee version – or both? – must have been tampered with in-house. If it was the latter, was it to cancel a fault known to Welte in the former? Was the long original red roll merely meant to be played back slower, but the appropriate instruction accidentally omitted from the roll? This would certainly be a very unusual procedure, since red rolls normally play at one set speed. (However, see below for a caveat about even that.) Alternatively, was the recording machine accidentally running slow when Debussy recorded that suite? Or could it have been deliberately set slow to let him play all the suite in one take, with the intention, then forgotten, of stretching it out on the published roll (which is exactly what the licensee roll does)? These hypotheses may seem far-fetched, but if we ignore them the musical and mechanical problems on this roll continue to mock us.

Another odd point here comes from the fact that dynamics to some extent had to be edited on to the rolls by Welte engineers: the claimed rubber ink traces that indicated performance dynamics on the original roll had to be converted into separate rows of edge perforations on the production master roll. Welte’s editors thus had to judge not only how much of what and where, but also how far in advance to place each nuance and pedal perforation, to allow for pneumatic delay. (The exact placing of these perforations can also vary considerably between different published rolls of the same supposed performance – I have seen examples, doubtless as a result of inaccuracies in factory punching.) In the case of Children’s corner, this raises the added question that the Welte editor, on this particular roll, seems to have allowed
less pneumatic anticipation than normal in the placing of those problematic nuances and pedal take-ups, possibly implying that he expected it to be played back more slowly . . . Again, to answer all this we need knowledge that no longer seems to exist.

Even the argument that red roll machines play at a strict, verifiable speed takes a dent from the variants in timing from different recordings from these rolls. ‘La Cathédrale engloutie’ clocks in at 5’ exactly on Caswell’s CD, but stretches to 5’57” on Denis Condon’s Bellaphon CD (690-07-011) of 1992! This can’t be just because Condon’s machine played uniformly faster, for Condon’s Children’s corner conversely clocks in a 12’53” against Caswell’s 13’13”! (Like Caswell’s, Condon’s Debussy CD is generally well done, but surprisingly omits Debussy’s Welte roll of ‘Minstrels’ and ‘Le vent dans la plaine’.)

Maybe because of this slightly slower speed, the normal pneumatic nuance problems of the Children’s corner roll don’t arise on Caswell’s CD. This may also be a tribute to the condition of Caswell’s equipment; yet the fact that the problem remains on other machines, uniquely with the Children’s corner roll, confirms something is odd about that roll. Even if Debussy did play Children’s corner that fast, it would mean that everybody, including Debussy on his other recordings, is playing the rest of his music too slow! Nor can we account for it through studio nerves on Debussy’s part, given his nicely poised tempi on the audio discs. Something logically has to give here, and I’m sure the culprit is – however it happened – the encoded speed on the 1913 roll of Children’s corner. Whatever one’s opinion, any recording from this roll really needs to carry a caveat.

One other oddity in this suite is a low-frequency drone sound (non-pianistic) audible through much of Children’s corner. Since it starts at around 60 Hz, I initially suspected mains hum, until the pitch started gradually to descend. I still can’t quite determine whether it’s LF oscillation from Caswell’s recording equipment or planes overhead! This, and the inexact piano tuning, are the only blots on the otherwise pleasing sound quality of the CD.

I suspect no Debussy autograph has been so often reproduced in facsimile (it appears in Caswell’s booklet) as Debussy’s panegyric to Welte dated 1 November 1913: ’Dear Sir, It is impossible to attain more perfect reproduction than that of the Welte apparatus. What I have heard leaves me marvelling, as I am happy to affirm to you with these words.’ This gives food for thought in several ways. To anyone familiar with Debussy’s correspondence the language sounds stilted, as if Debussy (always impeccuous) were fulfilling a commission with a cheque dangling alongside. It also leaves us wondering exactly what Debussy heard and where: the published rolls, under Welte’s own supervision? I presume nobody now knows, as nothing more of it is mentioned in Caswell’s booklet.
Caswell's booklet also assumes the recordings were made on the same day as Debussy's letter was written. However, even (or especially) if Debussy recorded all that repertoire in a day, it would presumably have been impossible to play it back on the spot. Assuming that Welte masters were inked by rollers or tracers during recording, the subsequently meticulous hand-punching of all the perforations, plus turning the volume traces into side perforations, with fourteen newly recorded pieces must have taken a good bit of work. And where did Debussy do the recordings, and on what piano? According to Charles Davis-Smith's and Richard James Howe's The Welte-Mignon: its music and musicians, the serial numbers of Debussy's rolls fall into the year 1912, amongst other French or French-based artists (including Fauré and Falla) suggesting that Welte took his equipment (and piano?) to Paris for some time.

1912 also makes musical sense, for Debussy's rolls thus include his latest piano pieces (up to 1910; he published no piano music in 1911 or 1912). By early 1913 Debussy had completed his second book of Preludes, some of which he premiered in March and June that year, and he surely would have included some of them for Welte had he been recording in 1913.

Caswell's booklet omits an amusing snippet once reported by Richard Simonton: 'They [Welte and Bockisch] had quite a time with Debussy, an egomaniac who once stood up and said "There have only been produced so far in the world two great musicians, Beethoven and me"..." This sounds like pretty wild hearsay, as nothing remotely like it is on record anywhere else, and especially as Beethoven was one of Debussy's least favourite composers (both Debussy and Ravel used to refer to him witheringly as 'le grand sourd'). Or did Welte hear (or thought he heard, bearing in mind the language barrier) some such comment direct from Debussy? Debussy in fact was a notoriously shy man, but with a sharp wit that included the usual French penchant for sending up the Germans. If Welte found Debussy difficult, the obverse side may have been that Debussy in turn hadn't taken to Welte and couldn't resist a bit of leg-pulling. The trouble is that all these stories and circumstances are now obscured by the mists of time and re-quotation, but they implicitly bear in varying ways on what we hear from the rolls, relative to what was played on to them. The larger point remains that Debussy could be demanding and awkward, and satisfying him musically was likely to be much harder than with most virtuosi.

The most radical musical revelation from Debussy's rolls is the now-famous tempo relationships in the prelude 'La Cathédrale engloutie': Debussy plays the minims of bars 7-12, 22-83 and 86-89 at the same speed as the crotchets elsewhere in the piece, although this isn't indicated in his manuscript or editions dating from his lifetime. In fact this is more a visual than an audible change of speed, as it makes the piece all sound in one continuous tempo
(like the end of 'L’ombre des arbres', in Debussy’s audio recording, noted above).

Of course, since pitch on piano rolls is unaffected by playback speed, we can theoretically question any of their tempi. In this case, though, the crux is not overall tempo (which sounds very convincing here, and coincides with the crotchet = 66 for the piece indicated by Debussy's friend Henri Büsser), but continuity of tempo. The Welte mechanism's inertia would make it impossible to doctor sudden tempo changes at these points, and anyway several independent sources back up what this roll tells us.

I have lingering doubts about overall tempi in two other pieces. 'Danseuses de Delphes' comes out from the roll much slower than Debussy's printed indication (crotchet = 44), and frankly drags somewhat (contradicting all the more what happens in Children's corner). D'un cahier d'esquisses also hangs around surprisingly long, a piece whose printed tempo heading 'Très lent' is probably a misplacement of an indication intended only for the final page (the complete edition describes this problem in more detail). I'll risk the wrath of purists by averring that it's impossible now to tell with certainty if Debussy's tempi for those pieces were really what we hear from the rolls.

On the other hand, La plus que lente emerges from the roll at a pleasingly flowing pace, suggesting that it isn't meant as a slow piece: the title is largely a gag, referring mostly to Massenet's Valse très lente, translatable roughly as 'The slow waltz outwalted'. This roll reveals more variants from the printed score than almost all the other rolls put together, and will be an interesting challenge when it eventually goes into the new complete edition (it's the only one of the pieces Debussy recorded for Welte that hasn't yet appeared there).

In an earlier article on 'Debussy and Welte' (Pianola Journal no. 7, 1994), I discussed the problems of the bouts of untidy playing that remain on these rolls, contrasting oddly with both Debussy's audio recordings and other pianists' Welte rolls from the same time or even earlier. I still suspect, as I did then, that a major problem was Debussy's known tendency to play very much in the keys, almost kneading them at the point of the double escapement – exactly where a player piano mechanism would find it most confusing to register if the keys, like the Grand Old Duke of York's men, were up or down. If some of these problems are now unsolvable, I think it can be said without hesitation that Caswell's CD gives as good an account of the rolls that can be managed with present resources. To my ears the most satisfying of the rolls are 'Le vent dans la plaine', 'La soirée dans Grenade', 'La danse de Puck' and 'La Cathédrale engloutie'. But to be certain of hearing how he really played, we need to hear the audio recordings from 1904, whose inclusion here provides crucial balance and context. All that said, this CD is a de rigueur item for French music buffs.
Notes

1. For more on the Telefunken and other transcriptions of these rolls, see Denis Hall, 'The player piano on record – a discography', *Pianola Journal* no. 3 (1990).

2. Regarding the role (so to speak) played in this by the Welte rolls, see Roy Howat, 'Debussy and Welte', *Pianola Journal* no. 7 (1994).


Contributors

Frederick H. Evans was by trade a bookseller of rare books and a dealer in oriental swords. Throughout his long life (1853-1943) he was plagued by ill health and, as a result, took early retirement. He turned his amateur genius for photography to full time use, producing famous cathedral studies and many portraits. In his day he was known as a most skilful player of the Pianola, presenting lecture recitals in defence of the instrument. He was disappointed in the repertoire of commercially published music rolls, and responded by cutting some 1500 himself on a small hand perforator. On his death, his collection of rolls passed to the philosopher (and Pianolist) Professor Joad, known to a generation for his contributions to the radio programme, the Brains Trust.

Denis Hall has for many years been an enthusiast of historic performance recordings both on piano roll and disc and in making them accessible to present-day music lovers. He has involved himself in the restoration and preparation of reproducing pianos for concerts and recordings and in the transfer of 78 rpm recordings to master tape for LP and CD reissue.

Roy Howat is a concert pianist living in London. Born in Scotland, Roy studied in Cambridge and France and soon became known as a specialist in French music. He discovered and premièred some rare items by Debussy, wrote the influential book Debussy in Proportion, and is a founding editor of the Paris-based New Complete Debussy Edition (Oeuvres Complètes de Claude Debussy). Besides his concert and recording work – CDs of his performances of Chabrier and Debussy are now available – he remains active as a writer and broadcaster, and has held university posts in Cambridge, Australia and New Zealand.

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Manfred Schöler was by profession a machine engineer, responsible for the construction and installation of automobile manufacturing equipment. He retired in the mid 1990s and has taken a lively interest in a number of local history projects, in association with the Urania cultural society in Gotha.