The Quest for "Support Personnel": Viennese Fortepiano Maintenance for the Ladies, and by the Ladies

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IN AN ARTICLE FROM 1990, early piano expert Stewart Pollens presented a selection of German-language works on piano maintenance, most of which address pianos made in the Viennese tradition. These texts were often written by piano makers (and occasionally by independent authors) and had the overall function of owner's handbooks; and yet, "it is unfortunate," writes Pollens, "that many of the rudiments of piano construction and action regulation are not described in these works: for example string lengths, soundboard thicknesses, rib positions, or dimensions of action parts are not dealt with in great detail, nor are precise measurements of key-dip or hammer checking height given."[1]

It is easy to muster some sympathy for the disappointed organologist of 1990 and his quest for string lengths and other design data of early pianos, but it is also clear that these user's manuals do tell us a great deal about the less measurable aspects of piano life in the period around 1800. Their restricted topic selection is, in fact, the key here, because it helps to answer two and a half important questions: "for whom was it important to write down this information, and why?" and "how was the intended readership expected to act on this information?"

The answers provide an opening into the art world of the piano in the early nineteenth century. The art world concept is based on the realization that art is the result of a collective activity; as Howard S. Becker explains, "the work always shows signs of that cooperation."[2] Addressing the actors who cooperate in an art world, Becker has made a distinction between artists and support personnel, explaining that the makers of musical instruments are sometimes "artists in their own right."[3]

This distinction is in itself less important for my purposes than Becker's

[1] Stewart Pollens, "Early Nineteenth-Century German-Language Works on Piano Maintenance: Information Concerning the Stringing, Tuning, and Adjustment of the Fortepiano," *Early Keyboard Journal* 8 (1990): 91–92.

[2] Howard S. Becker, *Art Worlds* (Berkeley: University of California Press, 1982), 1.

[3] Ibid., 80. On the role of "support personnel," see pp. 77–92.

observation that "in many art worlds it is not at all clear who is the artist and who are the support people."[4] The art world of the Viennese piano is indeed populated by many actors whose specific roles need to be determined before we understand what they were up to: piano builders, piano teachers who sometimes acted as local salespeople, their students who likely were also piano customers, piano tuners, and, indeed, the pianos themselves. Piano maintenance manuals show some of the behaviors that were expected of these actors.

Post-production worries: the piano as an actor

One of the most obvious tasks of these manuals was to provide a solution to what I would call the 'manufacturer's dilemma of delivery.' The manufacturer asks himself: "What happens to my product once it has left my hands? How can its users be instructed about its proper and improper use? How can I recognize any production flaws, how can I fix them? What kind of after-production control is essential and what level of maintenance is necessary?" These questions express insecurity—insecurity about both the product's (future) performance and the customer's competence when handling the product.

In a maintenance manual for a new product that has just been sold, it is obviously easier to address the latter: the customer's competence. For example, Andreas Streicher's famous depiction of an unsuccessful piano recital reflects this concern. At the time of writing, in 1800 or 1801, Streicher was best known as a piano teacher, and was only just about to branch off into piano building. The end of the passage in which he describes the performance by a self-absorbed and hapless keyboardist clearly reflects the piano maker's worries, seen through the teacher's lens:

> Exhausted, spent, as if he has been trying to uproot oak trees, he finally rises, and leaves the poor fortepiano (for which its owner was trembling at every note) in a state which could not be worsened by the fury of a barbarian. — One is lucky if the damage can be mended with half a dozen strings and if broken hammers and keys do not lie scattered about.
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> If he notices the bad impression [he made] on the listeners […] he is courteous enough to blame the instrument, on which one cannot play with fire and expressivity.[5]

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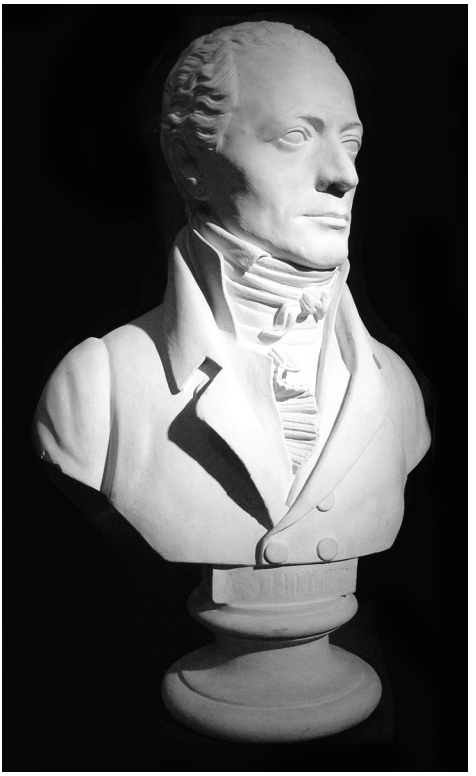
[4] Ibid., 91.

[5] "Matt, erschöpft, wie wenn er Eichbäume hätte ausreissen wollen, steht er endlich auf, und hinterläßt das arme Fortepiano, (für welches sein Besitzer bey jedem Anschlage gezittert) in einem Zustande, welchen die Wuth eines Barbaren nicht hätte schlimmer machen können. — Man hat



Johann Andreas Streicher, sculpture by Franz Klein 1812.

Streicher here side-steps his worries about what I have called "the product's performance," and instead ridicules the use of this concept as a cheap excuse. To be sure, the day-to-day application of the idea that objects, too, have agency is indeed silly most of the time. It is not the frying pan that burns the cook's hand, nor the dustbin that hurts the toe of a nightly visitor to the fridge. To claim that this is how objects influence our being usually does not go down very well in rational company. Yet it is precisely this idea that the piano "does" something to composers or performers that is behind many representations of the influence

von Glück zu sagen, wenn mit einem halben Dutzend Saiten dem Schaden noch abzuhelfen ist, und nicht abgeschlagene Tangenten und Hämmer zerstreut umher liegen. Bemerkt er die üble Wirkung auf die Zuhörer, (wer sollte ihn auch bewundern können!) so ist er artig genug, die Schuld dem schlechten Instrument beyzumessen, auf welchem sich nicht mit Feuer und Ausdruck spielen lasse." Andreas Streicher, *Kurze Bemerkungen über das Spielen, Stimmen und Erhalten der Fortepiano, welche von Nanette Streicher, geborene Stein in Wien verfertiget werden* (1801; repr. Den Haag: Lelieveld, 1979), 21.

of the developing instrument on the course of the history of Western music. Bruno Latour has taken the thought that things can be actors very seriously, inviting us to "imagine a metaphysics in which there would be other real agencies than those with intentional humans."[6] The difference between baboon societies (one of Latour's examples), where social ties are constantly being groomed and maintained, and human societies, where social hierarchies are shaped that survive over longer stretches of time, must be the existence of "entities that don't sleep and associations that don't break down."[7]

This is where objects as actors enter the picture. No matter whether an instrument is good beyond expectations or behaves in a recalcitrant way—even, paradoxically, if it collapses under the strings' stress—it represents such "associations that don't break down." Admittedly, if we see actions as exclusively intentional, this view makes no sense, which is one of the reasons we can laugh together with Streicher about the outrageous pianist who excuses his lack of skill by blaming the instrument. But "if we stick to our decision about [i.e., the distinction between] actors and agencies, then *any thing* that does modify a state of affairs by making a difference is an actor."[8] This idea provides a better understanding of how the construction of a piano, its properties, and its state of maintenance and repair, matter. One could call the piano an "entity that doesn't sleep," or an actor that may often fade into the background but can "come forward" again under certain circumstances. Thus, pianos that are too light or too heavy to play, that go out of tune, whose hammers break, that project the sound in unexpected ways, that have too few notes for the music we would like to play, or that turn out differently than envisioned by their maker, as well as exceptionally good ones, all "come forward," in that they modify a state of affairs.

A player's relationship to her or his piano can very well trigger interactions that solely depend on what the piano "did" when being played.[9] The step from here to using the instrument in a way that was not intended by its designer is small, and brings us back to the question of the piano owner's competence, leading

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[6] Bruno Latour, *Reassembling the Social* (Oxford: Oxford University Press, 2005), 61.

[7] Ibid., 70.

[8] Ibid., 71

[9] Recent research on psychohaptics and the feedback loop between the organist and his instrument explores this experience. See Randall Harlow, "Keyboard Psychohaptics: A Nexus of Multidisciplinary Research into Kinesthetics, Gesture, and Expression," *Keyboard Perspectives* 6 (2013): 1–21.

on to questions of how the piano's various intended user scripts and other uses intermingled, and how builders and pedagogues addressed this topic.

Lifespan and future utility

Slightly more complicated to discuss is the topic of a piano's lifespan. In 1797, the piano teacher J. P. Milchmeyer compared a good fortepiano with a painting that increases in value with age. The idea is that the instrument's intrinsic value as an art-like object justifies spending a sizeable sum of money on it, as it guarantees sustained (even increasing) utility for the owner.[10] Milchmeyer's prediction is, of course, based on questionable technical premises: unlike a painting, a fortepiano's value depends not only on its beauty but also on its functionality and durability, both of which are negatively affected by time. As I will discuss below, this problem was widely acknowledged. Some writers went so far as to suggest that the piano's tendency to wear out somehow worked in the interest of the piano maker. We encounter this train of thought in a work about the piano by the French music writer François-Henri-Joseph Castil-Blaze, some excerpts of which appeared in 1839 in German in August Lewald's periodical *Europa: Chronik der gebildeten Welt*. In the last of these four articles, Castil-Blaze claims that the earlier claviers had been especially durable and long lasting. In contrast, the new piano was more or less doomed:

> The life of the best piano nowadays does not last nearly as long. Ten years are enough to transfer it into a riper age, which is directly followed by old age and decrepitude. […] The durability of a piano is entirely based on its action, which cannot withstand the continuous use, the stress of persistent practice, frequent concerts, and especially the onslaughts of the players of the Contredance to which it is subjected. These clavier-virtuosos work in the interest of the instrument maker, in that they destroy his work. [11]

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[10] That a concept of future utility should have an impact on decisions such as spending behavior is not difficult to grasp; see, for example, Gary S. Becker's short introduction to imagining future utilities in *Accounting for Tastes* (Cambridge: Harvard University Press, 1996), 10–12. If the value of a piano were to increase greatly over time this would evidently not be of any benefit to its maker. On the contrary: Milchmeyer explicitly, and somewhat morbidly, states that the hoped-for doubling or tripling of the instrument's value would happen after the death of the master. J. P. Milchmeyer, *Die wahre Art das Pianoforte zu spielen* (Dresden: Meinhold, 1797), 57.

[11] "Das Leben des besten Piano währt aber jetzt bei weitem nicht so lang. Zehn Jahre genügen, um es in ein reiferes Alter hinüberzuführen, dem Greisenalter und Hinfälligkeit auf dem Fuße folgen […] Die Dauer des Piano liegt ganz in seiner Mechanik, welche dem beständigen Gebrauche, der Anstrengung durch anhaltende Studien, häufige Concerten, und besonders den Angriffen, nicht widerstehen kann, denen es sich durch die Contertanzspieler ausgesetzt sieht. Diese Clavier-Virtuosen arbeiten im Interesse des Instrumentenmachers, indem sie sein Werk zerstören."

Perhaps Castil-Blaze had a personal axe to grind that inspired his ironic conclusion about the French instrument makers' interest in the destruction of their own instruments. But the underlying notion hinted at in this passage is universal nevertheless: it is the same piano maker who first designs the action and then develops an interest in its service life being shortened through being played. The reader is made to suspect that the action was perhaps flimsily made on purpose, to somehow guarantee its eventual self-destruction. Between the lines, Castil-Blaze addresses here a principle well-known from modern product planning: the calculated breakdown, or built-in obsolescence.

Castil-Blaze's assertions are also, however, clearly polemical, which explains his somewhat puzzling failure to discuss the influence of string tension and structural problems on the piano's life expectancy. No matter whether, say, in 1810, or (as in this case) in 1839, and largely independent of the country, piano builders were faced with the necessity of improving the stability of their various designs. Sometimes, pianos indeed lasted an embarrassingly short time,[12] but the fact that this was seen as a problem rather than a secret goal is well reflected in the writings of the period, the patents addressing structural solutions, and the various stabilizing construction measures encountered in the instruments. Quite in contrast to Castil-Blaze's claims, Viennese observers viewed durability as the essence of a piano builder's professionalism. In the following passage from 1824, Stephan Edler von Keeß writes:

> For a pianoforte to be good, everything depends on the quality of the material, such as wood, glue, tuning pins, strings etc.; on the diligence and precision with which these materials are combined, and especially on the usefulness to the practiced player. The shorter or longer lifespan of the instrument depends especially on the wood. Poor wood cannot endure the great load of 8000 or 9000 pounds or more that equals the tension of the strings; [it] detaches itself, and the relationship between the parts becomes upset. In this respect, a master[builder] can only be judged after the course of several years... [13]

François-Henri-Joseph Castil-Blaze, "Das Piano", in August Lewald, ed., *Europa. Chronik der gebildeten Welt* (Stuttgart: Literatur-Comptoir, 1839), 2:593–607; at 607.

[12] See Michael Latcham, "Soundboards Old & New," *The Galpin Society Journal* 45 (March 1992): 50–58 for some examples.

[13] "Wenn ein Pianoforte gut seyn soll, so hängt alles ab von der Güte des Materials, als Holz, Leim, Stimmnägel, Saiten etc., von der Sorgfalt und Genauigkeit, mit welcher diese Stoffe verbunden werden, hauptsächlich aber von der Zweckmäßigkeit, mit welcher es für den geübten Spieler ausgearbeitet ist. Von dem Holze insbesondere hängt die kürzere und längere Dauer des Instruments ab. Schlechtes Holz kann die große Last von 8000 bis 9000, auch mehr Pfund, welcher die Spannung der Saiten gleichkommt, nicht aushalten, macht sich los, und das Verhältnis der Theile ist zerstört, daher in dieser Hinsicht ein Meister nur erst nach Verlauf von mehreren Jahren

The focus here is on the builder's demonstrable ability to meet the challenges of the profession, and on his status as a successful professional, or "master," a maker of "good" fortepianos. Both are, of course, at odds with the principle of planned obsolescence. And indeed, in the German sources on the piano, spanning nearly half a century, we find instead a stable rhetoric in praise of the superior Viennese standards of craftsmanship. It is in this spirit, that an editorial disclaimer at the end of Castil-Blaze's article informs us that,

> In the work about the piano, which was the basis for these articles, one misses very much a familiarity with the inventions and advances of our home country, that especially in Vienna have had such brilliant success.[14]

For a piano maker who considered durability and quality to be the very things that safeguarded his future reputation, the proper treatment and maintenance of the instruments became a matter of particular interest. This interest found support among fortepiano professionals in general, and it was often explicitly voiced in terms of the future utility for the owner. C. F. G. Thon introduced a book chapter about the maintenance of "metal string instruments" with these words:

> Metal string instruments, which not infrequently involve a considerable expense, will make their preservation desirable more than many other things, especially if one has obtained an especially good instrument, which provides every reason to be content with it.[15]

Changing fashion versus conservative tech support

Thon's concepts of investment and future utility are similar to the ones encountered in Milchmeyer's text; another similarity is that both authors fail to consider the importance of changing fashion for the instrument's actual future

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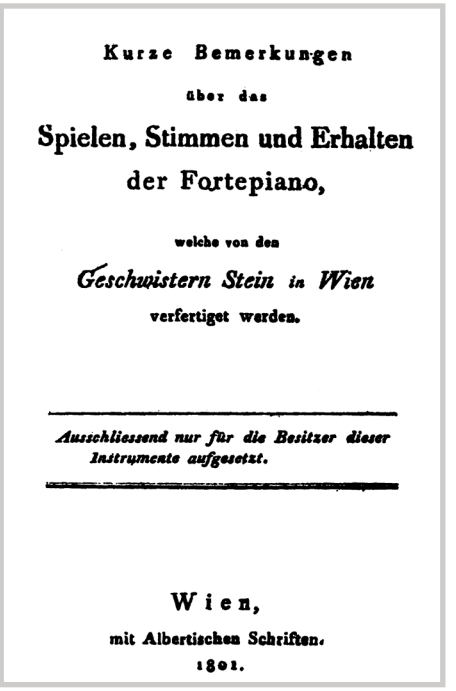
beurtheilt, und ihm sein Rang unter den übrigen angewiesen werden kann." Stephan Edler von Keeß, *Darstellung des Fabriks- und Gewerbswesens in seinem gegenwärtigen Zustande, vorzüglich in technischer, mercantilischer und statistischer Beziehung*, 2 vols. (Vienna: Mörschner and Jasper, 1824), 2:201.

[14] "Bei dem Werke über das Piano, welches diesen Artikeln zugrunde lag, vermißt man sehr die Vertrautheit mit den Erfindungen und Fortschritten unseres Vaterlandes, die besonders in Wien so glänzende Successe gehabt haben." Lewald, ed., *Europa. Chronik,* 2:608.

[15] "Metallsaiteninstrumente, die nicht selten mit einer beträchtlichen Ausgabe in Verbindung stehen, werden ihre gute und lange Erhaltung vor vielen anderen Dingen wünschenswerth machen, besonders wenn man sich ein vorzüglich gutes Instrument verschafft hat, mit dem man alle Ursache hat, zufrieden zu sein." Christian Friedrich Gottlieb Thon, *Abhandlung über Klavier-Saiten-Instrumente*, 3rd ed. (Weimar: Voigt, 1843), 79.


Kurze Bemerkungen

über das

Spielen, Stimmen und Erhalten

der Fortepiano,

welche von den

Geschwistern Stein in Wien

verfertiget werden.

Ausschliessend nur für die Besitzer dieser Instrumente aufgesetzt.

Wien,

mit Albertischen Schriften.

1801.

Andreas Streicher, Kurze Bemerkungen *(Vienna, 1801), title page in its original form.*

utility. Naturally, the user's interest in the proper treatment and maintenance of an instrument only lasts until it becomes outdated. The conservative aura of solidity that surrounded the Viennese piano builders was in fact somewhat at odds with the rapid development of the piano. But this circumstance did not hinder those writing on piano maintenance from producing texts of a remarkable consistency.

The year 1801 saw the publication of two works in which the content dealing with fortepiano maintenance was very similar: Streicher's *Kurze Bemerkungen* (see above), and Büttner and Nachersberg's *Stimmbuch*,[16] which was in large part re-published in 1805 in Vienna as the *Clavier Stimmbuch*, edited by Ludwig Gall (Gall's full title gives a good sense of the content and purpose of these volumes: "Keyboard Tuning Tutor, or clear instructions how any music-lover can himself tune, repair, and keep in the best possible condition his keyboard—

[16] Joseph Büttner and Ernst Nachersberg, *Stimmbuch, oder vielmehr: Anweisung wie jeder Liebhaber sein Clavierinstrument, sey es übrigens ein Saiten- oder ein Pfeifenwerk, selbst repariren und also auch stimmen könne* (Breslau and Leipzig: Gehr, 1801).

harpsichord, fortepiano, or harpsichord-fortepiano").[17] Throughout the first half of the nineteenth century, German writers on piano maintenance borrowed content from one or the other of these works.[18] Some chapters of Thon's *Über Klavierinstrumente, deren Ankauf, Behandlung und Stimmung* of 1817 are paraphrases of Gall's *Stimmbuch*, even including some of his quirky asides; they survive also in an expanded edition from 1843.[19] The Stuttgart piano builders Dieudonné and Schiedmayer re-issued Streicher's work in an expanded version in 1824. Other authors re-formulated the main ideas, and stuck more or less to the same organization of the material.[20] The general gist of the better-known texts on piano maintenance of the time is in fact so uniform that their chronological presentation adds surprisingly little to their understanding. In other words, in spite of acknowledging the rapidly changing character of the piano (as Thon, for example, did in his preface to the second edition of his book[21]), piano builders, or those who wrote on their behalf, addressed the German-speaking piano owners' desirable technical commitment to their instruments in largely the same fashion for almost half a century.

This uniformity may in part be a result of the mechanics of transmission typical for the time, which can be demonstrated in many specialized magazine articles and dictionary entries. Unless an author took issue with specific arguments, he often embraced previous research as a free resource, and thus information could be re-issued unchanged over many years.[22]

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[17] [Ludwig] Gall, ed., *Clavier-Stimmbuch, oder deutliche Anweisung wie jeder Musikfreund sein Clavier – Flügel, Fortepiano und Flügel-Fortepiano selbst stimmen, reparieren, und bestmöglichst gut erhalten könne* (Vienna: Carl Kupffer, 1805; facsimile, Straubenhardt: Antiquariat-Verlag Zimmerman). It has been impossible to establish whether one of these works influenced the other or not. The introduction to Gall's edition claims that thus far, no comparable instruction material existed, for the music lover to tune and repair his clavier. However, the beginnings of Gall's fourth book and Streicher's final chapter do show some strong similarities.

[18] See summaries of a few of these works in Pollens, "Early Nineteenth-Century German-Language Works," and a bibliography in Thomas McGeary, "A Bibliography of German-Language Keyboard Tuning and Maintenance Manuals," *Early Keyboard Journal* 9 (1991): 199–201.

[19] Thon, *Abhandlung*, chapter 3. Gall's asides continued to survive in an expanded edition of 1843.

[20] For example Carl Czerny, *Vollständige theoretisch-praktische Pianoforte-Schule,* op. 500, 4 vols. (Vienna: Diabelli, 1839), 3:92–95.

[21] Thon, *Abhandlung*, viii–x.

[22] Thanks to Robin Blanton for discussing this issue with me. An example of such unchanged information can be found in late eighteenth- and nineteenth-century articles about the life and achievements of Johann Andreas Stein, which are all based on a very small number of original texts.

Some overlaps among these sources can also be explained by the fact that they all address the basic nature of the piano as an "assembled apparatus," largely made of wood.[23] For the modern observer, with a house filled with mechanical and electronic gadgets that all come with separate, lengthy user manuals and maintenance requirements, the importance of this definition may not be immediately clear. Together with clockworks, spinning wheels,[24] and looms, keyboard instruments belonged to the rather few complex mechanical apparatuses located in private homes.[25] This remained indeed unchanged for a long time, in spite of the development of the piano, and thus the general responsibility of the owner to allow for, or provide, some level of basic maintenance was addressed in stable terms as well.

Preventing pianos from getting out of order, and getting them back in order, thus appears to have been a universal project of stability. How much wiggle room did this clearly static situation permit? How did the makers and owners of pianos and the "support personnel," negotiate and fulfil their responsibilities? What happened if this stability was threatened for some reason, through the owner's neglect or lack of expertise, through a tuner's biased view or limited experience, or when a piano somehow lost some or all of its functionality?[26]

Hazard prevention for careless young ladies

The most obvious division of responsibilities is that between the fortepiano manufacturer and the owner. In his piano tutor from 1839, Carl Czerny writes, "after many years of trials and improvements in the construction of the fortepiano, one has finally found that a good fortepiano can have, and therefore must have, the following properties."[27] These included a "full, strong and round tone," regularity in all the octaves, the capacity to support the player in creating dynamic shadings both in a chamber and in the concert hall, a "long sustained, singing"

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[23] Streicher, *Kurze Bemerkungen*, 36.

[24] See Otto Biba, "Die Wiener Klavierszene um 1800. Klavierunterricht, Klavierspiel, Klavierbau," in *La Cultura del Fortepiano—Die Kultur des Hammerklaviers 1770–1830*, ed. Richard Bösel (Rome: Ut Orpheus Edizioni, 2009), 231–59. Biba cites a passage in which Joseph Rohrer suggests that it would in fact be better for "a young lady from Vienna, Brünn or Graz" to obtain a spinning machine rather than a fortepiano (Ibid., 234–35).

[25] Thanks to Andrew Pinnock for drawing my attention to this circumstance.

[26] See Becker, *Art Worlds*, 77–92.

[27] Czerny, *Vollständige theoretisch-praktische Pianoforte-Schule,* 3:92.

tone, "utter clarity," and a balanced touch that is neither too light nor too heavy in order to accommodate all kinds of players. In addition,

> None of [the fortepiano's] keys, no damper, and anyway nothing movable may get stuck, and also, one may not hear any buzzing, rustling or rattling along with the tone when touching the key […] it must be durable and hold its tuning well.[28]

For Czerny, customers had a right to expect that a good fortepiano possessed these properties; it was the builder's responsibility to comply with these expectations.

From the viewpoint of the fortepiano professional, the owner needed to be educated to care properly for her instrument and to avoid mistreating it. Bad treatment resulted in predictable patterns of the instrument's deterioration, afflicting exactly those properties of the piano that at the outset had been the builder's responsibility. Malfunction was not only distressing for the owner; it also gave the builder a bad name. Thus Czerny continues his explanation as follows:

> But the owner, too, has his duties, because even the most perfect apparatus gets spoiled if one neglects or mistreats it. Therefore the owner must observe the following:
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> a) The fortepiano must stand in a dry place, because any kind of humidity harms it. It must not be exposed to continuous drafts. It may not stand in an overly cold or an overly warm place, and may for that reason neither be located close to a window, nor close to an oven or a fireplace…
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> b) It must always be kept clean and free from dust, and also, no overly heavy weights may be put on it. One may never touch the strings with damp fingers, or drop other things on them, because even the smallest pin that lies on them or on the soundboard creates an obnoxious buzzing. Similarly one ought to prevent any kind of dirtiness on the keys, such as, for instance, breadcrumbs, drops of candle wax etc., because otherwise the keys get stuck.
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> c) Every educated player, every pupil of a good teacher, knows anyway that the fortepiano may never be mistreated during playing, and even a strong young man will know how to temper the natural strength of his hands in a way that prevents his instruments from suffering: for he owes this to his sense of beauty as well as to the listeners…
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> d) One must always keep the instrument properly tuned. A new fortepiano has to

[28] "Es darf daran keine Taste, kein Dämpfer, und überhaupt nichts Bewegliches stecken bleiben, so wie man auch nebst dem Tone niemals ein Schnarren, Säuseln oder Klappern beim Anschlage der Taste hören darf … Es muss dauerhaft sein und die Stimmung gut halten." Ibid., 3:93.

be tuned often (about every fourteen days). Later it is sufficient that this happen every four to six weeks, sometimes even every two months.[29]

Thirty-eight years after Streicher, Czerny here acts again as the impersonation of the good teacher and mediator of a proper musical education. Evidently, the public was content with being spoken to in such a lecturing tone. This might be explained by the popularity of being taught in and of itself, and by the fact that the addressed audience was largely made up of women. In 1804, Joseph Rohrer wrote:

> Almost every wealthy nobleman in the Austrian monarchy, who has daughters, lets them be taught to play the fortepiano, and if his revenues decline and he is not wealthy [enough] to pay for his own clavier master on the country [estate], he demands of the house teacher who furthers his boy's language skills and gives him lessons in science, that he could give instructions in clavier playing as well. Such terms, which one is not too shallow to demand from scientists for meagre payment, can be found in almost every *Wiener Zeitung*. "Do you speak French? Do you play clavier?" These are the first questions one poses to the young man.[30]

In a recent article about the "Viennese clavier scene," Otto Biba devotes an entire

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[29] "Aber auch der Besitzer und der Spieler hat seine Pflichten. Denn auch die vollkommenste Maschine verdirbt, wenn man sie verwahrlost, oder übel behandelt. Daher hat der Besitzer Folgendes zu beachten. a) Das Fortepiano muss an einem trockenen Orte stehen, da ihm jede Feuchtigkeit schadet. Es darf dem anhaltenden Luftzug nicht ausgesetzt sein. Es darf weder an einem allzu kalten, noch allzu warmen Orte stehen, und daher weder nahe am Fenster noch nahe am Ofen und Kamin…

"b) Es muss stets reinlich, frei vom Staube gehalten, und auch keine allzu schweren Gewichte darauf gelegt werden. Die Saiten darf man nie mit feuchten Fingern berühren, oder andere Dinge darauf fallen lassen, da selbst die ste Stecknadel, welche auf denselben oder auf dem Resonanzboden liegt, ein widriges Schnarren verursacht. Ebenso verhüte man jede Unreinlichkeit auf den Tasten, wie z.B. Brotkrummen, Wachstropfen, etc., weil dann die Tasten stecken bleiben.

"c) Dass das Fortepiano nie beim Spiele misshandelt werden darf, dass man nie darauf schlagen und hacken soll, weiss jeder gebildete Spieler, jeder Schüler eines guten Lehrers ohnehin, und selbst der kräftige junge Mann wird die natürliche Stärke seiner Hände so zu zügeln wissen, dass das Instrument nicht durch ihn leiden wird: denn er ist dieses seinem Schönheitssinn sowohl, wie den Zuhörern schuldig…

"d) Man erhalte das Instrument stets in einer richtigen Stimmung. Ein neues Fortepiano muss in den ersten Monathen oft, (ungefähr alle 14 Tage) gestimmt werden. Später ist es alle 4 bis 6 Wochen, auch wohl alle 2 Monathe hinreichend." Ibid.

[30] "Fast jeder begüterte Edelmann in der Österreichischen Monarchie, der Töchter hat, läßt ihnen Fortepiano spielen lehren, und wenn seine Einnahme sparsamer wird, und derselbe nicht vermögend ist, einen eigenen Claviermeister am Lande sich zu besolden; so fordert er von dem Hoffmeister, der seinem Knaben Sprachkenntnisse zuwege bringt, und wissenschaftlichen Unterricht ertheilt, daß er zugleich eine Anweisung im Clavierspielen geben könne. Dergleichen Bedingungen, die man sich an Gelehrte für dürftige Bezahlung zu machen nicht entblödet, finden sich fast in jeder Wiener Zeitung. 'Sprechen Sie französch? Spielen Sie Clavier?' Das sind die ersten Fragen, die man dem jungen Manne macht." Joseph Rohrer, *Bemerkungen auf einer Reise von der türkischen Gränze über die Bukowina durch Ost- und Westgalizien, Schlesien und Mähren nach Wien* (Vienna: Anton Pichler, 1804), 287.

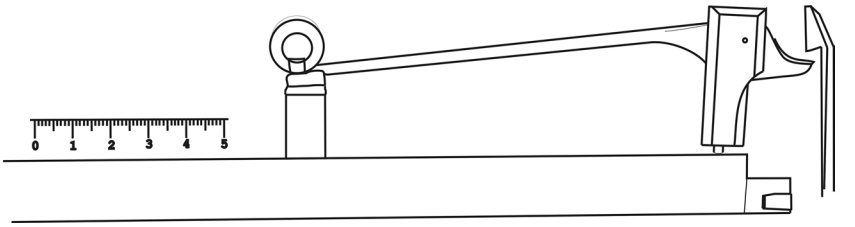

Figure 1 *Scale drawing from an early (1781) Stein (German) action without checks.*

section to the prevalence of female piano students, concluding "apparently, for boys and men the piano was the second instrument; it did serve them as a first introduction into the practice of instrumental music, but after that, they switched over—a suitable talent provided—to some other instrument."[31]

In this light, the recurring lecturing tone in the maintenance sources also represents a dynamic between the male writer-teacher and the (young) female student. It comes as no surprise that some of these authors misused their position for spleen-venting, and some felt inspired to veritable diatribes against female carelessness and irrational behavior. In Gall's *Stimmbuch*, we read,

> [One] should beware of placing wet containers on the lid, or worse, the soundboard. Indeed there are people who with the greatest indifference make use of their instruments as a table, who do not grow a single grey hair if they pour a few glasses of beer or wine across the soundboard.[32]

C. F. G. Thon evidently found this passage too weak and added "several cups of coffee" to the offending vessels with liquids. Those careless persons with the habit of pouring their drinks into the instrument, we learn, can especially be found "among womankind":

> They often do not even take the trouble to amend the carelessness that has occurred with hasty swiftness, but keep up their conversation with all cheerfulness and ease, and, with stoic indifference, let the fluid matter seep into the interior; conversely a terrifying clamor is raised, or a pathetic face is pulled, if but one drop of red wine falls on the good tablecloth.[33]

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[31] Biba, "Die Wiener Klavierszene um 1800," 236.

[32] "[Man] hüte sich, nasse Gefäße auf den Deckel, oder wohl gar auf den Resonanzboden zu setzen. Freylich gibt es Leute, die sich ihres Instrumentes mit der größten Gleichgültigkeit als eines Tisches bedienen, die sich kein graues Haar wachsen lassen, wenn sie gleich ein paar Gläser Bier oder Wein auf den Resonanzboden hingiessen." Gall, ed. *Clavier – Stimmbuch*, 118.

[33] "Sie nehmen sich oft nicht einmal die Mühe, die geschehene Unvorsichtigkeit mit geflügelter Schnelle möglichst wieder gut zu machen, sondern bleiben mit aller Heiterkeit und Ruhe in dem Tone der Conversation und lassen mit stoischer Gleichmuth das fluide Wesen in das Innere eindringen; dagegen ein erschreckliches Geschrei erhoben oder ein erbärmliches Gesicht geschnitten

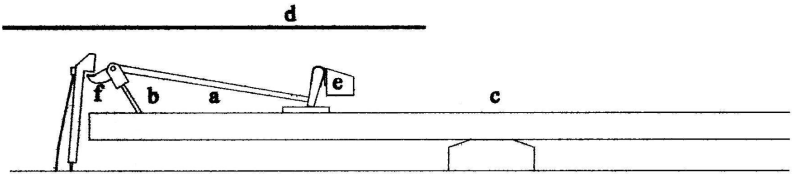

Figure 2 *Schematic drawing of a Walter action with check and brass Capsel.*

The tone of this example is no longer that of a benevolently lecturing Klaviermeister but rather that of an enraged father who cannot control his headstrong teenage daughter. Even if many other presentations are less extreme, their common central feature is a lack of trust in the discipline and rational behavior of the clavier-consuming public. Seen from a would-be rational male perspective, this collides with the other objective of maintenance manuals, which is to supply detailed technical information for keeping the instruments in trim.

Owners, support personnel, and expertise

The problem was addressed in various ways. The bigger firms in the larger cities simply supplied maintenance services. In Vienna, with its countless instrument makers, the organization of this work perhaps did not reach the level of sophistication that characterized the "after-sales service" of the Broadwood firm and its agents throughout Britain.[34] Many makers nevertheless deployed tuners upon request to perform maintenance and repair duties, and some piano teachers also had a maintenance and tuning practice on the side.

All those who took on the role of the support personnel needed to be well-informed about the maintenance of piano actions. This was especially important if instruments were exported into remote areas. Several manuals provided information that was likely above the average clavier owner's comprehension, but must have been a great support for provincial piano teachers, tuners, or other technically interested or otherwise suited persons.

Gall, for example, makes a valiant and somewhat disjointed attempt to describe all types of current clavier instruments, all of the mishaps that can befall them, and how these are set right. The key word in this book is "perhaps." The reader is invited to troubleshoot by testing and eliminating; to fiddle around with the instrument until it works properly again.

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wird, wenn auch nur ein Tropfen rother Wein auf das gute Tafeltuch fällt." Thon, *Abhandlung*, 80–81.

[34] David Wainwright, *Broadwood by Appointment: A History* (London: Quiller Press, 1982), 100.

Also the re-cast version of Streicher's booklet compiled by Dieudonné and Schiedmayer, which is exclusively about fortepianos, provides technical information of a professional standard. True, on the surface, it still addresses private fortepiano owners, but essentially, the book is a compact piano technician's manual. It includes a lengthy elaboration on wood properties, and the concluding chapter about "Remedies for various kinds of blockage and malfunction of the action and other conditions" is a veritable maintenance handbook. It discusses the complete disassembly, cleaning and oiling of actions, adjustments of axle bearings and escapement springs, re-polishing of surfaces, and even the re-shaping of twisted keys with a small plane. The maintenance and disassembly of actions as diverse as the (old-fashioned) Stein model with wooden capsels (Figure 1), the Viennese action with or without adjustable escapement hoppers (Figure 2), and the English action are all presented in great detail.

Expectations that piano owners would actually be able to carry out their own repairs, however, were often low. Usually, as in Czerny's instructions, piano owners were given the responsibility of preventive tasks. They had to protect their instrument from unfavorable temperatures and humidity, from dust (which was seen as a major problem), insects, debris on the soundboard as well as between the keys and in the action, and anything else that would lead to some "unavoidable peril," including soundboard cracks, rusty strings, detached bridges, and mechanical malfunction. There was a clear reluctance to add more responsible tasks to this list. Andreas, for instance, provides instructions for taking out and putting back the hammer action. But he adds,

> It is always best if a fortepiano is taken apart by an instrument maker or a clavier tuner, because these go about their work with a degree of care that can neither be expected nor required from a clavier lover.[35]

Similarly, Dieudonné and Schiedmayer explain how to readjust the distance between the escapement hoppers and the hammer beaks, and write:

> It cannot be denied that this procedure requires a little bit more than the usual level of mechanical skill, because, in want of the latter, the action of the hammers is easily brought into disarray; and therefore one does well not to act in this matter without being certain of one's cause, and to leave this revision, which is an easy thing for the skilled, to a handy tuner or instrument maker.[36]

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[35] "Immer ist es am besten, wenn ein Fortepiano durch einen Instrumentenmacher oder Clavierstimmer aus einander genommen wird, weil diese mit einer Vorsicht zu Werke gehen, welche man von keinem Clavierliebhaber weder erwarten noch fordern kann." Streicher, *Kurze Bemerkungen*, 39.

[36] "Es ist nicht zu läugnen, daß dieses Verfahren schon etwas mehr denn gewöhnliche mechanische

Karl Lemme, a piano maker from Brunswick, writes in his maintenance manual from 1802 that the success of amateur maintenance also depends on the design of the action: anyone can learn how to restore a sticking key in a clavichord or in a Viennese piano to working order, but,

> With the so-called patent-pianos in wing shape, if a problem should arise or a key should stick, I advise the owner to employ the most skillful instrument maker in the neighborhood […] An ignorant person can inflict the greatest harm on an instrument.[37]

Whereas we can conclude that the piano builders had to rely on the owners having picked up one or another bit of specialized information, it was generally agreed that non-professionals should stay away from overly complicated ministrations. In the case of concrete trouble, one solution—in the absence of an on-site professional—was for the maker to supply individual guidance in writing. An example of such assistance is a letter written by Andreas Streicher to Carl Bursy in 1818, in which he describes the procedure for cleaning out the brass capsels of the Viennese action (Figure 2). Bursy lived in Mitau (today Jelgava) in Courland, much too far away for Streicher to intervene in person. Bursy had visited Vienna two years earlier and now owned a fairly new Streicher piano, in which the hammers of three keys had become stuck. Together with the delivery of another piano, Streicher included a small repair kit for Bursy, which contained a pair of inverted pliers to spread apart the brass capsels for taking the hammer out, half a dozen pointed wooden sticks to clean out the axle bearing holes in the capsel, and a small needle for applying fresh oil.

Bursy clearly knew how to remove the action from the instrument, so this procedure is not mentioned. Streicher first explains how to take out the hammer with the special pliers.[38] The Viennese hammer axle design features polished, pointed axle ends made of steel that run in punched indentations of the flanges of the brass capsels, not unlike the bearings of a modern model train's wheel sets.

Geschicklichkeit erfordert, weil dadurch leicht, wenn es an dieser mangelt, die Mechanik der Hämmer in Unordnung gerathen kann, und man thut daher wohl, hierin nichts zu unternehmen, ohne seiner Sache gewiß zu seyn, und lieber einem geschickten Stimmer oder Instrumentenmacher diese Nachhülfe, die für den Geübteren etwas leichtes ist, zu überlassen." Johann Lorenz Schiedmayer and Carl Dieudonné, *Kurze Anleitung zu einer richtigen Behandlung der Forte-Pianos* (1824; repr. Tübingen: Gulde-Verlag, 1994), 67.

[37] Karl Lemme, *Anweisung und Regeln zu einer zweckmäßigen Behandlung englischer und teutscher Pianoforte's und Klaviere* (1802). English translation from Thomas McGeary, "Karl Lemme's Manual on Fortepiano and Clavichord Maintenance (1802)," *Early Keyboard Journal* 8 (1990): 123.

[38] Otto Clemen, "Andreas Streicher in Wien," in *Neues Beethoven Jahrbuch* IV, ed. Adolf Sandberger (Augsburg: Benno Filser, 1930), 115.

By ever so slightly bending the flange ends apart, the hammer can be taken out. The next step is to remove accumulated dirt and hardened oil from the punched axle bearings at the capsel's ends and from the tips of the hammer axle, then new oil is applied, and finally everything is reassembled. Streicher even includes a warning to avoid getting oil on the beak leathers, which engage into the escapement hoppers and may not get too slippery, or "the hammer can absolutely not be brought to a proper attack any more."[39]

The interesting part of this instruction is Streicher's description of the final function test, because here, he had to determine how much information was necessary without becoming too confusing. Before reassembly, he writes, one has to bend the ends of the capsel slightly back toward each other so that the hammer axle gets securely seated after being re-inserted. This is based on the assumption that the capsel was not only sprung open during disassembly, but actually got bent in the process. At the end, Bursy needed to test the setup:

> Should such a newly cleaned key drag when played, this would be proof that the capsel has not been pressed together properly. One must take out the hammer again and bend the capsel further together at its two flaps. This alone is the reason that the hammers of those […] keys get stuck in the air. If you succeed at the first attempt, you can very quickly correct all similar faults in the same manner.[40]

True, if the flange ends were too wide apart, the points of the hammer axle would not be properly seated, which could prevent the hammer from operating properly, make it stick, rattle or even unhinge itself. However, this type of axle bearing actually relies on a precise fit that is neither too loose nor too tight. In other words, the hammer would also jam if one were to bend the flanges too close together. Streicher's omission of this second possible reason for a sticking hammer—a too tight capsel—marks the point where he abandons his technical instruction for the sake of keeping things simple.

Perhaps he felt that his cleaning instructions gave Bursy enough to worry about for the time being.[41] His selectivity was surely also based on his experience,

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[39] "[…] weil sonst die Tangente selbst zu schlüpfrich wird, daß der Hammer durchaus zu keinem richtigen Anschlage mehr zu bringen ist." Ibid., 116

[40] "Sollte eine so gereinigte Taste beim Anschlag schleppen, so wäre es ein Beweis, daß die Kapsel nicht gehörig zusammen gedrückt worden. Man muß also den Hammer wieder aushängen und die Kapsel an ihren beiden Lappen stärker zusammen biegen. Dieß allein ist die Ursache, daß die Hämmer der 3 Tasten in der Luft stehen bleiben. Ist Ihnen der erste Versuch gelungen, so können Sie alle ähnlichen Fehler auf gleiche Art ausbessern und dem Übel sehr schnell abhelfen." Letter from May 29, 1818. Ibid.

[41] Streicher may have also experienced some difficulties when verbalizing technical content. Some of his descriptions, such as his utterances about French and English actions, come across as

in that the process of unhinging and reassembling the hammer, using the tools and materials he was accustomed to, in most cases tended to bend the capsel ends slightly outward, requiring the correction he recommends. It is nevertheless important to note that this recommended final assessment is a shortcut, and as such, technically speaking, not very convincing.[42]

Strings: a special case

In contrast to action maintenance, which could be done at various levels of sophistication, at any time, or not at all, the tuning of fortepianos and the replacement of strings was a matter of absolutely indispensable routine maintenance. Piano tutors and maintenance manuals all addressed in some form the proper preservation of pitch and temperament, and the steps necessary for replacing the strings. Discussions of various string materials, string resilience, and breakage show up in the most various texts and contexts, including, for example, newspaper concert reviews and Beethoven's conversation books.

Because tuning and string preservation or refurbishment were absolutely crucial for the usability of a piano, piano builders instructed owners to perform these tasks without any professional help. Streicher, as always careful and conservative, begins his chapter about tuning by warning that "it is not unimportant, to which hands one commits one's instrument for tuning"; but he ends with the statement that "it would be very advantageous for the fortepiano player if he would at least learn enough that he could tune one string in unison with the others."[43] Expectations were usually higher than that. Schiedmayer and Dieudonné refer at various points to string properties and proper tuning techniques, and dedicate almost two pages of their book to the things a tuner should not do when replacing strings. Both Hummel and Czerny provide crash courses in equal temperament in their piano tutors. Czerny adds a complete instruction for the replacement of broken strings, and concludes as follows:

> For tender hands, this [procedure] is, like the act of tuning, a tedious chore; but it is a necessary and often inevitable grievance, und hence always an advantage if one knows how to help oneself with it.[44]

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awkwardly phrased and not fully representative for his level of technical understanding.

[42] Streicher chooses not to mention some other possible causes of malfunction, such as an ill-regulated escapement or a hammer that has been turned out of its alignment.

[43] Streicher, *Kurze Bemerkungen*, 30, 33, and 38–39.

[44] "Für zarte Hände ist dieses, so wie das Stimmen, eine mühsame Arbeit; aber es ist ein nothwendiges, und oft unvermeidliches Übel, und daher immer ein Vortheil, wenn man sich dabei zu

Even modern wire based on historical designs[45] does not come in batches that are always perfectly produced, and occasionally a new string is just bad by itself and must be replaced. However, unless the chosen string is not suited for the pitch indicated by the instrument's scaling[46] (or, put another way, unless the instrument's scaling—in some areas or overall—does not allow the strings that are being used to be tuned to the intended pitch), or the tuner makes some mistake, they rarely break.

Historical wire could be much more unpredictable. Old instruments with surviving historical strings do not serve to illustrate the variations in string quality that likely were common in historical times. Obviously, these are strings that refused to break over the course of centuries, so they represent, by elimination though failure, the very best of their time, whereas strings of all other qualities are now gone.[47] On the basis of this material, we can only guess about the accepted average durability of strings of one or another historical period. It would indeed seem that the piano would not have reached any widespread popularity if constant string devastation had crippled its day-to-day use as a matter of course. On the other hand, the fact that string breakage is a constantly discussed topic in historical texts about pianos shows that it was a true concern.

The reasons for this "inevitable grievance" were manifold. First, undetected impurities could weaken the material locally and make a string fail whenever it was under particular stress.[48] Schiedmayer mentions another option: occasionally, strings were too soft, and would first stretch and ultimately break. These strings would sound "dull, quivering or murmuring" because they were either made of impure metal or improperly drawn.

Other than that, the process of cold drawing used in wire manufacture implied unequal gauge standards by default. The hole in the drawing die gradually widened through use, or even became oval; producing a batch of wire of the same nominal

helfen weiss." Czerny, *Vollständige theoretisch-praktische Pianoforte-Schule*, 3:95.

[45] That is, string material that is softer than modern piano steel, in order to better match various historical scalings in tensile strength and flexibility.

[46] The term "scaling" indicates the schedule according to which the string lengths are determined.

[47] "This may explain Siegbert Rampe's claim, in his discussion of Beethoven's purported lifelong habit of breaking strings, that Beethoven "never broke even a single string" in thirty years of performing on historical pianos. Siegbert Rampe, *Beethovens Klaviere und seine Klavierimprovisation: Klangwelt und Aufführungspraxis* (Munich and Salzburg: Katzbichler, 2015), 51.

[48] On the negative effect of inclusions on the breaking strength on thin wire, see Martha Goodway and Scott Odell, *The Metallurgy of 17th- and 18th-Century Music Wire* (Stuyvesant: Pendragon Press, 1987), 67.

Nanette Streicher, ink drawing by Ludwig Krones (1836).

thickness (at the time expressed in gauge numbers in whole or half steps, according to roughly unified but evolving systems) thus would result in a number of rolls with consecutively thicker wire. An observant builder could use this to his advantage, by sorting the rolls, and mounting strings of gradually increasing thickness in the instrument, effectively reducing the steps that otherwise occurred between strings of one gauge and the following one.[49] The increasing use of calipers or slip gauges[50] in some of the bigger workshops shows that there was a true concern among the makers about arriving at consistent results. Anyone who

[49] For a discussion of string gauge systems, quality issues, and preceding secondary literature, see Michael Latcham, *The Stringing, Scaling and Pitch of Hammerflügel built in the Southern German and Viennese Traditions 1780–1820.* 2 vols. (Munich and Salzburg: Katzbichler, 2000), 1:26–48. A discussion of oval string cross-sections and sorting wire can be found on pages 37–38.

[50] An explanation of the slip-gauge principle and a few pictures can be found on the website of Paul Poletti, a fortepiano maker and restorer: http://www.polettipiano.com/Pages/slipgaugengpaul.html (accessed December 10, 2015).

used piano strings off the roll without any access to accurate measuring tools, however, could end up using a noticeably thicker or thinner string even if it had the same gauge number. Summarizing the problems connected with judging the proper wire diameter, Thon writes (expanding on Gall),

> In some instruments, the numbers are specified by the builder, but not in others, and although the latter is not rarely the case, no disadvantage arises in fact from it, because the numbers of the various string factories and brass workshops are not equal to each other, and one and the same can be found to be once thicker, once thinner, depending on how the drawing dies vary among each other in the width of their holes. Thus the number system supplied by the builder is maintained the most securely if the factory from which the strings have been obtained is indicated, or if a chordometer is supplied which is calibrated to suit the stringing schedule. As it is, an experienced and sharp vision is able to select the strings by eye, which almost always will guide more correctly than the mere indication of the numbers.[51]

Thon's final recommendation to judge string diameters by eye is, of course, a workaround, and a very insecure one at that. That it was necessary at all demonstrates the difficulties of maintaining pianos to professional standards while perhaps missing part of the necessary equipment. Misjudgments and failure in this process must have stood for a large number of the stringing hassles in the historical reports. The most prominent example is arguably Beethoven's stock of pianos, especially the Érard from 1803 and his Broadwood from 1817. The first of these instruments contains in its present state a large number of historical strings, but in terms of diameters they are in complete disarray and represent neither a plausible Viennese schedule nor the originally intended French one.[52] The Broadwood is reported to have suffered several turns of string failure and was refurbished by a number of Viennese makers over time, using various types of string material and—likely—gauge schedules (the Broadwood firm did not stamp gauge recommendations into their grand pianos, as did the Viennese makers).

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[51] "Bei manchen Instrumenten sind von dem Baumeister die Nummern bemerkt, bei andern aber nicht und obgleich dieser letzte Fall nicht selten statt findet; so ist eben damit kein Nachtheil verbunden, weil die Nummern in den verschiedenen Saitenfabriken und Messingwerkstätten sich doch nicht gleich sind und eine und dieselben bald stärker, bald schwächer gefunden werden, je nachdem die Zieheisen in der Weite ihrer Löcher gegenseiting von einander abweichen. Am sichersten wird daher das, von dem Baumeister des Instruments zum Grund gelegte, Nummerschema beibehalten, wenn entweder die Fabrik, aus welcher die Saiten bezogen sind, an- [gegeben wird] oder ein nach dem Saitenbezug eingerichtetes Chordometer beigegeben wird. Schon ist ein geübtes und scharfes Gesicht im Stande, die Saiten durch das Augenmaß auszuwählen, welches fast immer richtiger, als die bloße Angabe der Nummern, leiten wird." Thon, *Abhandlung*, 89.

[52] See Alfons Huber, "Beethovens Erard – Flügel, Überlegungen zu seiner Restaurierung," *Restauro* 3 (1990): 181–88, and Tilman Skowroneck, "Beethoven's Erard piano: its influence on his compositions and on Viennese fortepiano building," *Early Music* 30, no. 4 (2002): 529–30.

Conclusion: piano art world conundrum made explainable

In some cases, the support personnel occasionally hit the wall, too. As the piano's design progressed, not every piano technician was able (or willing) to keep up-to-date. When, for example, one Dorothea Krug of Frankfurt received a Streicher piano in 1810, her piano tuner was unable to solve the problem of its breaking strings.[53] A possible misunderstanding during the selection of the instrument in the workshop about the intended pitch was almost certainly made worse by the fact that the tuner did not possess the most modern string material to address the issue, and that he was, after his first abandoned attempts, unwilling to consider the question of the new-fangled Viennese scaling any further.[54] Interestingly, Krug, the musically gifted daughter of the owners of a prosperous Frankfurt hotel, personally took care of the discussions about the issue with Nannette Streicher, supplying scalings, measurements, and a description of the Frankfurt pitch (which she said was higher than the Viennese standard).

Whereas the tuner in this particular anecdote represents a support person in the Viennese piano's art world who, as the latter evolved, somehow fell out of the habit of serving it well, Krug's own initiative shows how the teachings of the maintenance manuals made an actual imprint on an ambitious piano amateur. Even if the conundrum was only solved when the Streichers sent a new piano to Frankfurt,[55] and although some of the information that Krug wrote to Nannette Streicher makes little sense in the larger picture, she did take charge to the best of her abilities to try to solve the "inevitable grievance" of string breakage in her

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[53] The documents of this communication are presented in excerpts in Ute Goebl-Streicher, Jutta Streicher, and Michael Ladenburger, eds., *"Diesem Menschen hätte ich mein ganzes Leben widmen mögen": Beethoven und die Wiener Klavierbauer Nannette und Andreas Streicher. Ausstellungskataloge Beethoven-Haus, Bonn* (Bonn: Beethoven-Haus, 1999), 6:122–32. My thanks to Uta Goebl-Streicher for further information about the letters that were not reproduced in this publication.

[54] My discussion of the story of Krug's piano will be published as "Dorothea Krug's Streicher piano," in *Keys to the Piano*, ed. Ziad Kreidy (Paris: Beauchesne, forthcoming). See also an unpublished article by Paul Poletti, "The Mysterious 'Platzende Seyte' or (for Academic Purposes) a Case Study: Inadequate Standards of Illumination as the Cause of Industrial Accidents in Early 19th Century Viennese Piano Factories," available at http://home.arcor.de/w.jurgenson/pdfs/platSey.pdf (accessed December 10, 2015).

[55] Johann Baptist Streicher visited Frankfurt in November 1821, eleven years after these events and found Krug's *first* piano, which had been re-sold to a customer with less high-strung expectations, in perfect condition. Ute Goebl-Streicher, *Das Reisetagebuch des Klavierbauers Johann Baptist Streicher 1821–1822* (Tutzing: Schneider, 2009), 75.

new piano, using a language she had learned and that was understandable for the professionals.

These few examples will have served to show the complexity of the task of the writer of a fortepiano maintenance manual from around 1800. The ultimate goal of these manuals was to cater to a community of piano-minded people, an art world of the piano, in an effective way. Except in the case of specialized information for semi-professional maintenance people, and when the universally inevitable chore of replacing strings was discussed, most information for the amateur addressed the prevention of damage to the piano. Any more specialized information not only needed to be collected and systematized (a task that some writers managed better than others), it also needed to be packaged and especially selected to provide the necessary level of detail without exceeding it, in order to match the writer's expectations of his target group. The specific selective character of these manuals, disappointing as it may be for the modern organologist, helps to understand the inner workings of the Viennese world of the piano, how people interacted around and with these instruments, and what knowledge and which services they expected from each other.