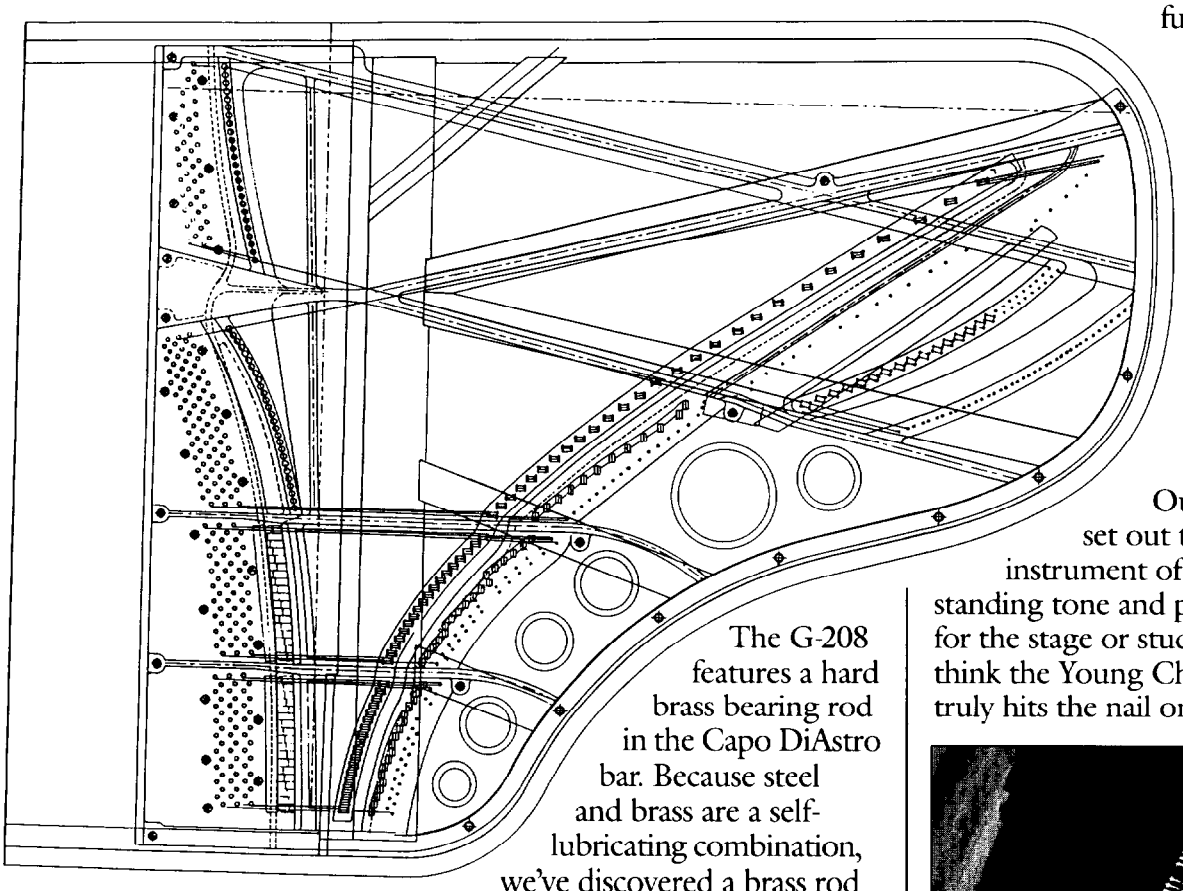
PIANO TECHNICIANS
Journal
August 1993

A nuts and bolts guide to the new Young Chang G-208.

Our engineers are obsessed with the little things because they recognize the importance of attention to detail. But lately, they've become equally obsessed with big things, and the result is 6'10" long. Our new G-208 grand is a departure for us and represents the smallest and largest of our latest innovations.

The G-208 is a 6'10" grand piano of an entirely new scale design. It features our new "Asymmetrically Crowned" soundboard which places the highest part of the crown in each rib directly under the bridge providing maximum support under the downbearing pressure of the strings. This new soundboard design exhibits improved power, projection and tuning stability, and offers a longer soundboard lifetime. We're so pleased with this new design, we're now incorporating it into all our grand pianos.

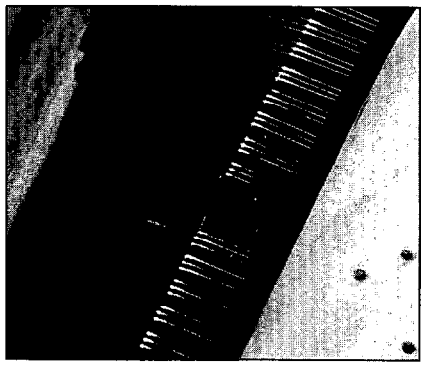


The G-208 features a hard brass bearing rod in the Capo DiAstro bar. Because steel and brass are a self-lubricating combination, we've discovered a brass rod offers better control of strings during tuning. In addition, the brass rod is easily replaced later in the life of the instrument eliminating the need for reshaping of the capo bar.

We also took a close look at our action and developed an all-new action design which improves response without loss of projection or clarity.

Our new double duplex system terminates the strings at the rear of the bridge and near the tuning pins with duplex bars. Both duplex lengths of the strings for each note are then terminated in equal length offering improved sustain, projection and clarity.

Together these innovations create an instrument with a rich, full sound, greatly improved response and a remarkable evenness of tone throughout the entire range of the keyboard. Our engineers set out to design an instrument offering outstanding tone and performance for the stage or studio. And we think the Young Chang G-208 truly hits the nail on the head.



Because strings bear against a replaceable brass rod, tuning control is improved.

For technical information on our new G-208 grand piano, write to us at Young Chang America, Inc., 13336 Alondra Blvd, Cerritos, CA 90701. Or call 310/926-3200, ext. 237.

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PIANO TECHNICIANS Journal

JIM HARVEY, RPT
Editor
205 Parker Avenue
Greenwood, SC 29649-2629
(803) 223-2889

LAROY EDWARDS, RPT
THOMAS GORLEY, RPT
Journal On Tape Readers

HOME OFFICE

3930 Washington
Kansas City, MO 64111-2963
(816) 753-7747

LARRY GOLDSMITH
Publisher/Executive Director

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Director of Communications

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About The Cover

Discover the secrets of one technician's soundboard press in the Project of the Month article, *A Rebuilder's Soundboard Press for the 90s, page 32.*

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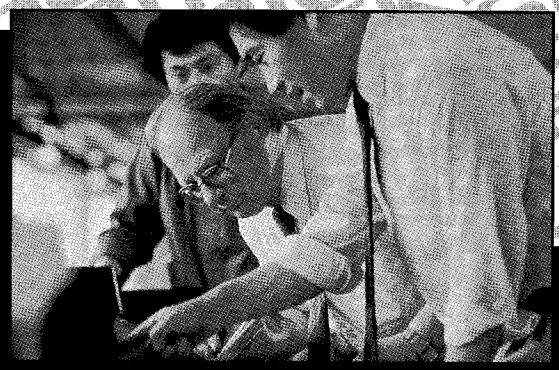

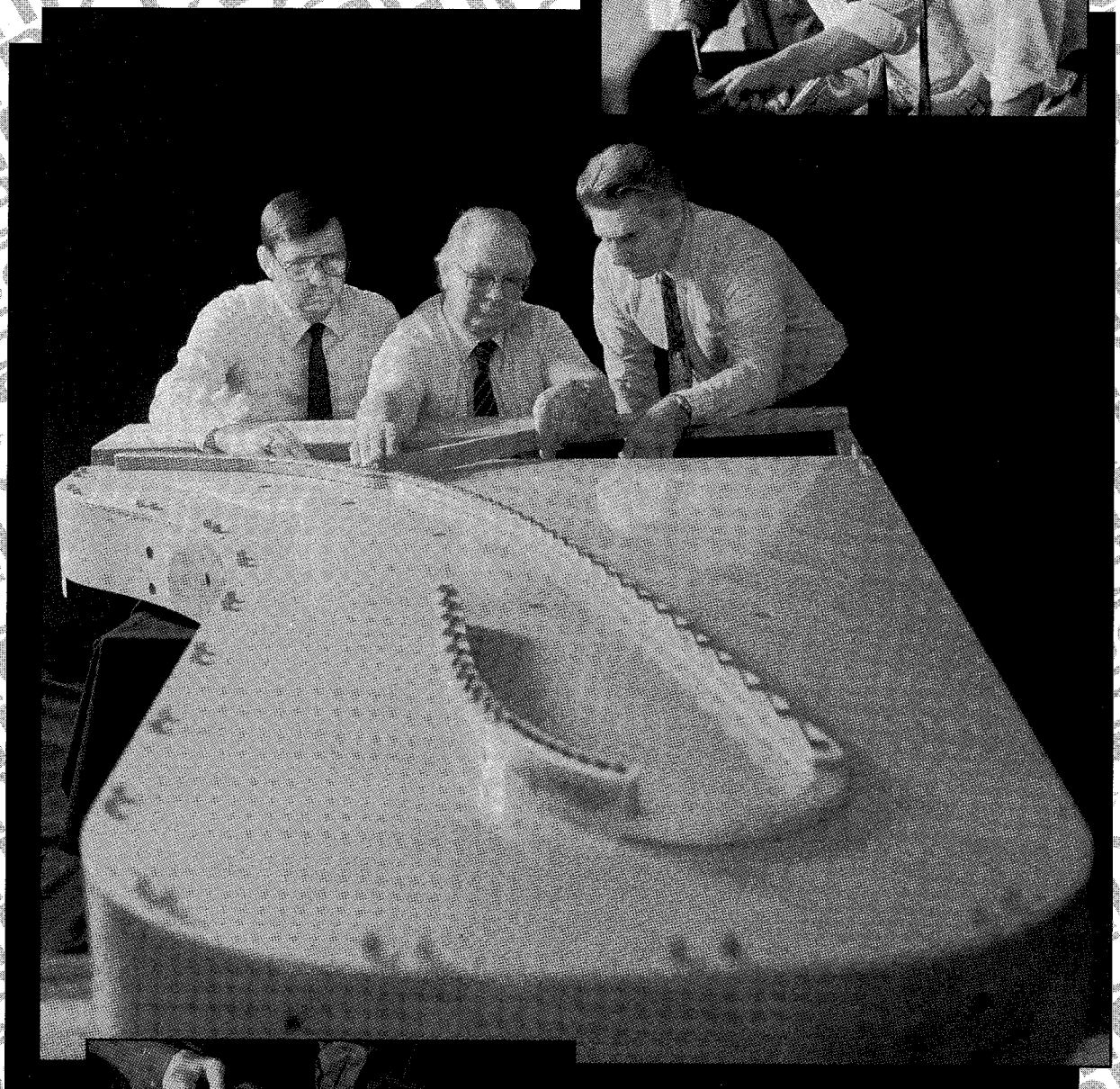

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President's Message

SETTING STANDARDS

Why does PTG have an RPT exam? Ever since its inception, PTG has had a qualifying exam for franchised members. Recently we have spent a lot of time discussing our exam, noting that the percentage of PTG members who have passed it is steadily shrinking. Some might ask, "Is the test valuable? What does it do for us?"

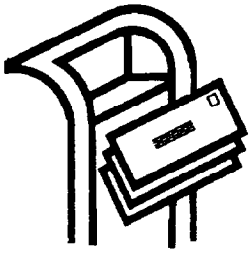
Simply stated, our exam defines a minimum standard for quality work in our profession. PTG's numerous educational programs, such as the *Journal*, Institute classes, chapter programs, and publications, all enable and encourage technicians to strive for excellence and continued professional progress. But it is by passing the RPT exam that a member ratifies the standard. By taking part in testing, a technician says "Yes, there should be a standard." And by providing the exam, PTG is stating that this is our current best definition of that minimum standard.

We believe that our RPT exam is one of our major contributions to the piano industry. The process of devising and refining the exam has itself raised the skill level within our profession by forcing a critical look at methods and standards. Exam day is always a learning experience for everyone present, as is each tutoring session and exam preparation class. By discovering new tuning checks and developing improved repair and regulation procedures, and by sharing these discoveries with each other, we have helped ourselves rise to higher standards.

Why did I take the exam? Taking the exam was good for me; it spurred me to work towards a goal and gave me the sense of accomplishment that eventual success brings. I then learned even more when I became an examiner and teacher, and later worked to refine the current technical exam. Quite bluntly, I am a better technician today because of my commitment to the exam. Why do I think others should take the exam? Do it for yourself first: make visible your commitment to quality. And then, do it for your profession. Ratify the standards that the exam represents and the goals that PTG sets forth for the piano service industry.

Technical Forum

LETTERS



TO THE EDITOR

Perceptions & Perspectives

Jim Harvey, RPT
Editor

Different types of correspondence is received from readers, not all of which gets published, and not all of a technical nature. Some writers wish to point out suggestions for improving the magazine. These suggestions range from ideas for articles, to the choice of type styles used in printing, to... you name it! Other correspondents point out errors in articles — information that was either not there, or was incorrect, or was unclear. Still other readers like to point out what is broken, without actually suggesting a method of repair.

The results of the recent questionnaire provided valuable insight into your wishes concerning the *Journal*. However, this was information that would fit into particular, relatively broad categories. While it might be argued that the Forum and a Letters to the Editor are one in the same, the following letters, printed in their original form, are more representative of issues rather than specifically technical matters. The replies are my personal views, and are not intended to cause anxiety or antagonism within the readership. I'm presenting them to open the lines of communication even more. I'd be interested in your opinions.

Letter Number 1

Dear Mr. Harvey,

I just read and enjoyed your treatise on action centers in the February 1993 issue of the *Journal*. However, I feel I must come to the defense of using alcohol (methanol) and water to shrink the wool bushing, thereby easing the friction at the center pin. This is an ancient technique used by the pipe organ industry, and who knows what else. My father and grandfather started using the compound in the early 1940s, having seen its use in pre-shrinking fabric bushings used in World War II production.

It works well, with no obvious side effects on bushings which have not been previously doped with the paraffin, oil, or silicone treatments. It works fairly well on paraffin or oil loaded bushings once they've been dry-cleaned with trichloroethylene. For a merely "slow" center fit, about 5% of water in methanol is adequate, and for definitely "snug" centers, mix with 10-15% water. After application the condition gets WORSE for several hours, until the water content evaporates. The silicone treatments eventually turn to varnish, and I haven't had any success removing it with anything. Of course, verdigris contaminated bushings need replacing.

Terry D. Cole

I apologize if I was unclear on this matter. The question *was* about lubricants and I gave a terse treatment to alcohol and water. There was no intention to dismiss the use of same for *shrinking* purposes. My words (referring to lubricants) were: **"Then there is alcohol and water. Ehhh! Wrong. Alcohol and water is a shrinking solution! Yet some technicians seem to have homogenized the intended usage and expected results of these solutions."**

That about covered the alcohol and water discussion. I suppose that, in abstract terms, one could consider the resulting freedom of movement in a flange treated with alcohol and water as a form of lubrication. After all, either one results in reduced friction, just by different means. I did leave out a significant point in that article. My early learnin' dictated that a center pin lubricant is used when a center is *whistling*. Like a hinge (that an action center really is), if it is squeaking, it needs oiling. (Note: word semantics only — just because it's in print, I would not want the word *oiling* to cause us to regress fifty years.) If anyone has missed

hearing this phenomenon, the sound is much like the effect in the recording of "All I Want for Christmas." If a center were slow, but not whistling, then I was to assume that the bushing was swollen, and apply alcohol/water. Times (and apparently theories) have changed, but my main intent *should* have been to point out that: (1) there is a difference between lubricants and shrinking solutions; and (2) one should first determine the *cause* of sluggishness before applying favorite elixirs.

Thanks for calling my attention to something that should have been clearer. Speaking of being clear, and without trying to pick nits, what remains of my memory of chemistry tells me that alcohol and water is a homogeneous *mixture* (even when in the form of a solution). It is not a *compound*. A mixture can be separated back into its various components by physical means. A compound cannot. Next, I believe that trichloroethylene is on the no-no list, having been identified as a known carcinogen. In most places it cannot be legally purchased.

Letter Number 2

Dear Jim,

Each month I eagerly await my next copy of the PTG *Journal*. I learn much from it. I suspect that for many members it is the main contact that they have with the piano world outside their own practice.

I applaud the teaching aspect of the Journal and it has given me much useful advice. There is, however, a certain atmosphere about the Journal which seems to divide technicians into those who know the right way to do things and those who need to learn. While I am sure that this distinction is not intended, there is an inescapable feeling of "cognoscenti" and "others", which belies the changing and variable nature of our work.

There are two areas which trouble me. First, there is too much emphasis on how to rebuild a Steinway (2.0% of the grand market?) and no discussion on how best to repair the amazing number of actions made around the turn of the century. While the Steinway might be the technician's most profitable piano, most of us have few of these amongst our clientele. The other pianos often offer the technician a fascinating insight into how the modern piano came into being. For myself, I specialize in the smaller turn-of-the-century grands and each piano is a voyage of discovery. Does every technician tread this lonely path by himself?

Second, while guilds by their nature seek to preserve ancient arts and crafts so that their practice will be maintained and not forgotten, in reality a large part of many practices consist of mundane inexpensive instruments with no great life expectancy, where the instrument owner just wants the instrument restored to playable condition for the immediate future. The necessity to get in, get on and get out can be greatly enhanced by using techniques that the original piano manufacturer would never have envisioned and which many schools would frown upon. The technician is called upon to serve the client rather than the instrument, and this can create conscience conflicts.

To address the above considerations, I would suggest that a section of the *Journal* be devoted to controversial topics. Perhaps a "point-counterpoint" letters column. Each month there might be a lead letter specifically chosen, (and perhaps written expressly) to express a highly controversial viewpoint. The cycle should be short enough so that responding letters, if prompt, could be published in the next issue.

I have no difficulty in thinking of a host of issues that should send anguished technicians racing for their pens to express their viewpoints, although they may at first be unused to the idea that anybody can make a valid and valuable contribution to piano technician practice. My present experience tells me that many technicians have developed ingenious techniques, some of which are really good and some of which make me shudder. I am sure that your experience must be the same!

Possible subjects: "Tuning pin tighteners — their types and uses" (don't pretend that the significant sales thereof is just for medicinal purposes!); "The use of cyanoacrylic cements for quick and dirty mends instead of hot hide glue;" "The customer who wants to try and touch up his own unisons: a boon or bane?;" "Split bridge fixes when the customer has little money;" "A careful quick machine tuning is better than a quick aural tuning," and so on.

Chris Day
Boston Chapter

Let the race for pens begin. For controversy, welcome to the Forum! I've been accused of putting the *con* in controversial, the *rev* in irreverence, and other unjustified assaults on my character or personality. The responses to your questions are yes, no, yes, no, no, and yes. (Was that too many?) I especially like the idea seeds expressed in the last paragraph. However, even if I'm not interpreting Chris' thoughts correctly, I want to use his earlier sentiments as a point of departure. I want to discuss something I've been wanting to get out of my system for quite a while. At the risk of receiving a lot of hate mail, here goes.

[Editorial mode on].

More than once I remember being embarrassed during the technical question portion (sometimes known as quiet hour) of the Los Angeles Chapter meetings. As an example, I was the *only* one trying to figure out a problem on a Kranich & Bach, an Estey, or a vintage Gulbransen. I wouldn't have bothered asking my questions, except that I could not get the technical representative of any of those products on the phone! In all fairness, the chapter members tried to help, they really did. Afterwards, I was still more or less left...alone...with a *voyage of discovery*. Had my questions, like other typical ones, involved Steinways, or any other

more popular (and prolific) instrument, there would have been an array of answers forthcoming.

I suspect that Chris' situation is worse than mine ever was. He works right in the heart of the birthplace of piano manufacturing on this continent. Flipping through the piano atlas should serve as a reminder of this. The very fact there are still those turn-of-the-century pianos to work on is testimony to how well some of them were built (never mind present status based on years of use and neglect).

The best pianos, even by today's standards, are built to last a lifetime. Different theories are in circulation, but for a rule of thumb, I've always considered the useful service life of a *quality* piano to be fifty years. If the piano is in institutional use, that value is *immediately* reduced to thirty years (and that's being optimistic and keeping fingers crossed). To extend this service life poses questions that cannot be taken lightly.

It is often asking too much of original designs, materials, and construction methods used in certain instruments to consider them worthwhile candidates for rebuilding, or reconditioning, or even serious repairs. Whether we like it or not, it all amounts to the cost effectiveness of restoring these older instruments in today's economy. Cost effectiveness also applies when using a spit and baling wire approach to keeping some older pianos alive. It's like kicking a dead horse. Yet many technicians believe it's their sworn duty to keep these once proud instruments alive. Not only that, there is a feeling that we should be eleemosynary (getting even for cognoscenti) and apologetic in the process.

Consider a situation that, without fail, every one of us has experienced. You are called into a home where parents have just purchased a new piano for their child to begin lessons. The new piano is *new* only to them, since they just picked up the old clunker at a yard sale. In looking around the home, you can find nothing else as old, or as worn out. The owners are quick to inform you that this is a temporary measure, just to see if the child "takes to the piano." Your mission, should you decide to accept it, is to "just make it work." Just make it work does not imply rebuilding, reconditioning, a pitch raise, or even repairing the (dangerous) broken key covers. Instead, it means it would be nice if all the notes did *something*. With few exceptions, the child does not *take* to the piano, for obvious reasons. The parents can then say, "See, we were right not to spend all that money on something better."

I used to feel guilty when involved in incidents like this. I even

felt guilty when, under the guise of "rendering the best possible service...," I underbid, overworked, lost money, and the condition of the piano was *still* somewhere between land fill and firewood.

One day a variation of this theme tilted the scales as far as my attitude is concerned. All the conditions were as described above, with a couple of twists. The piano was a grand. It had been in a nightclub. Being a cosmetic nightmare, the piano had been dropped off for complete refinishing prior to being permitted into the home. Talk about adding insult to injury! Only after refinishing and having arrived in their living room did they find my number in the Yellow Pages. Half of the strings were missing; the remaining damper felts were as hard as bricks, and the remaining damper heads pointed in all different directions; the pinblock was shot. Only a few notes would play, thanks to years of having barflies provide drinks for the piano.

The parents and the child were smiling with anticipation when I arrived. No one (including me), was smiling when I left. I had to be the heavy, and pronounce the piano "DOA." Too bad... the refinisher had done a good job, but the piano (whatever brand-name it was), was not worthy of additional repair consideration.

I no longer feel guilty. I finally accepted that it is not our fault that pianos are not built to last forever. It is not our fault that they get old. It is not our fault that they are neglected and abused, or that piano maintenance is last on the list of budget priorities.

And since people take so much pride in their consumer awareness I no longer feel guilty over the amount of ignorance that exists when folks fail to seek advice from a piano technician, instead of well-meaning but uninformed friends, musicians, *or* teachers.

To build a mental model for comparison, substitute any inference to "piano" in your thoughts with "guitar," "violin", or practically any other musical instrument. Then try "automobile," "copy machine," or any other form of equipment or machinery. We replace televisions and other hard-working devices every ten years or so, and automobiles even more frequently. Why *must* pianos *have* to keep on working — forever? I understand that in Japan, many people buy a new piano every ten years, but not because their pianos are worn out. Instead, they feel that the instrument has served a long and useful service life; and therefore should be allowed to retire with dignity.

Let's approach cost effectiveness from a different angle. Again, take pianos out of the thought loop. Say you buy a hundred dollar telephone answering machine. It works for years, then breaks. It can be repaired, but likely the cost of repair would easily exceed the cost of buying a new (and better) machine. Now, change the answering machine to an old piano for the same price. The same rationale doesn't work in the customer's mind (or often, in ours). Let's play it out. The customer has just purchased a hundred dollar upright piano. Assume the client is financially able (and willing) to pay far *more* than a hundred dollars for repairs. After the work is completed, we have an old, repaired, hundred dollar piano (that likely only cost three hundred when new — sixty or seventy years ago). At what point are we doing our clients a *disservice* by continuing to work on certain instruments whose useful service life is over?

At Los Angeles City Schools, we had an expression for internal use in the shop when assessing a piano for repair or rebuilding. That expression was *BER* (the letters spoken rather than the word), and was an acronym for Beyond Economical Repair. This did not mean that a particular piano could not be repaired. Rather, after the cost of replacement parts (if available), and labor were tallied, it became clear that the customer (a school, also on a budget in this instance) would be better served by replacing the instrument. The labor intensity is about the same on an instrument that is worthy of repair as one that is not.

This is likely not what was meant, but regarding the Steinway versus other, "turn of the century" actions (or pianos), I think Chris' own words summarized it adequately: *"...mundane inexpensive instruments with no great life expectancy."*

In response to the other portions of Chris' letter, the *Journal* is not a platform for either Steinway or any other brand-specific piano. And, we're currently pursuing subjects and authors to specifically address those in the "need to learn" category. That's assuming such a differentiation really exists — i.e., whom among us does *not* qualify for continuing education?.

All types of submissions are encouraged. If anyone has something to offer, run it by me. Just remember, though, that we are trying to appeal to the *majority* of readers. Pianos that have serial numbers starting with 1000 and ending with 1003 may not qualify.

Oh! Tuning pin tightener *is* only used for medicinal purposes — best when taken with peanut butter and cheese crackers. I take that back. Before cyanoacrylates, I used tuning pin tightener on a couple of spinet pianos. The threads in some of the wooden elbows had a tendency to strip out and cause lost motion. A drop of tightener at the juncture of the drop lifter wire and the elbow stopped this from happening. I honestly don't have other experiences with these liquids, so if someone does, "write on".

Letter Number 3

Dear Jim

Before you launch into your projected regulation series I would like to coive the following thoughts.

To date the biggest purveyors of regulation information to PTG have been Steinway, Yamaha and Young Chang. I am grateful for their efforts on our behalf and have learned a great deal from them about concert regulation and wish to do nothing to discourage their further efforts at teaching.

I would, however, note that few Yamahas or Young Changs should yet require regulation, having been perfectly regulated at the factory and that Steinway represents a very small percentage of the piano market. The majority of my customers' pianos could do with regulation to some degree. There are four items in the discussion: the customer, his piano, his budget, and the technician. For most customers, if I were to offer them a "Little Red Schoolhouse" regulation at a reasonable hourly rate, I would politely be shown the door. It may be more than they paid for the piano. I consider that my obligation is to give the customer's piano the very best uplift that the customer is prepared to afford and that any feelings that I may have about a "higher calling" are irrelevant.

While I acknowledge that there are risks involved, I consider it much better to try to improve the customer's enjoyment of his piano, no matter how little he or she can afford, rather than to walk away from good business patting myself on the back for having had the strength of character not do a half job.

I would, therefore, suggest that considerable space be given in regulation discussions concerning what is in the best interest of the customer with a limited budget. Bill Garlick has given a most entertaining talk about the "Panic Regulation." If this is a crisis to Bill, this is my bread and butter!

The *Journal* could have an entertaining discussion on the real-world compromises that technicians have to make every day. It might be possible to develop guidelines to help new technicians decide what really has to be done to a piano. These are just thoughts. Keep up the good work.

Chris Day

A I've been alternately serious and having fun at Chris' expense. Although this letter feels a lot like the previous one, I'm going to respond anyway. This letter came in the cracks between the time I made a request for a martyr to undertake a regulation series, and *after* Don Mannino had already accepted the challenge. My only suggestion to Don for the series was that he include suggestions about action reconditioning along with procedural matters, where applicable. For example, if the procedure is to level keys, but we first need to recondition the keyframe (new felts and cloth), I asked that Don mention that item at the appropriate place in the regulation sequence. Don's last installment indicates that he's trying to incorporate my request. I did *not* ask, nor do I expect, him to elaborate on the "how-to's." In this example, he will not (necessarily) be writing about

the best method of removing old back rail cloth. That information is also needed, and I'm quite receptive to articles on reconditioning procedures, or portions thereof. (This seemed a good place to make a plug for more submissions.)

More to Chris' point, and my earlier responses, I have tried many times to make the best of bad situations; that is, working under budget restrictions, and trying to get the best dollar value for the customer out of those limited funds. While it was easy enough to see all the work that needed to be done, two things invariably happened: (1) I *always* had difficulty in knowing where to stop, especially when following a top-down order of repairs and regulation; (2) I *always* lost money by not stopping in time. This doesn't mean I have stopped trying, no longer care, or am too good or too proud to work on less than first-class instruments, or to work for persons with tight budgets. That would not be economically prudent on my part. Whatever the case, it is *my* decision. I've been shown the door less and less.— I try to remember the way I came in so I don't need the extra assistance when I *choose* to leave.

I do not object, at least in principal, to the idea Chris is presenting. However, I know (based on the premise of not knowing when to stop) that I'm not the authority on this subject.

Letter Number 4

Dear Mr. Harvey,

I just completed reading your article "The Right Way, The Wrong Way, and My Way" (January 1993 Forum), and I can't emphasize enough how impressed I am. I am an Associate member apprenticing to learn this trade, and recently have read many an article from past *Journals.* January's edition stands out to me as one of the finest in recent years.

Tuner's Corner and Good Vibrations were also articles of high quality. I feel a great deal of pride in being associated with such a fine organization.

Your outstanding article is an important contribution, and I thank you for your time, sincerity, and honesty.

Cordially
Josh(ua) Harper
Minn-Kota Chapter

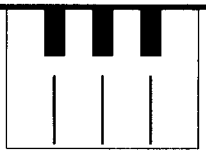
This letter is being printed for one simple reason — pure, unadulterated self-indulgence. I think I speak for all the writers with the following sentiments:

Sometimes certain articles come harder than others. Should I use this at all? Does it have any real value or message to convey? If so, am I expressing that message clearly? These and many other questions are vying for answers while writing a column.

One such article for *me* was the one Josh mentions. It's always good to get complimentary remarks. But it's especially comforting on an article, which, even after it's on that one-way trip to the printer, you still had second thoughts about. Thanks for the kind words, Josh! And thanks to each of you who think of fellow members when you run across something of interest.

We're article heavy again this month. So, since you have a lot more material to cover in this issue, I'm shutting me down for now.

Questions, ideas, concerns and or suggestions pertaining to the Journal and its technical content should be directed to the attention of Jim Harvey, Editor, Piano Technicians Journal, 205 Parker Avenue, Greenwood, South Carolina 29649-2629.



Between You, Me & The Tuning Pin

Tuning On A Leash

Bill Ballard, RPT
Contributing Editor
New Hampshire Chapter

Picture this: it's late August and you're doing back-to-school tunings in the local high school. All summer long, cinder block walls and cement floors have been breathing humidity into practice rooms which have had nothing to ventilate them. These pianos are high as a kite, with, say, the A-440 on A2 at 442.5, on D3 at A448, on A3 at 446, and A4 at 44.5. Play any interval spanning the bass break and you'll get indigestion.

You're about to lay the tuning hammer on the next poor wretch when you think on the last one. Its soundboard is still puffed up with summertime humidity. In your allegiance to A-440 tunings you've just pushed lots of wire down into the speaking length. That wire constitutes an A-440 tuning based on the board's current moisture content and crown. But three or four months later, when the piano dries out again, that wire change will become a slack amount, insuring that these As will be down in the mid-to-low 430s. If there's one thing that neither you nor the piano likes, that's to wrestle with large changes in the tension load. It usually requires a lot of banging to settle the strings down. After that work, there's still the question of whether the piano's back is going to react to a quarter-ton change in its string load. Admittedly, you've done nothing but remove what was added since the last tuning by the swelling of the board. Keep in mind, however, that what the board has had several months to take on, you've just knocked out in a fifteen minute rough tuning. Does a piano's frame squirm a little in a readjustment to a 1-2% change in string load? Good question, and I hope there's a factory engineer out there who can write in from his own viewpoint. If a piano's frame does have a tendency to squirm under more than just a "touch-up" tuning, it would be separate from and in addition to the usual "jittering" of the tuning due to setting the strings in such a pitch change. The effect of a time period for such a squirming would be to cause a piano's tuning to go from "green to cured" (at which point there would be a slight warping in the just completed tuning). Agreed that the actual extent of such squirming has not been determined, I would bet that the time for it would be longer than the two hours you're there with the piano.

So you shudder as you think of what may be in store for the tuning on this piano if you yank it back to A-440. You then remember that article in the June *Journal*, in which some upstart out of nowhere suggested that a piano doesn't really care where it sits, even 20 cents either side of A-440. And you ask yourself what's going to happen if you place this next tuning at the most stable "A" on the keyboard (usually an A-440 partial tone at the top of the bass bridge) instead of dragging it all the way back to A-440. To float it or fork it, if you will. Well, the best way to find out is to try it.

This, by the way, isn't the only situation that might tempt you to let the pitch float. How about the piano in a vacation home that gets two tunings each year, one for the summer months starting in early July, and then another right before Christmas? How about the 3/4 plate Victorian upright with its case beautifully refinished? The owners are so proud of it that they insist you tune it every three months. Even at those intervals, however, its tuning still yo-yos from sharp to flat. Furthermore, up in my neck of the woods, many pianos sit in 200-year old, partially rebuilt farmhouses. During the winter, poor insulation means that the heating system is constantly pumping BTUs into the room (and right on through the walls to the outside). The result is a winter of continual temperature (and humidity) fluctuations. Controlling humidity is even more hopeless: cold walls and windows immediately turn humidity into condensation. In the summer humidity exhumes from the cellar's stone foundations (and possibly earthen floors), with nothing between it and the piano upstairs but wide pine floorboards.

Certainly, there are parts of the country where these aren't the facts of life. And we should all try to do what we can to protect pianos from swings of temperature and humidity by keeping the pianos on inside walls (to avoid windows and radiators), and installing climate control systems — whether for the piano or the room. But when all these fail, there's the strong suspicion that the piano's pitch would do better when allowed to "bend in the breeze."

As you read last month's installment, with its assertion that pianos themselves don't care about A-440 and its discussion of the drift in a tuning due to climate conditions as opposed to use, you may have heard one shoe drop and have been waiting a month for the other. Here is where I go out on a limb — and possibly find a hornet's nest. (I was hoping for a new name, address, and social security number, but my editor says he can't get me into the Federal Witness Protection Program.) Yes, it's a natural thing to do, to allow the pitch to "float." I've been doing it for several years, in carefully chosen circumstances, and don't consider myself deviant. What actually happens when a piano's pitch gets "cut some slack" from A-440, and what do we gain? The best answer may come from the

record of hygroscopic tuning change in the late Don Galt's study, reintroduced last month.

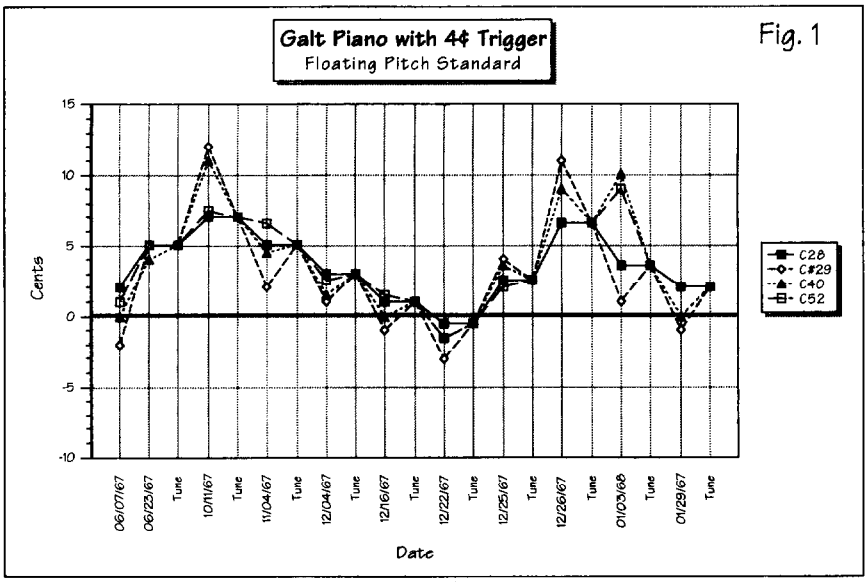
Please Assume...

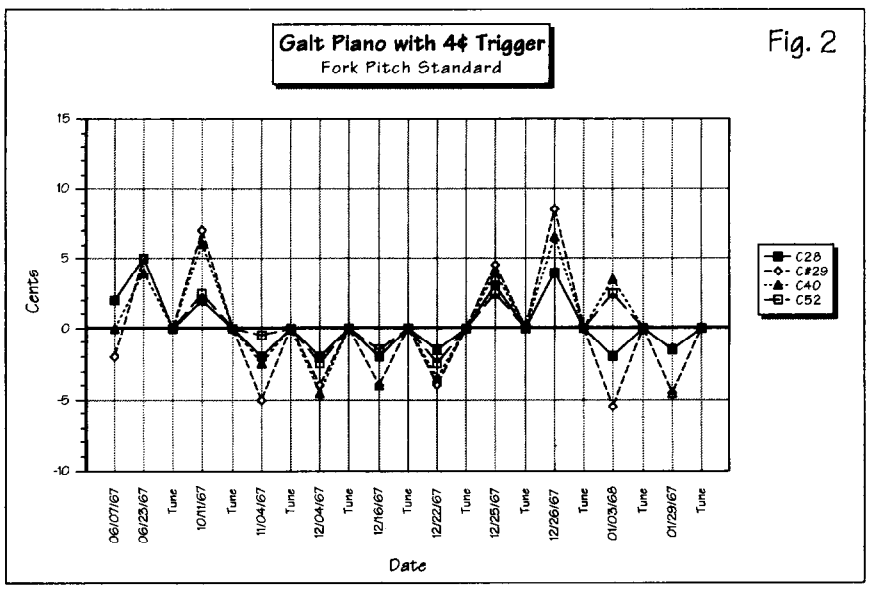
Hygroscopic motion, by the way, is the change in the tuning due to the rise and fall of the soundboard's crown, as the board's equilibrium moisture content reacts to relative humidity changes. Don Galt's console piano was not played or tuned during the study's three years, and for this reason his figures are purely those of hygroscopic motion. But let's suppose that there was a pianist to play it, but only enough to hear the tuning move with the relative humidity. Let's also assume that this (light) playing in no way makes its own changes to the tuning, which would add to the hygroscopic motion. This might be a big assumption because the matter of whether the board's motion under a tuning upsets the balance of tensions in string segments (that a tuner works hard to provide) is yet another unstudied phenomenon. I suspect that this does undo the solidity of a tuning.

However, including this possibility creates too many unknowns in what is a hypothetical discussion. We should also assume a working equivalence between the motion at A49 (the official location of A-440) and C52. Galt picked the three C's for a good reason: one of them was at the top of the bass bridge. We, however, have been talking for the last two months about A-440. It's a small semantic detail that the piano will oblige us. A49 and C52 are barely three notes apart on the bridge, and considering the slight difference in movement between C52 and C40, the differences between C52 and A49 are likely to be negligible. Yet another necessary assumption has to do with Galt's zero lines. For him they were the original pitches of the four notes on a piano that happened not to be in tune. It wouldn't be a flaw in my use of Galt's figures to have these zero lines represent a piano in tune at A-440. More to the point, I need them to be able to re-locate an A-440 tuning.

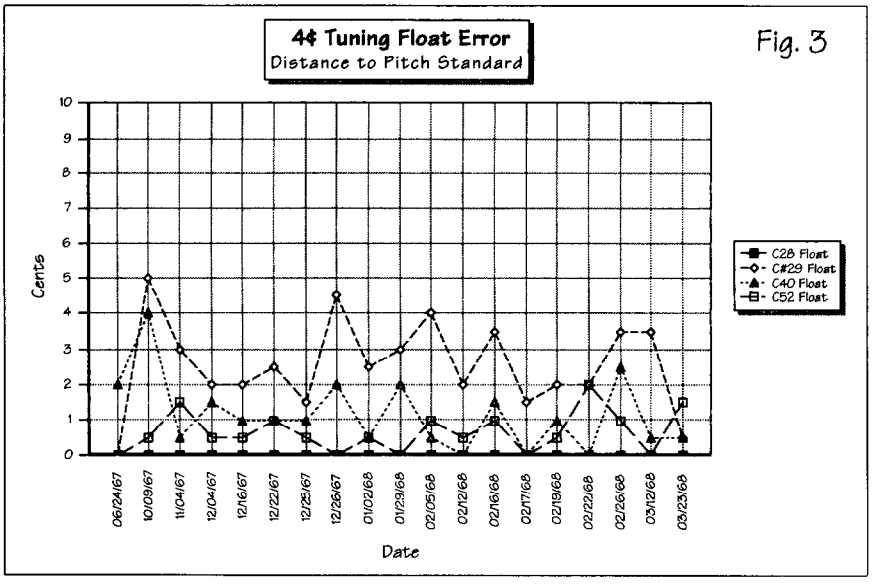
We'll further assume that this pianist will object to a change of 4 cents (measured against a fixed, outside standard) in any of the four notes Don was monitoring, and will then request a tuning. (A former chairperson of the College & University Technicians Committee had a good policy: "If anyone complains, retune the entire piano.") C#29 is usually the one to cross the 4 cents line first. What this means, in practical terms, is that if the piano is being retuned at a fixed A-440 (instead of being allowed to float), an instrumentalist accustomed to A-440 would find that their note corresponding to A49 would have a 1 beat per second conflict with the 3rd partial of piano's D30 (assuming further that D30's location right next to C#29 at the tip of the long bridge would give it the same hygroscopic motion). This is because a 4 cents change in the fundamental partial of D30 also means a 4 cents change in its 3rd partial (overlooking, of course, a small "administrative fee" for inharmonicity). At this 3rd partial level, as with the 1st partial of A49, 4 cents equals 1 Hz.

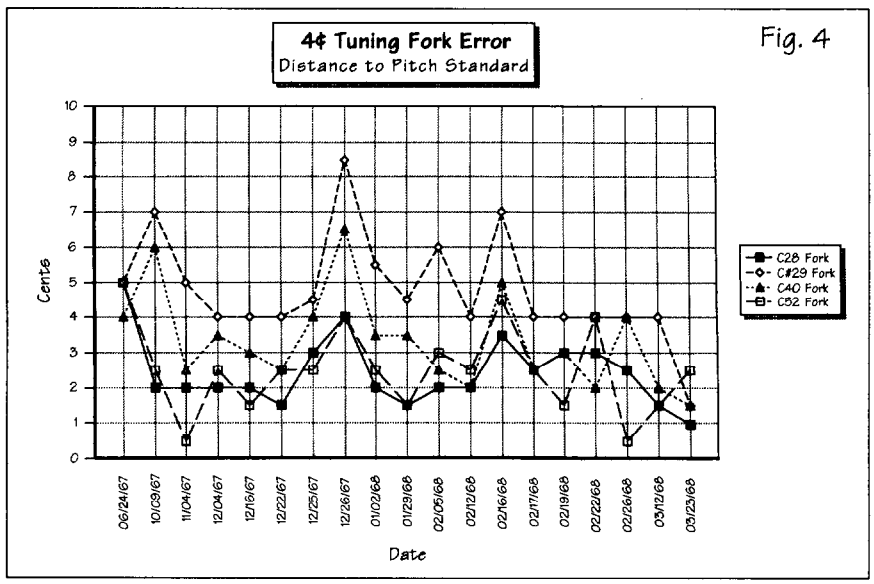
With these assumptions the piano would be tuned on 6/23, 10/11, 11/4, 12/4, 12/16, 12/22, 12/25, 12/26, 1/3, 1/29, 2/5, 2/12, 2/17, 2/18, 2/19, 2/22, 2/26, 3/12, with one final tuning on 3/23. (That's service!) The two accompanying charts, "Galt Piano with 4¢ Trigger, Floating Pitch Standard" **(Figure 1)** and "Galt Piano with 4¢ Trigger, Fork Pitch Standard" **(Figure 2)** show the motion of those four notes as they diverge from each tuning according to individual hygroscopic motion (observed by Galt's original study), and are brought back during these tunings to a chosen pitch (C28 and A-440, respectively; for the sake of clarity, only half of the set of tunings have been charted.) If you go at these data points with a pair of dividers, one thing becomes clear immediately: the spread of pitch levels among the four notes occurring at the point where the 4 cents travel triggers a tuning is the same regardless of whether the pitch is tied to the fork or floated. In plain terms this means that the amount by which the piano goes out of tune with itself is unaffected. This should be no surprise, as the spreading out of pitches from a unified tuning is solely a function of the soundboard's reaction to changing relative humidity (remember our assumption that playing did not change the tuning). In effect, the continuing lines of hygroscopic motion are simply being transposed by the chosen pitch standard to a new point of resumption, with no other alteration in these lines.





If the distance that intervals move following a tuning is unaffected by the choice of a pitch standard, what about the distance they are moved during a tuning? That's another matter, as can be seen by the next pair of charts, "4¢ Tuning Float Error" **(Figure 3-page 16)** and "4¢ Tuning Fork Error" **(Figure 4-page 16)**. For each note the absolute difference in pitch between where the note had arrived on the date of a tuning request and where that tuning put it, is plotted for the two choices of pitch standard. The "error" here really means how close these notes are to their next tuning. C28's "float error," by definition, runs right along the zero line. Please note that the "error" doesn't mean how out-of-tune the piano is. Most pianists won't perceive out-of-tuneness by measuring the

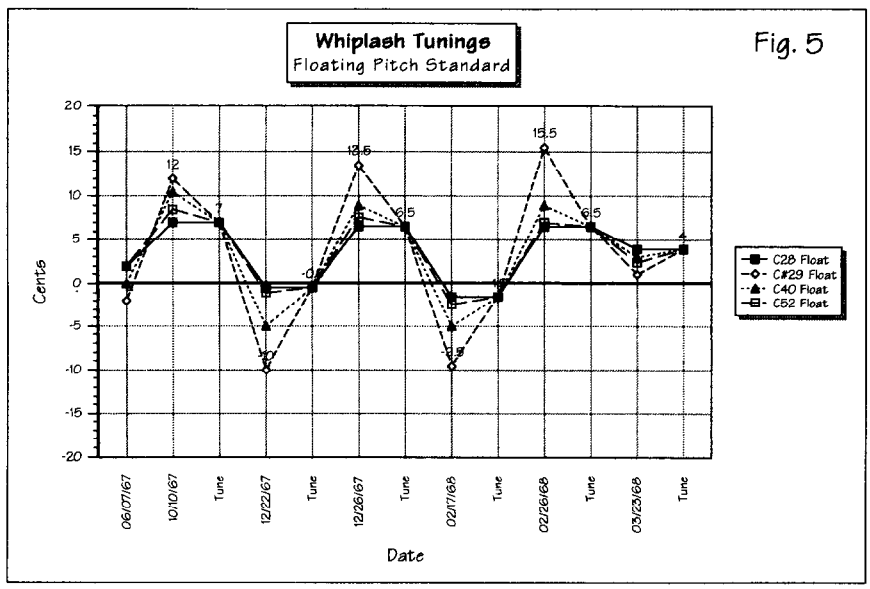




tuning's drift from a fixed standard (as would other instrumentalists). They notice a piano's out-of-tuneness to itself. Here, that would be the product of the hygroscopic spread of these pitches which, as we've seen, is unaffected by the chosen pitch standard. The "error" displayed in these two charts measures how far each note needs to be moved to join with the pitch standard. The fork error is consistently double the float error. This would be even clearer in a set of charts comparing float and fork for each of the four notes (which space does not allow). Again, there is little surprise: if your pitch standard is moving with the hygroscopic changes right along with the rest of the piano, the rest of the piano will be a lot closer to that pitch standard than if the tuning were being nailed at A-440. For those of us of the opinion that the less a piano gets moved during a tuning the more solid will be the tuning, the advantage of letting pitch float is clear.

Crack the Whip!

That first exploration of "floating" versus "forking" the tuning was based on the scenario of a piano kept on a very short leash. (Please forgive me this comparison to dog training.) The 4 cents "trip-wire" would have caused *eighteen* tunings between 10/10 and 3/23. In fact, one group of three came within four days, and another of four, within 6 days. That's hardly the treatment for most of the pianos we tune, and certainly not the practice room piano described at the start of the article. To simulate that scenario, I have selected only the very outward points of the hygroscopic curves (once again found on note C#29). There are five in all: 10/10, 12/22, 12/26, 2/17, 2/26, and I'm adding "one for the road" on 3/23. Earlier, the tunings tended to be frequent nudges in a direction opposing a longer trend. Now, the tunings are called in at the point where the hygroscopic curves are reversing themselves. As a result, the tunings and the hygroscopic curves are sending pitches in the same direction, and their effect on the piano's pitches is combined. As seen in the next pair of charts, affectionately titled "Whiplash Tuning, Floating Pitch Standard".**(Figure 5)** and



"Whiplash Tuning, Pitch Standard: Fork" (**Figure 6**), the decision to allow the tunings to float begins to tame the widest excursions of the piano's tuning. The same rules apply here as before.

The spread of intervals is solely a function of hygroscopic motion. The float and fork error (see "Whiplash Float Error" (**Figure 7**) and "Whiplash Fork Error," **Figure 8**) again represent how far these notes would have to be moved for a tuning at a chosen standard, as opposed to representing the out-of-tuneness a pianist might perceive. But the floating standard now begins to restrain the maximum swing. The reason here is that, as explained above, the hygroscopic motion and the tuning are combining. In this situation anything that can limit the amount of motion caused by the tuning (like a floating pitch

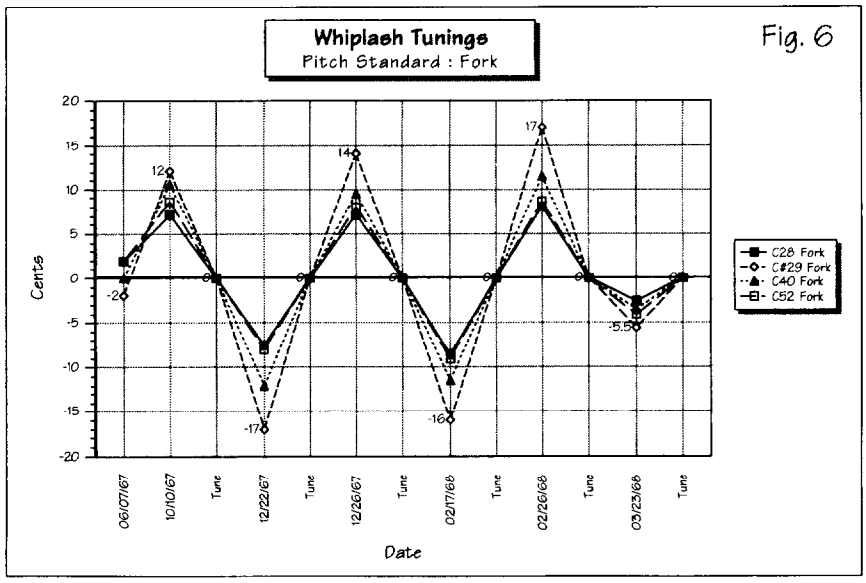


Fig. 6

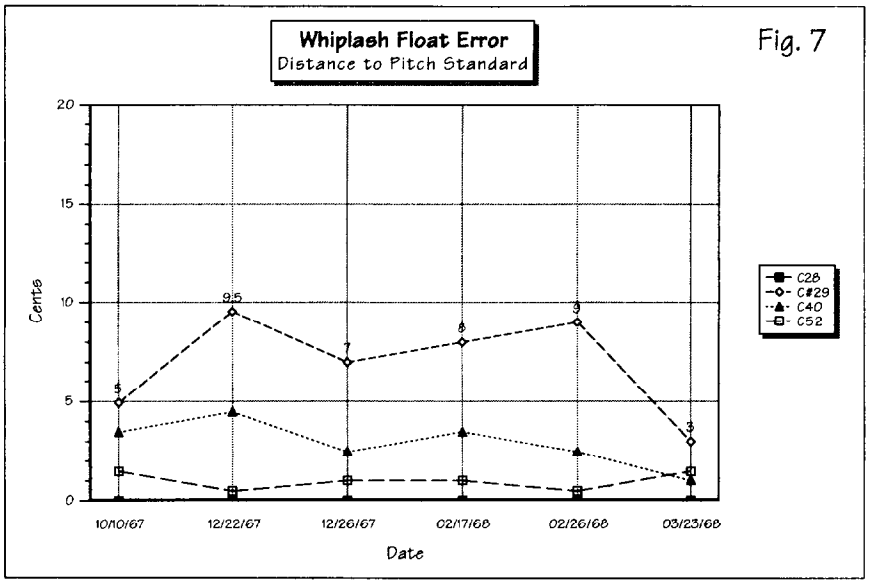


Fig. 7

standard), will cut back the hygroscopic curves next swing.

As you might expect, the extent to which a floating pitch can do this is a product of how far that pitch itself is straying from A-440. If C28 and A-440 are close by, there won't be much distance between the two sets of hygroscopic motion curves, as they are relocated by the tuning. Two high-low swings illustrate this. On 12/26, the tuning is bent out of shape again, but there's only a .5 cents difference between the pitch levels of the floated and forked tunings. That's because at the time of the previous tuning (12/22), C28 was a mere -.5 cents, and this amount was the resulting difference between that tuning and the next; however, on 2/17, there's a considerable difference between where these tunings have ended up, with the floated C#29 at -9.5 cents and the forked C#29 at -16 cents. That 6.5 cents difference comes from the 12/26 floated tuning being pitched at +6.5 cents. By the way, as you look at the two whiplash charts, you'll notice that the float pitch alternates between something in the range of plus 6-7 cents and something just below A-440. The explanation is circumstantial: the first float tuning was done at a point when the piano was on the high side. The width of the float tuning's swings is certainly narrower, and centering them around A-440 instead of the 3-4 cents line would be no special trick.

Of course, the maximum hygroscopic drift on Galt's piano was from +12 cents (10/10) to -6.5 cents (2/17), both on

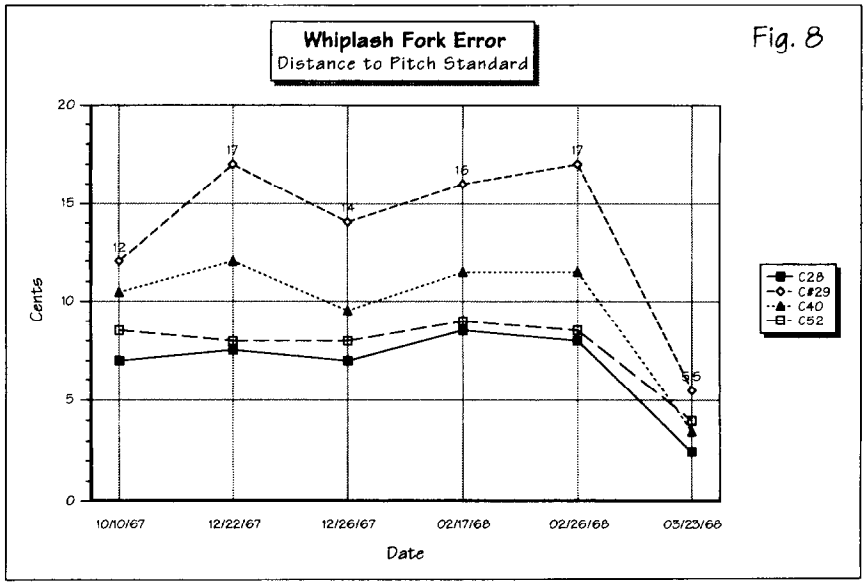


Fig. 8

C#29. This total swing of 18.5 cents is pretty tame compared to the piano in our practice room. Of course Galt's piano hadn't been having its hygroscopic curves knocked around by tunings at odd times of year. That, plus the difference in our climate zones, would account for most of the "temperateness" on his piano. But that shouldn't stop us from exploring what happens with Galt's piano, if we stretch its figures proportionally to resemble our practice room piano. Imagine that on the day we started this pair of hypothetical tunings the piano's D30 was at a peak of not 17 cents, but 31 cents (A448). At this rate, we would be nearly doubling Galt's pitch figures. (You'll have to allow yet another assumption in this scenario: that relative humidity swings *double* the size recorded by Galt are occurring in the original time frame.) As with many of the other steps in this exercise, the results are anti-climatic. Since all the hygroscopic figures double; the distances to a floating standard (at C28) and to the fork also double. Hence, the overall shape of the curves for both the tunings and the errors simply increase in direct proportion with no change in shape. If you halved the scale of the y-axis on this graph, the curves would be identical.

What *does* gain in significance is the absolute amount by which the floating standard has cut back the swings in pitch. Where C#29 on the fork tuning of Galt's piano jumped from 14 cents to -16 cents between 12/26 and 2/17, on our practice room piano it would have plummeted from 25.5 cents to -29.1 cents. (The operating ratio is 31:17.) With a float tuning, what was a 13.5 to -9.5 swing between those two days, would now be 24.6 cents to -17.3 cents. What is important here is the low pitch arrived at when the 2/17 tuning was requested. Looking at the A-440 at the 3rd partial of D30, with a fork tuning that would be to 432.6; with the float tuning we'd be at 435.6. Three Hz may seem like small consolation for a pianist wishing that the piano didn't wander at all, but it's certainly not to be spurned. Keep in mind that the greater the piano's

swings in pitch, the more a floating pitch will limit those swings. Yes, this does defy the rules of proper animal training, that the more it strays, the longer a leash you should give it, but that's the way it works. Remember, too, that if your pianists have the average sense of pitch, they'll notice less that each of your tunings is nailed to the fork, than the fact that when the weather gets finished with the tuning, the pitch seems ready to be rounded off to the nearest quarter-tone. Here the floating standard becomes well worth it.

Inconclusions

Yes, I did not mean to say "In Conclusion." To begin with, this study is statistically laughable. We're asking four notes on the piano to represent the condition of entire regions of the piano. I'll also make no excuses for the fact that this is a vastly simplified model and it works only because we choose to exclude the change in tuning caused by playing. Consider, however, the impossibility of a real-world study. The algorithm to cover 240 strings instead of 4 notes, and to break the recorded motion into the categories of hygroscopic, tuning, and playing, would be a monstrous one. Furthermore, given that such data would come from real-world observations, this experiment would have to be governed by an equally monstrous set of control conditions. Also, this exercise is scandalously uninterested in what could be accomplished by a little climate-control.

However, all that said, this model is the best on hand to explore the way these two pitch standards interact with a set of hygroscopic motion curves, or more simply put, affect the wandering of a piano's tuning. It demonstrates that the swings in pitch can definitely be narrowed down by allowing the pitch standard to float. I have personally seen pianos go from a swing of A432-448 to A438-442, by doing this.

This model also provides plenty of food for speculation (in the form of the float and fork error figures) for those believing that the most solid tuning is the one requiring the least movement. Ultimately, the difference in these two standards is the distance it takes an out-of-tune piano to reach them. What this means for the piano's ability to stay in tune comes down to the extent to which moving wire gets in the way of a solid tuning. This is of course outside the assumptions of this exercise. Regardless of the danger to a solid tuning from moving large amounts of wire, we assumed that playing wasn't going to knock anything loose, and if the hammers' percussive assault on the strings doesn't do it, it would be hard to make a case that the board's slow hygroscopic swell could. How we think this works in the real world is certainly up for discussion.

Rules for Violating

Yes, I allow pitch to float, but as said earlier, under certain guidelines. We'd be negligent if we didn't try to arrange for climate control. After all, climate is the reason we're having this instability, and to concentrate on the symptoms instead of dealing directly with the cause is the worst kind of medicine. Also, see if it's possible to budget more frequent tunings. I don't mean to say that the weather is going to push a piano tuned last week around any less than one tuned last season. However, you'd be surprised at how fast a piano stabilizes with a few extra tunings. What they will do is to limit the time that hygroscopic motion has to pull the intervals apart from a unified tuning, and as a result, cuts back on the divergence of the intervals.

We should also acknowledge the wisdom of the old fashioned "Fall and Spring tuning seasons". It took almost fifteen years for me to realize that because these two seasons were at the zero-line of the seasonal roller coaster, they were going to yield the most stable tuning. In fact, in my neighborhood, there is *no* time of the year when the climate just sits. Pick any month, and by the next, the climate is headed off in a different direction, dragging the piano with it. Visit that piano in the height of summer or the dead of winter, and it'll be crying loudest for a tuning. But to tune it then is to wrestle with large amounts of pitch correction. It sure makes the tuning stubborn in settling down. We have also seen this insure that another wide swing will follow. The best thing is to tune the piano during the temperate Spring and Fall seasons, when, at the most, you'll be repairing the damage left over from the extreme seasons. If the *pianist* really needs an August tuning, offer a twenty-minute rough tuning at a floating pitch, for the price of a service call.

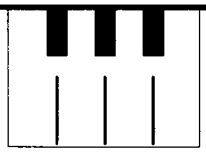
Often none of these remedies can be sold, and you're left to your own devices in taming these wildly out-of-tune pianos. First, make sure that the owner understands what you are doing with the piano's pitch and why. Second, I would look at the yearly schedule of tunings for that piano, and select one point at which the piano will be pegged at the fork. Without at least one such tuning a year, you'll have no way of knowing if the piano is having difficulty staying at pitch over the long run.

I'll add one further variation on floating pitch, that I've heard but not tried myself. If the tuning is just prior to what you predict to be a major seasonal change, pull the tenor section (remember, the least stable one) slightly in the opposite direction from which the entire piano will move with that anticipated change. For example, at a March tuning, widen the tenor octaves as much as you dare, so that these notes are starting from the tuning on the flat side. Then, in the next four to six weeks as this tuning goes sharp with Spring humidity, the tenor section (that moves farther and faster than the others) will first be catching up with them, then briefly in tune with them, and later, not as far sharp from them as it might have been. This trick is from the same bag as adding an extra 1/16" to a hammer bore length, putting crown in the middle of a keyboard's leveling, and setting bridge pins just slightly out

into the notch. All of these intend to delay the point at which a measurement will be correct until after an expected settling in period. Yet they all deal with a constant drift (due to wear) in a constant direction. This makes the choice of the point of correctness somewhat arbitrary. As for me, I'd make the tuning correct on the day when I'm there to insure it, and when I'm asking to get paid for a correct tuning.

To my knowledge, this is the first real discussion in the *Journal* about tuning to something *other* than a fixed pitch standard. It would be over quickly if climate control and a more forceful rough tuning were all that was needed. However, letting the pitch float is a common practice that deserves honest discussion. Let's hear from you.

As always, address correspondence to me c/o *Journal* Editor Jim Harvey. (By the way, have you ever posted a message on his electronic bulletin board? All it takes is your computer, a modem, and his fax phone number.)



Good Vibrations

The Basics of Good Piano Tone

The Fundamental Is Prime

Nick Gravagne, RPT
Contributing Editor
New Mexico Chapter

When Louie Armstrong was asked, "What is jazz?", he put a handkerchief to his brow and answered, "If you don't know, there's no way I can tell you." Most of us know jazz when we hear it; or at least we know we're *not* listening to "classical music" or Country. Along a similar line, the same can be said for piano tone. What is it? If you have to ask, there's no way we can tell you. For one thing, tone is a phenomenon that exists in the air and is perceived in the ear. Setting it down on paper is like trying to explain colors using words only. Still all is not lost.

Fortunately, as with jazz, piano tone is not *completely* subjective. There are many objective aspects to it. Thus any talk of piano tone must first deal with the concrete before moving on to something more vapor-like. Jazz musicians, for example, work with an agreed-upon format — a chord progression and a rhythm. This is concrete. Within these parameters the artists enjoy great leeway as to how the music flows. This is the gas. Good artists make good music; bad artists make noise. Likewise, good piano tone makes music, and bad tone makes noise. It is the job of piano voicers to separate the noise from the music.

An interesting language has evolved. Piano technicians and players have invented an emotion-laden "tone language." One marvels in the diverse subtlety and poetry of it. We are fond of such words as warm, round, full, thin, brittle, sharp, tinny, fluid, and so on. These words are not always useful, nor are their meanings always agreed upon. Yet most of us who have been around pianos for more than a few years hear and speak "piano" in all accents and dialects. We know. The outsiders are heathens and brutes. Such words describing tone, such as "rich" or "poor" are more literally accurate (as we shall see) than more open-ended words such as "magnificent" or (heaven forbid) "awesome." Thus, our little language must be used and studied and re-evaluated.

Certain assumptions must now be accepted. Our "tone", as it exists for the sake of our discussions, emanates from an instrument of fine order — the soundboard has crown, the strings are pressing on the bridges, the case is tight, the action in good regulation, the piano in tune. Granted, these are *huge* requirements, and often a piano's "hammer problem" can in large degree be traced to structural and mechanical compromise. Much of this has been covered in past articles, and more is to come. So let's move on.

The Essential Components of Piano Tone

In general, we are all in agreement that the following components of tone must exist for any piano:

I. Power. In most applications the sound from the instrument should be loud — as loud as possible on a forte blow, but without harshness and nose. Now it is important to know that this "noise" does not refer to buzzing agraffes or grooved capo bars. This noise is an unwanted component of the tone that arises when a firm hammer played hard "overdrives" the string/soundboard system. You know what it is like to overdrive your car radio when you crank up the volume. The sound breaks up and distorts. So you back off the control knob to the point of most volume, but "clear" volume. Loud and clear is what we want. Many forte blows delivered to the keyboard cause the tone to break up and distort; yet, at a moderate blow little or no distortion can be heard. This condition holds meaning to the experienced voicer. We will cover it in due time.

Regarding piano tone, where does power come from? Primarily from a firm hammer. The lower portion of the hammer must especially be firm. *The foundation for strong clear tone begins with a firm hammer.* This firmness, as opposed to looseness and softness, is built into the hammer naturally through pressing, or unnaturally through the use of hardening agents.

II. Projection. Also known as *carry* or *sustain.* Not to be confused with power only, this aspect of tone we recognize as "soaring" or "singing". The note, once struck, "takes off to the rafters" and hangs in

space loudly for several seconds. Imagine a large gong or a bell being struck by a large mallet. After the attack the tone swells and sustains effortlessly. Such aggressive tones insist on being heard, and pianists delight in hearing them. Now keep in mind that two notes may sustain equally long, but one soars while the other crawls. The reason will be explained in due course.

III. Proportion. Also known as *balance* and *evenness*. Strictly speaking, these considerations have more to do with harmony and consistency than with discovering and extracting piano tone from selected notes. Dress up one soldier until you are happy with the effect, then dress up the army likewise. "Dress up" a few notes for power, clarity, and sustain, then dress up the remaining notes likewise.

The Natural Dynamic Range

The idea of dynamic levels of tone quality, although less obvious than the idea of evenness throughout the scale, must surface here. When hammers are correctly made and voiced to a particular instrument, what we hear in the piano are different kinds of tones, corresponding to different forces of key blow. There exists what we call a dynamic range of tonality. A hard, forte blow jars the string and soundboard system, violently resulting in the excitation of high harmonics. The tone is not only louder, but more brilliant due to the presence of the high harmonics. A medium blow is less loud, and brings out fewer high harmonics. Finally, a soft blow is least loud and least brilliant. This natural course of events follows *if* the voiced hammer contains a graduated density (firmness) — most firm at its interior, and proportionately less firm toward the exterior of the hammer.

Physicists refer to this condition as "nonlinear"; that is, the hammer is effectively "harder" under a forte blow, and least "hard" under a pianissimo blow. But we have all run into trouble with super-hard pressed (possibly hot pressed) hammers which had no graduation of density. These hammers are, for practical considerations, equally dense from head to toe. No matter what sort of blow is delivered to the key, the tonal coloration in terms of high partials and brilliance is essentially the same. Volume changes, but a dynamic of coloration does not. Such hard hammers *can* be made to work better, but not necessarily as well as a more naturally made hammer.

Poor Tone, Rich Tone

Professor Helmholtz's Contribution

More than one hundred years ago German physicist Herman Helmholtz defined a "poor tone" versus a "rich tone" perhaps as well as is possible. In essence he informed us that a poor tone contains a weak fundamental, one which has been sapped by a hornet's nest of high discordant and competing partials. Note that the word "poor" here signifies that the fundamental is poorly represented. A rich tone, on the other hand, is rich in its prime tone, and coated with a pleasing array of coloring upper partials. These are objective reasonings, the concrete.

That someone should prefer a poor tone to a rich one does *not* alter the fact that a poor tone gives forth a poor prime, while a rich tone a strong prime! These simple facts are of such importance that I consider them to be the cornerstone of not only understanding tone, but in creating tone in the instrument.

A brief lesson (or reminder as the case may be), seems in order as to how piano strings behave. First, we all know that a taut piano string is able to vibrate not only along its full length, but in shorter segments as well. The lower the tension, the fewer the segments, and the higher the tension, the more abundant the segments.

Hence, a struck or plucked string gives rise to what is called the "harmonic series." If we take C40 as the prime tone, the lower harmonic series exists as follows:

Fundamental
C40
1st overtone
C52
2nd
G59
3rd
C64
4th
E68
5th
G71
6th
Bb74
7th
C76

The 8th overtone is D78 (which, incidentally, naturally clashes with all the C's in the series). Still higher overtones clash even more and compete for "equal time" with not only the prime tone, but with the lower series of overtones.

If we imagine that tone is an empty cup, and that a prime and partials are required to fill up the cup, then the question begs as to what mix of prime and partials are required for the best tone? As suggested earlier, a poor tone fills up the cup with little prime and far too many partials, but a rich tone fills up the cup with a generous portion of prime, and a healthy sprinkling of lower partials. This isn't just fanciful wording on my part. Remember that a soft and a hard hammer of the same mass, and moving toward the string at the same speed, each carries with them identical energies. But the condition of impact is markedly different. The softer hammer delivers a portion of its energy to the string and receives the remainder back on itself in absorption. The harder hammer delivers a greater portion to the string and receives a lesser amount back on itself in absorption. In both cases the identical energies were "used up" — in the "hard" case to cause a weak prime but strong overtones, and in the "soft" case a stronger prime but fewer overtones. Thus, and it comes as no surprise, the condition of the hammer

exerts a tremendous influence over the harmonic series arising out of a single string.

The Test of the Perfectly Hard Metalic Hammer Versus The Felt Covered Elastic Hammer

Consider two quotations from Helmholtz's famous book, *On Sensations Of Tone.* You will note in both passages the use of the intriguing terms "abrupt discontinuities" and "discontinuity of motion." If you can't guess what they mean from the passages, just bear with it for now. These and additional terms such as hard, soft, stiff, resilient and so forth will be explained next month as we start to close in on actual voicing procedures.

Now the quotations:

If the string is struck with a sharp-edged metallic hammer that rebounds instantly, only the one single point struck is directly set in motion. Immediately after the blow the remainder of the string is at rest. It does not move until a wave of deflection rises, and runs backwards and forwards over the string. This limitation of the original motion to a single point produces the most abrupt discontinuities, and a corresponding long series of upper partial tones having intensities, in most cases, equaling or even surpassing that of the prime. When the hammer is soft and elastic, the motion has time to spread before the hammer rebounds. When thus struck the point of the string in contact with such a hammer is not set in motion with a jerk, but increases gradually and continuously in velocity during the contact. The discontinuity of motion is consequently much less, diminishing as the softness of the hammer increases, and the force of the higher partial tones is correspondingly decreased.

And in another place:

For a pianoforte, the discontinuity in the motion of the string is diminished by covering the hammer with an elastic pad. This sensibly diminishes the force of the higher upper partials, because the motion is no longer conveyed to a single point, but is imparted to a sensible length of string, and this too, not in an indivisible moment of time, as would the case for a blow with a perfectly hard body. On the contrary, the elastic pad yields to the blow at first, and then recovers itself, so that while the hammer is in contact with the string, the motion is capable of extending over a considerable length.

We'll put professor Helmholtz back on the shelf for a while.

In a nutshell, what the passages simply mean is that a hard hammer, rebounding instantly from the string (that is, the point of the hammer does not flex upon contact), sets up a violent and jarring series of high upper partials at the expense of a string fundamental. The elastic hammer, delivering a less violent blow, allows the string to develop full continuous velocities in the fundamental and lower, harmonious partials. It is these "continuous velocities", as opposed to the "abrupt discontinuities", which encourage the singing and sustaining piano tone.

We'll develop these concepts more practically next month.

Everyday Voicing

HAMMERS: Internal Forces At Work

Bob Davis, RPT
Dale Erwin, RPT
Modesto Chapter

In last month's article, Bob presented a concise overview regarding the physics and mechanics relating to tone production in the acoustic piano. This piece of writing represents a sort of informational thesis that will be the framework for all our further discussions on voicing. Although it may seem like a lot of science and theory, we hope you found it revealing, for it is always information and subsequent reasoning which back up things we do, or have learned in an intuitive or hands-on way. I think you will discover that the techniques and understanding of voicing usually have followed the doing of it, i.e., trial and error (heavy on the error). And error for many means risking failure at the expense of a client's piano and our own reputation. That is one reason we've suggested low risk experimentation (old hammers or spares for voicing practice). Our endeavor is to approach voicing from a different direction, so others starting the process or expanding their expertise can have an informational base to check in with. However, theory and science won't matter to anyone unless it gets down to the decision-making process where some form of reason dictates reasonable action, instead of second guessing each needle stroke or juicing application.

It is obvious that one of the hottest topics discussed among technicians is that of hammers. How do they sound? How do they voice? Why are they different? Do they hold the voicing? All good questions — all striving for a deeper understanding of what makes these things work and why poking them with needles changes the tone.

Hammer Mechanics

A hammer's movement is similar to many flexible spherical objects, i.e., basketball, superball, golf ball. Like these objects, a hammer stores and releases energy. Physical forces move down over the point of physical contact and out at the sides. As the hammer strikes the string it compresses and at the same time deforms the string. Upon reaching maximum string deflection, the energy stored in the form of compression is released and pushes the hammer away from the string. The string also being a spring assists the hammer's escape. A hammer, being a felt spring, compresses in a nonlinear way. It becomes harder and stiffer as it is compressed mainly because of the elastic nature of the felt.

Internal Forces Work For You

There are a lot of things about hammer manufacturing which are intriguing. However, it is the internal forces at work in the finished hammer that work for or against you. Let's take a look.

Hammer making begins with a long, triangular, tapered felt sheet, rather limp (**photo 1**). A long stick of molding material is pressed into the felt and forced into a hammer-shaped caul that forms the hammer. The glue dries and the set of hammers is removed and cut apart. This great force applied is doing several things. It is bending, stretching, and compressing the felt simultaneously. Why is this important? The tension and compression forces are now captured in a permanent state on the molding. The ideal hammer, pre-compressed, is now a unique mechanical device. Unlike a coil spring at rest, the hammer is in a pre-loaded state. When these stress forces are available it allows them to be rearranged and shaped to achieve the desired sound. Remember, potential energy is caused by the relative position, or by arrangement of particles (material). The above description is for what I call reasonably made hammers. It is possible to abuse felt through over-processing and poor manufacturing that truly creates just felt on a stick. If these forces are not present, why not? The elastic characteristic of wool fibers themselves is a critical element. The outside of a wool fiber has plates that lock together like Velcro, only stronger. During the felting process they lock tight and become denser. The inner cell of the wool

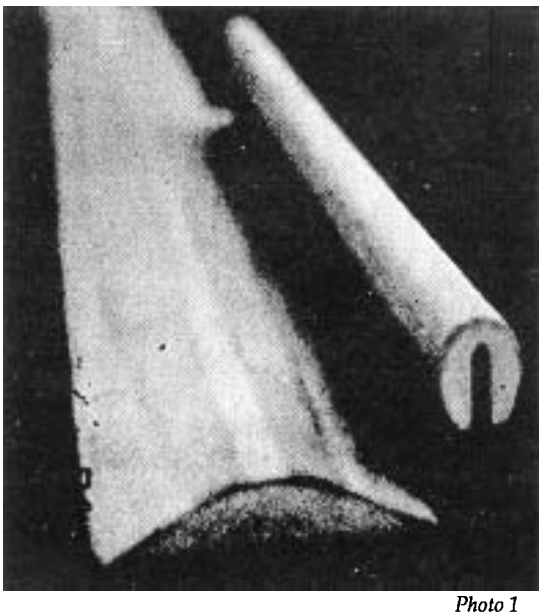


Photo 1

hair has elastic cells that have memory (thank you, Ari Isaac). After the felt sheet is pressed into the caul, steam is introduced in many cases. This heat and moisture is added to help densify the outer tension layers that are stretched. This causes the tension in the felt to relax, reducing tension and increasing stiffness. At the same time the inner hammer becomes excessively dense — to its detriment. In extreme cases the hammer now has the same inert characteristics as a felt buffing wheel. That's fine for polishing metal, but not for creating tone. When heat and steam are used judiciously in the press, more reasonable hammers result. Why use steam at all? The tension layers being less dense sometimes lack enough stiffness initially for high partial clarity until some playing time packs in the top of the hammer. Steam also allows the treble area to be made very dense to meet stiffness requirements. (Heat also is used to cure the glue.) The piano-buying public will usually tolerate loud and bright sounds, but not soft or dull ones. Recognizing and responding to public demand, manufacturers have tried to accommodate. Please note this is an incredible oversimplification of hammer making. How felt is made, its differences, over-processing, heat or steam in the press, etc., all affect the end product. Perhaps later we will offer a complete article on hammer/felt making.

A Resilience Demo

Here is a good place for a demo. You can easily prove to yourself how hammers flex. A picture is worth... select a spare bass hammer, and, with a sharp pencil, draw a grid of reference lines on the cut side. This makes the flexing more visual. Hold the hammer firmly and press it up against a stationary object, such as a heavy work bench or door jamb. Press and release. Any reasonable hammer will flex downward between strike point and molding tip and out into the shoulders. Try this — it is instructive. You will notice that your initial force, when doubled, does not equal twice the movement. It becomes *more* resistant to compression. This is the hammer's nonlinear aspect at work. Basically, all hammers work the same way and this fact makes voicing procedures more or less predictable. I didn't say all hammers work equally well or that they are made the same way, but in the well-voiced piano, they must flex down towards the molding and out at the sides, even though it is only for a few milliseconds.

Back to Internal Forces

Because the felt is bent, compressed and stretched, certain areas have differing densities. The felt above the tip of the molding to about one-half way up is denser than the outer half by reason of its being sharply bent which densifies it and also being under the most intense compressive forces applied by the press. The outer half is less dense because the felt had to be stretched

an elapsed time (1-7 days). Typically the ones that expand the most have a more versatile voicing application than the ones that don't. (See **photo 2**). Note: In Sample 1, with the molding cut out, the felt has not moved. Sample 2 literally unloaded dramatically upon being set free. No assistance required. Honest!

Photo 2

Why the differences in response? 1) Difference in manufacturing process based on the maker's hammer stiffness requirements for their specific tone building system. 2) Poor design and manufacture. 3) Cost! Quality material, equipment, and expertise are expensive. The fact that we are aware of different styles of hammer will help us to recognize the capabilities and limitations of each style so we can more quickly assess what voicing measure will be needed — juice, light or heavy needling, or jack hammer!

Introduction to Voicing Demonstration

There are many common conditions we see in everyday voicing. As a practice session, we will take a couple of examples and dissect them tonally. Then we will prescribe a treatment as we examine specific needling techniques and their effects. Here is a place you can participate in a sample voicing session. Remember, all hammers work the same way. Therefore, all voicing techniques are applicable, but the proportions will vary, as we will see. Take one expendable stiff hammer appropriate for octave 4 or 5 and follow along. Use a single needle so you can get a feel for the felt. For my sample I will use the "felt on a stick" hammer. It is the most extreme case and this creature is hard to kill. On a scale of 1-10, 10 being stiffest, it is an 8 or 9. The sound it's creating is bright at all levels.

A word about preparation. Although we have purposefully not discussed pre-voicing prep, we will at a later time. For now, level your strings on your test note (string hook). File off the cupping and the fuzz, leaving the hammer top clean, level, and mated to the strings. Set your letoff at 1/16"-1/8". Set a reasonable hammer blow and key dip.

Reading the Hammers

The ultimate goal of voicing is to be able to quickly read the piano hammers by the sound they are producing. Comparing the pluck test with the struck sound, we can quickly ascertain specific problems. Is the problem in the board, strings, bridge, or hammers? If the pluck test exhibits a reasonable sustain and swell, and the struck sound doesn't match it, the fault lies in the hammers. You won't usually exceed the characteristic of the board through voicing. A very common voicing problem these days is short sustain which, of course, has a weak fundamental and predominance of higher partials and a piercing attack. What is wrong at all dynamic levels with the hammer? Reviewing what we found so far will tell us that string contact time is too short indicating the hammers are too stiff everywhere. We must increase the resilience of the hammer to increase the hammer-string contact time. How? Lightly needle the top? That would temporarily reduce some ping at all levels but leaving middle and low partials unaffected as well as sustain. Important concept: in everyday practice if sustain is increased, many other tonal objections are decreased because as we needle to create variable rate compression energy is transferred to the lower partials via exciting longer segments of the string (longer contact with string).

How is energy transferred from the high to low partials? By removing stiffness from the areas that are supporting the crown of the hammer. For example, deep needling the shoulders and/or needling through the cut side of the hammer you can reach the denser core of the hammer (**photo 3**). (Side voicing entails needling through the cut side of the hammer. Hold the hammer firmly with one hand and push the needle all the way through with the other hand.) This creates more flexibility in the core and increases the time it takes for the hammer to compress from strike point to molding tip. Aha! Time. The key is it takes longer for the hammer to compress while in contact with the string. This creates a less severely deformed pulse wave and pushes the string longer. The results are more fundamental and better mix of higher partials. This is most notable on a forte blow. Why? Because this hammer is still too stiff elsewhere. As we play the note through its dynamic range, it becomes clear that only some harsh and loud sounds have been

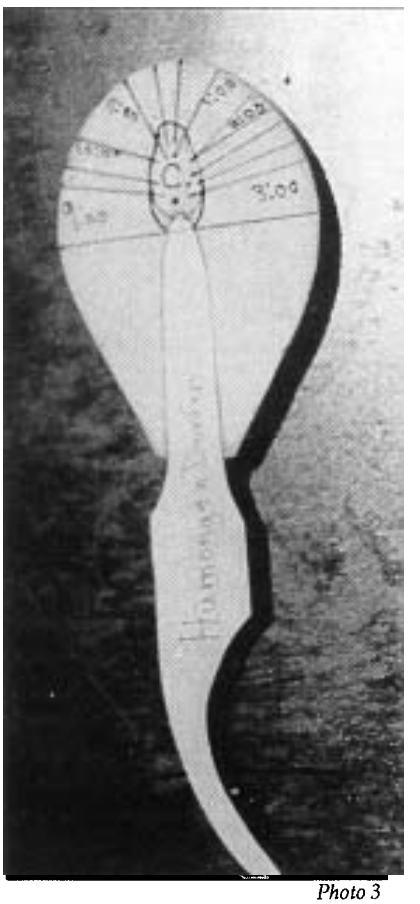


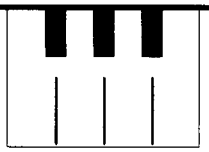
Photo 3

removed at forte levels. Mass and force (kinetic energy) have acted to distribute energy deeper into the hammer utilizing these areas. At pianissimo, the upper shoulders are still too stiff to flex when a lighter blow is applied. They are still acting independently because stiffness is inhibiting its variable rate of compression. The next step would be to do some deep needling at the 10-11 o'clock and 1-2 o'clock areas. This will remove more stiffness from the crown area, which allows more flexibility higher up in the hammer on lighter blows. The results should be a smoother attack, stronger midrange and lower partials, and improved tone color change over the dynamic range. Important concept: deep needling the shoulders does two things at once. It releases tension on the shoulders, allowing expansion (and a decrease in stiffness) both in the shoulders and in the core. This can be either good or bad, depending on the condition you are attempting to rectify, as you will see in our next example.

Probably with the needling we've done the tone has improved greatly but being that this hammer is really stiff, we need to look at the top. If a pinging sound is present at pianissimo the area directly below the striking surface can be judiciously needled at varying angles and depths to break up the stiffness. This aids compression and improves tone color especially at pianissimo. After this, re-listen dynamically. Use the clues to answer what the next move will be. Remember, this sample hammer is expendable. For soft pedal voicing, a few shallow needle strokes between the string marks will improve tone color at reduced volume. In the shift position the hammer is moved off its normal string marks and onto this area. By this time, the top surface is a little fuzzy. With the back of your voicing handle, pound on the top surface firmly to re-pack and reset the felt. This will recompress the felt you have disturbed and will simulate a few hours of actual playing time. Redress lightly with fine sand paper (220/320) to clean up the fuzz. Check for level, then retest the note at all dynamic ranges. Continue to let the tonal clues tell you where the hammer is still stiff. When in doubt, your single needle as a probe is an invaluable tool.

Another common condition exists in many new pianos. It is the case where individual parts of the hammer are working against each other. In our first example all parts of the hammer were too stiff and spectrum too bright at all levels indicating too much stiffness everywhere. In this case we have a stiff core, a less stiff top, and low shoulders that have been over-needled. In this condition the high partials are removed at all levels. The top and shoulders are working against the core. Why? The core will be trying to produce a high spectrum on a hard blow but the tip and shoulders will actually be absorbing energy. The effect is like letting air out of a basketball. The result on a loud blow will be an unfocused, muddy sound with a short sustain and little projection. First a light filing will clean the surface and free it of any dead felt that may be absorbing energy. To avoid further shoulder damage the appropriate fix would be side voicing through the core. The core will be made to expand while parts farther from the core will be made more stiff. The compression is redistributed without further disturbing or destroying the tension areas in the shoulders. Sustain and spectrum have improved as string contact time increased. How much needling is typical for side voicing? It depends on the stiffness. Start needling directly above the molding one or two times and then listen for increased sustain, swell and tone color shift. Repeat as needed in the general vicinity around the molding tip. Generally, more needle strokes can be used in the bass than in the treble to correspond with stiffness requirements as you move to the high treble. The low shoulders being weak may need to be reinforced with lacquer to support the compression and stop the energy drain. The result will be better power and more sustain. Some upper shoulder needling often helps midrange partials now that lower support is restored.

These few brief voicing demonstrations are just an initial exercise. As difficult as it is to write about (and two heads *are* better than one — thanks, Bob), I suggest that it is even more so to wade through in one reading. We will continue more demonstrations in greater detail in subsequent articles. As our ability to read hammers increases, it reduces confusion. The exciting part is producing wonderful, customer pleasing sounds with consistency and confidence. If the fog sets in, try again later — that's what I do. But if you're a real voicing type, you probably lie awake at night thinking about this stuff.



Tech Talk

Don Mannino, RPT
National Service Manager
Young Chang Pianos

The Keyframe

Fourth in a Series of Articles on

Grand Action Regulation

Now that some conceptual groundwork has been laid, let's look at the grand piano keyframe, start laying some physical groundwork in the action cavity, and begin the first steps of regulation. A stable, well-bedded keyframe is the first step in a solid action regulation. All three rails (front, balance and rear) must be stable and in solid contact with the keybed itself. If there is any vertical motion of the keyframe when the piano is played, energy will be lost which would otherwise have been sent on to the piano strings to create music.

In preparing for concert tunings, especially with an unfamiliar piano, it is a good idea to do a basic key bedding test; pound on the keys throughout the scale with your fist, watching to see if the unplayed keys near those that you are pounding bounce (thanks to Norm Neblett for sharing this in a technical institute class some years ago). If the neighboring keys bounce, then the keyframe is not solid, and this should be corrected if at all possible.

A flexible, unbedded balance rail is one of the biggest energy absorbers you can have in a piano. In tests at Young Chang, we found that in some pianos the bass hammers did not start moving until the key had already reached bottom on very hard blows. This gives the piano a terrible feel, similar to having backchecks catch the hammer tails on hard blows; as the note is played harder, the sound gets louder only up to a certain point (when the hammer no longer starts moving before the key reaches bottom), then it seems to fall off, as the action plays the note solely with stored energy. The key, keyframe, wippen, knuckle and hammer shank all release the energy stored in them, and "thwack," the hammer flings up and hits the string.

Although this can occur from a design problem, it can also be caused by keyframe motion from poor bedding, especially at the balance rail. If one or more bedding screws (also called glide bolts or sometimes Touch Regulating Screws [perhaps not the best term]) are not in solid contact with the keybed, the balance rail is allowed to spring and flex, absorbing power. On the fist banging test mentioned above, this can be seen as a *downward* movement of the hammers next to the ones being pounded.

In the front rail, the main symptom of poor bedding is usually knocking, but this can be masked by the sound of the piano. I have had customer complaints of poor, woody tone in a section of the piano, and rebedding the front keyframe rail solved the problem. A severe problem can also show up in the pounding test as *upward* motion of the hammers near those being pounded with your fist.

The rear keyframe rail is often neglected by technicians, mainly because the symptoms of poor bedding are not as severe as with the other rails, or perhaps because the symptoms don't always seem to be caused by the keyframe. The main symptom of poor bedding of the rear keyframe is excess bouncing of the hammers and keys when the keys are quickly released.

In addition to good keyframe bedding, we must also consider the location of the action side to side. Since action location is the first step in my regulation checklist, let's look at how to establish the correct location of the keyframe in the action cavity.

The location of the action in the action cavity *must* be set by the strings. In an improperly made piano (or one with a new damper action to install) this may require re-setting the damper action to meet the keys - a necessary evil that must be done in the interest of getting everything set right.

In the piano factories, the upper action (what we call the action stack) is assembled, and the parts are traveled and spaced so the wippens and hammers move in the same plane, with the hammers spaced directly above the wippens. Although I have worked on exceptions to this rule (and they were pretty marginal pianos in terms of quality of design), the vast majority of pianos are made with the parts aligned in this way. So once the parts in the action stack are all aligned and traveled, the factory worker then locates the stack laterally by spacing the wippen heels directly over the centers of the keys where the capstans will be installed. This also puts the capstans at the center of the wippen cushions, and hopefully keeps all of the action parts traveling in the same plane (depending on a few other things, like the accuracy of the key

balance bushing slots, etc.). The method of setting the front to back location of the action stack varies from one manufacturer to the next, but the side to side location is always set for proper key / wippen alignment. So the next step is to align the entire action assembly to the strings. Although most pianos we regulate won't need a lot of action relocation work, I will go into a little detail here for those situations where nothing seems to be fitting right.

The fit of the action stack to the keyframe should be checked before the locating and bedding work is done. With the keyframe on a very flat surface, place the action stack on the keyframe without screws, and look for gaps between the action stack feet and the keyframe. Any gaps should be filled with veneer to insure that the action stack, which is quite rigid, is not pulling up on the keyframe and warping it when the screws are tightened. Do not make wholesale changes in the action stack height here - you should only correct for slight gaps.

Step 1: Locate The Action

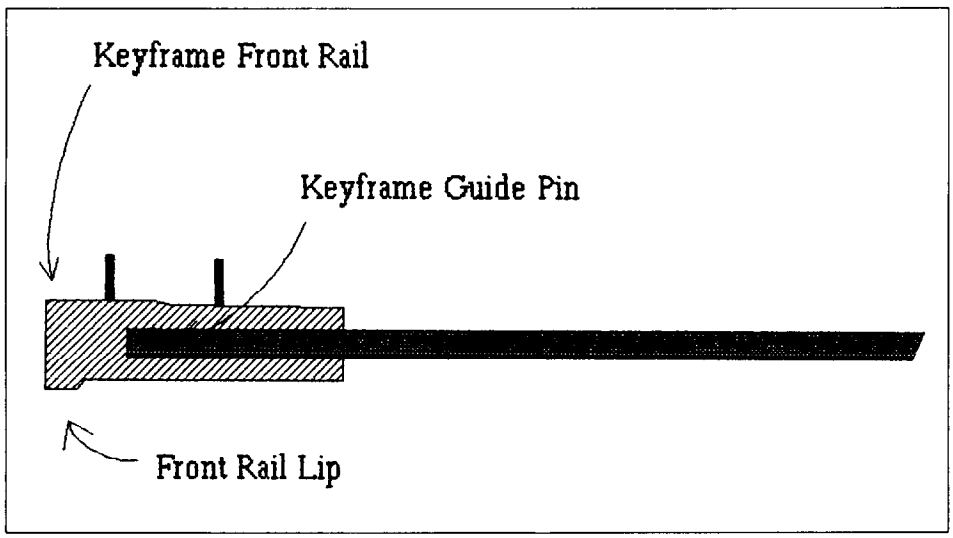
With your action parts assembled and reasonably well traveled and spaced as described above, put the entire action in the piano. If this is one of those pianos that needs a thorough relocation job, take out the action return spring and the action stop block (usually at the bass end of the action cavity), then put the action in the piano. Find the best location of the action in and out by testing the tone in the treble. (Since this series of articles is supposed to be focused on regulation and not hammer work or tone voicing, I will leave the details of this process until another article.) If there is a need for adjusting the hammer line, find the action location that is good for most of the treble and reset the hammer line as needed.

When you are happy with the treble location (in and out), mark the location by drawing a pencil line on the keybed at the front of the keyframe in the treble. Measure the distance from the very front edge of the keybed, and position the bass end of the keyframe the same distance from the front of the keybed. Lightly place the key blocks and keyslip on the piano, and check that there is sufficient clearance between the key fronts and the keyslip. Now look down through the bass strings and, raising the hammers up towards the strings by reaching in and lifting the wippens, check the alignment of the bass hammers to the strings. The problem you can run into here is that, as the action is moved in and out for best tone, the hammers appear to become misaligned/aligned with the strings in the bass. This is because the bass strings are angled across the piano. Although the strike point of the hammers on the bass strings will have a subtle affect on the tone, the lateral alignment of the action to the strings and the action in the piano cabinet are the critical factors. So if the bass hammers are generally missing the strings in one direction, and the tenor hammers seem to be generally aligned to the strings, then you should reconsider the in and out location of the action and look to see if you can adjust the action for a better string alignment while still giving good case part alignment.

When you are happy with the action location front to back, mark the keybed and adjust the keyframe guides in the cheekblocks to fit the action location. In the case of those pianos with keyframe glides screwed to the keybed, plug the holes and relocate the guides. If you took out the action return spring and the stop block, reinstall them now and look at the overall side to side location of the action. Either trim or shim the stop block until the action is located so that the hammers are correctly spaced laterally under the strings.

Keep in mind that some manufacturers recommend that you space the tenor and treble hammers slightly towards the treble, not quite centered on the 3 strings of the unison. This is done so that the unacorda pedal does not have to move the action as far to clear one string of the trichord unisons, making the alignment of the bichord hammers simpler. This small offsetting of the hammers is normally done later when the hammers are finely spaced to the strings, but paying attention to this detail now may help save some time later.

Once the action is located well, put in the cheekblocks and screw them down, then test the unacorda pedal. If there is excess lost motion in the pedal, this is the point where you should look at the bottom of the keyframe to check for wear where the unacorda lever engages the action. If this is worn, repair the keyframe before going on.



Step 2: Bed the Keyframe

Some pianos have bedding screws in both the balance rail and the

front rail. I have seen a few with bedding screws that came up from underneath the keybed also. In any case, turn all the bedding screws up so they do not touch the keybed. Next, check the back rail for knocking by putting a long screwdriver (or a pedal rod, or something similar) through the strings. Place the end of the screwdriver either on the rear action stack feet, or on the back of the keys themselves. Lightly tap on the screwdriver and listen for knocking of the back rail against the keybed. If there are knocks, the areas that are *not* knocking need to be sanded on the bottom.

Many keyframes have a slight ridge on the bottom of the back and front rails that runs the width of the action. This is an effective way for the manufacturer to reduce the area of contact between the keyframe and keybed, thus reducing the sliding friction when the unacorda pedal is used. This also makes the job of bedding the keyframe easier. In an action with very large gaps between the keyframe and keybed this ridge can be built back up by gluing strips of veneer to the ridge, then sanding it. In extreme cases of warped keyframes, the keyframe can be saw-kerfed to help straighten it out and bring it close enough to bed it the normal way. Cutting 3mm deep slots across the bottom of a rail (front to back) will sometimes allow the rail to lay flat. In other cases cutting slots in the top of the rail and gluing wedges in the slots may be necessary to flatten a seriously bent rail.

After you have eliminated the knocks in the back rail, the front rail should be bedded in a similar fashion. There are two basic types of keyframe bedding for the front rail; fully bedded front rails, and spring loaded or clamped front rails.

The fully bedded front rail is one in which the cheekblocks do not put downward pressure on the keyframe guides. Test for gaps by tapping down on the front rail just under the key fronts, moving back and forth across the piano listening for knocks. In the spring loaded or clamped keyframes, the cheekblocks apply pressure to the keyframe guide pins, so you must do the knock test while the cheekblocks are screwed down in position. In some pianos you can use keyframe clamps (large C-shaped spring clamps available from supply houses) to simulate the downward pressure of the cheekblocks on the keyframe guide pins to avoid repeatedly removing and replacing the cheekblocks.

When you find an area that knocks, lift the keyframe slightly and insert a piece of sandpaper (approximately 180 grit is good), with the grit up, under the front rail at the tight (non-knocking) part of the front rail next to a loose (knocking) part. Pull out the sandpaper to remove a little wood from the bottom of the rail. Retest and continue to remove wood in this manner until the gaps are closed and there are no more knocking areas. In those pianos that have front bedding screws, you can usually access them with a thin stemmed screwdriver by lifting or removing the black keys which are over the screws. Starting at one end, gradually turn down each screw until the knocking in that area is eliminated.

The last step is to bed the balance rail. Starting with the second bedding screw (near the bass), gradually turn the screw in until it contacts the keybed, bumping with the palm of your hand all the time, listening to the sound of the keyframe on the keybed. If the bedding screws were turned up, there will often be no knocking at first because the balance rail is too high to contact the keybed when you bump it. To test this press down on the keys at the balance rail and watch the fronts of the keys. If they move down when you press on the balance rail, the bedding screw is not in contact with the keybed. Turn down the screw while continuing to bump on the keys, and you will soon hear the rapping sound as the bedding screw gets close. Keep turning until the rapping or knocking just stops. *The screw should not lift the balance rail at all.* To test that you have not gone too far, lift on the top of the bedding screw with one hand while you bump on the key buttons with the other (if the screw is down low, you may be able to do this by putting a good, sharp screwdriver in the screw slot and lifting on the screw with the screwdriver - a little tricky, but it can be done). You should hear knocking with only a little upward pull on the bedding screws. This indicates a proper adjustment.

After the second screw up from the bass is correct, regulate the first one in the bass in the same manner, then retest the second one again. If it changed substantially, you may have over-adjusted the lowest one, so re-check it. If the second one up only changed a little, go ahead and fine tune it again. Now go on up and regulate all of the bedding screws to the treble. After you regulate each screw, always recheck the previous screw to gauge your work and eliminate any changes.

The best way to think how the keyframe should work is to imagine the keyframe viewed from the side as an arched spring. The front and back rails should rest solidly on the keybed, and the balance rail bedding screws should just touch the keybed to prevent the balance rail from springing down and bouncing when the keys are played.

As a final step, apply a dry film lubricant (for example, McLube 1725) to the keyframe and keybed at all contact points. This will not only help the unacorda pedal to work more quietly and smoothly, but it will greatly cut down on the effort of removing and replacing the action as you regulate and voice the piano.

We will go on to the keys next time. As this series progresses, I will be creating a basic regulating checklist that will grow in length with each new article. I will also attempt to include related service that should be done either along with the regulation step, or just prior to the regulation step listed.

See chart above right

Regulation Checklist:

Regulation Step	Related Service
1. Locate Action	Replace stop block cloth. Repair keyframe at unacorda lever contact. Repair / tighten keyframe joints. Clean and polish keyframe guide pins or springs. If damper wires being replaced, locate damper action to keys.
2. Bed Keyframe	Replace keyframe felts. Replace key pins.

INDUSTRY NEWS

Ray Chandler Has Rejoined Kawai As Piano Technical Services Manager

A native of Northern California, Ray Chandler, RPT, has been involved in just about every facet of the music industry. He graduated magna cum laude from Utah State University with a degree in music, followed by two years of graduate work in England studying music and piano technology.

Ray spent six years in Salt Lake City operating a successful piano rebuilding shop and serving as chief piano technician to the Utah Symphony Orchestra and the Utah Opera.

He then went to work in the piano industry in various capacities which included technical consulting and service management, product training, wholesale and retail sales.

A leading piano authority, Chandler is listed in *Who's Who in the West, Who's Who in California, International Leaders, and Men of Achievement.* He has been an active member of the Piano Technicians Guild, Royal School of Church Music, American Guild of Organists, American Choral Directors Association and the International Platform. He has also served a term on the board of the National Piano Foundation.

Dampp-Chaser Electronics Announces New Humidity Stabilization System

HENDERSONVILLE, N.C—April 20, 1993. Dampp-Chaser Electronics announced it had developed a new humidity stabilization system designed especially for use in a number of models of the Vertical Yamaha Disklavier piano MX-100 series. According to Bob Mair, Executive V.P., the system has three dehumidifiers and a vertical humidifier including a low-water-warning light and an easy-fill watering system. The dehumidifier rods and the humidifier tank are mounted behind the soundboard and between the vertical posts of the frame. This location is made necessary because the space behind the lower panel on the front of the MX-100 is occupied by the Disklavier electronic equipment. The entire frame in the back is covered with a ventilated clear plastic sheet in order to create a chamber to increase the effectiveness of the system throughout the piano, Mair said. The low-water-warning light is mounted under the right end of the key-bed and the easy-fill tube is mounted outside the clear plastic sheet. The control (or humidistat) is mounted on an empty 6" rod in the space in front of the soundboard behind the lower panel.

The dehumidifier rods in the new system are the models 36-38 and 24-25 which Dampp-Chaser recently introduced as part of its new HI-POWER line of dehumidifiers, each of which has at least 50% more drying power (wattage) than the previous models of the same size.

Tests have showed that Dampp-Chaser's new humidity stabilization system for the Model MX-100 Yamaha Disklaviers produces even better results than their regular system for vertical pianos, Mair said. Based on a careful study of these test results, Bill Brandom, Digital Acoustic Piano Service Manager, keyboard Division, Yamaha, has endorsed the use of this new Dampp-Chaser system, when properly installed by a skilled technician, Mair said.

Project Of The Month

A Rebuilder's Soundboard Press For The 90's

David G. Hughes, RPT
Baltimore Chapter

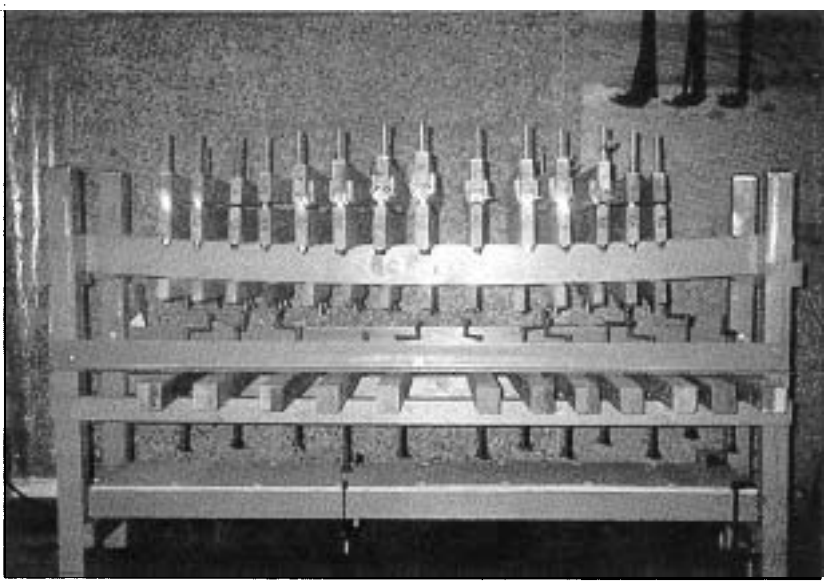


Photo 1

This shop-made belly press has been in use in our shop since the spring of 1991 (**photo 1**). In fact, the term belly press is somewhat of a misnomer. It could better be described as a combination rib-to-soundboard and bridge-to-soundboard gluing fixture. Let me say at the outset that I lay no claim to originality regarding the design of this press. Many manufacturers today use presses of this design and at least one rebuilder, Clair Davies, published an article in the September 1987 *Journal*, outlining the assembly and use of a similar press he constructed to glue ribs to the back of the soundboard. My fixture combines ideas presented by Clair, methods gleaned from numerous factory tours, as well as some original thoughts of my own.

Several years ago, when I decided to take the plunge into soundboard replacement (amongst all the mystery associated with that process), there was one thing I knew for sure: I wasn't going to build a traditional go-bar deck. The massiveness, lack of portability, and, frankly, the antiquity of that style of press didn't appeal to me. What you see in the accompanying photographs is the result of considerable head scratching and tinkering which is still an ongoing process. I wanted the press to meet several important (for me) design and use criteria. First, it had to be relatively lightweight and portable. Second, should I move to another shop location, it had to be able to come along with me, without having to attack the front wall of the building I'm currently in with a jackhammer. With the rib clamping cauls and bridge press beams removed, it will roll through a 32" doorway. Third, it would be designed large enough to comfortably rib and bridge a concert grand soundboard.

The last stipulation is that it had to be able to set up a soundboard with respect to ribbing, crowning, and bridging in conformity with the way I think it ought to be — which brings me to the last concession I'll ask you to swallow before we get down to nuts and bolts. There are probably as many theories on crowning soundboards as there are pianos in production, present and past. This press supports my own, which should not be considered gospel.

Basic Assembly

The superstructure of the press (**photo 2**) was built with standard construction grade lumber and hardware store fasteners. The corner posts are 4x4's held together horizontally by 8'6" lengths of 3"x4"x5/16" steel 'L' angle. Into the bottom of each 4x4 is fitted one of those nice old Steinway grand casters with roller bearings. The entire fixture rolls quite easily on the concrete floor of our shop. The steel angle provides the rigidity in the lower deck for gluing bridges to soundboards. The 2x8 "roller coaster" tracks of the upper deck provide the foundation for the rib clamping cauls to rest on. The 4x4 cover caps on top of the posts are necessary because I can't cut a 4x4 square with a circular saw.

Design of Upper Deck

The upper deck of the fixture provides for gluing the ribs to the back of the board. This is accomplished via the use of numerous clamping fixtures of various lengths to accommodate ribs of differing lengths (**photo 3**). These clamps are made of #1 yellow pine, both 2x6 and 2x4. Yellow pine is an extremely dense, rigid softwood. If you drop even a short length on your shoe, you'll know it. End grain selection was made to get as close to quartersawn as possible. The look on the face of the yard boy the day these were chosen was priceless. The 5/8" threaded rod is locked down tightly to the 2x6 concave shaped lower caul, the 2x4 upper caul can float vertically on the rod via oversized holes. These

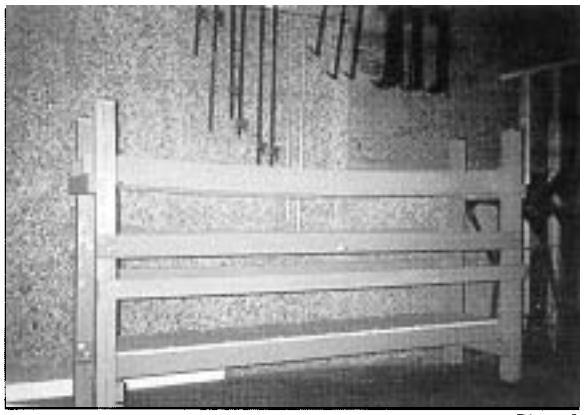


Photo 2

fixtures are set on the roller coaster tracks using the lockbar/wing nut/threaded rod assembly that protrudes from the bottom of the 2x6.

The shorter rib clamps rely simply on the mechanical force of tightening the floating upper 2x4 against the back of the rib to make the joint. This is accomplished with two 5/8" wing nuts tightened with the so-called "Neanderthal wrenches" made from pinblock scrap. The lengths of the longer clamps dictated the use of

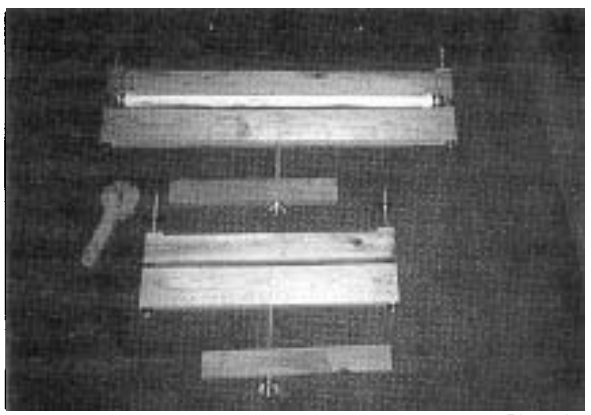


Photo 4

pneumatic force to provide even pressure against the backs of the longer ribs. 1 1/2" fire hose is fitted to the underside of these 2x4's, capped with nominal 1 1/2" copper plumbing fittings and hose clamps, inflated and deflated with Schrader valves — just like your car tires. **Warning**: The pneumatic pressure developed within this type of design is potentially *deadly*. You have only to witness the result of an insufficiently fitted end cap to appreciate the sobering reality of this statement. Know what you're doing should you attempt this, or consult a savvy professional plumber.

Theory of the Upper Deck

Dave's Axiom Number 1: *Ribs shall be crowned, that is, their gluing surfaces shall be intentionally machined to the curvature of a circle, for the purpose of imparting crown to the soundboard.* I subscribe to a 60' radius, widely used by many manufacturers and rebuilders. We built a simple jig for cutting the crown into the face of the rib (**photo 4**). To give credit where it is due, this jig is a virtual verbatim copy of one used by good friend and mentor Rick Butler, RPT, of the Washington, DC, Chapter, who, I believe, got the idea from Steve Jellen. Ribs sit between the two convexly crowned maple rails — gluing surface up, are locked into position with the hand screws, then cut as the router, fitted with a special base plate, rides on the rails. The radius of the curved rails is 60'. However, the router bit protrudes below the rails about 3/8", which compensates nicely for a nominal board thickness of 3/8". Therefore, the top surface of the soundboard arrives at a 60' radius of curvature. With this in mind, the 2x6 portion of the rib clamping cauls is cut to a radius of 60' 1/4", the extra 1/4" to compensate for the back rail cloth that is glued to that surface to protect the face of the board.

Dave's Axiom Number 2: *The highest point of that crowned rib shall fall under the long bridge.* The downward force of string bearing is applied at the bridge. If the board is to be resilient and stand the test of time, this is where it should be strongest. Bearing across the bass bridge should be quite light and is of little consequence when determining crown layout. Pianos with three bridges (old Steinway A's, Mason & Hamlin AA's, etc.) necessitate some compromises, but the long bridge is always favored. When the crown is cut into the ribs, the point at which the bridge intersects the rib is placed dead center in the middle of the jig, the highest point. The end result is that the crown, or hump, of the board across the grain, if viewed on edge from note 88 down to note 27, will not be a straight line — it will follow the curve of the bridge. Occasionally this bridge-conformed crown gets "eased", for example, in the case of smaller pianos where the tenor end of the long bridge bends tightly back towards the straight side of the case. Here, a common sense average of the bridge curve is taken so the bridge is within an inch or so of riding the top of the hump. Piano building is the art of perfected compromise.

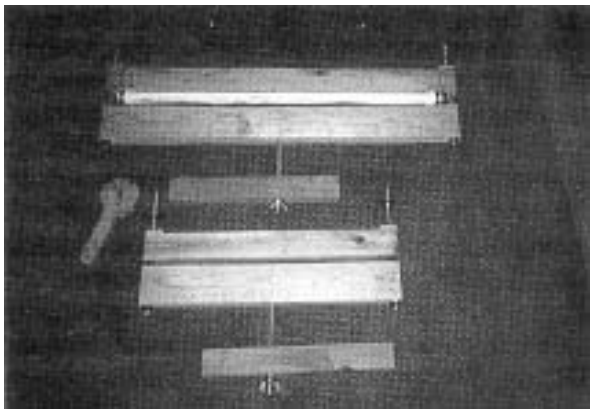


Photo 3

Piano building is the art of perfected compromise.

To accomplish this non-linear crown, the rib clamping cauls must be

able to slide perpendicular to the roller coaster tracks. Early on in the rib making process, a pencil mark is made at the bridge location and the distances from that mark to the ends of the rib are recorded. Later, when the press is being set up, the cauls are positioned within the tracks so that their mid-length (i.e., deepest point) will form the bridge line. The distance between the tracks, 12", was determined by studying the overall bridge swing of numerous high quality grand pianos.

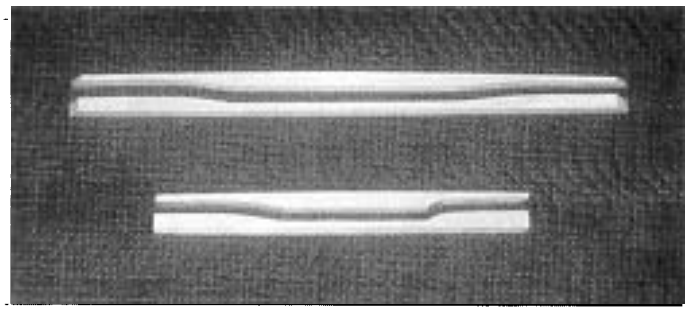


Photo 5

Dave's Axiom Number 3: *Soundboards shall be crowned along the grain as well.* I believe in a loosely spherically crowned board. To accomplish this, the rib clamping cauls must pitch inward to some point above the shop, 60' above the middle of the board when it is lying in the press. This is why the roller coaster tracks are curved and not flat rails. These tracks are cut to a concave radius of 60' 5-1/2" — the additional radius compensates for the 5-1/2" dimension of the 2x6 portion of the clamping caul. This creates a 60' radius along the grain of the board at the back rail cloth. I would be willing to concede that much of this crown disappears when the board is released from the press. However, it reappears considerably when the bridge is glued back on. Fellow chapter member Phil Huth, RPT, once told me the most important rib on the board is the bridge, and until I began replacing soundboards, I didn't realize how correct he was. Crown along the grain makes a bold reentry when the board is glued back in the case. I sleep better at night in the belief that my rib-to-board glue joints are "happier" done this way than if they were glued up on a flat deck.

Use of the Upper Deck

Rib clamping cauls of appropriate lengths are selected for the job. With upper 2x4 cauls removed they are placed on the tracks. The caul for the longest rib — usually #7 — is placed and locked via the wing nut and lockbar dead center along the length of the tracks, the deepest point. Earlier in the process, the ribs have been located and "pricked" to the back of the board.

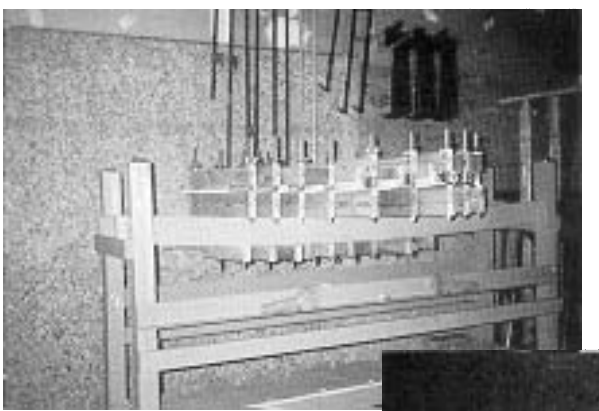


Photo 6

The board is placed face down on the cauls and temporarily locked in place with the upper caul for rib #7. The remaining clamping cauls are moved around on the tracks under the board to correspond to those prick marks, both along the grain and across the grain, as mentioned above. They are then locked in place. At this point the board and ribs go back in the hot box for appropriate drying prior to belly-ing.

We shape our ribs before they are glued to the board. That is, the ribs are approximately the final depth we want and the feathering at the ends is where we want it. This is done simply by drawing the side elevation profile on the sides of the ribs using the original ribs as guides (occasionally with some changes) and cutting them out carefully on the band saw. The waste from this operation, or "negative", is numbered and saved (**photo 5**).

I like to have three people present when a soundboard is ready for gluing — my wife Judy, my father, Ray, and me. When dry, the board is removed from the hot box and placed in the cauls. Rib #7 is removed from the hot box, rolled with glue (I use yellow glue), and quickly placed on the board. Negative #7 is placed on top of the back of the rib. The 2x4 upper caul is lowered down the threaded rod, its fire hose fully deflated, collapsed, and in good contact with the back of the negative, and its wing nuts turned home by hand behind it. compressed air regulated to 35 psi is applied to the hose until the board is forced down into the caul and glue squeezes out uniformly along the length of the rib. Supply air is then disengaged from the valve

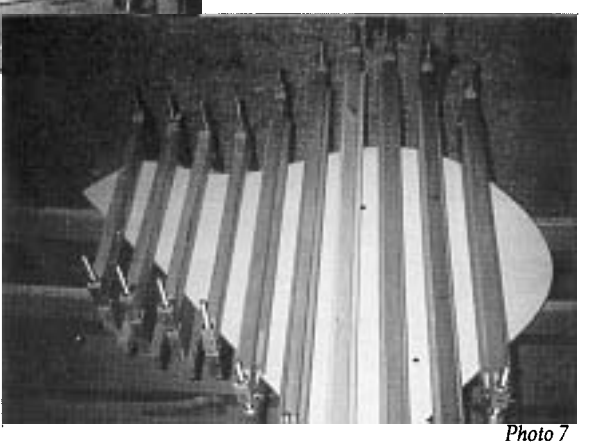


Photo 7

stem and the airtight hose continues to do its thing until deflated when the board is removed from the press. This first rib is the most difficult to affix because the board has not yet taken a crowned shape. The remaining ribs, applied alternately on either side of #7, go on with decidedly less disqui-

etude and sweat (**photos 6 and 7**).

Glue squeeze-out is both my friend and nemesis — I like to see it but I hate to clean it up. I marvel at the undersides of some current production grand pianos at the absolute absence of damage to the board near the ribs from cleaning up glue. Spruce is so soft you merely need look at it cross-eyed to gouge it. I will say we have gotten better at it, finding less glue is desirable. Ever-patient Judy caters to the minimum squeeze-out with a flush cutting 12mm chisel from Garrett Wade (#15SO1.03) while it is still "leathery", as she calls it..

Design Of The Lower Deck

The bottom half of the fixture is fairly self explanatory. Twelve movable press clamps were built which hover above a secure floor, allowing the bridges to be pressed onto the face of the soundboard. Until they are actually turned down in contact with the bridge cap, these clamps rest on two horizontal 2x4s hung just below the outward facing upper steel angles. The clamps are constructed of the same yellow pine, glued and screwed together to form a more or less quartersawn 4x4. In the center of each of these beams is an 18" screw press clamp available from the Hartford Clamp Company in East Hartford, CT. When turned on the diagonal, these beams easily slide out the ends of the fixture.

The floor of the lower deck is made with the highest quality 1" plywood I could find, resting on yellow pine joists, spaced 12" on center, which rest on the inward facing lower steel 'L' angles. The floor joists have 1/2" fine thread nuts embedded and epoxied in them at the point where they contact the steel angle. Corresponding hex head bolts threaded into these nuts pass through clearance holes drilled vertically in the joists. Access to the heads of these bolts is gained through oversized holes in the deck (visible in **photo 6**).

Prior to gluing the bridges to the board, they have been recapped, cleaned, and located on the board. Once located, the ribs and soundboard are drilled through at the bridge locations to accept #10 wood screws that will serve temporarily to clamp the bridge to the board. Large wooden washers prevent the screw heads from marring the ribs. Later they will be removed and the bridge will get doweled to the board in the usual manner. In addition, the long bridge is placed on the lower deck so that the deck can be crowned to match the concave crown on the bottom of the bridge. This is done with the adjusting bolts embedded in the floor. The end joists are stationary allowing the inner joists to arch the 1" flooring.

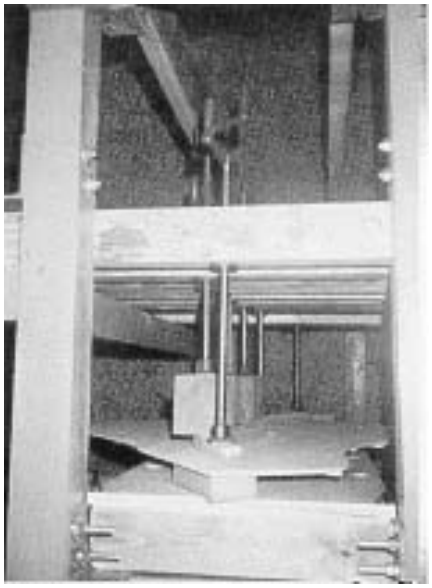


Photo 8

After correct drying, the board is removed from the hot box, the bottom of the bridge is rolled with glue (hide glue here — I can't completely abandon tradition), and the bridge is screwed to the board from the back. This assembly is placed on the floor of the press, padded fill blocks of appropriate dimension are slid under the bridge between the ribs (allowing the ribs, protective washers, and screw heads to hover off the floor), and the screw press clamps are positioned accordingly above the bridge at these locations. As the cranks are turned, the beams rise and block against the upper steel angle and the bridge is pressed home (**photo 8**). Although the bass bridge can usually be done at the same time, we often do it the next day.

Final Thoughts

Those of you ambitious and crazy enough to have a go at constructing this type of press are probably asking some important, as yet unanswered, questions by now. I'll attempt to field the more critical ones here.

Dense yellow pine is probably only available from well-stocked lumber companies, particularly those with on-site roof truss fabricating facilities. Fortunately, one such firm exists 1/4 mile from my back door.

Of all the hours spent in the various areas of design and construction, none occupied more time nor demanded more precision than the calculation and execution of the curved surfaces on this press. I am indebted to Judy and my father for their mathematical prowess, without which I would still be standing knee deep in ill-fated excursions into crownland. The single algebraic formula necessary is where *h*

$$h = r - \sqrt{r^2 - (c/2)^2}$$

Formula 1

is the height of the arc (amount of crown) in inches, *r* is the radius (in this case 60') in inches, and *c* is the chord (rib length) in inches. For instance, given a 60' radius, a rib of 46.47" (let's call it 46-1/2") will produce a crown of 3/8". If solving for rib length, use its derivative(*See formula 2*).

$$c = \sqrt{4[r^2 - (r-h)^2]}$$

Formula 2

Remember that the curvature of the arc for a given radius is always the same — the only variables are the

length of the chord and the corresponding height of that arc. Prior to using these formulae, some of my attempts to draw a 60' radius were, at the very least, laughable, and none will ever make it to print! For a definitive discourse on drawing large arcs such as these, consult the December 1991 issue of *Fine Woodworking* magazine, pages 4 and 5. Master templates and sanding platens, both concave and convex were made (often several times!) for the various radii, by which the fixtures were machined.

The mechanically pressed shorter rib clamping cauls are tightened until they "feel right". The visors on either side of the pneumatic upper cauls keep the fire hose from snaking when inflated — it grows longitudinally as well as diametrically. The threaded rod at the ends of each clamp keeps the hose boxed in. The OD of 1-1/2" type K copper pipe just happened to snug inside the ID of the fire hose. The end caps were machined 1/2" shorter than stock length to allow a greater clamp working length. The working half-length of each clamp is the important dimension to consider when deciding which clamps will be used for which ribs.

When pressing a bridge, 4x4 idler blocks about 4" tall are placed between the screw clamp feet and the top of the bridge at every other clamp location to allow the hand cranks to swing and not bump into their neighbors. Had I approached it intelligently, I would have bought a mixture of 18" and 12" clamps. Clamps are tightened until everything groans nicely.

Photo 9

The steel angle flexes a little more than I would like when pressing a bridge. A simple provision has been made to solve this problem. However, if I had it to do all over again (and I'm tempted), I would use heavier steel. The threaded rod located mid-length between the upper steel angles (visible in photo 6) keeps them from splaying under the tremendous force generated by the screw presses.

Of course, the real question is, "is the proof in the pudding?" In what I hope will be taken as a forthright attempt to avoid self-serving, author-driven accolades, allow me one absolutely true statement. We recently completed a 1953 Steinway 'S', which, oddly enough, possesses the first soundboard we made using this fixture (**photo 9**). To date, every technician who has sat down to play this instrument, after doing so for ten or fifteen seconds, has stood to visually verify the length of the piano, aurally perceiving it to me an 'M'.

Like Clair Davies, I, too, enjoy building contraptions like this as much as rebuilding pianos. The problem is the older I get, the more I realize I'm never going to make any money at either. Piano work is gratifying sobriety.

DISPLAY AD INDEX

Like the little red hen, firms that proclaim, "Then we'll do it ourselves!" often prosper in unlooked for ways. As part of the Kimball International family of companies, Kimball Piano Manufacturing has shared richly in a tradition of self reliance. Jon Light, Supervisor of Technical Training for Kimball, spent the morning portion of our meeting in the new, beautifully designed display facility of the Martin Music Company (owned by Lowell and Judy Martin) in Decatur, IN. A gathering of twenty-five was present, and the local press and a photographer gave us front page coverage that was high in human interest.

The Martin firm has purchased the famous Kimball grand used for many years in Johnny Carson's Tonight Show. Its gilded frame is adorned with large autographs of Johnny himself, Ed McMahon and "Doc" Severinson. At its keyboard, in one picture, are Jon Light and our newly arrived associate, Michael Mezhinsky, from Russia.

Kimball was adopted by the Jasper firm in 1958 and moved from Chicago to its present location in southern Indiana. The parent firm is the only company engaged in piano manufacturing to be included in *Fortune* magazine's listing of 500 leading firms. The piano company is one of 56 divisions. A wide range of products includes IBM computer keyboards, slate bed pool tables for Brunswick Balke, hospital beds and many plastic components, large and small. It is the ninth largest office furniture manufacturer and the second largest producer of veneer in the United States.

The philosophy of "Manufacturing Excellence Lifestyle" abounds at Kimball International. Originally inculcated in Japan by the renown statistician Dr. W. Edwards Deming at General MacArthur's behest immediately following the war, these ideals have finally returned to their nation of origin. Kimball was one of the earliest to welcome them home; the results are part of history yet unfolding.

In keyboards, for example, input from the production floor resulted in an $18,000 computer guided screw drive boring machine for key balance holes that saved $65,000 in losses to scrap. Tolerances that were an eighth of an inch are now .005". A 45 degree hitch pin is being developed to enhance tuning stability. Research revealed that a structural shift of a mere .031" could result in a change of pitch of 54 cents. Strings are pre-stretched to simulate a two-week aging period. Extensive developments are being implemented in the hammer department. Should certain models reveal a slight deadness anywhere on the keyboard, the sheet of felt corresponding to the tonal problem peculiar to that model can be thinned by a mere few thousandths of an inch by means of a numerically controlled grinder. New molds and cauls, new moldings and new hammer felt from several firms are being sampled prior to a final selection. These and many more changes and innovations are being worked out on the basis of experience on the production floor rather than inflexible procedures mandated on the basis of theoretical concepts.

Jon then moved on to the most "scientific" area of design, that of scale evaluation. We were handed six sheets of graphs and data suggesting the advances in scale design through the criteria of tension, breaking point percentage (must be kept under 65% to avoid molecular deformity) and inharmonicity. Many of the advances in this area that will come in the next decade can be credited to the calculations and programming provided by Dr. Al Sanderson. Jon has concluded that the coming improvements in scale design may become the most important improvement in the piano industry in the next ten years.

Thus, a new 46" studio piano has three bridges — an old idea with a new thrust. The improvement was immediately noted by the company's first tuner, who is unsighted.

Extensive research and development is under way in the design of both vertical and grand piano actions. The Langer 80 model action is being modified for installation in the 43" console. The catcher and backchecks will have a curved radius and, finally, a synthetic "buckskin" covering from Japan will last longer as well as work with greater reliability than former synthetic applications in this area. The Langer grand action will have a lighter, approximately 52 gram touch resistance, set screw adjustable repetition springs and aluminum action rails.

The spherical concept of soundboard design was made possible through computer assisted design. Its implementation on the production floor was another matter entirely. The variables in conforming a soundboard panel, ribs and taper to the sections of a sphere do not lend themselves readily to production line routines. The varying thicknesses of ribs and edges of the soundboard must be mated securely to an inner rim precisely routed to provide a solid foundation. The bell curve near the

high treble side of the rim must remain very slightly above adjacent areas to avoid excess compression of this corner of the board in the gluing and clamping process. Each model grand had its own "spherical" taper. It finally occurred to Jon that an efficient process for routing the inner rims of varying sizes would be linear in concept. The router for a typical model is suspended from a "monorail", a bar of high test steel approximately the same length as a line tracing the circumference of the workpiece. The top surfaces of these stout rectangular bars are precisely machined to lower or elevate the router riding upon them to remove a few thousandths of an inch more here and a few thousandths less in other locations. The rims are presented to the appropriate router on a revolving turntable and the monorail type router suspension bars are arrayed similarly to the blades of a helicopter above the turntable. Of course it would take precision calipers to discern that the top, riding surface of any one of these bars is other than uniformly the same measurement from the bottom.

Finally, we learned that a 15 year full warranty with paid labor is already in effect. The ideal is clarity in wording and a minimum of fine print legalisms.

Environmentalism is not to be short-changed, either. With large tracts of hardwood forests in Iowa, Illinois, Kentucky and Indiana, an employee volunteer program sees to it that for every precious hardwood tree harvested, eighteen more are planted to take its place.

On a recent visit to Kimball we viewed a beautiful, newly manufactured desk of costly veneer costing nearly as much as a fine piano but requiring the application of far less labor. We concluded that Kimball was staying in the piano business with considerable earnestness. This is but a sample of Jon's inspiring morning seminar but it suggests dramatic assurance of Kimball's staying power in one of the world's most competitive businesses.

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SEPT	25	**Pomona Valley Chapter Annual Seminar** Contact: John Voss, 2616 Mill Creek Road, Mentone, CA 92359
SEPT-OCT	30-3	**Ohio State Conference** Holiday Inn-Dayton Mall Contact: Kathy Shaw 1066 W. Sparrow Road Springfield, OH 45502 513-323-2555
OCT	15-17	**Texas State Seminar** Marriott hotel-houston Contact: Ray Whitmore, 7126 Sonnet Glen, Houston, TX 77095, 713-859-7535
NOV	4-7	**New York State Convention** Westchester Marri9ott Contact: Michael Meade, 27 Perch Drive, Mahopac, NY 10541, 914-528-3365
NOV	6	**Orange County Chapter Seminar** 1st Presbyterian Church Contact: Peg Browne, 11511 Wasco Road, Garden Grove, CA 92641, 714-530-4768
NOV	11-14	**North Carolina State Conference** Omni Hotel-Richmond, VA Contact: Lewis Spivey, 15 Rachel Drive, Nashville, NC 27856, 919-937-4777
FEB-1994	10-14	**California State Convention** Cathedral Hill Hotel—San Francisco, CA Contact: John Schaecher, 1052 Oak Street, San Francisco, CA 94117, 415-431-1187

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AUXILIARY EXCHANGE

Dedicated To Auxiliary News and Interests

Have you ever gotten your photo albums and your old family records out on a rainy, cloudy Sunday afternoon? Well, that's what I did last weekend. We have been having so much rain here this spring that I feel as if I live in Hawaii. I have visited my college roommate there several times and I know what it's like. Rain every morning for about ten to fifteen minutes and then clear up and it's a beautiful 86 degrees there for the rest of the day. Well, anyway I wasn't looking at my immediate family, I was looking through the records and pictures of my PTGA family!

Yes, I was going through the old minutes of meetings and records of conventions gone by. Do you know what I found in there? I found the first program of the first convention in 1958. Golly that was exciting reading and I even shared it with my tuner/husband. That was the year he was graduated form college with a master's degree in music and was going to set the music world on fire!

Well I'll tell you, everyone in our organization should have a rainy Sunday afternoon like that going through our past history. I am bringing all of those records and notebooks and pictures to Milwaukee and hope each one of you gets, in this case since I'm writing two months in advance, GOT a chance to look through them. Some of these things should be placed in the museum in Kansas City under "Glass" instead of kept in an old box on a shelf somewhere.

Now all of this brings me to my next question. Will someone *please* volunteer to take all of this valuable material and really work on it, it takes more than a rainy Sunday after, and put it into some sort of order so that we can transport it more easily to conventions around the country?

I also want to take this space to thank each and everyone of you for honoring me with this office one more year. I have really had fun getting to know more of you and if anyone really wants to get to know the membership, they should become a national officer. We are always looking for people to serve on the Board. As some of you know by now, I love to write letters and my computer sometimes gets red hot with letters to PTGA and my music fraternity, SAI. I have started some new committees this past year and am happy to report that they are doing nicely, namely, tape recorder and photo recorder. Beva Jean Wisenbaker was in charge of these two and since she was not able to attend convention, I had to appoint someone else.

I truly hope that each of you had a wonderful time at convention in Milwaukee. Will you please share your memories and travel experiences with your friends at home and in your chapter and instill in them the desire to come to convention next year in Kansas City, our home base? I know all of you will want to see "our" new building and museum.

Thanks again for a wonderful year and I truly hope that this year is even better. It can only be better with your help and sharing of ideas. Please write to me with any constructive criticism or programs that you would like to see us pursue. I need to know your thoughts and wishes, what you like and don't like. Again, majority rules so I can't promise the world but I will try to make our week at convention a memorial one.

Always try to talk about PTGA to your friends in your local area and inform them of our purpose. Invite new members to join us and together we will help make the music world a better place.

Thank you for your support!

Phyllis Krahmer Tremper
President

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VIDEOS

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Tech Gazette

Yamaha Piano Service August, 1993

"Why Does My Console Piano Have Sticking Keys?"

As we all know, there are nearly a b'zillion things that can cause keys to stick in a piano. We've seen just about everything, from paper clips to birdseed to just plain ol' tight keys.

But there's something in the compact console actions, in particular, that will sometimes cause similar symptoms. In reality, though, it doesn't have anything at all to do with the keys.

We discovered it a few years ago, when we were prepping some console pianos for a NAMM show. The phenomenon usually surfaces when keys are played at *mezzo piano* level (that's "medium soft" for non-musician types), and especially when the damper pedal is down.

To add to the mystery, we're not the only piano maker to experience the same perplexing problem. But we found that it has been mainly limited to compact, "Schwander-style" console piano actions.

The hammer hits the string, but doesn't return all the way to the rest rail. And usually, the key doesn't come back to its original playing position.

In valiant attempts to remedy things, folks have eased the livin' daylights out of keys, re-pinned action flanges, introduced excessive amounts of lost motion, and even added weights to the backside of keys. But all to no avail. So, what's really going on here?

Well, in these actions, the let-off rail also does double-duty as a *jack stop rail*. The bottom of the rail is decorated with those cute little let-off buttons, and the back of the rail (the side closest to the plate and away from the musician) is adorned by a strip of felt.

What we found was that in some cases, and for reasons unknown, the factory would position that rail just a bit too close to the jacks. And what happens is that under certain conditions, the jack gets wedged between the rail and the hammerbutt. (Sort of reminds me of a chair that's been propped up against a doorknob, although that's probably not the best analogy.)

As a result, the action "hangs up", and simply will not repeat. Again, it's usually worse when the damper pedal is depressed. For with the damper levers being held by the damper lift rod, they don't exert pressure against the whippen spoons.

The thing that makes this condition so insidious is that its root cause is completely invisible.

So, if it occurs, first check the obvious things, such as tightness in keys and action centers. If everything seems to be okay, then play a key with a good, firm blow, and hold it down. While you're holding the key with one hand, check the jack with the other. There should be a good 1/16" to 1/8" of clearance between the jack and the rail. If there isn't, then from above, loosen the screws that hold the rail in position, move it toward you slightly, and retighten the screws. When you're done, make sure that the alignment between the let-off buttons and the jacks hasn't been upset too much. Do the "jack space test" again, and you'll find that the nagging "key sticking problem" has magically disappeared.

YAMAHA WILL PARTICIPATE IN

LITTLE RED SCHOOLHOUSE:
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PTG CONVENTIONS:
October 15-17, Texas State
November 4-7, New York State, Tarrytown, NY
November 11-14, North Carolina State Richmond, VA

PIANO TECHNICIANS Journal UPDATE
FOR MEMBERS OF THE PIANO TECHNICIANS GUILD, INC.

At Your SERVICE

Colette Collier, RPT
Chapter Services Committee Chair

Outstanding Newsletter Awards

This year PTG held the second annual Outstanding Newsletter Contest. The goal of the Chapter Services Committee in designing this year's contest was to make it a good experience for all involved. To that end, we issued invitations to three people to judge the contest: Mark Stivers, last year's winner; Wim Blees, previous Newsletter Committee Chair; and Jami Henry, Director of Communications. Each was asked to study all 18 entries, and make comments to help the editors improve their work. Happily, all accepted the challenge.

It took two ballots, but this year's winner is Jon Light, editor of the Indy-440 (newsletter of the Indianapolis Chapter). Jon received a Cross pen & pencil set as his award. Congratulations, Jon! There was also an Honorable Mention for Outstanding Newsletter Award: Paul Gunty, editor of Whippenpost (newsletter of the Chicago Chapter). Congratulations to you too, Paul! We hope you'll try again.

There were also six "Newsletter Recognition" awards. They went to: Carol Beigel, editor of Alpha Bits (newsletter of the Washington, DC Chapter), Christopher Brown, editor of News & Notes (newsletter of the Boston Chapter), Ken Burton, editor of In Tune (newsletter of the Calgary Chapter), Alan Hallmark, editor of the Richmond Update (newsletter of the Richmond Chapter), Robert Guenther, editor of Partial Post (newsletter of the Waukegan Chapter), and Stan Kroeker, editor of Hammertales (newsletter of the Minn-Kota Chapter).

I hope you had the chance to see the award winners on display in Milwaukee. If you're looking for good candidates for subscriptions, here are some excellent suggestions. Thanks again to all who participated, and my heartfelt appreciation to all newsletter editors for their front-line work at keeping members in touch with each other.

Continued page U2

Piano Technicians Guild Foundation Scholarship Awarded To Barbara Kudirka

Barbara Kudirka, a nationally certified member of Music Teachers national Association, was presented a $750 Piano Technicians Guild Foundation continuing education scholarship during MTNA's annual convention in Spokane, WA, March 20-25.

The scholarship was presented during the convention banquet by Taylor Mackinnon, PTG's Pacific Northwest Regional Vice President, who represented the Foundation. Members of PTG's Eastern Washington Chapter also staffed a booth in the convention exhibit hall.

Barbara Kudirka received her undergraduate degree in music at Mankato State University in Mankato, MN, and a Master's Degree in Piano Performance at Northwestern University, Evanston, IL. Her teachers were Mary Veverka, Edward Epple and Pauline Lindsey. She has performed in master classes for Byron Janis, Alexis Weissenberg and Adele Marcus, and since 1988 has

been in the solo performance classes of Menahem Pressler, distinguished Professor of Music at the Indiana University School of Music, Bloomington, IN.

She teaches piano at Harper College, Palatine, IL, the Roosevelt University Center for Keyboard Studies in Arlington Heights, IL and maintains a private studio in her home in Skokie, IL.

She is well-known as a pianist, judge and clinician, and is past president of the North Shore Music Teachers Association. She holds national certification in the Music Teachers National Association.

Outstanding Chapter Awards

The chapter awards were slightly revamped this year. Instead of 5 chapter size categories, we had three: Category I (5-15 members), Category II (16-34 members), and Category III (35+ members). Chapter size was determined by the number of members listed in the prior year PTG Directory. Eligible activities were those that took place from May 1, 1992 to May 1, 1993. Our goal was to find one "Outstanding Chapter" in each of the categories that characterized the finest in PTG chapter activity.

Chapters were nominated by their CSC Regional Representatives, after which a ballot listing all chapters nominated was circulated to the 10 representatives. Each representative was asked to rank the top three chapters in each size category, and then to vote individually on whether each chapter should receive a "Chapter Recognition" Award. The scores were tallied, with the following results. In all, 37 chapters were nominated for awards. Three chapters received the top honor, and 21 were given "Chapter Recognition" awards. Congratulations to all!!

Outstanding Chapter Award: Category I

Blue Grass Chapter

The Bluegrass Chapter lists only 12 members in the 1992 Membership Directory, yet you wouldn't know that from their list of activities. This year they held their sixth annual tuning seminar, complete with lunch prepared by members of the chapter, and tutoring sessions following the class session. In addition, technical presentations were given by members and guests such as Ben McKlveen, RPT (Cincinnati Chapter) and Dr. Edwin Goodwin of the University of Kentucky (speaking on aural perception).

Other chapter activities included the writing of a set of bylaws—a project that took over a year to complete. The chapter has also recently instituted the practice of an annual audit.

Special projects included a mini-seminar devoted entirely to tuning, private tutoring to any members who have passed the written exam, and a scholarship in the form of a reimbursement to Associate members for the expense of the tuning and technical exams once they are passed. The Bluegrass Chapter regularly sends a delegate to the PTG Council session. There is a lot of dedication and enthusiasm in this chapter, illustrated by the fact that two of their new members travel a 5-hour trip one way to attend meetings.

Outstanding Chapter Award: Category II

Richmond Chapter

The Richmond Chapter weighs in at 25 members, and it seems as if all have been working overtime during 1992-93! Much of the activities have been associated with the Piano Music Association of Richmond, a non-profit organization of piano technicians, piano teachers, and piano dealers to promote the enjoyment of music through playing the piano. The chapter became involved in the SPELLS test market, promoting both piano care and PTG at a booth at the Virginia State Music Teachers Association Conference. The display made use of videos, PTG pamphlets, action models, and one-to-one conversation with music teachers. At the Carolina Craftsman Christmas Classic, chapter members handed out materials on piano maintenance, a list of Richmond RPT members, and sold chances to Piano Music Association and the Children's Miracle Network. Another event that saw the Richmond Chapter shine was their participation in the "Longest Piano Recital," an event which filled an area mall with 16 hours of piano music played by over 300 participants. The chapter also presented "You and Your Piano" to the Richmond Music Teachers Association meeting, and joined RMTA in the "Music Makes a Difference" piano seminar—a free public presentation to promote pianos and piano lessons.

But the chapter was also taking care of business at home. There were 2 written, 1 technical, and 2 tuning tests given, resulting in one Associate member upgrading to RPT. Two Associate members also gave technicals to the chapter during the year. With the help of Michael Travis, RPT (Washington, DC Chapter), the Richmond Chapter established a tuning test center at VA Commonwealth University.

Eight members attended the 1992 NC State Conference, and the chapter has joined the conference rotation, accepting an invitation to co-host the 1993 NC State Conference with the Pamlico Chapter. To that end, a joint meeting was held with the Pamlico Chapter. Other chapter activities included: donating tuning proceeds for a disabled chapter member, the annual chapter picnic social, winter social pot luck dinner, Christmas caroling visits to home bound members, and two board meetings for organization and planning. Hats off to the Richmond Chapter for a job well done.

Outstanding Chapter Award: Category III

Washington DC Chapter

The Washington, DC Chapter, at 86 members, is second in size

only to the Twin Cities Chapter. The activities of the DC Chapter were many and varied. In early June 1992, the chapter finished production of "A Temperamental Journey," a critically acclaimed set of two 90-minute audio cassette tapes based on a presentation by Owen Jorgensen,RPT (Lansing Chapter) on the history of temperament tuning, based on his book Tuning. The chapter applied for and received the copyright on this tape. For National Piano Month, the chapter sent 425 packets including the PTG brochure "The Special Care & Maintenance of the Teaching Piano," a list of DC Chapter RPT members, and a scholarship application form to area piano teachers. A chapter member handed out information about PTG in a local shopping center in conjunction with a promotion for his store.

Special technical presentations have included a one-day seminar featuring Bill Garlick, RPT (Long Island-Nassau Chapter) who gave classes entitled "Grand Action Design from 1700 - Present" and "Grand Regulation in a Panic." The chapter also invited PTG President Fern Henry, RPT, and Bill Spurlock, RPT, to visit while they were on the east coast for the PA State Conference. Bill gave two technical sessions: a special afternoon session on vertical regulation, and the regular meeting technical on efficient shop procedures. In the spring, the chapter hosted a Mason & Hamlin night featuring Rick Baldassin, RPT, Paul Monachino, and Bruce Clark. PTG members and guests from Baltimore, Northern Virginia, and Richmond were also invited.

Educational and testing opportunities were readily available. The chapter welcomed 2 new Associate members, gave 3 written tests, 1 technical test, and 1 tuning test—all of which were successful. One Associate member upgraded to RPT. Each month Associate sessions were held for an hour before the business meeting, with the topics including the Sanderson Two-Octave Temperament, string replacement and knot tying, demonstrating the use of a micrometer, taking string patterns and stringing scales pinblock repinning, and disassembling an old upright and a 1920s upright player. Three members also master tuned a piano for future service as an exam piano, helping provide some training to a future CTE in the process. Many members attended both the PA State Conference and the NC State Conference during the year. The Washington, DC Chapter has awarded two $250 scholarships to area music students, as well as a $250 scholarship to a chapter member to attend the PTG Institute.

Chapter activities included the design and sale of special T-shirts showing chapter pride and unity. They were worn at the chapter picnic, and for the opening ceremonies for the 1992 PTG Convention. A special award was given by RVP Don Valley at the 1992 convention for chapter support to members who have been incapacitated due to illness or injury. The injury list continued throughout 1993, resulting in the chapter voting to pay one member's dues, providing food, flowers, and tunings for other members who have fallen ill.

Chapter communication requires more effort and planning with a larger chapter. The chapter meets 10 times per year, taking off August and December, and the board meets during those months on a separate evening. A telephone tree is set up annually whereby the chapter president can call one list, which fans out to reach all chapter members quickly when needed. Name tags have been designed for all chapter members to use during meetings. Information packets are given to all prospective members, and new Associate members are given notebooks including the current PTG Directory, and other helpful information. The chapter produces a yearly roster book listing all chapter members. As part of the chapter newsletter mailing, quarterly financial reports are sent to the chapter members. A major project (taking 5 months) was the complete revision of the Chapter Bylaws. Each year, following the PTG Convention, the chapter members signed a letter of thanks to the manufacturers who supported PTG at the convention.

Chapter Recognition Awards

There were also 21 chapters honored with special "Chapter Recognition Awards" for 1992-93 activities. At least one chapter from each region was a winner of one of these awards.

Region 1: New Hampshire Chapter, Pittsburgh Chapter, South Central Pennsylvania Chapter, Southeast Pennsylvania Chapter, Buffalo Chapter

Region 2: Baltimore Chapter, Charleston Chapter, Roanoke Chapter, Western Carolinas Chapter, Daytona Beach Chapter, Nashville Chapter

Region 3: Dallas Chapter

Region 4: Chicago Chapter, Cleveland Chapter, Waukegan Chapter, Madison Chapter

Region 5: North Dakota Chapter, Twin Cities Chapter

Region 6: San Francisco Chapter

Region 7: Puget Sound Chapter, Seattle Chapter

There were many, many exciting chapter activities this year. Too many to mention in these pages. Don't be afraid to contact the chapters who have been successful in their PTG endeavors. They will be happy to share the benefit of their experience.

A Long Day's Journey Into Night

The Baltimore Chapter's trip to the Steinway factory began auspiciously April 4 at 4 am. in the parking lot of a local shopping mall as those punctual troopers sat on the chartered bus watching the last "tourist" arrive under police escort. Fortunately, the officer was in a charitable mood, claiming she didn't have a ticket book with her, and let relieved, lead-footed Rob Bangert board the bus sheepishly and we were on our way. Little were we to know this was not the last we would see of the police that day.

Our bus and cheerful driver Luther bounced up Interstate 95 on the raw and rainy morning. No one dozed in preparation for our 9 o'clock e.t.a., as the coach was alive with conversation and snacking. As we approached the Verrazano Narrows Bridge, however, Big Apple traffic reared its ugly head and we began to creep along with what seemed a million other frustrated travelers for nine miles. For two hours. At one point, Luther, unable to withstand Mother Nature's call any longer, put the bus in park, availed himself of the facilities at the rear of the bus, and returned to his duties. It's amazing how fast a bus driver can run when he really wants to. Finally, after entering "the City" and surviving, the obligatory getting lost within spitting distance of the factory, we pulled up to Steinway's door at 11:30 am., a mere two and a half hours late.

Our hosts were most gracious. Upon arrival, our tour guides Michael Mohr and Dave Grossi assured us our visit would not be truncated. After a few minutes to collect ourselves, our group of 23 was divided in two, with Michael and Dave taking us off in different directions, occasionally crossing paths throughout the day.

Both guides and tourists decided it might not be the best day for a close up look at the lumber yard. Michael's group started off in the Cross Cutting Department, where all the raw lumber is cut to approximate size for the various component of the piano. The moisture conditioning rooms, immediately adjacent to this area, are now digitally controlled. Due to our late arrival, we were unable to witness rim bending.

Noon approached and we snaked through the catacombs, then climbed several flights to the Restoration Department for lunch. Here we met with our fellow troops and enjoyed a tremendous buffet lunch. We were free to wander around this newly rejuvenated area of the factory and inspect and play the numerous, handsome instruments. The Restoration Department occupies two floors, one for work and the other, below, for storage. The number of instruments in this department was impressive. One o'clock approached, the lights in the factory came back on, and we were off again.

Michael explained to us earlier that one of the recent improvements at the factory was a more efficient flow pattern throughout production. This was apparent to those who had been through the factory in years past. The Action Assembly Department is now a concisely organized group. Action frames are assembled and drilled, parts installed, hammers hung, and parts traveled - all within touching distance of each other. Hammer making, from sheet skiving to final shaping, is done in a large area next door. Improved lighting is evident in both these areas.

There is also a handful of new high-tech machinery, of both German and Japanese origin, which greatly improves quality and speed. Two are of particular note. Grand top lids are now cut to shape, edge contoured, sliced for the continuous hinge, and drilled by one mammoth, computer controlled "robot." Elsewhere, a long, green, multi-operation machine turns out trays full of glass-smooth damper underlevers. The resultant products of both these machines decidedly above industry standard.

Steinway is making a limited production run of 140th anniversary instruments. We had the pleasure of seeing the first of these ready for public view, a walnut Model B. The grands are of the Sheraton style, with special legs, lyre, and music desk, along with other more subtle appointments. Our tour guides and the gray-suites alike were justifiably proud.

Finally, three thirty arrived and we decided we better hit the road in order to miss rush hour - if that's possible. We said our goodbyes to Micheal and Dave, boarded the bus in what had become a steady, bone chilling rain, and parted for home. Ah, but the day was still young.

Once again, we crept in traffic. Mysteriously, several motorists tooted and waved to us as we inched along. Finally, a pick-up truck pulled up beside us, Luther opened the door, and the driver shouted, "Your front tire is down on the rim." Sure enough, we were experiencing an unfortunate mechanical breakdown at a most inopportune time. Luther coaxed the bus off at the next exit down into a neighborhood of stately brownstones, standing tall in the middle of which was the Watchtower Press. As luck would have it, our Jehovah's Witness friends from the Washington D.C. Chapter - Rick, Rodney, and Greg Butler—had come with us. They hopped off the bus to see what strings they could pull. Meantime, Luther got on the company radio and incredibly located two other company buses on runs to JFK Airport. They would give us a call when they dropped off their fares. . . in

about two hours. Shortly thereafter, the Butlers reappeared to announce a repair truck was on the way to change the tire.

Making the best of a what was quickly becoming a laughable situation, we sat, chatted, and afforded the nearby deli what had to be its largest take in its history. We're convinced the guy behind the counter kept raising his prices with each new contingent from our bus.

The repair truck showed up first, after about two hours, to cheers from within, and that poor guy changed a tire for an hour under less than ideal circumstances. Unbeknownst to us, a local resident had called the police to complain about our bus's idling engine noise and diesel fumes. As the repair truck pulled away, here arrived the other two buses, coincidentally along with several of New York's finest - all of which was more than this narrow one way street could handle. After a few minutes of explanation, all pulled away shortly after 8 o'clock - leaving our complainer content.

We eventually rolled into our original meeting place at 12:30 am. Considering the time at which some of us had gotten up to meet the bus - *the day before* - our excursion to Steinway had become virtually a 24 hour adventure. It can safely be assumed no one in Baltimore with a 9 am. tuning appointment received service that day.

TURN IN A TEACHER!

What's the best presentation you've seen at a recent PTG seminar or chapter technical? If it wasn't on this year's convention program, we want to know about it so we can share it with other members. Please drop us a note listing the following information, and tell us what you especially liked about the class and instructor. We'll take it from there!

Instructor: _____

Class Title or Topic: _____

Where Presented: _____

Comments: _____

_____

Please return this form to: Technical Institute, Piano Technicians Guild, 3930 Washington, Kansas City, MO 64111-2963

Membership Status

Northeast Region	837
Northeast RPT's	518
Southeast Region	621
Southeast RPT's	381
South Central Region	305
South Central RPT's	197
Central East Region	614
Central East RPT's	382
Central West Region	378
Central West RPT's	247
Western Region	621
Western RPT's	376
Pacific NW Region	391
Pacific NW RPT's	234
Total Membership	3,767
Total RPT's	2,335

DATES & DEADLINES

September 6
Labor Day Holiday—Office Closed

September 30
Deadline for return of 1994 chapter dues collection forms

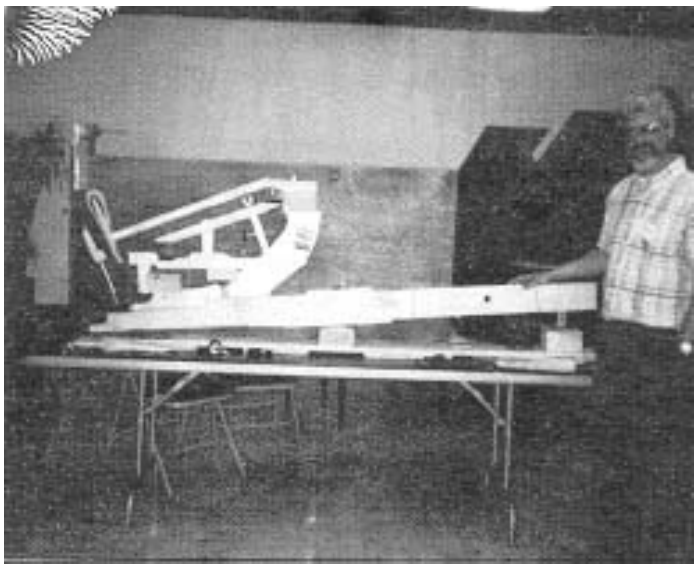
October 4
List of chapter dues sent to chapter presidents for verification

October 15
Request Board/Committee reports for January meeting

Deadline for chapter changes to dues collection amounts

Send tuning and technical exam dates to PTG Update. Allow at least six weeks from exam month.

An Action Packed Picture? PTG's Last Action Hero?



You set your hammer blow distance to 8 inches and you're still too close to the string? That's the case when you have an action model 5 times larger than the standard size!! Pictured here is Sam Powell, RPT from the Washington, DC Chapter, with the action model that he built. The model has a lacrosse stick for the repetition lever, the hammer shank is the size of a baseball bat, and being 5 times larger that means that the mass is 125 times greater. Originally the parts were bushed with felt, but that wasn't strong enough so they were rebushed with Teflon. It takes two people to carry it and it is eight feet long. Two different sizes of knuckles and hammer shank boring distance help illustrate proper action geometry. Sam has given technicals on Trouble Shooting the Problem Grand Piano Action to the D.C. and Northern VA Chapters. This is definitely one action model that you can see from the back of a room!

A Man's Best Friend...

...is a hero named Rhett

On February 21, at about 7:30 p.m., fellow piano technician Bernard Bagwell fell victim to a hit and run accident with a suspected drunk driver, and discovered that his best friend Rhett was willing to lay down his life to save him.

As they were walking outside in the parking lot of the apartments were they live, a car swerved directly toward them. Although Bernard, who is a blind technician, did not realize the car was about to hit him, his pilot dog Rhett jumped between the oncoming car and his master, which, Bernard believes, no doubt saved him from being hurt even worse than he was.

Rhett took the brunt of the blow, and remarkably was not hurt. The car struck Bernard in the legs, attempted to stop and then bumped into Bernard again, knocking him and Rhett to the ground.

While Bernard yelled for help, the driver got out of his car, decided that "everything would be alright", got back in to his car and left Bernard laying on the ground. Because there were no witnesses, the driver got away.

Rhett then pulled Bernard, who was also able to half crawl, back to his home. After his legs grew steadily worse, he finally had to enter the hospital in May.

This was not the first time Rhett has come to the "above and beyond" call of duty for Bernard. Last November, Bernard was walking to the grocery store with Rhett. He began to get suspicious when he felt Rhett turning his head every so often to look behind them. Suddenly, Bernard felt a hand slip into his back pocket.

During that incident, Rhett lunged at the thief, who turned and ran away.

A recent conversation with Bernard concludes that he feels like Rhett is indeed his hero and is grateful for the love and devotion Rhett has so willingly given.Of Rhett's heroic gestures, Bernard says, "He's a good dog. He takes me everywhere I go. It takes a lot of courage to get out there on the streets with cars going everywhere. And if you put your faith in yourself and faith in God you can do just about anything you want to."

Bernard left the hospital on June 29, but is still unable to walk and remains in a wheelchair. He does report that he feels no pain, is continuing his therapy and believes that soon he will be back on his feet.

Bernard also reports that Rhett has not let him out of his sight since he has returned home from the hospital.

All of us at the Home Office extend our good wishes to Bernard for his continued recovery and hope to welcome him and Rhett to the 1994 Convention and Technical Institute in Kansas City.

In Memory

Orville Braymer, RPT
January 7, 1928
April 30, 1993

Ollie Braymer, a charter member of the Northern Virginia chapter of PTG, passed away on April 30, 1993. Ollie was a loved and respected technician, teacher and friend.

He was the principle technician for Wolf Trap Center of the Performing Arts in Vienna, VA for 20 years and performed services over the years for Fords Theater. Warner Theater, Constitution Hall, Capital Center and Bias Recording Studio.

Ollie played trombone in the Army Band at Fort Belvior, studied at Catholic University for three years and in 1950, joined the National Symphony in Washington, D.C. as the youngest member ever.

A memorial service was conducted by his fellow technicians on May 5th in Alexandria, Virginia.

Highlights of the service were jazz and classical piano selections, a composition entitled "Ollie B, Ollie Bop" written by fellow Guild member Steve Jones and jazz artist Ron Elliston, and a collection of "Ollieisms" such as "this thing plays like a truck", "you never stop learning and you will never know everything there is to know about pianos". His grand piano regulating code was "upsee downsee, frontsee backsee", and he believed, "If you can't afford to go the National Convention, then you're not charging enough."

Perfection in his work came natural. His contributions in knowledge and friendship to his fellow PTG members is truly irreplaceable. We miss him greatly.

Ollie's last words, in classic Ollie style of course, were "show's over."

God's speed Ollie!

Respectfully submitted,
Steve Cunningham, RPT
Northern Virginia Chapter

Stanley Oliver, RPT
May 6, 1913
May 30, 1993

Stanley Oliver began his professional career at the ripe old age of ten, owning a sign painting business, and continued his artistic venture from 1932 -1942, after receiving a commercial art degree from Cass Technical High School. His class motto: "Ad astra per aspera" (To the stars through difficulties).

By 1942, he had become visually impaired from a hereditary blood condition and in 1945, joined the American Society of Piano Technicians, studying piano tuning with Reinhold Price.

During his career, Stanley tuned for the Detroit Symphony and such artists as Rubinstein, Cliburn, Serkin, Liberace and David Syme. Victor Borge always insisted that Stanley tune for his concerts. He also tuned for the Detroit Public School System for over 45 years.

Stanley was a charter member of, and held many official positions in, the Detroit-Windsor Chapter of PTG, including the office of president. There were times when he held two offices concurrently.

He served on PTG's Visually Impaired Committee and on the International Relations Committee.

Charlie Huether comments: "Stan was a tireless supporter of his fellow technicians, particularly those who are visually impaired."

Stan Oliver

It is said that Stanley Oliver did not have customers, but rather friends for whom he performed a service. Although he was a fine technician, there were a few times when things didn't go exactly as planned. Once he worked on a grand action on his lap, without realizing that a cat had crawled up in the keybed. When he shoved the keyframe back into the piano, he was startled to hear a shrill, "meOWW!" from the trapped cat.

One of Stan's favorite sayings in recent years was an old Polish proverb that freely translated means, "old age is not exactly gang-busters!"

There are so many great guys in PTG who blend gentleness, wisdom and humor. Stanley was one of them. He will be truly missed by every technician who has had the opportunity to know him.

The Detroit-Windsor Chapter

TIPS FOR USING THE PTG BUSINESS AIDS

Brochures — "How should I take care of my piano?"
"How often should my piano be serviced?"
"The special care and maintenance of the teaching piano"

Use these to:
- answer customers' questions about piano care and maintenance
- enhance your reputation as a provider of professional service
- advertise your business, via your attached label
- promote PTG and RPT

Distribute brochures by:
- handing them to customers at each service call
- displaying at piano and music stores in counter-top brochure holders*
- providing them to piano teachers, in display holders, for distribution to their students
- individually or as a chapter project, mail complimentary brochures to members of music teacher organizations along with information on how they can obtain additional copies.

Technical Bulletins — TB#1 "Pitch Raising" TB#4 Voicing
TB#2 "Regulation" TB#5 Finish Care
TB#3 "Humidity Control" TB#6 Rebuilding/Reconditioning

Use these to:
- provide clients information on specific maintenance options
- enhance the credibility and professional appearance of your maintenance proposals
- back up your recommendations for maintenance with a third-party document.

Distribute Technical Bulletins by:
- handing them to customers when discussing additional work, for them to read at their leisure
- enclosing one with your estimate when mailing a formal proposal for repairs
- offer them to piano dealers as an informative wall display
- place Finish Care Bulletins alongside dealers' displays of finish care products

Client Newsletter — "The PTG Soundboard"

Use the newsletter to:
- remind your customers of your appreciation and interest in them
- build customer loyalty by maintaining a continuing relationship with them apart from your service visits
- advertise your business, via your attached label
- promote PTG, RPT, and advertise the availability of PTG's piano care brochures (via articles in the newsletter on these subjects).

Distribute newsletters by:
- handing them out to customers at each service call
- mailing them to selected customers between regular appointments
- mailing to customers as a "thank you" after a service visit
- enclosing them with service reminder notices

*Plastic countertop brochure holders available from: Siegel Display Products, 1-800-626-0322