PIANO TECHNICIANS

Journal

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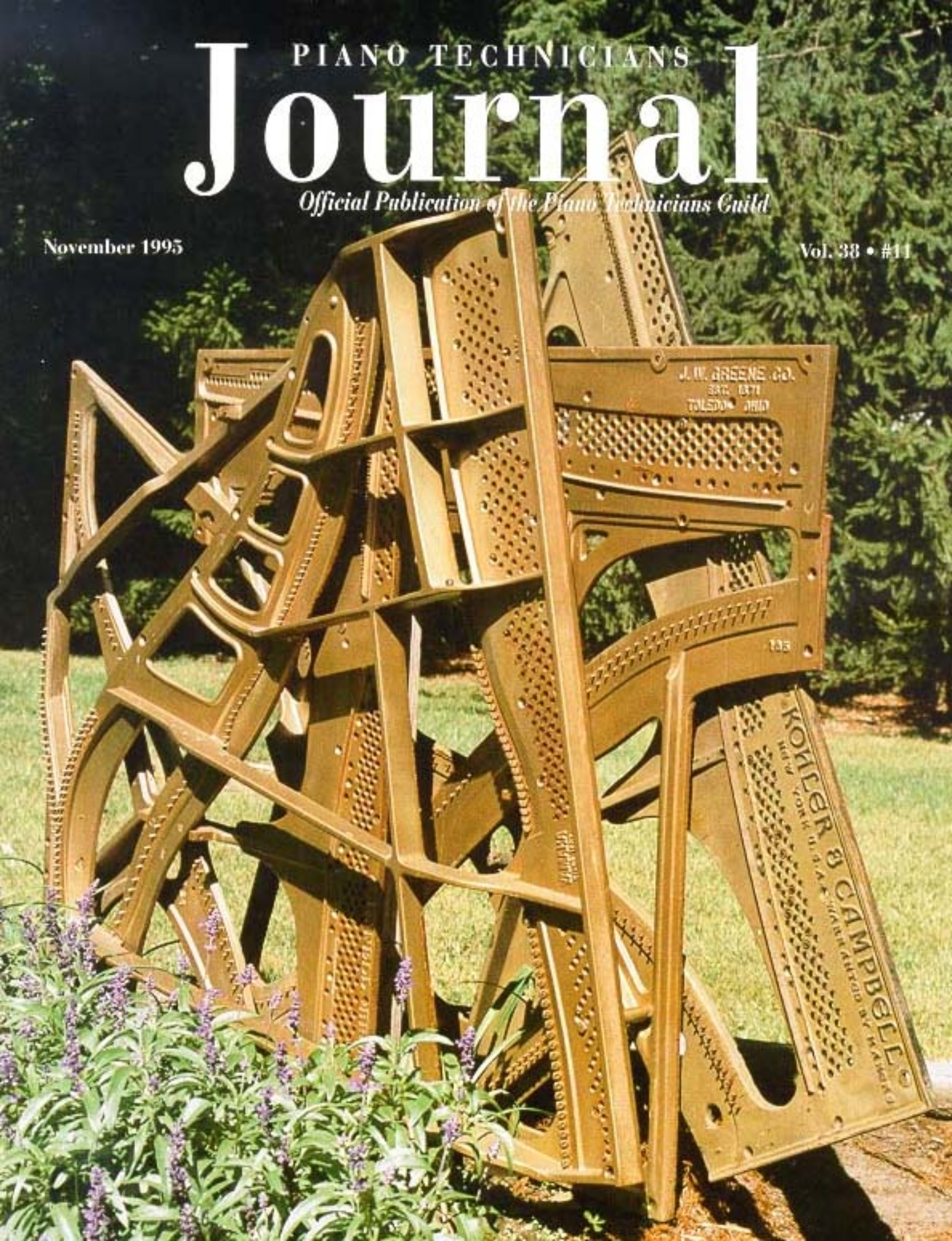

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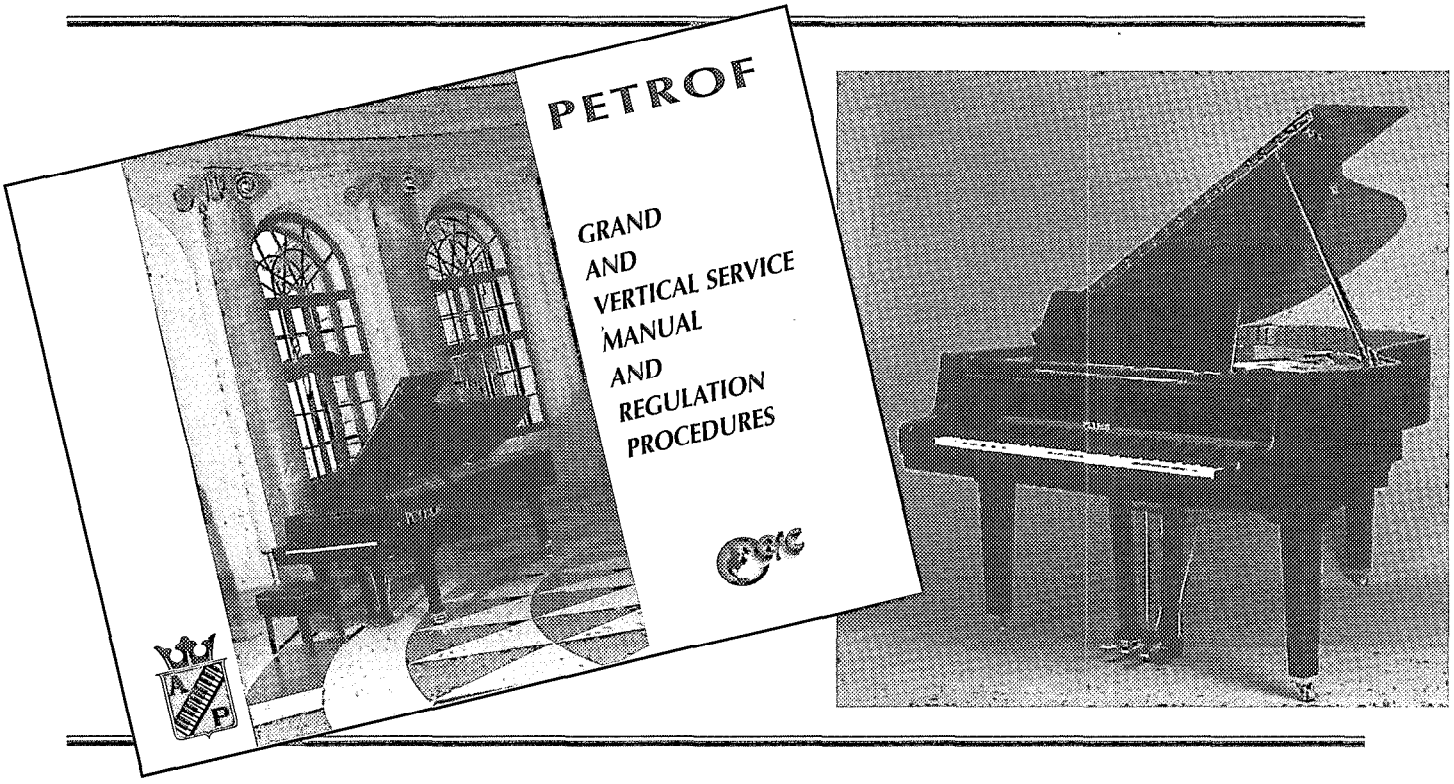

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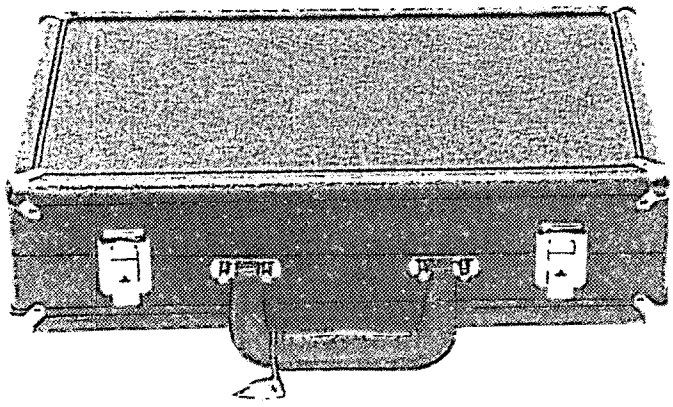

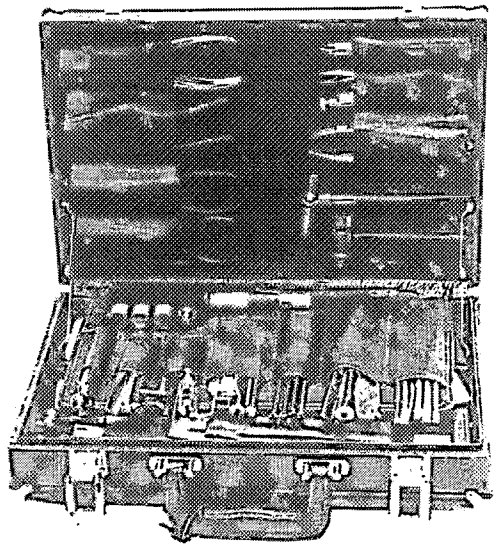

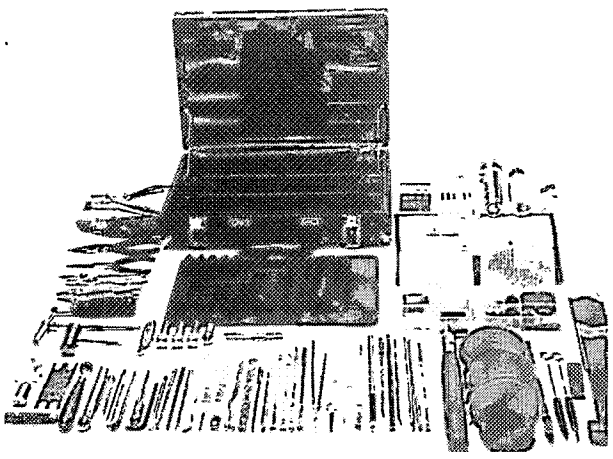

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PIANO TECHNICIANS
Journal
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Editorial Perspective

Volunteers

Steve Brady, RPT
***Journal* Editor**

With this issue, I'm sorry to see the last articles (for the time being) from two writers, Michael Travis and John Hartman. Both have worked countless hours to do research and perform experiments, and then organize their material and make a definitive but easily understood statement about difficult subjects. They have pulled it off beautifully. I hope that we'll see both of these writers in the *Journal* again before too long.

Michael and John are outstanding examples of the kind of individual effort it takes to make the *Journal* fly. We depend on a large number of these individuals each month to help get the *Journal* out and create material worth reading. Although we do pay a very modest honorarium to writers of technical and tuning articles, it is far from enough to compensate them for their time — time which could easily be spent earning real money. It's no stretch of the truth to call our writers volunteers.

Why do we in PTG enjoy the labors of so many bright, capable volunteers? Is it because they want to become famous, as some have suggested? Maybe. Participation, whether in the form of teaching a class, writing an article, or presiding over a chapter or a region, brings with it a certain amount of public exposure. The question is whether that exposure alone will be a happy experience or not. In most cases, the "public figures" created by such participation are forgotten soon after the convention ends or the ink dries or the next election is held. But a slim chance for continuing esteem is there.

Is it because they want to repay the profession for the knowledge and rewards they've gained over the years? Possibly. I've often said that I gained my current store of knowledge (for whatever it's worth) in approximately the following ways: 1) initial training, 20 percent; 2) my own subsequent experiences, 20 percent; and 3) the *Journal* and PTG meetings, classes and colleagues, 60 percent. I know I'm not alone in this feeling.

Is it because they've somehow discovered that by participating you are bound to increase your own rate of learning? Probably. In teaching, you are constantly confronted by eager minds wanting know the reasons why — reasons you may have long since forgotten or simply taken for granted. In publishing, you do your best to get it right. Then you hear from even more eager minds.... In leading, you learn how much you don't know about human nature. No matter the form of your participation, you're likely to learn and learn some more.

We participate as volunteers for many reasons — in fact, there are probably many I haven't mentioned here or even thought of. No matter what our individual reasons are, though, one thing is certain. When people share themselves to help others or to improve the organization or the profession, the sharers end up better than they started.

■■■

To update the procedure for *Journal* submissions:

1. My preferred method for receiving submissions is to have the text sent by e-mail to me at sbrady@u.washington.edu. If there are special characters (like math sym-

bols) which might not be easy to send via e-mail, send the text by e-mail anyway, and fax a hard copy (with the special characters intact) to me at 206-285-7610, or send hard copy by mail.

2. My second favorite method of submission is to have the text on a disk, saved in, a) a plain ASCII text file format, and b) your word-processor's format. I currently use Microsoft Works 3.0 for Windows. If you use that, just send the file in that format.

3. For the technologically challenged, a typewritten copy of your article is acceptable.

4. Handwritten submissions are discouraged because, at my advanced age, my eyesight just ain't what it used to be.

5. Photos and drawings, of course, must be sent through the mail. My address is 205 McGraw Street, Seattle, WA 98109.

PIANO TECHNICIANS
Journal
Volume 38 • Number 11 • November 1995

COLUMNS & COMMENTS

DEPARTMENTS

IN ADDITION

FEATURES

PACE
Professionals Advance through Continuing Education
LESSON PLAN

COVER ART

This Piano Plate Sculpture is the final resting place for four piano plates in the backyard of Richard and Anne Doerfler in Toledo, Ohio. PTGA President L. Paul Cook took this photo in September while staying with the Doerflers to attend the Convention Planning Committee meeting in Dearborn, Mich., 50 miles north of Toledo.

Politics and The Piano Technicians Guild

PTG President
Leon Speir, RPT

Strategic Planning: Politics and Policy

Politics and PTG are synonymous. Although sometimes the word "politics" can leave a bad taste in your mouth, it's a necessary "evil" in any form of representative government, including PTG. Leaders are elected by the constituency (our members) to represent the views of the constituents. An elected leader is also expected to provide guidance in developing goals and priorities to form policy. Beginning this month, I want to scrutinize both the process of electing leaders within PTG and examine how policy is made. I also want to raise the question: *"Is the system we employ to elect leaders and set policy as efficient and as representative as it can be?"*

Council

Each year a "Council of Delegates" meets at the time of the Annual Convention. The political design is that the makeup of this Council be one voting RPT representative from each chapter. This "Chapter Delegate" carries the views of the chapter to Council by his/her vote. If every chapter sends a delegate, Council would have a total of 166 voting RPT members representing more than 3900 RPT and Associate members. The Council's job is to elect officers and to set policy based on input from Chapters, Committees, the Board of Directors, and the Home Office. Council is the "*final authority*" in the governing of PTG.

This "*Council*" system of government is used by many organizations in varying forms. Governing by a Council of Delegates, selected to represent chapters views, gives RPT members direct input into the selection of officers and in setting official PTG policy. Although this is a good form of governing, it has inequities which may need to be evaluated.

A. Does it truly represent members views?

Some chapters give their delegate specific voting instructions. Delegates which have been instructed by chapters will represent chapter views in most cases. Often, however, the issues are modified at council by adoption of amendments or introduction of new candidates for office. In these cases the delegate must make an individual decision on behalf of their chapter. Many other chapters rely entirely on the judgment of their delegate without providing voting instructions to their delegate.

All chapters do not send a delegate to Council. Last year's Council had 91 chapters (54 percent) represented. In 1994 there were 92 chapter delegates (55 percent) in Council.

B. Associate members are not represented

Current bylaws require that all council delegates be a RPT member and that Associate members cannot vote on Council issues at the chapter level. Almost 40 percent of PTG members are Associates.

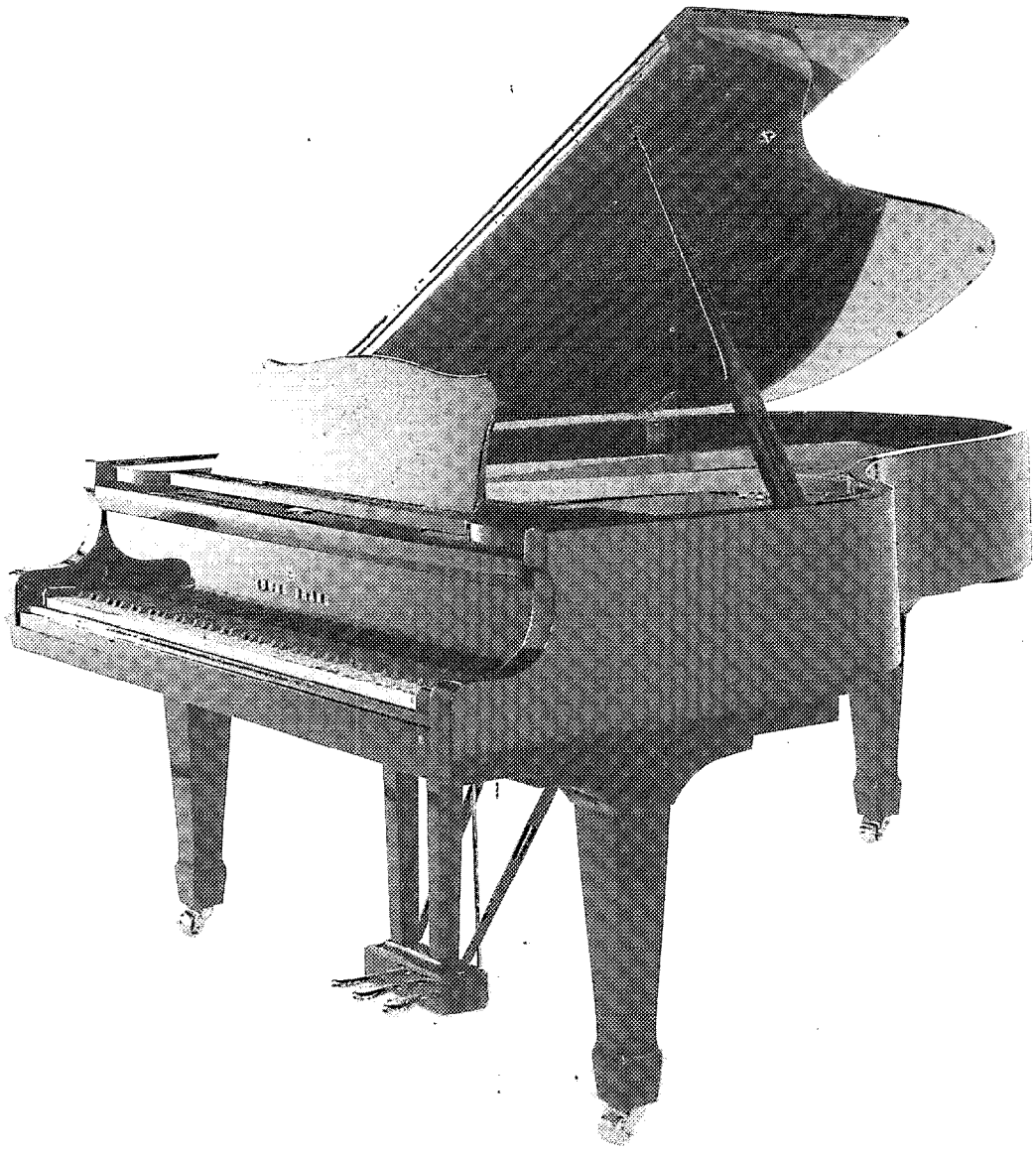
C. Council meets only once a year

Conducting the business of PTG takes place on a daily basis. Questions often come up during the year which require a prompt decision. When this happens the decision becomes the responsibility of the Home Office, or the Board, or the Executive Committee.

D. Council often does "Committee" work

Proposals which are presented to Council each year represent a significant amount of work and analysis by those presenting them. These proposals come from Chapters, Committees, and the Board, and they are drafted well in advance of the Council session. Documentation is also presented to the chapter delegates to insure a thorough evaluation of the proposal prior to the Council session. The role of Council is to evaluate the impact of the proposals and make an informed decision based on the material presented. Often, however, Council will attempt to modify a proposal to significantly change its meaning and/or purpose. A debate then ensues over the merits of those changes. Council delegates are then presented with a significantly different proposal and asked to consider it without the time to evaluate it properly.

(Next Month - Strategic Planning: Politics and Policy, Election of Officers)



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On Hammer Boring Jigs

I was gratified to see the review of hammer boring jigs by David Severance in the June *PTJ*. It shows that quite a few technicians, like me, are interested in the control and freedom gained by being able to bore one's own hammers.

I have only used the Brooks jig, and I have a few observations to add to David's review. I started out using the mounting vise pictured, but I soon bought a machinist's cross vise. As he states, "they make the job much easier." Not only is it easy to center the bit on the molding, but the bore distance can be quickly changed when needed.

I encountered the same problems that he mentioned, but they weren't hard to solve. The objection that the jig flexes under load is easily dealt with by inserting a support wedge in the space between the bottom of the arms and the top of the vise.

I haven't had a problem in accurately holding the hammer in place by hand, but if it is a problem for anyone, a suitably thinned popsicle stick can be used as a shim to wedge the hammer in place between the arms of the jig. Of course, one of the handy features of the jig is the speed of inserting and removing hammers.

I'm content with the hammer angles marked every 5 degrees. If someone wants angles marked every degree, marks can be easily scribed on the jig.

I made a simple change to my cross vise to improve accuracy. I found that the cranks on the ends of the threaded adjustment shafts could turn the shafts while I was drilling, due to the vibration of the drill press. I just removed the cranks. I can easily turn the shafts with my fingers.

Although Brooks recommends a jobber bit at high speed, I use a spur bit at 1820 rpm. Faster speeds will shorten the life of the bit. I have not found that the spur bit gets deflected. If the bit attacks the wood gently, it seems to center accurately enough. The thing I like about the spur bit is that the sharp point serves as a marker to change bore distance. Although Brooks' instructions suggest using the string height in the center of each section as a guide for boring distance, string heights across individual sections can vary quite a bit.

Using a 6" steel ruler graduated in 1/64" butted against the center bolt head, the spur bit point can be lowered to the ruler and the bore distance changed by as little as 1/64". That isn't much more trouble than changing the hammer angle.

I have also found that I can leave the jig in the vise when I'm performing other operations, the arms serving as a little table top. For instance, I can clamp Bill Spurlock's tail shaping jig on top, with the hammers reversed, to cut coves in the hammer moldings with a Forstner bit. I can also place a triangular block of wood across the arms to make a base for key-sticks, while pressing on new back-checks.

It goes without saying that orienting the jig to the drill bit is essential for accuracy. I use a small square to make sure that the plane of the working surface is perpendicular to the drill bit. However, the arms on my jig extend out from the base at slightly different angles, so that they are not at the same height at the point where the drill bit meets them. But it was a simple matter to put a thin block of wood over the arms, shimmed over the lower arm to create an accurate level surface for my square.

In our imperfect world, it pays to learn and keep track of the idiosyncrasies of our tools and jigs, not to mention the inconsistency of the parts we work on. Using the most accurate jig in the world won't make up for lack of control over all the parameters of the process. I like my Brooks jig because it provides a good balance between speed and accuracy.

Hammer boring leads me to another topic I would like to read about in the *PTJ*: correct hammer bore distances. Common lore says to add a small amount to the theoretically correct bore distance (which would make the hammer meet the strings at a 90-degree angle). This is supposed to allow for wear on the striking surface of the hammer over a period of time and the subsequent filing. Recently, I've heard that some manufacturers, like Fazioli, over-center the hammers to allow for the flex of the shank as the hammer is propelled toward the strings. To over-center or not-to-over-center, that's the question.

— Bob Anderson

Duplex Query

I appreciate Mr. Fandrich's writing, but I would like him to illuminate some parts of his August 1995 article. First, I would like to add two very important sources for discussions about the modern piano that was overlooked. *The Physics of*

Continued on Page 10

The 2nd GPA
Dublin International
Piano Competition
Dublin, Ireland
All Six Prize Winners selected Kawai.

The 42nd ARD International
Music Competition
Munich, Germany
First Prize Winner selected Kawai.

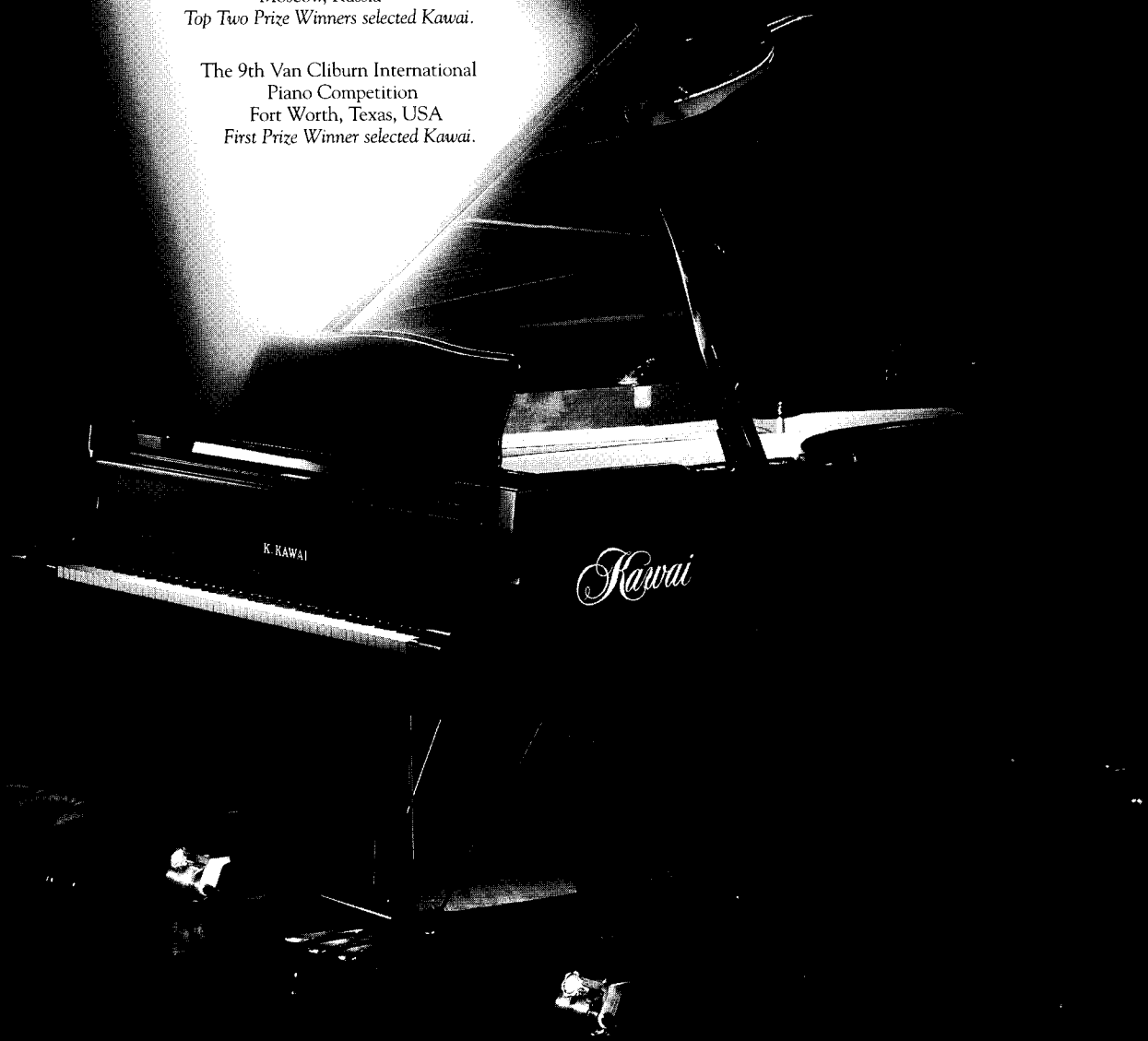
The 45th Ferruccio Busoni
International Piano Competition
Bolzano, Italy
First Prize Winner selected Kawai.

The 11th Santander
International Piano Competition
Santander, Spain
First Prize Winner selected Kawai.

The 2nd Hamamatsu
International Piano Competition
Hamamatsu, Japan
First Prize Winner selected Kawai.

The 10th International
Tchaikovsky Competition
Moscow, Russia
Top Two Prize Winners selected Kawai.

The 9th Van Cliburn International
Piano Competition
Fort Worth, Texas, USA
First Prize Winner selected Kawai.



It's becoming a familiar refrain.

Continued from Page 8

Musical Instruments by Fletcher and Rossing, published by Springer-Verlag, 1990. I have found this book to be an exceptional work and I highly recommend it. Next, I can't quite get the picture of what he means by "Power and Sustain." How are they defined, and what is the basis for saying that "acoustical power and sustain are inversely related?" I'm not trying to dispute what he is saying but merely want some clarification.

After having read the article several times I find some doubts about his conclusions persist. If the "duplex segment" is faulted for dissipating energy into the plate, what would then be more efficient. I can't think of a better alternative. What follows is another way in which this whole matter can be perceived.

Why have a duplex at all? Without it there is a tremendous energy loss. Ideally, a perfect termination would be one that provides a boundary for each and every molecule at the same cross-sectional location. We know by Newton's Laws that forces come in pairs. If you throw a ball at a hard surface, the surface will literally throw the ball back in the opposite direction.

Likewise, with a piano string, the mass at the capo bar reflects (throws back) the energy, but only on one side of the string while the other side continues to send its energy to the other side of the capo until it hits the counter bar on its side of the string. At the counter bar it is reflected to the other side of the string and moves towards the capo bar. Now, at the capo bar the energy is reflected on one side and on the other side the energy moves past the capo to the main speaking length on the other side, so on and so forth. In essence the energy is returned to the string and it is not allowed to be given up to dampening in the felt, tuning pin and wood.

[*Editors note: Del Fandrich responds to these questions in his column "The Designers Notebook", on Page 38.*]

— Michael Wathen, RPT
College-Conservatory of Music
University of Cincinnati

On Treuhaft

The June issue of the *Journal* contained an article by Benjamin Treuhaft about his experiences in Cuba. This prompted me to write a sequel to his story.

One day in the late 1960s I was working out of my garage with the garage door open, and I saw a touring car (no top) drive up. In the driver's seat was a hippie — long hair, old clothes, no shoes; and in the passenger's seat was his faithful and perpetual companion, a dog later introduced as Jeckel.

"Will you teach me to tune pianos?" Benji (not the dog) asked. Without thinking, I said, "Sure." I showed Benji and Jeckel around the shop and gave a few lessons in the next few days on tuning and repair of pianos.

At the time I was sponsoring Mike Silva, a blind tuner from Ceylon (The story of Mike was in a previous *Journal.*) I was Mike's driver, taking him to his first tuning; then I would make my appointment, then return to take Mike to his second. When Benji came on the scene, here was a chance for Mike to have a free chauffeur, and also give Benji excellent training in tuning, home troubleshooting and minor repairs.

One day I sent them to a client in Livermore, a town some 20 miles away. When they arrived at the house, Benji saw a note on the door telling the tuner to go on in and start tuning — the owner would be back shortly. This all went well and good except the neighbor across the street was watching. She saw a tall hippie and a short dark man go into the house. Suspicion got the best of her, and she called her friend's house. No answer. Then a call to the police, who came within five minutes, guns drawn ready for any emergency. About that time the lady of the house returned and satisfied the police on the legitimacy of this most unusual couple.

Benji was the restless type — it didn't take long to notice that. When he said he wanted to work in a piano factory to learn fast tuning, I contacted my friend, Roger Weisensteiner, who put him to work at the Kimball factory, and, if memory serves me correctly, he was paid 90 cents a tuning. No better way to learn how to tune a piano fast.

I don't know how long Benji stayed at the Kimball factory, but his itchy feet took him to New York, where he became a tuner for Steinway. Then he was sent to France to be the Steinway tuner in that country, but itchy feet brought him back to California where he opened his "Under Water Piano Service" in Berkeley. Where else in the world could this have happened except in Berkeley?

I didn't see Benji for a few years. Then, in 1978, at the California State Convention in San Francisco, he showed up as a registrant. It was good to see him and hear of his odysseys. He

Continued on Page 14

More on Plugging Screwholes

These wooden cones work very well on stripped screwholes in lid hinges and even Steinway action rails. The cones are available from the Trend-lines® catalog, phone number 1-800-767-9999. The price is $7.95 for the reaming tool and 20 cones (see figure 1).

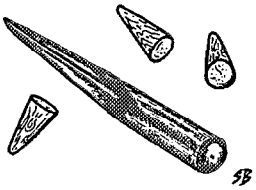


Figure 1

They are listed under "Screwhole Restorer," and the stock number is SE25. If you live in the Northeast, you can buy these items at Woodworkers Warehouse™ stores. The only negative with this system is that the reaming tool which is supplied with the cones is somewhat dull and doesn't seem to last very long. I substituted an American-made Uni-bit® (see figure 2). At about $18 or so, it is very sharp and long-lasting, and with an appropriate stop it works fine with the cones.

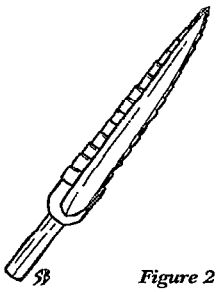


Figure 2

— Isaac Sadigursky, RPT

Get Sharp!

I had the occasion a few years ago to work with a great restoration technician from England, David Winston. Though very traditional in his approach to his work, he was a bit of a maverick in his procedure for tool sharpening. He used diamond-coated, steel sharpening "stones" (flat, steel bars) along with traditional water stones for polishing. What follows is a short article I wrote for our chapter newsletter that outlines my current procedure for sharpening:

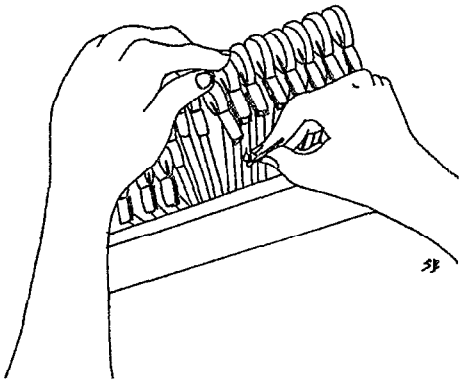
Let me confess first to being a former devotee of oil stone sharpening who has thrown tradition to the wind and adopted the use of cleaner, less toxic water-compatible sharpeners. In fact, I've gone one step further and now incorporate into my sharpening regimen the use of a diamond-impregnated "flat stone," also compatible with water. The advantage of using this "stone" (it really is a 1/4" x 3" x 6" piece of plate steel impregnated with industrial diamonds on one side) is that the abrasive material is very hard and — because of its mounting to a flat and hard piece of steel — provides a cutting surface that stays flat. In addition to this obviously important quality, its performance is really remarkable. I find it removes material easily, as fast as a coarse oil stone, and yet it leaves a surface on the blade being cut with a polish similar to that left by a medium-grit oil stone. I go from my diamond stone immediately to my 6000-grit polishing stone, obviously saving lots of time.

The diamond stone I have I received from Bob Marinelli at Pianotek. He ordered it special for me from one of his suppliers. It is made by EZE-LAP Diamond products, Box 2229 Westminster, CA 92683 (714) 847-1555. They also make other diamond-impregnated sharpening tools.

— Ken Sloane, RPT

Burning-in Shanks with a Match

Have you ever needed to straighten out a crooked hammer and found yourself with no heat gun? If you have a book of matches, look no further! While I was at Steinway, Scott Jones taught me this tried and true axiom: "If the flame is blue ... there is no residue." Just hold the match to the hammer shank and slide it up and down, carefully keeping the angle at about 45 degrees. The angle you hold the match at will keep the flame blue and cause no scorching or burning. Usually the heat from two or three matches is enough to make the correction in one shank.



— Susan Willanger, RPT

Polishing Ivories

I would like to offer a suggestion for polishing ivories. 3M Industrial abrasives division has a line of Scotch-Brite™ Belts that they make up to fit on belt sanders. The one to look for has the code LS-T on it. This belt takes a regular ivory polishing compound, and the advantages are that you are polishing the keytop on a flat surface (as opposed to a round polishing wheel), and also there is little heat buildup as the heat is distributed evenly on the keytop. 3M has to customize these belts to the size of your belt sander, so they require a minimum order of ten at a time. This could be a good chapter project to find a common size and purchase a number of them (my belt sander is 4" x 36"). I find them to be quite durable. Please feel free to call me if there is any interest in this.

Also I would like to mention that I have had good success at repairing chipped plastic keytops using polyester resin colored with white polyester pigment. There seems to be a good bond there and, although it may not pass the ultimate stress test, it is a good alternative for the customer where recovering keytops is not an option. I use masking tape on the top of the key, invert it and then pool the mix into the chipped area. I can do these repairs while tuning an instrument, if necessary.

— Chris Gregg, RPT

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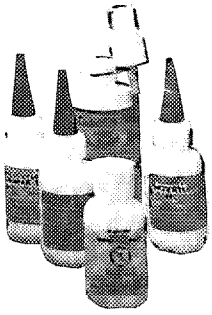

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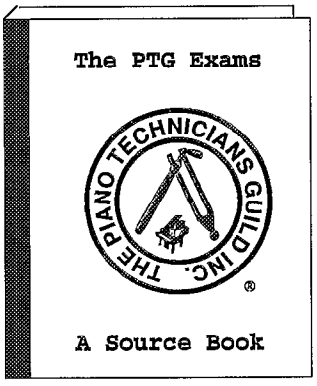

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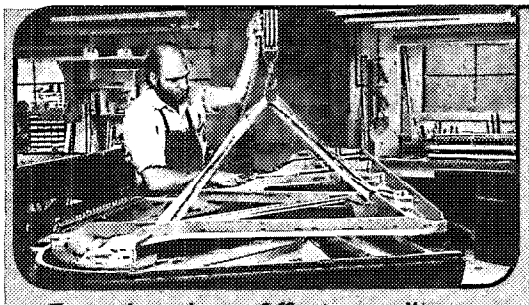

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Letters

Continued from Page 10

surprised me by saying, "Do you know what I liked most about you? You never asked me about my background." Come to find out his father was a well-known attorney in the San Francisco area; and his mother was Jessica Mitford, author of the best seller, "The American Way of Death," and other writings. I was later told that his mother was a high ranking Communist official in England, which undoubtedly influenced his affinity with Communism.

Benji had told me that he was planning to go to Cuba to service pianos there; and I was happy as well as surprised to see his report in the *Journal.* I am sure Benji is appreciated in Cuba and his article was fascinating reading, though I do not share his regard for Fidel Castro. I would like to see more fascinating experiences in the *Journal,* especially from PTG members.

— Sid Stone, RPT

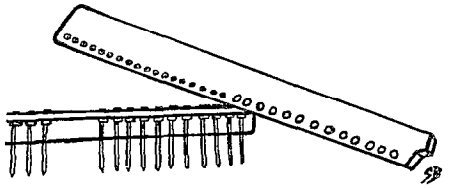
Tips, Tools & Techniques

Continued from Page 12

TT&T

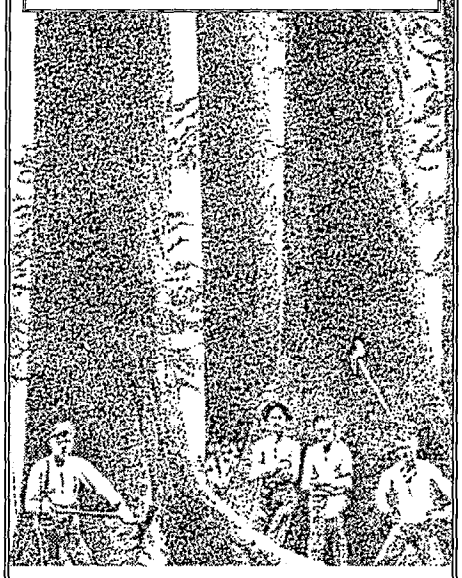
Protect Damper Guide Rail Bushings

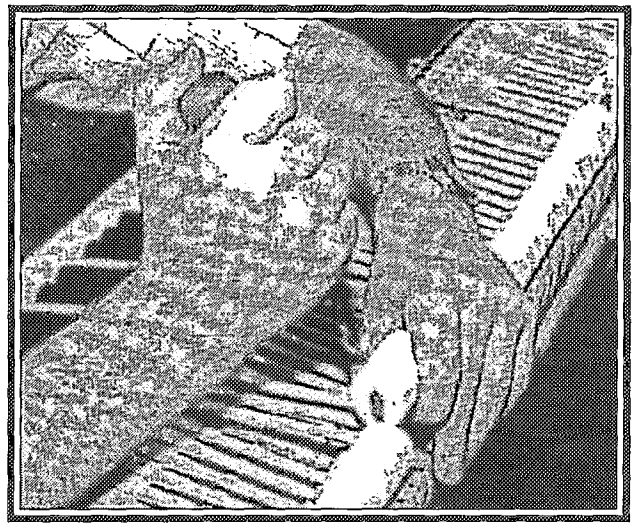
When rebushing and refinishing damper guide rails I prefer to refinish them last, so as to avoid razor blade marks on the new finish caused by cutting the bushings on the top side. I follow this procedure: first, remove old bushings by either drilling them out or soaking them out; second, sand the rails down to remove dirt and stains; third, rebush the holes; fourth, insert smooth 6d box nails through the new bushings (see illustration).



The heads are just the right size to cover the bushings and prevent contamination from lacquer soaking into the cloth. The shanks of the nails are also just right for sizing the bushings for damper wires. Finally, spray a couple of light coats of clear lacquer or acrylic finish over the nail-protected guide rails. When the finish is thoroughly dry, remove the nails and install the damper guide rails in the piano.

— Steve Brady, RPT





Q&A/Editor's Roundtable

(Editor's note: The following questions and answers were taken from the Internet discussion group, "pianotech.")

Q — Bent Plates

Recently, while relocating our piano shop, the plate to a Baldwin E (Louis style) was dropped by the movers causing the bass bar/crossbar to crack at the junction where it passes through the nose-bolt. We subsequently had the crack (which ran on both sides of the nose-bolt hole) repaired with Metalstitch®. However, upon re-installing the plate, it became apparent that the tail of the plate was bent upward such that the last two plate bosses are off the dowels by 1/2" to 3/4". Everywhere else the plate makes good contact. Obviously, the bearing in the mid- to low-tenor is a joke. That, however, is *not* my number one concern as bridge recapping to the "new plate configuration" along with installing new dowel supports could make up for that shortcoming. My real concern here is: "What are the ramifications when re-stringing a repaired plate that already has a head-start on its way to imploding?"

Am I over-reacting? What do you see as options given that this is a customer's piano and a Louis-style case? Thanks in advance for words of experience anyone might care to offer.

— Jack Kehe

A — From Richard Raskob, RPT

In my shop we have rebuilt five Baldwin grand pianos over the past two years. Each of them had a plate that was "bent" in the same manner you have noted in your post. I cannot say for sure, but I would bet that it was not the plate repair that caused the 1/2" to 3/4 " bend in the plate. I would guess that the factory shipped the piano with the dowels cut to those heights to force the piano to have bearing. This was the case in all of the pianos we did. Mount the plate where it is and cap the bridge. In my opinion, the piano and plate will be fine.

Q — Shop Feet

This year is my first time standing on concrete for some action work in our basement. I have seen interesting-looking wooden walkways on Steinway's concrete floors around worker's areas that look like plywood thrown over some cross pieces that prop it up an inch. I have also seen rubber mats with "nap" that feel shifty to walk on and remind me of taking a serious hike in a tennis shoe. Wonder if any of you have a favorite trick for a more comfortable floor?

— Audrey Karabinus, RPT

A — From Paul Kupelian, RPT

Woodworkers Supply catalog, and I'm sure others like it, advertise an 'antifatigue mat,' either 27" X 36" or 27" X 60". Prices range from $25 to $37.50. [*Editor's note: This item is also available from Trend-lines (800-877-7899, item #CZ35, and from The Woodworkers' Store (612-428-8668, item #37234).*]

A — From Newton Hunt, RPT

The fatigue mats mentioned above are good. I suffer from foot pain and find the mat most comfortable. Two layers of common carpeting work wonders as well. Basement floors can be *cold* as well as hard. I have an electric mat to use when the floors get too cold for me. It is only about 15" X 30", but that is enough to stand upon. Also wearing good sneakers helps.

A — From Dale Probst, RPT

I've tried several things: carpet, 3/8" plywood decking over 1" x 2" supports, either plain or covered with carpet, a section of wooden fence reinforced with 1" x 2" supports covered with carpet, and finally a sheet of 3/4" plywood decking. I like the decking the best. It gives enough to protect my knees but is not so high or limber that it impairs hand sawing or planing. I had trouble keeping the carpet clean, but it does pretty well other than that. I think the best mats I have seen are the ones used by restaurants in the dishwashing area.

Q — Mason & Hamlin Screwstringer

After 15 years in this business, I finally ran across (or into) a Mason & Hamlin Screwstringer. From what little I've read or heard about them in the past, they were considered to work well, and I was sort of looking forward to actually tuning one.

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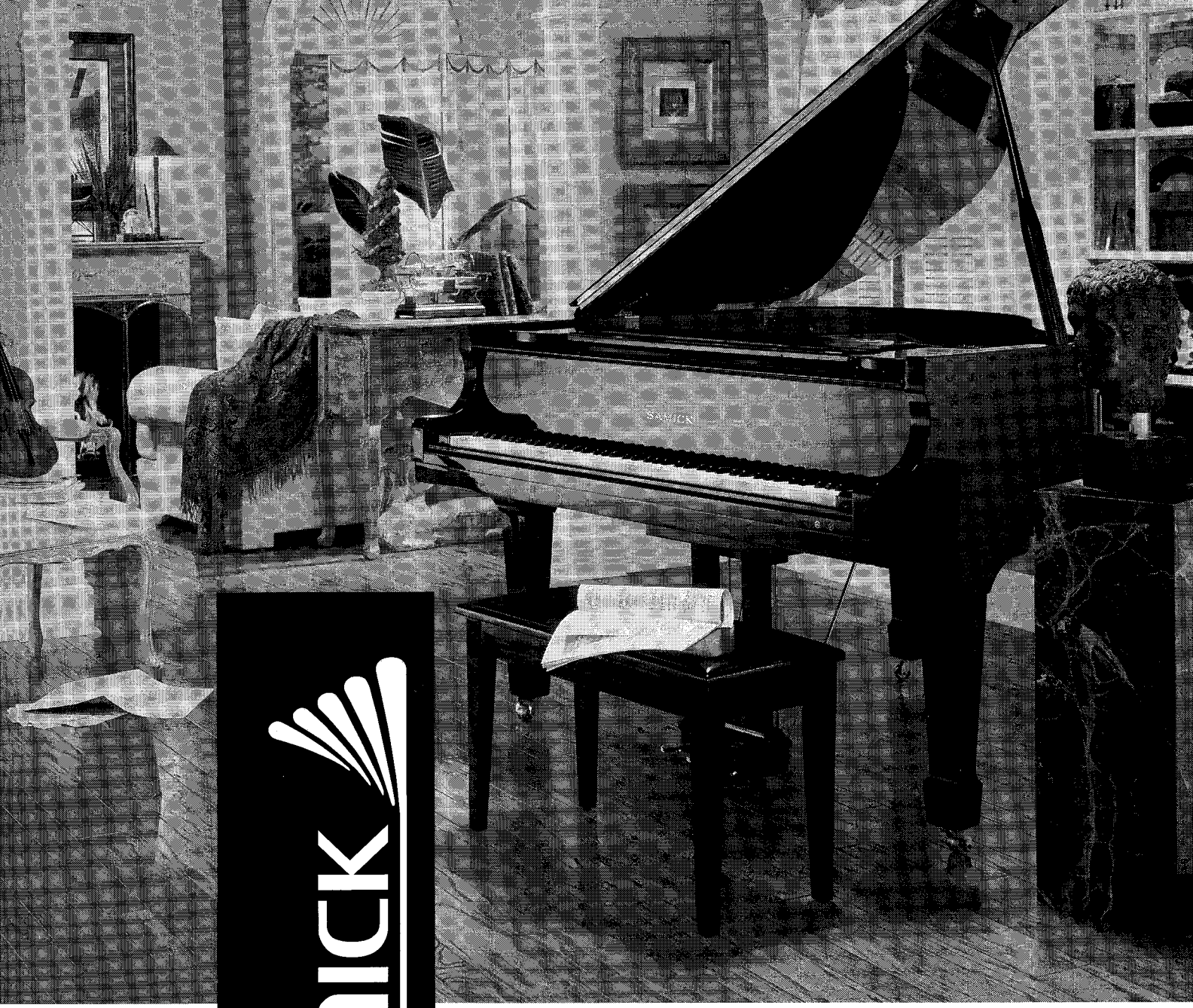

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Continued from Page 16

This particular instrument hadn't been tuned in as long as anyone could remember, and the top two octaves were over 100 cents flat relative to the rest of the instrument, which was roughly around A-435. There was some rust on these top strings where they wrap around the do-hickey — I have *no* idea what the proper name is for the part that connects the string to the machine screw — and I suspect a previous tuner chose to leave the top section flat, rather then risk breaking strings and having to figure out how to string this kind of system.

Instructions inside the piano said that pitch should always be approached from below because this type piano settles sharp. I realized that with the machine screw, one cannot use any impact motion to help overcome friction. That would be achieved by the test blow, but this piano is 100 years old, and the action wouldn't withstand much in the way of pounding.

Anyway, I thought that by having this machine screw setup, I'd notice infinite control over the string. But in reality, I felt separated from the string. Many screws moved half a turn before I heard any change in pitch, then all a once the pitch would jump. This also was far from uniform from note to note. After two and a half hours I called it quits and came back home to write this letter.

Is anyone familiar enough with these critters to offer me some advice? Thanks in advance.

— *Gordon Large, RPT*

A *From Jim Harvey, RPT*

That was a very interesting summary you provided about your experience with the Mason & Hamlin screw-stringer. (Try saying that fast three times).

The following comments are in no way supported in either the scientific, theoretical, or even empirical sense. There is little supporting data for these opinions. In addition, these statements do not necessarily reflect the opinions of the Mason & Hamlin Company, nor the inventors of the 'screw-stringer' mechanism. (Who are most likely deceased.) Rather, they reflect exclusively my limited experience with these instruments. Is that enough disclaimers?

Unlike the Chickering Brothers, whom I believe stayed up nights coming up with methods of not making *any* two pianos alike, I believe the 'screw-stringer' was conceptually and inherently a sound design. I believe its demise was caused by: (a) being too costly from a manufacturing standpoint, and/or (b) being too radically different from the mainstream to become widely accepted; likely the former.

I believe you (Gordon) were the victim of time and circumstance, i.e., irregular service, to put it mildly, ("...hadn't been tuned in as long as anyone could remember...") and the last tuner's fear of string breakage, thus leaving the top end 100 cents flat. Incidentally, any wire breakage due to rust can be repaired. The second through *whatever* repairs go quite fast. It's the first one that's a killer.

The fact that you found the remainder of the piano at only A-435 after an unknown length of time supports the premise that this is (was) a plausible method of securing piano wire under tension. It removes pinblock structure and the question of loose pins from the circuit. This leaves the structural integrity of the back, soundboard movement — including any bridge roll, and wire memory as the other variables. Well, there is the variable of tuning technique — more later.

One of your suspicions should have been correct: that of having infinite (or certainly finite) control over the string. I prefer to think of it as a vernier effect. I, too, do not know the correct nomenclature for the "do-hickeys," so will borrow "machines" from guitar buzzwords.

Therein lies another similarity. I've known guitar players to curse an instrument for the same jerky motion you described. I've known others who insist on using *brand name* machines on their guitars — to the point of replacing factory originals — to eliminate this problem.

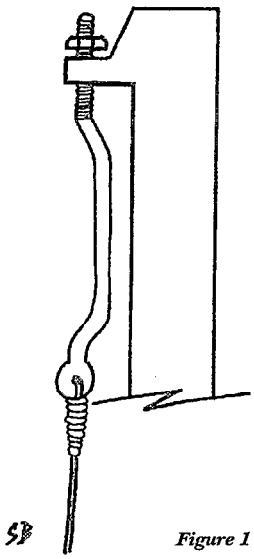

Figure 1

To borrow another term, this time from motorcycles, I think you were working against "stiction." In addition to possible rust on the threaded portion, the other, sliding "do-hickey," just wasn't rendering. Had the string not jumped, either the screw would have stripped, the wire broken, or a similar effect as the recent agraffe discussions herein. Either way, something else negative would have happened.

(*Don't-Try-This-At-Home Department*) At the risk of sounding unprofessional, I'd have no problem adding a small amount of light lubricant to the threads and moving (sliding) parts of the machines. Perhaps administering a film of WD-40® with a pipe cleaner would help the stiction problem. After all, there's nothing to fear about it running down into the pinblock, is there? The remainder of your 2-1/2 hours were due to: (a) first attempt at an unknown situation, and trying to modify your natural rhythm/tool handling accordingly; (b) fighting the wire's reluctance to render across friction points after years of developing a memory, and (c) if you did bring the top end to pitch, that would affect the stability of the rest of the piano.

Finally, some thoughts on tuning technique. It becomes immediately obvious, even without instructions inside the piano, that one does not need to "over-tune" to compensate for pin flex. However, instead of the "pitch should always be approached from below because this type piano settles sharp," I prefer to think in terms of tuning up *to* pitch, and no more. I don't think the piano settles sharp by design. I think this is simply a by-product of approaching the tuning with our customary methods. All other conditions being equal (to other pianos), I suspect that a few "normal" service intervals will find the piano quite cooperative ... and incredibly stable.

Almost forgot your statement about old action parts and pounding. Instead of velocity, think frequency ... less energy repeated more times. This should help stabilize the strings just as well.

Continued on Page 20

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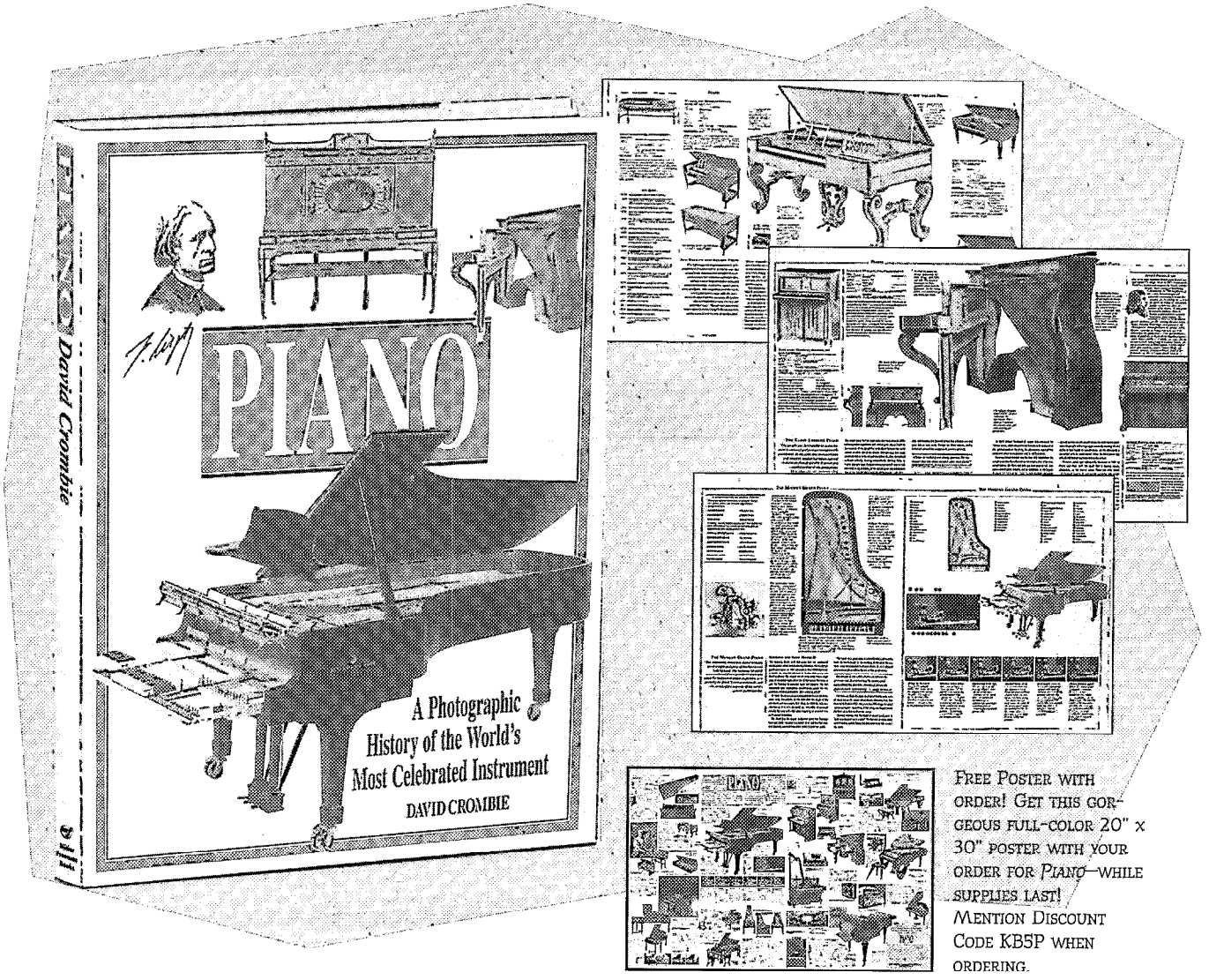

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Continued from Page 18

This combination of conditions should qualify for what Newton Hunt calls "rare or unusual circumstances," and prices should be adjusted accordingly.

I hope this provides some seat-of-the-pants insight until someone comes up with something more ... scientific.

A — *From Bob Davis, RPT*

I can't claim vast experience on screwstringers, having worked on exactly *one.* Restringing with nice clean wire and cleaning up the bearing points did improve the rendering considerably, but I did break two of the do-hickeys in the process and had to make new ones. Actually I shouldn't say I broke them — they broke themselves. I guess they decided I was ready for a sudden and inconvenient lesson in metalworking. One does get the hang of it, but you'll also notice that not even Mason & Hamlin stayed with them very long....

Q — *Tinned vs. Polished Wire*

I was just wondering if any of you have any strong opinions about Röslau's tinned (vervinnt) wire versus their polished wire. Obviously, there are appearance differences, but how about tonal considerations, etc?

— Paul Dempsey, RPT

A — *From Don Mannino, RPT*

I used the tinned wire in a few pianos which lived ridiculously close to the Pacific Ocean in San Diego/La Jolla. I didn't notice any tonal difference between it and the regular Röslau polished wire.

It doesn't look as nice because the tinning is not perfectly even in color — it's a little splotchy. The polished wire is more shiny.

Some technicians complain that the tinning can scrape off at the capo bar and agraffes and cause buzzes, but I never experienced that. The tinning delays the inevitable rust caused by those daily salt air fogs experienced by pianos living on the surf. It doesn't stop the rust, though.

A — *From David Stanwood, RPT*

I've used tinned wire for 17 years because I've always lived near the water. It's gratifying to see my stringing jobs looking clean year after year when others succumb to rust. On a Steinway B I'd restrung (inadvertently using unplated #15 wire), it was visually obvious after a few years that the #15 wire was not plated. If there were a significant difference between the adjoining plated sections, I'd be hard-pressed to tell if there were a difference in tone quality.

A — *From Scott Thile, RPT*

We used Röslau's tinned wire for many restorations in my shop, especially for instruments located near or on the coast and subject to salt air off the ocean. It did hold up better in these extreme conditions, with less corrosion than polished wire. Unfortunately, there was a problem. After several years the tin would start to flake off the wire around bearing points. It even caused a rendering problem through the agraffes of some pianos. I stopped using it several years ago.

As to the difference in tone, I believe there is one. It may be the tin plate wire is somewhat stiffer. It seemed to have more dominant high partials. I felt the tonal differences were minor though, especially compared to the flaking.

By the way, good string covers work best in high corrosion areas. Much better than the tinned wire did.

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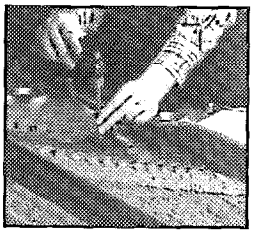

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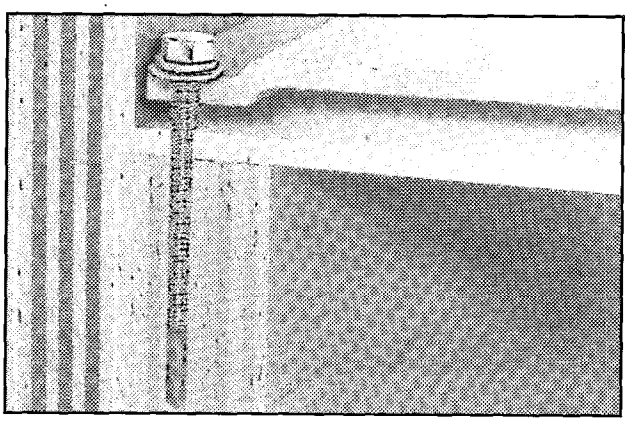

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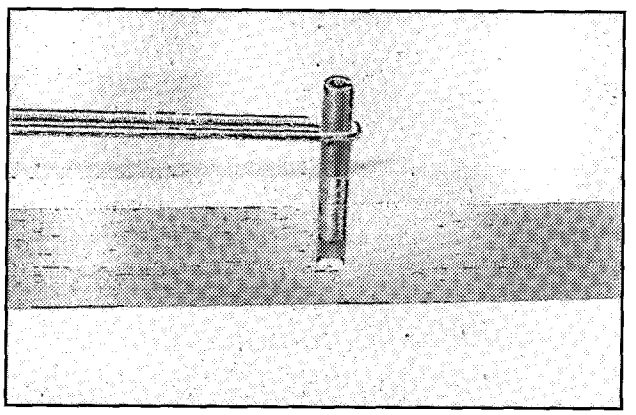

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1995 PTG Technical Institute Class Reviews ... Part 2

No Woven Felt — No Pianos

Instructor: Peter Van Stratum (Charles H. House Co.) Reviewed by Doug Kirkwood, RPT

Is woven felt (proper name for cloth) with a white center better? How do you really identify good quality woven felt? These were just a few of the questions answered by Peter Van Stratum of Charles H. House. In an informative and enlightening presentation, the class took a slide tour through the House factory, following the wool from its shipping bales, through the initial cleaning and carding stages to spinning, weaving, dyeing and finishing.

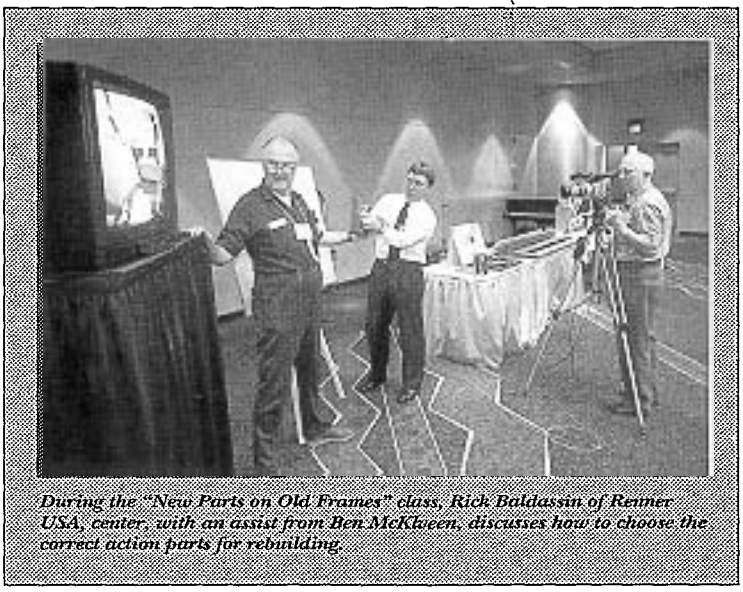
Wool is purchased from Australia and New Zealand, the source of the highest quality white wool. When the wool arrives at the factory, it is mixed with other bales to normalize the characteristics of the wool (wool from different animals and regions has different physical and chemical characteristics which need to be mixed to ensure consistency). Once mixed, the wool is passed through a carding stage which removes the fiber clumps and twigs, etc. and orients the fibers so that they all go in one direction. The product of this is a sheet of unidirectional strands of wool called roving. It is at this point that the wool is either committed to the rest of the production process or rejected. This go/no-go decision is made based on the weight of the roving. Since wool will absorb up to 16 percent of its weight in water, the facilities for the production of roving are temperature and humidity controlled.

Roving is then spun into yarn by machines which carefully control the diameter of the yarn to within ±5 percent. The yarn is then woven into cloth which is shrunk and inspected for uniformity, dyed and finished. Felting is nothing more than just shrinking. (Do you suppose that sweaters which are preshrunk could be sold as felt sweaters?) The center of the cloth is treated with a chemical to prevent the uptake of dye — hence the white center of the "bushing cloth." Coincidentally, higher quality woven felt is put through this process. However, if you really want to identify the high quality woven felt, put it in water for a long time (a day or so) and then dry it. If the thickness of the material doesn't increase by more than 0.008", it is high quality woven felt.

There were three topics of discussion which have direct impact on our business. First, when the woven felt is finished for the manufacturers, it is sanded to thickness. This leaves the material with a definite grain. Thus, if the material is pulled through the flange with the grain, then, after applying the glue, the strip is pulled back through the flange against the grain, the fibers try to straighten up forming a stronger joint. If you want this cloth, it needs to be ordered specially through the supply houses.

Second, wool relaxes in water. According to Mr. Van Stratum, the best way to "size" a bushing is to wet it! He pointed out that you could pay a lot more money for various lubricants and additives, but water would accomplish the same thing plus cause the felt to take on a new, permanent shape. With judicious selection of cloth size, reaming and burnishing could be minimized greatly. Actually, the water should have a small amount of lanolin in it as well as a surfactant like Ivory® soap to facilitate the relaxation process. This gives a long-lasting bushing which is permanently sized to the pin!

Finally, one last little tidbit — pressed felt (i.e., spring rail felt, butt felt, etc.) contains an acid left over from the pressing process. If this material comes in contact with a metal surface it will corrode it! We've all seen pitted damper spoons or badly rusted or broken upright hammer springs. His solution is to use the woven felt instead. Food for thought, eh? Indeed, the entire class was thought-provoking, especially for rebuilders.



During the "New Parts on Old Frames" class, Rick Baldassin of Renner USA, center, with an assist from Ben McKlveen, discusses how to choose the correct action parts for rebuilding.

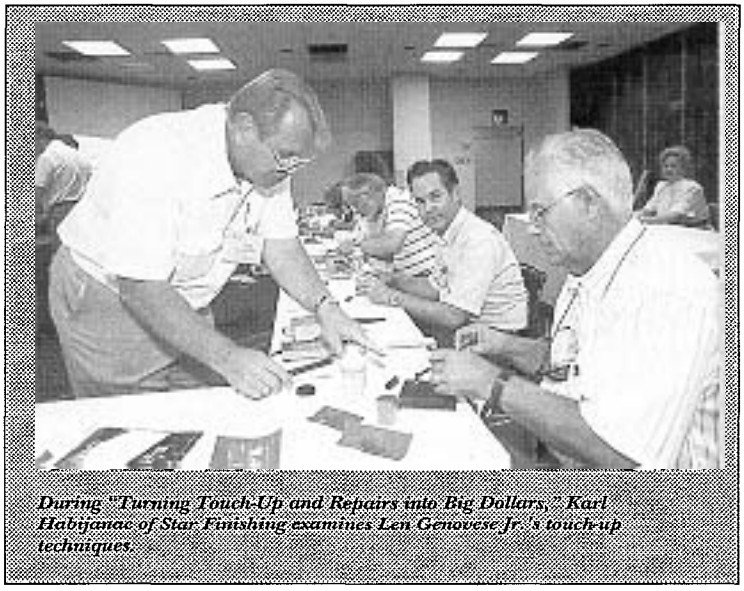
Steinway & Sons Concert Preparation

Instructor: Ron Coners, Steinway & Sons Reviewed by Bill Ballard, RPT

Chief of Steinway & Sons (NY) Concert Technical Dept., Ron Coners, started by drawing up a shopping-litany of what the class thought pianists look for in a piano (you know, a good evenly-voiced sound with projection and a color range, solid and clean tuning, and an action which delivers power evenly). In Ron's business all other things usually are equal, and the main concern is voicing, first for quality of character then evenness. But for that to happen you need a number of things: thorough action regulation, strings leveled, hammers well-shaped and fit to the strings, and at the proper strike point. Strike point will be a factor even two octaves down, and is suspect when you hear that choked sound. Be prepared for this when putting a new set of pre-hung shanks from the factory on a 19th century piano. The shank length on Steinway's current factory hammer gluing jig has grown approximately 1/16" in the last hundred years. As for the hammer's side profile, he's seen diamond, pear, apple, and even lollipop shaping done in the filing. (The latter had the molding cut down to a toothpick, with little felt left below the shoulder staples.) All these shapes sound good, even the lollipop, although "it didn't have a lot of body to it because it didn't have the mass behind it. Actually the only part of the hammer's shape which

controls tone is right at the hammer strike point: there you must hit with the tip of a curved crown, and the filing should leave that absolutely flat across the width before you do any string leveling.

How you space the hammers for the unacorda is optional. Rubenstein only cared that the hammer shifted over to a fresh spot for hitting the string, yet for Horowitz clearing the left-hand string was essential. (The sympathetically vibrating LH string can give a nasal tone, which is an acquired taste.) However you do it, the margin of hammer to the left of the trichords must be constant. Ron suggested the thickness of a quarter, and somebody chimed in "Ah, the una quarter pedal!" The above-mentioned rounding off of the LH edge of the hammer is to eliminate the wicking and crusting of reinforcer at that edge which you'll hear as a loud "ping" just as that edge clears the LH string.



During "Turning Touch-Up and Repairs into Big Dollars," Karl Habijanac of Star Finishing examines Len Genovese Jr.'s touch-up techniques.

Fitting the hammers to the strings is the basis for solid tone, and as mentioned above, absolutely square hammer crowns are required (with, of course, a discrete bevel of the LH edge). Leveling strings is a fact of life with wire which goes from a coil onto the straight string path of a piano. The factory did trace a bizarre rash of unlevelness in which every other string was low to a recently installed stringing machine, but that was a temporary bug. Ron considers holding the hammer to the string with a hook under the shank instead of the finger on the jack fly to be inaccurate. When leveling, he likes to be lifting at about an inch away from the agraffes. How hard do you pull? Wire from different sources behaves differently, but it's a matter of how much bend you need and how much has been put into the wire already. The only string seating he does is at a noisy capo bar. He's seen at least one bridge ruined by repeated seating which mashed the wire down into the top.

Ron does all of his hammer voicing (that is, reinforcing and needling) right at the crown. The only effect that juice applied to the shoulder will have is from that which manages to wick up into the crown, and after the initial reinforcing the shoulders will get rock hard before any effect will be noticed at the crown. This leads him to say that the less juice you use the greater its effects. The situation may even require a thin pencil-line of juice across the top. Actually anything which stiffens up the fibers will work. He told of a friend who on his way out the door grabbed an unmarked bottle of what was supposed to be plastic/acetone but was instead McLube®. Yes, McLube® does it, too!

Should you be facing overly hardened hammers ("with the BrillCream® set" as he affectionately called it), there are a number of ways of undoing the reinforcer. Mild cases can be fixed by a drop or two of acetone at the crown. He did hear of a drastic treatment where the hammers were thoroughly soaked with acetone two to three times and wrapped up in aluminum foil to contain the active volatiles. After an hour or so in this condition, high pressure air was forced onto the hammer tops to drive the hopefully still-liquid resin down away from the crown. For dramatic effect you can bang on the crowns with a checkering file to break up this crust, as you might in tenderizing a tough cut of steak.

You must voice at all the levels at which a pianist will play, The hammers Ron works on show no reaction to shoulder needling, and work at the crown is in pinpoint locations, done string by string. (He mentioned slicing radially into the shoulders of a voiced hammer at the 9 and 10 o'clock positions. It wasn't until the slices got up to 11:30 that the crown showed any effect.) All of his voicing, whether loud or soft, is done with the same single needle. He uses most of that needle's 3/16" length since voicing at the crown with a shallow needle doesn't last long. These voicing techniques won't work on every set of hammers, and without the proper experience will ruin the set of hammers they're intended for. However, in Ron Coners hands, they produce the New York Steinway sound known and emulated around the world. It is a pleasure to see Ron in PTG classrooms.

Understanding Relationships in Grand Action Regulation

Instructor: Sam Powell, RPT
Reviewed by Eric Schandall, RPT

You can measure how the level of technical knowledge in our field has risen over the past few decades by what we now take for granted. The piano tuner's "song" has become contrapuntal in contrast with what it was as our understanding of acoustics has broadened. Many of us have a working knowledge of the basic physics involved in studying the interaction of the hammer and the string, and have developed and altered our approach to voicing. Many of us commonly take on rebuilding jobs now which we previously would have either passed on to the few good shops able to do them, or just ignored altogether.

Basic gear mechanics and action geometry, and how they have been applied in action design and must therefore be applied in action rebuilding, have been slower to be understood and taught in a general way. I've often felt we have been like early Egyptologists studying the pyramids — speculating about, but not really understanding, how they were built. This has begun to change, as it must.

Sam Powell's class, "Understanding Relationships in Grand Action Regulation," went a long way in explaining some of the basic principles. This stuff can be difficult to grasp because the action is a complex system and, as in any system, changing one component can affect everything.

Sam has spent a great deal of time and effort in building a grand action model scaled up five times. Five times normal size

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is surprisingly large, and this was the cause of many trials and tribulations in its being built. A tractor wheel mounting-bolt serves as the capstan screw, the "bolster" for the knuckle was epoxy poured into a tube. It overheated and bubbled, which left it looking like the real thing. Regulating is done with large wrenches and pliers. As a teaching aid to this class, it proved itself invaluable and worth the effort to build.

In the first half of the class 12 regulating steps were laid out vertically and horizontally to make a graph. Class discussion was encouraged as we moved down the vertical column and marked any other step which would be affected. For example, key height was considered to affect seven other steps, illustrating the systemic nature of regulating an action.

The handout for the second half of the class is titled "Sorting out Geometry, Regulation, Friction and Mass in Solving Grand Piano Action Problems." We went through a checklist with the aid of the action model. The list was of things to check on regulated samples as you go about doing the sorting out. Here is a taste of the list:

The distance between the wippen center and hammer center is typically between 4 13/32" and 4 1/2" (horizontal spread). A line drawn between these pivots at escapement cuts across the knuckle about one half of the distance between its core and its circumference or outer edge. The difference in height between the wippen center and the hammer center should be 64 mm or more (vertical action spread). A line from the balance rail key pin at the bottom of the key to the wippen center should show the wippen cushion and capstan passing through it to a distance above the line (with the key fully depressed) similar to their distance below the line with the key at rest. The wippen should start out level (not below level), the hammer shank should be horizontal when the hammer contacts the string, and so forth. As I said, this is just a taste.

We were advised to check that the regulating screws were not at extreme positions, and that the jack has room between the knuckle and the jack stop cushion. Sam talked about friction in action centers and keys, as well as normal downweight (about 50 grams) and minimum upweight (20 grams). Mass is determined by subtracting friction from downweight.

There was a lot packed into this class, and the material will be useful. When grand actions are not working well it can be a big problem. By isolating separate elements and still keeping in mind their relationships you can discover whether the problem is an accumulation of small ones or a small one in a strategic place. Thanks to Sam and his family who helped in demonstrations using the action model.

Ed Dryburgh of Dryburgh Adhesives explains the uses and applications for adhesives in piano repair during his "Secrets of the Superglues" class.

Secrets of Performance Piano Preparation

Instructors: LaRoy Edwards & Kyota Esei
Reviewed by Doug Kirkwood, RPT

This class was really about preparing a performance piano, not just a concert piano. Initially, we discussed how to evaluate the piano when you are called upon to prepare a piano for any performance, whether it is for a recital on the teacher's piano, or the piano for an Alfred Brendel concert.

What should you do first, quickly, when you come to the piano, even before you tune? First, check for the second hammer rise. Next, check for the aftertouch "click." After that, check the hammer blow distance — is it correct? Then, do you have drop? Finally, do you have sufficient repetition spring tension? Having reviewed that, we were then taken back to a more preliminary discussion of some non-technical "Secrets of Performance Piano Preparation." Topics such as image, preparation, dress, listening skills, business aids, etc., were covered. One overriding thought came out: "Life has rules. While you can break these rules and succeed, you have to work harder if you do." First impressions are extremely important. If yours is questionable, you'll have an uphill battle to win respect. An example given went as follows: if you were in the hospital needing major surgery and two surgeons came to see you — one dressed in jeans and a polo shirt, the other in a suit with a white lab coat, with which one would you be more comfortable and confident? Which one would you want to cut you open?

At times, we all tend to forget that our customers pay our wages. We provide a service to our customers, not ourselves. Our job is to make them happy. This should be tattooed to the inside of our eye lids! That is not to say that we should compromise our standards, but that we should, through our piano skills and professionalism, do our best to make our customers happy.

One should talk to the performer, the owner, stage manager, etc., to get their impressions and find out what they want. Also find out how much time you have! With this information you can then do a more thorough evaluation and prioritize, in you own mind, what to do and in what order. If you were to prioritize what the artist wants most from the piano, you would have to say even tone, control and tuning, in that order. This translates into listening to the piano's voicing, checking its regulation and the physical condition of the instrument (keys level, pedal system solid and functioning properly, case and board clean — cat hairs and ashes gone?). Pianists must feel good about the instrument they play. Looks help. Once all of this is done, get to work. Finally, it is very important to follow up with the principals after the performance to get feedback. A teacher once told me: "when

failure occurs, welcome it — for it is only through failure that you really learn."

The rest of the class focused on action preparation using the Yamaha Performance Piano Service System. How is this done? If Dustin Hoffman in "The Graduate" were receiving advice from a piano technician instead of a chemical engineer, he would have been told: "Aftertouch, young man. Aftertouch!"

Evaluation of aftertouch was demonstrated, depressing the key until initial friction was felt — the point where the toe of the jack tender contacts the let-off button. Then, the solidity of the "ledge" is tested by feeling the resistance — is it mushy or firm. It is at this point that all three points of contact must be made simultaneously. If any one of the three is made out of sequence, there will be a mushiness in the feel. The adjustments which affect this feel — jack position, repetition lever height, let-off and drop — were then reviewed. Next, the key was pushed through escapement. Was there a quick release of resistance after the "ledge" was felt or did it drag. How far did the key travel after escapement? Did it feel comfortable? Finally, how did the key feel when it hit the bottom of its travel? Was it a hard shock, a comfortable one, or a mushy one indicating too much, just enough or too little aftertouch?

Bill Smith demonstrates how to bring birds and flowers to life from piano hammers in his Artistic Hammer Carving class.

As a last point, the drop is checked by going through escapement slowly. If the hammers do not go into check, but line up in a straight line, then the drop is okay. If not, that is if the hammers go into check, then either the drop is too great or the repetition spring is too weak.

After having evaluated the aftertouch, you will know what has to be done. The class moved on to a detailed discussion of how the work on the action is done, starting with the keyframe. Bedding the keyframe is done with the key-height in mind. Assuming that the initial work leveling the keys and bedding the keyframe was done properly, the following techniques were refinements, not gross adjustments. Keyframe bedding is done by checking the pressure that the glide bolts make on the keybed and adjusting them slightly so that the pressure is equal and that the key-height is appropriate. Then check and correct the key-level where appropriate. Tapping the keys with a short straightedge and looking for movement is useful here. Finally, the key-dip for the white keys is checked and set using a key-dip block. Punchings were added or removed from the bottom of the keyframe, not by removing the keys.

Then we moved on to setting the hammer blow and escapement. Escapement was broken into two parts: pre-adjustment (jack position and repetition lever height) and adjustment (let-off, drop and key-dip for the sharps). These settings are straightforward. The drop is set after let-off so that the hammers drop 2 mm and make a straight line. Finally, hammer checking and repetition spring strength was set. Repetition spring strength was set so that the bass hammers rose firmly, just getting to the top, tenor hammers rose so that there was almost a bounce at the top and the treble hammers rose so that there was just barely a bounce at the top. The hammer line is then checked for any change.

Then, the final secret was presented — refining the drop by the "bounce" method. This entails taking the key through escapement and watching the amount of the bounce that the hammer makes after let-off. All the bounces should be equal. If there is some variability in the repetition spring tension, it will show up here and can be corrected. This is the penultimate adjustment.

After this, we proceeded to a more theoretical discussion of the relationship between hammer travel and key travel when the hammer and key are at rest, when the jack contacts the let-off button, at the point of let-off and at the end of aftertouch. Several graphs were shown illustrating these relationships and what happens to power, repetition and aftertouch. These graphs point out, quite clearly, the iterative nature of regulating an action and how you can make changes to give the action different characteristics to accommodate the performer.

This was an excellent class, concentrating on techniques that really work once you have acquired a high degree of skill in action regulation. These techniques, when practiced and perfected, give results faster and with a high degree of precision and consistency. The videos illustrating these techniques were clear even though they were still under development. This is a new class, but, Yamaha willing, it should turn into a convention or seminar staple. It's well worth it.

Removing Snake Oil from Grand Dampers

Instructor: Richard Davenport, RPT
Reviewed by Doug Kirkwood, RPT

Removing snake oil started with evaluating the back action and damper guide rails. If these are not in good working order, then any other work done to the damper system just yields more snake oil! Checking the obvious — post and underlever pinning, sostenuto tabs, damper guide rail bushings — was covered. Then, time was spent discussing how to make new damper guide rails, including locating the holes, front to back and between the unisons. Hammers and strings must be lined up and spaced first! Treating the bushing cloth with silicone to help maintain a good bushing surface over a long period of time was suggested. In the discussion of the back action, putting a saw cut in the front edge of the underlever tray to help prevent it from warping was recommended.

The overall goal is to have damping where the sound decays very quickly, but not instantaneously. With this in mind, installation and regulation of the dampers was presented. Installation focused on replacing the wires and putting in the bends. Regulation concentrated, in detail, on the refinement of these bends to achieve the goal. Members of the class carried out different operations during this sequence, being rewarded

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with unique badges — buttons — of honor. Two basic principles guided the process; first, establish and maintain a perpendicular (straight up and down) nature in the damper movement; second, trim the damper felt so that the "business end" of the felt has a slightly rounded profile and barely gets between the strings in the bass. All the fuzz must be cut off. Once the dampers have been in the piano for a while, they will compress and move further down between the strings. However, they should not extend more than 1 mm below the strings.

Regulation, once the initial bends (five of them) were made, started from below the guide rail. The bottom bend is set so that the damper wire is centered in the guide rail bushing and the underlever top flange. Be sure that the top flange falls freely (hole in top flange has already been checked for size and obstructions) on the wire if the bottom bend is correct. The top bend is then set to eliminate the left-right travel of the damper head. These two bends set the movement of the damper head. Bends above the guide rail merely set the damper head position. A jig which hung on the stretcher was used to set the flatness of the damper head and the straightness of the wire in both planes.

Finally, the neck bends were set to align the damper head so that it was perpendicular to the strings, lifted evenly front to back, corrected any twisting as it left the strings and corrected the front-to-back position to maintain an even damper head line.

There was also a brief discussion of tools and how to modify them. Most notable was a pair of serrated scissors used for trimming felt. They were "ICE" scissors which can be purchased through any barber supply and, oddly enough, at most fly fishing shops which carry a lot of fly-tying materials [*Editor's note: see Brian DeTar's related suggestion in the October issue's TT&T section. SB*]

At the end of the class we were given a video "pop quiz" showing several different conditions which we had to identify and suggest the appropriate remedy. Once we had recorded our answers, the answers were shown on video. Results are held in the strictest confidence!

This class certainly moved damper work from a frustrating, ulcerative process to being straightforward and, would you believe, fun. You may have to modify this approach to deal with pianos where nothing can be perpendicular, but it's possible! A discussion of different types of damper felt and grain orientation would have been helpful and rounded out what is an excellent, logical and concise treatment of this undeservedly difficult subject. PTJ

Inharmonicity and Octaves, Part 2: Multiple Octaves

Dan Levitan, RPT,
Contributing Editor

Introduction

In last month's article on octave tuning we distinguished between the two distinctly different objectives we have when we tune octaves: first, to extend our temperament out to the ends of the piano; and second, to tune single octaves and multiple octaves — double octaves, triple octaves, quadruple octaves, and so forth — so they are as pure as possible. We saw how the inharmonicity which is found in all pianos makes these two goals fundamentally incompatible. We then examined the ways in which inharmonicity affects the first objective, the extension of the temperament, especially in the areas of the piano just above and below the temperament. Now, in this second and final article, we'll consider the effects of inharmonicity on single and multiple octave tuning, and go to the ends of the instrument.

Single Octaves

Let's begin by looking at the effects of inharmonicity on single octave tuning. As we saw last month, it is usual for single octaves in the piano to have some degree of positive secondary inharmonicity. When an octave has secondary inharmonicity, it is not possible for all its coincident partials to be tuned beatless at the same time; and when that secondary inharmonicity is positive, then the octave has to be widened to bring successively higher levels of coincident partials into tune.

This positive secondary inharmonicity is usually most apparent to an aural tuner in the last few single octaves above the wound strings. There are two reasons for this. First, the inharmonicity of these octaves stands out because it is usually a bit higher than that of the octaves just above and below. This is because the lowest plain wire strings are usually an area of greater than usual compromise for the scale designer. Relative to their neighbors, these last few strings above the break frequently must be scaled so that they are anomalously short, thick, and at a low tension, and all three of these factors tend to increase their level of primary inharmonicity.

As we have seen in previous articles, for an octave to have zero secondary inharmonicity, the primary inharmonicity of the lower string of the octave must be much lower than that of the upper string — one fourth, to be exact. The almost universal relative rise in the primary inharmonicity of the low plain wire makes this ratio difficult to achieve in the last few plain wire octaves except on the largest concert grands. As a result, the secondary inharmonicity of the octaves in which the lower note is a low plain wire string tends to be unusually high.

The second reason that the positive secondary inharmonicity of single octaves is usually most apparent to an aural tuner in this section has to do with the nature of the aural tests for octaves. The two most common aural tests for the single octave are the M3-M10 test, which tests the octave at the 4:2 level, and the m3-M6 test, which tests it at the 6:3 level. In a piano which is reasonably close to being in tune, the area just below the temperament is an area where both these tests beat at a rate that is comfortable to hear. Because it is relatively easy to do, and because other aural tests contribute to our awareness of the beat rates of the thirds, sixths, and tenths in this area, we tuners tend to compare these two basic octave tests in the low tenor more than in other areas of the piano. This makes us more aware of the levels of secondary inharmonicity in these octaves. In addition, the most common tests for the 2:1 and 8:4 octaves, the M10-M17 test and the m6-M3 test, respectively, are also fairly easy to hear in this register, making it relatively easy for us to compare the sizes of our octaves at these levels with those at the 4:2 and 6:3 levels.

Ordinarily, the inharmonicity of single octaves drops as they move onto the wound strings. These octaves, whose lower strings are wound and whose upper strings are plain, often have the lowest levels of secondary inharmonicity of any octaves in the piano, but we can easily fail to make note of this — for several reasons. For one, these octaves are not so problematic to tune, and so they don't inspire us to use tests. For another, the m3-M6 test is so convenient in the high bass and produces such good results that we tend to ignore other tests. Using other tests, however, can reveal some interesting things about these octaves, even, occasionally, the presence of octaves whose secondary inharmonicity is so low that it is negative. Negatively inharmonic octaves can be tuned so they test wide at the 6:3 level at the same time that they test narrow at the 4:2 level. A further check of such octaves at the 8:4 level will usually confirm the condition of negative secondary inharmonicity, but in borderline cases — where the secondary inharmonicity is close to zero — the 8:4 test may conflict with the others, due to variations in the primary inharmonicity levels of the component strings.

Secondary inharmonicity begins to rise again as we descend farther into the bass, and becomes most noticeably problematic in the extreme low bass. If we are so inclined, we can indulge our enthusiasm for octave tests more in this area than in any other part of the piano, abetted by a tremendous array of single octave tests, most of which are usable only in this register. (*See, for example, Michael Travis' thorough exploration of 8:4 and 10:5 octave tests in March 1995.*) One session spent using these tests to wrestle with low single octaves at the 6:3, 8:4, 10:5, and 12:6 levels will suffice to make us acutely aware of their high levels of secondary inharmonicity.

Ascending from the temperament, we are usually again unaware of the levels of secondary inharmonicity in our single octaves up to the top of the instrument, simply because high beat rates make most of our single octaves tests unusable much above the temperament. That doesn't mean, however, that there is no secondary inharmonicity in these octaves. In fact, inharmonicity usually begins to climb immediately above the temperament.

For example, those of us who use the single octave F3-F4 as our tempera-

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Inharmonicity and Octaves, Part 2: Multiple Octaves

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ment octave are well aware that on many large pianos this octave, with both strings on plain wire, can be tuned to satisfy simultaneously both the M3-M10 tests and the m3-M6 tests, indicating that this octave has no secondary inharmonicity. If, however, we use A4 as our starting note, we should not assume that the octave A3-A4 has no secondary inharmonicity as well. Ordinarily, we use only the M3-M10 test to check this octave — at the 4:2 level — and it's been my observation that there is an almost universal tendency to make the M10 beat a little faster than the M3; in other words, to stretch the octave a bit at the 4:2 level. We shouldn't feel at all uneasy or guilty about this stretch. It's more than appropriate; it's usually absolutely necessary, and not just as a little margin of safety against the note dropping flat later on as we continue to tune. If we were to test the octave at the 6:3 level as well; we would very likely find that the octave had positive secondary inharmonicity. That means that in most cases it *should* be tuned wide at the 4:2 level, in order to quiet the coincident partials at the 6:3 level and above.

Secondary inharmonicity usually climbs steadily up to the highest octaves. Usually, though, we are not directly aware of this increase in secondary inharmonicity. Instead, we can infer it from the universal, one might say irresistible, tendency of all piano tuners to stretch the single octaves in the treble at the 4:2 and 2:1 levels; as well as from the conflict between treble notes tuned as pure 2:1 and 4:2 octaves and those same notes tuned as multiple octaves. Tuning octaves wide at the 4:2 or 2:1 levels is nothing to feel vaguely guilty or uneasy about. We do it not just to accommodate the demands of other intervals, such as multiple octaves, as well as fifths, twelfths, and so on; and not just to make sure the notes don't drift flat. When we tune a single octave wide at the 4:2 or 2:1 level, the fact is that we have not necessarily stretched it at all. The octave has secondary inharmonicity, and so it may still be pure or even narrow at the 6:3 or 8:4 levels. Just because it is impractical to test treble octaves at these higher levels does not mean that beating at these levels doesn't affect the overall sound of the octave.

We now have a general picture of the standard layout of secondary inharmonicity in the single octaves of typical instruments: very high in the low bass, decreasing slowly as the octaves ascend through the wound strings, quite low over the break, jumping suddenly higher in the low plain wire, and perhaps then decreasing a bit, but soon enough increasing steadily to the top of the piano. The smaller the piano, of course, the higher overall these levels will tend to be.

In considering how we should best tune these single octaves, the first thing to keep in mind is that there is a progression in the audibility of the higher partials from bass to treble, and that therefore a bass octave with a certain level of secondary inharmonicity sounds very different from a treble octave with the same level of secondary inharmonicity. In the bass, the higher levels of coincident partials are very noticeable, and in the low bass they may even overpower the lower levels. So, in tuning single octaves in the bass, we will tend to be concerned more with quieting down beating partials that are high in the harmonic series. In the treble, the low levels of coincident partials will predominate, and in the high treble, only the first few sets of coincident partials may be audible at all. As a result, in tuning these single octaves we will naturally tend to focus more on the lower levels of coincident partials.

"In fact, I believe that a rule of thumb that more closely reflects actual practice would be that the standard single octave size does tend to be narrower the higher the octave, but for most tuners over most of the piano it is somewhere around a 6:3 octave, except in the low bass and high treble where the tastes of different tuners can vary widely."

For argument's sake, let's say that we are tuning a piano on which the lowest single octave has exactly the same level of secondary inharmonicity as the highest single octave. If our goal in this particular tuning were to tune single octaves as smoothly as possible, we would be ill-advised to tune both at the same width. The highest octave in the treble would be most quiet tuned as a pure 2:1 octave. If we tuned the lowest octave in the bass as a pure 2:1, though, the higher coincident partials would be unbearably narrow and would beat like crazy, and we would find the octave much improved if we widened it considerably.

Another thing to keep in mind is that the higher levels of coincident partials tend to diverge more and more, at a geometric rate, as they ascend the harmonic series. This means that we can expect single octaves to be noisier the lower they are in the piano's range, no matter how they are tuned, as the audibly conflicting levels of coincident partials in the bass are farther apart from each other than they are in the upper treble.

Generally, then, single octaves want to be wider in the bass than in the treble. On the face of it, this tendency is reflected in the standard piece advice given to beginning tuners regarding what size octave to tune in the various registers of the piano: that the temperament octave should split the difference between 4:2 and 6:3; that 6:3 octaves are most appropriate in the bass, perhaps widening out to 8:4 or 10:5 in the low bass; that 4:2 octaves work best above the temperament; and that the high treble calls for 2:1 octaves.

This advice must not be taken too literally. It really does not describe at all the ideal size of the octave that should be tuned in a given register, but only

the kind of octave test that is easiest to use in that register. This becomes clear if we think a moment about our actual practice as tuners. It's true that the m3-M6 is certainly the most frequently used test in the bass, and it is arguably the easiest to use in the bass as well: it fits easily in the hand, it relies on intervals that have already been tuned, and those intervals beat at a comfortable speed. A few octaves higher in the low treble, however, the m3-M6 test is too fast to be used comfortably. Here we tend to use the M3-M10 test, which fits almost as easily in the hand, and, in this register, beats at a useful rate. This doesn't necessarily mean, however, that we tune octaves in this register pure at the 4:2 level. As we have noted, there is an almost universal tendency to stretch the M3-M10 test in the treble. In contrast, I have noticed no corresponding overwhelming imperative to stretch the m3-M6 test in the high bass. We might be tempted to conclude that the octaves we tune in both registers actually tend to be 6:3 octaves, but while in the bass we can test them directly, in the low treble we must infer their size from the degree of stretch at the 4:2 level.

In fact, I believe that a rule of thumb that more closely reflects actual practice would be that the standard single octave size does tend to be narrower the higher the octave, but for most tuners over most of the piano it is somewhere around a 6:3 octave, except in the low bass and high treble where the tastes of different tuners can vary widely.

If you're interested in pursuing this question on your own, you could test the actual size of your "4:2" treble octaves with an electronic tuning device. Or, you could use a very convenient ninth-partial test for 6:3 octaves in the area above the temperament. This test takes advantage of the fact that an octave is pure at the 6:3 level when the 9:6 fifth below the lower note beats at the same speed as the 9:3 twelfth below the upper note. Here's how to elicit beats at these levels:

First, silently depress and hold down both the lower note of the octave and the test note, which is a fifth below. Ghost the coincident partial of this 9:6 fifth by striking the note two octaves and a fifth above the upper note of the fifth a staccato blow. If this note has no damper, you will have to immediately damp it, directly on a grand, or, on an upright, by pushing the hammer up to the string. Note the rate of the beat at that pitch that you hear in the fifth. Now silently depress both the upper note of the octave you are testing and the same test note, now an octave and a fifth below the upper note. Ghost this 9:3 twelfth at the same coincident partial as for the 9:6 fifth. This is tricky, since both hands are already occupied in holding down the notes of the twelfth. If the piano has a sostenuto, use it to keep the dampers of the twelfth off the string, and ghost as before. If there is no sostenuto, I recommend that you strike a staccato blow to the two notes a single and a double octave below the coincident partial. Strike, in other words, the octave whose lower note is a fourth below the upper note of the twelfth and whose upper note is a fifth above the upper note of the twelfth. This octave can be struck with the fingers of the right hand that are not engaged in holding down the upper note of the twelfth. Listen for a beat at the level of the coincident partial. Usually the pitch of the coincident partial is strong enough in the octave you struck to bring out the beat in the 9:3 twelfth.

Getting back to single octaves, rather than dictate an ideal size for them it would perhaps be better to say that the very notion of an ideal size for a single octave is misleading. It's more useful to think of a range of acceptability for any given single octave. With so many coincident partials — the only interval that has more is the unison — single octaves are quite elastic, easily accommodating a variety of sizes. A particular single octave may actually not sound any better as a 4:2 than as a 6:3 or 8:4, or than as some other width in between. When such is the case, as long as we stay within the range of acceptability we can let other considerations influence the exact tuning of notes as we move into the bass and treble. And prime among these other considerations, of course, is the sound of the multiple octaves that contain that note.

Double Octaves

Let's turn, then, to multiple octave tuning. We'll begin with the double octave. A rule of thumb that one sometimes hears is that a piano will sound best when its double octaves are tuned as pure 4:1 double octaves. This rule must not be taken too literally. Consider: one easy way to tune a double octave pure at the 4:1 level would be to tune a single octave as a pure 4:2, and then to tune another octave above and contiguous to it as a pure 2:1. The lower note of the first octave and the upper note of the second octave would then form a pure 4:1 double octave. As we have seen, however, there is a strong tendency for most tuners to avoid pure 4:2 octaves in all but the high treble. If most single octaves in the piano are tuned wider than pure 4:2 octaves, it follows that most double octaves are tuned wider than pure 4:1 double octaves as well.

Again, though, this does not necessarily mean that the double octaves are stretched. A double octave that is wide at the 4:1 level may, in fact, be pure or narrow at the 8:2 level. There is a range of acceptability for double octaves, just as there is for single octaves. The narrow end of that range may indeed be around the 4:1 level, but the double octave can certainly be wider than 4:1 and still be well within the bounds of acceptability.

The acceptable range for double octaves, however, is generally a bit narrower than that for single octaves for two reasons. One, there are half as many audible coincident partials in the double octave, and as a result the coincident partials that are audible stand out more clearly. Two, secondary inharmonicity increases as intervals widen, and so the coincident partials of a double octave will tend to be farther apart than those of a single octave in the same piano. As a result, one can tune a double octave more confidently than one can tune a single octave; it is less uncertain, less elastic, and the range within which it sounds good is smaller than for either of its component single octaves. Herein lies the wisdom in the above-mentioned rule regarding double octaves: simply, that it encourages us to pay attention to them. There are excellent reasons to be scrupulous about checking double octaves as we tune out from the temperament. Once we have a good double octave, we can be pretty sure that the single octaves within it, having more elasticity than the double octave, will fit in. If not, they will likely have the elasticity to be able to be retuned to accommodate.

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Inharmonicity and Octaves, Part 2: Multiple Octaves

Continued from Previous Page

Triple Octaves

Triple octaves have an even narrower range of acceptability. Triple octaves in the treble beat most audibly at the 8:1 level, and by and large, triple octaves that are pure at that level seem to serve as an approximate upper limit to the width of the triple octaves in this register if the single octaves contained within them are not to be uncomfortably large. The beat at the 16:2 level is usually faint enough that we can safely ignore it. Single and double octaves that are on the narrow side will usually result in triple octaves that are narrower than pure 8:1 triple octaves; and if we prefer these narrow inner octaves, we'll usually find that the beat of a triple octave slightly narrow at the 8:1 level is often inconspicuous enough that we can afford to take liberties with it. If we wish to have clean triple octaves on our pianos, we will have to rely on the greater elasticity of the inner single and double octaves to be tuned wide enough to accommodate the triple octave. The very high level of inharmonicity of the triple octave will reward any tendency we already have to stretch the size of the inner single octaves beyond the 4:2 level.

Quadruple Octaves

The quadruple octaves have, in theory, an even more limited range of acceptability. The first two levels of coincident partials for the quadruple octave are the 16:1 and 32:2. The faintness of very high partials in the temperament area makes the idea of beats in a 32:2 quadruple octave almost completely academic. If they can be heard at all, quadruple octave beats will be heard only at the 16:1 level. Even these beats, however, will be faint, and if we have compelling reasons for tuning quadruple octaves other than beatless, we should not be too concerned.

Tuning Clean Multiple Octaves

The secret to tuning clean multiple octaves, therefore, does not lie in tuning lots of clean single octaves. It lies in keeping the single octaves a bit on the wide side while constantly checking the multiple octaves, adjusting the single octaves to fit if necessary. And this is precisely what we tuners actually tend to do. We don't tune treble octaves wide of the M3-M10-M17 tests to allow ourselves a margin of safety, or from a lack of precision; we tune that way because hard experience has taught us that we must have single octaves wider than 4:2 in order to have clean multiple octaves. In the larger grands, our tendency is usually not to stretch the M3-M10-M17 tests too much; to tune, in other words, single octaves just a hair wider than pure 4:2 or 2:1. This makes sense in light of the fact that inharmonicity tends to be low in these pianos. One would expect less elasticity in these octaves, and therefore less difference among the 4:2, 6:3, and 8:4 octaves.

In Conclusion

Let's look now at one final bit of advice regarding octave tuning, namely, that when tuning octaves one should always refer the tuning of all the notes in the piano back to the temperament. I believe this is excellent counsel, for two reasons.

In the first place, always checking notes at the ends of the piano against the temperament ensures that we will constantly be checking multiple octaves. It is not at all necessary to use aural tests to do this; the most efficient approach is simply to monitor the sound of your multiple octaves, particularly those that include notes in the temperament, as you tune single octaves out to the ends of the piano. And the experience of many tuners continually reconfirms that there is no improving the almost universal reliability of the most basic check for single octaves, namely the sound of the fourth and fifth within the single octave being tuned. Octave tests can help a great deal, though, in helping to maintain consistency; here, then, are some tests for referring multiple octaves back to the temperament:

"The secret to tuning clean multiple octaves, therefore, does not lie in tuning lots of clean single octaves. It lies in keeping the single octaves a bit on the wide side while constantly checking the multiple octaves, adjusting the single octaves to fit if necessary."

Double octaves below the notes of the temperament often sound quite good when they are tuned pure around the 8:2 level. They can easily be checked at this level with the m6-M10 test. The m6 can be ghosted three octaves above the lower note if its beat is hard to hear. Coincidentally, and fortunately, two contiguous single octaves in this register, if tuned as pure 6:3 octaves, usually result in a double octave pretty close to an 8:2 double octave.

Triple octaves below the temperament are easily tested at the 8:1 level with the m6-M17 test, but notes tuned as pure 8:1 triple octaves in this register tend to sound too narrow when tested as single and double octaves, or as 12ths and 19ths. On the other hand, 16:2 triple octaves are usually too wide. As a result, if we wish to test notes in this area we must rely on single and double octaves, as well as 12ths and 19ths. One approach which often seems to work is to tune these low bass notes as single octaves pure or slightly wide at the 10:5 level. The easiest way to do this is simply to play the single octave and focus one's ear on the correct coincident partial (two octaves and a major third above the upper note).

Single octaves above the temperament are usually tuned wide of the 4:2 level. We've seen how they can be aurally checked at the 6:3 level. They can be tested at the 8:4 level with another ninth-partial test: the M2 below the lower note should beat at the same rate as the M9 below the upper note.

Fifths, tested at the 3:2 level with the M6-M10 test, make a handy check on single octave tests in this area. If you use this test, remember that if you have tuned a wide temperament octave, your fifths may be wide at the 3:2 level, and that, therefore, you should expect your 3:2 fifths just above the temperament to be wide as well.

Double octaves above the temperament are usually checked at the 4:1

level, using the M3-M17 test. They can be checked at the 8:2 level with the M2-M16 test. While the M2 must be ghosted, the M16 is usually fairly easy to hear as is. If your temperament is good, you can even skip listening to the M2. Remember that if you have set your temperament between F3 and F4, the M2s usually start around 4 to 5 bps in the lower end of the temperament, progressing to around 10 to 12 bps in the upper end. This will give you a basis on which to judge the speed of your M16s.

Twelfths, tested at the 3:1 level with the M6-M17 test, make a convenient check on octave and double octave tuning in this area. Some tuners tune these 12ths pure, while some use the speed of the M6 as an upper limit for the amount of stretch in the M17. Again, much depends on the size of your temperament octave, and consequently on the size of the fourths and fifths in the temperament; but there is no particular reason to be alarmed if your 12ths, particularly in the lower part of their range, come out wide at the 3:1 level, as they often will be if you have tuned double octaves around the 8:2 range. They will still usually be narrow at the 6:2 level.

Triple octaves above the temperament are most easily tested with the ninth partial. This is, without a doubt, one of the tests which is easiest to hear and most reliable in this area. Again, there's no particular need to check the speed of the major seconds in the temperament if you have done a reasonably good job there. If you are tuning 8:1 triple octaves between F6 and F7, the M23s (for example, F3-G6) will usually start around 4 to 5 bps and go up into the teens. Anything much wider than an 8:1 triple octave usually seems too wide.

By the way, don't hesitate to use upper partials, such as the ninth, as test notes. Sometimes tuners assume that these partials must make unreliable test notes because, being high in the harmonic series, they are considerably sharp of their theoretical pitch. Keep in mind that the pitch of these partials has absolutely no effect on their value as tests. Whatever their pitch is, it does not concern us; we are simply using them as benchmarks against which to compare two other pitches.

The only time we might wish to be cautious of these high partials is when we use them in parallel intervals to judge the consistency of our tuning. Here again, though, it's not the exact pitch of the partials, but just the consistency of their inharmonicity from note-to-note that concerns us. It's been my experience that even ninth partials are easily consistent enough to make themselves useful in parallel interval tests.

I mentioned earlier that there is a second reason why it makes sense to heed the advice always to refer the tuning of notes at the ends of the piano back to the temperament section. We saw in last month's article that a perfectly tuned equal temperament, transposed by perfectly consistent octaves to another register, only rarely forms another perfectly equal temperament. In fact, each time we transpose the temperament up another octave, we compromise it further. Clearly, referring our tuning directly back to the temperament gives us the best chance of maintaining the notes at the extremes of the piano in something resembling an equally tempered relationship, and thereby creating a tuning that unifies the entire piano as much as possible into one harmonious whole.

The Effects of Downbearing On the Tone of the Piano

Part 4 — The Practice Of Setting Downbearing

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New York City Chapter

In the first three parts of this article we explored how downbearing works and how it affects the tone of the piano. We will now see how to set downbearing as part of the rebuilding process. To simplify things, the process of setting bearing on a new soundboard will serve as a reference for other situations, such as resetting bearing on older soundboards and recapping bridges. Hopefully, this will give the reader a better understanding of the important relationships between the amount of bearing needed and the condition of a soundboard. First, before we discuss the ideal situation of setting bearing on a new board, I would like to discuss the limitations of improving tone on older instruments by increasing bearing.

Improving the Tone of Older Pianos

What tonal improvements can we expect when correcting the bearing in an older piano? As we discussed in part three, in the real world, tonal problems that develop in the piano are complex. Just because a piano has less than the ideal amount of bearing does not indicate that all, or even most tonal problems are related to the amount of downbearing. There are usually a number of factors contributing to poor tone: the condition of the strings, hammers, bridges and soundboard, for example. I have found that most rebuilding procedures work best in combination. For example, changes in downbearing are more effective if you also replace the pin block, restring, replace hammers and shanks, regulate, tune and voice. So it is important to consider the condition of the downbearing in relation to the overall condition of the piano. Ideally, the rebuilding procedure should be designed to keep the condition of all elements of the piano in balance.

It is important to remember that downbearing works in conjunction with soundboard crown. Older boards have considerably less crown than new soundboards. Most of the crown will be gone within 40 years. In Photos 1 & 2 we can compare the crown of a new soundboard with the crown of an older board. The new board shows over 5/8" of crown, before it is installed into the case, while the original 50-year-old board has no remaining crown. Do not expect great tone from a soundboard more than 30 years old. It is often wise to replace a soundboard more than 40 years old. My recommendations for typical rebuilding schedules are:

- 15-30 years: reset bearing, restring, replace the hammers, (and possibly replace the shanks), new damper felts, other action repairs as needed, regulate and voice.
- 30-40 years: replace the pin block, consider replacing the soundboard (especially if there are numerous cracks or problems with the bridge cap), reset bearing, restring, moderate to extensive action rebuilding, regulate and voice.
- 40 years and older: definitely replace the soundboard, replace the pinblock, extensive action rebuilding, etc.

As I have learned from past experience, doing less than the above-suggested work leads to disappointed clients and frustrated piano rebuilders. Can an auto mechanic return a 40-year-old car to the road for the fees that we charge to completely rebuild a piano? It is bad enough that we usually charge too little for our work, but even worse, we turn difficult work into impossible work by over-estimating the durability of the piano; in particular, the durability of the pinblock and soundboard. These parts are continually stressed by the tension of the strings as well as from seasonal wood movement. The true condition of the pinblock and particularly the soundboard are often overlooked or over-optimistically evaluated. This is especially unfortunate because the foundation of any

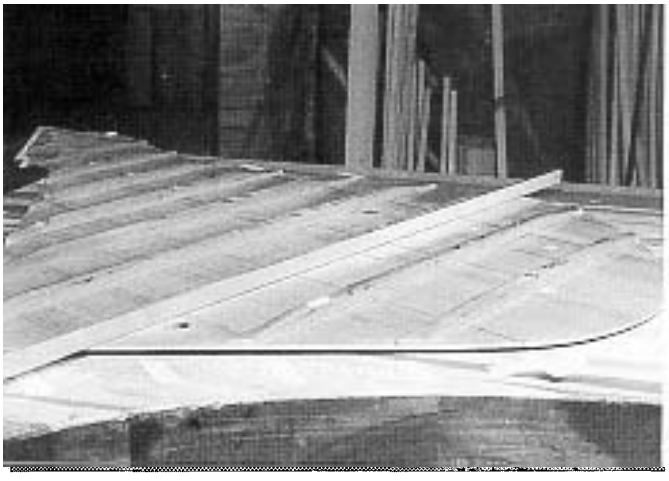

Photo 1

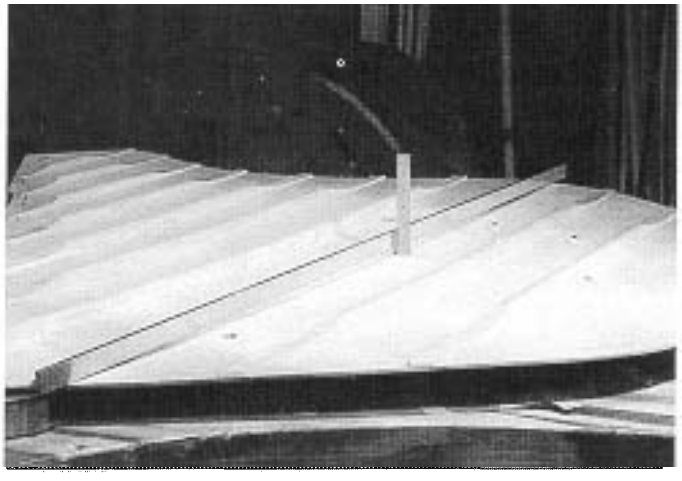

Photo 2

durable, high quality piano rebuilding begins with the pin block and soundboard.

How Much Bearing is Too Much?

Too much bearing is an important issue that we should discuss. I previously mentioned that too much bearing in the bass will weaken the bass tone, but I have not yet suggested a limit to the total amount of bearing applied to the board. The primary factor limiting the amount of downbearing that can be safely applied to the soundboard is the strength of the soundboard panel. The force of downbearing compresses the soundboard, therefore the strength characteristic of interest to us is of compression perpendicular to the grain. In "Wood Handbook: Wood as an Engineering Material" 580 Pi is given as the pressure that will begin to permanently deform spruce. Using this figure and allowing for stresses due to wood movement I have calculated that a typical soundboard can safely sustain about 1,500 pounds of downbearing pressure. This figure is applicable to a new soundboard with plenty of crown. Older boards with less crown can only support about 3/4 to 1/2 of this amount of downbearing pressure.

As I mentioned above, on a crowned board, the bearing compresses the soundboard panel. The strength of the board is relative to the strength of wood in compression perpendicular to the grain; the curve of the crown is directing the forces in line with the soundboard surface. This is similar to how an arch works to support a load in architecture. The forces are directed down to the ground through the arch. Each individual stone bears its small share of the load and the force is directed to compress the structure together rather than to pull it apart. Soundboards with limited or no crown are weaker than crowned boards. They do not evenly distribute the bearing forces throughout the surface of the board, so some areas are under a large load and others are not. Also, a flat board will tend to be in tension rather than compression. Wood is less strong in tension across the grain than in compression across the grain. As a result old, flat soundboards are less able to support downbearing; they also cannot fully take advantage of the acoustical effects of downbearing which we discussed in parts two and three.

Soundboards that still show a small amount of crown should also be considered with skepticism. This small crown measurement at the apex of the longer ribs is often created by the influence of the angle of the inner rim (rast angle). When the board is glued into the case, the inner rim forces the board upward (on a Grand) by tensioning the edges of the board and the rib ends. In this state the soundboard's crown, created through tension, offers little support for the downbearing. My recommendation is that if the soundboard *with the strings removed* shows less than 3 mm of crown on the longest rib, consider the board flat and proceed carefully with setting bearing.

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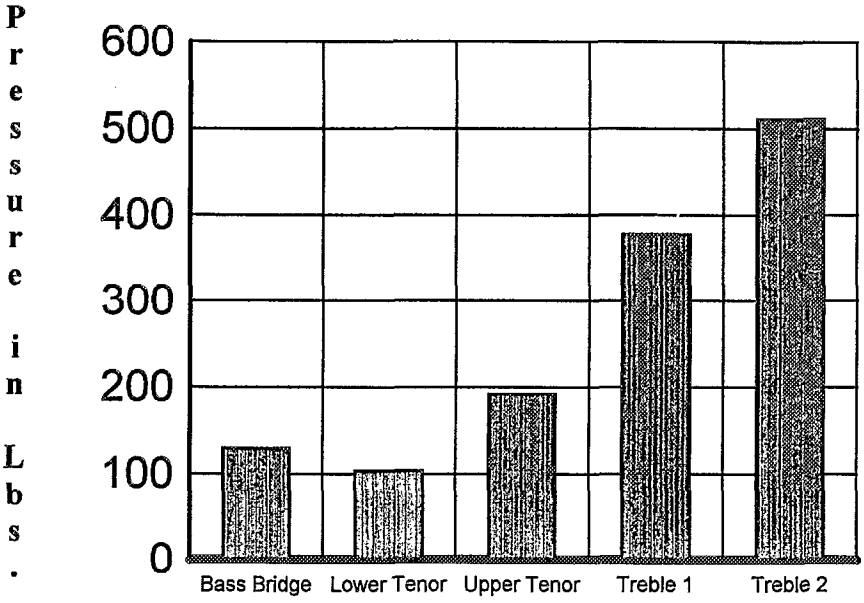
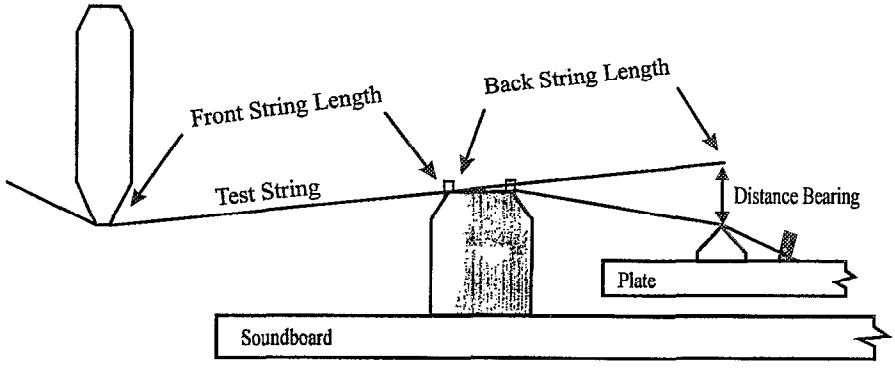
Pressure on Bridge

Variations in pressure from bass to treble



Steinway O 1914 *Total Pressure = 1313 Lbs.*

Distance Bearing



Illusrtration #1
A test string is stretched between the front termination and a point above the plate string terminus. When the string just touches the bridge, distance bearing is measured between string and the plate terminus. The quantity of downbearing pressure is a result of four factors: the distance bearing, the tension of the wire, the front string length and the back string length.

The Effects of Downbearing On the Tone of the Piano

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In this situation applying less bearing is prudent.

A good general rule to follow is: no more than 1 mm more bearing than the amount of crown. This rule applies to the middle and lower areas of the scale; in the treble, bearing can safely be more than 2 mm greater than the crown. So if the crown is only 1.5 mm in the middle of the soundboard you should only apply, at most, about 2.5 mm of downbearing to the bridge. Limiting the amount of bearing in relation to the crown will prevent over-stressing weaker soundboards that have minimal crown.

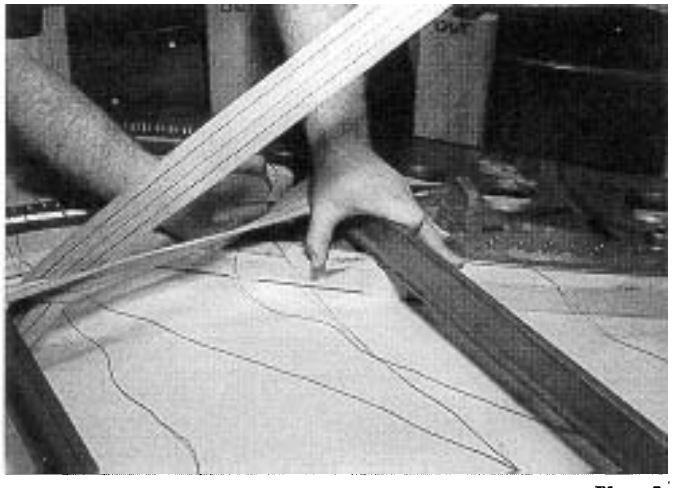

Photo 3

Downbearing as Pressure

As we already discussed, the function of downbearing is to apply downward pressure to the bridge. There are two basic ways to measure this pressure. The first and most common method is to stretch a string from the front termination of the string (either the agraffe or capo bar), and measure the gap found between the test string and the string's terminus with the plate (plate bearing or aliquot bridge) with the string just touching the bridge top. This method is called distance bearing (See Illustration 1).

Another method is measuring the angle formed at the bridge with a bubble downbearing gauge. While this method is best for finding the pressure applied to the bridges before disassembly, it is difficult to use for setting bearing. I prefer the distance bearing method. Although it is more difficult to calculate the pressure the strings are applying to the bridge, once the dimension B (see sidebar Page 37) is known it is easy to use in setting bearing. I also suggest using metric measurements for setting bearing with an accuracy of no more than .25 mm. I have found that more accuracy than this is unnecessary considering the variables of piano construction and the fluctuations of the soundboard crown due to seasonal movement. Simple numbers like .5,1,1.5, make it easier to think about and simplify the work procedures. For the math on calculating downbearing pressure from distance bearing, I refer you to the sidebar by Patrick Baron (on Page 37).

If you have read the first three parts of this article, you know I advocate a graduated downbearing pressure from light in the bass to heavier in the treble. Studying how distance bearing works shows that if we keep the distance bearing the same and alter the front and the back string lengths, the pressure will change (see sidebar). In a way, the scale design and the design of the plate naturally create a graduated downbearing pressure. As the front and back string lengths increase, the pressure drops. At this point we have come full circle and are rediscovering a simple recipe that can be used to create a graduated downbearing. The piano designer can simply give the worker a thin rectangular gauge of metal or wood to measure the distance bearing. This along with some simple instructions will insure that complex design parameters are met. If the distance bearing is the same throughout, say 2 mm, the bearing pressure will graduate from about 5.5 pounds per note in the bass to about 18.5 pounds per note in the high treble. The change in pressure is due to the increased front and back string lengths. I usually prefer to make this graduation greater by using 2.5 mm in the treble, 2.25 mm in middle of the tenor bridge, 2 mm at the end of the tenor bridge, 2 mm on the treble side of the bass bridge and 1.5 mm on the lower bass bridge. I have calculated the pressure applied to each area of the bridge using the distance bearing measurements above. The results are shown in the chart (see chart of Pressure on Bridge). These figures and the sidebar can be used to calculate reasonable distance bearing for any piano — for example, pianos with third bridges or ones with short back string lengths in the bass.

Setting Bearing on New Soundboards

I believe the best way to really understand how to set downbearing is to see the process used on a new soundboard. This will clarify the relationship between the condition of the soundboard and the amount of bearing while demonstrating the entire process. Setting downbearing is a relatively simple process. There are only a few things to know: the soundboard set-up (including pre-stressing),

Bearing String Setup

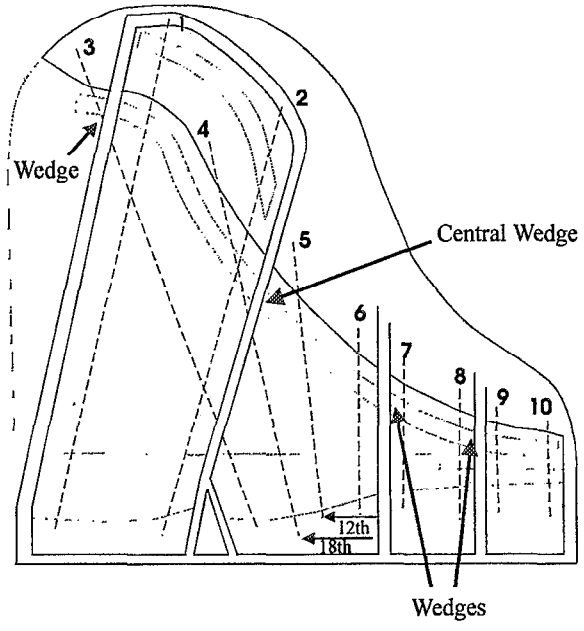

Illustration #2
Location of bearing strings on the plate and bridges of a Steinway model M. String #1 is fifth from the bottom of the bass bridge and #2 is third from the top of the bass bridge. Others are arranged similarly; the third note from the end of each section. #4 is placed at the eighteenth and #5 is placed at the twelfth string down from the first treble bar.

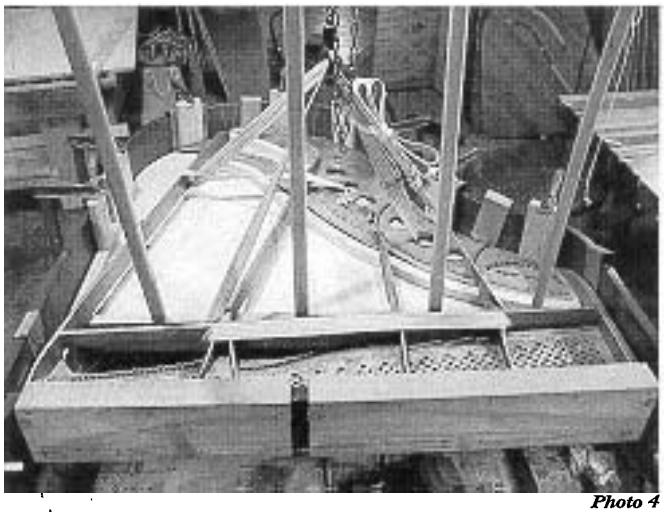

Photo 4

where to make the measurements along the bridge, and finally, what tools and techniques to use in the process.

The new soundboard with raw bridge caps (typically with 2 to 3 mm extra capping material) is dry fit into the case. The plate is installed and secured with 6 screws to the pin block. If a new pinblock is part of the rebuilding, and it usually is, it should be glued into the case before setting bearing. Every other plate lag screw boss receives a wood shim representative of the perimeter dowels. The thickness of these shims is determined in the earlier process of pinblock fitting. Wooden blocks and clamps are used to secure the plate. The soundboard is further secured to the inner rim with clamps and cauls at the spine and four go-bars along the belly rail (See Photo 3 of setup). Next the bearing strings are placed at the correct point in the scale (See Illustration #2).

Before establishing any measurements the board must be pre-stressed. To do this, a wedge is inserted between the central plate strut and the bridge. The wedge is inserted with your thumb while pounding on a nearby area of the bridge. The amount the wedge is inserted is determined mostly by feel. However, taking a measurement with the central bearing string usually gives a reading of about 3 mm. The feel should be quite tight but the pounding force should be done by hand and not with a hammer, for example, as this will probably be too much force. The soundboard's moisture content is another factor; the above advice is correct if the board is at 7 to 8 percent EMC. If the EMC is more, more wedge pressure is needed; if less, then ease off with the wedge. At first, you may want to measure the crown that is left after pre-stressing; no less than 2 mm is recommended. This process of stressing the board will take the slack out of the soundboard, bringing it to the level it will be after stringing. If this step is omitted, the amount of bearing the piano will have when strung will be much less than what was set originally (See Photo #4 of setting wedge).

At each of the bearing-measuring points on the bridges a groove will be cut to establish the correct bridge height. Later the bridges will be planed down to the height of these grooves. The tool I use is a shop-made float, shown in Photo #5. This tool is made from a file and is about 1/8" thick, the two sides taper inward to create clearance and the teeth are not set. If no such tool is available, you can use a carving gouge; this is what I use at first if there is a lot of bridge cap to be removed or where there is not enough room for the float.

As I said earlier, I do not think that front and back bearing contribute very much to the tone, but may be necessary in the treble to help secure the strings to the bridge when the piano is played very forcefully. My own practice is to have equal front and back bearing in the top two sections and down to the central bearing string. The rest of the scale is cut straight with the front string length. From observing many older quality pianos I believe this is the way it was commonly done. It is important though, not to create any negative bearing; the bearing string should not touch the back of the bridge first. When setting bearing on the bass bridge I apply pressure to the bridge with my hand to even out the pre-stressing and compensate for the lack of wedges in the bass. The bass bridge will usually move about 1/2 to 1 mm.

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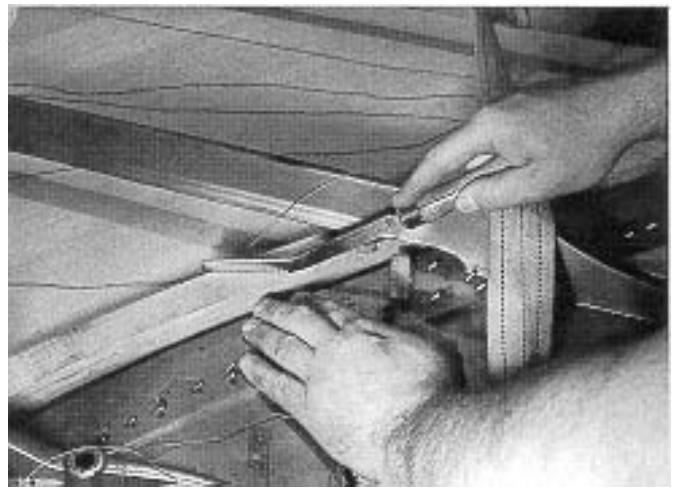

Photo 5

Setting Bearing

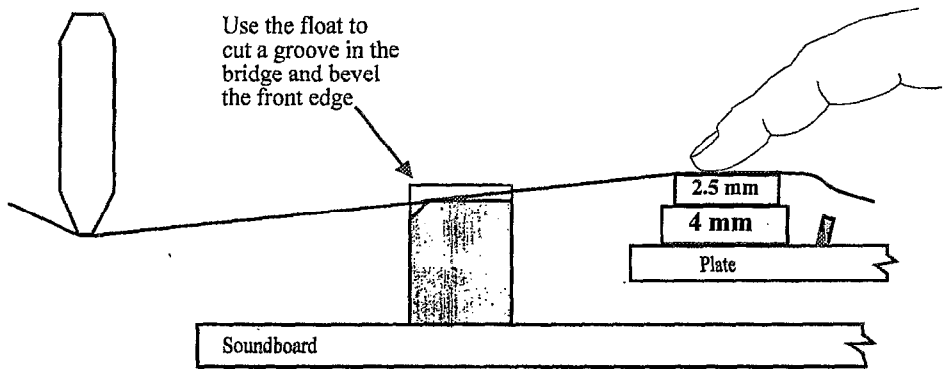

Illustration #3
Shows the use of bearing gauges to set bearing. A string is passed over the bridge. The 4mm gauge represents the height of the aliquot bridge. Cut a groove in the bridge so that with a 2mm gauge added the string just touches the bridge. Test by adding a 1/2 mm gauge and check for clearance between the string and the bridge. Bevel the front edge of the bridge to get a clearer reading of the bearing where the wire will rest on the bridge.

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Setting Bearing on Older Soundboards

As I suggested earlier, old and new soundboards are quite different. An old board has much less crown than a new board and can only support a fraction of the force from downbearing. To appreciate the difference, look at the crown in a new soundboard and compare it with that of the original (See Photos 1 & 2). Keep this in mind, as it is paramount to successfully improving the tone of the piano. Tonal improvement will not be made by over-loading a flat board with downbearing. The soundboard will shortly develop compression ridges and cracks and probably move even further south. My feeling is that lowering the plate or recapping the bridges should be done only once in the piano's life span; hopefully within 20 or 30 years. At this point the board still has some, if little, crown. Increasing the bearing on a 60 to100-year-old piano more than a very small amount is immaterial; more downbearing will not bring much improvement to the tone.

Before the strings are removed, careful measurements of the existing downbearing should be taken. Use gauges and strings to find the distance bearing at each bearing measuring point. This will give you a clear idea of how much additional bearing to add. Remove the piano wire and remeasure the bearing; this will provide important information regarding how much pre-stressing the soundboard will need for resetting. Remove the plate and do the soundboard repairs. There are two techniques to use for increasing downbearing. Lowering the back area of the plate by trimming the dowels, and lowering the forward area of the plate by installing a thinner pin block. These methods can be used in combination if needed. If the dowels are to be trimmed, no more than 2 mm should be removed. It is rarely necessary or desirable to trim all the dowels. Height is removed, where needed, with a gradation in the amount removed from adjacent dowels. The rules to observe are: no more than 1/2 mm difference in the amount removed from adjacent pairs of dowels and no more than 1 mm from the last dowels in the treble. This procedure can only be done once after the initial setting because further trimming will introduce too much stress on the plate and the bearing will become too great for the soundboard crown. Lowering the forward area of the plate by installing a thinner pinblock works well and has little risk if done correctly. The bass part of the pin block is made thinner than the original by no more than 2 mm. If this option is taken, then the new block is replaced first and the decision about how much the dowels should be trimmed is made after the plate is reinstalled. It is important to check the original bass string height and see if there will be any problem with the action. Never lower the treble area this way without careful consideration.

The amount of downbearing to apply to an older piano will vary, depending on the condition, from the full amount used on a new board to about half that amount. It is important to keep all the bearing measurements in relative proportion; if 1 1/2 mm is used in the middle, then use 2 mm in the treble and 1 mm to 1/2 mm for the bass. Often the bass will need a shim under the plate felt in order to lower the bearing. The directions I have given may create some bend in the plate so it is important to exercise caution. Make gradual changes in the dowel heights of no more than 1/2 mm from one to the other. Also taking notes on how the plate reacts when it is freed from the case is important. Lifting of the plate in the tail is common and usually is not a problem, but abrupt flexing between adjacent dowel pairs is to be avoided. In either setting bearing on a new soundboard, or resetting on an older one, the nose bolts are not used in the process. They should be either lowered or temporarily removed. The method I use to reset the nose bolts is to place my finger at the junction of the plate and the bolt with my finger nail facing down touching both the plate and the bolt. Any motion can be felt by tapping on the plate with my fist. Gradually I raise the bolt until contact is felt.

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We have now come to the end of this series of articles. My goal has been to examine the effects of downbearing on piano tone. I have endeavored to keep the information simple and straightforward. Even so, it took considerable space in print to make my view of the subject complete. When I started researching the subject over four years ago, I had no idea of the complexities involved or the obstacles I would have to hurdle in order to make the subject comprehensible to a wide audience. I thank those of you who have taken the time and found the patience to read this work. I suspect that the knowledge and experience gained from researching and writing this article is probably of as much, or more, value to me than that gained by the reader. There is no better tutor than writing and teaching. I would recommend the process of writing an article for the *Journal* to anyone interested in clarifying their thoughts on piano technology.

Is there still more to say on the subject of downbearing? For my part, no, but there remains a lot that could be done. First, I have no proof of the theories suggested, nor has anyone else, of whom I am aware, done conclusive work in this area. These theories have come strictly from studying the texts mentioned in part three and conversations I have had with more knowledgeable minds. I may even say that some of the theories are a guess—hopefully, a well-informed guess. Second, another aspect that prompts further investigation is the clarification of the distortions and omissions due to the simplification of the acoustic theory. The desire to deliver a clear and simple picture and my limited science background may have led to the omission of factors that could alter my theories. Third, since science has done fairly little investigation into how the piano works, we can expect new research which may alter our viewpoint. I am confident that these side issues and new evidence will not totally negate the simple foundation outlined above, but there is no way to be certain.

■■■

Like many aspects of our craft, the creation of this small work involved the help of many friends and colleagues. I would like to thank the following: my wife, Chris, for her support and many hours spent correcting and editing the text; my friends Viktors Berstis (with IBM) and Peter Favant (piano technician and math whiz) for their stimulating discourse on piano acoustics; my teacher and friend Angelo Andino (formerly with Steinway and Sons) for generously showing me the proper way to set downbearing; Patrick Baron for providing the math sidebar and my friends and colleagues in the PTG New York City Chapter for their support and encouragement.

Calculating Downbearing Force

By Patrick Baron, RPT

Let's begin looking at bearing by doing a little thought experiment: Imagine a setup in which the agraffe and aliquots could slide freely toward each other but were fixed so they could not move up or down. Also imagine a bridge the height of which can be adjusted at will. First we'll make the bridge very short. Now, notice that if the bridge does not touch the string, then there is no downbearing (obviously). Now imagine that we make the bridge half as high as the string is long — in this case *all* of the tension is directed onto the board as downbearing. (Our moving termination points will, of course, move towards each other so they nearly touch.) So, in our thought experiment, the amount of tension transferred as downbearing becomes greatest when length D = L1. We can now see that the fraction of the tension which becomes downbearing is a function of the angle the string makes as it leaves the agraffe heading towards the bridge and also the angle it makes at the plate after leaving the bridge.

Now force yourself back to high school trigonometry and look at the diagram we've constructed. The downbearing can now readily be calculated by taking the sine of the agraffe/aliquot angles, M and N in our diagram. If you remember your trig definitions, you recall that the sine is the ratio of the opposite side over the hypotenuse. Don't get flustered — go back to our thought experiment — this is simply the relationship between the height of our expandable bridge and the length of our string (on one side of the bridge).

Let's assume that if we pivot line L2 up until it becomes an extension of L1, the length of the resulting line will closely approximate the line L3 in our drawing. This coincides with the string you've run through the agraffe to measure bearing with. (An accurate measurement of this length would be preferable but our approximation will be very close anyway.) We label string deflection at bridge as D.

Now let's label the angles: call the angle at the agraffe M and the angle at the aliquot N. Also label the angle the string makes with the bridge (agraffe side) as P and the angle on the aliquot side as Q. Our triangles are all built on a plane defined by a straight line drawn from agraffe to aliquot which we'll call R, divided into segments R' and R"

What is important to us is not the actual deflection of the string, but the ratio of the deflection D to the length L1 and also D to L2. The ratio of D to L2 will be contributing more to our final result than D to L1 will, as you know intuitively and soon will know mathematically as well.

Note that the triangle with sides L1, D, and R' is a "similar triangle" with that formed of sides L3, B, R. That is, since they share the same angle M at the agraffe and are both right triangles, the ratio of sides D to L1 and B to L3 will be equal. We can calculate the unknown length D from this relationship:

D/L1 = B/L3 so; D = (L1/L3) x B

Now, the total force exerted on the board by a string is given by the sum of the force of the agraffe-to-bridge segment and the force of the bridge-to-hitch end segment. This can be calculated from the tension, T, multiplied by the ratio of deflection to segment length for each section:

Total downward force = T (D/L1) + T (D/L2)
or:
Total downward force = T (D/L1+ D/L2)
or:
Total downward force = T (sin M + sin N)
or:
Total downward force = T (cos P + cos Q)

which is the same thing by definition.

Now let's try some real numbers. If the front string length is 50mm, the back string length 25mm, and the distance bearing is 2mm, then

D = (50mm/75mm) x 2mm
D = 1.33mm

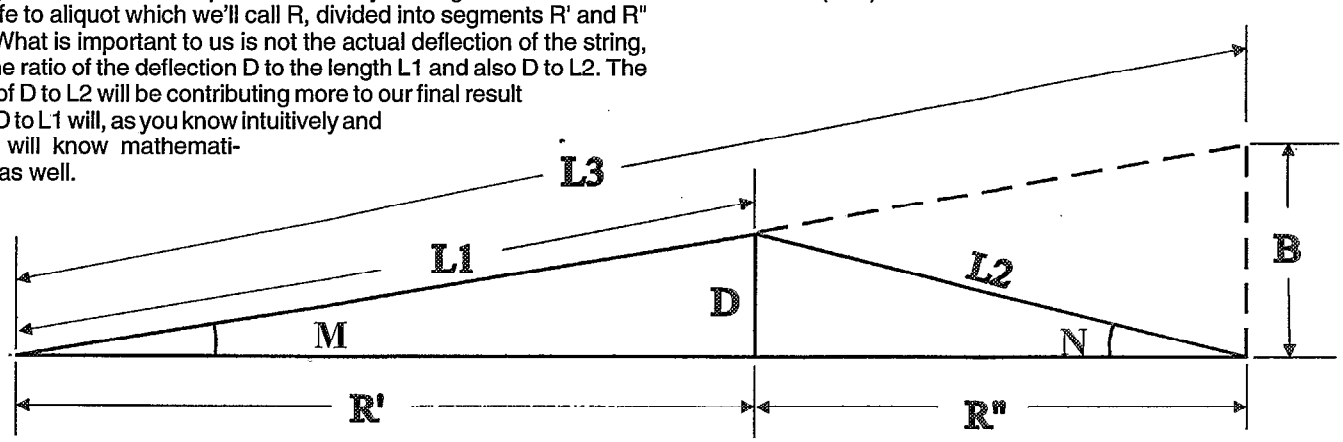
and, if we assume a string tension of 160 pounds,

F = 160 lbs X 1.33/50 + 160 lbs X 1.33/25 = 12.75 lbs

You can examine the breakdown from segments: the agraffe end contributes 4.25 lbs and the hitch end about 8.5 lbs.

Finally, if you wish to calculate the height above the aliquot that a thread stretched from the agraffe, just grazing the bridge, would reach for some specific bearing force (F) we can, with some algebra, rewrite our formula:

B = L2 x (F/T)



L1 is the front string length.
L2 is the back string length.
B is the distance bearing.
D is the height of the bridge deflection.
R'-R" is the reference line.

The Designer's Notebook

By Delwin D. Fandrich, RPT
Contributing Editor

Piano Power, Sustain

Introduction

This month's article was prompted by a letter from Michael Wathen, RPT, of the College-Conservatory of Music, University of Cincinnati, which appears in the "Letters" column. He introduces his letter by reminding me of the book ***The Physics of Musical Instruments*** *by Neville H. Fletcher and Thomas D. Rossing. Yes, I do have this book and I agree it is an excellent book which tackles the rather daunting subject of the physics of musical instruments very effectively. However, my comment about there being little written for the student of piano* ***design*** *still stands. Perhaps an explanation is in order. The physicist will study an existing piano with an eye toward understanding what makes it work, or more commonly, what makes a specific part of it work. He will be interested in finding out about (measuring and charting) precisely what kind of sounds a particular mechanism produces. He is usually interested in learning more about what already exists. He will test and measure and record and study at great length and in great detail. He will try to reduce all of his test data to formulas and equations and graphs and clearly defined principles. The function of the piano is a highly complex subject, one which a number of researchers have found fascinating in recent years.*

The designer will come along and look at all of this data and wonder, "That's really great, but I wonder what would happen if...." The designer must be concerned with things like string lengths and weights, string layouts, plate designs, rim shapes and structures, how the belly rail is going to fit to the rim ... well, you get the idea. The designer must take all of the random bits of knowledge she has learned and can gather about the piano, creatively break a few rules, invent a few new ones, and put them all together in his head to create a new instrument that will be a major leap forward. Well, okay, if not a major leap, perhaps at least a small step or two. He then has to put his new vision down on paper (or nowadays, into a computer) in a form that the engineers can take and make into a real manufactured piano.

The Physics of Musical Instruments *is just what it says it is: a book about the* ***physics*** *of musical instruments generally and, specifically, the* ***physics*** *of some of the mechanical systems used in them. It is not a book about the* ***design*** *of the piano. I don't mean this as a criticism of the book. The authors make no claim that it was ever intended to be a book on piano design. But, from the piano designer's standpoint, since it is a book on the general physics of musical instruments, it shares the same limitations of most other books of its type, including Benade's* ***Fundamentals of Musical Acoustics****. Its treatment of the piano is necessarily brief (there are a lot of different musical instruments covered in the book), fairly superficial and very generalized. And, much of what it does have to say specifically about the piano is based on work done by researchers who are not piano technicians (in the original sense of the word) and were examining only very small parts of the whole instrument and that often out of context. This research work, while usually (though not always) exhaustive, too often measures things in ways that lead to conclusions that can be misleading to the student of piano design. For example, I've now seen several published studies that are intended to measure and demonstrate the resonance patterns of soundboards in which the test soundboard was attached to the rim of the piano with screws and with no plate or strings installed to load the board. It is much easier to run the tests this way — I did it myself before I learned the futility of it — and you can get pretty pictures, but it doesn't tell you much about how the soundboard works in the real world. It also doesn't tell you if another way of mounting the soundboard might be better, or if an entirely new soundboard configuration might be better still. (Incidentally, doing these tests with the aid of a computer may make the illustrations more sophisticated and technical-looking, but it doesn't make them any more valid.)*

Having said all of this, ***The Physics of Musical Instruments*** *is still an excellent piece of work and should be studied by anyone interested in learning more about how the piano works. Just don't throw out all of your own hard-earned common sense while you are reading any book of this type.*

Now on to the questions.

Sound Power

When a piano is played it radiates *sound power* and this results in a *sound pressure*. Sound power is the cause and sound pressure is the effect. An electric heater radiates heat and temperature is the effect. Temperature is the physical quantity that makes us feel hot or cold. What we hear is sound pressure but it is caused by the sound power being emitted by the piano. The level of sound pressure is what tells us how loud the piano is.

In the context of my August article, as well as in general use among piano technicians, *power* can be described as the *perceived loudness of a piano tone that is created within the first few milliseconds of time after a piano hammer strikes a set of strings* — that is, a unison. I say "perceived" because it is our ears and minds that make the final judgment of how loud a given piano sounds. Unfortunately, this can be highly subjective. Our judgment of piano power depends on a number of factors, among them the acoustical environment in which the piano is located and, more importantly, the frequency spectrum (the amplitude of which is constantly changing and must be measured over time) of the sound envelope that is being produced by the piano.

The actual amount of acoustical power (measured in *acoustical Watts*) being radiated by a piano can be measured,

of course, but it is a complicated procedure that requires some rather sophisticated equipment. A simple *sound pressure level* (SPL) meter will give inconclusive readings. SPL meters measure the pressure of a sound wave at a particular instant in time and at a particular point in the acoustical environment (the *sound field*) in which the piano (and the listener) is located. SPL measurements are easy to take. The pressure variations on the eardrum that we perceive as sound are the same ones detected by the microphone of the SPL meter. Unfortunately, it is possible to get identical SPL readings from two different instruments, one of which may sound considerably louder than the other.

Sound power is the *rate* at which energy is being radiated, or *energy per unit time. Sound intensity* describes the *time averaged rate of sound energy flow at a specific point,* that is, *through a unit area.* In the SI system of units the unit area is 1m2 so the units for sound intensity are *Watts per square meter.* Sound intensity measurements can be related to the power output of a piano, but even this will not be enough to accurately measure the perceived power of a piano.

In the piano the rate at which sound power is being produced is constantly changing. To learn much about how "loud" a particular piano is — how much power it is radiating — it is necessary to measure, record and analyze the sound envelope (including the frequency spectrum of the envelope) over precisely measured sequential periods of time. Even then it will take a considerable amount of experience to interpret the results correctly. Our ears, of course, give us this information in a matter of milli-seconds with a high degree of accuracy.

Sustain is somewhat simpler to understand. It is a measure of the time from the inception of the sound — from the instant of hammer-to-string contact — until the audible sound has completely died away and the piano can no longer be heard. A piano with long sustain can be heard for a considerable length of time after the hammer has struck its associated string set. A piano with short sustain will be heard for a somewhat shorter period of time.

Let's assume that a piano key is being played as hard as possible to determine how much acoustical power the piano is capable of producing. When the hammer with a given mass and traveling at some given velocity, impacts the related set of strings — the unison — it transfers most of its energy into the strings and sets up a broad spectrum of more or less random wave motions within them: noise, if you will. Since both the mass of the hammer and its velocity are constant at the instant of impact, the amount of energy transferred into the string set will also be fixed. It would seem, then, that this would determine the loudness of the piano. The more wave energy we can put in the string set, the louder the piano will sound and the longer the tone will sustain, right? Alas, there is just a bit more to the problem than that.

Because the string has springiness (it is elastic and it is under high tension) and mass, it forms an oscillating system so that within a couple of milliseconds this noise organizes itself into a more or less coherent wave motion that is made up of some fundamental frequency and a series of harmonics based on that fundamental. When the initial wave of energy impacts the bridge there is still a lot of "garbage" in it — more so in the upper tenor and treble than in the lower octaves of the piano, because the longer string lengths of the tenor and bass sections allow the wave motions to begin to stabilize themselves into coherent wave motion before the initial wave of energy impacts the bridge and bridge pins. Within about one to three milliseconds, depending on where the unison lies in the scale, the vibration pattern will have stabilized and will be feeding a fairly steady, though decaying, stream of wave energy to the bridge at the strings' designed fundamental frequency of oscillation plus a spectrum of harmonics related to that fundamental frequency.

Sound Power vs. Sustain Time

When this initial package of noise plus the coherent frequency wave motion reaches the end of the speaking length of the string defined by the bridge it throws the bridge and soundboard assembly into a violent motion creating what I call "*impact sound.*" This initial impact sound — plus a certain amount of hammer and action noise — is what our ears (and minds) use to define both the tone quality of the note and its power (or loudness) level. Obviously, if the notes are being played as hard as is possible for that piano, then our minds are defining the tone quality and the maximum perceived power level of the whole instrument. A fairly large amount of the available energy in the string is poured into the soundboard and, subsequently, into the air within the first three to five milliseconds following hammer impact. The initial *decay rate* of a piano tone is quite rapid, on the order of 4 or 5 dB/second in the bass and up to 50 to 80 dB/second in the treble. Also, within a given note, the higher harmonics will generally decay at a much faster rate than will the fundamental and lower harmonics. Sustain time may be a simple parameter to measure and understand, but the decay rate of the vibrating wave energy in the string is not — it is dependent on both power and frequency.

After the initial impact sound and the rapid decay that takes place during those first three to five milliseconds the decay rate slows and the string's vibration — the piano's "tone" — continues on for some period of time. This can be up to 45 or 50 seconds in the bass of a good piano and down to half a second or so in the treble of a not-so-hot piano. This period of time is referred to as the *sustain time* of the piano. (Actually, depending on the level of bragging rights we're after, when we measure "sustain," we'll start the count on hammer impact and we'll stop it when the last whisper of sound has died away in an otherwise dead quiet room.)

Since there is a given maximum amount of wave energy in the string set, it becomes critical that we use all of this energy to its maximum potential. This is done by carefully controlling the rate of energy transfer from the strings into the soundboard by manipulating, or fixing, the ratio of

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string impedance to soundboard impedance and by carefully conserving the remaining energy that we have available; using all that we can to actually move the soundboard.

String Damping

The damping rate of any vibrating string is determined by three factors: 1) the transfer of energy to the string's boundary systems — whether desirable or not; 2) internal damping, or damping within the string itself due to the internal friction of the material; and 3) air damping. Damping due to any of these factors will vary with frequency, and to some extent with the amplitude of the strings vibration. Some energy loss to the string's boundary systems is actually desirable — after all, the bridge and soundboard system is part of the strings' boundary system and without losing some of the wave energy to the soundboard there will be no sound from the piano. For the most part, though, we are concerned with unwanted energy losses at the fixed-end boundary, i.e., the mechanism devised to terminate the speaking length at the tuning pin end of the string. Internal damping with steel strings is usually negligible, but it can become a factor in the upper tenor and treble sections of the piano. For normal piano strings, air losses are negligible.

The rate of energy transfer from a set of strings to the soundboard will be the primary factor determining both the power (volume) of the unison and its sustain time. If we transfer a large portion of that energy to the soundboard very quickly to make a louder sound, there will be less energy remaining in the string to provide for a long sustain time. This is the situation we would have if the soundboard were fairly compliant. (Whether it was designed that way, or became that way over time is not relevant to the discussion now but will probably be the subject of some future article.) Conversely, if we restrict the transfer of energy from the strings to the soundboard by making it less compliant, there will be less initial power, but the sustain time will be greater.

Hence, acoustical power and sustain are inversely related. We can make a piano more powerful (loud) by sacrificing sustain, or we can make the tone sustain longer by sacrificing power. With the same amount of energy available in each case the difference is in how fast we use it up. For a simple but illustrative example, let's say we're trying to fill a five-gallon fish tank and we have available two five-gallon buckets filled with water. The first has a 50 mm valve in the bottom. It won't take long for the bucket to empty and fill the fish tank, but some of the water may splash around a bit. The second bucket has a 5 mm valve in its bottom. It may take a bit longer to fill the fish tank, but it will be a little less messy. The same amount of water was available in each bucket. The first had greater power, the second had longer sustain.

Let's say we have optimized the soundboard design. What else can affect power and sustain? Where else can the wave energy in the string go? It will either go into the soundboard to be turned into sound energy or it will be lost in the plate, in the string itself, in the tuning pin/pinblock, etc. (There are losses in the soundboard and its mounting system as well, but they are not relevant to this discussion so we'll ignore them for now.) The secret of good piano performance is to keep as much energy as possbile in the speaking length of the string where it is available to move the soundboard and to not let it get lost in the mechanism and mass of the piano itself.

Why Do Pianos Have Duplex Strings?

Which brings us to the question of the duplex string. First, let's refer back to my original definition of the "duplex" string. It is that portion of the string between the V-bar and the counter-bearing bar — whether it is found on a grand or a vertical piano is irrelevant to our discussion. Nearly all pianos have a duplex string of some sort. The debate is over whether they should be "tuned" and be an active part of the sound producing system, or be "un-tuned" and acoustically dead. Which system we have will be determined by how the plate is designed.

To define the speaking length of a piano string there must be some method of effectively defining and terminating the string when the piano is being played. The system must block all, or at least most, of the wave energy in the string — keeping it in the speaking portion of the string — yet it must allow some string movement during stringing and subsequent tuning. The duplex string exists because the simplest technique yet devised to accomplish this is simply to bend the wire over a fixed V-bar bearing surface on the bottom of the capo d' astro bar, deflecting it sufficiently to block the wave energy in the string at that point. For a variety of reasons the string is then deflected again over a second bearing bar before passing on to the tuning pin. The segment of wire between these two bearing surfaces is the duplex string. This system is used in the upper tenor and treble sections of most grand pianos and occasionally throughout the entire piano. The distance between V-bar and the counter-bearing bar determines whether the string segment is tuned or not. In general, tuned duplex segments are considerably longer than the un-tuned segments and, at least in theory, they will be tuned to some harmonic of the fundamental frequency of each unisons' pitch. They will also usually have a smaller string deflection angle across the V-bar.

The most efficient — and best — system would be one in which 100 percent of the wave energy traveling along the speaking length of the string and impacting the V-bar would be reflected back into the speaking portion of the string. In real life,

Piano Power, Sustain

unfortunately, this is an impossible dream. The statement "Without it there is a tremendous energy loss," (I'm assuming that Michael is referring to a tuned duplex string segment.) seems to be at the heart of our misunderstanding of this whole subject. The tuned duplex stringing system has long been promoted as one which actually adds energy to the system, but it doesn't. Any time energy is allowed to leak past the V-bar there are energy losses. Without adequate string deflection at the V-bar to effectively terminate the string's speaking length, there are high energy losses. If, in addition, the duplex string segment is excessively long, and especially if it is tuned, there will be additional losses. The whole point of my August article, of course, was that the string deflection angle at the V-bar must be sufficient to completely terminate the speaking length without being so great as to make the string untunable, and that the length of the duplex string segment must be short enough so that it is not easily excited by the fundamental pitch of the unison or by one of its overtones.

Any energy that "leaks" past the V-bar is energy that is subject to additional losses. There are some losses in the V-bar/capo d' astro bar. There are losses within the string itself due to the internal friction of the steel. There are further losses into the upper bearing bar. When we design a system that allows — actually encourages — the transfer of energy across the V-bar we are also encouraging additional losses of energy. To take the example of a ball being thrown against a hard wall just a bit further, picture what happens when the same ball is thrown against a wall with just a little bit of give to it? It will still bounce back, but without quite as much force. Some energy has been lost in moving the wall.

It is true, of course, that some of the energy in a tuned duplex string segment will be fed back into the speaking length of a perfectly designed and perfectly manufactured system in which each string segment is perfectly tuned. But there are a lot of "perfects" there, and even then the net amount of energy in the speaking length of the string will be less than if the wave energy had not been lost to the duplex string segment in the first place. We may be able to get a slight increase in power, but it will come at the expense of sustain time. Any system that actually encourages energy losses from the speaking length of the string should be avoided.

Capo d' astro Bar Mass

Beyond a certain critical minimum, the mass of the capo d'-astro bar is not much of a factor in either the power or sustain time of the tuned duplex stringing system. If the deflection angle is such that it allows some of the wave energy to pass in order to set up vibrations in the duplex string segment, the V-bar is not functioning as a good energy reflector. Increasing the mass of the capo d' astro bar in such a plate will have little effect on the system's overall efficiency. In contrast, increasing the mass of the capo d' astro bar on a well-designed plate using short, untuned duplex string segments and adequate string deflection angles will — up to a point of diminishing returns — improve the overall efficiency of the system.

The idea here is that *we don't want to allow the energy to get past the V-bar/capo d' astro bar system in the first place!* If we don't let the energy across the V-bar/capo d' astro bar, we can avoid most of the losses you mention. Remember that only a small portion of the energy that crosses the V-bar/capo d' astro bar to excite the tuned duplex string segment will ever be returned to the speaking length of the string even under ideal conditions — conditions that rarely, if ever, exist in real-world pianos. The rest will inevitably be lost. By keeping the string deflection angles and the duplex string segment lengths within the guidelines I defined in my August article, these losses are minimized — there will be very little energy getting past the V-bar/capo d' astro bar to worry about.

In other words, if our buckets get rusty and develop a few holes in their sides, they are going to empty even faster and the floor around the fish tank is going to get pretty wet. And the fish may have a hard time swimming around in the gravel pit at the bottom of the tank.

Behold The Upright ... Rebuilding the Damper System

By Don Valley, RPT
Western Carolinas Chapter

Choosing the damper system or the hammer system at this point would be a toss-up for some. However, by my reasoning, the damper system should be the first of the two to be re-installed on the main action rail. Once the rebuilt dampers are installed, you do not have the obstruction of hammer shanks to work around as you space and regulate the dampers to the strings. First, we'll look at the preparation of the damper system.

The set of damper levers has been removed and placed on a tray to be first cleaned and inspected. At some time during the procedure of rebuilding, the lifter rod(s) will be attended to. We will start at the bottom of the lever with replacement of the damper lever cushion, followed by the spring groove punchings and then the damper head felt. Attention to the flange, spring and spring cord is also necessary.

Many manufacturers have used felt for the damper lever cushion. This should be replaced with woven felt because of the pressure of the spoon. With the consistent firmness of good action cloth, the problems we have had with spoons digging holes in the soft felt will be eliminated. In order to keep from doing extensive regulation when the action is replaced in the piano, try to duplicate the same thickness in the new cloth as in the original. A small difference in thickness, especially in the damper system, makes a great difference in the leverage movement. Once you have chosen your cloth, take a sample of the original for size. Using your guillotine-type cutter, duplicate this until you have a complete set of about 68. Note, as you begin the gluing process, that these are glued on each end. This is for noise reduction at the point of spoon contact. Just a spot of hot glue at each end is sufficient. PVC-E is also acceptable here.

Next stop on the damper lever is the damper flange. The damper spring is mounted into this flange. Often you will find the damper flange, if not replaced, needs to be rebushed and repinned. This is brought on by the force of the damper spring working the center pin so hard as to compress the bushing cloth, enlarging the opening. The symptom is excessive side play of the lever. This is an area many technicians avoid because of the dread of installing new springs. It is really quite simple as you take it step-by-step.

Once again, you must decide whether to replace or repair. New damper flanges must have the same dimension from the cross-wise mortise underside and near the rear of the flange, to the flange screw hole. If the dimensions are not the same here, new flanges will not work, so you will need to rebush and respring the old flanges. Assuming you need to do this, the procedure is as follows (the flange does not need to be removed from the lever):

Remove the cord on which the damper spring is mounted. You can use a type of center-pin punch or a drill bit of slightly smaller dimension. With a punch, push some of the cord through — enough to grip it with small pliers and pull some through. Then the rest is easily removed. Discard the old spring. If you have not done so up to now, you will need to

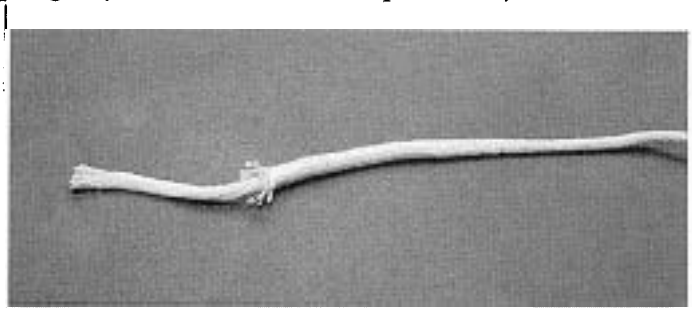

Photo 1

prepare the damper spring cord to be able to feed through the hole and new spring coil.

Your piano supply houses stock this. It is a sheathed cord—strands of cord inside a knitted sleeve. Let's make a "needle" on one end of this strand. First, grip the threads and hold them while you pull the sleeve back about 2" (see Photo 1). Cut away about 1 1/2" of the threads. Pull the sleeve back to its original position (it will be empty, of course). Pull this sleeve tightly while you have clamped part of the cord in a vise, wet the sleeve thoroughly almost up to the strand area with thin CA glue, then apply accelerator to the glue. Hold it in place for about 20 seconds. You may even see some smoke rise as it sets. Now you have a slender "needle" to go through the flange. The point may need trimming and the start of the cord section may need compressing with pliers in the event any glue wicked back there

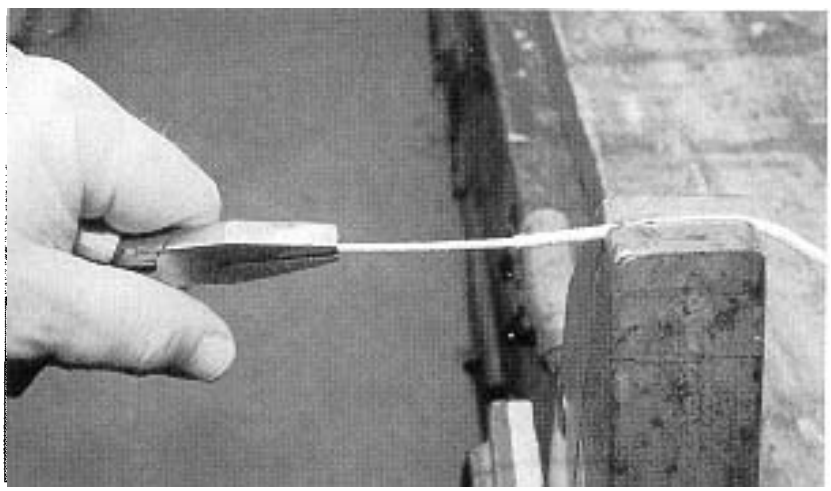

Photo 2

and hardened that spot. The reason for not holding this with your fingers is that this type of glue can glue your fingers to the cord and to themselves (see Photo 2).

Springs are mounted in flanges in two ways, according to the design of the flange. Some have a hole in which to insert the

tail of the damper spring. Others have a ledge against which the tail of the spring is compressed (see Photo 3). If you are working with the hole-type, it is easy to bend the tail to a 90-degree position from the main spring arm. By doing this you do not need to remove the flange from the lever. After your spring installation, it can be bent back to correct position. With the other style, bending is usually not needed.

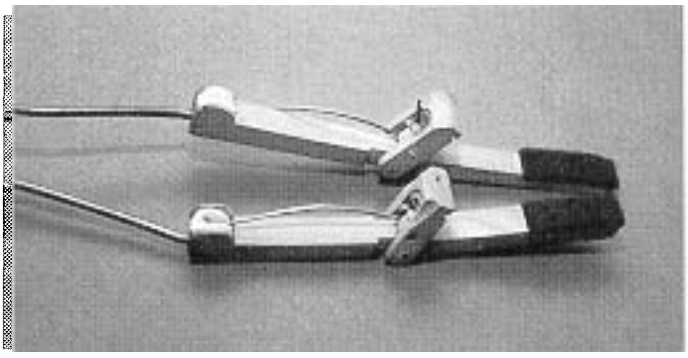

Photo 3

To begin the repair, first set the spring coil in place with the main spring arm alongside the lever, having the opening of the coil in line with the side holes of the flange. Push the cord needle through (see Photo 4). Then pull the cord the rest of the way through almost to the end. No glue is used in this process; it is a pressure fit. With a sharp blade (I prefer a double-edged razor blade), trim the cord flush with the side of the flange. This, of course, is for individual repairs. When doing a complete set you may lace a whole section of flanges onto the cord and then slice them apart. Once each one is laced, place the spring top in the groove for easier handling during the slicing process.

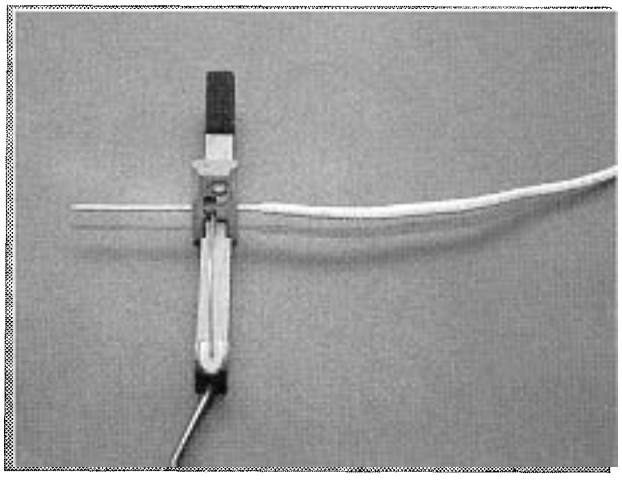

Photo 4

I won't go into the specifics of rebushing a flange at this time, since I plan an all-inclusive article on all phases of bushing where this subject will be covered thoroughly. Similarly, upright spring installation, regulation, and adjustment will be completely covered in this series in a later article.

At the top of the lever, the spring groove is ready for cloth punchings. I find it expedient to fold the punching in half and squeeze it with flat surface pliers so as to put a crease in it. Place a small spot of glue in the bottom of the groove. Spread it a little to keep it from seeping through. Locate the top of the damper spring in its place to help secure this punching while drying.

Damper heads are made in several types, the three most popular being the block, the dowel and the dowel/block (see Photo 5). You can purchase damper felt in various sizes and types, also. The block dampers come in red-backed felt, sewn and unsewn and unbacked sewn. For other styles you will need to contact the manufacturer directly. Upright bass dampers come basically in two lengths and two widths. The point of all this is to advise you to check the sizes and types on the existing levers and to keep samples so that you can acquire the same type and size for your replacements.

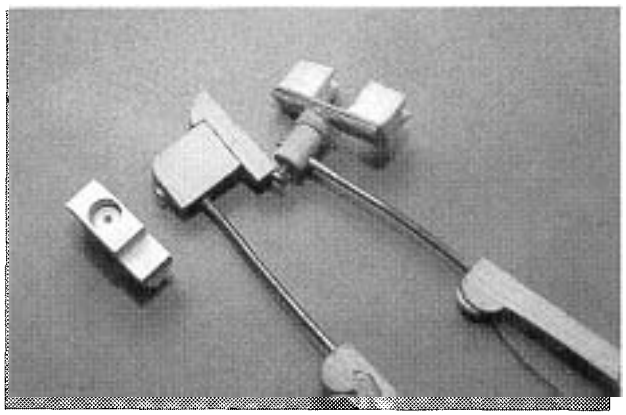

Photo 5

Of crucial necessity to all pianos is the damper lifter rod(s). It might seem, since this item is quite concealed, that it is all right left untouched — not so. The bumper felts need to be replaced to keep it from thumping or knocking on the action rail. So, remove the rod and all the hanger flanges; remove the bumper felts; scrape away the old glue; replace them with new. You will probably see that the rod is somewhat corroded, especially as you feel it. A good liquid metal cleaner meets the need here very well. Polish the rod on all surfaces. Buff it well and then spray your favorite dry lube on the surface that lifts the damper lever. Lubricate the hangers with a talcum-based product such as VJ-lube®. It will help to prevent those hard-to-locate squeaks down the road.

Remove the bushing cloth from the hanger flanges, clean the flanges, and then I like to polish them on the buffing wheel. Using the old cloth as a reference, cut your new bushing cloth to width. Bush the same way you did for action brackets to receive the hammer rail, and then reinstall the rod(s).

It is time to reinstall the damper levers on the main rail. Right now just the wippens are on, and not the hammers. This is so you can regulate the dampers accurately without the obstruction of the hammers and shanks. I prefer to start at the bass end and progress from there. Once the levers are all installed you must set the damper heads in line with the strings. A sure way to know you are doing this right is to sit so your eyes are on the same plane with the block screw; otherwise, parallax can be a real issue as you look from an angle onto already-angled items. It is not until then that the felt should be installed. You may remove the action to glue on the block felts. With the action back in the piano, install the bass dampers. They are easy to handle and keep in place using a little tool

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Behold The Upright . . . Rebuilding the Damper System

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made with two needles and a hammer shank (see Photo 6). Installing the dampers — especially in the bass — with the action in the piano, gives pressure for everything to stay in its proper place and needing no further adjustment.

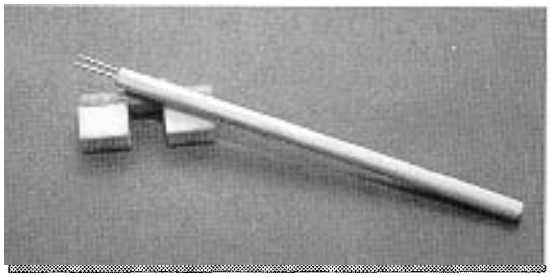

Photo 6

Rather than go through the damper regulation procedures at this time, I refer you back to the October and November, 1994 issues of the *Journal*. On pp. 20-23 in both issues, the process of adjusting, regulating, and aligning dampers was presented in very easy-to-understand form.

One of the most frustrating situations to deal with when your dampers are all installed, fitted, and regulated is extended ringing, especially in the first several notes in the tenor just above the break. Because of the necessary improper placement of the dampers in the upright — they cannot be placed where the hammers strike the strings — this ringing often results. You have probably seen in some of the finest pianos the "overdampers." The overdamper consists of a small damper extended by a wire from the damper block to also damp the string above the hammer head (See Photo 7). It is fairly easy to replace the existing block with a new one designed for the overdamper. A good wire to use is the damper wire used for grand piano dampers. It is pliable and yet sturdy enough for this. Placing these overdampers on several "culprits" in the tenor section can dramatically reduce the problem and will satisfy musically demanding players.

Next time we'll tackle the hammer butt-shank-head combination.

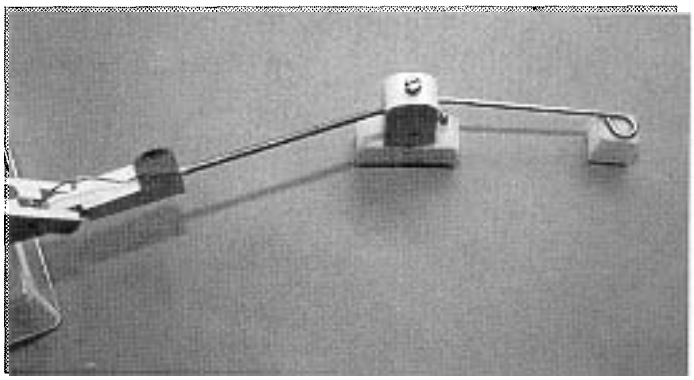

Photo 7

How Much Is This Thing Worth?

Ward Guthrie, RPT
Montana Chapter

"Appraisals? Estimates? Aren't they the same thing?" "What will I do if someone calls me to do an appraisal? Refer it to someone else?" "How can I arrive at an appropriate value for this piano?" "What will the insurance company be looking for in this appraisal?" "Are there any forms out there for me to use?" In this article, I hope to answer these questions for those frightened by the thought of doing appraisals or estimates.

What is an appraisal? When you provide an appraisal, you offer your personal opinion concerning the value of a piece of property. Note — it is just your personal opinion. Other opinions may differ, but you should be qualified before offering your own.

What is Value?

So how does something have value? Value is the relationship between an object for sale and a potential purchaser. The object is worth only as much as a buyer is willing to pay. If no one wants to buy what is for sale, it has no value, regardless of what the seller feels it is worth. There needs to be a market. Value depends on supply and demand, scarcity, transferability, and its effectiveness for use.

Supply and demand: Are there many trying to sell their pianos, but very few buyers? Values will be low. Is someone looking for a specific instrument of which very few are available? Values will be high.

Scarcity: Is the piano unique? Does something make this piano very special in the music world? If it is a true antique, values may be high. If it is one of the "dime-a-dozen" uprights, values may be low.

Transferability: Can the piano be moved easily to the new location? We've all seen the piano that was built into a room or basement. If sold, the only way to move it would be to remove a wall. This piano will have less value.

Effectiveness for use: Can it be used well for the purpose intended? Is it a functional instrument? If not, values will be low. If it is a quality performing instrument, values will be high.

Appraisals vs. Estimates

Many are confused as to the difference between appraisals and estimates. Appraisals tell you the value of a piano. Estimates state the approximate cost of a repair. Appraisals and estimates are often directly related, but either can be done separately. When doing an appraisal, you will often need to complete some sort of estimate as well. Seldom, however, will you need an appraisal to complete an estimate.

So, how do you know which to do when? You need to know if your client is buying, selling, repairing, or insuring the instrument. For buying or selling, an appraisal is appropriate. For repairing, you will need an estimate. The client generally is not asking how much the piano is worth, just how much it will cost to have it working again. For insurance, you may need to complete an appraisal, estimate, or both, depending on the reason the insurance company hired you.

When I do an appraisal, I generally do at least a partial estimate as well. This is mostly for my use in working up the value, but I leave this information with the client also. Throughout this article, I will often be talking about both estimates and appraisals at the same time. Keep in mind the difference and remember the definitions.

Who Appraises Pianos?

Do you provide piano appraisal service for your clients? If not, who does? Usually auctioneers or furniture or antique dealers will set the value. Do they really know what a piano is worth? Do they understand it as having musical value, or just as another piece of furniture? Are they qualified to appraise the mechanical efficiency of the instrument? Certainly not! I hope to give you some tools so you will be competent and qualified to do these appraisals for your clients instead of relying on others.

Who should be called on to appraise pianos? Of course we, as piano technicians, should be the ones. Are we all qualified? Why not? Should we be? Definitely. But it takes time and risk to be qualified.

Time

You shouldn't try to do a good appraisal in 15 minutes. You should look at all aspects of the piano. A few years ago, I regularly serviced an old upright in a church every six months. It tuned easily, held the tuning well, sounded pretty good, had reasonably close regulation, had new plastic keytops, and had been professionally refinished. If I had done a "quickie" appraisal, I would have placed a high value on it; however, when I began checking all aspects of the piano, I found the soundboard was literally falling out. I was really surprised it didn't show up more in the tone or stability during tunings. Of course, the piano had little value. Often a client phones asking for a value. How do you answer? Would they ask a car dealer the value of an unseen car? I often give them an approximate value, but no more. As an example, I usually quote an old upright as worth between nothing and $2,000. If they press more, I begin describing what is involved in an accurate appraisal and usually obtain a job. In other cases, I will tell what the general market is bringing in my area, but am sure to point out that the piano may be worth far more or far less than these figures.

Some technicians, as part of the appraisal process, also require a tuning first. If so, charge accordingly. We all sell our time. I don't do free appraising or estimating — most never amount to any work. I used to do free appraising until I realized that anything free is not worth anything. I was essentially telling my clients that my opinion was worthless. If you are uncomfortable charging for your time, some technicians will

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How Much is This Thing Worth?

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offer to deduct the estimate charges if the repair job is authorized.

What time are you charging for? First is travel to and from your home or shop. (You also have car expenses.) Then you have time for the actual appraisal and filling out your appraisal form. Finally, you have consultation time with the client, finished off by office time to record the transaction.

Probably more important is the time you have invested in conventions and individual study. You should be reimbursed for the knowledge you have gained concerning your field. You need to be paid for time spent in education and experience. (Who will pay you for reading this article?) You cannot appraise a piano well unless you have a good working knowledge of piano construction and function.

Another time investment is time necessary to stay current with the piano market, both new and used. If you don't know what others are paying for comparable pianos, how can you derive a market value for your area? In addition, you must know what a comparable new piano would cost. Visit your local piano dealer. Use the Ancott Associates "Music Product Directory" for new piano prices.

The Ancott directory is published twice a year. They offer four directories: Acoustic Piano Edition, Electronic Keyboard Edition, Computer Edition—All Keyboard Products, and Discontinued Keyboard Products. Each Acoustic Piano Edition directory "includes the majority of piano models currently being distributed and sold throughout the United States. Only piano models that are currently in production are listed in the Directory." You can get more information by writing to P.O. Box 46532, Cincinnati, OH 45246.

Risk

What are you risking when you supply an appraisal? Mostly your reputation. It is on the line when you assign a value to the piano. You are risking that reputation and making a public statement concerning your knowledge and ability. You need to be qualified and know what you are doing.

Remember, values represent one person's opinion. Others doing the same appraisal on the same piano will come up with a different value. So when you state that value, your foremost concern should be honesty. Appraising is an inexact science, but use a rational approach. Don't let the seller influence you into stating an inflated price, or let the buyer take advantage of the seller.

Many industries, and all insurance companies, realize that appraising is not a pure science. One jewelry store we know includes the following statements with every appraisal.

> *The appraised values reflected herein are estimates of the current market price at which the appraised jewelry may be purchased at a retail establishment in the business of selling such merchandise and does not necessarily reflect the price at which the appraised jewelry may be purchased at Marty's Fine Jewelry. Because jewelry appraisal and evaluation is not a pure science and is therefore subjective, estimates of replacement value may vary from one appraiser to another and such a variance does not necessarily constitute error on the part of the appraiser.*
>
> *The appraisal should not be used as the basis for the purchase or the sale of the items set forth herein, and is provided solely as an estimate of the approximate value and for acquiring insurance of said items at this time and place. Accordingly, we assume no liability with respect to any legal action which may result from this appraisal being used for any purpose or function other than those stated herein.*

It is advisable to have some sort of written statement on your appraisal form as well. It could save you from problems later on.

Who should you give the appraisal to? Only to the person paying you for the information! In my practice, I usually ask that person if it is all right for me to pass the information on to others. Usually they say yes; other times they will only allow certain portions to be shared — follow whatever is their request.

What if they want a second opinion? Don't feel threatened. If 100 tuners are all asked to appraise the same piano, they will show a wide range of values. The same thing happens with jewelers, real estate appraisers, or art appraisers. Often just pointing this out to the piano owner will help.

Usually, piano prices are not set by piano technicians anyway. It's probably not the furniture dealer, antique dealer or the piano teacher either. So who sets the prices? Mostly they are set by the gut feeling of the owner. He knows that grandma said this was a wonderful piano when she bought it new 84 years ago, so it must be worth a lot now. After all, someone once told him that pianos always appreciate in value. In an uninformed public, the seller will often get whatever is asked. Newspaper prices are commonly out of line, both high and low.

So, how should we go about the process of making an appraisal? What are the methods we can use? There are essentially four approaches: original cost, current market, depreciated, and idealized value minus costs of repair.

Original Cost Method

For original cost, ask the present owner how much she paid for it. Ask near to the same price for it now. Pianos generally hold their value well. Inflation accounts for the costs of wear and tear. There are two advantages to this method: it's quick and easy, and it takes little knowledge or experience. What are the disadvantages? First, it assumes that the owner paid a fair price for it in the first place and that his memory is accurate concerning that cost. But more important — the method is very unprofessional! The client will wonder if you really know your business. They will wonder what they are paying you for. This procedure is not recommended.

Current Market Method

The second approach is the current market method. This method compares recent sales of comparable pianos. You are concerned with the market value of the piano "as is." However, market values and musical values are often very different.

We have all seen those pianos that have new keytops, hammers and dampers, but the soundboard or other major structural components are worthless. Considered as a musical instrument, it probably has little value. However, the uninformed public will look at all those new parts and pay a premium price. What the public is willing to pay is the market value.

To derive a market value, do not figure the cost of repairs. Just get a quick idea of the general condition and how it visually impresses you. You will need to stay in contact with current piano sales trends in your area. When I started working on pianos I could get old uprights for nothing. Not anymore. Values vary widely in different parts of the country. Watch the newspaper. Ask clients who have just bought a piano how much they paid, but be tactful. Some will not want to tell you.

Visit your local dealers and check their prices on used pianos. Their prices will generally be higher than those of a private party. Why? A private party has no warranties, no overhead, no sales staff or other expenses. The dealer needs to make a living, too.

The current market approach works well if there are multiple sales in your area for that size and/or make of piano. Auto blue books work on this principle. Do we have a blue book for pianos? Not that I'm aware of. Conditions of pianos vary too much. Also, there are not enough sold of any one brand, style or given age in a specific locality to establish a price. The closest thing I'm aware of for a blue book on pianos is "The Piano Book" by Larry Fine. He has a very good section on used pianos. I recommend you read at least that portion of his book.

Why are prices so different in various parts of the country? Supply and demand. In Montana, we don't have many people, and therefore, not many pianos. Supply and demand can fluctuate dramatically from year to year, and from one time of the year to another. So do the prices. In many areas of the country, pianos, such as old upright and spinets, sell for half as much just before taxes are due in April as they do when school starts in September.

How do we put a value on concert grands? In Montana I'm only aware of three that have been for sale in the last 19 years. How can I establish trends with only three? That is where our PTG network should come into play. Use your contacts. Those technicians and dealers in the large cities have a better feel for the demand and market. If you don't know the value of an instrument, say so. Don't do off-the-cuff appraising. Consult with others knowledgeable of piano prices, such as your friendly piano dealer. Ask her how she would value the piano and why. Also, if you don't feel capable, don't be afraid to pass the job on to another technician.

What are the advantages and disadvantages of the current market method? It will give a fairly accurate idea of what the instrument will probably sell for. Since the condition is really not a consideration, it may not be worth that as a musical instrument (or it may be worth much more also). You will also have the responsibility to stay abreast with the market in your area.

New Cost Less Depreciation

The third approach is new cost less depreciation. For this, start with the retail cost of a comparable new piano.

How can you find what a comparable new piano will cost? Use the Ancott Associates "Music Product Directory" as mentioned earlier.

If depreciation is a factor, how long should a piano last? Many technicians accept 40 to 50 years. If a piano is 75 to 100 years old, it usually requires extensive rebuilding. The following depreciation schedule, which I use, ends at 50 years. Montana's climate seems to help pianos last longer than in certain other parts of the country.

Age	% of New Value Remaining
1	85%
2	82%
3	79%
5	73%
8	66%
10	62%
15	52%
20	42%
25	32%
30	25%
35	20%
40	15%
50	10%

The "new cost less depreciation" method works well with pianos that have average home use and care. It assumes a normal rate of wear. Depreciation tables say nothing about condition, use or abuse. You may find a piano that has had little use and is in almost new condition, but perhaps it is 80 or 90 years old. Does it have no value? Certainly not. We should always take the condition of the piano, and its value as a playable instrument, into account. In these cases, depend more on one of the other methods for setting the value.

Depreciation schedules also assume that all pianos depreciate at the same rate. What about "top quality" brands of pianos? They won't depreciate at the same rate as a "no name" cheap spinet. Use your judgment and be flexible. Depreciation schedules work best on inexpensive pianos, not the "top quality" ones.

Next month, we'll examine one more method of appraising pianos, discuss actual things to look for when doing an appraisal, talk about estimates, and conclude with information about appraising for insurance purposes.

Surfing The Net — Lesson One: Surf's Up!

Bill Springer, RPT
Hawaii Chapter

It's early morning, that special pre-dawn time of day when the ocean is kind of glassy looking and the waves are coming in smooth and regular. I wax up my board and paddle off into surf....

Surfing the Internet, hopping on the InfoBan, trucking down the Information Superhighway — really all the same thing — can be just as easy and fun. All you really need is access to a computer that can send and receive information from another computer and the proper software so they can talk to and understand each other. This access and linking up of computers is getting easier every day as more and more people get their computers on-line.

What can I do on-line?

Electronic transmission of messages or E-Mail is one of the most popular uses of the "Net."

Example 1: Let's say you have a friend in New Jersey and you live in Hawaii (lucky you!), and you'd like your friend's opinion about a certain type of piano hammer. It's 7 p.m. Hawaii time, and you're working on a hammer replacement bid that you need to get in the mail tomorrow. It's 1 a.m. (the next day!) in New Jersey. You can't phone now, and unless you get up at 2 a.m., you can't reach him before he leaves for work. No problem. You type up a couple of lines and send an E-Mail message right away. When you wake the next morning you check your E-Mail box on the computer and find a note from your friend which helps make your decision.

E-mail is not limited to sending notes. Whole articles, files, and even pictures can be transferred in editable form across the "Net." As one of my favorite technicians puts it: "I write a monthly column and send it to all six chapter newsletters; four via e-mail and two on paper. I find myself feeling annoyed with the two who aren't on-line. I have to print it out, address envelopes and lick stamps!"

Another very popular use of the Net is the Newsgroup or Forum, where E-mail messages can be shared. E-mail messages are posted by subject just like a community bulletin board, except people from all over the world can drop in and respond. *Wow!*

Example 2: Using your communication program, sometimes called a "reader," you use the "word search" command to browse through your favorite Newsgroup's messages and find "piano." Ah, someone is looking for advice on buying a used piano. You see from the message "tree," or map, that an RPT friend from Illinois has responded, so you add a short message to reinforce her opinion and add your two cents. Going down the tree a little further you spot another message and, "gee, this technician has an interesting slant on things. Great idea!. Have to store that one!"

My favorite place right now is the Pianotech Listserver. This group is set up just for us piano technicians! Like a newsgroup, this mailing list allows people to respond to messages from all over the world but with a slight difference. You need to subscribe (there's no charge) to this group to receive the messages. E-mail messages are sent to the "host" address and then sent out again to everyone on the subscription list. This generates a lot of free discussion, and the information one can tap into is amazing! Much of the information in the *Journal's* "Editor's Roundtable" and "Q&A" comes from this group.

Example 3: You send a message to the listserver group asking where to find a special type of sandpaper. You get several responses the next day and it will take you a while to decide what's best for you. The same day you find out that Steinway has "merged" with Selmer (you get a letter from Steinway a couple of weeks later) and finally know what shraffing is and why this might create a better sounding bass string.

Well ... now you have your feet wet (*grin*). Next time we'll discuss exactly what computer hardware and software you'll need and where to go for access to the "Net." For those of you already on-line, your comments and suggestions are welcome.

My E-Mail address: 74557.2546@compuserve.com

PACE
Professionals Advance through Continuing Education
LESSON PLAN

Technical Lesson #26

Grand Regulation - Part 7: Setting White Key Dip

By Bill Spurlock, RPT
Sacramento Valley Chapter

This monthly lesson plan is designed to provide step-by-step instruction in essential skills. Chapters are encouraged to use this material as the basis for special Associate meetings, or for their regular meeting program, preferably in a hands-on format. This method allows the written information to be transformed into an actual skill for each member participating.

In Brief

. Lesson 25 explored the relationship between key dip, hammer blow distance, and aftertouch in the grand action, and a process of using trial adjustments of dip and blow on sample notes to determine the optimum measurements for a given piano. Once these measurements are determined, white key dip can be adjusted on the entire action. This lesson will cover methods of setting white key dip.

Getting Started

In order to pursue any serious study of piano technology, one must obtain basic resources. Catalogs from several piano supply houses, both large and small, are essential. Besides offering the necessary supplies, their pictures and item descriptions are valuable sources of information. Piano manufacturers' service manuals are also essential sources of valuable information. Most are available at no cost. Most important to participating in this Lesson Plan series are the PTG Exam Source Books, both the tuning and technical versions. Articles in these books will serve as reference material for the lessons.

Hands-on Session Setup

To teach this lesson in a hands-on format, you will need one or more grand pianos in good condition. Good used pianos in a dealership or practice room pianos at a college are good candidates, as long as they have only light wear. Ideally, keyframe bedding, determining optimum dip and blow, and key leveling should have been done (as described in lessons #20-25). New pianos in a dealership might also be used, by applying the methods described here to refine their existing key dip. Action models are not suitable for this lesson.

Participants may take turns checking key dip in different sections of a piano, and point out keys they believe to have incorrect dip. The instructor should confirm their conclusions before and after corrections are made.

Additionally, meeting setup should include:

- an extra 3/8" dip block fitted with a crosspiece as shown in Figure 1
- extra dip blocks of various thicknesses
- calipers to measure participants' dip blocks
- extra front rail paper punchings

Estimated Lesson Time

Approximately one hour, depending upon the number of participants.

Tools & Materials Participants Must Bring

For this lesson, participants should obtain the following tools:

- selection of regulating tools
- key leveling straightedge (short or long, for confirming proper key level before setting dip)
- key dip block, preferably modified as shown in Figure 1
- 6" steel ruler, graduated in millimeters and inches
- assortment of front rail paper punchings

Assigned Prior Reading for Participants

PTG Technical Exam Source Book (PTG Home Office, 816-753-7747), pgs. I.9-I.10, & pg. II.17.

General Instructions

Measuring the dip of a single key or adjusting the dip of a test key to a specific setting may be done with a ruler or calipers. However, setting white key dip on an entire keyboard is normally done with a dip block, equal in thickness to the desired key dip dimension. The ordinary key dip block must first be checked for thickness, and if necessary, adjusted by gluing shims to its bottom surface. Then it is placed on each key, depressed with a consistent force, and a finger is slid back and forth to compare height between the top of the block and the adjacent white key. Keys must be well leveled before setting dip. See Photo 1.

While this method works well, I present the modified dip block shown in Figure 1 as an option. This modification can be easily made to any existing dip block, and in my opinion makes it more accurate, faster, and easier to use. Photos 2 & 3 and their accompanying text describe use of the modified block.

For this lesson, participants must determine the desired white key dip as described in Lesson #25, then adjust their dip blocks, if necessary, to that dimension. If new pianos in a dealership are being used, you will not want to make wholesale changes to the existing key dip, but rather to even out the existing adjustment. In this case, dip blocks should be adjusted to match the average dip already existing on the piano.

When regulating grand pianos, key dip is normally adjusted first on the white keys only. Later, when most other regulation steps have been completed, sharp key dip is adjusted so that aftertouch of the sharps is equal to that of the white

Continued on Next Page

Photo 1

Photo 2

Photo 3

There are four points to consider when using the conventional dip block:

- Because the front rail felt punchings are soft, you must depress each key with the same force to get a consistent key dip "reading."
- Key dip varies for different models of pianos, and often for pianos of the same model depending upon manufacturing tolerances; therefore you must obtain dip blocks of different thicknesses (or build up your block with shims) to accommodate different measurements.
- The taper of a dip block will not always match the angle between the depressed key and the adjacent key top for all pianos. In other words, if the top of a dip block is even with the top of the adjacent key at its front end, it may be lower or higher than the key at the other end. Therefore you must know where along the key you wish to measure the dip (at the very front end or slightly back), and always feel at the same point along the dip block when measuring dip. Manufacturers' service manuals will usually specify where their key dip measurement is to be made. If you derived your own measurement by regulating sample notes, then apply that measurement to all keys just as you did on the samples.
- Because dip blocks are tapered, you must be sure to place the block at the same place on each key (even with the front end of the key) for consistent measurements.

keys. This method directly addresses the objective of key dip, namely that all wippens, jacks, and hammers go through the same cycle of motion and all keys have the same feel. After let-off, drop, hammer blow, jack position, etc. have been adjusted for all notes, all keys will have the same aftertouch if they have the same key dip. Thus sharp key dip will be covered in a later lesson.

Photo 1: To use the conventional dip block, place it on each key in succession and depress the key with a medium, uniform force. Slide your finger over to feel the relative height of the block and the adjacent key top. If they do not match, add or remove paper front punchings as necessary.

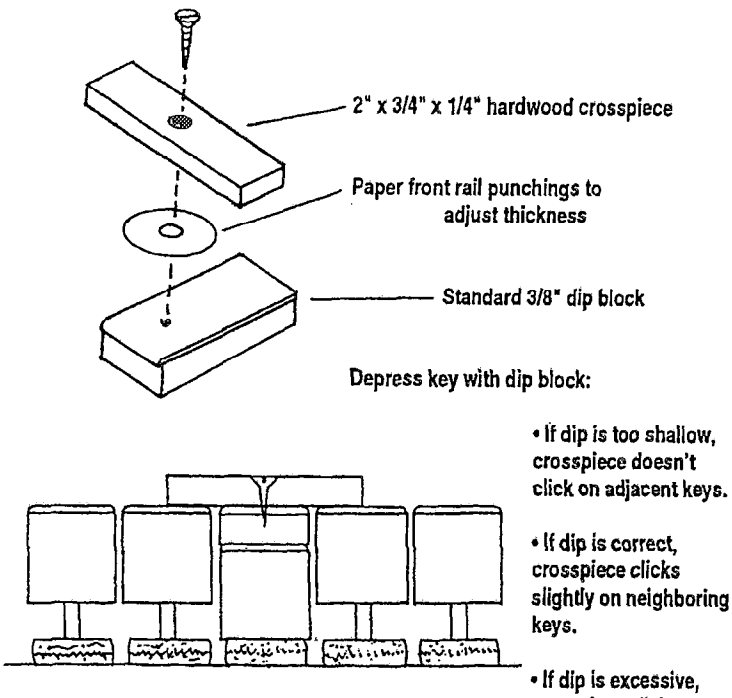

Figure 1

Photos 2 & 3: If using the block with a cross piece, you will not have to make a tactile judgment. Instead, you will know whether the dip is too deep, correct, or too shallow the instant the key hits bottom, by using your sight and hearing as follows: If the cross piece clicks loudly on the neighboring naturals, and they wink noticeably, then dip is excessive. If the cross piece clicks faintly on the neighbors, and they possibly wink very slightly but are not moved downward, then the dip is correct. And if there is no clicking, the dip is too shallow.

With either block, strive to depress the keys with a uniform pressure. Uniformity will be easier with the modified block, since the "reading" occurs instantly at the bottom of the key stroke, whereas with the plain block you must maintain an even pressure on the block after it has hit bottom and while you are feeling for height. In either case, go through the white keys once to get them close. Then make a second quick pass with your block; this quick, repetitive checking from key to key makes it easier to maintain an even pressure and any errors show up readily.

PACE

Professionals Advance through Continuing Education

LESSON PLAN

Tuning Lesson #26

Prototype Master Tuning Session

By Michael Travis, RPT

This monthly lesson plan series is designed to provide supervised practice of tuning skills as a supplement to independent study and practice. Chapters are encouraged to use this material as the basis for special Associate meetings, or for their regular meeting program. Each lesson is designed to take about one hour, with about four participants. Participants are assumed to have essential reference materials and tuning tools (see PACE checklist) and access to a well-scaled large upright or grand piano for independent practice.

In Brief

This is the last of the current series of PACE tuning lessons. This lesson is intended for more advanced students of tuning. It need not be restricted to the one hour guideline suggested. Participants will work together as a master tuning committee, under the guidance of a Certified Tuning Examiner, to refine the tuning of a piano just as if it were to be used in administering a PTG Tuning Exam. After taking this lesson one or more times, participants will gain a practical understanding of just how well a piano can be tuned. For each participant to get the most from the experience, a limit of five participants per piano, including the instructor, is advisable, with more than one RPT suggested.

This lesson is a prototype that may be repeated again and again, providing a uniquely valuable experience for participants each time. It should be particularly valuable for those preparing to take the RPT Tuning Exam. In addition, PTG chapters may provide this lesson and set up a chapter tuning test site at the same time, provided they meet additional requirements noted in the background section.

Because not all RPTs are familiar enough with the procedures for "tuning by committee," or for measuring a tuning according to PTG exam specifications, the instructor for this lesson must be a PTG Certified Tuning Examiner. For names of CTEs in your area, please refer to the listing in the current PTG Membership Directory, or call the PTG Home Office.

NOTE: please refer to the background information below for guidance in meeting specific equipment and personnel requirements if the master tuning and the piano will actually be used for administering exams. All equipment must be approved by a Certified Tuning Examiner.

If the master tuning will not be completed due to time constraints, or will not be used in administering an exam, then the only personnel requirement for this lesson is that the instructor be a CTE, and the only equipment requirements are the best available piano and a suitable measuring instrument such as a Sanderson Accu-Tuner.

Chapter Meeting Set-up

These lessons are most conveniently taught to a small group of four or five. Each group should have its own piano and RPT instructor. Each piano should be in a quiet environment for close listening. Avoid using pianos that present serious obstacles to tuning, such as deeply grooved or misaligned hammers, string termination noises, etc.

In addition to the above, the piano for this lesson should be a well-prepared, exam-quality grand, pre-tuned to A-440 pitch, strip-muted to single strings, and tuned again with the mutes left in just prior to starting. The piano must be in very good tune, and the pitch at A4 must be within 2 cents of A-440 for the master tuning session to proceed. The CTE should do the final set-up tuning, and should then lead participants through as much of the master tuning process as time permits.

See background information below for specific equipment and set-up requirements for pianos that will be used to administer actual tuning exams.

Tools & Materials Participants must Bring

Tuning hammer and mutes.

Home Study Assignment for Participants

Review all PACE tuning lessons, especially: #18 — Parallel Interval Tests (2/95 *PTJ*); #20 — Refining the Midrange (5/95 *PTJ*); #21 & #22 — Treble Tuning (6/95 & 7/95 *PTJ*); #23 — Single Octave Tuning in the High Treble (8/95 *PTJ*), and #25 — Refining the Bass (10/95 *PTJ*).

General Instructions

The purpose of this lesson is to allow those who may not otherwise have the benefit of participating in a master tuning to do so, and to provide a valuable educational experience to all concerned. To that end, the CTE-in-charge should guide the process only as much as necessary, and try to make sure all participants contribute and understand what is going on. The piano should have been prepared ahead of time so it is on pitch and in tune, ready for "nit-picking." Participants should take turns at the piano with their tuning hammers, using interval tests suggested or approved by the CTE instructor.

First confirm that A4 is at A-440 within ±2 cents, and then proceed to nit-pick the midrange. Avoid following any particular temperament sequence or focusing too much on any one octave. A good suggestion is to use the extended midrange, from F2-F5, as "the temperament," and nit-pick it until you can find nothing further to improve. You might want to look at intervals in order of large to small, and slower-beating to faster-beating. For example, you could start by listening to double octaves and seventeenths, nit-picking both ends of any problem intervals with smaller and/or faster-beating intervals (such as contiguous fourths and thirds, or parallel thirds) to see where the most improvement is possible. When these are satisfactory, look at single octaves and 10ths in the same way, and proceed to parallel sixths, fifths, fourths and thirds. Always remember the prime directive of parallel interval checking: adjacent like intervals should sound similar. Focus on the differences.

When a participant finds a note needing improvement, try to make sure everyone agrees that it does before allowing any changes. It is usually most efficient at this point to first measure where the note is before making a change, so that if the change is not an improvement, the CTE can visually restore the tuning to the original setting. Participants need not know

Continued on Next Page

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how to tune visually for this to be done. Once the instructor or a participant familiar with the visual instrument measures the original setting, whoever currently has the tuning hammer can make the change and perform aural tests to confirm that it is an improvement. If participants are familiar with visual tuning methods, it is perfectly okay for them to make small controlled changes visually; the exam manual suggests changes be in the range of ±0.3 cents, which requires a high degree of control. However, all changes must be aurally verified, whether done visually or aurally.

Most improvements to what is already a good tuning will be subtle, and may be rather complex. One common example of this is when you find that both ends of a third need to be moved slightly sharper or flatter in parallel changes, which may help clean up the contiguous fifths, say, around each end of the third. It takes a little extra time to really listen to a tuning to fully appreciate some of these subtleties, and that's why the exam manual says "hide the tuning hammer!" at this point. Listen first, measure, make the change, listen again, remeasure.

Once the midrange is satisfactory, the CTE should remeasure A4, enter any necessary pitch offset into the instrument (or just take note of any deviation from A-440), and then measure the midrange or extended midrange before proceeding to either the bass or treble. Usually it's a good idea to take a breather at this point, get away from the piano and get some fresh air and sustenance if needed. If you leave the piano for more than a few minutes after measuring the midrange, always recheck A4 upon return to be sure it's within master tuning tolerance. Sometimes it is necessary to retune the whole midrange up or down by visually tuning with the recorded measurements to get back within an acceptable pitch range. This is a job for the CTE or a highly-skilled visual tuner.

Proceed to nit-pick and measure the bass and treble in a similar manner to the midrange, using tests appropriate to those areas. As each area (octaves 1-2, and octaves 5-6) is completed, measure and record the notes. Remember to have participants take turns after several notes at the tuning hammer, or "in the hot seat" as we sometimes call it. Usually, in both the bass and treble it's a good idea to check a long string of parallel intervals to see where the worst problems are before focusing on a limited range. Take particular care to avoid noticeable beating in the double octaves; 1 bps seems about right for most pianos.

Special instructions apply for the high treble. My personal style of master tuning in this area involves first being sure the notes from C7-B7 appear visually as 2:1 octaves 1 to 2 cents wide. Then the committee will listen to each note to make sure it produces a desired degree of resonance with the open string one octave below, and modifications are made aurally to enhance this resonance effect, the optimization of which is one definition of the "clean-sounding single octave" we are supposed to produce in that area. Any needed changes may be made in small, controlled steps either visually or aurally, but as before, all changes must be aurally verified. Of note here, it is unlikely that single octaves wider than 2 cents at the 2:1 level will sound clean. Avoid any arpeggio tests, and play both ends of the interval simultaneously except when listening for the single-octave resonance effect.

PACE

Professionals Advance through Continuing Education

LESSON PLAN

Background

Most RPTs involved with the PTG Tuning Exam have commented that the most valuable and educational part of the exam experience for them is the master tuning. No matter what your skill level, you can always learn something, if you don't let your ego get in the way and are not afraid to ask questions. Though the main goal is to achieve and measure an aurally refined single-string tuning in a reasonable amount of time, a secondary result is often a greater appreciation of the shared knowledge and skill that a master tuning represents.

The PTG Bylaws and the PTG Tuning Exam Manual note a number of requirements that must be met in setting up a piano for use in a tuning exam. These are divided into equipment and personnel requirements.

Equipment: minimum requirements — (1) The piano must be a well-scaled grand, minimum 5'9" in length, no wrapped strings above B2, well-regulated and voiced, with all hardware tightened and strings seated on the bridges, located in a quiet place with minimum airflow from windows or ventilation systems, and so as to avoid any direct sunlight. Suggestions: consult with a CTE in piano selection and prep work. Ideally, the piano should be available for repeated future use in exams. Avoid using pianos with excessive false beats or other string noises. Avoid using pianos that are unusually difficult to tune for any reason. Mute off any overly excitable duplex sections. (2) Measuring equipment may only be one of the following: Automatic Pitch Analyzer, Sanderson Accu-Tuner, Sight-O-Tuner (stock or modified), Yamaha PT3 or newer model. Use the CTE's choice.

Personnel: minimum requirements — At least three RPTs, at least one of whom must be a functionally-sighted CTE. One CTE should be designated examiner-in-charge, and will direct the master tuning and resolve differences of opinion among the other participants as necessary to keep the process moving. Additional participants other than the required three are optional. "Additional participants" for our purposes here means those taking the lesson or participating in some way who are not RPTs. There are no rules prohibiting non-RPTs' involvement in master tunings per se; just be sure that the minimum equipment and personnel requirements are met, and all other procedures are as stated in the exam manual.

Acknowledgments: for all the direct and indirect encouragement, help, advice and information from many individuals as this series was written, including the original "PACE-cadets" Bill Spurlock and Fern Henry, Michael Kimbell, Dan Bowman, Owen Jorgensen, Al Sanderson, Jim Coleman Sr., Rick Baldassin, Kent Swafford, Daniel Levitan, Jack Stebbins, Mitch Kiel, Jim Harvey, Steve Brady, and others; numerous anonymi whose kind words kept me going, and of course Larry Goldsmith and the PTG Home Office staff. I've said what I could, and learned a lot; I hope you did, too, and that some kind person will continue this part of the PACE program with a new perspective, because there's so much more we can do. Thank you.

— Michael Travis
September 4, 1995

***Note:** Do you find these lesson plans valuable? Do you have specific suggestions for changes or clarification? Please direct any comments or suggestions to the author c/o the* Journal.

Correction

In the "Background" section of the September 1995, PACE Lesson Plan #24, Step 5 should have read:

"Tune F3 so that the speed of F3-A3 is midway between the contiguous major thirds that flank it; C#3-F3 and A3-C#4."

TECHNO stuff

Richard Anderson, RPT • Chicago Chapter

Achy Breaky Shanks

What can be done with a hammer shank that breaks across the shank and flush with the butt or hammer molding?

Most often shanks will break with the grain and along the length of the shank. These breaks are easy to repair because there is lots of surface area to glue, clamp and help align the joint. These breaks are usually random and are a result of a weak grain line in an otherwise good shank. Once reglued, we can reasonably assume the problem won't occur again in that shank as well as the others.

When a shank breaks across the grain and flush with the butt or hammer molding it is usually a sign of structural deterioration of the wood in the shank. This usually occurs in older actions where the wood is darkened and punky looking. This is primarily caused by oxidation and is a result of the breakdown of the lignin (the stuff that holds wood cells together) in the wood.

The part of the shank that is exposed outside of the butt and molding will deteriorate the fastest, while the part sheltered inside the butt and molding might be quite sound (which is why it's so hard to remove). Also, the point at which the shank enters the butt or molding is the point of greatest stress on the shank during playing, hence the perfect spot for a nasty break.

If the break is a result of playing and not reaching in to retrieve a mute or similar trauma, we might assume that the rest of the shanks are likely to break as well, and new parts would be in order. The condition of the rest of the piano would determine if replacement is a wise use of the customer's money. Remember one of Richard's Rules: Stuff Breaks; we need not apologize for it. When a mechanic determines that your car needs new brakes, he doesn't apologize for it, nor does he care that the car will need new tires eventually, too. The brakes simply need to be replaced. We too often have the idea that owning a piano involves simply buying and tuning, and forget about maintenance and repairs as a normal part of the joy of piano ownership.

· My favorite technique for this repair uses AC (super glue) and can be done with the parts still in the piano. Use a paper towel as a drop cloth to protect neighboring parts from the inevitabley errant drop of glue. Test fit the parts, and then, using the thinnest viscosity, place a drop or two on the end of the shank and what's left of the shank in the butt or molding, and let it soak in for a moment. This will strengthen the punky wood and prime it to avoid a dry joint. Next put a drop of the medium or thick viscosity (for better gap filling and less running down the shank) on the end of the shank and place the parts together. Align the parts and accelerate the glue or hold until set.

If you prefer to replace the shank, you face the problem of each end of the shank being harder than the punky wood of the butt or molding surrounding it. Add in a glue collar that's harder than the two of them put together and you can see why drilling and pulling out the shank isn't easy. Use heat.

Heat the joint where the shank enters the butt or molding and it will eventually pull apart by hand. For what's left of the shank left in the butt or molding, drive a small screw into the stub and heat the screw. The screw will transfer the heat into the glue joint and you'll be able to pull the screw and stub out together. Clean up the butt and molding and install with a new shank.

Industry News

Brock Named Baldwin Senior VP

Steve Brock

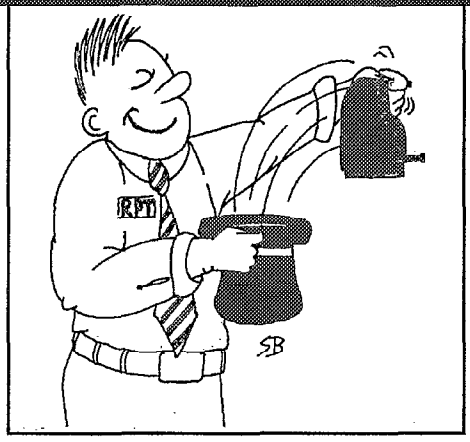
Baldwin Piano & Organ Co. recently appointed Steve Brock as senior vice president for marketing and sales. Brock joined Baldwin in July to oversee the company's marketing and sales efforts.

For the past 11 years, Brock has served in marketing at Proctor & Gamble in Cincinnati. Most recently, he was marketing director for worldwide strategic planning in the company's laundry and cleaning products organization and was responsible for global strategies and resource deployment for P&G's laundry business.

Brock earned his bachelor's degree in music at State University of New York and a master's degree in fine arts and opera performance from Carnegie-Mellon University. From 1979 to 1984, he worked for the Cincinnati Opera, moving through a series of assignments with increasing responsibility, ending as administrative director.

Grand Illusions . . .
The Page for Serious Cases

Nursing Home Blues



[***Editor's note:*** *The following are true stories.*]

William A. Magnusson, RPT:

Tuning in nursing homes is always humbling and sobering, but it is not without its occasional amusing moments. Recently I had two pianos to tune in a nursing home. About halfway through the first, an aide led a befuddled gentleman into the room and sat him on the couch next to the piano. He started groaning loudly (thus dooming the rest of the tuning) and periodically crying out, "They call that music!? They call that music!? I call it shit!"

Ah, well, on to the next piano in the Alzheimer's Activity Room in search of a more appreciative audience. Lunch was in full swing — the best time to tune there, they said, as it's the most quiet it gets. About halfway through the temperament, I look up to discover a plate of food on the bench next to me and a woman peering intently over my shoulder. She smiled broadly and sweetly and said softly, "Who wrote that?"

That kept me smiling later in the tuning, when the assembled residents started singing along.

Patricia Owens:

I went with my husband, Bill, when he tuned the piano at our local nursing home.

After a few minutes into the tuning, a women's soft-spoken voice came from the back of the room, where a number of patients were seated. She exclaimed, "Martha, come play the piano." But, no response came from the request.

Again, after the repeated piano key playing by Bill, the elderly lady pipes in, but this time much more in earnest.

"Martha, come play the *Piano*!"

Finally in utter frustration, after several more minutes of the one note solo by Bill, she yells, "Martha, *please* come play the piano; he keeps playing the same tune over and over again."

Susan Willanger, RPT:

While tuning (a Horugel) at a nursing home, I was interrupted by one of its elderly denizens who noisily shuffled up to me, pointed a finger and intoned: "Stop it! Stop it right now!" Then she spat on me! When the nurse came and took her away, I wiped myself off and went back to my tuning. (This, I thought, was even worse than the time a nursing home resident had approached me during a tuning and said sternly, "You should be ashamed of yourself!") A few minutes later the same old woman shuffled up, admonished me, and spat on me again. She was led away once more, and I tried to regain my composure. It wasn't long before I heard the dreaded shuffling sound again. Without even looking around, I let out an involuntary cry: "*Help!*"

New PTG Membership Category

A new membership category, which supplements the current categories of RPT and Associate, is being discussed. The brainchild of certain affluent technicians in northern California, the third category is "Prima Donna Yuppie Scum," and requirements for attaining this title are most rigorous. To qualify as a PDYS piano technician, a PTG member must:

- Drive a luxury automobile. BMW, Jaguar, Cadillac, Lincoln, Acura, Lexus, Infiniti, and Mercedes are recommended. A Honda Accord LX-i or EX may qualify, but only if it's loaded.
- Have a cellular phone.
- Have at least two of the following three: a fax machine, a copy machine, a computer (486 or better) with Internet access.
- Work mainly on grands.
- Tell people you work *only* on grands.

The benefits of this new level of membership are said to be outstanding.

— Submitted by Steve Brady, PDYS

PTG Review
PIANO TECHNICIANS GUILD
Dedicated To PTG News • Interests & Organizational Activities

News from Albuquerque . . . Your New ETS

By Mitch Kiel, RPT
ETS Chairman

Members of the Examinations and Test Standards Committee for 1995-1996 are:

Chair, Mitch Kiel, and advisor, Jim Coleman, Sr.

Tuning Exam Subcommittee: Chair, Teri Meredyth; Jack Stebbins, NE; Christine Lovgren, NE; James Arledge, SE; Kerry Symes, SC; John Baird, CE; John DeHaan, CW; Steve Schell, W; and Keith Kopp, PNW.

Technical Exam Subcommittee: Chair, Curtis Spiel; Michael Carraher, NE; Joseph Gotta, SE; Robert Mishkin, SE; Tom Seay, SC; Richard Bittner, CE; Brian Mahaffy, CW; Kathy Smith, W; David Vanderlip, W; and Eric Schandall, PNW.

To those members who retired from ETS this past July, thanks for serving. Your contribution is appreciated.

Electronic Tuning Exam Revised

In Albuquerque the Council voted to reverse the order of the sections of the tuning for those Associates using Electronic Tuning Devices (ETDs). The new order is aural followed by electronic.

During Council's deliberation, an amendment was passed regarding who decides to continue the exam if the aural portion is failed. In the original proposition published in this column several months ago, the CTE would have made that decision. In Albuquerque, the ETS proposed and the Council adopted an amendment removing such language, which means responsibility for that decision remains where it is under current PTG regulations — with the examinee.

The new regulation reads in its entirety:

"Article V, Section A.3 a and b

a. A candidate who will use a visual tuning instrument for the main part of the exam must first tune octaves 3 and 4 aurally only. Passing this part of the exam requires scoring at least 80 in pitch, temperament, and midrange.

b. A candidate who passes all except the aural tuning of octaves 3 and 4 may repeat that portion of the exam one time within one year of the original exam provided that one-half the tuning fee is paid. After one year from the date of the original exam, the entire exam must be repeated at full fee.

Proposal to go into effect on January 1, 1996."

Section A places the aural portion before the electronic portion. Section B is virtually unchanged, the only difference being the addition of one word: "aural."

Except for the order of the sections, procedures remain the same. There is no internal change to either the aural or electronic section. Passing score remains at 80 for all sections.

Aural portion:

• Aurally only, tune single strings in octaves 3 and 4, and be scored in pitch, temperament, and midrange. Time limit is 45 minutes.

Electronic portion:

• Tune one string of 85 notes within a 1 hour time limit, and be scored in pitch, temperament, midrange, bass, treble, and high treble.

• Then get tested for stability (an 8 ounce weight dropped 3 times from 6 inches).

• Then tune unisons in octaves 3 and 4 with a 30 minute time limit, and score unisons.

The ETS and the Council hope this new regulation will help raise the pass rate for examinees using ETDs. We hope ETD-using Associates will become more inspired to practice aural tuning and ETD users will enjoy having fresh ears when tuning during the exam's aural portion.

If you have any questions, please contact your local CTE or the CTE-in-charge for your region (listed above).

Examinee Evaluation Form

In other exam news, the ETS has instituted use of an Examinee Evaluation form. This confidential form will be given to every examinee immediately prior to

Continued on Next Page

Bylaws Proposals Due Dec. 31

Chapters and PTG committees are reminded that Dec. 31 is the absolute deadline for the receipt of any and all proposals for changes in the PTG Bylaws if they are to be on the '96 Council's agenda in Dearborn next July. Mail or fax your proposals to me at the address below.

There are several reasons why the PTG Bylaws require this deadline. One is that it precedes the midyear PTG Board meeting in January and allows the Board to preview and comment on the proposed changes. Another is that the Bylaws committee faces a March 1 deadline for its final report for the Council agenda book and needs all available time: to consider all proposals, sometimes having necessary dialogue with the sponsoring chapter or committee; to develop its position or recommendation on each; and finally, to get its report into readable, understandable form.

If the Bylaws Committee can be of any assistance with proposal development or wording, feel free to contact us ... the sooner the better! Direct inquiries to:

Michael Travis, Chair
Fax: 301-441-3576
PTG Bylaws Committee
Voice Mail: 301-441-3555
P.O. Box 576
Greenbelt, MD 20768-0576

Continued from Previous Page

taking an RPT exam, to be filled out at any time following completion of the exam. The evaluation form can be returned to the examiners or mailed to the Home Office.

Thirteen examinee evaluations from the Convention Test Center in Albuquerque were returned to ETS. The comments were helpful in assessing examiner's performance and the efficiency of various examinee preparation methods.

Examinee evaluation forms with instructions for proper usage have been mailed out to all CTEs and technical examiners. The ETS looks forward to receiving your feedback, and we hope it will help us continue to meet your high expectations for the RPT exams and PTG.

Here is an unformatted sample copy of the Examinee Evaluation form:

Examinee Evaluation Form

Thanks for volunteering to fill out this confidential evaluation of your RPT exam experience. Your input will help the Examinations and Test Standards (ETS) committee keep the RPT exams efficient, fair, and effective.

Please complete this form within three days and return it to: PTG, 3939 Washington, Kansas City, MO 64111-2963, fax (816) 531-0070.

The information you share with us will remain confidential in accordance with PTG Bylaws. You need not show this form to anyone, including your examiners. Writing your name at the bottom is optional.

Feel free to continue your comments on the reverse side or on additional sheets. Thanks for your help.

1. Which exam did you just take? technical, tuning (aural only), tuning (aural/electronic), tuning (aural portion of electronic), CTE; 2. Did you pass or fail? What were your scores?; 3. Where did you take your exam? What was the date?; 4. How much time did your exam take?; 5. Have you taken this same exam previously? If so, where and when? How'd it go?; 6. Please describe your exam prescreening/preparation. How could you have been better prepared?; 7. Please rate each examiner's effectiveness on a scale of 1 (excellent) to 4 (poor); 8. Was the exam administered efficiently and fairly? Please describe any problems and suggest solutions; 9. Were there any problems with exam equipment? Please describe and suggest solutions; 10. Additional comments; print your name (optional); date.

CTC a Learning Experience

The 1995 Convention Test Center (CTC) in Albuquerque was a rousing success. We gave lots of high-quality exams, we trained examiners to administer better exams when they get back home, and we made the CTC much more visible to all convention goers. New administrative procedures premiered in Albuquerque proved out, and will now become a part of ETS standard procedure.

Here are the numbers for the 1995 CTC:

Tuning exams:

Total tuning exams given

Attempts 22
Passes 10
Failed 12

Breakdown of tuning exams:

RPT only:

Attempts 15
Passed 8 (4 aural only, 3 e/a, 1 aural retake)
Failed 7 (2 aural only, 3 e/a, 2 aural retakes)

CTE only (examinee already an RPT):

Attempts 7
Passed 2
Failed 5

Technical exams:

Attempts 7
Passed 6
Failed 1

Written exams:

Attempts 13
Passed 11
Failed 2

Totals:

42 exams administered
54 examiners /trainees participated
4 Associates became new RPTs
9 CTEs recommended for recertification
2 CTE trainees completed training
1 CTE trainee recommended for certification

At ETS's booth in the Exhibition Hall, more than 200 Pre-Screening Manuals were distributed, and we estimate we could have given away 300 more. Let's hope that all those manuals get read, and that pre-screening becomes an accepted part of everyone's RPT exam preparation, resulting in more examinees passing the exams and more new RPTs.

Special thanks go out to all the examiners and trainees whose participation made the Convention Test Center possible, especially full-time examiners Teri Meredyth, Jack Stebbins, Michael Travis, and Michael Carraher.

And back-slapping congrats to all the examinees, including those who passed and those who didn't: your commitment to upgrading to RPT and improving yourselves deserves everyone's praise and respect. Don't ever give up.

Funny Faces

A sideshow of grimaces and googly-eyes was an unexpected benefit of participation in Albuquerque's Convention Test Center. During master tuning sessions and examinee aural verification, an entertaining array of facial expressions that normally remain unobserved were unself-consciously portrayed.

There are three basic tuner visages:
1. The Zombie: cold, staring eyes that see nothing, head tilted, drool optional;
2. The Warrior: snarling lips, grimaces of vast internal struggle, sweat on brow, much low grunting;
3. The Bird: eyes never blinking, head swivels back and forth continuously, chirps of attempted deliverance.

Tune in front of a mirror some time. Then write to ETS (care of the Home Office) with a description of your own clown face.

Info Sought for MTNA Convention

The Music Teachers National Association (MTNA) has invited PTG to present a program for their National Convention in Kansas City, March 23-28, 1996. The subject they have chosen is "Historical Temperaments on Modern Pianos," to be presented by RPTs Karen Hudson-Brown and David Rostkoski. Karen is preparing a list, for distribution at the convention, of RPTs who currently offer historical temperaments to their clients. Please send your name, address, phone number, approximately what percentage of your clientele currently enjoys the sounds of unequal temperaments on their pianos, and any other pertinent information you wish to share to: Karen Hudson-Brown, RPT, 2516 Belvedere Ave., Charlotte NC, 28205.

A Tale of Two Cities

By Dennis Kurk, RPT
Ethics Committee

No, this is not a re-reading of the Charles Dickens' classic. It's the story of the Twin Cities Chapter, PTG, and the two cities of Minneapolis and St. Paul, Minnesota. And although it does go back in time, the laws that pertained to our case are still very much in effect.

It all started so innocuously. A piano dealer in the area had offered a very low price for piano tuning in the local paper. This upset one of our members and, unknown to us, he registered a verbal complaint with the dealer. The dealer did not really appreciate this meddling in his business (rightfully so) and promptly called the Office of Attorney General, State of Minnesota, to have them initiate an investigation of our Chapter on a charge of conspiring to fix prices. And thus began the tribulations of our Chapter.

The Attorney General's first letter to the Chapter President requesting documents is the epitome of legal jargon. It goes in part as follows:

"Definitions for Documents and Questions. Unless otherwise defined herein, the following terms shall have the following meaning:

1. "You" or "your" means the Twin Cities Chapter of The Piano Technicians Guild. The term "you" or "your" also includes directors, officers, employees, and agents of the Twin Cities Chapter of The Piano Technicians Guild.

2. The term "guild" means the Twin Cities Chapter of The Piano Technicians Guild.

3. The term "documents" means any writings of any kind in the possession or control of you and includes, but is not limited to: letters, telegrams, memoranda, reports, studies, newspaper clippings, speeches, testimonies, calendar or diary entries, daybooks, minutes, agenda, pamphlets, notes, charts, tabulations, and records of meetings, conferences and telephone or other conversations. The term "documents" also includes any other means by which information is recorded or transmitted. All designated documents are to be considered as including all attachments or enclosures. Any document relating or referring only in part to the subjects within this Schedule shall also be produced."

I won't bore you with the rest, but this goes on for five more pages. Needless to say this letter did manage to get our serious attention.

Our first thought was to contact the Home Office and have them review the situation. After discussing the matter with three attorneys, the Executive Secretary told us that there was little that the Home Office could do.

Authorizing a cost for an attorney to assist us would have had to be approved by the Board and, of course, no precedent for legal assistance to local chapters had ever been set. Also, such approval might be doubtful since if one chapter was given such assistance, all should have the same entitlement which would severely strain the financial resources of PTG.

Our chapter then made a further inquiry to the Office of The Attorney General asking if the documents requested could be used in a legal action against us. We were informed that they could.

At this point there was no alternative other than to hire the services of a local attorney. At a meeting of our Chapter, this attorney explained that even though it might be clear to us that our chapter had never officially practiced a policy of setting uniform fees, enough discussion on the subject of prices had taken place to warrant legal action against us. We did not know it at the time but an individual convicted of a criminal violation of the Sherman Anti-Trust Act could be fined as much as $100,000.00 and imprisoned for up to three years. That means each chapter member.

Nevertheless, we were greatly relieved to hear that in discussions with persons in the Office of Attorney General our attorney was told that punitive action against our chapter would not be forthcoming because they felt it would not be in the interests of either party. In other words, this was our "reprieve."

The only further action necessary on our part was to have each member sign and return to the Office of Attorney General a letter from him or her personally to discontinue any activity that might be construed to be in violation of the law. This is called an "Assurance of Discontinuance," and each member did so.

So what was the cost of this excursion into legal land? There were over 60 pages of correspondence during this time, countless hours spent in discussions and a monetary cost of $1,453.00 which, at the time, wiped out our chapter financially.

And we are not alone. The Federal Government has brought civil or criminal actions against such small organizations as Maine Lobstermen, a Virginia audio-visual association, Bakersfield Plumbing Contractors, the Utah Pharmaceutical Association, local barbers associations, etc.

So the moral of this tale is — beware — and heed the following:

1. Do not complain to a competitor that his prices constitute unfair trade practices.

2. Do not discuss prices of any kind; past, current or future.

3. Do not discuss what is a fair profit level.

4. Do not discuss an increase or a decrease in prices.

5. Do not discuss standardizing or stabilizing prices, pricing procedures, cash discounts or credit terms.

Someone is watching.

Associates Pass the Test

REGION 1

064 CONNECTICUT

MICHAEL K. JOHNSON
30 TALBOT STREET
TORRINGTON, CT 06790

JEAN M. MARIOL
588 WEST LAKE AVENUE
GUILFORD, CT 06437

REGION 2

301 ATLANTA, GA

VERNON R. NORRIS
180 TREADWICK DRIVE
ATLANTA, GA 30350

COMING EVENTS

All seminars, conferences, conventions and events listed here are approved PTG activities.

Chapters and regions wishing to have their function listed must complete a seminar request form. To obtain one of these forms, contact the PTG Home Office or your Regional Vice President.

Once approval is given and your request form reaches Home Office, your event will be listed through the month in which it is to take place.

Deadline to be included in the Events Calendar is at least 45 days before the publication date; however, once the request is approved, it will automatically be included in the next available issue.

November 2-5, 1995 — **North Carolina Regional Conference**
Omni Hotel, Durham, NC
Contact: Richard Ruggero
3504 Fairhill Drive, Raliegh, NC 27612
919-787-7123

November 18, 1995 — **Lehigh Valley One-Day Seminar**
Holiday Inn & Conference Center, Bethlehem, PA
Contact: John J. Zeiner
830 Hanover Ave, Allentown, PA 18103
610-437-1887

January 5 & 6, 1996 — **Arizona State Seminar**
Ramada Inn University, Tucson, AZ
Contact: Bob Anderson
5027 E. Timrod Street, Tucson, AZ 85711
520-326-4048

New Members In September

REGION 1

059 QUEBEC

EDMOUR BELANGER
222 RANG 1 NORD
SAINT-MARTIN, QC
GOM 1B0 CANADA

REGION 3

741 TULSA, OK

DEWAYNE C. BOYD
P. O. BOX 400
514 S. CEDAR
KELLYVILLE, OK 74039

REGION 4

537 MADISON, WI

NANCY J. BURD
1250 W. STOVER ST.
FREEPORT IL 61032

612 QUAD CITIES, IL

WILLIAM KOELLER
2262 POLAR BEAR CT.
NORTH POLE, AK 99705

ANTHONY M. POLITES
245 LAWNRIDGE DRIVE
CREVE COEUR, IL 61610

REGION 5

581 MINN-KOTA, ND

IVAN SVENDA
611 OAK STREET
WINNIPEG MB R3M 3P9
CANADA

641 MICHAEL J. VAN DEVENTER
200 VAN BUREN ST.
SAUK CITY, WI 53583

013 KANSAS CITY, MO

HAL D. COWAN
4912 SOMERSET DRIVE
PRAIRIE VILLAGE, KS 66207

REGION 6

901 LOS ANGELES, CA

MIKHAIL GUTMAN
6131 COLDWATER CYN.
#1-B
N. HOLLYWOOD, CA 91606

REGION 7

011 VANCOUVER, BC

ANDREW K. WONG
14-9800 KILBY DRIVE
RICHMOND BC V6X 3S2
CANADA

013 BC COAST AND INLAND, BC

BOB B. STEEL
4727 PHEASANT PLACE
N. VANCOUVER BC
V7R 4G4 CANADA

SIMON WU
1014 10TH AVENUE
NEW WESTMINSTER BC

V3M 3M6 CANADA

846 UTAH VALLEY

VAL B. JONES
1571 W. 1460 N.
PROVO, UT 84604

AUXILIARY EXCHANGE

Dedicated To Auxiliary News and Interests

On the Cover

L. Paul Cook
PTGA President

The cover photo for this month's *Journal* has quite a story behind it. I photographed this notable "object d' art" in September when Claudia and I stayed at Richard and Anne Doerfler's lovely home in Toledo, Ohio. Richard and Anne are both members of the Detroit-Windsor Chapter, which is hosting the 1996 National Convention in Dearborn, Mich. Richard, besides being an RPT, concert technician and all around great guy, is the artist who designed and created this most unusual Piano Plate Sculpture, made of four deceased piano iron plates. Since it rests in their back yard just off the music room, it can be seen and enjoyed through the large windows just behind their seven-foot and nine-foot Yamaha grand pianos.

Claudia and I were in Dearborn so I could set up next year's auxiliary tour and attend the Convention Planning Committee meeting on your behalf (Claudia came along to keep me company). Toledo is only 50 miles south of Dearborn, and the Doerflers offered to pick us up at the airport and show us around.

We have known Richard and Anne for many years now. We first met them at an annual PTG Convention, then went on to travel through Europe and Asia with them on the PTG tours in 1986 and 1989. We have been very good friends ever since. Anne is both choir director and organist for her church. Claudia and I asked her to sing and play the organ at our wedding in 1989 aboard a United Airlines 747, mid-way to Hong Kong during the 1989 PTG Asian tour. The organ was taped, of course.

Despite knowing the Doerflers all this time, we learned a few interesting things about them on this trip. Most noteworthy is their love of music and their generosity in giving back to their community. They accomplish this by holding free concerts in their home two or three times every month with an attendance of more than 30 people! They often have local, national and internationally known artists perform. I understand Dr. Yat-Lam Hong, RPT, and concert pianist, delighted a standing room only crowd at the end of October. Dr. Hong is also one of our PTG tour participants and wrote a series of *Journal* articles on our 1989 Asian tour adventure.

In order to accommodate their two marvelous grand pianos, the Doerflers added 15 feet to their home. The environment is kept between 70 and 72 degrees all year round, even when they are on trips. Their entire living room/music room, entry and dining room are designed and beautifully decorated primarily for sharing beautiful piano music with their lucky guests.

Richard's piano "workshop" has taken over the original garage so they have added a new garage. It is the best organized and cleanest shop I have ever seen. Yes, he uses it every day. He has a waiting list of customers ready for Richard to lovingly rebuild their instruments.

The Doerflers are just one example of the delightful friends we have made all over this country and the

Continued on Next Page

On the Cover

Continued from Previous Page

world, too. Our lives have been so enriched through our membership and participation in PTGA. If you haven't gone to an annual convention recently, plan to attend the July 1996 Convention in Dearborn, Mich. We are putting together another exciting schedule for Auxiliary members. You thought the food was great in Albuquerque — wait 'till you see the menu for '96. We will also be offering three sessions of classes on Saturday. There will be business, computer and time management classes for your learning enjoyment. I want you to take back valuable information and training that will more than pay for your trip to Dearborn, by making you more efficient and effective in whatever you do. Many of you have been asking for classes of worth — now you got them, so come and learn.

Our Auxiliary Tour is still not completely set. That's because I have too many choices, too many wonderful things to see and places to go. Of course, there is the world famous Ford Museum and Greenfield Village. Each would take an entire day to really see everything. Then there are the unbelievable mansions! We toured both the Henry Ford and Edisel Ford mansions. Both are exquisite! Other possibilities include the Renaissance Center, the Fisher Mansion, and the Dodge Mansion. We might also tour the place where they make the floats for the world famous Detroit Parade. Or we might take a boat ride on Lake St. Claire. We may also visit Motown, Hitsville U.S.A., founded by entrepreneur Berry Gordy, Jr., 30, who invested $700 to start the recording company where Motown Records all began. I'll let you know where we are going as things shape up.

The Auxiliary Scholarship Store is alive and well. In fact, I have worked out a new deal with our vendor to expand our efforts and income this year. We may now have several thousand dollars worth of music related sales items shipped to any regional seminar/convention on consignment. If you or your chapter would like to set up an Auxiliary Scholarship Store at your next regional seminar or convention, drop me a line or call me and I'll make the arrangements. Every time we have asked a regional seminar or convention committee for a complimentary table in the exhibit area for this purpose they have accommodated us. By doing business this way, we have nothing at stake, plus we will get an even larger percentage of the sale price to put in the National Scholarship fund. The scholarship fund is used to promote excellence in piano performance and to promote the PTG. My goal is to expand our scholarship gifts to five states every year on a rotational basis. It will take the help of many of you to accomplish that goal, so if you see the opportunity in your area, please take advantage of it and contact me.

It's hard to believe it's November already. That's because it is really only early October and it is 101 degrees here in Los Angeles, today, as I write this article. Thanksgiving is just around the corner though. This year Claudia and I have rented the same cabin at Lake Tahoe we rented last Thanksgiving. Several of our children and grandchildren will again be joining us for a wonderful week in the mountains and we are hopeful that it will snow. We had a blizzard last year! That's a treat for us. Thanksgiving is my favorite holiday of the year. I wish you all a wonderful, safe Thanksgiving, too.

Circle of Friends

The many circles of friends we have developed over a lifetime enrich and give meaning to our lives. Think about the different circles of friendship you have: neighbors who are like family, school pals, civic and church associations, piano customers who have become close friends, and, of course, great ties within the local PTG chapter on a business and a personal basis — to name a few examples. It goes without saying that while the national PTG convention lures us with its educational and sightseeing offerings, it is by far the enduring friendships we have enjoyed over the years with *people* that are the "high-lights" we take home with us.

For sure, friends are one of life's best gifts to ourselves. No matter how many friends we have, the human heart always has the amazing capacity for more. No matter what our age, we continue to need to make new relationships with people.

And speaking of *new* friendships! One of the new proposals our PTGA board voted on was to sponsor a national PTG membership exchange program patterned after the IAPBT exchange on an international level. The intent of this exchange would be to encourage families (or individuals) to get to know each other better on a personal and/or professional basis. Participation is voluntary. Interested members would fill out a questionnaire, send it back to me, then a list would be completed and circulated to those participating. Our upcoming newsletter will highlight this proposed program.

Don't forget, you will be hearing from me soon when I mail out notices for the 1996 Auxiliary dues. In the meantime, enjoy the fall color and cooler temperatures and remember to cherish your many friendships. Happy Thanksgiving!

— Carolyn Sander
Auxiliary Vice-President

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FOR THE HIGHEST QUALITY GRAND PIANO REFINISHING call 'ADEPT of Ft. Myers, FL. Bill Collins proprietor, 32 years in the craft. Licensed for 11 years at this same location. Specializing in exquisite, high quality and high gloss, lacquer finishes. Color and natural finish matching, case restoration, and invisible repairs. PH. 813-275-7170.

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VIDEOS

INSTRUCTIONAL VIDEO TAPES. Victor A. Benvenuto. Piano tuning, $50.00*; Grand Regulating, $50.00*; Grand Rebuilding, $100.00 (2)*; Key Making, $50.00*; Soundboard Replacement, $29.95*. (*Plus S/H). The Piano Shoppe, Inc., 6825 Germantown Avenue, Philadelphia, PA 19119-2113; Ph. 215-438-7038, Fax, 215-848-7426

PIANO TECHNOLOGY EDUCATIONAL MATERIALS. $49.95 each reel— Vertical Piano Regulation, presented by Doug Neal. Presented by Cliff Geers: Plate & Pinblock Installation Part I, Plate & Pinblock Installation Part II, Wood Repairs, Soundboard Repair, and Grand Hammer Replacement. Add $5 per order for shipping and handling. Questions? Call 712-277-2187. Mail orders to PTEM, 3133 Summit, Sioux City, IA 51104 .

WANTED

WANTED!! DEAD OR ALIVE: "Steinway uprights and grands." Call collect, Ben Knauer, 818-343-7744.

PIANOS! PIANOS! PIANOS! !!!Free phone appraisal!!! Buying all types of usable pianos. Cash or bank check on pick up. Won't hesitate on price. Call us first for fast professional service. "Steinway, Mason-Hamlin command specialty prices." Jay-Mart Wholesale, P.O. Box 21148, Cleveland, OH 44121. Call Irv Jacoby collect 216-382-7600/FAX 216-382-3249.

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WANTED: Donation of used Electronic Tuning Aid for Baptist Mid-Missions Missionary going to Central African Republic. Pianos at their College are receiving no service. FINE TUNING, 540-626-7202.

STEINWAY M parts needed: Fallboards, Music Desk, Lid and Keyslip. Also interested in decrepit Steinway D, will consider any major problems but must have 20 note base section. Call John 713-351-1603.

ANTIQUE GRAND PIANOS WANTED: Any restorable condition. Top prices for pre-1850, wood-frame grands in original condition. Ed Swenson; P.O. Box 634; Trumansburg, NY 14886; 607-387-6650; Fax: 607-387-3905.

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STEINWAY & MASON HAMLIN WANTED!! "Dead or alive." $$$ Grands, uprights, consoles—any size, cabinet style or quantity. Cash and immediate removal. Finders fee for successful purchases. Call us first!! 800-438-3814 toll free or write to be listed in our worldwide data banks. Piano Wholesalers, 5817 Wickfield Drive, Parma Heights, OH 44130. Call us first!! 800-438-3814.

DISPLAY AD INDEX

PianoDiscussions™

November 1995

News From The World of PianoDisc

Liner Notes

Kochanski joins PD Artist Series

Noted Baldwin classical artist Wladimir Jan Kochanski is the most recent addition to the PianoDisc Music Library Artist Series. A graduate of the Juilliard School of Music, Kochanski studied with the legendary teachers Rosina Lhevinne and Eduard Steuermann. Madame Lhevinne called him, "a dazzling pianist, reminiscent of the old masters."

PianoDisc Musical Advisor Paul Magee (who did advanced study in Theory at Juilliard himself) commented after a Kochanski concert, "I haven't seen technique like that since Horowitz! And he's so musical."

Still, it isn't technique alone that makes Kochanski such a favorite with audiences. Mixing humor and storytelling during a recital, he gives his audience an insight into the music and the master composers in a way that brings their music to life. His recitals are at the same time brilliant, educational and inspirational. As you can imagine, his fans are legion and loyal.

Among the pieces he recorded for his first PianoDisc recording are "Un Sospiro" by Liszt, Rachmaninoff's "18th Variation on a Theme by Paganini," and Lecuona's "Andalucia" and "Malaguena."

Artist Director Jan Kiser commented, "We were thrilled with Wladimir's recording session. He combines virtuosity and a highly emotional approach to music. His warmth and spirituality shine through each piece. We are delighted he chose PianoDisc to archive his performances for future generations."

An early 1996 release date for the disk is expected. Meanwhile, readers are urged to experience Kochanski in concert. It will be time very well spent.

PianoDisc has the best compatibility with ALL marketed software!

Baldwin artist Wladimir Jan Kochanski.

PianoDisc Installation Training 1995/96

- Nov./Dec. 28-2
- Jan. 24-28
- March 21-25
- April 18-22

1996 Continuing Education Series

- May 4-5
- June 15-16

Tuition for the installation and Continuing Education seminars is **free**, but a $50.00 refundable deposit is required for confirmation. The PianoDisc Continuing Education Series seminars are restricted to PianoDisc certified technicians in good standing. For more information about attending a PianoDisc Installation Training seminar or a Continuing Education seminar, call PianoDisc during our office hours (see below).

PianoDisc
4111 North Freeway Blvd.
Sacramento, CA 95834
Phone: (916) 567-9999
Fax: (916) 567-1941

Tech Support: (619) 258-1460
(916) 567-9999

Our telephone lines are open daily (except weekends and holidays) from 8 AM-5 PM Pacific Time.

Steve Allen video has smash debut

PianoDisc's new sales video, starring television great Steve Allen, has just been released to its' dealer network. The 12 minute film covers PianoDisc from engineering to possible applications of the finished product. Standard features and available options are also demonstrated by Mr. Allen.

"The response to the film has been incredible. Dealers are delighted to have such a great marketing tool available, and particularly like the fact that it's as entertaining as it is informative. With the great Steve Allen, we knew it would be a winner," says Executive Vice President Tom Lagomarsino.

The film, produced for Music Systems Research by TVI Productions of Sacramento, is intended for viewing in dealer showrooms, at exhibitions and trade shows. It will also be an effective way to present PianoDisc to corporate buyers who typically have to present products to be purchased to committees for approval. Dealers will be able to have their own store name and address inserted at either the beginning or end of the film.

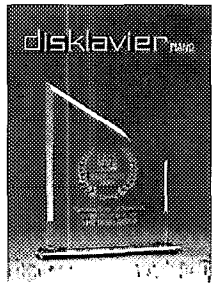
"We anticipate that a dealer might even send this home with a prospective customer. Particularly when only one of the decision makers is in the store initially. The film offers a relaxed way for a customer to become familiar with PianoDisc. After viewing the film, they'll come back to the store informed and intrigued," says Lagomarsino.

Distribution of the film is continuing at press time.

DID YOU KNOW...

... **George Gershwin** taught himself to play the piano by studying a player piano? He would stop a song, put his fingers on the depressed keys and memorize what he did and how it sounded. He learned whole songs with this technique.

1994 KEYBOARD PRODUCT OF THE YEAR



Dealers have chosen the Yamaha Disklavier Piano as "Keyboard Product of the Year." It just goes to show that great craftsmanship, great technology, great dealers and great salespeople can make things happen.