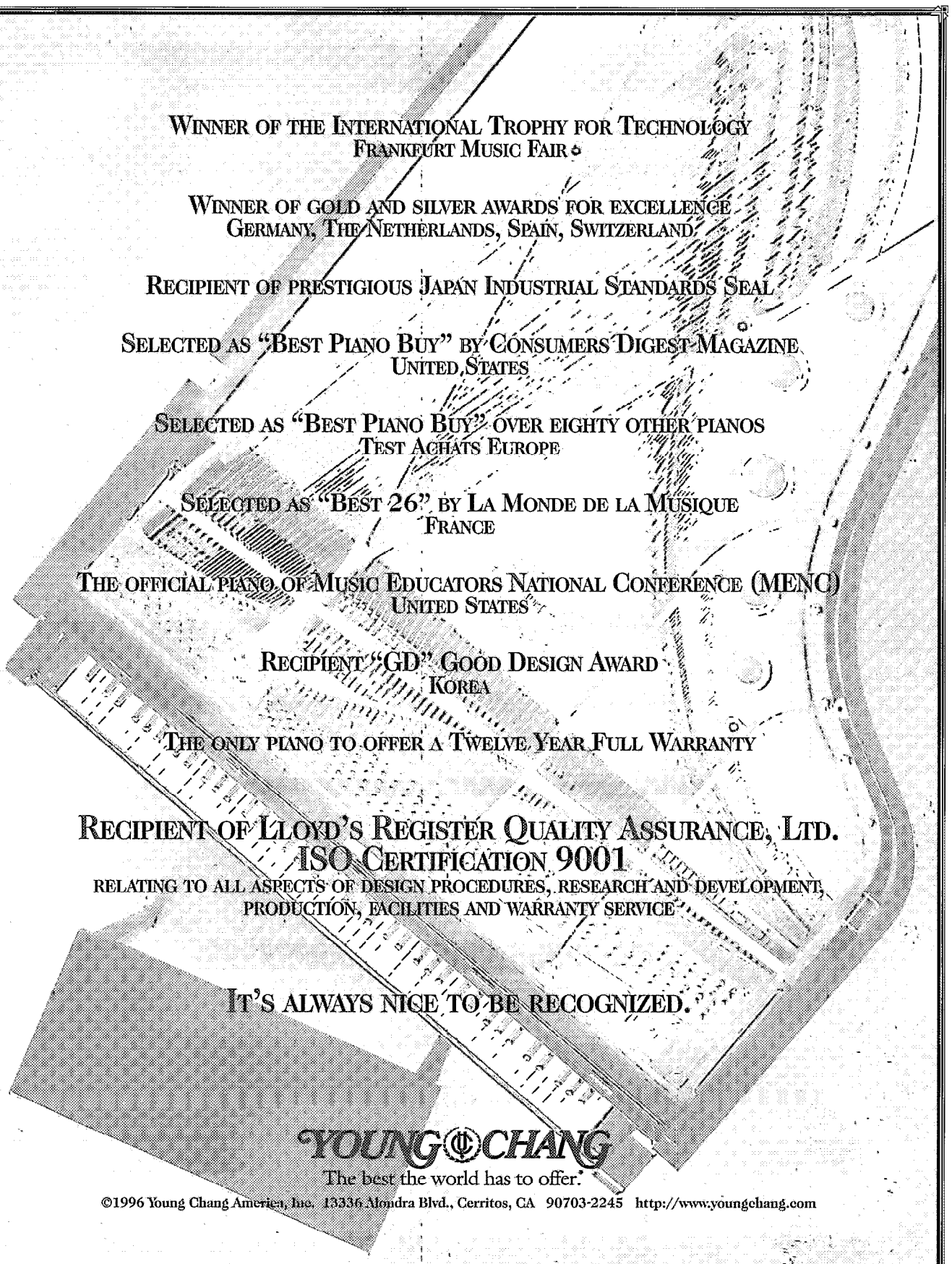
PIANO TECHNICIANS
Journal
Official Publication of the Piano Technicians Guild

February 1998 Vol. 41 • #2

Inside:



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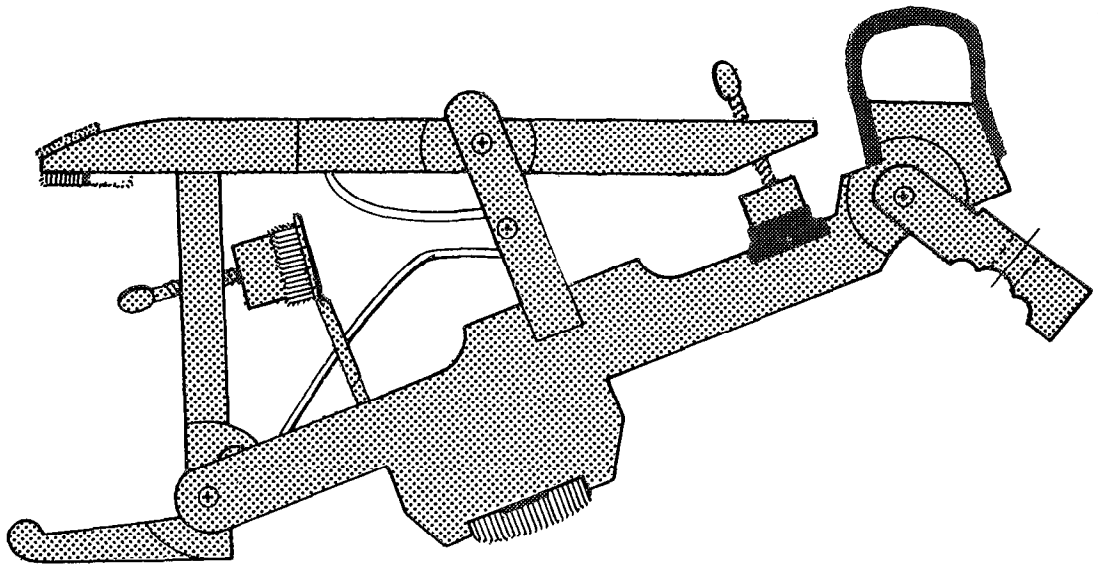

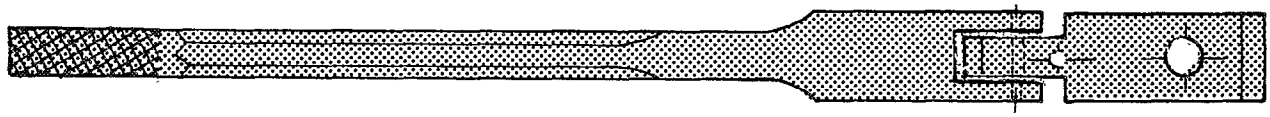

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Editorial

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DEADLINE: No less than 60 days before publication date (i.e., September 1 for November issue)
Send materials and letters to: Steve Brady, *Journal* Editor
205 McGraw Street • Seattle, WA 98109
Fax: 1-206-285-7610 • E-Mail: sbrady@u.washington.edu.

Subscriptions

Annual subscription rates: $55 (US) for Members; $85 for Non-Members (US)/1 year; $155 (US)/2 years;
Single copies: Current year/$10; 1 year/$5; back copies/$2 if available. Piano Technicians Guild members receive the *Journal* for $55 per year as part of their membership dues.
Address Changes/Subscription Problems
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POSTMASTER: please send address changes to:
Piano Technicians Journal, 3930 Washington,
Kansas City, MO 64111-2963

EDITORIAL PERSPECTIVE

Piano Pricing Guides

When I appraise a piano for a client, I first look at the piano and make notations about its age, appearance, and internal condition. The second thing I do is find out what a new piano of like quality would cost today. This figure becomes a point of reference for the appraisal. For the technician who appraises pianos, there are three ways to find out about new piano prices. If you happen to be on good terms with a local dealer of whatever kind of piano you're interested in pricing, you can call the dealer and get a price. The other two ways are books. *The Ancott Music Product Directory — Acoustic Piano Edition*, has been around since 1986, and until recently was the only such guide available. Beginning in August of 1996, the Annual Supplement to *The Piano Book*, by Larry Fine, RPT, became a second reference option. In this brief review, I would like to compare and contrast Fine's book with the Ancott publication.

Steve Brady, RPT
Journal Editor

The Ancott Music Product Directory (referred to hereafter as Ancott) appears twice a year and is purchased by subscription from Ancott and Associates. The current annual subscription price is $42 for two issues. It lists pianos by make, model, size, finish, and furniture options, and gives a "list price" for each piano, calculated from the wholesale price. Another section of Ancott lists such "technical" information as soundboard area in square inches, speaking length of #1 bass string, and number of plies in the pinblock, country of manufacture, and whether a bench is included or not. Ancott's *Acoustic Piano Edition* is also available on disk along with Ancott's other directories, the *Electronic Keyboard Edition* and the *Discontinued Product Edition*, as a computer database for $79.

A review of **Music Product Directory — Acoustic Piano Edition**, *Ancott Associates, PO Box 46532, Cincinnati, OH 45246, (513) 772-2282, and* **Annual Supplement to The Piano Book**, *Brookside Press, PO Box 178, Jamaica Plain, MA 02130, (800) 545-2022.*

Dan Kobida, president and owner of Ancott Associates, graduated from Northwestern University with a degree in music education and worked for a time as a high-school band director. He founded Ancott in 1986, bringing to the venture experience gained from 14 years working for Wurlitzer in education and strategic planning, and four years at Baldwin in marketing and planning. The name Ancott combines the names of Kobida's two sons, Dan and Scott, with the first letters dropped.

The *Annual Supplement to The Piano Book* (abbreviated hereafter as ASTPB) is published, as its name indicates, annually (in August). It is available in bookstores everywhere for $14.95. Smaller in format (5"x 9") than Ancott (8.5" x 11"), the ASTPB fits comfortably in a typical toolcase. The book looks very much like a miniature copy of *The Piano Book*. In addition to pricing information very similar to that found in Ancott, ASTPB includes a "Manufacturer and Product Update" section which gives information on recent changes in the various product lines. ASTPB does not include the "technical" tables found in Ancott.

Larry Fine began publishing the ASTPB as a way to "effectively extend the 'shelf life' of *The Piano Book*." Because piano models, prices, and even manufacturing alliances change so frequently, the information in an edition of *The Piano Book* might be somewhat out of date even during the year of its publication. The annual supplement helps to keep each edition current.

Whereas Ancott is oriented towards dealers and manufacturers, the ASTPB is oriented towards consumers. Both books arrive at their list prices in a similar way ("most prices are double the wholesale price," says Fine), but Ancott includes this information on a tear-out page at the back while ASTPB does not. Rather, ASTPB includes what Fine calls a "frank discussion about customary discounts from re-

Continued on Next Page

Please submit tuning and technical articles, queries, tips, etc., to me:
Steve Brady*, Journal *Editor
205 McGraw Street • Seattle, WA 98109
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Continued from Previous Page

tail that may be available to the consumer." The ASTPB includes some pianos not included in the Ancott Guide. Steinway's entire "Crown Jewel Collection," for instance, appears in ASTPB but not in Ancott, as do some makes new to the U.S., such as the English import, Kemble. Whereas the Ancott guide is printed in an all-business style of rows and columns reminiscent of a computer printout, and with some of its information in codes and abbreviations, the ASTPB is in a more consumer-friendly format with wide margins and piano styles and finishes spelled out.

So which of these price guides is right for the piano technician? It depends on your business. If you are a piano technician who is also actively engaged in buying and selling pianos, you'll likely find Ancott, with its twice-yearly publication, additional product information, database option, and merchant orientation to be an attractive choice. If, on the other hand, you don't sell pianos but are called upon to do the occasional appraisal or to help a client purchase a piano, you'll probably opt for the convenience, lower cost, and consumer-oriented approach of the ASTPB. But if you truly want to cover all your bases, get both!

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IN ADDITION

COVER ART

The business end of a Mason & Hamlin upright screw stringer was photographed by Journal *writer Susan Kline, RPT. See this month's Q&A for a discussion of screw stringers and other piano anomalies.*

PIANO TECHNICIANS
Journal
Volume 41 • Number 2 • February 1998

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Taking Care of Business

Before we get too far along into the new year, allow me to share with you a few thoughts which, if followed, will surely be of help to you in many, many ways through the years ahead. I know that my own business has developed tremendously over the years since this idea was put into full practice on a daily basis.

Along life's way there are many mentors from which we gain knowledge and expertise. I, too, have had many mentors over the years, but what is being shared here came from one mentor I wish all of you could have known. I am speaking of Robert Hayward. Bob was a contributing editor to the *Journal* for some years. The name of his column was *Getting The Business From Hayward.* In his column he would present various business aspects of his piano service field. You could always count on receiving solid business tips that worked well for many of us.

Marshall B. Hawkins, RPT
PTG President

It is standard fare in business today to have business cards. Most folks, more than likely, do some type of advertising. You may perhaps place an ad in the yellow pages of your local phone directory or in special events publications in your community. It is not uncommon in some areas to see ads for piano service in newspapers. I notice at various PTG functions many trucks, vans and cars with the name of the business painted on the side. Just about any business can utilize such basic methods of advertising.

There are those who do giveaway items such as pens or pencils with their logo imprinted on the merchandise. Continuing with that idea there are businesses such as barber shops, clubs or lounges, restaurants, alcoholic beverage stores and many other retail outlets that have book matches with the name of their business located on the cover and are available for their customers to pick up and take with them. There is no reason why a piano shop could not put this idea into practice as well.

The first thought that comes to mind is that it might not be too practical inasmuch as a typical piano shop does not generate that much traffic. But, think about how many people you come into contact with during your travels from one service location to another. Why shouldn't a piano technician be able to get some mileage out of this thought? On second thought, however, it might not be such a good idea inasmuch as there are not as many folks using tobacco products today and matches lying around can possibly be a fire hazard. Where am I going with this?

Here is the thought: We go back to Bob Hayward, who was way ahead of us in this. Advertise your business on book matches, but when you place your order, specifically order matchbook covers with no matches. In addition have this special message printed on the inside where the missing matches would be: MY SERVICE IS MATCHLESS! The next step is to pass one out to every client you service just as you would your standard business card. What is vital is to live up to what it says. Make your service matchless!

If you should decide to do this, here is what you are signing on for. Some words used by Bob Hayward many years ago are applicable today and fit here very well: To build a flourishing piano technicians business you must have something more than good fortune. You must also have knowledge in the field, aggressive, honest business methods, and settle for nothing less than becoming a craftsman member of the Piano Technicians Guild.

Putting the previous quote into language for 1998 means first passing the minimum standards for the field by becoming an RPT if you are on the full service path. To do that requires more than reading a few books and putting in a few hours of practice here and there. It requires more than attending an occasional chapter meeting. It will demand a commitment to excellence. It will require a thirst for knowledge and continual application of that knowledge far beyond simply gaining the RPT credential. It will require diligence which is long-term. True diligence is steady, sure and constant. That is why chapters have regular meetings with technical sessions offered to all. That is why there are regional conferences and that is why we have an annual convention and institute. That is why we give back to help others along the way. Education is continual. Planning for participation in as many education opportunities as possible combined with an attitude dedicated to making your individual service matchless will bring great rewards.

Quality: Quality is never an accident. It is always the result of high intention, sincere effort, diligent direction and skillful execution. It represents the wise choice of many alternatives – the cumulative experience of many masters of craftsmanship.

A Loss for PTG

On a personal note ... We have indeed lost a loyal and dedicated member in Jess Cunningham. The numbers of member who remember Jess as a vital and energetic member are growing small all the time. Since he had been ill and out of the activity of the organization for a number of years, many never had the opportunity to meet and experience his warmth and vitality.

I met Jess during the time of his presidency. His friendliness and outstretched hand to greet people impressed me. Not as a "glad-hander," but as a warm and personable individual. To me, as a new member, that meant a lot.

As time passed and I was able to observe and speak with him, now a Past President, but still the same friendly person I had met initially, there was always time to involve me in some conservation. We became friends and thereafter I was always able to count on Jess for an opinion on this or that. I found his manner to always be easy-going.

He was a correspondent my wife and I were always glad to hear from. We will always remember him as the consummate gentleman with impeccable dress.

Although Jess was not seen at Guild functions in recent years, he will nevertheless be sorely missed.

– M.B. Hawkins, RPT

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First Prize Winner selected Kawai.

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

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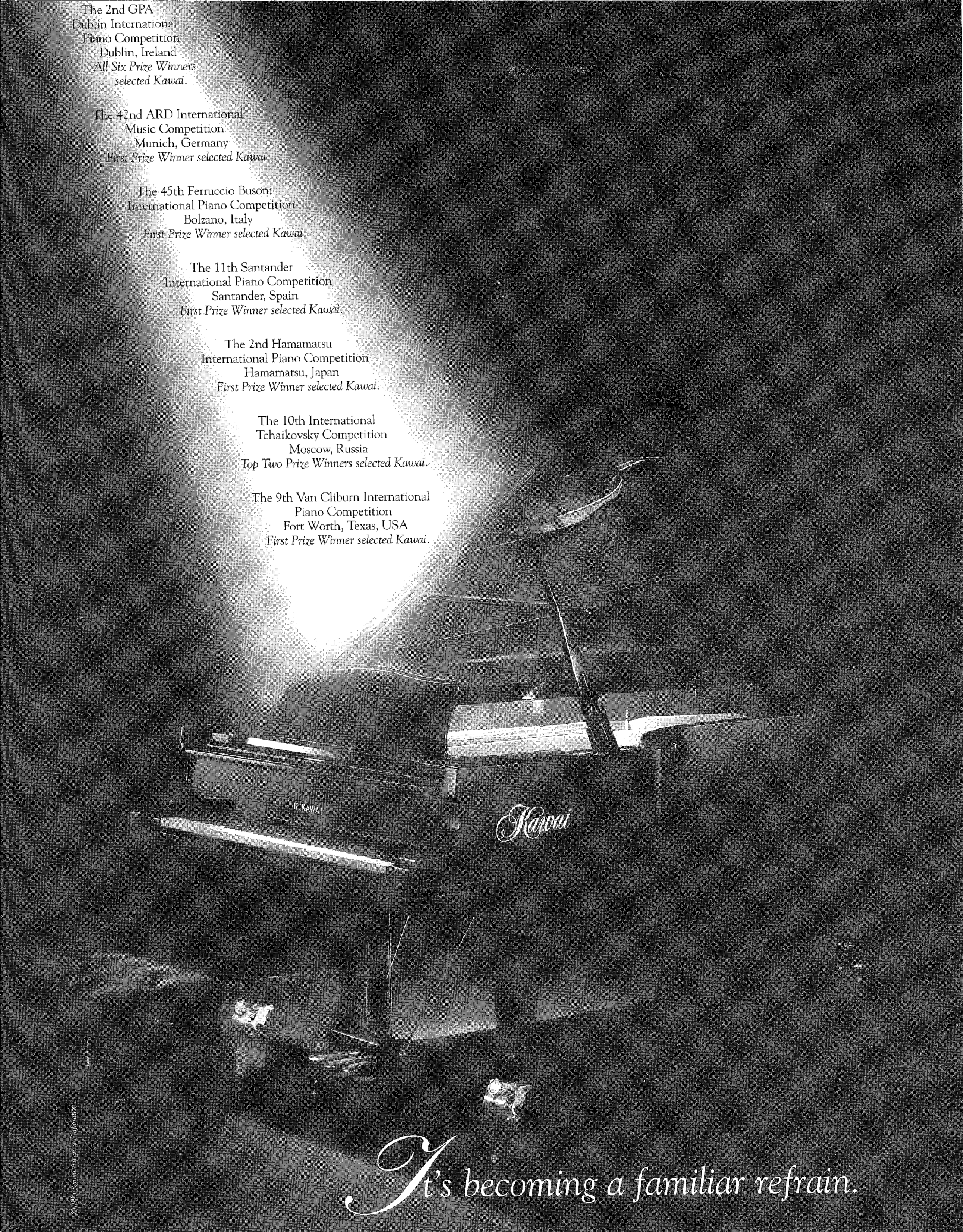
Top Two Prize Winners selected Kawai.

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



It's becoming a familiar refrain.

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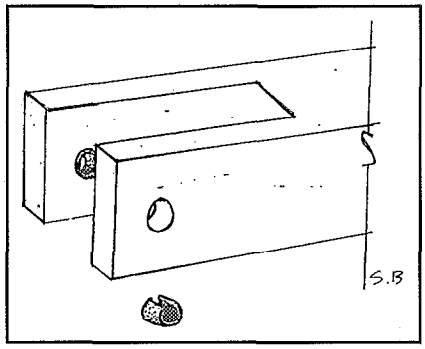
Tips, Tools & Techniques

Hammer Flange Bushing Repair

From the Unauthorized "Oops" Repair Guide

Now don't give me a hard time. I know you all carry your own copy of this guide around in your head, written by years of tough-spot experience. In this case, you are working on a relatively new instrument, say a grand, and too-tight bushings require a few repinnings. Somehow, in the process of removing the old pin, or reaming the bushing for the replacement pin, you end up with a tiny piece of felt in your hand that seconds before was one side of the flange bushing. It might not have been your "fault," because the factory gluing of that bushing — was inadequate.



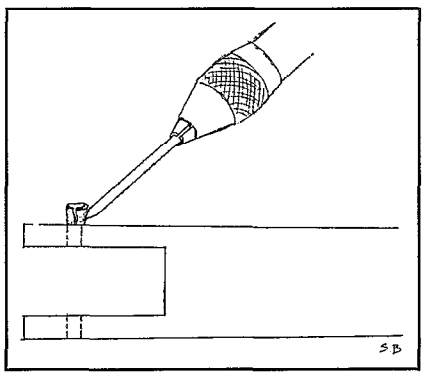
What to do? You could punch out the felt bushing on the other side of the flange and do a new textbook flange re-bushing – or, if the bushing cloth you carry is back in the car, is not the same as is in this new piano, or it's been a while since you've done a nice rebushing job, try the following.

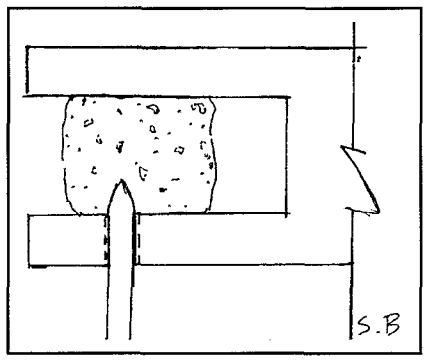
To do this repair you will need your tweezers, reaming tools (centerpin holder with scored centerpins is by far the best), complete set of centerpins (i.e., your centerpin case), some glue – and the key: some stiff foam, like a packing peanut.

Step one is the hardest, so expect a couple of tries to succeed. Since this is a fairly new piano, the felt bushing you accidentally punched out is good. (If not, forget this whole idea and get the stuff from your car.) Using your fingers and tweezers, role this tiny piece into a roll, like bakers do to make cinnamon buns. Hold the "bun" with your tweezers and get part of the roll somewhat started into the flange hole. This is small intricate work, and fat fingers like mine make imprecision the rule, but if it's just sort of stuck in the hole it's enough.

Now, using a point, like your tweezers point, or a centerpin in your center pin holder, gently prod this roll into the flange hole. You'll be shocked at how well this goes. In no time you will have that tiny felt piece completely back in place, but not yet ready for use.

Gently push the felt roll half way back out of the flange for gluing. Using a small applicator like a centerpin in the centerpin holder, put a small bead of glue around the roll. Clean the center pin and again use it to push your felt roll back into place. Because the roll is still like a cinnamon bun, things are not tight yet.





Now for the job of "unrolling" that cinnamon bun back into a normal "tube" of a flange bushing by reaming it back into shape. Before starting to ream, however, you need to support the felt bushing from the back, or it will pop out again.

Here's the trick. If your fingers are so small you can put one inside the flange, do it. If not, get the packing peanut, or stiff foam, and whittle yourself a "finger" that is just slightly larger than the flange. Roll it between the flange fingers and you're ready. The foam will hold the bushing in place, and also allow the centerpins to pierce all the way through the bushing.

Start reaming with the smallest centerpin possible, and a smooth one. Increase pin size until felt is spread back in place. Now you can use scored centerpins to size the bushing. This is a quick and easy repair that keeps the flange looking great.

Final thought, when choosing the centerpin to finally install in the flange, check to make sure it will be tight in the birdseye. A loose birdseye is a plague.

— Lyn Nelson, RPT
Grand Rapids, MI (Reprinted from West Michigan Chapter Newsletter)

A Special System for Sharpening

All us amateur woodworkers would love to use sharp planes and chisels like we see our heroes on TV do. Well, I have found a tool which really takes most of the time and frustration out of sharpening these blades. I must give RPT John Hartman credit for demonstrating it at last year's convention in Charlotte.

The tool is the Veritas Sharpening System, "A Precision Honing Guide and an Angle Setting Jig for Bevels." This wonderful pair works by *1)* providing an angle gauge to set the desired blade angle and, *2)* a rolling guide to hold that angle as your sharpen.

That's it! The problem most of us have in sharpening is our inability to hold a constant angle of the blade against the stone. We wind up sharpening, and sharpening, and sharpening, and apparently getting nowhere unless we get lucky. Any wonder most of us have chisels which would make good wedges?

I was amazed at my first attempt using this tool. It only took about five minutes to read the instructions, set the tools up, and go through the coarse and fine stones. Wow! When you can hold a constant angle sharpening can really go very fast. No more excuses for dull chisels and planes.

I bought mine for $33.99 at a WoodCrafter's Store.

— John Stenstrom
Richmond, VA Chapter, Reprinted from The Richmond Update

Continued on Page 14

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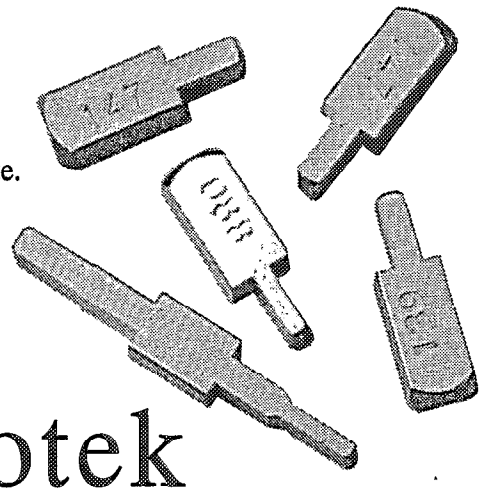

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M&H Screw Stringers, Wegman Pianos

Q Is there a "feasible" way to determine the wire length needed for restringing a Mason & Hamlin screw-stringer, considering that the wire is wrapped around the screw hook as there are no "tuning pins" in this instrument? I would like to keep the "level" of the screw hooks within 1/8˜, if possible. My guess is that Mason & Hamlin had all this wire precut to the necessary lengths before stringing. I await your response(s). Thanks in advance.

—John Fortiner

A **Jon Page:** Be very careful to have the wire cut to a proper and even (for looks) length. There is one near here where the strings were too long when re-strung and now the machines have run out of threads to keep it up to pitch, and many have already broken. Jim Coleman, Jr. has replacements. Don't use your fingers to measure; use a rule or something like my Becket Tool.

A **Mark Graham:** With regard to restringing a M&H screw stringer — is this a piano worth restringing? I tune one for a customer, and am never happy with the tuning, and would never want to own one. In my mind, they're in the same category with square grands: interesting, but the world has moved on to better things.

The question about string length is still a valid one for repairing individual strings, but if one of these babies needed restringing, I'd tell the customer to get a more serviceable piano.

I'm willing to be wrong on this one. That's my perspective. I should say I adore Mason & Hamlins in general.

A **Pat Wethington, RPT:** I recently saw my first screw-stringer last fall. It was at A-440 and had a few unisons out (six). When I finished looking it over I asked when the last time it was tuned. They replied that they had never tuned it and they had had it since 1962! It was most amazing, the cabinet and keys were also very solid. Not many scratches or cracks.

A **Bill Simon:** I tuned a M&H screw stringer for a number of years for a family that has since moved back east and took it with them. It was one of the most solid and easiest to tune pianos I have ever tuned. One took the "nut wrench" that was needed and simply brought a string up into tune and stopped right on the mark. I tuned it about every two years and then it only needed touching up. It was extremely solid. Restringing one would be a nightmare.

I also, once, tuned a piano with a "wedge-lock" type of pinblock. The tuning pins sat in wedge-shaped holes, barely larger than a regular tuning pin hole, in solid cast iron. To tune it one had to slightly lift the pin, turn it, and settle it down into the wedge again. Actually it felt fairly normal to tune. I have heard of tuners spraying the pinblock holes with WD40™ before starting to tune, but I never did that. Anyone else ever see one?

Fortiner: Thanks for the input about the M&H piano screw stringer. You are right, according to my experience regarding tuning and tuning stability. A friend of mine owns one and when I tune it the piano needs only the slightest corrections — I get a lot of "freebies." About six or seven years ago I did install a set of bass strings on this piano. Whew! What a job! But the piano really sounded great afterwards. I am still looking for a means of measuring the wire for broken wire replacements and have had no really helpful input. By the way, I did question a piano technology school (name to remain anonymous) about how to measure the lengths of the bass strings for this piano and was told — so to speak — to let some other piano technician have the headache. I gave the letter to the friends that I did the work for just for their own amusement. They have really laughed about it.

The other piano you mentioned, the one where you have to "lift" the tuning pin slightly in its socket, turn it, and then re-seat it is a Wegman piano. I have tuned three or four of them up here in Montana. On page 63 of Schaff's older catalog you will see (if you still have a catalog) a tuning pin replacement called "Feaster Tuning Pin Lock." This worked (no longer available) on the same principle as the Wegman piano tuning system.

A **Vince Myrkalo, RPT:** I had a customer with a Wegman, and you'd better not lift the pin to tune it. No control if you do. But never fear, there are directions in those pianos on how to do it.

A **Danny Moore:** Since you brought it up, do you bring the Wegman up to A-440 or do you tune it somewhat below pitch? I've been forced to work on a couple of them, and both broke mass quantities of strings (like 15 or 16) in the octave and a half above the treble break (kinda gave a new meaning to the term "treble break!") Fortunately, both customers got rid of the beasts. Just curious if there really was a design flaw in the scale or if this was a result of living in the swamp.

Fortiner: The Wegmans that I have tuned have all been brought to A-440 without string problems. That doesn't really prove anything, other than that I (and my customers) were luckier than you (and yours). I haven't studied the scaling to see what "flaws" might exist.

Your play on "treble break" was very fitting.

Better luck next time — or should I say I hope there isn't a next time like the ones that you have described.

"Oinking" Dampers

Q When the shift is engaged I often have an "oinking" sound from the dampers when the sustain pedal is released. Possibly the left string isn't vibrating the same as the other two. Anyone have a solution?

—David Ilvedsen, RPT

A **Jim Coleman, Sr., RPT:** You are right about the left string not vibrating as the others do when you have the shift pedal down. This is what causes the "oinking" sound. For this very reason, it was ex-

Continued on Page 12

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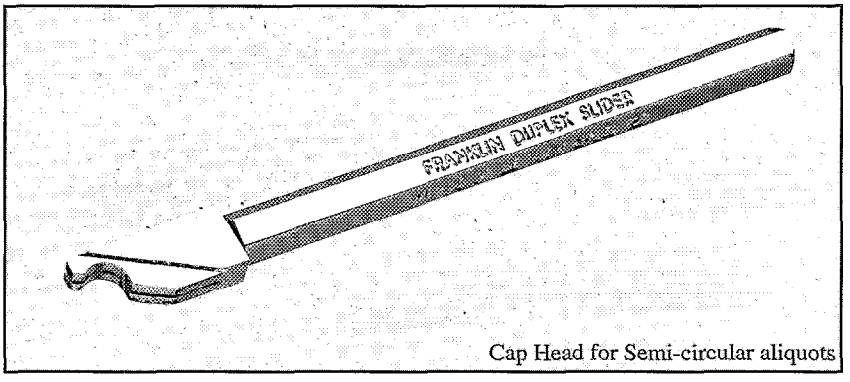

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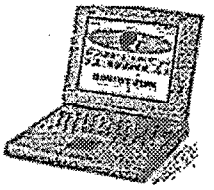

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Continued from Page 10

plained to me that the Bösendorfer factory did not regulate their grands to shift far enough to miss the left string. Those who do half-shift pedal work when the shift regulation does clear the left string will experience the same type of cut-off sound. It's the price you pay for the different sounds you wish to make.

When the shift pedal is adjusted to completely miss the left string, you can get the impression that the tone has a longer duration. It probably is more than just an impression, because while the two strings are giving up duration, the left string is taking on energy which helps take up some of the percussiveness of the prompt tone and then gives back energy in better duration of the end sound.

A Ed Foote: This is the sort of noise that, once heard, has pianists fearing to let go of the last chords in anything. It always seems to have a perfectly quiet background to come leaping at you, usually right at the end of the softest, most sensitive parts of the music.

Things that have worked for me are: real straight up-and-down travel, leveled strings, polished strings where the dampers contact, peeling off the slightest thinness of felt from a block damper's face, roughening the surface of wedge dampers with 220-grit wet-or-dry paper, running a few needles through them, then (if nothing else works) replacing with new felt.

Credit Cards and Credit Card Checks

Q Some folks want to use their credit cards to pay for the services I offer. I can relate to their wants and desires to rack up "miles" and other "bennies." My query is, how do I get set up? Do I want to get set up? Are there any sharks out there ready to eat my lunch with every transaction? What is a good deal? Should I have a minimum? Incentives?

I can see where, with the cost of the basic tuning fee being what it is, some people might benefit from such a simple transaction and I might benefit with larger service bills ... that is to say, maybe more people would spend the money for the $100-and-up service if they knew they could get some extra miles out of their transaction.

Any hot ideas?

— Larry Fisher, RPT
Portland, Oregon Chapter

A Tom Cole, RPT: I began offering VISA/MC service several months ago with the thought that the trend is toward more and more electronic transfer of monies. Also, I had this theory that I could sell more service if the customer could defer payment. No takers that I know of, however.

So far I've been getting paid with a credit card about as much as I get paid in cash, which is to say a very small percentage. I've been keeping it on as an additional service that I can offer to customers because, whether it's for the "miles" or it's the only way they can pay, they do appreciate the service. I advertise this in the yellow pages and this theoretically gives me an advantage since no one else has done so.

To get started, probably the place to begin looking is your own bank, although any bank card service can deposit into your account. For comparison, my current discount rate is 2.1 percent and there are no transaction fees.

As to whether you might want to add this capability, I think it depends on how much you are willing to promote it and how much you are willing to deal with one more complication (carrying an imprinter, filling out the form, remembering to punch a bunch of numbers into a terminal when you get home). I can't say whether or not it ends up being a financial liability. My guess is that it is, but that it's worth it as a premium to offer to your clientele.

A Chris Gregg, RPT: I have been using credit card sales for a number of years. It does not see much use though. The paperwork is a pain, it takes time to fill out the forms correctly, make the necessary phone calls, and submit the merchant invoice. I pay a three percent discount rate. Having the capability to do sales over the phone is a bonus and has to be asked for. Customers do appreciate it though, because they can get their air miles.

A Phil Bondi: When I made my business public record back in April, I must have gotten six calls from different companies asking if my business needs this type of service. I turned them all down for the simple fact that, *a)* I'm just getting started, and *b)* I did not want the paperwork involvement yet. I believe the person who said that it could increase billing potential is on the mark with his statement. Giving people an option like this could very well increase billing potential. Speaking strictly for the area in which I live, a person is more likely to do those key tops if they can charge it instead of having it come out of their checking account.

It's not a dead issue with me. I do not see the need right now. Hopefully, within a two-year period, I will have one of those charge machines, or by then, we might have the technology to "phone it in." Anyone know how long you wait for payment with this method?

A Mark Cunningham: This is one merchant advantage with credit cards. Most credit card processors guarantee to have the funds electronically deposited in your business bank account within 24 hours of "closing" your credit card machine out for the day. Hence, you don't have the "float" problem with credit cards that you have with checks (where you don't have full use of the funds in your account because the checks haven't cleared at the customer's bank). Check with your prospective credit card processor on the charges (percentage of amount charged) and the time frame for crediting your account.

Something to watch — My wife runs a retail business and when she accepts these "check cards" she still gets charged the same percent on the total as if it were a regular credit card. We have seen these bank charges grow steadily in the last several years due to debit/check card usage. My advise on this: watch your bottom line.

Something else to watch — Check your card processor agreement. Most will not allow you to have "minimum" charges on credit card sales. We were going to look at offering a small discount for cash to encourage people away from credit card use, but that seemed to add another level of complexity ... I think the credit card discount percent is somewhat negotiable.

Continued on Page 14

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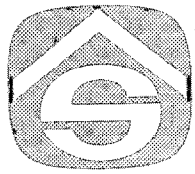

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Q&A/Editor's Roundtable

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The trade association of which my wife is a member, has a bank that has given them a lower discount due to the quantity of members who have agreed to use that bank for credit card processing. (You can process your credit cards through a different processor than your regular bank).

A Guy Nichols, RPT: Mark Cunningham's advice is solid; shop around. Our rate is under two percent. Do you want to get set up? Ah, that's the big question. Ask yourself... Are credit/debit/cash-card type financial instruments going to go away? Not likely. With that conclusion in mind, I don't understand how anyone who was planning to stay in business would not participate.

A Danny Moore: I spent 15 years as owner/agent of record of an independent insurance agency. When I sold out in '94 and entered the piano business full-time, I added up my bad debts. Almost $40,000! The majority was hot checks — someone writing a check for an evidence of (auto) insurance card so they could renew driver's license, license tags, etc. Oh well, just another contributing factor to my changing careers at this late date.

Credit was a way of life in the insurance business, and a big factor adding to the confusion of the business. For that reason I have not considered credit of any type in this business. However, when someone asks if I accept Discover, Visa, etc., I reply "No, but I will accept a Discover Check." (Or Visa Check or whatever.) Most people who have cards also have checks available on their account.

I've never gotten one for a small job (under $100) but occasionally receive one for a big job, long move, etc. It seems that most people who need credit have the means of getting it without my providing it.

Just a few thoughts.

A Ed Tomlinson: I have found that when you bring up the credit card checks for a big job that most will remember that they have that option. That is how I have done some recent $2,000 to $4,000 jobs. Nice money when you can get it.

A Wallace Scherer: I haven't had the opportunity to ask for a credit card check, but it seems like a good practice — "if." What happens if they are at their limit on their card? Will the check bounce?

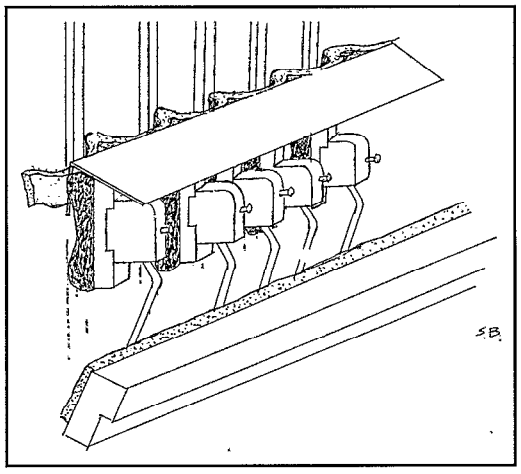
A Danny Moore: No, the check will clear and they will get hit with a $20 per month overlimit fee on their bill until they get it paid down below their credit limit. Incidentally, if they pay it down promptly, the credit card company usually figures they are a good risk and increases their credit limit. PJ

Tips, Tools & Techniques

Continued from Page 8

Protecting Vertical Dampers

For those of you who put a felt muting strip behind the upper register dampers in a vertical, there is the danger of damaging the damper felt as the strip is extracted. To avoid this I suggest the following, a method shown to me by Matt Deffley of the Little Egypt Chapter.



Place a piece of cardboard folded as in fig. 4, and tuck the short length between the dampers and the felt strip as shown. As you pull the felt strip, the cardboard protects the damper felts from harm. The cardboard I use is cut from a manila folder, which is the right thickness and density. It is about 5 1/4" long by 2" wide, and will protect about 10 dampers. Make it longer or shorter as you wish.

— Fred Tremper, RPT
Bluegrass, Kentucky Chapter

Corrections

In the December 1997 issue, my TT&T item describing the Tautline™ Regulation Guide contained two errors. First, Jon Page, the inventor of the guide, is neither an RPT nor a member of PTG. He may be reached at 508-432-5262. Second, the Tautline™ Guide may be purchased from Pianotek (not Pianotech) Supply Company, at 810-545-1599.

In addition, Jon Page informs me that the price of the Tautline™ Guide has been increased to $8.95. *SB* PJ

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Thanks from the Heart

My heartfelt thanks to all the people for the many phone calls, get well cards, and gifts, regarding my recent open-heart surgery. I am progressing well, and will soon be back working at my second love (Pianos). The very best to all.

— Willis P. Snyder, RPT

Another Take on Equal Temperament by Pure Fifths

I recently read the article by Jim Coleman on Equal Temperament by Pure Fifths with surprise! I developed and have used this system of tuning (first introduced by an ethnomusicologist, Mieczyslaw Kolinski in the *Journal of the American Musicological Society* in 1959) since the early 60s. My complete guide (*The New Tuning*) to using their approach, along with all of the mathematics, was published in 1985 and, although received luke warmly by your *Journal*, sold well to PTG members through your mailing list. It is also on the shelves of many libraries and college libraries (such as Princeton) and was used for many years as the tuning basis for a course I taught at the New School for Social Research here in New York City. The *New Tuning* was advertised in numerous musical publications, including your own and the *International Musicians Paper.*

Steinway's concert department head technician, Franz Mohr, told me, upon getting my book, that they were using this same approach, and a European technician I met called the Pure Fifths tuning method the "German System."

It's common that people in different places develop like ideas at the same time. I once worked out a system of equal temperament with 31 tones to the octave that allowed for most pure harmonic conjunctions. I thought I had arrived at a very original microtonal system, and remember how surprised I was to see an article and picture of an organ a Dutch man had invented with 31 tones to each octave!

I believe, however, that both Mr. Kolinski and I should be given due credit as founders of this Pure Fifths equal temperament system of tuning.

While I have never been a PTG member, not being much of a "joiner," I respect your ideals and principals very much and hope to hear from you. Thanks for "listening."

— Lucas Mason, New York City

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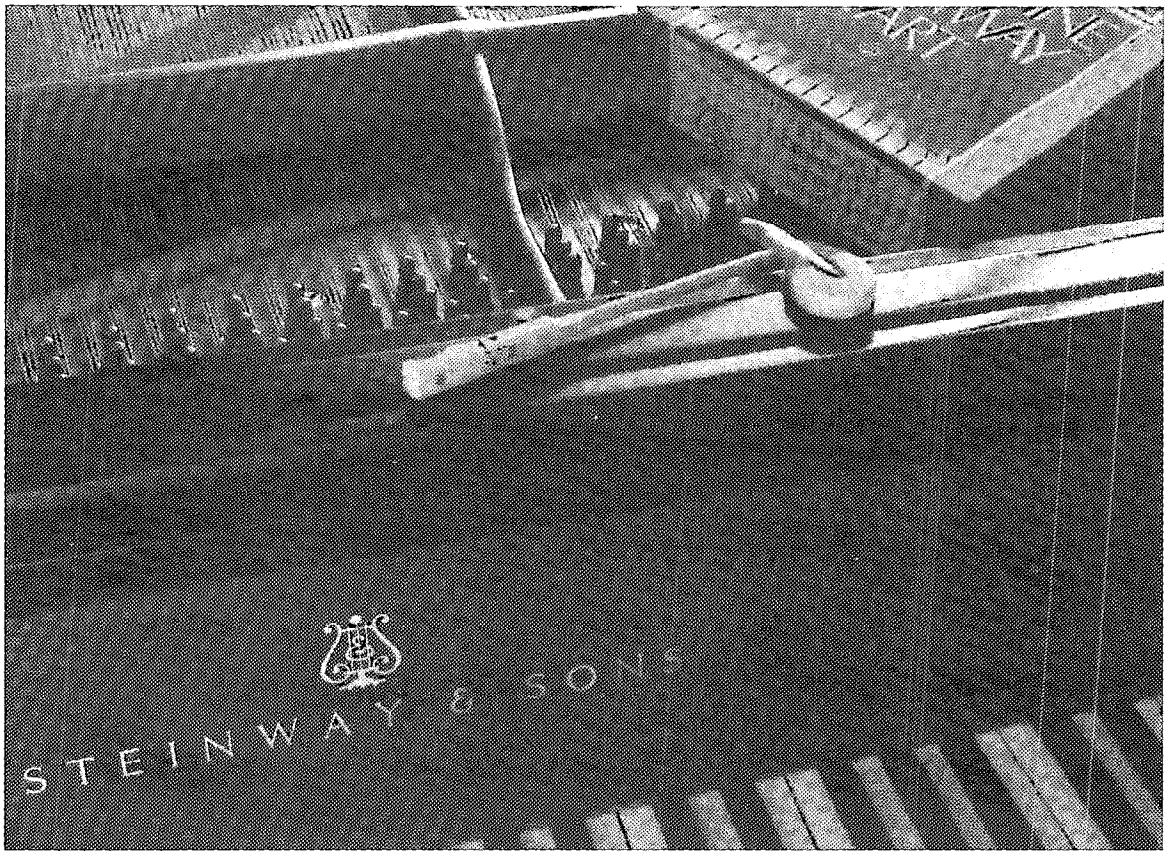

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The Pneumatic Bridge Press – Part I

By Clair Davies, RPT
Bluegrass, Kentucky Chapter

The Pneumatic Press: Why and How

How does something like a pneumatic bridge press come about? The person whose name is on it usually wants to claim ownership, but it's almost always wrong for a single individual to take sole credit for a complex project like this. So much of the inspiration in even the most solitary kinds of creativity comes from somewhere outside one's self. Great ideas that appear to come right out of the blue can have a much more prosaic origin.

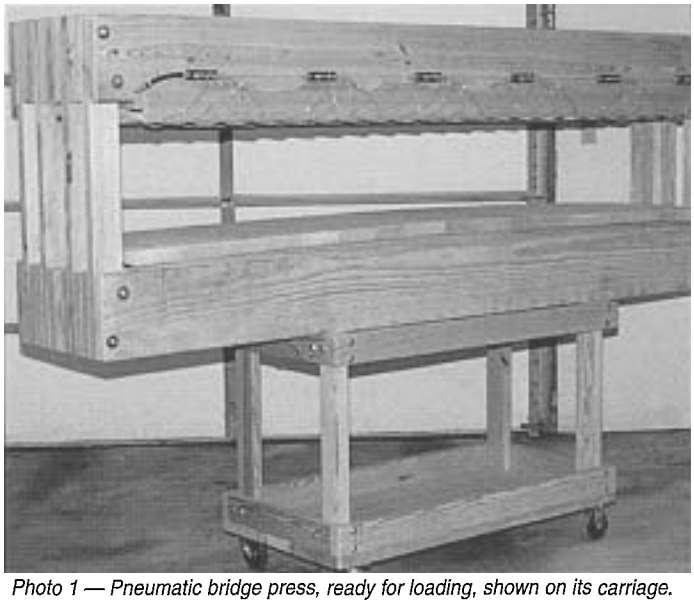

Photo 1 — Pneumatic bridge press, ready for loading, shown on its carriage.

I remember watching three middle-aged siblings at a family reunion joyfully wrangling at the kitchen sink over the best way to wash a fork. Pop had been doing the dishes. Lloyd and Nora had been laughing and reminiscing with their brother about the events of their childhood. But the stories and the dishwashing had come to a halt, as each eagerly described his or her own special way of cleaning between the tines.

They could agree only that you couldn't get the dried food off a fork just by swishing it around in a little soapy water. Each one's approach was very different from the others, but each idea sounded tried and true. I was tickled by their enthusiasm and their thoroughness. Watching this happy trio, I could only laugh and maybe grimace a little. This was where I came from.

I'm wondering now if the old folk's conversation led to any breakthroughs in the technology of fork washing. You never know. Both my presses developed out of the many sessions I've had competitively comparing methodologies "around the kitchen sink" with other piano rebuilders over the years.

A search has been going on for a long while for a practical way for rebuilders to clamp the bridge with air pressure. My own efforts were blocked by the notion that a hose had to follow the curve of the long bridge. No one had found a way to keep a hose in place like that under high pressure. Yet that was the way the ribs were clamped in the pneumatic soundboard press and it seemed only right to try to stay with the concept. This, despite the fact that the manufacturers, even with their massive research and development capability, had long ago given up on the use of hose for bridge presses.

Photo 2 — Press loaded, showing pneumatic hoses above and crossways to bridges.

Many piano factories actually employ air pressure in clamping the bridge, but they supply it by means of rods pushing down from pneumatic cylinders. Since my goal from the beginning has been to keep things cheap and simple, just looking at pictures of the steel-framed factory presses with all their custom-made hardware made my pocketbook pucker.

Nothing really happened with the bridge press dream until my friend Larry Loree suggested I use a number of short hoses and run them crosswise. I argued with him, of course, and I seem to recall we really were in his kitchen and his wife, Beth, was making bacon and waffles. I don't believe we ever settled the question.

Later, with a little perspective, I realized Larry had made my breakthrough for me and my mind took off. I saw that I could have long cauls coming down from the short hoses that would somehow turn the force 90 degrees or so and lay it out again lengthwise, freely following every curve (see Photo 2). I might not have quite the evenness of pressure as with one long hose lying on top, but it would be close.

As with any new device, the details that make the bridge press actually work had a long evolution of their own, but it has been worth all the trouble. The bridge press is as enjoyable to operate as the soundboard press, and it succeeds like the other press in providing a measurable and fairly even 100 pounds per square inch.

Continued on Next Page

The Pneumatic Bridge Press

Continued from Previous Page

To some technicians 100 psi may seem excessive, given that the bridge joint is not under great stress and serious failures are not often seen, unlike with rib joints. It's important to realize, though, that piano factories use this kind of force in gluing bridges on new pianos. I believe that fact alone implies a standard that should be adhered to, particularly now that's it's possible to do so.

As supporting logic, consider that high pneumatic pressure is effectively converted to hydraulic pressure when it reaches the wet glue, squeezing it down into the cell structure of the wood, where it forms not only a solid mechanical bond but also a chemical bond with the wood molecules. Low pressure does no more than leave a layer of dry glue of varying thickness sandwiched between the two surfaces, relying for strength purely on surface adhesion. When the primary function of the bridge is high efficiency transmission of sound, high-pressure gluing would surely seem better.

As with the soundboard press, building the bridge press will present no great difficulty. Some initiative and a few hundred dollars for materials are all that's needed. In this and the next two issues of the *Journal* all the necessary pictures, drawings and specifications will be provided.

Materials Needed

First, a list of parts and materials:

1. Mill discharge hose (50') 1-1/2" ID, 300 psi test
2. Hose clamps 1-3/4" (48)
3. Yellow pine 2" x 10" x 10' (10)
4. Yellow pine 2" x 8" x 8' (2)
5. Yellow pine 2" x 6" x 8' (5) (for press floor)
6. Plywood 4' x 8' x 3/4" (1) (for press ceiling)
7. Lag screws 5/16" x 5" (22) (for hose racks and for attaching the press to the carriage)
8. Lag screws 5/16" x 3" (32) (for the carriage)
9. Lag screws 1-1/2" x 5/16" (16) (for attaching casters to carriage)
10. Washers 5/16" (70)
11. Threaded rod 1/2" (16')
12. Flat head wood screws #12 x 3" (100) (for attaching press and carriage floors)
13. Round head screws #8 x 1-1/2" (12) (for attaching manifolds)
14. Casters 4" (two fixed and two swivel)
15. Parker brass pipe fittings
    a. 209P-4-2 reducer bushing (34)
    b. 3814-6-CL 1/8" urethane hose (24')
    c. 801-4-BLK 1/4" ID hose (1')
    d. 219P-4 1/4" hex head pipe plug (1)
16. Clippard Minimatic brass pipe fittings
    a. 11924-1 hose barb (36)

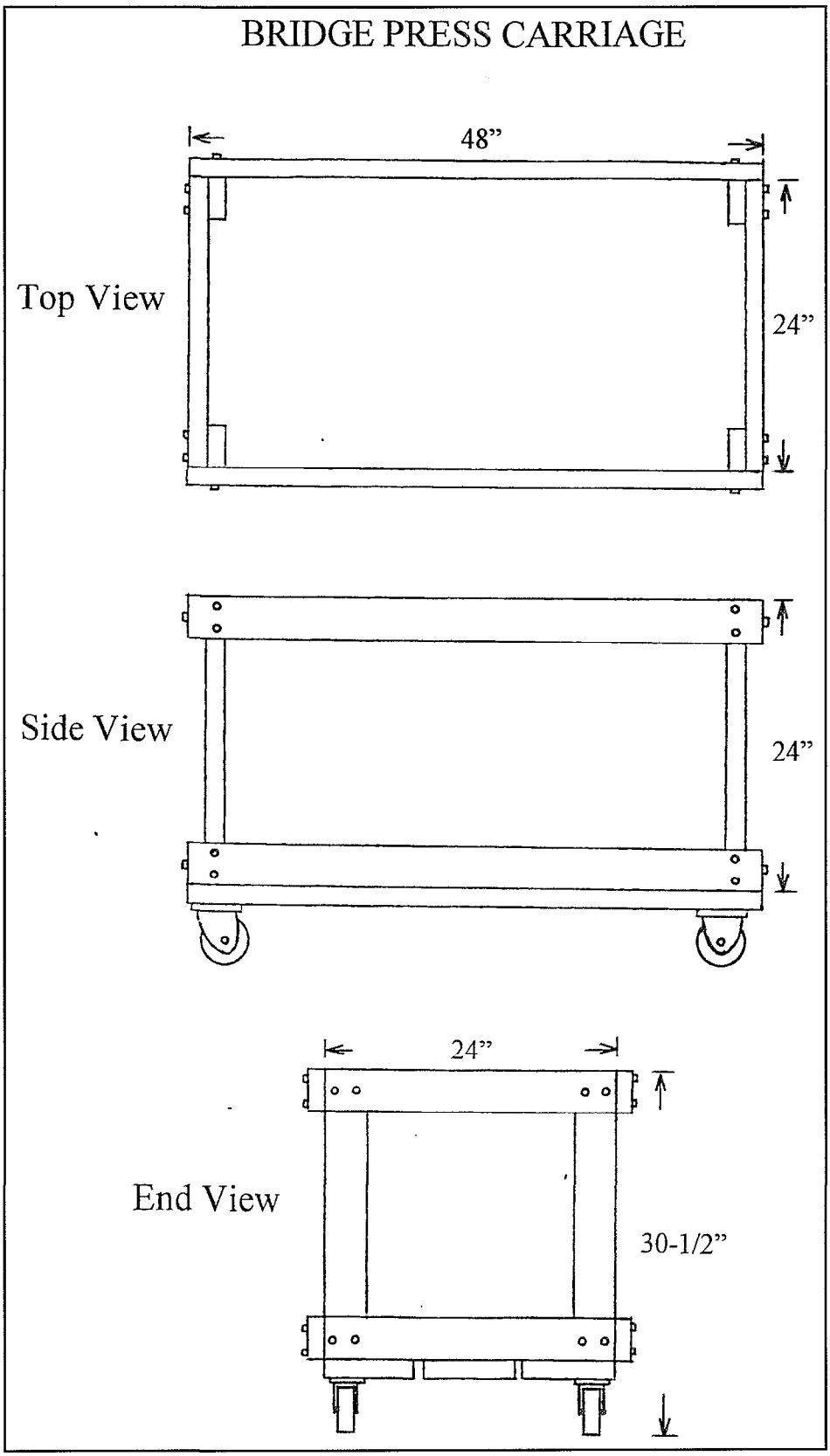

Figure 1 — Bridge Press Carriage.

b. MQC-VP valve body (24)
c. MQC-F hose connector (24)
17. Aluma-Tec manifolds AM-1-4 (6)
18. American coupling, male, 272-0404 (1) (use with 15c to hook up the compressor)
19. American coupling, female, 274-0404 (1) (same as above)
20. Quick disconnect fitting, male, H8CP 1/4" Hose barb (1) (same as above)
21. Pipe thread compound (1 oz. tube) (Ace Hardware)
22. Black pipe bushings 1-1/4 x 1/4 (24)
23. Black pipe plugs 1-1/4 (24)
25. Nuts 1/2" (16) (for threaded rods)
26. Washers 1/2" ID (16) (for threaded rods)

A phone call to any of the following suppliers will save a frustrating, time-consuming hunt for special parts. They all ship UPS and all accept credit cards.

Fluid Power Products (items 15 to 20), 1221 Georgetown Road, Lexington, KY 40511 606-231-8882.

Masters' Plumbing Supply (items 22 and 23), 1141 Industry Road, Lexington, KY 40505 800-388-7544.

General Rubber and Plastics (item 1), 3118 Preston Street, Louisville, KY 40213 502-635-2605.

Building the Press Carriage

The press body will be too heavy after it is built to lift onto the carriage, so the carriage should be built first. The press will then be assembled piece by piece right on the carriage. A single five-inch lag bolt up through each end rail of the carriage is all that will be needed to keep the press body in place.

Originally, the floor of the carriage was made extra strong to hold six concrete blocks for lowering the center of gravity. In the end the concrete blocks were unnecessary because of the weight of the carriage itself and its wide stance. Although the press is undeniably top heavy, it's more stable than it looks. The weight of the two-by-eights on the bottom of the carriage probably play a part in this.

The only way to get decent yellow pine two-by-fours for the carriage frame is by ripping two-by-eight planks down the middle. The best positions for the lag bolts are shown in the drawings. All other particulars of the carriage construction are also clearly seen and no further instruction for assembly should be needed. Keep in mind that the vertical dimensions were determined by the height of the designer (six-foot-one) and that you may need to adjust them to your own height.

Next month, I'll describe how to put the press body together.

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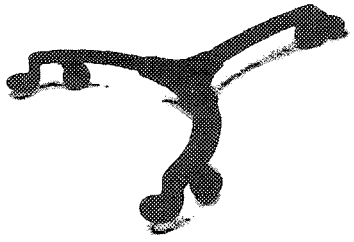

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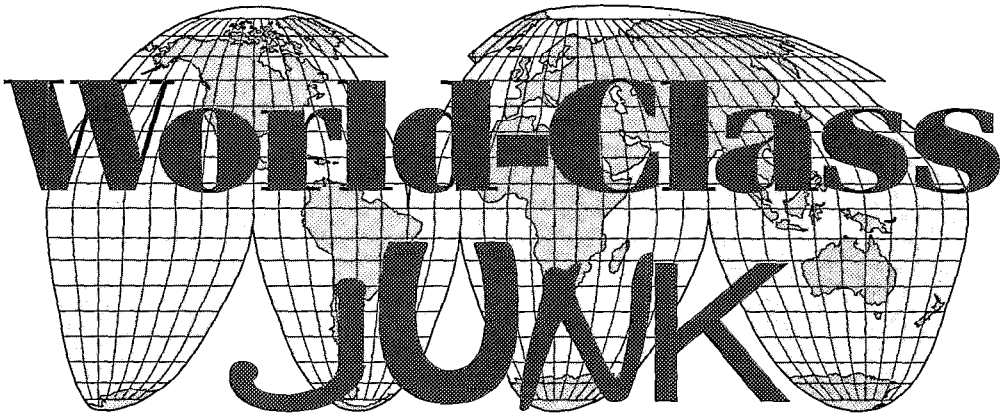


By Susan Kline, RPT
Eugene, Oregon Chapter

Bridge Confessions: Cobbles I Have Done on Pianos of No Commercial Value

The bridge is a crucial part of piano anatomy. It possesses the lower speaking-length termination, and down- and side-bearing, without which a clear strong tone is impossible. In grand pianos of character and financial value the bridge is worthy of study, and occasionally of awe. There are frequently photographs in the brochures of even the most highly mechanized factories showing craftsmen meticulously hand-notching the bridges with shining large chisels exceedingly sharp, which no doubt are marvels of craftsmanship themselves. Somehow my usual spinets and tired consoles with plastic parts have to carry on without benefit of work at this level.

In the world of true junk, minor bridge problems are almost invariably present, and almost invariably ignored. They *should* be ignored. In the really authentic "modest instruments" the gritty truth is that conventional bridge repairs simply cost too much. When tuning a Winter spinet, one does not check the downbearing in octave 5, or consider whether the tonal qualities of the high treble might be improved by inserting metal plugs into the bridge through the soundboard.

When bridges in poor pianos refuse to be ignored, it is because they are truly awful. They either are so split-out that pitch can't be stabilized or they have so little contact with the soundboard that tone is completely gutted. Yet the proper repair may well cost several times the value of the whole piano!

Confession Time: I Cobble Them.

I am going to describe several repairs I have done, effectively, which might well cause me to blush if the pianos I did them to had been worth more than $300. Please do not consider these confessions as a license to wreak such havoc on good-quality pianos. After I have all of this off my chest I will describe a bridge repair with epoxy that I consider an improvement over what I used to do, and worthy of fairly decent instruments, if not of the "upper crust."

Worst

The first example was a very poor grand, with many very split-out pins on the bass bridge. Many strings went straight across the bridge without even nodding sideways at the bridge pins. There was also no bearing, and possibly in some instances, negative bearing.

Although I explained to the owners that a bridge cap was needed, I was not keen to take it on, especially for a grand that had so little else to recommend it. Yet the tone and tunability of those unfettered strings had to be improved if the piano was to be even marginally usable. Strings with neither side- *nor* down-bearing can sound truly weird. The speaking segments are trying to be two lengths at once.

I was a lot younger than I am now. Instead of talking about epoxy and selling a repair, I fiddled with that bridge for an hour or two, tops. If a string sounded okay, even if it looked foul, it got left alone. If it sounded false as a $3 bill, I took slivers of popsicle stick and wedged them between the wire and the displaced bridge pins. Usually doing this to the front pin was enough, but for a few I did it to both. If the sliver fell out as I pulled up the string, I slacked it off again, and wedged a bigger one in. No glue at all.

Net result: tremendous tonal improvement! Durability: no idea. I luckily never saw the piano again. Cost: minimal.

A very few times since I have wedged wood between a poor bridge pin and a string, but never on this scale. It is not my repair of choice. I consider it a stopgap at best.

The Speedy Cure

I have fond memories of the next encounter. You may need some background to see why. This was a tuning for a very small, very poor church in an extremely rundown area of a California city. It was the kind of place where you make sure you come in daylight hours, because after dark gunshots may be heard. There were graffiti on the stucco outer walls of the tiny church. The minister who met me there was an elderly black man with a warm character and unstrained natural dignity. It would have taken a heart of stone not to want to do one's absolute best for such a person.

I had tuned for tiny churches in this city before.

Dreading what I might find, I felt relief upon seeing a normal-looking Hamilton upright of no great age. I'm sure it would be familiar to everyone reading this. Fumed oak. One-piece lid and music desk with the prop built in. I opened it and played a few notes, and my relief faded markedly.

I have no idea what had happened to it, but if it had spent a week standing in two feet of water it could hardly have suffered more damage. Every hammer bobbled. It was a semitone low in pitch. And ... (hereby hangs the tale) when playing downwards through the tenor into the bass section, one heard:

"bong bong bong bong thwick thwick thwick thwick thwick..."

The trick is to fix everything within a normal tuning fee, without going more than 1/2 hour over my usual time. (It is hard enough for such a place to come up with even a standard fee.) I nearly made it. I did have to leave it at the lower pitch, after learning that they never played it with other instruments.

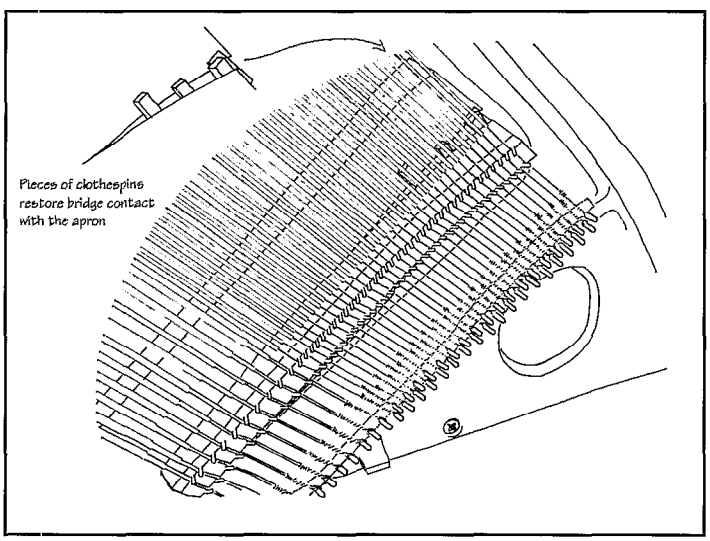
Quick removal of a fat cardboard punching from each front key pin fixed the bobbling hammers. Then, tuning: two good solid passes. Look at watch: 10 minutes to go, after which I would have started cheating myself. Ten minutes for a hopeless bridge....

I finally forced myself to remove the bottom panel and view the disaster. Sure enough, the bridge was a good 3/8" off the apron at the top end. The gap tapered down till the bridge re-contacted the apron about half way along its length. The tone gradually reappeared about there, too.

I used one of my favorite handy things, or rather, three of them: wedges made from spring-type clothespins. I carry clothespins because they make dandy clamps for split key buttons, and because removing the spring gives one two useful little hardwood wedges: I tapped them into the gap. The upper end was so wide I had to layer two of them, one from each side. I ended up with three new areas of contact for that bridge, each about two inches apart.

The minister was in the next room. It sounded like he was doing minor carpentry himself, maybe on a bookshelf. I played the same notes as before:

"bong bong bong bong BONG BONG BONG BONG



The Hamilton bass bridge with wedges.

BONG..."

I shouted, "Hah!" The minister appeared, worried. I showed him, I played the notes for him. We knelt and looked at my wedges as I dribbled Elmer's glue along them in hopes they would stay put. Smiles all around. I told him that if the tone got bad again someone should try tapping the wedges in further, but if they hit them too hard the whole bridge might come off, and then they'd have to call me back.

I lived there for another five years, and no call came. I imagine my clothespins are still wedged in there, and the piano is still playing away, rather out of tune by now, every Sunday. If I am off-base, and some tuner reading this recognizes this piano, and my repair failed, you may inform me. I can bite the bullet.

An Imitation of a Bridge Problem

There was a little Yamaha upright in a theater pit where people had a high old time fairly often. Tuning it, when I got to the treble I thought it had a bridge separation, because the tone dropped dead. The theater people had asked me to get it ready for a "real fussy pianist," and I would have to admit total defeat if I couldn't get the treble to play above *mezzo piano*. The bridge appeared perfect. I finally diagnosed Coca-Cola™ fouling the v-bar area. I borrowed a toothbrush (needed discarding after this), a bowl of water, and a towel, and got about three-fourths of the tone back by removing as much sticky residue as I could and then blotting dry. I wish I'd had a hair dryer with me for the end, though it would make me feel like I was working in a beauty salon.

Epoxy, Live Forever

A young couple had acquired a quite new spinet of a famous make I shall not name, for nothing, *zero* dollars. There was one problem: all the bass strings were off the bass bridge, tied in a bundle, and the bass bridge itself was completely split — end to end. A number of the bridge pins were lying on the bottom board.

A number of factors had combined to render this bridge useless. First, it was a very narrow bridge, extremely narrow — excessively narrow. Second, whoever had bored the holes for the bridge pins (possibly for less than a living wage) had angled the bottom row towards the edge of the bridge instead of towards its interior, so there was hardly any wood supporting them. Third, side-bearing was not only very, very erratic, but it was wildly excessive. The string tension levered the lower row of pins right out.

I tested the rest of the piano, just in case there was some other fatal problem, and found that every note gave me a minor second. I started blithering to the worried couple about bad pinblocks, before I came to my senses and started reasoning out the sequence of events.

1. Sanguine tuner fated for a bad experience arrives at (a different) house and finds spinet 1/2 tone low.
2. Tuner inserts muting strip and does temperament. So far, so good, as the man falling off a building said when passing the second story.
3. Tuner attempts to tune the upper bass. Impossible.

Continued on Next Page

World-Class Junk

Continued from Previous Page

No stability, weird tone.

4. Tuner discovers wretched, hopeless, narrow, failing bass bridge. Just what attempt was made at a diagnosis and estimate I have no way of knowing.
5. Tuner slacks off bass strings, threads the loops with dental floss to keep them in order (hey, it worked!), and ties them to the beam supporting the action with his muting strip. He has not tuned the treble unisons yet, hence my alarming minor seconds.
6. For some reason (owners balked at the estimate? tuner lost his stomach for the job?) tuner exits the scene, and piano is relegated for a short period to a garage.
7. At his next job, tuner discovers he no longer has his muting strip....
8. A young couple with a small child and unquenchable optimism adopt the "worthless" piano and call me. He wants to do arrangements of songs. Later I heard him play them. They were very good, and he played them well.

The Cure

Epoxy works wonders, but a split that large and long needs support and clamping while the epoxy does its work. I had a slat of chestnut wood, left over from another project, roughly the right length and width. It was about 1/4" thick. Set all the way down to the soundboard, the top came just below the bevel at the top of the bridge. My plan was to remove all the bridge pins in the lower row (the upper row was intact), wrap the slat in plastic, slather slow-set epoxy copiously all around the area, and clamp the slat to support the area and close the crack.

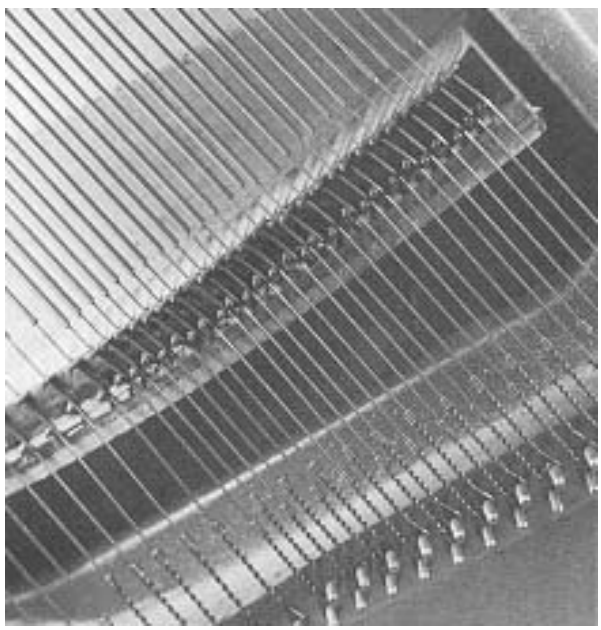
I brought all my gear, tilted the piano, and then had second thoughts. The bridge was already too narrow ... I decided not to wrap the slat in plastic, but to leave it permanently glued to the bottom of the bass bridge. That was accomplished easily enough, though I later had to take a hacksaw and remove a bit of wood from the end of it, which was in contact with the plate. There was just enough clearance between the slat and the plate everywhere else.

A week later I came back and removed the clamps. I then figured that a more wholesome side-bearing was in order. I took a piece of monofilament fish line, tied a loop in one end, and stretched it from each hitch pin to the front bridge pin for that note, marking a line with pencil where it passed the bottom row. *Somewhere* along that line, wherever I could find solid, wholesome wood, I punched a mark for drilling a new bridge pin hole. None of them were on the old row of holes. Most were far into the bridge, staggering with each other so as not to start a new split.

When I drilled them, I angled them toward instead of away from the middle of the bridge, and leaned them a fairly normal amount. I then applied DAG (graphite solution), and inserted new, larger bridge pins with a little CA glue to encourage them. I also dripped thin CA glue at the bass of the bridge pins in the front row.

Replacing the bass strings was interesting. The hapless tuner had twisted several of them around each other in taking them off. He had also slacked them off too much, so the coils were a mess, and I had to straighten them.

I then un-tilted the piano, and tuned it. The tone in the bass was far better than I expected! In fact, it was above average for a spinet. This is a repair that I would do again the same way, though it looked pretty awful, with the pins all over the place (see photo).



The repaired bridge.

Epoxy for Bridge Pins: A New Variation

In school, we were taught to fix bridge pin cracks by removing the pin, putting epoxy in the hole, replacing the pin, and cleaning up the glue that squeezed out. Then the pins needed filing flat again.

This was a fairly disgusting operation. The epoxy would squeeze out all over the place, just where one wanted a clean string termination. It was hard to clean up since the rag would shred and leave fibers behind. One could also shred one's fingers quite easily, especially when refiling the tops of the pins.

Bill Spurlock improved matters by suggesting in a *Journal* article using acetone on a small brush to clean up the excess. The rest of the drawbacks remained, however.

At a meeting of our chapter, Joe Garrett, RPT, showed us a much improved process for inserting epoxy into the cracks, which makes the acetone unnecessary and has many other benefits. In his system the bridge pins are left in place, which is a great time-saver. Also, one doesn't have to refile the tops of the pins this way.

Heat Makes the Difference*

Joe takes a large soldering iron and puts it on top of the bridge pin, as he holds a very small glob of glue near the crack at the bottom of the pin. The heat is conducted down the pin, heats the epoxy and makes it thin, whereupon capillary action sucks it right into the crack. Zip! There it goes, right where you want it! The very small residue remaining on the surface he cleans with a brass brush. It goes very quickly.

Now, here are some important things to be aware of before you try this repair. First, an upright piano must be tilted, so the bridge is horizontal. It may also be worth the time to remove the bottom board to get

better access to the bridge area. If you do, it is a good idea to stick the screws in a piece of cardboard (you can make holes with an awl) to keep them in order.

Second, but very important, all soldering irons are not created equal. Joe considers using a large soldering iron to be the approved method of doing this repair. He considers that the large mass gives consistent heat, which leads to more dependable results. The small pen-style soldering irons, with only 40 watts or so, just aren't strong enough to get good results.

At this point I must admit that I have three times used a soldering gun, with excellent results. We just had quite a discussion about this, and several facts emerged: my gun had a good total wattage. It had two settings, 100 watts and 140 watts. In fact, as I worked the tip tended to get red hot, and I would use it without pulling the trigger till it cooled a little. Joe said that using it with a red-hot tip was very dangerous, and that it could short out. Certainly controlling the heat with the gun took a greater effort than with the iron, though the gun had other benefits. You could set it down on the plate, and the tip would be safely away from anything. It is turned off unless you push the trigger, and it is comfortable in the hand. Possibly a good rheostat and some careful experimentation might help one control the heat better.

The heat is critical. If the epoxy doesn't get warm enough, it will not fully penetrate the crack. Joe says if it gets too hot it is damaged and won't hold properly. What I did was watch the blob of glue like a hawk, and as soon as it melted and sank down into the crack I would remove the heat immediately. I was more concerned with charring the wood around the bridge pin than with damaging the glue, but if one removes the soldering iron or gun as soon as the glue is liquid I doubt that the wood could be damaged. Certainly there was no smoke or smell of burning wood. If I used too much heat, the epoxy started to bubble, so I quickly learned to stop sooner than that.

Also, I have tried this repair with both slow-set and five-minute epoxy. Both worked, but the slow-set is much better. Once again, it is more consistent. The five-minute epoxy is setting up as you work, so it is always a changing viscosity. Also, you have to keep making new batches of it. In the future, I will always use the slow-set.

Lastly, it is a very good idea to let the whole bridge set up overnight before putting the strings back on it. The epoxy should have some time to cure properly before being exposed to any strain.

I have used this repair on several pianos, one of which was a true basket case, with large splits and hundreds of cracks. The results have been excellent. This repair might even qualify for medium-good pianos instead of true junkers. I will leave the question of whether to use it on the slender, long, expensive beauties to those better qualified to work on them. Still, my inner voice would say, "the 6-foot, 50-year-old modest American brand: yes. The 9-foot German Steinway: no thanks."

*[**Editor's Note:** *This technique was first described by Darrell Fandrich, RPT, in the November, 1977 issue of* PTJ. — **SB**]

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Three vs. Four

By Yat-Lam Hong
Western Michigan Chapter

From time to time customers would call me with the question: "We just moved our piano from one side of the room to the other. Does it need to be tuned?" My usual answer is: "Yes, if your piano is a vertical. No, if it's a grand."

This typically brings forth another question: "Why would a vertical piano need to be tuned after a move across the room, but not a grand?" It's because a grand has three points of support (in the form of legs or casters) while a vertical has four (usually four casters or two legs and two casters). But why so? To get to the bottom of it (pardon the pun), the answer has more to do with the floor than with the piano.

We know all buildings settle, and it's safe to say there is probably not a single floor anywhere that's *absolutely* level. (If there is, it won't remain that way for long before nature takes over). With only three points of support, a grand would *tilt* with the floor, and its three legs (or casters), which carry the full weight of the instrument, would still be in full contact with the floor. In other words, the piano would always lean in the direction the floor leans.

With a vertical piano, it's a different story. Because the floor is never perfectly level, moving the piano changes the internal stress within the instrument, twisting the soundboard, bridges, plate, and case to a different position from the one when the piano was last tuned, thus throwing it out of tune. It's this twisting that necessitates a new tuning. Have you noticed that sometimes the front treble caster of a vertical piano, which carries the least amount of weight of the four, doesn't even touch the floor, and just dangles in midair (and occasionally buzzes with certain notes)?

Many everyday items, which require stability, are made with only three legs. The grand piano is the first thing that comes to mind. The music stand and camera tripod are other familiar examples. That's because three points of support constitute the minimum number needed to hold up an object. One or two can't do the job. Now, suppose your camera tripod has four legs. You'll have nothing but trouble: There'll always be one leg either not touching the floor, or just barely touching, which destroys the desired stability.

One can easily understand how an uneven floor could create internal stress within a heavy item, such as the vertical piano, by trying this experiment. Place a four-legged chair on a hardwood or tile floor and start rocking it gently to feel for any movement while you slowly rotate the chair. You'll eventually find the position where the rocking stops. This means that whatever unevenness in the chair legs just happens to match exactly the unevenness in the floor at that point.

Continue rotating the chair clockwise, and it'll begin to rock again. But as soon as you sit on it, the rocking stops. Does that mean, with your weight on the chair, its four legs have now found another spot perfectly even with the floor? Certainly not. It simply means that your weight has *forced* all four legs onto the floor simultaneously. Now, there's internal stress within the chair. And if you stand up, the rocking would immediately return as the chair finds its natural equilibrium. Rotate the chair counterclockwise past the no-rock position, it'll also begin rocking. Sit on it, and the rocking again goes away. But this time a *different* set of internal stresses are forced into the structure. To the unwary, the chair always seems to be in "solid" contact with the floor as long as the weight is on it, but that's deceptive.

I'm reminded of a true story an old-time factory technician told me. A voicer once asked a young tuner to tune a particular piano before he did the final voicing, and the tuner did as he was told. When the voicer checked the piano, he found it horrendously out of tune, and wanted to know which way the piano was facing during the tuning. As it turned out, the piano had been turned around in the walkway to allow some bulky equipment to get through. As soon as the piano was turned to its original position, it was back in tune immediately. The culprit? The uneven floor. That piano was, of course, a vertical. Had it been a grand, this problem would not have happened, regardless of which direction it was facing — before or after the tuning.

There is a lesson here for all of us: Whenever possible, tune every vertical piano exactly where it is. If you move it away from the wall to tune, and then push it back to where it was afterwards, your tuning will have changed. The change may not be drastic enough to bother the customer, but you won't leave behind your best work. If you must move it an inch or two away from the wall to allow the top to open without damaging the wall or the piano, ask the customer to consider leaving it in that position permanently, and explain why. Rather than a waste of space, that tiny gap is a sound investment that pays stable dividends.

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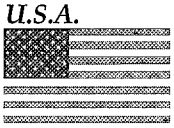

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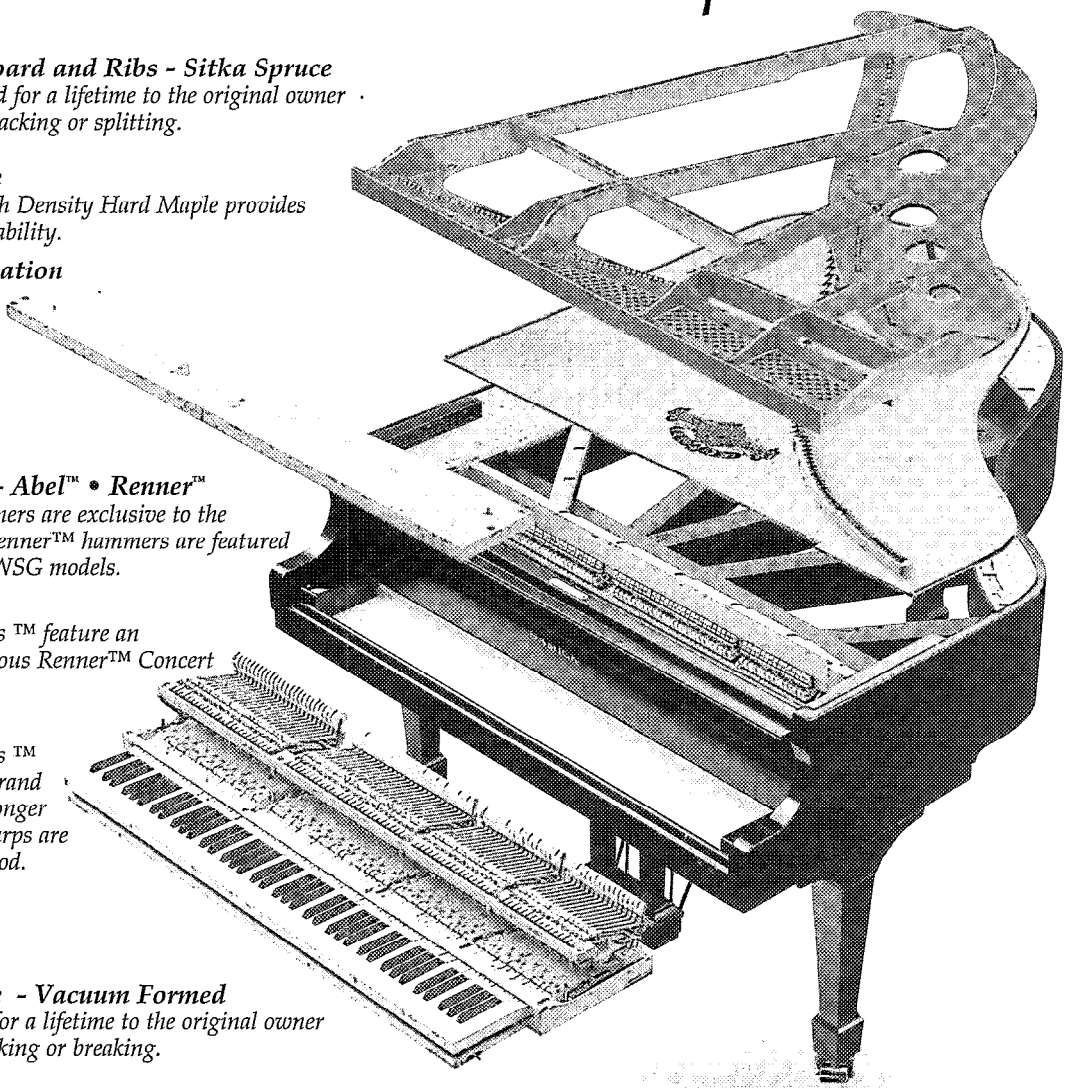

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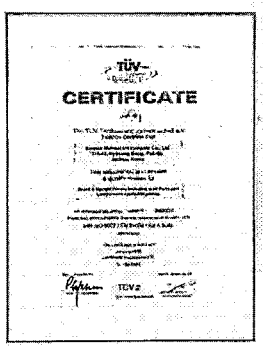

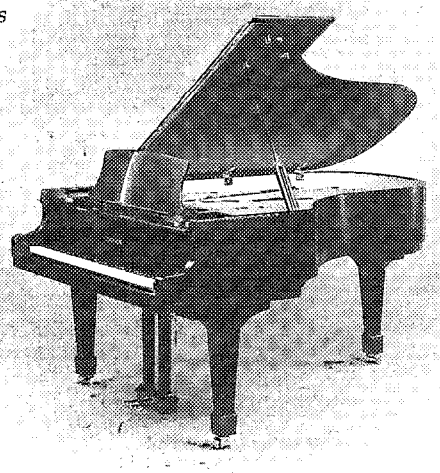

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An Essay on the History of Tuning

By Skip Becker, RPT
Northeast Florida Chapter

Part VIII — Classical Times

From Arthur Loesser's Men, Women, and Pianos: a Social History —

Science, or "natural philosophy," as it was called, became a growing preoccupation of the later-eighteenth-century minds. Europeans, and especially the English, were deriving a profound satisfaction from their increasing grasp of the processes of nature, especially the simpler ones of physics: a palpable proof of that grasp was the constructing of successfully working machines. Englishmen enjoyed machines; they enjoyed making wood, metal, and water move in neat ingenious ways — just to show that it could be done and that they could do it. Mechanisms became self-justifying works of art; it is invidious to call them toys.

There was James Cox, clever jeweler and watchmaker. He had hoped to sell his precious contrivances to Indian rajahs; but failing in this, he arranged his entire collection — valued at nearly £200,000 — in a museum of its own at Vauxhall. There thousands of people paid 10s 6d — the price of a good seat at the opera — to gaze on a jeweled bull rolling his eyes, or a mechanical pineapple that opened to reveal a nest of mechanical singing birds.

The Merlin

When John Joseph Merlin (1735-1803) came to London in 1760, the Cox collection at Vauxhall must have been the first place he visited. Merlin was, in his own right, an extraordinarily inventive fellow. History remembers him best for his roller-skates (actually the grandfather of in-line skates), and his Bath (invalid) chair. Both are in common use today. Merlin was born in Flanders, moved to Paris when he was 19, and came to London in the entourage of the Spanish Ambassador, at age 25.[1] Quite naturally, Merlin and Cox "hit it off" and formed an association. Merlin supplied some remarkable contrivances for their partnership, and the marketing as well (a fledgling concept in the 1760s). Anticipating the antics of Madison Avenue by a couple of centuries, he advertised their wares with his "spectacular behavior and queer use of the English language." Regrettably, the joint venture was short lived. Vauxhall and its "Gardens" were a favorite haunt of the royal family. Cox became concerned that Merlin's latest invention, the "ballet on wheels," was challenging decorum; and scuffing the highly polished floors.

Furthermore, such jollifications were distracting attention from his own "woggle-necked" silver geese. The undauntable Merlin soon opened his own workshop on Princes Street, where he built and sold his "startling little machines." London's "smart set" delighted to visit Merlin's "cave" (as they called it), and purchase one or another of his remarkable devices; such as a wood-turning engine, a mechanical tea service that poured 12 cups at once, or a self-flicking buggy whip.

It was natural that this mechanical wizard would turn his attention to musical instruments. Much of his inventiveness went into the improvement of harpsichords, but he deserves a more prominent place in our histories as a pianoforte pioneer. Through the 1770s, harpsichords were still the primary keyboard in production; but the fledgling piano was attracting attention.

Beginning in the early 1760s, a wave of German immigrant instrument makers moved to London and opened shops. Several had worked for Silbermann back in Germany.[2] The most successful was Zumpe, who churned out great quantities of relatively inexpensive small square pianos.[3] Merlin's harpsichords attempted to match the expression available in the new piano with ingenious and elaborate pedal assemblies and stops. Pedals might raise the lid or open baffles, add ranks of strings, enable drones, or even add piano hammers (if you can't lick 'em, join 'em). Often a pedal would have one function when played alone, and another when played in combination with other pedals. Merlin even equipped a harpsichord with the earliest known recording device.[4]

In 1774, Merlin patented a combination harpsichord/piano keyboard, anticipating the much more famous Stodart patent by four years. Merlin claimed this piano action could be applied to any of the commonly made harpsichords.

Merlin's pianos were equally ingenious. He both improved the common hammer mechanism, and invented a "downward striking" grand action years before any other builder. His quadro-chord stringing anticipated Graf by 40 years. His damper mechanism was based on the mop stick principle: "so cleverly devised that it can be removed in one unit, and put back in a matter of seconds, merely by undoing a couple of metal butterfly catches. This makes for easy repair and adjustment."[5] (What happened to this idea?) In 1777, when the daughters of musical historian Charles Burney complained that their piano was too small for duets (hooped skirts were the fashion), Burney made the pilgrimage to Merlin's cave. His appeal to the roller-skating wizard resulted in the first six-octave keyboard, the most massive piano of its time. Merlin also combined the piano and organ, into the "Claviorganum."[6]

Merlin was also a tuner. The tuners with the best reputations had all "made their bones" as instrument makers, a prerequisite that Merlin satisfied in spades. He serviced the instruments of London's "smart set," the most prestigious clientele in England. Mrs. Thrale, an important socialite, had little ear for music, but by 1780 was fashionably in the possession of several new pianos. She even employed Charles Burney, by then a famous Oxonian Doctor, to give piano lessons to her daughter, Queeny. In January, 1781, she wrote Burney's daughter that she had Merlin come to tune the instruments: "He told Mrs. Davenant (a cousin, also of the smart set) and me that he had thoughts of inventing a particular mill to grind old ladies young, as he was so prodigiously fond of their company. I suppose that he thought we should bring him grist.... Was that the way to put people in tune?"

The condescending attitude of Mrs. Thrale was common among England's upper class. Merlin was never invited to stay for dinner. Those with aristocratic pretensions lumped tuners with other musicians under the category of "fiddlers," and held them beneath contempt. Even Merlin

couldn't escape this paradoxical English stigma. "Merlin was on good terms with certain literary and artistic people, such as the Burneys, who enjoyed, admired, and liked him while finding him personally rather ridiculous" (Loesser). Merlin's closest friend and companion remained the Spanish Ambassador.

William Frederick Herschel

Sir William Frederick Herschel (1738-1822, knighted 1818) was that *rara avis* of musicians, one who made good in British Society — but not as a musician. He is best known today as an astronomer. Herschel was the first to introduce the radical concept that conditions in the heavens changed with time. His systematic observations founded the science of sidereal astronomy. Herschel was born in Germany, where his father was an army musician. In those times vocation was hereditary. The boy played in the band of the Hanoverian Guards. After the French occupation of Hanover in 1757, he escaped to England. At first he earned a living by copying music, but steadily improved his position by becoming a music teacher, performer, and composer. In 1766, he was appointed organist of the fashionable chapel in Bath, the well-known spa. Intellectually curious, he studied music theory in Robert Smith's *Harmonics*. From this book he turned to Smith's *A Complete System of Optics*, which "introduced him to the techniques of telescope construction and whetted his appetite for viewing the night sky" (Britannica).

In 1781, using a telescope of his own design, he discovered Uranus. This caused a world-wide sensation, including the honor of being noticed by the Royal Society. Admission as a Fellow proved problematic — Herschel was a working musician. For the aristocrats in the Royal Society, extending an invitation to the amateur astronomer who had discovered the first planet since ancient times was one thing — a "fiddler" in their midst was quite another. This "accident of birth" was redressed by an annual pension from King George III, so that Herschel could devote full time to astronomy. The affable Herschel, with his exciting discoveries, proved to be George's favorite investment. The £200 pension was soon increased to £500 per year (a princely salary). The "smart set," royal family included, loved to visit Herschel's observatory. When they complained about the rigors of late night visits to the countryside (Burney had actually been robbed returning home), King George had Herschel moved to Slough, an easy trip from Windsor. It was at Slough that Herschel constructed his great telescope, the technological wonder of the age. The new observatory at Slough was simply the place to be. "The most privileged visitors were allowed to walk through the giant tube of Herschel's telescope before it was raised to the sky. King George III took great pleasure in showing the 'way to Heaven' to the Archbishop of Canterbury" (Lebrecht).

Herschel and Charles Burney formed a close friendship. Burney's great History of Music had brought him many accolades, and he shared with Herschel that special status of a "fiddler" who made good.[7] Also, their respective areas of expertise complimented each other. Herschel knew as little about the ancient music of Pythagoras as Burney did about sidereal astronomy. Burney encouraged Herschel to pursue his music along the only avenue permitted to those who ran with England's socially elite. Herschel became a concert promoter. "Such was his ardor for discovery, that in some benefit concert which he gave, he had his telescope fixed in the window, and was making his observations between the acts" (Lebrecht).

Imperial Tuners

As noted above, the best tuners of classical times all had made reputations as builders. When Robert Smith wanted to hear one or another of his experimental temperaments, he went to the shop of Jacob Kirckman, often accompanied by a young John Robison. Thomas Young, the redoubtable temperament mechanic, frequently visited the Broadwood factory. The skills of a builder were necessary, as tuners were expected to keep instruments in a good state of repair. The very best could aspire to that most prestigious position of "Tuner to the Court." The chances of such an appointment were slim, but they were geometrically improved if the tuner could also play.

"'Tuner to the Court' assured access to the highest levels of society. Heilman made more money tuning than he ever could building."

Cristofori, the very first piano tuner and Court-appointed Curator of Instruments, is best remembered today as an inventor and instrument maker. In his times, he was most often referred to as "the Medici harpsichord player."

Another tuner to the Court was Matthaus Heilman. He began building instruments in Mainz, Germany, in the early 1770s. C.F. Colt, author of *The Early Piano*, regards his 1775 Heilman grand as one of the finest in his extensive collection. This instrument has been used for several modern recordings, and, according to Colt, to hear the music of Bach and Mozart on this Heilman is a revelation. In 1788, Heilman was appointed tuner to the Court at Mainz, with an annual salary of 100 florins. Perhaps it was an offer he could not refuse. This rather meager salary implies that the position was not full time. Nevertheless, Heilman turned over the manufacturing business to his son, Joseph (who also attained an excellent reputation as a builder), so he could take advantage of this opportunity.

"Tuner to the Court" assured access to the highest levels of society. Heilman made more money tuning than he ever could building. Some newly-discovered correspondence between Heilman and a local dignitary reveals the rivalry and professional jealousy that existed between the early piano makers. In reply to an earnest inquiry, Heilman manages splendidly to put his rival Andreas Stein (Mozart had swooned at Stein's pianos), in his place. "You want to buy from me a piano-forte like Stein's, whose pianos I know only too well as I have already earned much money by repairing them. I should be sorry if my instruments needed such frequent repair."

The Cutting Edge

It is fairly easy to discover what a particular theorist

Continued on Next Page

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thought about temperament, especially if they were fellows of the Royal Society, and contributors to magazines and encyclopedias.[8] By way of contrast, it's difficult to discover what specific techniques were used by the working tuners of classical times. European society was constructed in such a way that, say, a fellow of a royal society would rarely have to speak to someone who worked for a living (indeed, based on their often divergent nomenclature for describing the same phenomenon, it appears they rarely spoke to their fellows). Probably the best way to discover what working tuners were doing is to look at what theorists were writing about 50 or 100 years later. It takes a while for the practical techniques evolved by tuners to get noticed by theorists and academicians.

Of course, the musicians of classical times had entirely different expectations from a tuning than do musicians at the turn of the 21st century. The demand then was for Well Temperament. The best classical tuners were artists, who used sophisticated techniques which rival our own. They were, for example, the first to use tuning forks (invented by Handel's trumpeter John Shore in 1752). Because their job description was different, classical tuners had different aural skills than we currently cultivate. We have already noted their ability to recognize key signatures by the size of intervals. If they didn't count beats (do we?), they did compare beat rates of both major and minor 3rds in the bearing section. In addition, they were capable of producing subtle shades of major, minor, and diminished chord coloration.

They used a different bearing plan than Holder's (the classical standard), one which incorporated tempering three contiguous 3rds directly. This ingenious innovation, already in use by professional tuners for decades, was finally sanctioned in print by Thomas Young (who spent much time talking to tuners), in 1799. By tuning the 3rds directly, they didn't have to temper four notes before checking the C-E 3rd. They knew that an octave could not be constructed of three contiguous pure 3rds, so they confronted the lesser diesis head-on. Middle C-E was tempered to personal taste (this elite set of tuners knew enough about temperament mechanics to avoid the problems involved with beginning with an absolutely just major 3rd). After then dropping to E an octave lower, the beat rate of the ascending 3rds (E-G# and Ab-C) were compared and equalized. This technique was common among professionals. To theorists of the 19th century, it became known as the "bi-equal 3rd." It was possible to quite accurately divide these intervals by comparing beat rates. If the initial 3rd were pure, or beatless, the "bi-equal" 3rds would beat around 11 bps.[9] If the initial C-E were set at 4 bps (the upper limits of good taste), the resulting bi-equal 3rds were 9.5 bps.

Something strange happens if the initial 3rd is set at 8 bps. It is possible to construct the E3-E4 octave with tri-equal 3rds! But, for all this would have seemed like ET, this was never done: the traditional key of C-based tonality center becomes distorted, and the character of the keys is lost.

"... he seized a kettle-drum, which he threw with such violence at the leader of the band, that he lost his full-bottomed wig in the effort."

The bi-equal 3rds technique decidedly favors the key of Ab. In the above case of the pure 3rd, the resultant E-G# 3rd is widened almost 23 cents. This is at the Pythagorean limit, and the boundary of good taste for the times. In contrast, Ab-C was expanded only 18 cents (4 cents larger than ET). One of the few things practical tuners had wrong (that 18th-century theorists had right) was the belief that equal-beating intervals were equally tempered.[10] The great musicians were aware of this defect. One of Mozart's students recorded his opinion: "G# is a note which all instruments have, but the harpsichord has not." In 1784, Cramer's *Magazin der Musik* reported that Clementi used a tuning in which C-E was tempered "beating, slightly high," E-G# was "very high," and Ab-C was "even higher."

George Frederick Handel

George Frederick Handel (1685-1759) was born in Germany. In 1706, the young musician tried his luck in Italy, where he struggled amid the masses of musicians trying to make a name, or at least earn a living. In 1710, he visited England; he liked it so much that he soon returned. The English were in the middle of a 200-year native composer drought, and Handel preferred his chances in London. After 1712, he remained there permanently (naturalized citizen in 1726). During his life, he became the most popular composer in England. His death did little to diminish his fame. According to Burney, the final decades of the 18th Century saw a "Handel-o-mania" sweep the entire European Continent. The English revered him as their own, although he never lost his thick German accent. The Germans "discovered" him (Handel had been relatively unknown outside England), and were ecstatic to find in his music the great "German Virtues." His religious oratorios permeated Italy; and the Italians smiled wryly, knowing that Handel's career had begun in failure there. The French also loved Handel, perhaps because he wasn't French.[11]

Handel was a true baroque musician, who found inspiration in the old speculative notions of Universal Harmony. Paradoxically, such ideas had no place at the approach of the 19th century. Natural Philosophy was challenging the very existence of anything unscientific, including the traditional notions of deity. But the new sciences raised more questions than they gave answers. It is ironic that the Age of Reason should have produced so much doubt. For the troubled people of these times, Handel's music offered a glimpse of Heaven.

Handel also offered help to troubled tuners. Around 1780, the *Twelve Votaries and Fugues for the Organ or Harpsichord with Rules for Tuning by the Celebrated Mr. Handel, Book IV* were published in London by Longman and Broderip (two decades after Handel's death).[12] The title is most intriguing. Longman and Broderip imply that the votaries and fugues were written by Handel, but a strict interpretation of the title promises only his tuning rules. The rules are found on page 1 of the 37 page manuscript. Ordinarily, such instructions were appended at the back of music collections. This primacy is an indication of how

Concluded on the Following Page

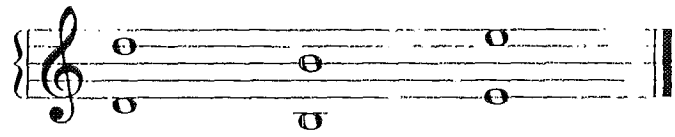
1st Chord

"In this Chord tune the Fifth pretty flat and the Third considerably to sharp, NB. the Fifth will not bear to be redused so much below it's true accord, as the Third will be raised above it."

2nd Chord

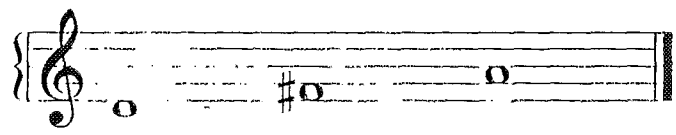
"Let the Fifth be nearer perfect than the last tho' not quite, tune the Third a Fifth to E, make it good but just bearing flat."

Octaves



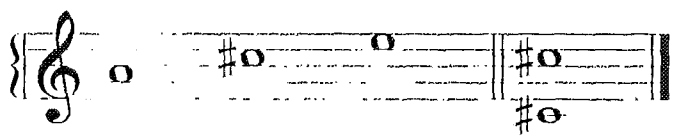
"Tune all Octaves perfect."

3rd Chord



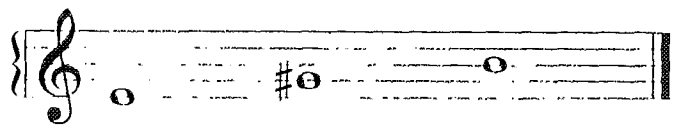
"Tune A, a good fifth to D, trying it at the same time with E, above already tune, Tune the Third a fifth to B, and let it be nearas flat as the fifth in the 1st Chord, this will in some measure bring down the sharpness on the Third."

4th Chord



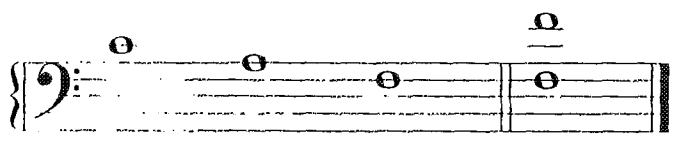
"Tune the Third a fifth to F, sharp already tuned, let it's bearing be the same as the Third in the last Chord."

5th Chord



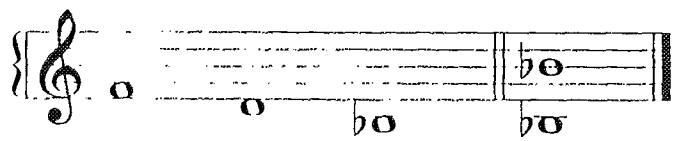
"Tune the Third very fine rather bearing sharp, for in fact all Thirds must be tuned sharp more or less, as all fifths should be flat."

6th Chord



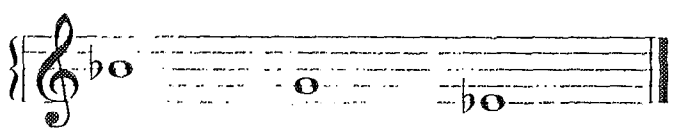
"Tune the A, an Octave to A, above, when you have drawn the F, to a perfect fifth with C, give it a little inclination higher, that being the same as if you had tuned your C, a fifth to F, giving the C, a little flatness."

7th Chord



"Tune the fifth as in the 6th Chord."

8th Chord



"Tune the fifth as in the last Chord."

"Tune all the rest by Octaves,"

Handel's Tuning Rules. — *Reprinted with permission from* Tuning, *by Owen H. Jorgensen, Michigan State University Press, East Lansing, 1991.*

An Essay on the History of Tuning

Continued from Previous Page

valuable Longman and Broderip thought the rules to be. No doubt, Longman and Broderip were attempting to cash in on the good name of "the celebrated Mr. Handel" (that much is accurate — Handel was celebrated). Some music scholars doubt that the music could have been written by Handel. The style is too advanced, and properly belongs in the late 1770s or early '80s. The rules for tuning were equally advanced for a baroque musician. We read for the first time that "the 5th will not bear to be reduced so much below its true accord, as the 3rd will to be raised above it." This violated the baroque philosophy of tuning. Even granting this, if Handel did author the rules, his tuning procedure was far ahead of his time. The intended result was closer to equal temperament than any other from the 18th century.[13]

Handel's rules were the last, best hope for amateur tuners. They are easy to use. There are none of those vexing "checks" found in other "established temperament" instructions of classical times. Consequently, there was no troublesome retuning necessary. For example, in Handel, the C-E 3rd is tempered directly. In Rousseau's typical-of-the-times instructions (see Chapter 7 of this essay), there is the necessity of tempering four 5ths before this most important interval can be determined. With Handel, the 5th C#-Ab was "left to fend for itself." In great contrast, the truth of that 5th was the final check of the "established" procedures; and we can sympathize with amateur tuners who were required to "iron out" any harmonic wrinkles inadvertently introduced along the way.

There are several reasons to believe that Handel did author the tuning rules. They are the work of a master. Whoever wrote the rules had a better understanding of harmonic balance than anyone else living before 1780.[14] They also have Handel's old-school flavor. They are, in fact, a window into melodic tuning procedure developed during the Renaissance. The temperament (F3-E5) is constructed by tuning the eight "popular" chords, in the old aural style, with the sharp keys ascending and flat keys descending. They are even written in arpeggiated (melodic) form. What makes this ancient procedure uniquely Handel's is that the intended result was Well Temperament, not meantone. A study of the rules in detail reveals that they "appear to allow for the utmost freedom in using aesthetic judgments when tempering the notes. However, the abstract appearing instructions in fact allow no freedom at all."[15] Following the rules accurately required ears capable of tempering in increments as small as 1/25 ditonic comma (.9 cents). The rules represent the state of the art for melodic tuning in the late 18th century. Amateurs, who could accept harmonic waste, found these instructions very easy to follow. Professionals would have found them as difficult to implement as those for Equal Temperament.

We shall conclude this portion of our essay with another musical anecdote from Norman Lebrecht. It does shed light on Handel — and his feelings about tuning. It may even be a proof as to whether or not Handel was the author of his rules; but regrettably, this author cannot decide for which side it is proof. Enjoy!

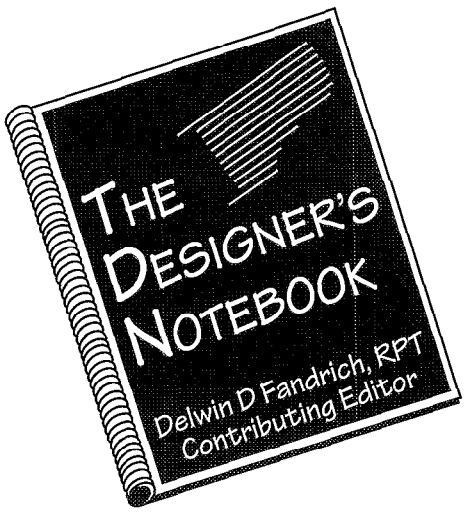
"Handel, as is well known, had such a remarkable irritability of nerves, that he could not bear to hear the tuning of instruments, and, therefore, this was always done before he arrived at the theater. A musical wag, determined to extract some mirth from this irascibility of temper, stole into the orchestra, one night when the Prince of Wales was to be present, and untuned all the instruments. As soon as the Prince arrived, Handel gave the signal to begin, *con spirito*; but such was the horrible discord, that the enraged musician started up from his seat, and, having overturned a double-bass which stood in his way, he seized a kettle-drum, which he threw with such violence at the leader of the band, that he lost his full-bottomed wig in the effort. Without waiting to replace it, he advanced bare-headed to the front of the orchestra, breathing vengeance, but so much choked with passion that utterance was denied him. In this ridiculous attitude he stood staring and stamping for some moments, amidst the general convulsion of laughter; nor could he be prevailed upon to resume his seat, until the Prince went in person, and with much difficulty appeased his wrath."

Notes

1. This author suggests that Merlin was not his given surname. "Merlin" is actually a title: the Merlin ("Myrdwyn" in the Old Tongue) was the head priest of the Druids. The name is too perfect to be an accident of birth.
2. These included the legendary "12 Apostles;" but contrary to the legend, they did not arrive arm-in-arm.
3. Zumpe has earned the title "father of the commercial piano." He soon became wealthy and retired early.
4. The recording device was a roll of parchment driven by clockworks, which could be laid above the jacks. The jacks were equipped with pencils, which when lifted by the keys, marked the rolling parchment. These marks could later be deciphered. The instrument is extant in the Deutsches Museum. It bears serial #80, but only this harpsichord of Merlin's has survived.
5. Quotation from C.F. Colt, *The Early Piano.*
6. The pipes are engraved with "R&W GRAY, 31st January 1784." It is possible that the Grays made only the pipes, but more likely that Merlin "jobbed out" the entire organ mechanism to them.
7. Burney began his musical career in Handel's band, playing summer concerts at Vauxhall Gardens.
8. These theorists represent a pretty narrow segment of musical thought (especially about tuning), but at least they got published.
9. All numbers were crunched by Paul Bailey, RPT.
10. Robert Smith, in his *Harmonics* of 1749 proved that the beat rate of intervals varied with pitch. Not all theorists read Smith, and few tuners agreed; some tuners fervently disagreed.
11. Many French musicians advocated abandoning the French musical style (based on harmony), in favor of the melodic Italian style.
12. The volume was reprinted throughout the 19th century, always with the rules for tuning.
13. It must be left to the reader to decide if that particular feature represents an achievement.
14. See Jorgensen's *Tuning: Etc.* Chapter 45.
15. *Ibid.*

Soundboard Damage — A Guide to Soundboard Cracks & Other Maladies — Part III

By Delwin D Fandrich, RPT
Contributing Editor



Soundboard Maladies In Depth

Introduction

This month we'll look at the actual breakdown of the soundboard panel. Of the various physical problems that are associated with compression-crowned soundboards, the three most common are cracks, compression ridges and loss of crown. Well, there's also a fourth if you want to include the various ribs that come loose as the animal-hide glue joints fail. These joints usually come apart first immediately adjacent to a panel joint and then work their way in.

Soundboard Cracks

And so, we're finally back where we started: with the dreaded soundboard crack. By now it should be apparent that the soundboard crack is merely the visible symptom of an otherwise possibly unseen structural breakdown. It's the crack that usually causes the panic, but it is not itself the actual problem. Many years ago, my shop contracted to rebuild a piano with a rather odd-looking soundboard. The individual boards making up the panel were about 100 mm wide and they were not edge-glued together. Instead there was a gap of about two to three mm between each board. Talk about your soundboard cracks! We did the usual checks for crown smugly certain that there would be none, but found, to our surprise and embarrassment, that there was plenty. Then I discovered that the ribs themselves were crowned and, even though the original string set still had good deflection across the bridges, an adequate amount of that crown had held nicely for some decades. I also found that the crown was fairly uniform — the board exhibited little of the rock and roll irregularities commonly found in a compression-crowned soundboard. After restringing, and with its nice new hammers, I remember being very impressed with the way the piano sounded. I could hear no tonal abnormalities that I could attribute to the unique soundboard design. (Okay, so this was twenty-odd years ago and I don't know what I'd think of the piano's performance today. Tone memory fades and our tone expectations and references change as we gain experience. My impression at the time, though, was that in spite of those gaps — now I would have to at least consider that it was possibly because of them — this soundboard was working quite well. There were no other "cracks" in this soundboard, by the way.)

> "How long it takes for this loss of springiness to become enough of a factor to affect the tone quality of the piano is an uncertain variable. It could be a period of time as short as a year or two or as long as a hundred years or more."

In the more normal sense, of course, a crack in a piano soundboard is just what the word implies: a complete separation of wood fiber resulting in a visible gap in the wood surface. Cracks develop in the earlywood layers and are found in that area of an individual board where the wood fiber is the weakest. For a variety of reasons, this is very often immediately adjacent to — but not actually on — a glue line.[1] In other words, most soundboard cracks are not the result of glue failure — that's another problem.

Cracks appear in areas where compression ridges have developed for reasons

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that will become self-evident in the following section. But why do cracks develop in areas where the wood seems to be otherwise completely undamaged? The culprit is accumulated compression set. As described in Part I, soundboard panels are made of "quarter-sawn" lumber. Unfortunately, wood is most susceptible to damage from compression stress in the plane perpendicular to grain. By design and intent, compression-crowned soundboards start out life with some significant level of compression stress perpendicular to grain built into them so some amount of compression set is taking place even before the strings go on the piano. As the piano is strung, some of the crown is forced out of the soundboard and compression stress increases. So does compression set. During periods of high humidity, the expanding wood fiber increases this compression still further. And the amount of compression set increases still more. So, from the very beginning of the soundboard's life, compression stress is causing the wood fibers to deform in an effort to relieve some of this stress. Since the wood fibers found in the earlywood layers are the least resistant to compression stress, they are the ones that deform the most.

There are few areas of the country with weather conditions such that the equilibrium moisture content of wood will get as low as 3.5 percent or 4.5 percent for any prolonged period of time. So, in theory, if we could discount the effect of compression set, there should always be at least some compression stress within a compression-crowned soundboard panel. Unfortunately, the reality of compression set makes this impossible. Once compression set has occurred, the wood fibers are permanently deformed from their original size and shape — they've been squeezed together more tightly. During dry periods, the wood fibers lose moisture and they begin to shrink and compression stress decreases. Unfortunately, because of compression set, the wood fibers have been altered and they are no longer able to expand to their original size so at some point they come under tension. Normal wood fibers already have very low tensile strength perpendicular to grain and they have even less after they have been deformed by compression set. Sooner or later, to relieve the tension stress on the shrinking wood fibers, those areas that have the weakest earlywood layers will develop open and visible separations — that is, *cracks* — during the dry seasons of the year. Unfortunately, though they may start out as hairline cracks that are barely visible during only the driest times of the year, compression set will continue to develop during each humid season and eventually those hairline cracks will become open and highly visible cracks throughout the year, except, perhaps, during the most humid times of the year.

Compression Ridges are areas in which the latewood grain line is standing a bit proud of the panel surface. They are also usually located in areas immediately adjacent to a glue line joining two boards.[2] They are typically found in areas of wide- rather than close-grained wood. And, they are most often found in areas where the wood grain is not exactly vertical, i.e., where it is at a slant. They are called *compression ridges* because they result from *compression* within the wood panel that is sufficient actually to crush the earlywood fiber and cause the hard latewood layer to tear away and shift proud of the panel surface forming a *ridge*, or *ridges*, along the surface of the panel. Compression ridges vary in width from just one or two grain lines to upwards of 20 or 30 mm in extreme cases. They can protrude as much as 2 to 3 mm above the surrounding surface of the board, but are usually somewhat less that that.

> "The appearance of the soundboard has absolutely nothing to do with its ability to function as a transducer. What does matter is its mass, which is not likely to change, and its elasticity, which is."

Earlywood fiber is a fairly resilient material — latewood fiber much less so[3] — but it is also a natural material. Its physical characteristics are not perfectly uniform throughout its section. For a variety of reasons the wood fibers in certain areas will be a bit softer and weaker than others. It will be in these weaker areas that compression damage will be found. To form visible damage, the compression stress in these areas will have to exceed the *fiber stress proportional limit* (fspl) for the earlywood fiber for some prolonged period of time.[4] The wood fiber will have to sustain damage beyond anything normally associated with compression set. Once damaged in this manner the earlywood fibers will have lost much, if not all, of their structural integrity and resilience and they are easily torn away from the adjacent latewood fiber. With the earlywood fibers no longer structurally sound, once the compressive forces are sufficient, the harder latewood fibers will shift up or down to escape the pressure. They usually go more upward since the ribs tend to keep them from pushing down too much.

If the grain angle is not perfectly vertical — and much of the time it is not[5] — the failure will be in the form of a shear stress fracture. In this type of fracture, the structural failure takes place in the earlywood layer. Individual boards with grain angles greater than about 20 degrees are particularly vulnerable. As the late wood layers are forced up they will slightly overlap each other forming a slightly washboard effect. The appearance of a compression ridge is a bit like a closely spaced row of dominos that has fallen down.

Once a compression ridge — however small — has developed to the visible stage, the wood fiber has already been damaged beyond recovery. It is already a "crack" just waiting to be seen, although any cracks that do show up are really redundant. The damage is in the crushed wood fiber.

Since both compression ridges and cracks are caused by the pressure built up in a constrained wood panel; and since that constraint comes from ribs glued cross-grain to the soundboard panel; and since the bridges — even if not glued cross-grain to the panel — further restrict the expansion and contraction of the soundboard panel, it should come as no surprise that both cracks and compression ridges can extend under a bridge glued to the top of the soundboard just as easily as they can extend over ribs glued to the bottom of the soundboard. Both defects are found

in wood fiber that has been damaged and then subjected to either tension or a shear stress that is great enough to pull the weakened wood fiber apart. Having the bridges glued to the board doesn't help at all — indeed, by further restricting the natural movement of the soundboard panel they may actually exacerbate the problem.

Loss of crown. It is a very common misconception that if there is no visible damage on the surface of the soundboard, then the soundboard must still be in perfect condition. Sadly, this is not necessarily so. The appearance of the soundboard has absolutely nothing to do with its ability to function as a transducer. What does matter is its mass, which is not likely to change, and its elasticity, which is. From the moment the soundboard panel is installed in the piano rim it begins to undergo some amount of compression set and its springiness begins to decrease. The loss of springiness is observed as a loss of crown.

How long it takes for this loss of springiness to become enough of a factor to affect the tone quality of the piano is an uncertain variable. It could be a period of time as short as a year or two or as long as a hundred years or more. Wood is a natural material with physical characteristics that are impossible to predict on a piece-by-piece basis. Engineering specifications for wood cannot be precisely applied to a specific piece of wood. They can only be averaged. Several aspects of piano assembly will affect soundboard springiness and crown. Was the moisture content a bit above or below average when the soundboard panel was ribbed? Was the soundboard assembly abnormally dry when it was assembled to the rim? Was bearing set on a dry day or a humid day?

Then, once the piano reaches its final home, a whole new set of variables starts to affect it. Is the climate hot and humid? Cool and dry? Is the room heated with radiators? Forced-air? Is it air-conditioned? Have Dampp-Chasers been installed?

Other Contributing Factors

There are several reasons why some of these problems may show up with more frequency today than they did in the past. (I must point out, however, that there is at least some evidence — albeit mostly anecdotal — indicating that most soundboard "defects" that are common today have been around since the development of the so-called "modern" piano.) One is a noticeable decrease in the quality of wood currently available. Most of the world's really old, and really large, spruce trees have already been harvested. Those trees that remain are not nearly as large as their ancestors, so the soundboard maker is forced to use wood coming from an earlier growth period of the tree. This wood is generally less flexible and resilient than wood from the outer portion of the tree, hence, it is more susceptible to the damage caused by excessive compression.

> "At this point someone usually raises their hand to challenge all of the above by relating a story about this beautiful seven foot grand that they service. Typically, it will have been built around 1922 and it will have about 27 cracks in the soundboard and it has great downbearing and ... well, it sounds better now than it ever did."

There have also been a number of changes in the way the wood is processed from the time it is cut. The logs are no longer "floated" to market on rivers and they are no longer stored in ponds until being sawn into lumber. There is less air-drying and more kiln-drying of the wood prior to milling. It is uncertain what specific effect these, and other processing changes, have had on the suitability of the wood for musical instruments. But it is clear that due to the economics of the marketplace, the piano builder has had absolutely no control over any of them. It is also clear that there are many more changes yet to come.

How Serious Are Soundboard Defects?

Just how serious are these various soundboard problems? Well, it depends. Many instruments that are now quite old have soundboards with both compression ridges and cracks that are still musically functional. That is, they still sound reasonably good — at least to the ear of the beholder, which may well be all that really matters. At the same time, these problems can show up on new, or relatively new, pianos to the extent that they become a source of some concern to their owners. Other pianos — of any age — are found with soundboards that look perfect, but which have serious tone problems, problems that cannot be attributed to "hammer voicing." Unfortunately, it's not possible to tell how serious any of these defects are in acoustical terms without carefully examining and, more importantly, carefully listening to the individual instrument in question.

Historically, there has always been some controversy about the effect of cracks and compression ridges on the value of a piano. Nearly all visible soundboard defects, but especially cracks, have traditionally been considered serious defects by most technicians, by piano dealers — especially when they are making an offer to purchase the instrument in question — and by most, though not all, manufacturers. And nearly all types of soundboard defects are considered to be of no practical consequence by many others. Why such contradictory views? In part because ultimately these very slowly developing defects must be evaluated aurally and the audible changes occur very slowly – typically over a period of years, not days or weeks. If a hammer shank breaks, the result is immediate and obvious. Press the key and nothing happens. Compression set that develops over a period of years might result in a five- or 10-percent decrease in sustain time per year. If a particular note had a sustain of 30 seconds when the piano was new it might drop to 27 or 28 seconds

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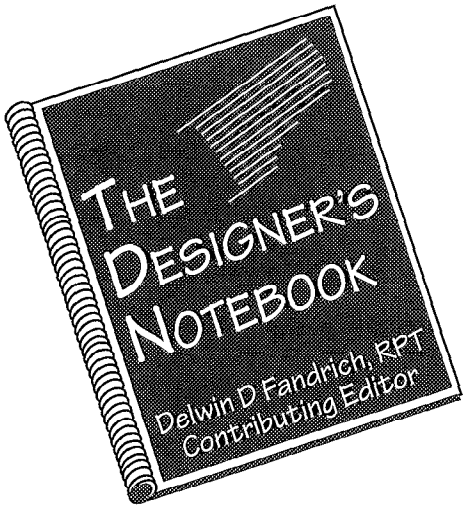
after one year. The rate of loss decreases as time goes by, so the cumulative effect after 10 or 20 years might be a loss of sustain time of only five or 10 seconds. None of this is going to happen very fast.

While the soundboard structure is breaking down, the tonal spectrum of the piano is also changing. But again, very slowly. Referring back to the discussion on the mechanical impedance (**Z**) of the soundboard system, we now understand that the spring component of the impedance relationship is changing. The mass of the assembly, of course, remains the same. But, as the wood fibers are subjected to increasing levels of compression set, soundboard system crown decreases and the spring stiffness of the assembly decreases. *As the springiness of the soundboard assembly decreases,* **Z** *also decreases and the rate of energy transfer between the string and the soundboard increases.* Since there is only a fixed amount of energy in the strings, and since that energy is now being coupled from the string to the soundboard at a faster rate, sustain time decreases. Not mentioned in Part I, but important to understand now, is the fact that while **Z** is dependent on mass and springiness, it is also variable with frequency. Changes in the springiness of the system will affect soundboard **Z** somewhat more at lower frequencies and somewhat less at higher frequencies. As the springiness of the soundboard assembly decreases, then, the resistance of the soundboard assembly to the lower frequency vibrations — the fundamental and lower harmonics — also decreases. Actually, its resistance to all frequencies decreases, just more so at the low frequencies. Energy at these frequencies will now transfer at a faster rate than it did earlier in the soundboards life. The sound of the piano will be just a bit "louder" and a bit more percussive. Also, the sustain time will decrease. Most of these changes, of course, will get blamed on those poor old hammers.

At this point someone usually raises their hand to challenge all of the above by relating a story about this beautiful seven foot-grand that they service. Typically, it will have been built around 1922 and it will have about 27 cracks in the soundboard and it has great downbearing and ... well, it sounds better now than it ever did. So, that being the case, none of what I've just written has any validity. To which there are several possible explanations. One is that a soundboard that has developed numerous compression ridges and cracks has not necessarily lost all of its tone-producing abilities. Indeed, there might well be some isolated examples of pianos that really do sound better now than they did when they were new. If the soundboard had excessive crown to begin with, it is possible that, even though the soundboard might now look like the top of my grandmother's old washboard, it might still sound pretty good. Of course, we have no direct knowledge of how this piano really did sound when it was new. I don't know of anyone today who is in a position to verify what any piano sounded like in 1922. I suspect that when new, this piano would have sounded rather restrained, i.e., not very powerful, with a fairly weak bass and fundamental tone response, but it probably would have had very good sustain.



A second explanation is that there are different standards of tone judgment. A piano that may be perfectly acceptable to one, may sound completely deficient to another. We've run into this many times. We'll look at a piano about which we've received glowing reports only to find that, in our opinion, sustain is shorter than it should be, the tone is percussive and "hollow" sounding to our ears, the "killer octave" is a real killer, etc.

The fact that a soundboard has sustained significant structural damage doesn't necessarily mean that it has lost all of its crown, but the cracked and/or damaged areas certainly aren't helping any. To some degree, the tonal performance of the soundboard will have been permanently and irreversibly altered. Whether this has been for good or bad is for you, the technician, and for the piano owner and player to decide. Usually the problem of soundboard breakdown is one of lost tone performance. And once it's gone, it's gone. As with all aspects of piano technology, we have to be careful not to use the exceptions to try to prove the rule. The exceptions are just that — exceptions.

If you're servicing a piano that has developed soundboard problems and you're not personally familiar with the techniques of diagnosing these problems and repairing them, don't be embarrassed to consult with someone who is. If the instrument is still under a factory or dealer's warranty, the dealer and the manufacturer will need to be involved as well. Sometimes hammer voicing can mask developing soundboard problems for quite some time. However, there will come a time in the life of every piano soundboard when it will say, "Enough, already. I give up." If the piano has reached this stage, it's better to find it out before you repair all those cracks, reset the plate, put on that great new stringing scale with those shiny new pins in that nice new pinblock and rebuild that action with those beautiful new hammers only to find that the expected results just aren't there. The only consolation now being that the soundboard really does look good.

Repairing Soundboard Cracks

Before leaving this subject, I should at least mention the effectiveness of the various techniques that have been developed to repair the various defects found in soundboard panels. Many creative methods have been developed to fill cracks and to remove compression ridges and insert new wood into the panel. Just how effective are these repairs?

Since I can already see that the tar vats are being fired up, the chickens feathers are already plucked and the rails are being cleared in preparation for my rapid departure, why should I stop now?

Both compression ridges and cracks are the result of catastrophic and irreparable damage to the wood structure of the soundboard panel – cracks obviously so; but with compression ridges, even though the damage may not be so obvious, in the long run they are potentially far more serious. Repairing either one — whether in relatively new or in very old soundboards — is of aesthetic value only. If there is any acoustic value at all

from these repairs, it will be only a short-term improvement. No soundboard repair that I know of has any long-term acoustic value. It doesn't matter which method of repair is used or how carefully the repairs are done.

Why is this so? Well, consider the following points:

- For the soundboard system to function efficiently as a transducer, it depends on the increased springiness that develops when a highly crowned soundboard assembly is securely installed in a piano rim and then loaded by the downforce of the string set at scale tension. This increased springiness is required for the soundboard to present the proper impedance load to the strings.
- In a compression-crowned soundboard assembly, compression set can reduce the level of compression stress to the extent that the soundboard is no longer able to function as an efficient transducer — it will no longer offer the correct impedance load to the strings — even with no visible damage present.
- In a compression-crowned soundboard, most of the crown is developed by the compression stress built up within the soundboard panel by expanding wood fibers as described earlier in this series. The soundboard crown depends on relatively undamaged and resilient wood fibers for this compression stress to be developed and maintained. The wood fibers throughout the entire panel are affected by compression set even though they may exhibit no visible structural damage. Compression stress throughout the entire panel is reduced.
- Repair of either cracks or compression ridges will place new, resilient wood into the panel. This new wood may be capable of developing and maintaining higher levels of compression stress than the old wood it is replacing, but any acoustic improvement will be limited and temporary. Any effect it may have on soundboard crown — and springiness — will be limited to the percentage of new wood compared to the old wood that still makes up the bulk of the panel. Inserting new wood into a few cracks will not alter the springiness of the panel appreciably and compression set will insure that any effect it does have will be very temporary.

Conclusions

Can these problems be avoided? Conditionally, yes. I have dwelt here on compression-crowned soundboards because it is this process that stresses the wood in such a way as to encourage the development of these problems. There are other methods of crowning soundboards that can avoid these problems to some degree. Basically, they involve processing the soundboard panel at a much higher moisture content — up to 6.0 percent or 6.5 percent — and building the crown into the rib structure. When this is done the ribs must also be pressed into a curved "caul" when they are glued onto the soundboard. These techniques place the primary responsibility for forming and maintaining crown on the rib set rather than on the internal compression of the soundboard panel. With proper design and engineering, essentially identical tonal performance — better in some ways since the impedance of the soundboard assembly can be more precisely controlled — is obtainable with the crowned-rib systems and much of the wood damage associated with compression-crowning can be avoided.

"Inserting new wood into a few cracks will not alter the springiness of the panel appreciably and compression set will insure that any effect it does have will be very temporary."

We could also use a laminated panel in place of the solid panel. Laminated soundboard panels are essentially immune to cracking but, so far, pianos using them have not been able to equal the tone qualities of those using solid panels. (This does not have to be the case. Pianos with laminated soundboard panels are capable of producing excellent tone. As good as, or better than, those with solid panels. But this is a subject for another article.)

If the practice of compression-crowning soundboards is so fraught with danger, why does anybody still use it? This is a question I can't answer. Tradition, I expect. There is no way to tell with certainty — piano builders are often loath to discuss these matters publicly — but fewer and fewer manufacturers today are using "pure" compression-crowned soundboards. Those companies that still do use relatively pure compression-crowning techniques are builders of very traditional, and in a sense, historical instruments. There is probably great concern within these companies about altering fundamental processes that have been in use, in some cases, for well over a hundred years. Sometimes an instrument can become so classic, so frozen in time, that to change it may well be unacceptable to the musical community. There are also many piano rebuilders and restorers who feel the same way. To change from a pure compression-crowned soundboard to some other design would mean altering the original specifications somewhat and this must always be done cautiously.

Soundboards Vs. Climate

Often the climate conditions in the piano owner's home is blamed for any and all structural damage that develops in piano soundboards. And, indeed, the environment the piano lives in can certainly be a contributing factor. However, of the literally hundreds of pianos of all ages that I have examined, very few serious soundboard acoustical problems have developed solely as the direct result of the piano's immediate environment. (At least this holds true when the piano is located in the typical private owner's home. The same cannot be said for many of those residing in churches and educational institutions — both of which are notorious for their general neglect of the instruments in their care.) Pianos using compression-crowned soundboards tend to develop compression ridges and cracks in their soundboards in spite of all attempts at climate control and those using more modern soundboard-crowning techniques tend to remain intact even when those controls are missing.

Having said this, there are still strong arguments supporting good climate control of the space surrounding

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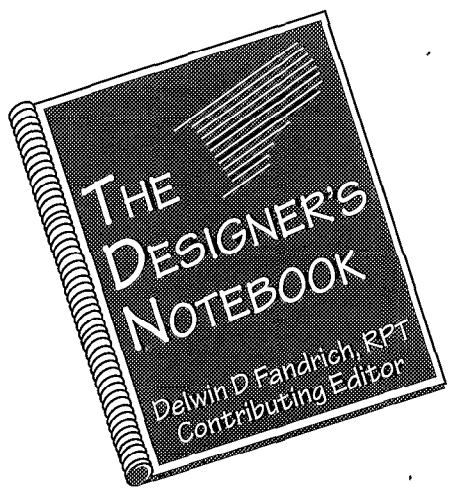
the piano. Lacking that, indeed in addition to that, localized climate-control systems have proven themselves effective in at least reducing the extremes of the moisture content fluctuations that a soundboard goes through in problematic climates. These systems can be helpful in private homes and they are essential in churches, schools, auditoriums, etc. At the very least, these systems will probably improve tuning stability somewhat and, at best, they may be able to reduce the extreme humidity swings that can raise the levels of fiber compression above the fiber stress proportional level. This won't stop compression set, but it should slow it down. The soundboard will still not last forever, but its useful life will almost certainly have been prolonged.

Notes

1. It has occurred to me, but I've not yet attempted to actually prove, that cracks often develop immediately adjacent to — but not exactly on — glue lines because of the additional stiffening of the earlywood fiber from an effect similar to "glue-sizing."
   When soundboard panels are glued together, water-based adhesives are universally used to bond the individual boards together. By tradition, the wood is fairly dry when the panel is glued up, and dry wood absorbs moisture at a fairly rapid rate when it comes into contact with water. When a water-based glue is applied to warm, dry wood, some of the water is immediately absorbed into the wood carrying with it some diluted glue liquor. This is especially true if hot animal-hide glue is used. This diluted glue coats and stiffens the wood fiber it comes into contact with, reducing the resilience of the fiber in the process, but not appreciably strengthening it. Once compression set has occurred, this stiffened fiber is less able to expand freely during dry seasons. Tension develops sooner and the crack appears.
2. This has more to do with how wood is selected for soundboard panels than with any mysterious quality of the wood. Trees don't grow at a constant rate. Within any particular cant there will be areas of tight-grained wood and areas of loose-grained wood. If a particular board is, say, six inches wide and the grain density progresses fairly smoothly from five grains/inch along one edge to 21 grains/inch along the other, the two extremes will be cut away. This may leave a board that meets the manufacturers specifications, but it will have a weak area — in terms of compression set — along the edge with the loose grain.
3. At least in softwoods. The physical strength variations between earlywood and latewood are somewhat less in hardwoods.
4. In a normal soundboard. If the soundboard panel was excessively dry, the levels of compression can be so great in the finished soundboard that compression set and the resultant compression ridges begin to develop immediately. I have seen them developing in pianos that are only a year or two old.
5. The term, "vertical grain," as a specification, can mean many things. Looking at some older, well built pianos, vertical grain meant that the grain was 90 degrees to the belly rail, ±10 degrees or so. I've seen other pianos, including some that are highly regarded in the trade, in which vertical grain meant 90 degrees, ±45 degrees. These days a "tight" specification for vertical grain would be 90 degrees, ±30 degrees.
6. William Braid White, in an article written many years ago for the *Piano Trades Magazine*, proposed the theory that soundboard cracks basically have no effect on the tone performance of the piano. It was his assertion that the crack would only affect the soundboard by the amount that it reduced its physical radiating area. Since that reduction would be negligible, no noticeable change in sound would occur.
   Were it not for the fact that in a compression-crowned soundboard it is necessary to maintain a certain minimum level of compression stress to form and hold crown, there might be some merit to this theory. Unfortunately, it overlooks the problem of compression set and the structural wood fiber damage found in the areas where compression ridges have developed. There is no compression stress where there is a crack or a compression ridge and it will be somewhat reduced where compression set has occurred. In light of the reality of the character of wood and wood movement, the basic premise of this argument must be rejected. The crack is but a symptom of the real problem.



The Puzzler

Answers to WonderWord on Page 38

1. ACCELERATED
2. ACTION
3. ALIQUOT
4. ATTACK
5. BALANCIER
6. BAR
7. BIRDCAGE
8. BOLT
9. BRIDGE
10. CAP
11. CAPODASTRO
12. CAPSTAN
13. CASE
14. CATCHERS
15. CENT
16. CROWN
17. DECAY
18. DECIBEL
19. DIP
20. DOWNBEARING
21. DROP
22. EQUAL
23. FALSEBEATS
24. FREQUENCY
25. FUNDAMENTAL
26. HARMONICS
27. HARP
28. HERTZ
29. ILL
30. INHARMONICITY
31. IVORY
32. JACK
33. KEY
34. LETOFF
35. LID
36. LOOP
37. NODE
38. PARTIAL
39. PINS
40. PLATE
41. POT
42. PROP
43. RIBS
44. SN
45. SOUNDBOARD
46. TONE
47. TOUCH
48. TUNING
49. VIBRATION
50. WEB

INSIDE OUT

The Tuner's Life

By Anita Sullivan
Eugene, OR Chapter

Sometimes when I'm writing about piano tuning I forget that it's not just an art, but a way of earning a living. It's work. The tuner is a mechanic, a person who fixes things, gets dirty, has to use a drill and lots of rags, who breathes dust and numerous strange chemical lubricants, who has chronic back trouble from sliding heavy actions out of grand pianos and carrying them over to the piano bench. Sure, it's not like working in a steel factory, or an automobile assembly line, or out in the breathless heat of a bean field, or in the kitchen of a fast-food restaurant. Karl Marx would probably not have gotten very far if piano tuning were the only work of the world.

Still, I would like to address this question to all other piano tuners, the real ones, I mean, who do it for a living, full-time, every day: I would say to them, "Have you ever stood in front of a piano in somebody's living room, after the owner has gone off to another part of the house, have you ever stood there just before you lift up the top and get ready to work, and found yourself speaking to that piano, almost in desperation, saying, "You will have my heart, you will have my heart?"

Because listening, when you do it on purpose — with purpose — it's hard work. It takes the pulp out of you. It's not easy to explain this, because we are surrounded by noise, by gratuitous music, so we hear something almost all the time, and we would miss it if it disappeared and we were floating suddenly in a balloon of silence. But — this stuff we are hearing all the time is extra, it's filler, like a great styrofoam mass standing between us and the apprehension of the stark silence of our mortality. Or something like that. So, to do a reverse, to bring noise out into the open from the alleys where it normally lurks, and to say to it, "You are actually part of the hard framework of our everyday life, we cherish you, we need you, we will put you onto our hard disks, we will wait for you to cross the road ahead of us," — this is the equivalent of raising a drowned body from the ocean in a fishing net and heaving it onto the deck of a ship.

When you listen, you turn yourself inside out. You do it naturally, because the ear is an eager instrument, its tiny, tiny hair cells accurate to billionths of an inch (they say you can hear differences in the colors of paint, and I believe it). We don't begin to take advantage of this ability we all have, those of us possessed of the full powers of hearing. But even so, even though listening is natural, listening to the highest degree of accuracy humanly possible is what you do when you tune a piano. Your entire body is involved, every cell gets called up for duty. "Attention!" You are like an athlete, you must be free of contamination, clear in body and mind, fully primed, and then you step out. As the religious poet Thomas A. Kempis once said, when writing about love, "Let me be holden by love, mounting above myself through excessive fervor and wonder." That is what you do three or four times a day if you're a tuner, on purpose whether you feel like it or not. Thus, piano tuning is a kind of performing art. I imagine sometimes, in my deep soul-weariness at the end of a long week, facing one more mute and demanding hunk of musical furniture in the corner of someone's basement or living room, I imagine myself a little like Kathleen Battle, or Elvis Presley, ready to turn myself inside out again for music.

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The Puzzler

WonderWord for PTG

By Sidney Stone
Golden Gate, CA Chapter

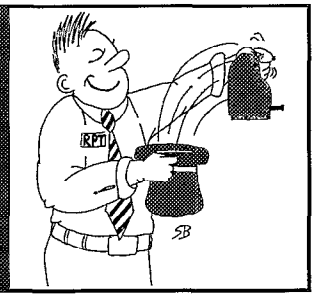
Instructions: Circle each letter of the answers to the clues below. ***Answers are in alphabetical order on Page 36.*** Example: (1-13) is ACCELERATED to (50-1) is WEB. When you find the clue, mark it off. Read up, down, forward, backward, and diagonally. Leftover letters reveal the WonderWord(s). Bonus puzzler: Which piano part is misspelled?

1	(W)	(E)	(B)	E	G	A	C	D	R	I	B	C	V	T	R	F
2	R	T	N	E	C	K	L	C	R	D	L	I	D	O	I	R
3	E	N	O	T	C	E	A	I	R	O	B	L	A	U	Q	E
4	I	S	I	A	T	P	T	A	Q	R	P	P	P	C	G	Q
5	C	O	T	O	S	E	O	P	A	U	I	O	L	H	N	U
6	N	T	F	T	G	B	A	T	O	N	O	R	A	A	I	E
7	A	F	A	D	D	R	I	F	S	L	O	T	T	R	N	N
8	L	N	I	N	T	O	S	R	A	B	L	S	E	P	U	C
9	A	R	U	I	N	H	A	R	M	O	N	I	C	I	T	Y
10	B	O	A	K	L	A	T	N	E	M	A	D	N	U	F	L
11	S	L	C	A	P	Y	E	K	W	T	L	O	B	R	N	E
12	C	A	T	C	H	E	R	S	P	O	R	P	N	S	O	B
13	J	I	E	S	(A)	(C)	(C)	(E)	(L)	(E)	(R)	(A)	(T)	(E)	(D)	I
14	Z	T	R	E	H	A	R	M	O	N	I	C	S	P	E	C
15	S	T	A	E	B	E	S	L	A	F	Y	R	O	V	I	E
16	D	E	C	A	Y	G	N	I	R	A	E	B	N	W	O	D

~~(1-*13*) Type of action where the key balances on a rounded rather than a flat surface;~~ (**2**-*1*) Part of the piano that is removed for repair; (**3**-*1*) Type of construction on duplex scales; (**4**-*7*) Initial sound of the hammers striking the strings lasting milliseconds; (**5**-*10*) Another name for repetition lever; (**6**-*8*) Aliquot, bearing, capo, pressure, tuning; (**7**-*1*) Redneck thinks this is a piano; (**8**-*11*) Metal bar used as a fastener; (**9**-*10*) Wooden part that transfers string vibrations to the soundboard; (**10**-*11*) Part of the bridge; (**11**-*14*) Rigid, raised part of the plate under which the strings pass before the tuning pins; (**12**-*2*) On back of keys to adjust lost motion; (**13**-*13*) Framework of a piano; (**14**-*12*) Parts of the vertical hammer assembly caught by backchecks; (**15**-*2*) One-hundredth part of a semi-tone; (**16**-*14*) Spherical curvature of the soundboard, radius c. 61 feet; (**17**-*16*) Gradual loss of volume in tone; (**18**-*16*) Unit of measuring the intensity level of sound; (**19**-*16*) Depth of downward travel of the keys; (**20**-*16*) Downward pressure of the strings on the bridge; (**21**-*1*) Distance the grand hammer moves during escapement of jack from knuckle; (**22**-*3*) Most common temperament; (**23**-*15*) Tonal irregularities which may cause tuning problems; (**24**-*1*) Number of sound waves per second; (**25**-*10*) First partial of a vibrating string; (**26**-*14*) Higher-pitched fainter tones whose frequencies are exact whole number multiples of the note being played; (**27**-*5*) Another word for plate; (**28**-*14*) Cycles per second; (**29**-*9*) What one becomes after working on a square grand; (**30**-*9*) Deviation of the frequency of partial tones in a string from their theoretical values in an ideal flexible sting; (**31**-*15*) Type of keytops in older pianos; (**32**-*13*) Action part that pushes the hammer assembly; (**33**-*11*) Natural or sharp; (**34**-*2*) Closely adjusted discontinuance of contact between top of the jack and knuckle or hammer butt; (**35**-*2*) Top board; (**36**-*7*) Eye made in the end of a string at the hitch pin end; (**37**-*11*) One of the points of a vibrating string that divides the string into segments of vibration; (**38**-*5*) Any component of a complex tone (**39**-*4*) Tuning, hitch, bridge, center, hinge [pl]; (**40**-*4*) Cast iron structure supporting the tension of the strings; (**41**-*4*) Containers for hot glue; (**42**-*12*) Stick that holds open the piano lid; (**43**-*8*) Light strips of wood glued to the soundboard; (**44**-*12*) Serial Number abbr.; (**45**-*11*) Component of the piano that amplifies the tone; (**46**-*3*) Musical sound considered in reference to its quality; (**47**-*1*) Responsiveness of keys and action; (**48**-*9*) Adjusting the tension of the strings; (**49**-*1*) Another name for wave; ~~(**50**-*1*) That part of the plate perforated by the holes through which tuning pins are inserted into the pinblock.~~

Grand Illusions ...

The Page for Serious Cases



You Do The Math

By Terry L. Greene, RPT

The new day begins. We pray that life still exists in the engine. Ahhh — it starts, it is alive. So, with foot on clutch and stick shift in reverse, the itinerant piano tuner sets out once more on his career path.

Moving from subdivision to long division onto the freeway, we are faced with the fact that, like Mohammed who realizes that the mountain will not come to him, we must go to the first and every subsequent instrument of the day — since the average piano weighs nearly as much as the average mountain.

So we must travel to the piano, and thereby become victim to the whimsy of the highways and byways between us and our customers. It is wise to deal with this in as friendly a way as possible, and brace ourselves to the inevitable, since we know that nature abhors a piano technician almost as much as a vacuum. Therefore, we accept it as a given that every possible train crossing, bridge lift and road work detour will appear in an attempt to stay us from our appointed rounds. Usually this antipathy of roads and highways is inversely proportional to the degree of importance of the job, and the timeliness thereof. Hence the formula $T \neq \sqrt{IJ+RH}$, where T (time) is never equal to the sum of the square root of IJ (important job) and RH (road hassles). Two things become evident from this formula — first, that the author of this article is severely math deficient, and second, that he nonetheless understates the principle. Herein, therefore, are a few examples of the principles stated in practical terms:

The first example is the toll booth. If you encounter toll booths in the course of your travels, you know that they chose the word "toll" for an excellent reason: not only is it a place where money is extracted from you on your way from Point A to Point B, or back from B to A, but also a place where a toll is exacted on your nerves and psyche as well. I speak here of the rule that governs the lines at all toll booths; the rule that states that no matter which line you consider to be obviously the quickest one, it will *always* be the slowest. No matter how, no matter why, it *will be the slowest.* Sometimes the problem lies with the cars in the line — for example, little old ladies searching the bottoms of purses the size of travel trunks for a quarter they are sure is hidden under the jar of pickles. Or the problem may lie with the toll booth itself, as when the automatic coin receiver refuses to accept the coin of the realm as the currency required to activate the mechanism that raises the gate. In addition to the quarter, they seem to require obeisance and a sacrifice of some kind, perhaps one of those little bottles of gin that can be purchased on an airplane. All of this makes one want to forget all about going from Point A to Point B, but rather to Point C, where one can in fact purchase one of those little bottles — albeit not for the toll booth.

The next example of road hassles encompasses both bridge lifts and train crossings. There are rules, not unlike the toll booth line rule, that govern these points of travel: as for bridge lifts, there is seemingly a countless number of boats, ships, barges and seagoing vessels that need to go under bridges, but which are never actually seen by the drivers stopped by the raising of these bridges. We see the bridge being lifted, of course (again, always proportionately related to the importance and timeliness of the job we are thereby detained from reaching), but we never see the reason for the lift when the bridge is lowered. At best, we might espy the odd small motor boat or some piece of flotsam and/or jetsam moving with the current. But a tall ship? A yacht? A tanker? Never.

On the other hand, the reason for a delay at a train crossing is all too obvious. It is a train. A *long* train. An endless train, usually with empty cars. Or it may be a train which is short, but which, for reasons of perversity, stops in the middle of the track. One can almost hear the conductor of said train yelling, "No one aboard!" I've always wanted to ask the train powers that be: "Can a train get stuck? Is there such a thing as a train with a flat tire?"

The final example of road hassle is the road detour. These can involve several different scenarios, but I will sketch out one brief one guaranteed to bring out the irreligious of even the highest Dalai Lama of any persuasion: it begins with one of those portents called a *warning sign* that says something like "road work ahead," but which should more accurately say "ticked-off area ahead," or "you-are-going-to-want-to-kill area ahead." The next indicator of trouble is that series of little orange cones that start unobtrusively on the peripheral edge of the road, but which gradually start to wind their way into the mainstream of traffic. Orange cones. Thousands of them. They are meant to funnel three or four lanes of traffic into one or two. They do so not so much to protect us from the road work ahead — which is usually miles ahead — but in fact to maximize the ticked-off quotient. When we finally come abreast of the "work area," we see five or six hardhats all standing around a hole in the pavement, and one hardhat positioned in the hole itself — all of them staring, as if in amazement that they were actually able to dig that hole. While we're querying powers that be, let's ask what exactly that hole is *for*? If we could ask the hardhat guys, they would probably say, "Well, you gotta dig holes, don'tcha know? We got a work order here to dig this here hole. Whaddya mean, why are we digging this here hole?"

All of these impediments to our reaching our job on time should be anticipated. Expected, even. In fact, we ought to be surprised if they do not occur. But even if anticipated and expected and allowed for, one thing is certain: if these do not present a transportation problem, there is always one standby ingredient of trouble which can be counted on to throw off our accounts receivable, an ingredient which can be expressed by the following formula: PIJ=VB*CUR, where PIJ (payment for important job) equals VB (vehicle breakdown) multiplied by CUR (cost of unbudgeted repair)! ◆

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

Life-Long Learning: New Classes at Providence Institute

By Evelyn Smith, RPT, Institute Director

Years ago when I was thinking about becoming a piano tuner, I met a successful older technician who said something that surprised me—that he'd worked on pianos for 40 years but he'd never stopped learning interesting new things about them. I was glad to hear it; I wanted a job that would challenge me to continue learning new ideas and skills for decades. This same technician believed in PTG, and rarely missed a chapter meeting, a state seminar, or an annual institute. I'm grateful that he showed me by example the satisfaction and enjoyment of continuing education through the Guild.

For Providence, we're working hard to bring you the best classes and instructors we can find, and we have a special commitment to providing new classes that have never before been taught at the annual institute. So whether this will be your first institute or your forty-first, we promise you there's something new to learn.

Take a look at some of the outstanding new classes this year:

- Richard Davenport — action geometry
- Ted Sambell — 2-new classes: vertical hammer, shank and butt Installation; also pinblock installation.
- Doug Wood — grand and vertical sostenuto systems
- David Stanwood and John Foy — wippen support springs
- Allen Wright — college and university technicians forum on fortepiano regulation and voicing.
- Dan Levitan — In-home service tools, based on the NYC tool kit *Journal* article.
- Phil Glenn — polyester repair
- Gina Carter — pitch raising with an Accu-Tuner™
- Kevin Stock — Steinway voicing
- Brian de Tar — voicing small grands
- Christine Lovgren — tuning stability
- Ben McKlveen — vertical regulation

A featured new institute class this year is Anne Ingard's "Body Tuning For Tuners." Anne, a physical therapist who has worked with piano technicians' injuries for years, will present ways to deal with the many aches and pains associated with our work. A technician who recently saw her class called it "extremely well-presented and geared toward real life problems and how to prevent or cure them."

In addition to the class, Anne will be available for private half-hour consultations to observe your posture while you tune, and make suggestions for improvements. There will be a $35 fee for these consultations and spaces are limited, so pre-register for the consultations as soon as you receive your convention registration form.

Check this space next month when we'll describe the all-new classes in the soundboard and belly workshop.

Institute Classes Getting Better Every Year

By Jeannie Grassi, RPT
Special to Institute Committee

Many people who have been able to attend a PTG Annual Convention have been impressed with the wide range of classes offered and the caliber of instructors offering these classes. And yet, there is an effort to make the quality of each year's classes even better than what has been presented the year before. So, you can be sure that this year will be the best yet.

With the costs to attend an Annual Convention increasing almost every year, the Institute Committee wants to be absolutely sure that those who attend get their dollars' worth and that their valuable time away from work was wisely spent.

If you've attended classes at either of the past two Technical Institutes you would have been asked to fill out a class evaluation at the end of each class. The information gained from this data has been a most helpful tool for the Institute Directors to upgrade previous classes and to plan new ones. It has also been helpful to the instructors to make corrections in their presentation and improve what they have already done.

The instructors who are asked to teach at such an event, are considered the best in the world. Most start out by teaching their class for their chapter or neighboring chapter meetings and then, perhaps, at their Regional Conference. Usually, these smaller and more familiar audiences provide for a good dry run allowing for alterations and modifications before presenting it on the international scene.

For those of you who have been participating in PTG as instructors, we will be offering some suggestions for you to make presentations on the chapter, regional and international levels over the course of the next few months. And if you are already an experienced instructor, some of the ideas offered will help you to see an even more interesting way to present your material. Instructors at an annual convention are models for the rest of the organization, and we want to help them present their valuable information in the most professional and effective way they can.

Applied Skills Back for Providence

Popular Demand for Work-Station Class

"One of the best parts of the Convention!"
"You can go from one table to another and always pick something good."
"These hands-on classes are a marvelous opportunity, extremely beneficial...."

Q: What do these comments have in common?

A: Applied Skills classes at the PTG Institute in Providence!

For three hours you pick the brains of 12 of PTG's finest technicians on 12 different subject areas, in a limited hands-on session. Subjects range from basic to advanced so that everyone can benefit from beginners to the most experienced.

Twelve stations arranged in a large room, 12 instructors ready to share, tools, jigs, parts, pianos.... You wander over to station one and, before you know it, you are learning by listening, then by doing. The tools are in your hands, the parts are in your hands, the instructor is encouraging you, as are the others at the station. You have never tried this procedure before and feel an internal tension, what if you can't do it? With everyone watching? The instructor guides you with words of encouragement, your confidence grows, before you realize what has happened you are accomplishing a task that a few moments ago was intimidating beyond belief.

You cannot wait to get home to try this procedure on the next piano you service. Then, it hits you. You are only on station number one, there are 11 more to go. Where has the time gone? You only have three hours! You hurriedly thank instructor number one and you are gone. Your job is done there.

Moments later at station number two you see the familiar look of terror and concentration on a colleague's face as she attempts task two. Then the rainbow look of knowledge, the assurance that she has got it, by George, I believe she's got it!

You plunge in, knowing your time is short, believing that you can learn more here in less time than anywhere on the planet. Knowledge is power and the Force is with you! In three hours you are going to learn enough to pay for the trip to Providence, the week off from work, the time away from home, and all the other sacrifices you have made. The Force is with you! You can overcome the power of the Dark Side!

Take me to Table Number Three!

—Dale Probst
Assistant Institute Director

Boston is More Than Clam Chowder

By Phyllis R. Glazerman
Newton, Mass.

Before leaving Providence this summer, if you have an extra day or so to spend, you may want to make a 45-minute trip to Boston. Here are some suggestions for you.

Boston's rich history, including its early settlement, its role in the Revolutionary War, and its heritage of three presidents: John Adams, John Quincy Adams and John F. Kennedy, can be traced by visitors in a variety of ways. One might choose to walk The Freedom Trail by following the yellow footsteps painted on the pavement. Brochures about the walk may be picked up at Boston By Foot, a nonprofit educational corporation at 77 North Washington Street, Boston, 02114, telephone 617-367-2345. The organization also runs guided tours with such specialty features as Victorian Back Bay, The Waterfront, Beacon Hill or The North End.

For visitors who wish to see Boston by bus, the largest company is Old Town Trolley Tours, telephone 269-7010. Boston Duck Tours feature a "fully narrated land and water tour on an historic WWII amphibious vehicle that takes you on a big splash into the Charles River," telephone 723-DUCK. Boston Harbor Cruises specializes in all sorts of excursions that let you view the city from the water and even offers a whale watch expedition, telephone 227-4321.

Another historic city next to Boston also offers walking tours through Cambridge Discovery, telephone 617-497-1630. Harvard University, founded in 1636, is worth a visit. Harvard Square, with its college ambiance and many restaurants and shops, draws an interesting cross section of local and touring types.

If you are looking for a few good museums, Boston is just the place for you. Trouble is, there's so much to see, you might have to plan to spend a week or two. The Museum of Fine Arts on Huntington Avenue houses a fabulous collection of historic musical instruments, as well as antiques, paintings, furniture, pottery, and glass. There you might check out the early 17th Century fretted clavichord, or the 1796 unfretted clavichord, a 1783 Stein Saiten-harmonika, a Chickering "Cocked Hat" 1858 piano, an 1835 Schleip upright Lyraflugel, and many other squares, uprights, and grands. A few blocks down Huntington Avenue, across the street from Symphony Hall, is the Christian Science Building, which features a gigantic walk-through globe room. Around the corner from the Museum, on the Penway, designed by famed landscape architect Frederick Law Olmsted, is the Isabella Stuart Gardner Museum, featuring historic European art housed in a lavish palazzo surrounding a gorgeous indoor garden. Other great places to visit are the water front aquarium, with dolphin and seal shows, and the Science Museum, with its laser show in the planetarium and an Omni movie show in its specially built auditorium.

If you just want to sit and watch the crowd somewhere, Faneuil Hall, at the site of the old Quincy Market, has a good variety of food, shops, entertainment and people. The Public Garden, with the Swan Boats featured in the children's classic, "Make Way For Ducklings," beckons strollers, artists and sunbathers. Along the Charles River are sailboat watchers, rollerbladers and kite flyers. Waterfront Park, near the Aquarium, is a good place to watch the boats going out from and coming into Boston Harbor.

For window shoppers, a walk down Newbury Street, between Boston Garden and Copley Square, will take you by the best of women's and men's clothing, art, and home decor. Parallel to that street is Boylston Street, with Marshall's and F.A.O. Swartz. Two large shopping malls are Copley Place, across from the Boston Public Library at Copley Square, and the Cambridge Galleria, near the Science Museum on the Cambridge side of the Charles River.

A word about restaurants in Boston: if you are looking for ethnic food, try Chinatown, or if you prefer authentic Italian cuisine, the North End is just the place. Cambridge features the best variety of choices from French-Chinese (China Café) to Ethiopian to Middle Eastern (The Middle East) to Spanish (Dali). Boston's great fish restaurants are recognized far and wide. If you're a serious restaurant goer, you'd be wise to choose discriminately from a Zagat guide or a comparable advisor. Welcome to Boston! Have a great time.

Don't Miss the Minis in Providence!

Not mini skirts, *Mini Technicals*! The Mini Technicals in Providence will have something for everyone!

Mini Technicals are 40 minute classes. 1998 "Minis" will have instructors from around the country teaching on a wide range of topics. So many, in fact, that I'm sure it will be hard to choose.

There will be minis on subjects that address our bodies and how our job effects them. You will be educated on the Hanta Virus, Carpal Tunnel Syndrome, preventing injuries, correct tuning posture and how to safely move a piano by yourself!

Other minis will teach us rebuilding and reconditioning skills. You'll learn how to make a bridge template, bridge repair and a new procedure for fighting verdigris.

Glean knowledge from experienced technicians on regulation skills such as key leveling, aligning hammers to their strings, and you'll explore the mystery of the hammer and back check relationship. There will be classes that address repair tips on splicing strings, rebushing keys and those grand lyres that are trying to escape their pianos!

You can receive instruction in every day muting and pitch corrections and ideas to help quickly identify those elusive "clicks" and "knocks" and "buzzes" that plague us. Pick up a few pointers on player pianos from a man whose business is players. Explore ways to help your customers purchase the best piano for them and ideas on more services to offer your existing customers.

As you can see, there will be something for everyone in the form of a 40 minute "Mini." The collective knowledge in a group of 4000 piano technicians is astounding, and the willingness of many technicians to share that knowledge is equally amazing. This knowledge is there for the taking at a PTG Annual Institute. Come and join us this July, you may find it ... Providential!

— Laura Kunsky, RPT
Institute Committee

Examinations & Test Standards Committee

In July 1997 in Orlando, Fla., the PTG Board of Directors approved a plan to acquire 14 grand action models, 14 vertical action models and 14 repair jigs.

The purpose is to provide these items to test centers and chapters requesting their use. Each of the seven members of the Technical Exam Subcommittee will be responsible for the storage and upkeep of two sets of the action models and repair jigs. Test centers or chapters requesting these items will be responsible for the cost of shipping both ways.

A chapter or seminar planning committee giving technical exams should contact their Regional Technical Exam Subcommittee member. The committee will then receive the proper equipment for giving these exams. If they are unfamiliar with administering the technical exams, they should request assistance from the ETS committee person. The ETS committee encourages chapters and seminar committees to offer more technical exams.

Also, the grand action models are available for $225 plus S&H directly from Lloyd Meyer at Renner USA, P.O. Box 1223, Weston, CT 06883, phone (203) 221-7500, Fax (203) 454-7866.

The vertical action models are available for $200 plus S&H from the PTG Home Office, 3930 Washington, Kansas City, MO 64111, phone (816) 753-7747, Fax (816) 531-0070.

The repair jigs are available from Mike Carraher, So. Central Pennsylvania Chapter, 1502 Mill Road, Elizabethtown, PA 17022, phone (717) 367-8256.

Members of the Technical Exam Subcommittee are:

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(712) 277-2187
Carl Lieberman, *Western Region*
(310) 392-2771
Curtis Spiel, *PacificNW Region*
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Don't Set Customer's Limits

By Ruth Brown, RPT
Economic Affairs Committee

ECONOMIC NEWS & VIEWS

During a recent drive on one of America's great old two-lane highways, I spotted a ramshackle trailer home, replete with an assortment of rusted-out cars, an old, beat-up sofa on the tacked-on porch, torn sheets on the clothesline — and a shiny new satellite dish the size of a Mack truck.

This happened to be in a rural area of a southern state. But the sight was not a new one. We've all seen it — I have, in Pennsylvania, Quebec, Minnesota, California, Texas — you name it.

Occasionally we all run across a very neat, technically proficient, but minimal, repair. It becomes clear that, in this case, the customer's budget was not a roadblock. Nor was their attitude towards the work. They thought they were having everything done that needed to be done. In such cases, one wonders why this capable technician did not go further. I picture a mental roadblock in the technician. Obviously he or she was capable of very fine craftsmanship. What could be the reason for setting limits?

It may be that there was a limited ability to see the customer's ability to appreciate and pay for more. I'm talking about the limits we set in our own minds, the decisions we make for customers, and not giving them the opportunity to decide for themselves.

Many will say "my area is different." There may be a greater concentration of pianos in metropolitan areas, but that only means a difference in how the day's work is laid out to minimize driving if your customers are more spread out. In my mother's rural area, I have been in a couple dozen homes, and most all have pianos, and they're all unattended. Having been so for years, this means a lot more than tuning is needed. There's enough work in this one small town to keep a good technician busy full-time, but the opportunity hasn't struck anyone.

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The "piano facts" don't change, whether we're in a mansion or a shack. Nor does the owner's need for an accurate, factual assessment of the piano, and assistance in coordinating the technical with the practical. What changes is the needs or desires of the user, and his or her priorities at that time.

Science has proven that what we call "gut feelings" or "intuition" are based on our past experiences. We may make snap judgments that this home, or this individual's demeanor, is proof that they "can't afford it — no money — can't afford it — no money" (Zig Ziglar). Or that they'll never be interested, because we see a poorly maintained piano and assume that this is their choice. Our reaction may come from an experience in the past in a similar setting, or from stereotypes learned in the comics, or television.

While worrying about the first impression you are making, check also that the first impression they have made on you doesn't limit your ability to help them. We must open our eyes to each customer as unique in needs and circumstance. Each deserves our best attention. In fact, it's cheating to not offer every customer the same level of service.

Does this mean pushing for the top-of-the-line proposal on every job? Definitely not. It means taking the time customers need to fully understand the existing condition of the piano, and solutions needed. Of equal importance is taking the time to listen, and learn the person's needs. How long does this take? It can vary from five minutes to well over an hour.

The first step is continuing education. It does not mean having to personally make every repair which can be made to a piano. It does require the ability to systematically and accurately diagnose the current status of a piano from the technical viewpoint. This means knowing a good bit about every aspect of pianos, like a good GP in medicine. For example, how much better will this instrument sound with new hammers instead of filed ones, even if the action can be regulated with the existing parts?

Step two is customer relations, this being primarily how you relate what you see to the piano owner. The back-and-forth of your initial conversation sets the tone for all future visits. Your pre-visit telephone work, your paperwork, your professionalism and your personality all come into play.

Just remember — it isn't your decision to make, except from a technical viewpoint. Even then, you and your customers must work together to decide whether what makes technical sense will help them achieve their goal — whether it's one more year out of Ol' Bessie, something that won't need work again for fifty years, one evening with a hired rock band, a voice and piano recital, or maybe a new piano altogether. Sometimes the shack dweller will not be satisfied with less than the top of the line grand, and the mansioner won't bother with anything over the lowliest spinet that barely makes a noise.

Let your enthusiasm for your work, and your love of the piano come through. A piano in truly excellent condition is a joy to play. It will last longer. In the long run, it's more cost-effective to make all needed repairs at one time. And you'll find yourself surprised just how many piano owners will agree, and be grateful you came along.

RPT — We Made It!

Published in the November *Journal*, listed under Class of 1996 — 97 RPTs, Chicago Chapter 601, you will find three names listed together. Donald Bee, Henry Kopek and John LaBorn. We are proud of becoming RPTs, and we would like to explain how we did it in hopes that we will encourage other associate members to achieve their RPT status.

The three of us started this "tuning" business about the same time, roughly 15 to 17 years ago. All of us were part-time tuners and members of the Chicago Chapter when we joined together to tackle the PTG testing process, just over three years ago. We felt that we were close to the same aptitude (and all of us were over 50 years old).

After changing our strategy once or twice, we decided that the tuning test would be the most demanding. So it was decided that we would do written, bench and tuning, in that order. Meeting weekly, we spent several months using the PTG study guide for the written test, with each one taking a small section for study and reporting to the others. In this process we compiled a 21-one page booklet and had a wonderful time doing it.

With the written test behind us we dived head-long into the bench test using again the PTG study material. What an adventure! Many times the blind leading the blind, but with the help of some RPTs from the Chicago Chapter, we made it through. Probably the most helpful person to us in the bench test was Mr. Paul Mueller. He took one evening and an entire Saturday helping us to prepare for this part of the testing.

As we suspected, the tuning was the most difficult for us. Here we were split, with two of us tuning electronically and one aurally. Each of us worked hours and hours perfecting this part of the test. Each would set a temperament and the other two would tear it apart. This went on virtually every Tuesday night for more than a year, but by the time Orlando was history we had all become RPTs.

We were so determined to complete this project that Henry's wife referred to our weekly sessions as "Sacred Tuesday," and always worked her schedule around it.

We need to point out that we had plenty of help from others in our local chapter and the Waukegan Chapter. We took advantage of the tuning evaluations offered by the Chicago Chapter and are thankful to our chapter RPTs who volunteered to do the evaluating and provide the related guidance. And we appreciate all of their encouragement in the process.

Henry and Don would like to especially thank Mr. Ken Orgel and Mr. Robert Guenther for their help on the tuning test. John would like to especially thank Mr. Alex Keylard for allowing him to tune exceptionally fine pianos at his store, and we all want to thank Mr. Paul Gunty, who took several evenings and an entire Saturday to set up a test piano. And last but not least we would like to thank Mr. Fred Tremper (who's school we all attended back in the early 80's), who helped motivate us all these years after graduation.

So, if you are an associate with the goal of becoming an RPT, you may want to grab a couple of other associates who really want to work, take advantage of the numerous resources offered by the PTG and your local chapter, and have a great time doing it. This method really worked well for the three of us ... go for it!

PTGF Offers Convention Scholarships

The Piano Technicians Guild Foundation will offer two scholarships for eligible Associate Members to the Annual Convention & Institute in Providence, R.I., July 8 - 12, 1998. Application forms were sent to all Chapter Officers in the Dec./Jan. issue of the *LeaderLetter*. If you are an Associate Member on the track to upgrading to RPT, we encourage you to apply for this scholarship.

The first Convention Scholarship was awarded in 1991, and since that time nine Associate Members have had their convention registration and the fees for either the PTG Tuning Examination or the PTG Technical Examination paid for. This year exam fees are $90 and Registration fees are $195, so these scholarships are worth $280! More than half of all Associate Members who have been awarded these scholarships are now RPTs.

I spoke to the 1996 winners, Alan Hoeckelman, RPT, of the St. Louis Chapter, and Margaret Elmslie, RPT, of the Toronto Chapter. They both completed their upgrades about nine months after the convention.

Alan Hoeckelman commented that he didn't think he had much of a chance at getting the scholarship, but he filled out the application, picked up a reference and decided to give it a shot. His wife, Joanne, brought the letter notifying him that he'd won to the shop where he works and they made a big deal about it. He was thrilled! He admits it was quite an honor and it really gave him a "boost," and encouraged him to study for the test. Even though he didn't pass the test, he learned where his strengths and weaknesses were, and so he knew what to work on. As Alan said, "Persistence should be worth something."

Margaret Elmslie, RPT, said the scholarship was the motivation she needed to go to her first convention. She took the tutorials for the Technical and Tuning tests which were taught by Bill Spurlock, RPT, David Vanderlip, RPT, and Kathy Smith, RPT. Margaret felt these classes were very helpful. Having her registration and test fee paid for made the convention costs a little more manageable. Now, Margaret is the president of the Toronto Chapter. How's that for "giving back?"

The Piano Technicians Guild Foundation is proud to offer these scholarships to help two lucky Associates along on their path to upgrading to RPT. Please, encourage Associate members to apply. The selection committee is composed of Directors Emeritus Ernest S. Preuitt, RPT, Charles P. Huether, RPT, and Nolan P. Zeringue, RPT. The deadline is May 1, 1998. The winner will be announced May 31, 1998 and will be recognized on the PTGF page of the July issue of the PTG *Journal*. Applications can be mailed to:

Selection Committee
Piano Technicians Guild Foundation
3930 Washington
Kansas City, MO 64111-2963

Good Luck!

— Laura Kunsky, RPT
PTGF President and winner of the 1991 Convention Scholarship

Piano Technicians Guild Foundation

Mission Statement

"The Piano Technicians Guild Foundation is formed to support the goals of PTG by preserving and displaying historical materials and providing scholarships and grants for piano performance, study and research."

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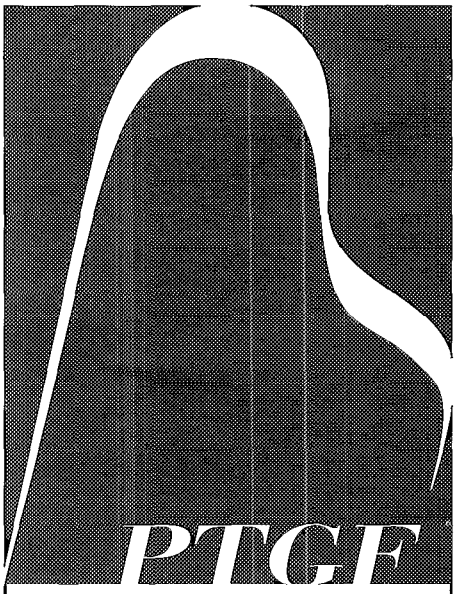

The PTG Foundation Needs Your Help!

The history of PTG and its predecessors is in danger of being lost. As part of its mission, the PTG Foundation has taken on the task of preserving that history.

The work of collecting, organizing and preserving our past must be an ongoing part of our present. Your donation of money or historical materials will allow us to continue this important work. You may also designate the PTG Foundation as the beneficiary of your PTG death benefit. Contact the Home Office for details.

Honor a mentor, friend or associate, either living or deceased, with a tax-deductible contribution. Three contribution levels have been established:

- Patron ($100 or more)
- Contributor ($50-$99)
- Supporter ($35)

To make a contribution, or for more information, contact:

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

Passages

Past President J.C. (Jess) Cunningham, RPT
February 11, 1918 - December 23, 1997

On the third day of winter, December 23, 1997 we lost a good friend and a lifetime supporter of PTG. Jess Carver Cunningham, RPT, was 79 years old. Jess had been in and out of the hospital and had many operations these past few years, he was too weak to attend any PTG functions, however his heart was always with PTG.

You honored him by presenting him with the Golden Hammer Award in July, 1997. Shortly after returning home, a party was given by his friend, Dan Hall, in New Orleans. Many friends attended and were honored to officially present Jess with the Golden Hammer (He was unable to attend the Annual Convention because of his illness). A reporter from the New Orleans newspaper was present to interview Jess. Pictures were taken and published in the newspaper and also in the PTG *Journal*.

Jess joined PTG July 4, 1964, in Chicago at the Annual Convention. He got excited about recruiting new members for PTG and by July 26th, 1964, he had recruited 17 new members and formed the first Louisiana PTG chapter. Jess became chapter president. Two years later, President Wendell Eaton, appointed Jess South West Regional Vice President. Jess teamed up with Aubrey Willis to travel throughout the Southwest region and formed 14 new chapters. Jess was the first RVP to have PTG chapters in every state of his region. He also worked with Aubrey to form chapters in other states.

President Erwin Otto appointed Jess as the first membership chairman in 1967 along with his duties as SWRVP. In 1968 PTG membership increased from 900 to over 1800, much of the membership drive credit goes to Jess for his untiring efforts. In 1969, Jim Sims wrote to Jess with the idea of presenting a gold plated tuning hammer to reward Aubrey Willis for his dedicated work, and the "Golden Hammer Award" was born. Jess, Jim Burton, and Kay Gilson decided on an award for individual member recognition, and the "Member of Note" award was developed.

Jess was appointed PTG Vice-President in November, 1969, after PTG Vice-President, Ward Rawlins passed away. Jess had been SWRVP and Membership Chairman for three years. A year later, in 1970 Jess was elected President of PTG and served until 1972. Jess got approval for the "Hall of Fame Award" in 1975 and presented 14 awards to the Hall of Fame recipients that same year. Jess received the "Member of Note" award in 1975 and was named to the PTG Hall of Fame in 1977.

Jess was buried in the town of his birth, Moss Point, Mississippi, December 27th, 1997. He will be sadly missed by PTG. His Golden Hammer Award will be placed at the PTG Home Office for display. If you would like to honor a true friend of PTG please make your contributions to the PTG Foundation.

—Gary A. Neie, RPT

In Memory . . .

Steve Maytan
Reno, NV

Pauline Glumac
San Pedro, CA

Calendar of Events

February 20-22, 1998
CALIFORNIA STATE CONVENTION
Pomona Valley, Riverside, CA
Contact: John Voss (909)794-1559
2616 Mill Creek Rd., Mentone, CA 92359

March 19-22, 1998
CENTRAL WEST REGIONAL SEMINAR
Clarion Hotel Airport, Wichita, KS
Contact: Marty Hess (316)744-0564
3900 N. Parkwood, Wichita, KS 67220

March 26-29, 1998
PA STATE
Hotel Brunswick, Lancaster, PA
Contact: James Bittinger (717)681-9191
2087 Franklin Road,
Washington Boro, PA 17582

April 23-26, 1998
PACIFIC NW REGIONAL
Banff Centre, Banff, Alberta Canada
Contact: Chris Gregg (403)226-1019
or Fax (403)226-2430
11444 Coventry Blvd., Calgary AB T3K 4B1

May 1-3, 1998
FLORIDA STATE SEMINAR
Mariott Hotel, W. Palm Beach, FL
Contact: Tom Servinsky, (561)221-1011
5271 SE Nassau Terr., Stuart, FL 34997

May 16, 1998
NEW MEXICO SPRING SEMINAR
Piano Store (Vintage Piano Workshop)
Albuquerque, NM
Contact: Les Conover (505)255-0658
4805 Central, NE, Albuquerque, NM 87108

July 8-12, 1998
PTG ANNUAL CONVENTION & INSTITUTE
Westin Hotel, Providence, RI
Contact: PTG Home Office (816)753-7747
3930 Washington, Kansas City, MO 64111

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 the Home Office, your event will be listed six-months prior and each issue until 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.

Congratulations Associates Make The Grade In November

Region 1

165 Erie, PA

Stephen G. Brown
508 Lillian Drive
Sharon, PA 16146

Region 2

325 Northwest Florida

Michael T. Tilley
21149 Lawrence Rd
Fairhope, AL 36532

Region 3

741 Tulsa, OK

Herman E. Jenkins
Rt. 3, Box 44
Mounds, OK 74047

DISPLAY AD INDEX

NEW MEMBERS

November 1997

Region 1

061 Ottawa, ON

M. David Featherstone
73 Springwater Drive
Kanata ON K2M 1X7 Canada

118 Long Island-Cristofori, NY

Tad S. Sterling
24 Tarkington
Holbrook NY 11741

165 Erie, PA

Tyson N. Hoppe
269 Quaker Drive
Seneca PA 16346

Ann L. Odom
309 Presque Isle Blvd., #202
Erie PA 16505

Region 2

296 Western Carolinas, NC

Jennifer H. Merrell
117 Meadow Run
Hendersonville NC 28792

Region 3

787 Austin, TX

Daniel R. Benke
5919 Shanghai Pierce Rd
Austin TX 78749

Region 4

405 Bluegrass, KY

Wayne I Worley
848 Arrowhead Drive
Lexington KY 40503

454 Dayton, OH

Kent S. Burnside
3121 CR 18
Bellefontaine OH 43311

537 Madison, WI

Margaret F. Hood
580 W. Cedar Street
Platteville WI 53818

543 North Central Wisconsin

Michel Y. Roy
P. O. Box 211
Baileys Harbor WI 54202

625 Central Illinois

Timothy S. Schloz
3210 N. Emery Avenue
Peoria IL 61604

Region 6

851 Phoenix, AZ
Christine M. Nilsson
1025 W. Buffalo
Holbrook AZ 86025

953 Modesto, CA

Colin Tamburri
507 Gumwood Court
Los Banos CA 93635

956 Sacramento Valley, CA

Alexander J. Hernandez
6140 Gloria Drive, #11
Sacramento CA 95831

Region 7

981 Seattle, WA

Jeffery P. Brock
2115 D Avenue
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Phyllis Tremper
PTGA President

AUXILIARY exchange

DEDICATED TO AUXILIARY NEWS AND INTERESTS

What is Osteoporosis?

Primary osteoporosis is an age-related disorder characterized by decreased bone mass and by an increased susceptibility to fractures. Osteoporosis is a common condition affecting as many as 15-20 million individuals in the United States. About 1.3 million fractures attributable to osteoporosis occur annually in people age 45 and older. Among those who live to be 90, 32 percent of women and 17 percent of men will suffer a hip fracture, mostly due to osteoporosis. The cost of osteoporosis in the United States is about $3.8 billion annually.

Who's at Risk?

There are many factors that determine who will develop osteoporosis. The first step in prevention is to find out if you are at risk, since not everyone is. The risk factors are:

- ***Age*** — The older you are, the greater your risk.
- ***Gender***—Women have greater chances than men.
- ***Race*** — Caucasian and Asian women have greater risk.
- ***Bone structure and body weight***— Small-boned and thin women are at greater risk.
- ***Menopause/Menstrual History*** — Normal or early menopause increases the risk.
- ***Medication/disease*** — Osteoporosis is associated with certain medications.
- ***Family history*** — Hereditary.

How Calcium Helps

Calcium plays an important role in maintaining bone strength. By itself calcium cannot prevent or cure osteoporosis but it is an important part of a treatment program. Yet, national surveys show that many Americans are not consuming enough calcium. Many women consume less than half the daily recommended allowance of calcium in their diet.

Optimal Calcium Intake

One way to increase the amount of calcium in your diet is to eat calcium-rich foods like low-fat milk, cheese, broccoli, seafood, and others. If you are unable to get enough calcium through your diet, your doctor can recommend an appropriate calcium supplement. Since there are several different types of calcium and a variety of supplements available, you should discuss the choice of calcium with your doctor.

Getting enough calcium whether through diet or supplements, is essential to maintaining bone strength and can play a vital role in preventing osteoporosis-related fractures. Speak to a doctor about how you can get the proper amount of calcium.

— Phyllis Tremper
PTGA President

In Memory of Bert Sierota

On October 16, 1997, Bert Sierota, age 68, an Honorary Life Member of the Piano Technicians Guild Auxiliary, died in her home.

She was the widow of Walter Sierota, who died July 17, 1986. She is survived by her mother, Catherine Spies and two daughters, Patricia (Pat) and Sheryl.

Bert was a member of the Philadelphia Auxiliary Chapter and was Chapter President for several years. She served on the PTGA board as Recording Secretary and Corresponding Secretary and on many committees through the years. She was also a willing worker for the Pennsylvania State Conference of Piano Technicians.

Bert loved to do needle-point, knit and crocheting. She taught many craft classes at conventions and state seminars. She made our beautiful needle-point Auxiliary banner seen at the annual convention and embroidered the table cloth after each one of us signed our name as a fund-raiser for PTGA. Bert made several needle-point pieces as fund-raiser for the Pennsylvania State Conferences.

We have many pleasant memories of Bert and will miss her.

— Kathryn Snyder

A Look Backward & Forward

Already 1998 is here! Where did the past year go, so quickly? I hope that it has been a good year for you, and that the new year will be even better.

Just before the convention in Orlando, Jean and Ralph Long, PTG friends from England, came to visit us before attending the PTG convention in Orlando. Fortunately they do speak English, but sometimes I began to wonder.

It all started when I showed them the closet where they could put their clothes. Jean answered "How convenient to have it next to the bed." But, when she opened the closet door, "There's no loo in here."

The next morning, when I asked how she made out with the microwave to make tea, her reply was, "I couldn't find the torch." I suddenly had visions, of the Olympic torch running through my house. All Jean wanted was a flashlight, so she could find a light switch.

On our way to visit Washington, DC they wanted to know if we were going to put soda in Fred's boot! Now I know we are strange people in NJ but we do not put soda in our boots. We then found out the boot is the trunk of the car. After checking the bonnet of the car we were off to visit Washington, DC. They laughed at our sign's on the bridges, "Bridge may be icy" (in the summer time?) "Well, blow me down, toots."

We found that there are several foods that we take for granted, and are not served in England. Funnel cake, Harvard beets, Sloppy Joe's and Scrapple were all new to them.

On Sunday morning, Jean asked if we were going to roll a Joint before church! My reply was "I think you need to go to church more often." It turned out that a joint is a rolled roast. You can see we had a delightful time.

When I interpret for the deaf there are many expressions, that they do not understand. Think about a rubberneck, a redneck, driving up the wall, flipped your lid, it's raining cats and dogs, you're chicken, and your marbles are loose.

Now to a more serious note. The Annual PTGA Dues notices have been mailed. A few of you have sent your check for $15 to me, but for some I am still waiting. In order to keep the costs of dues to only $15 we do not send reminder notices. We would like to have some of you join who have never been a PTGA member. It is a real value for the inexpensive fee. Also, it would be appreciated if you would include a check for the PTGA Scholarship Fund at the same time.

If you have any questions, please contact me at any time. You are an important part of PTGA and we want to have you included in our membership for 1998.

To renew your membership send your name, address, phone, fax, e-mail and birthday to: Marilyn Raudenbush PTGA Treasurer, 20 N. Laurel St., Millville, NJ 08332-4148.

CLASSIFIEDS

Classified Advertising rates are 40 cents per word with an $8.00 minimum. Full payment must accompany each insertion request.

Closing date for placing ads is six weeks prior to the month of publication.

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REYBURN CYBERTUNER State of the art piano tuning software from authorized distributor and author of its user manual, Mitch Kiel, RPT. Reyburn CyberTuner version 2.0 just released, includes Custom Equalizer (simple graphical interface lets you individually adjust stretch at A1, A2, A3, A5, A6 and A7—totally amazingly cool), Limits (automatically senses scale problems and adjusts octave widths as needed—spinets and short grands never sounded better), Pitch Raise (at every note, automatically measures and calculates overshoot using optimized overpull percentage from 4% to 38%), Pianalyzer (specialized spectrum analyzer displays pitch, inharmonicity, sustain, and volume for partial 1-8, 10, and 12 for any note—great for voicing and scale design), PTG-approved for scoring RPT tuning exam (a CTE's delight—auto-measures and records an aural tuning in 12 minutes or less), creates an editable spreadsheet and graph of any tuning, unlimited storage, and more. Read a review of RCT 1.0 in Jan. 1997 Journal. Reyburn CyberTuner 2.0 $795 (Macintosh only). Upgrade from RCT version 1. x $149. READY-TO-USE COMPLETE PACKAGES STARTING AT $1595 (includes portable Mac computer & RCT 2.0). Try RCT at no risk with our 30-day money back guarantee. Mitch Kiel, RPT, 11326 Patsy Drive SE, Olympia, WA 98501. 888-I-LUV-RCT (888-458-8728) mitchkiel@reyburn.com www.reyburn.com (Web site)

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Piano Technician/Events Coordinator, Department of Music and Art, Tennessee Technological University, Cookeville, Tennessee. High School diploma required. Certification as Registered Piano Technician (RPT) or commensurate experience required. Experience in piano tuning, voicing, and regulation required. Experience in rebuidling pianos preferred. Ability to provide minimal level of instrument repair for wind, brass, percussion preferred. Ability to effectively perform various managerial duties, including departmental inventory control, coordinating equipment check-out, and scheduling student support staff for duties with concerts and other activities required. General microcomputer experience in word processing and database functions preferred. Ability to establish and maintain effective working relationships with faculty, staff, students, and the general public required. This is a continuing, 12-month staff appointment. Salary competitive and commensurate with education and experience. The state of Tennessee offers excellent insurance and retirement benefits. TTU is an AA/EEO employer. Submit a resume and three (3) letters of reference to: Dr. Greg Danner, Chair, Department of Music and Art, Tennessee Technological University, Box 5045, Cookeville, TN 38505. Application deadline date: February 21, 1998.

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See our ad on page 3.

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WANTED

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Piano Discussions™

February 1998

News From The World of MSR/PianoDisc

In Memoriam

The world lost a wonderful man, and PianoDisc a very special friend, when Floyd Cramer died last December.

As a musician, he was a true original. His signature slip-note style, the foundation of country piano and "The Nashville Sound," is heard on hundreds of recordings from country music's golden age, and is still being widely immitated today.

Although Floyd Cramer was a star, he never seemed to know it. He was humble, kindhearted and as good a man as we have ever known — a gentleman in the truest sense of the word.

The world is a better place for having had Floyd Cramer in it. We will miss his friendship and support more than words can say.

Tech Gazette

Yamaha Service February 1998

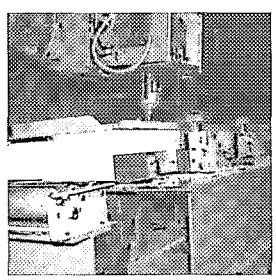
Last month, in our continuing articles about Yamaha Music Manufacturing (YMM), we discussed how the tuning pin bushings are inserted into the plate.

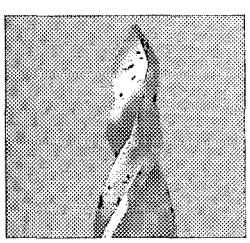
In this article, the backframe moves to the next station where the tuning pin holes are drilled.

Drilling The Tuning Pin Holes

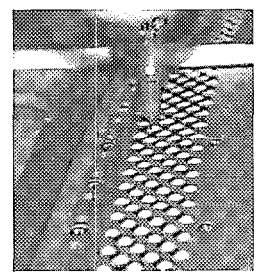
This operation has always been a challenge for piano manufacturers. The string leaves one side of the pin and attaches at the other end to a hitch pin. If the holes are not in precisely the correct place, the strings don't line up with the bridges, and the action parts don't line up with the strings. Also, the drilling process controls the tightness of the tuning pins. If drilled "by hand," errors in angle and alignment can creep into the process. If the drill bit gets too hot or is used when slightly dull, the tuning pin torque is uneven.

The computer controlled pinblock drilling station (shown in the photo) was engineered, designed and manufactured by Yamaha exclusively for YMM. It solves the problems associated with hand drilling, creating precisely drilled and sized holes in every piano constructed.

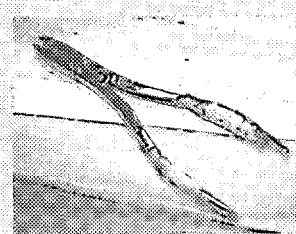




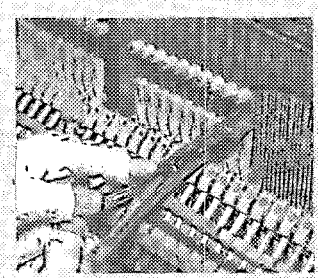
As the backframe reaches the drilling machine, it is locked into place and the platform is tilted so that the holes are drilled at a 5 degree angle. A unique "two diameter" drill bit (see photo) is used instead of a "conventional" drill bit. The smaller diameter of the tip of the drill bit initiates a pilot hole in the center (or dimple) of the plate bushing. As the drill bit extends through the plate bushing and into the pinblock the larger diameter of the drill bit completes the drilling to the precise diameter. Great attention to detail went into designing this machine to produce Yamaha pianos with the best tuning characteristics possible. Just ask any piano technician which brand of piano he or she likes to tune above all others.



The YMM "Tip of the Month"



Wire bending pliers have a convex jaw that pushes the wire into a concave jaw. The direction the wire bends depends on which side of the pliers is "up". To eliminate confusion one technician at the factory taped the handles first for comfort, but put more wrappings on one handle than the other. When picking up the tool, one can feel which handle is larger and thus which way the wire will bend when inserted into the jaws of the pliers.



Stay tuned for next month's information from Yamaha Music Manufacturing.

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