PIANO TECHNICIANS
Journal
Official Publication of the Piano Technicians Guild

June 1998

Vol. 41 • #6

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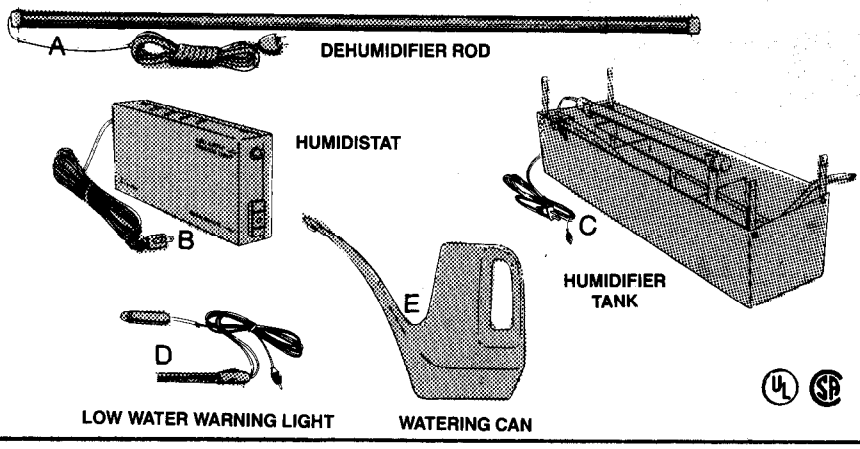

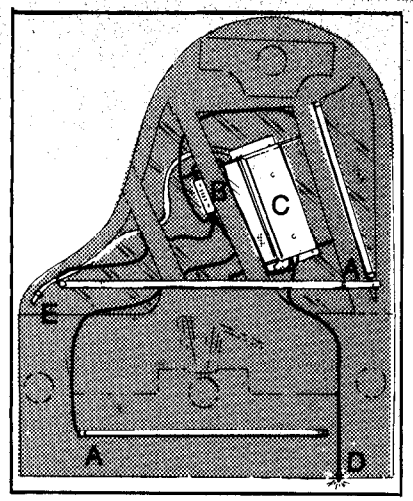

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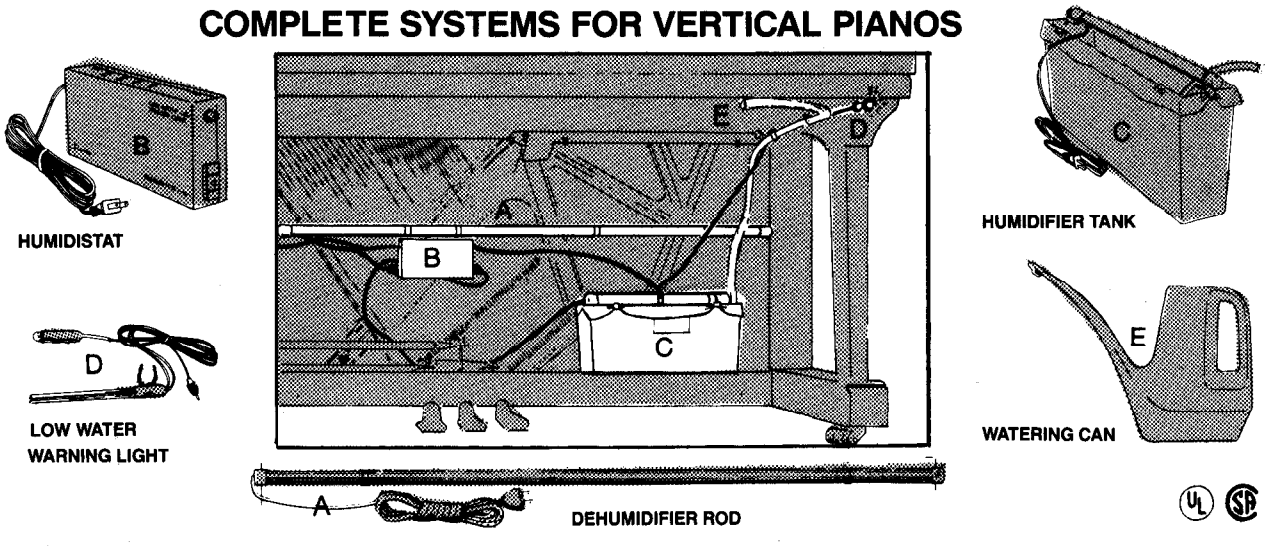

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Journal
Official Publication of Piano Technicians Guild

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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
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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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EDITORIAL PERSPECTIVE
Tools & Methods, Old & New

One of the marvels of the technological age we live in is the rapidity with which improvements in tools and methods of work are evolving. For instance, it was more than 200 years after the invention of the piano before the first electronic tuning device, the Stroboconn, was invented. Within a few decades, more easily portable strobe tuners appeared, followed by the first digital tuning devices. Now, visual tuning devices have achieved levels of sophistication unthinkable just 10 years ago.


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Steve Brady, RPT
Journal Editor

I had hoped to publish reviews of three important new VTD upgrades – the TuneLab97™ tuning program for Windows95, the latest Reyburn CyberTuner upgrade, and the Sanderson AccuTuner™ III – in this issue. Originally, I sought a reviewer who could use and review all three objectively and fairly, but I failed to find such a person. What I've done instead is invite three different individuals to review their VTD of choice. Unfortunately, due to Dr. Al Sanderson's serious health problems earlier this year, release of the SAT III has been delayed, and the SAT III review will have to wait until at least next month.

Adhesives are the topic in this month's Q&A feature, and here again we see the impact of technological development in the creation of new adhesives for bridge repairs, cosmetic soundboard repairs, and key top replacement. Today, life as a piano technician without CA glues and specialty epoxies would be unthinkable for most of us.

Ironically, in light of all the technological advances, some pianocraft tools from 100 years ago are just as appropriate and necessary for the job today as they were then. Consider the tuning hammer in my article, "The Way It Was." Consider some of the tools used in bellywork, as described by David Hughes in his excellent survey article. Consider the scrapers in Bob Hohf's treatise on sharpening the same.

Finally, the one tool most important to our work, the one tool most basic and irreplaceable, the human body, is the subject of Clair Davies' new series on self-applied Trigger Point Massage for piano technicians. Clair shows how you can relieve those aches and pains by finding and massaging the effective trigger points.

Modern tools and methods make our work easier and the results better. But each advance in technology comes with both a blessing and a curse. Electronic tuning aids, for example, have the potential to speed our work and make it both more accurate and less stressful to us. The downside is the potential for our ears to become lazy if we don't continually make sure to use them as we tune. The "miracle glues," epoxy and CA, give us the tools to perform repairs more quickly and in ways previously impossible, but also hold the seeds of sloppy workmanship if we don't take the time to learn proper joinery and the skills of working with more traditional adhesives when appropriate. Time-tested tools and archaic methods can also be beautiful – works of art in their own right – and a joy to use.

We make the difference; each technician acquires and develops a set of tools – both literal and figurative – uniquely his or hers, according to personal preference, and those tools provide a kind of comfort to the user. The tools and methods we use define us as artisans, and that's why they hold such an important place in our lives and work.

Please submit tuning and technical articles, queries, tips, etc., to me:
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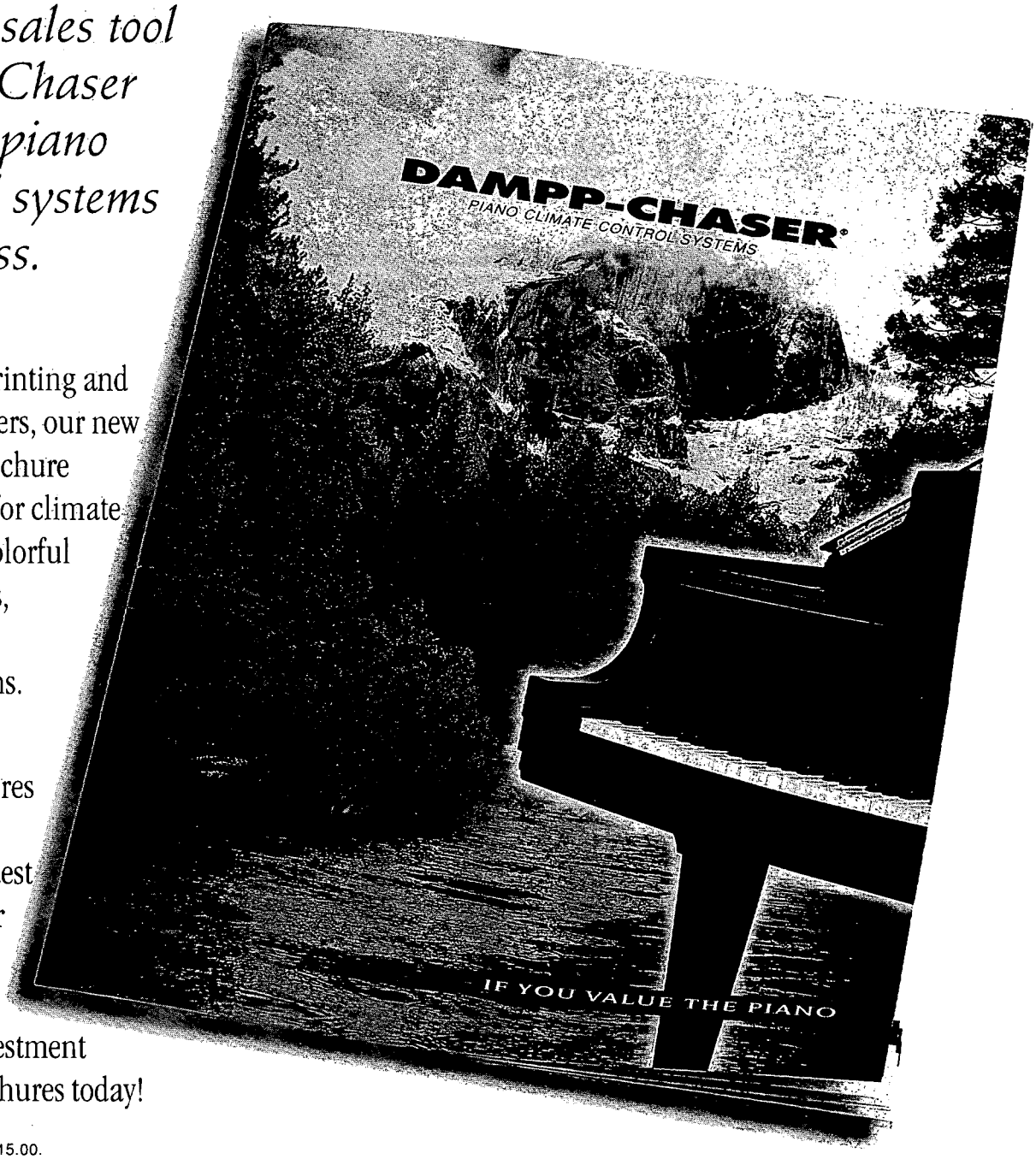

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Piano 300

By this time next year (June, 1999) we will be only six months away from the change of the millennium. In the spring of 2000 the Smithsonian Institution in Washington, D.C., will kick off the year-long celebration of the 300th anniversary of the invention of the piano.

Being people involved with the piano, we owe our very existence in the business of pianos to Bartolomeo Cristofori, the inventor of the pianoforte. Because of that we need to be among the largest supporters of the project called Piano 300.

The idea for noting the 300th anniversary of the invention of the piano came from David Sutherland, scholar and instrument builder in Ann Arbor, Mich. It has been five years now since a group of scholars, curators and builders were called together to explore the period of the early piano. From those initial discussions Lynn Edwards of the Westerfield Center for Early Keyboards began to identify builders to make copies of pianos made by Cristofori. It was from this point the Smithsonian began to explore the possibility of an exhibition.

Marshall B. Hawkins, RPT
PTG President

The Curator of Musical Instruments at the Smithsonian Institution's National Museum of American History, Cynthia Adams Hoover, emphasizes how important collaboration has been and continues to be to the success of the Piano 300 project. The third floor of the museum will have over 5,400 square feet of space dedicated to the project. This will house the exhibition of antique and modern pianos, action models, electronic interactives, graphics and films along with live performances to tell the story of this wonderful instrument's 300-year history.

A goodly number of proposals have been submitted for collections, ideas and objects to go into the exhibition. Cynthia Hoover and Ted Good have been to Italy in order to examine the 1722 example of a Cristofori piano which it is hoped will join the exhibition. The exhibition will attempt to show pianos in context with associated materials such as music, tools for tuning, methods of learning and listening, the diversity of owners by the end of the 19th century, the importance of manufacturers, concert presenters and performers. It is expected that members of the Piano Technicians Guild will be on hand during various periods of time to assist with portions of the exhibition.

The piano has always played a fantastic role in cultural tradition, education, personal growth, religion and entertainment. The concert presenters including representatives from the Washington Performing Arts Society and the Van Cliburn Foundation have offered to design concert series featuring the piano and to negotiate with artists regarding benefit performances as well as contacting their colleagues in other professional organizations for further input.

Piano technicians have a unique relationship with the piano. We should utilize every opportunity to pass along to our clients on a daily and continuing basis the merits of lifting up and supporting Piano 300 along with all of the benefits derived from the music produced on the piano. Chapters are encouraged to develop strategies for promoting this milestone in the history of the piano. All are invited to visit the Piano 300 website (http: etc.,) We encourage you to share your plans and experiences. The time is ***"now"*** in order to benefit the most by year 2000.

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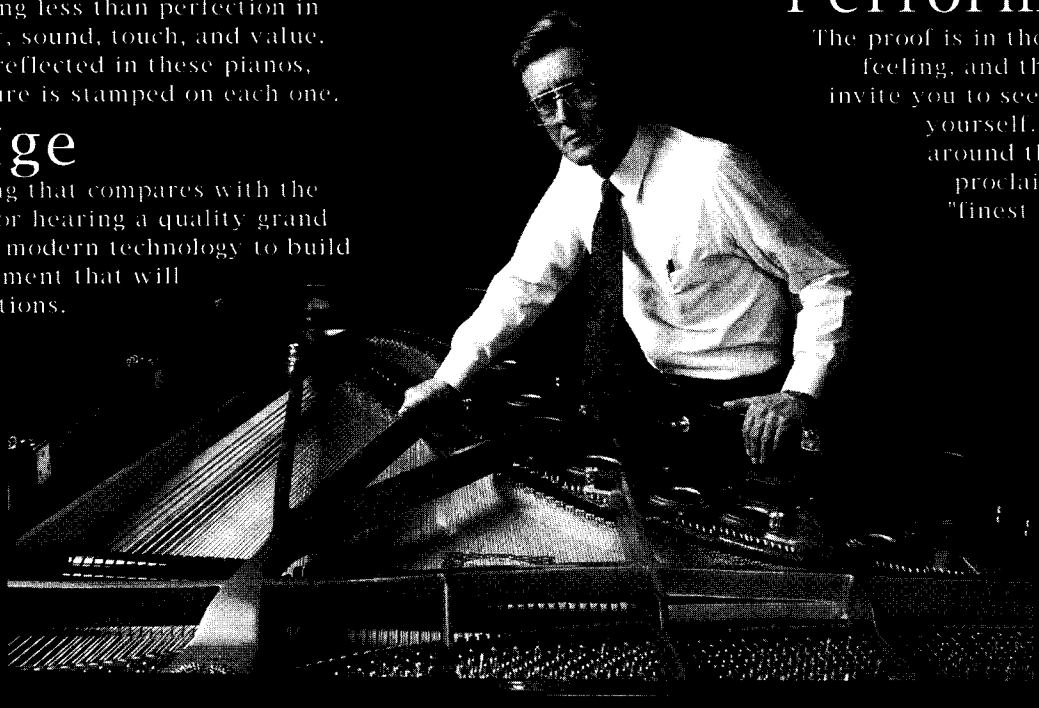

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Cover Sends a Message, Too

The cover of the March 1998 issue of the *Journal,* which shows a car jack with a makeshift screwdriver handle being used to support a grand piano gives a terrible impression of the Piano Technicians Guild. I would feel mortified if a piano teacher or owner thought that this is how I would treat their beloved instrument.

In the future, please be aware that the cover picture on the *Journal* is in plain sight of the public; continue using the tasteful and interesting images you have selected in the past.

— *Carman Gentile,*
Redwood Chapter

More on Tuning to Pipe Organ

As a former RTT and now an Associate after having been out of the Guild for a number of years while I concentrated on harpsichord tuning and service as well as the Northeast Sales and Service Rep for Wicks Organ Company, and for the Boston dealer for Rodgers Organs (Rodgers of New England) working mainly with pipe and pipe/electronic organ installation, sales and service, I was interested in your short article in the March *Journal* regarding tuning pianos to organs in churches.

I would add only a few comments having to do with pipe organs particularly and those are that pipe organs are extremely sensitive to temperature – far more so than pianos – and will travel much faster up and/or down, depending on the "swing" of the temperature in the church. As pipe organs usually include pipes made of different materials, including wood and "spotted metal" (an alloy of tin and lead), with newer instruments having more tin than lead than older ones (the newer ratios one to the other may be 60 tin/40 lead, while in the older instruments, it may be 50/50 or something else, depending on the builder. If you can see the pipes, you can tell by the patina with more tin being brighter in sound and visually with obvious spots and the ones with more lead being duller in both sound and visually.) If the air is cold, the metal will contract some and the pitch will go up, if it is warm the metal will expand a bit and be flatter than if cold. For this reason, it is a good idea to call the church at least a day before tuning the piano and have the heat turned on or the air, depending on what the ambient temperature is at the time.

Also, it is important to use a principal stop at the eight-inch level since it will give the purest and least "fighting" sound to the piano. The principal may be called that, or diapason, sometimes geigen (actually more of a string sounding principal). If the organ is small, there may be only a few stops, or some of them may sound the same pipes on one keyboard as on another. This should not create any problems since you can use the same theory of the "Principal" or "Diapason" stop on either keyboard. To find out if they are the same on both (all) keyboards, draw one on each keyboard and play Middle C or A. They will all sound the same. Also, make sure that the Swell pedal(s) are open as many organs today are built within an expression box which is a device to allow the organist to shade the music as it is being played from soft to louder and vice versa. This pedal is always the one on the left toward the center of the pedalboard in an opening in what organ people call "kneeboard." This is the panel under the keyboards (manuals, as opposed to pedalboard). There may be more than one of these expression pedals, and as many as five, in which case, they will be labeled and you should choose the one that says "Swell" or "Great." If the organ has more than one or two keyboards, you should play on the Great, and this will be the one on the bottom of a two manual console, in the middle of a three-manual, the second from the bottom on anything bigger. The stops for each keyboard are arranged across the top of the upper manual, or on side jambs on either side of the console, all will be labeled for the division they control, beginning on the left side as you face the console, with the Pedal, then the Swell, then usually, the Great, then the Choir, then Solo, Echo, etc. as you continue around to the right hand side.

Sounds complicated, but it really is not. Any piano tech who knows what he/she is doing can figure it out in a very short time as all consoles built in this country since about 1925 or so are standardized. Also, don't be intimidated by an organ ... you almost cannot hurt it. Don't forget, however, to shut it off before you leave the church – the blower costs money to run.

Hope this helps some of my fellow technicians out there. If you need more, call me at 901-382-8732.

— *Ken Licht*
Memphis, TN Chapter

NOTICE — To PTG members and all *Journal* subscribers . . .

Effective immediately-the Home Office will no longer mail out more than three (3) back *Journals* to anyone (excluding those outside the US) who does not notify the Home Office within three (3) months of an address change or of lost/missing issues.

If you should move, your notice of new addresses must be called or mailed in to the HO within three months of the move. *Note- Please do not expect the Postal Service to forward your* Journals *to a new address.*

Tips, Tools & Techniques

More on Stress Relief in Tuning

I thought it would be a good idea to update the item which appeared over my name in the March 1998 issue of *PTJ*, since it was taken from a newsletter about five years old.

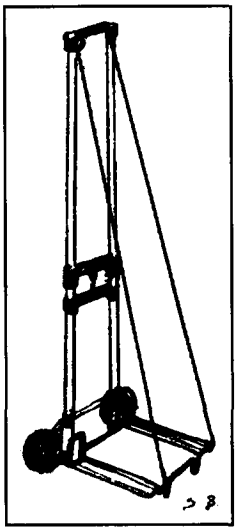
I've now been tuning for 20 years, and for the past four years have been happily using the Mahaffey impact tuning hammer, which has eliminated all left arm pain and the need for any supportive devices. I am eternally grateful to Barbara Pease for turning me on to it, and can't recommend it enough to technicians for their vertical tunings. I should also add that, facing a 200-cent pitch raising on a grand one time last year, after 15 minutes I began using the Mahaffey, and it made the first major run-through a piece of cake.

Second, I'd like to also mention that another important help in eliminating arm stress was my taking a class by Anne Ingarde, a physical therapist who has taught at a few NEESCO Regional Seminars and N.E. Chapter meetings, and who will be teaching at the Annual Institute in Providence this July. A few years back, it had been presumed that there would be few takers for her class; however, technicians lined up down the hall to get in, prompting the need to schedule more class time. Clearly, a lot of us are in pain, and she's honed in on it. Check out her class in Providence.

— David Flanders, RPT
Rhode Island Chapter

Luggage Cart

As my tool kits get heavier and heavier and my arms get older and older, I frequently take the easy way into (and out of) the customer's home: I load the cases onto my collapsible luggage cart. The cart (shown fully extended in Figure 1) doesn't take up much space in the trunk of my car, but is a real help when I've got a ton of tools to transport over a long distance or up and down steps.



Another great use for this back-saver is the transporting of grand actions from the piano to the car. I just stand the action on end on the base of the cart and strap it to the frame with bungee cords. It's important to watch the balance of the action when doing this, but when done properly, transporting an action this way is both easier and safer than carrying it out.

— Steve Brady, RPT
Journal *Editor*

Tuning Complaints

If a client calls to complain about a recent tuning, find out whether the problem is with single notes or with intervals. I recently received a call regarding notes which were "twangy," as though they had "fast beats." I suspected a slipping unison or two, and asked the client to demonstrate the problem over the telephone. After she played a series a major and minor thirds in the mid-tenor, I developed another theory and tested it by asking if the problem showed up when she played single notes, fourths, fifths, and octaves as well. No – the piano only bothered her when she played thirds.

The answer? I had performed a major pitch raise (100+ cents) prior to tuning this piano, which she had been playing untuned for several years. She had become so accustomed to the slower beat rates that the corrected ones took her by surprise!

— Kent S. Burnside,
Dayton, OH Chapter

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Adhesives & Pianos

Bridge cracks

Q Willard Leverett in his video, "Piano Bridge Repair Made Easy," showed Leverett using a 30-minute epoxy to fill the tiny hairline cracks in both a treble and bass bridge. The epoxy he was using was very watery and therefore was good at soaking deeply into the wood. Do any of you have suggestions where one would look for the watery variety? All I have been able to find is epoxy with the consistency of honey.

Thanks,

— Glen Deligdisch
Charlotte, NC Chapter

A **Bill Simon:** You don't need to look for the "watery" variety of epoxy. Just apply heat to the best 30-minute epoxy you can find. The viscosity drops, it wicks in, the cure is accelerated, etc. Try a soldering iron on low, run it through the glue above the hairline cracks. This tip is on the sides of many of the epoxy containers, where they mention not to thin the epoxy.

A **Mike Jorgensen, RPT:** Have you checked with Gougeon Bros.? They have a great catalog and instructional videos and are experts in wood boat construction. (On the World Wide Web navigate to) <http://www.gougeon.com>.

A **Rob Stuart-Vail, RPT:** Also try Epoxy Technology in Billerica, MA – near Boston – I used their Epo-tek™ line some years ago on a Bechstein block where I inserted plugs for upper bass and some tenor notes ... worked fine; still holding okay after 15 years.

A **David Stanwood, RPT:** Epoxy Technology sells epoxy as this as water that is incredibly strong and sucks into the tiniest cracks. It really brightens up the tone on old bridges that have hairline cracks. The stock Number is #301. It's much stronger than the West System epoxy; the stuff is designed for gluing glass optical components together. It's clear. It's also great for pinblocks when mixed with the colloidal silica from West System. It makes a paste that squeezes out really easily and hardens really hard. Epoxy Technology's phone number is: 978-667-3805.

A **Don Rose, RPT:** I have had very good success with using Krazy Glue™ for wood in this application. Much faster and even an upright can be done without tilting! Another plus is you may begin tuning on the same visit.

A **Robert Goodale, RPT:** I realize that several others have already touched on this, but I'll pitch in my two-cents worth (no pun intended), for what it's worth. "Free flow of information and knowledge," that's my philosophy!

For split bridges/loose pin problems on any high-quality instrument I immediately recommend a recapping job. It looks neat, it's professional, and it's the right thing to do. There are many occasions, however, when we encounter lower-quality instruments or customers who are not yet ready to invest in a full rebuilding. In such situations we are often required to "repair" such bridges.

Assuming the bridges are not beyond all hope and split deeper than a California fault line, the first and obvious step is to de-string the instrument (or section of bad bridges on less severe cases). Pins must be pulled out carefully. Some remaining tighter pins may take some splinters with them if care is not taken. Except in some more minor sectional repairs, I replace all the pins with new, particularly if I am repining an entire bridge. Pins are cheap, easy, and look more like a professional repair. I recommend the long pins sold by Pianotek (p. A-18). The shorter pins sold by many other suppliers usually bottom out in an old bridge hole making it more difficult to achieve a solid-fitting pin. ***Do not*** replace loose pins with the next larger size. Unlike tuning pins, each size bridge pin is considerably larger than the previous size. All you will accomplish is splitting the bridges worse.

In terms of epoxies, I highly endorse the "West System" (by Gougeon) 105 Resin with the 206 hardener. This is also available from Pianotek (p. B-19), however, here's a hint: it is also available over-the-counter at many marine supply stores for less money. If they don't have it, inquire about the price to order it. You can also check out their Web page at: <http://www.westsystem.com/>.

West System 105 has the fantastic advantage of being incredibly thin in viscosity. It soaks deep into the wood like a sponge, filling microscopic cracks and splits you didn't even know were there. At the same time it has just enough body that it still remains manageable. When cured it is absolutely glass-hard, critical for positive transfer of vibrational energy. Many epoxies cure surprisingly soft, particularly the so-called 30-minute varieties. No offense to those who use these types of epoxies – I use them as well, just ***not*** for bridge work.

FYI: *Gougeon also makes a really great fast-cure epoxy for "other" uses – #865-B epoxy and 865-B hardener. Also available from Pianotek, but check the marinas for this, too.*

If there are any larger splits in the bridge, two applications will be necessary, the first to fill the cracks followed by all needed filing/shaping and sanding, and the second for the pin holes. Epoxying the new pins into the holes will insure a long-lasting reliable repair with no loss of vibration between the pins and the bridges.

Likely before this step is taken you will want to ***lightly*** sand down and smooth out the bridge tops (be careful not to change downbearing). You can also clean out the notches while you're at it. At this point the tops will need a new application of "Dag," (one of those fun words no one knows the origin of – or cares). Traditionally, Dag is made from graphite, but I much prefer gray Teflon™ (Pianotek P. B-18). Use a small artist brush to apply. A couple of coats may be necessary. Follow this by burnishing the tops with a thick soft cloth or a piece of hammer felt. The result will be a beautiful shiny finish virtually identical to graphite, but with half the effort and no mess. It looks even better on new bridges.

I have seen technicians use a variety of ways to apply the West System 105 to the pin holes. One popular method is to simply dip a piece of heavy music wire into epoxy and dribble it into the hole. A way that works faster and more efficiently that I have discovered is using a hypo-oiler bottle. Use the large sized bottle. West System 105 is quite thin when first mixed and can be applied easily in this manner, but you do

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have to work fast. After about 10 to 12 minutes it thickens enough that this becomes more difficult. The epoxy ***must*** be very well mixed or it will not cure evenly – I don't know why, it just won't. After mixing for several minutes, quickly pour the mixture into the hypo bottle and go to work. I like to wrap the bottle in a piece of medium felt cloth (to protect the plastic bottle), and then hold and squeeze the bottle with a pair of channel-lock pliers. Quickly move from one hole to the next all the way down the bridge until a adequate amount of epoxy has been injected into each pin hole. Note that if too much is injected it will squeeze out in a big mess when the pins are inserted. Too little may not do the job – you will have to experiment.

Once all the holes have been epoxied you need to immediately empty and clean the hypo-bottle. The pins can wait till afterward, the epoxy will not harden for many hours so you have a little time at this point. Fill and rinse the bottle several times with acetone. If epoxy hardens in the needle, blow it out with compressed air and/or insert a small piece of music wire, followed by a good rinsing with acetone. The bottle can last a long time if it is properly cleaned after each use.

The pins can now be inserted into the bridge. I like to tap them in with a piece of brass rod with a small dimple on one end to protect the copper plating. It is likely that some epoxy will ooze out when the pins are inserted. This can be flossed out with a rag and a small dry brush after all the pins are installed, repeating several times with fresh clean rags. If there is any substantial remaining residue, it can be loosened and cleaned with a small artist brush dipped in acetone followed by a dry rag. This may take some of the Dag off, however, so some manual touch-up may become necessary.

Once the epoxy has cured, the tops of the pins can be filed flat for a professional and cosmetically appealing look. A file may be necessary in tight areas, but I simply take a belt sander with a fine belt and run it across the bridge tops. Obviously this requires a great deal of care – don't go crazy. Keep the machine moving so that the pins don't get too hot. This procedure is actually easier than it sounds. Do a bit of touch-up with a file, clean things up a bit, and you're home-free.

I first learned this procedure from a very successful and proven technician in the Midwest who specializes in bridges and soundboards (I won't mention names here, but you can e-me privately). My personal experience with it has yielded great success numerous times, however, I will admit that it took several jobs before I perfected my technique. Hopefully it can bring you success as well.

Q *Adhesives for Plastic Sharps*

What adhesives are people using to glue on plastic sharps?

— Danny Moore
Houston, TX Chapter

A Larry Fisher, RPT: I prefer PVC-E glue. The bond is flexible so when the wood and plastic move about, expanding and contracting at different rates, the glue takes the flex and the bond remains intact. Ripping one of these things loose after the glue dries, compared to ripping off a Titebond™ or wood-glue-held sharp convinced me.

A Wallace Wilson: I like to use Liquid Nails™. Works well, no clamping! There are different kinds of Liquid Nails™ for specialized applications, but they won't work for this. Just plain vanilla Liquid Nails™.

A Joseph Alkana, RPT: I've been using Titebond, just liberally pouring it into the cavities or bays of the plastic sharp and then inverting it on to the resurfaced key top. No actual part of the sharp bottom receives any glue in this method. Quick. Works great. No callbacks thus far. I learned this from Randy Rush here in Seattle.

A Barrie Heaton: I have used about everything short of flour-and-water for sharps. I find a hot glue gun the best in the workshop, and contact cement in the home.

A Ken Burton, RPT: Friends, I don't think you can do any better than Weldbond™. ***[Editor's Note:*** *Weldbond™ is similar, if not identical, to PVC-E glue. SB]*

A Guy Nichols, RPT: I've had good luck with Titebond™, by putting a glob in the hole of the sharps while they're upside down, (ten or so at a time), and then just setting them on the well-prepared wood. I'm starting to like the Weldbond™, though, and may start using it for several applications.

A Jon Page: Sharps: Titebond™ in the hollow and tape to key until dry. Tip: Tape adhesive is a pain to remove; place paper on the tape first at key surface. Or rubber band? Naturals: PVC-E. It will not etch into surface accidentally. Rub off residue before buffing.

A Mike Jorgensen, RPT: What about Duco™ cement for gluing on those hollow plastic sharps? It seems to melt the plastic a little and forms what appears to be a solid bond. (IMHO) Smells deadly! Never had a sharp come off with this!

A Greg Torres: I have used regular contact cement, the "safety" contact cement by Elmer's™ and carpenters wood glue. I personally have had the best results with the wood glue. The most important thing is to roughen the bottom of the plastic sharps with 100 to 120 grit sandpaper first (I have also used my grand hammer-tail checking file with good results) and also make sure the key surface itself is sanded flat, clean and dust free. Haven't had any problems with this method.

A Richard Wagner, RPT: I dunno about that Titebond idea. I tried it once and ended up doing the job over again. Maybe my fault. Who knows? Come to think of it, it might not have been Titebond™ after all but some left-over "Lepages" I'd saved from the First Grade in 1963. Anyway, I'd feel safer with 3M Water-based Contact Adhesive or perhaps PVC-E.

A Keith A. McGavern, RPT: Myself, I use Titebond™. Works okay.

Continued on Page 16

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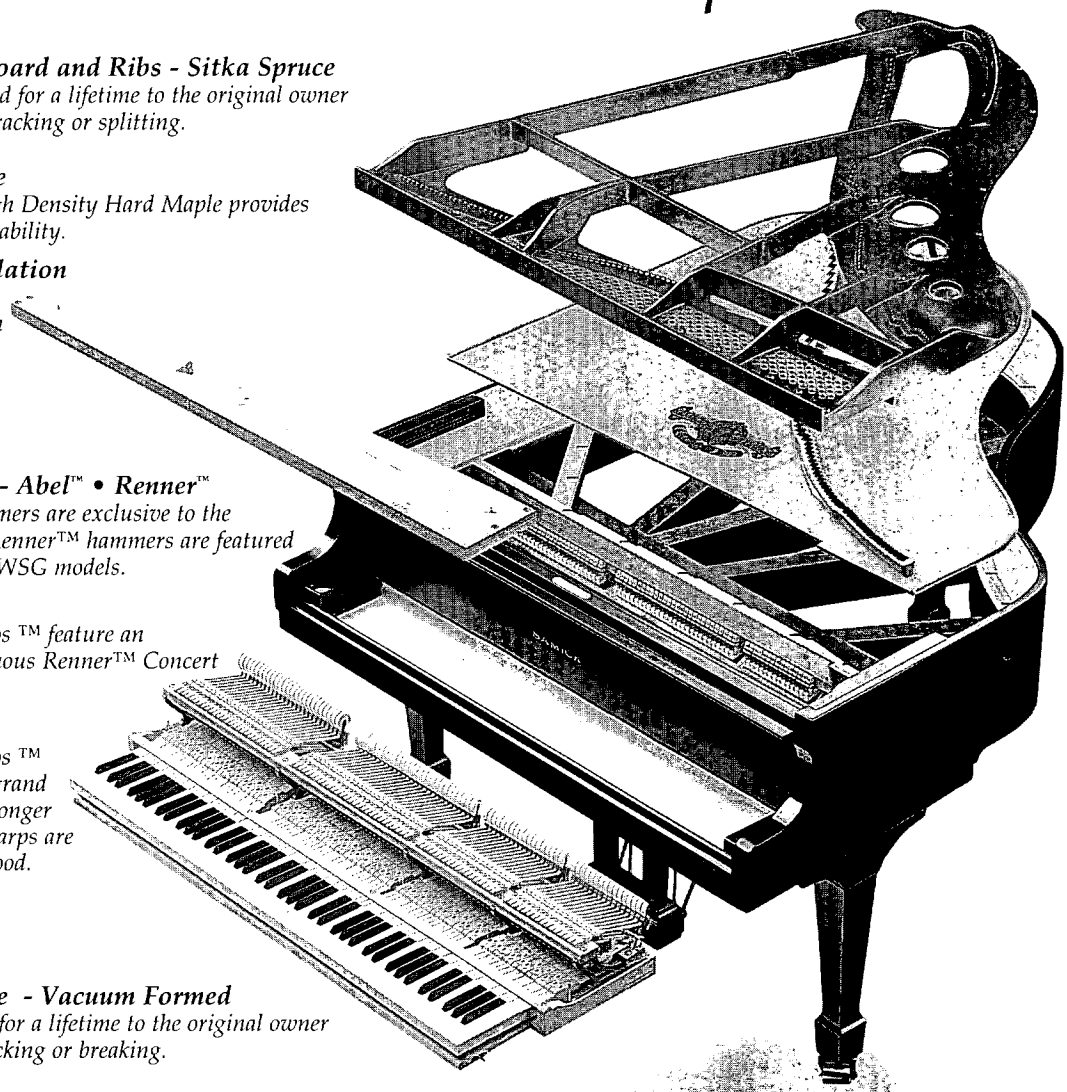

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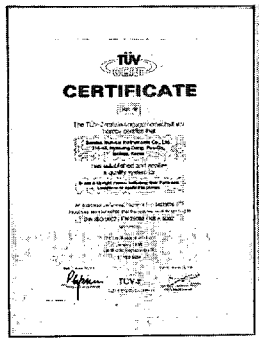

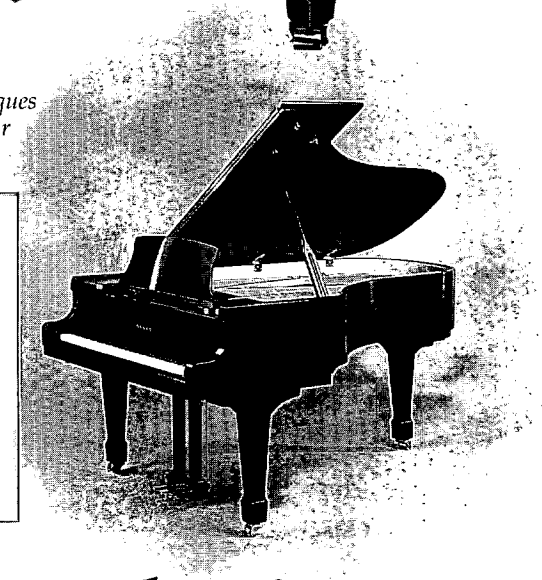

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A Survey of Bellymen on Soundboard Building

By David G. Hughes, RPT
Baltimore Chapter

Preamble

The practice of installing a new soundboard/rib/bridge assembly in a grand piano rim outside the environment of the original manufacturer's factory is well beyond its infancy. Indeed, the procedure occurs nationwide on a daily basis in remanufacturing facilities ranging in size from buildings of several stories occupied by tens of employees to mid-sized shops with a handful of bellymen to the single technician operating a bellypress in his garage. Not at all long ago, soundboard replacement was considered as radical an undertaking as pinblock replacement was considered to be in the 1960s. Now, however, it is taken as a matter of course within the framework of total piano restoration by a preponderance of technicians, including those who do not personally perform the installation themselves.

Those who do take the necessary leap to commit to the undertaking view it as merely a necessary extension – albeit a costly and laborious one – of such disciplines as installing new hammers and rebushing keys. With the possible exception of manufacturing a replacement keyframe/keyboard assembly, soundboard duplication, as viewed from any angle, is the most involved process within the rebuilding trade as we currently understand and accept it. Perhaps someday rebuilders will bend their own rims and merely reinstall the original plates – but that day is not on the immediate horizon!

By and large, today's factory-employed bellyman operates in a setting handed to him by a corporate hierarchy ultimately possessed of profit-and-loss mindset. Certainly he must be an above-average woodworker. However, beyond this he truly has little need to understand the complexity of the component he fabricates and how it relates to the whole. He most likely was not included in its design, probably would know little about how to improve or adjust it, and certainly would rarely be given the opportunity to do so. In addition, he arrives to work everyday in a workroom heated, lit, owned, and insured by his employer, uses hand tools and power machinery selected and provided by that same authority, and basically performs the same set of procedures in perfunctory repetition. There are, of course, exceptions to these statements in certain piano factories of the world where, in fact, growth from below is encouraged. Nevertheless, current do-or-die global economic factors dictate this scenario to be the rule and not the exception.

On the other hand, today's home-grown bellyman necessarily operates as a jack of all trades. He owns his own shop – be it however humble. He designs, assembles, and field tests his own jigs, tools and procedures. Should a manufacturing problem arise, he's the one who works overtime (usually to the enlargement of the deficit column) ironing it out. He is his own test pilot who occasionally dares to experiment – ever so minutely – with his trusting clientele's guinea pigs. Skating on thin ice is not at all uncommon in his arena. To his benefit and unlike his factory counterpart, he has the power of choice. He enjoys the luxury of observation and possesses the flexibility to redesign – if he so chooses. The price to be paid for this indulgence is that he must know how his component relates to the rest of the product, specifically the rim, plate, and action. After all, it is likely he who will be subsequently completing the instrument and ultimately be held accountable for its performance. Acceptable, if not favorable results achieved, a steady flow of projects should follow as there never seems to be a shortage of clients willing to pay appropriately for soup-to-nuts work.

It is this maverick-like freedom which brings us to the import of this article. For each of the independent soundboard builders currently in business, there are perhaps equally as many methods of manufacturing and installing their product. The variables are vast.

The Genesis of This Article

For quite some time I had been anxious to contact a wide sampling of PTG bellymen/rebuilders, curious to learn the intricacies of their procedures. As if by providence, *Journal* editor Steve Brady recently asked if I would compose an article discussing the various methods of bellying a soundboard panel – emphasizing the types of presses currently in use. The opportunity thereby presented itself for combining the two related topics in in-depth fashion.

A questionnaire was designed for

dissemination to willing participants which would, it was hoped, outline the major steps of their procedures from beginning to end. A list of 25 recipients was compiled by Steve, myself, and several respondents who suggested some other rebuilders to contact along the way. A concerted effort was made to include members from across our continental membership. Accordingly and in advance, I offer my sincere apologies to any who feel they would have had something to contribute but were, under the best of intentions, inadvertently overlooked.

Although I'm no research analyst, an attempt was made to word the questionnaire to elicit unbiased responses. Correspondingly, an attempt was made to keep the analysis of the collected data as objective as possible, with occasional exceptions to be found in the footnotes. One primary goal was established – to facilitate PTG members interested in the subject, i.e., future bellymen, to glean considerable information from multiple sources in one consolidated forum. As an added bonus, those contributing would have the opportunity to learn something about each other's process. A cover letter which accompanied each questionnaire indicated that a "trade secret" posture was to be discouraged. To their credit, all who responded were forthcoming in a most candid manner.

Twelve rebuilders, including the author, participated. Their names and chapter affiliation appear in the following chart and text. Of those who chose not to participate, a significant number contacted me to state that they did not feel qualified and/or had insufficient experience to contribute constructively. The sense of community, willingness to share, and honesty exhibited throughout our organization are truly rare and delightful attributes.

I offer three final notes before we get underway. Though the presence of several fine "rebuilding houses" is strong, without entering into a long harangue extolling the merits of belonging to our organization, we felt compelled to keep the scope of the participants within PTG membership.

Secondly, some technicians honor every dimension and procedure of the manufacture's original blueprint, others take considerable liberties, and most fall somewhere in the middle. For certain, most manufacturers have manipulated their own scales several times over since the late 1800s. The information provided herein by the various respondents should in no way be considered judgmental or disrespectful toward any manufacturer's original intent.

Finally, and most importantly, the questionnaire was designed to serve as merely a primer and not cover the seemingly endless stream of "finesse" points of soundboard/rib/bridge building. Therefore, an intentionally incomplete picture of each rebuilder's process should not tempt the reader to question the validity of his entire procedure. These bellymen have bared their souls for our benefit – let us accept their generosity graciously.

The Questionnaire

The questionnaire consisted of 35 questions in approximate sequential order of the entire process. They are:

1. Rib material used.
2. Rib configuration.
3. Soundboard material used.
4. Glue up your own soundboard panels?
5. Style of press used to glue ribs to soundboard panel.
6. Is deck or gluing caul(s) flat or crowned (concave curved)?
7. If crowned, what radius is used?
8. Glue used for rib/soundboard joint.
9. Thickness taper the soundboard panel?
10. If so, what process is used?
11. Again if so, performed before or after ribs are glued to soundboard?
12. Crown (concave belly) on underside of bridge.

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TECHNICIAN	1 Ribs: Material used	2 Ribs: Configuration	3 Soundboard: Material used	4 Soundboard: Glue up own panels?	5 Belly press: Type	6 Belly press: Deck configuration	7 Belly press: If crowned, radius used	8 Glue: Rib/soundboard joint
Richard Butler *Washington, DC*	Spruce	Crowned	Eastern spruce Sitka spruce	No	Go-bar deck	Crowned	60'	Titebond: Minimal clamping time
Clair Davies *Bluegrass, KY*	Sugar pine: Low weight, easy workability	Straight	Sitka	Yes, but not for 9' pianos	Pneumatic	Flat, but it crowns up upon release	N.A.	Urea formaldehyde
Dale Erwin *Modesto, CA*	Sugar pine, Yellow pine, Eastern spruce	Light crowning	Eastern spruce	No	Screw press	Crowned	45' - 50', with a 60' resultant	Liquid hide: acoustic properties & working time
Del Fandrich *Puget Sound, WA*	Sitka	Crowned	Sitka	Yes	Pneumatic	Crowned	Adjustable, 5 position	MPA -2, commercial version of Titebond: Works well w/ spruce & pressure we use
Nick Gravagne *New Mexico*	Spruce, rarely pine	Crowned	Eastern spruce Western white	Not any longer	Pneumatic	Crowned	60'	Garret Wade GF202: Great strength, gap fill, chips easily
Ken Hannah *Twin Cities, NM*	Yellow pine on ribs that hit the belly rail sugar pine through the bass	Crowned	Eastern spruce	No	Go-bar deck	Crowned	60' or smaller	Liquid hide: Dries glass hard
Shawn Hoar *Connecticut*	Spruce	Crowned	Eastern spruce	No	Go-bar deck	Crowned	100'	Weldwood Plasic Resin: Moisture resistance, good open time, strength and glass-like properties
David Hughes *Baltimore, MD*	Sitka spruce first 3 treble ribs, eastern thereafter	Crowned	Sitka spruce Eastern spruce	No	Pneumatic	Crowned	60'	Liquid hide: Glass-like hardness, easy chip-off when cured
Joel & Pris Rappaport *Austin, TX*	Spruce Sugar pine	Crowned	Eastern spruce Sitka spruce	No	Go-bar deck	Crowned	70"	Hot hide: Vibration, transmission
Paul Revenko-Jones *Chicago, IL*								
Chris Robinson *Connecticut*	Western white pine 90%, spruce 10%	Straight	Sitka spruce, will begin Engleman shortly	Yes	Screw press	Crowned	Not radial: Tracix of Huygens based on catenary curves	Titebond: Ease of use, reliability
Ted Sambell *Calgary,AB*	Spruce	Light crowning, hybrid design	Sitka spruce, will experiment w/ Engleman	Yes	Spring press	Crowned	60'	Liquid hide

A Survey of Bellymen on Soundboard Building

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13. Bridge cap material used.
14. Style of press used to glue bridge caps to trunk line (root).
15. Style of press used to glue bridges to soundboard.
16. Glue used for bridge/soundboard joint.
17. Final method of fastening ribs to bridge (through soundboard).
18. Replace wooden nut/dowel assemblies where bridge floats off soundboard?
19. Method of gouging bridges for setting bearing.
20. Soundboard loading condition at time of setting bearing.
21. Soundboard installation condition during setting of bearing.
22. Soundboard installation condition during planing of bridge caps.
23. Soundboard installation condition during bridge notching and pinning.
24. General bearing load on soundboard.
25. Approximate thickness of finished bridge cap on long bridge.
26. Method of drilling bridge pin holes.
27. Type of drill bit(s) used.
28. Method of bridge notching.
29. Method of attaching treble bar to top edge of soundboard.
30. Method of clamping soundboard to rim.
31. Glue used for soundboard/rim joint.
32. Finish used on soundboard/rib/bridge assembly.
33. General EMC of the assembly during various operations.
34. General impedance of completed soundboard.
35. Who was/is your soundboard building mentor?

A multiple-choice answer format was provided for each question. In the interest of space and clarity, only the rebuilders' answers appear here. If one or all of the provided responses for a given question were deemed not appropriate, respondents provided their own answers longhand. Indeed, candidates were encouraged to embellish throughout and virtually all did so.

Several explanations about the following chart are in order. Justifications for a technician's method or product of choice were offered voluntarily and appear after a colon (:) for a given response. N.A. is an abbreviation for "not applicable." D.N.R. is an abbreviation for "did not respond," which is probably more attributable to a misunderstanding of the questionnaire's wording rather than reluctance to provide information. Finally, Paul Revenko-Jones's responses are empty at some locations as he uses pre-crowned soundboards provided by Nick Gravagne.

The results have been compiled in the following chart:

TECHNICIAN	9 Soundboard: Taper Panel?	10 Tapering: Process used	11 Tapering: Before or after ribs glued on?	12 Bridge: Crown on underside	13 Bridge caps: Material used	14 Press: Bridge caps to trunk line	15 Press: Bridges to Soundboard
Richard Butler *Washington, DC*	Most of the time	Router, belt sander, palm sander	After	Use as original	Maple	Mechanical	Go-bar arrangement
Clair Davies *Bluegrass, KY*	Most of the time	Hand plane, cabinet scraper, orbital sander, performed on underside	Before	Preserve what's there	Maple, resawn from 2" stock	C clamps & cauls	Pneumatic
Dale Erwin *Modesto, CA*	Yes	Hand plane, sanding	After	Use as original	Maple	Off board: C clamps or bar clamps On board: screws or screw press bar	Screws & buttons only
Del Fandrich *Puget Sound, WA*	Yes	Router, on linear bearings	Before	Defete to flat	Maple & laminated	Mechanical & pneumatic	Screws & buttons only
Nick Gravagne *New Mexico*	Yes	Kerf down to depth, hand plane, sand out	Before	Use as original: Rarely necessary to augment	Maple	Mechanical/clamps	Go-bar arrangement with screws and buttons
Ken Hannah *Twin Cities, NM*	Yes	Hand plane	After	Use as original	Maple	Mechanical	Screws & buttons only
Shawn Hoar *Connecticut*	Yes	Belt sander, half sheet sander, monitored w/ calipers	After	Use as original	Maple	Go-bar arrangement under "duck board" forms	Go-bar arrangement under "duck board" forms
David Hughes *Baltimore, MD*	Yes	Router on base plate which rides around perimeter of soundboard, palm sand afterwards	After	Use as original	Maple	Bar clamps on dedicated foundation	Srcew press with adjustable floor to dupicate bridge crown
Joel & Pris Rappaport *Austin, TX*	Yes	Hand plane	Before or after	Use as original	Maple, boxwood, laminated	Use screws as clamps, remove when glue has dried, then dowel holes closed	Go-bar arrangement
Paul Revenko-Jones *Chicago, IL*	Yes				Maple	Mechanical	Mechanical clamping
Chris Robinson *Connecticut*	Yes	Electric plane	After	Use as original	Maple	Hand screws	Mechanical clamping
Ted Sambell *Calgary,AB*	Yes	Router on advancing base plate	After	Use as original	Bass, tenor - maple Treble - dogwood: Fine grained and harder than maple	Use screws as clamps, remove when glue has dried, then dowel holes closed	Screws & buttons only

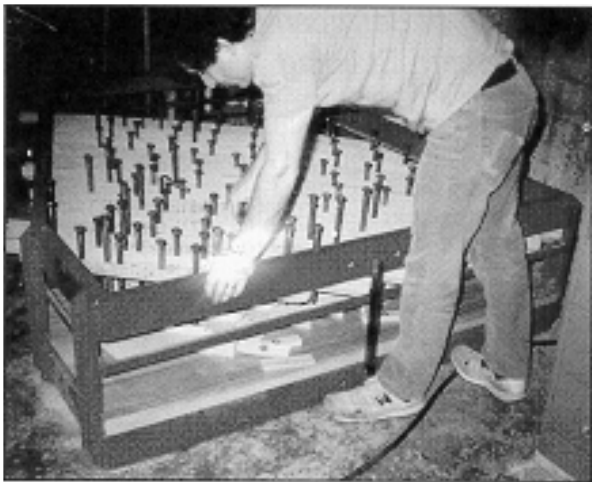
Explanation and Analysis

Now, with all the information laid before us, let's look at each question and make some observations.

1. Rib material. In the past 100 years of piano manufacture both pine and spruce have been used for rib stock, with perhaps pine being the more widely used. In general, sugar pine is the most flexible, Sitka spruce the most rigid, and the other members of the spruce family falling somewhere in the middle. Rebuilders who choose to construct a soundboard of uniform springiness may use the same material throughout, others may choose to place more rigid ribs in one area and "softer" ribs in another. Rib stock may be purchased locally from well-stocked lumber mills, some of the rebuilding-oriented suppliers, and is usually available from soundboard panel suppliers.

2. Rib configuration. Like several of the questions posed for this survey, this remains one of the more controversial issues in piano manufacturing and rebuilding. From the manufacturers' corner, Steinway has

always used a straight rib, Knabe (the original one!) used crowned ribs, and the Mason & Hamlin pianos of yesteryear utilized a hybrid mix. In the heyday of the American piano of 1920, each was considered to be a world-class instrument, the individual rib design certainly contributed to the celebrity of each.



Photos 1 (ABOVE) & 2 (RIGHT) — A typical screw-type soundboard press. As the screws are turned, the beams through which they are threaded rise and block against the upper rail of the fixture, forcing the ribs against the back of the soundboard. PHOTOS COURTESY BRADLEY RENSTROM, RPT.

3. Soundboard material. Sitka spruce has traditionally been considered the ultimate material for piano soundboards due to its superior strength-to-weight ratio, stiffness, and energy conductivity. Most manufacturers used it exclusively through at least the first half of this century. Today it is more expensive and somewhat less plentiful. Eastern spruce and Western White spruce have come to be used in many factories and rebuilding shops. A growing handful of rebuilders are now also using Engelmann spruce.

4. Glue up your own soundboard panels? This commitment requires significant moisture control capability, storage facilities, more heavy-duty thicknessing machinery, a lay-up/glue up table and clamping devices, and greater capital investment as wholesale lumber suppliers generally are not willing to sell small quantities of material. If you or someone in your area glues up his/her own panels, tip your hat. Bear in mind the piano rebuilding community doesn't even represent the smallest speck on the map in terms of lumber consumption in this (or any other) country. Today's remaining U.S. piano manufacturers are indeed only a small dot themselves.

By and large the industrial community in which the piano rebuilder operates is oblivious to his needs and desires. As piano technicians, we are fortunate to have the support of the numerous supply houses dedicated to keeping us well-bathed in tools and parts. As piano remanufacturers, however, their product lines provide only a large percentage of our needs. Independent bellymen must learn to inquire, forage and improvise to acquire the remaining raw materials which comprise the essentials of the instrument.

Getting back to the question at hand, having confronted the issues of gluing up their own panels, most of the respondents have chosen to purchase ready-made soundboard panels from a handful of North American suppliers who benevolently continue to fabricate them. Most of these suppliers maintain acceptable records of manufacturers' rim shapes, grain directions, panel

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TECHNICIAN	16 Glue: Bridge/sound-board joint	17 Final method: Fastening ribs to bridge (through soundboard)	18 Wooden nuts & dowels: Duplicat or delete?	19 Bridge caps: Method of gouging for downbearing	20 Soundboard loading condition: during bearing setting	21 Soundboard installation condition: during bearing setting
Richard Butler *Washington, DC*	Liquid hide: Works better with softwood to hardwood joints	Screws & buttons	Delete: Defeats the purpose of relieved area on bridge	Float	Relaxed	Glued in
Clair Davies *Bluegrass, KY*	Titebond: For color	Dowels	Duplicate	Small hacksaw for sides, 1/4" chisel to clear bulk	Relaxed	Glued in: Seems more certain and controllable
Dale Erwin *Modesto, CA*	Titebond: Strong & shows no glue line	Dowels & screws	Duplicate: Originality	Chisel & file, but changing to a wide pull saw	Relaxed	Glued in: For accuracy with the board having taken final set
Del Fandrich *Puget Sound, WA*	MPA-2	None: Why weaken the rib at the point you need greatest stiffness?	Typically delete unless exact replacement is requested. Usually "design out"	D.N.R.	Relaxed	Dry-clamped in
Nick Gravagne *New Mexico*	Liquid hide: Long set-up time, easy wet clean-up	Usually dowels, sometimes screws where original	Duplicate: Originality	Float, 3/16" wide blade from Dana Masaglia	Loaded, moderate w/ wedges at plate struts	Dry-clamped in: Can remove for ease
Ken Hannah *Twin Cities, NM*	Liquid hide	Dowels	Replace with a screw and button	Float	Relaxed	Glued in
Shawn Hoar *Connecticut*	Weldwood Plasic Resin		Delete: Hinders flexibility	Router	Relaxed, at low EMC	Glued in: At low EMC, can count on final result
David Hughes *Baltimore, MD*	Liquid hide	Dowels	Duplicate	Float, 3/16" wide blade from Dana Masaglia	Loaded to assume strung pressure	Dry-clamped in
Joel & Pris Rappaport *Austin, TX*	Hot hide: Can be removed if necessary acetic acid	Dowels	Duplicate	Gouge or chisel	Relaxed	Dry-clamped in
Paul Revenko-Jones *Chicago, IL*	Urea formaldehyde: Rigidity, transmission			Gouge or router	Relaxed, and ambient. Loading jig under design	Usually dry-clamped in, sometimes glued in when working on unfamiliar bearing structures
Chris Robinson *Connecticut*	Titebond: Ease, reliability	Dowels	Duplicate: To fail to do so is to return less than original to client	Bull nosing plane	Loaded: To flat	Dry-clamped in
Ted Sambell *Calgary,AB*	Hot hide	Dowels	Duplicate	Router, caps are machined to desired height before bridge is glued on board	Relaxed	Glued in

A Survey of Bellymen on Soundboard Building

Continued from Previous Page

thicknesses and so on. Additionally, most will custom-fabricate a panel to virtually any design criteria.

Be aware that some factories will not sell soundboard panels to the rebuilding trade for proprietary reasons, and those that will certainly no longer maintain panels for obsolete scales.

5. Style of belly press. Ingenuity rules here. The difficulty in gluing a set of ribs to the back of a soundboard panel is achieving sufficient uniform pressure across the backs of the ribs along their entire lengths. From a clamping standpoint, a soundboard panel is expansive. The longest ribs are four feet in length, the soundboard equally wide if not wider. Merely clamping the ribs at the edges of the panel and hoping for the best in its center is not realistic. In the last 150 years of piano building, several methods of clamping this joint have withstood the test of time.

The ***go-bar deck*** dominated this country easily for 100 years. For those unfamiliar, it is a massive fixture consisting of two platforms, usually wooden[1], perhaps six to eight feet square each and a foot or more thick, separated vertically by four connecting corner posts, perhaps six feet in height, thereby resembling a large, open-framed cube. The lower platform operates as a floor, the upper, the ceiling. In use, the soundboard panel is placed face down on the floor, the ribs are coated with glue and placed in position one at a time on the back of the board, and are clamped in place with "go-bars" which span to the ceiling. These go-bars are perhaps one inch square in cross-sectional area, made of a springy wood such as hickory, and are slightly longer than the distance between the backs of the ribs and the ceiling so that, when bent and forced in position, they act as very powerful clamps. Numerous go-bars are employed on each rib, spaced at four- to six-inch intervals. The tremendous force generated by dozens of sprung go-bars attempting to separate the deck from the ceiling platform is managed by the corner posts. Although

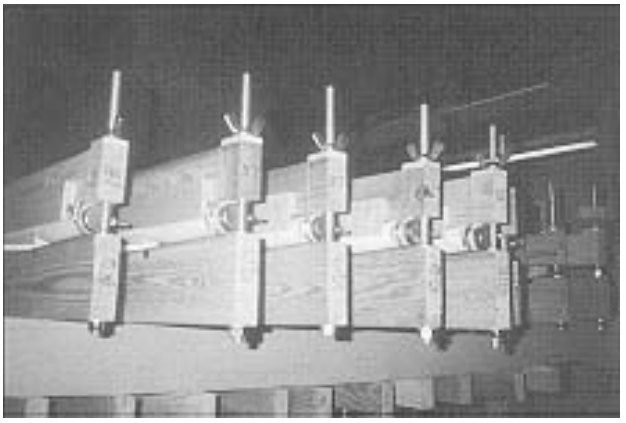

Photo 3 — A typical pneumatic-type soundboard press. Consists of wooden beams – a mated pair for each rib – which sandwich the assembly. The end bolts are tightened down with the air hose deflated, then compressed air is applied forcing the ribs against the back of the soundboard.

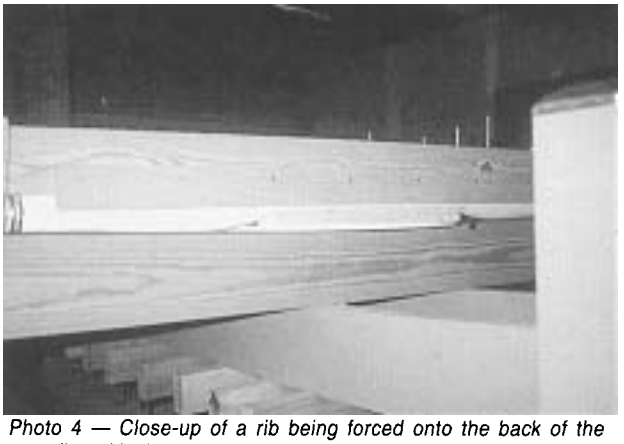

Photo 4 — Close-up of a rib being forced onto the back of the soundboard in the pneumatic soundboard press.

TECHNICIAN	22 Soundboard installation condition: during bridge cap planing	23 Soundboard installation condition: during bridge notching	24 Downbearing load on soundboard: a. bass b. tenor c. treble #1 d. treble #2	25 Bridge cap: Approximate thickness on long bridge	26 Bridge pin holes: Method of drilling
Richard Butler *Washington, DC*	Glued in	Glued in	a. bass end heavy, tenor end light b. medium c. light d. medium	.250"	Electric drill
Clair Davies *Bluegrass, KY*	Glued in	Glued in	a. light b. medium c. medium d. light	.375" +	Electric drill
Dale Erwin *Modesto, CA*	Glued in	Glued in	a. .5 degree to 1.5 degrees (low to high) b. light c. increasing into center of belly d. D.N.R.	.250+	Foredom tool
Del Fandrich *Puget Sound, WA*	N.A.: Bridge height is pre-determined out of rim	Out of rim	a. light b. medium c. heavy d. heavy	6mm. - 12mm. solid 8mm. laminated	Drill press
Nick Gravagne *New Mexico*	Out of rim: Ease	Out of rim: Ease	a. medium - 1 degree dry nets .5 degree loaded b. 1 - 1.5 degrees, gap never more than .200" c. 1.5 degrees/ nosebolts to tweak d. 1.5 degrees/ nosebolts to tweak	.250"	Flexible shaft tool at 1350 rpm done out of piano
Ken Hannah *Twin Cities, NM*	Glued in	Glued in	a. light b. medium c. medium heavy d. heavy medium	.375" treble, .250" center	Electric drill
Shawn Hoar *Connecticut*	Glued in	Glued in	a. bass end light, tenor end minimal b. minimal c. light to medium d. medium to light	.375" tenor .312" treble #1 .250" treble #2	Electric drill or pneumatic drill
David Hughes *Baltimore, MD*	Out of rim: Ease	Out of rim: Ease	a. light b. light to medium (bottom to top) c. medium heavy d. medium heavy	.250"	Electric drill
Joel & Pris Rappaport *Austin, TX*	Out of rim	Out of rim: Ease	a. D.N.R. b. Ditto c. Ditto d. Ditto	5mm. - 8mm.	Electric drill
Paul Revenko-Jones *Chicago, IL*	Usually out of rim s	Out of rim: Ease of reach	a. light b. medium c. medium d. medium, heavy	.250"	Electric drill
Chris Robinson *Connecticut*	Out of rim: Ease of execution	Notching performed out of rim, pinning of bridges with glued in: Ease of execution	a. bearing matches crown (set level) b. Ditto c. Ditto d. Ditto	.250" - .312"	Pneumatic drill
Ted Sambell *Calgary,AB*	Out of rim, pre-determined in prior operation	Glued in	a. light b. light c. light d. light	10mm.	Pneumatic drill

necessarily an extremely heavy-duty, weighty piece of hardware, a go-bar deck is not difficult to construct. Many rebuilders prefer it as it can serve multiple functions such as bridge recapping, gluing the bridge to the soundboard, panel veneering, etc. Also, it is infinitely adjustable with regard to rib array – that is, no matter where a rib is situated on the back of the soundboard, as long as ceiling exists above it, the rib may be clamped.

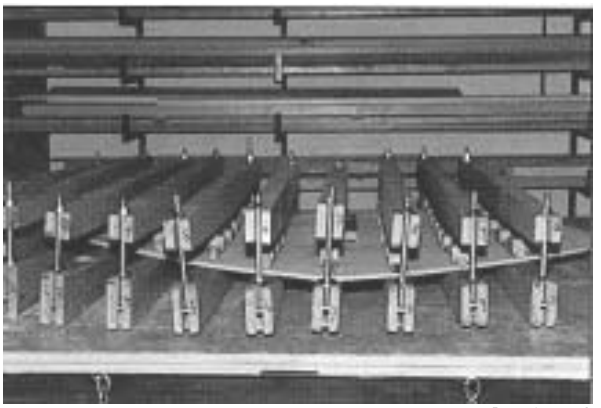

Photo 5 — A typical spring-type soundboard press. Consists of wooden beams – a mated pair for each rib – which sandwich the assembly. As the end bolts are tightened, the springs compress and force the ribs against the back of the soundboard. Note the spare spring/caul assembly resting on the soundboard next to clamp #7. PHOTOS COURTESY TED SAMBELL, RPT

The go-bar deck uses mechanical force to make the rib-to-soundboard glue joint. Another using mechanical energy is the ***screw press***. Similar yet smaller in design than the go-bar deck, this press resembles a fortified cage. It also has a lower deck which supports the face of the soundboard, but the upper ceiling is replaced with a series of maneuverable overhead beams equipped with descending screw presses. When turned down, these screw rods come in contact with the backs of the ribs via some sort of idler cauls and force the joint. The beams containing the screws block upward against an overhead framework to harness their power. Like the go-bar deck, usually all the ribs are glued on in the same operation, resulting in tens of tons of vertical force. However, due to its reduced size the screw press generally is fabricated entirely of welded steel rather than wood making it more design-intensive and costly to construct. Somewhat trickier than the go-bar deck, the overhead framework, which serves as a foundation for the rising beams, must be carefully designed to allow for unrestricted placement of the beams relative to the ribs below. On the positive side, the screw press is an extremely rigid yet potentially mobile fortress. The go-bar deck, on the other hand, usually spends its lifetime on the site of its construction.

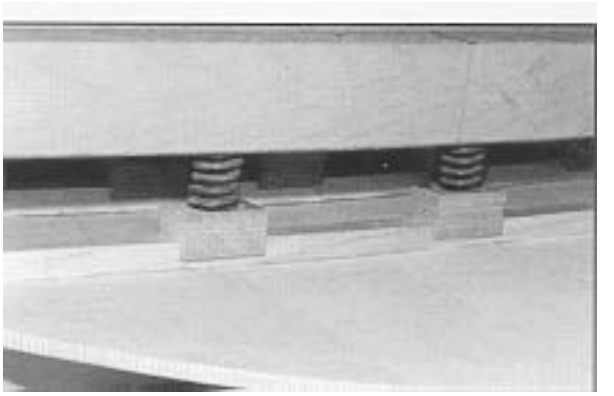

Photo 6 — Close-up of spring/rib caul fixtures affixed to the underside of the upper beam. PHOTOS COURTESY TED SAMBELL, RPT

The ***pneumatic press*** has been in use for several decades now in piano factories. Similar in general size to the screw press deck, the undersides of the overhead beams are fitted with inflat-

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TECHNICIAN	27 Drill bits: Used for drilling bridge caps	28 Bridge notching: Method	29 Treble bar: Method of attaching	30 Clamping: Soundboard into rim	31 Glue: Soundboard/ rim joint	32 Finish: Applied to soundboard/ rib/bridge assembly
Richard Butler *Washington, DC*	Fast spiral	Hand chisel	Flat & beveled	Mechancal - bar clamps w/ cauls	Liquid hide: Works better with softwood to hardwood joints	Lacquer: Ease of application
Clair Davies *Bluegrass, KY*	Jobber's	Hand chisel	Duplicate what was there	Mechanical - bar clamps w/ cauls	Urea formaldehyde	Lacquer: For speed
Dale Erwin *Modesto, CA*	High spiral from Pianotek	Hand chisel	Beveled	Mechanical - bar calmps w/ cauls	Liquid hide: Workimg time, acoustic properties	Shellac & varnish: For appearance and does not like spraying
Del Fandrich *Puget Sound, WA*	Fast spiral, parabolic flute, custom sharpened	Custom built bench machine	Flat	Mechanical - bar clamps w/ cauls	MPA-2	Lacquer: Fast, good vapor barrier not seriously affected by UV light
Nick Gravagne *New Mexico*	Usual supply house	Hand chisel, sometimes sand choppy notches for smoothness	Beveled	Mechanical - bar clamps w/ cauls	Liquid hide: Long dry time, gap filling, tradition	Lacquer: Control, fast dry
Ken Hannah *Twin Cities, NM*	Supply house	Hand chisel	Duplicate what was there	Mechanical - bar clamps w/ cauls	Liquid hide: Working time, hardness	Varnish: Mechanical adhesion
Shawn Hoar *Connecticut*	High spiral jobber's sometimes with reamers	Hand chisel	Beveled	Mechanical - bar clamps w/ cauls	Weldwood Plastic Resin	Lacquer: Quick flash, lightweight for function
David Hughes *Baltimore, MD*	High spiral, parabolic flute, brad point, custom ground from W.L. Fuller	Hand chisel	Formerly flat, now beveled	Mechanical - bar clamps w/ cauls	Liquid hide with electric heater placed underneath overnight to cure	Lacquer: Know how to use it, good moisture barrier, appearance
Joel & Pris Rappaport *Austin, TX*	Wood bits, high speed steel, 2.1mm. to 2.9mm.	Hand chisel	Beveled	Mechanical - bar clamps w/ cauls	Hot hide: We know how to work with it	Shellac, then varnish: Fast, cheap, efficient
Paul Revenko-Jones *Chicago, IL*	Straight titanium high spiral	Hand chisel	Both	Mechanical - bar clamps w/ cauls	Liquid hide: Working time, less full crystalizing	Lacquer, with shellac in bridge notches
Chris Robinson *Connecticut*	Fast spiral	Hand chisel	Beveled	Mechanical - bar clamps w/ cauls	Titebond	Conversion varnish: High impermiability to moisture
Ted Sambell *Calgary,AB*	Numbered drills	Hand chisel	Beveled	Mechanical - bar clamps w/ cauls	Liquid hide or hot hide slowed w/ urea: Slow open assembly, non-staining	White water varnish: Smooths out well, doesn't darken wood, beautiful appearance

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able hoses rather than mechanical screws. The soundboard panel lays face down as in previous fixtures, the ribs are applied, and the beams are positioned so that the deflated bladder hoses are in close contact with the back of the ribs. The beams are then secured so that they may not rise. Compressed air is then introduced into the air-tight hoses causing them to expand diametrically, thereby forcing the ribs downward against the soundboard. This type of press is desirable from a manufacturing standpoint. It is cheap to operate and quick to load and unload. The entire length of the joint is under consistent pressure the instant the compressed air is applied, and it has fewer wearable moving parts. As examples, Baldwin and Steinway use pneumatic soundboard presses.

Although factory pneumatic presses are usually heavily constructed steel apparatuses, rebuilders have modified the design somewhat to allow them to be relatively lightweight, portable wooden fixtures. Deleting the need for a large deck to support the entire face of the soundboard during gluing, which reduces the size and weight of the press considerably. After all, the only areas on the front of the soundboard panel in need of solid support during glue-up are those immediately underneath the ribs. The sections of soundboard between the ribs are under no vertical pressure. With the deck now gone, all that is needed is a pair of mated cauls, one for each rib to be glued. The lower caul supports the face of the soundboard for the length of the rib and is perhaps only one and one half inches wide, and the upper caul, or beam, serves as a rigid backer for the air hose. The two are held together by a simple vertical rod or bracket of some sort at the ends beyond the extremities of the soundboard, and the entire assembly looks much like an overgrown version of the fixture piano technicians make or buy from supply houses for clamping sections of grand piano hammer shanks securely when shaping tails, filing hammer heads, etc. Indeed, no "press" is necessary at all. A soundboard can be ribbed on a large worktable installing one of these fixtures at a time for each rib of the scale.

A mechanical variant of this design employs automobile engine valve springs affixed to the overhead beams rather than airbags. The overhead beams fold down and lock on top of the lower cauls sandwiching the soundboard/rib lay-up and in so doing compress the valve springs against the backs of the ribs. The former Knight piano factory in England used this system very effectively, as does Ted Sambell currently.

Regardless of press design chosen, factories have the distinct advantage of being able to concentrate their efforts and machinery on only a handful of scale designs. They have several presses dedicated to each unchanging product model. The piano rebuilder must always keep in mind the ability of his equipment to accommodate numerous scales from a large handful of manufacturers. In short, his sole press must be able to handle a soundboard panel of virtually any size and its accompanying rib array.

6. Press deck flat or crowned?

No matter the style of press, the deck may be either flat or crowned – crowned being defined as concave in contour, remembering that the panel is ribbed "upside-down." In the early days of soundboard building, panels were bellied at an extremely low[2] equilibrium moisture content (EMC) and utilized straight ribs glued up on a flat deck. The crown was atmospherically induced when, upon being released from the press, the soundboard took on ambient humidity and bellied upwards across the grain. This occurred because the vertical grain of the panel expanded (tensioned) freely on the face of the board, but was restricted (compressed) from doing so on the

TECHNICIAN	33 EMC during various operations: a. bellying panel b. downbearing setting c. finish application d. installation	34 Impedance: Completed assembly	35 Mentor:
Richard Butler *Washington, DC*	D.N.R.	Medium	Wally Brooks Steve Jellen
Clair Davies *Bluegrass, KY*	a. 5.5% b. 7% c. 8% d. 7%	Don't know	Self-taught Cliff Geers Willis Snyder Steinway
Dale Erwin *Modesto, CA*	a. 5 - 5.5% b. 42% R.H. c. 42% R.H. d. 5 - 5.5%	Medium	Nick Gravagne
Del Fandrich *Puget Sound, WA*	a. 6 - 6.5% b. 6 - 6.5% c. 6 - 6.5% d. 6 - 6.5%	"Sorry"	Self-taught
Nick Gravagne *New Mexico*	a. 5% b. 5 - 7% c. 5 -7% d. 5 - 6%	Medium - high: Function of bearing and how it nets out	Wally Brooks Sam Camileri Self-taught Samuel Wolfenden
Ken Hannah *Twin Cities, NM*	a. 5% b. 8% c. 8% d. 5 - 6%	Varies with case design and rib scale	Keith Aikens James Reeder Cliff Geers
Shawn Hoar *Connecticut*	a. 4.5 - 5.5% b. 4.5 - 5.5% c. 4.5 - 5.5% d. 4.5 - 5.5%	Good structure but flexible	Wally Brooks
David Hughes *Baltimore, MD*	a. 5 - 6% Varies with season b. 42% R.H. somewhat - will not run hot- c. 42% R.H. box too dry in summer to d. 5 - 6% prevent compression ridges	Medium to high	Richard Butler PTG Samuel Wolfenden
Joel & Pris Rappaport *Austin, TX*	a. 5% b. 5% c. 5% d. 5%	Good	Claus Fenner Paul Stockle Johanes Ruous Cliff Geers
Paul Revenko-Jones *Chicago, IL*	a. N.A. (see Nick Gravagne's response) b. 7 - 8% c. 7 - 8% d. 5.5 - 6%	Varies according to board, bridge mass & placement	Nick Gravagne
Chris Robinson *Connecticut*	a. 5% b. 7% c. 7% d. 7%	Varies, not fully predictable	Sam Camilleri
Ted Sambell *Calgary,AB*	a. 4% Values suitable for area - b. 4% would not be appropriate c. 4% everywhere d. 4%	Low	Otto Keyes PTG Denis Brassard

back due to the ribs. The ribs "crowned" as a result. This is an extreme example of a tension/compression soundboard, the inherent problems of which are well-documented.

Piano makers then began experimenting with somewhat higher EMC values[3] and presses equipped with dished-out or crowned decks. This allowed the panel to assume a curved shape while the straight ribs were being applied creating a lower tension/compression load. Doing so achieved a compromise of a still-vibrant yet less self-destructive soundboard assembly.

Some makers and many rebuilders now use a pre-crowned rib – the gluing surface of which is machined into a curved profile – in conjunction with curved press cauls and perhaps even higher EMC values.[4] This method greatly reduces rib, soundboard panel, and rib/soundboard glue joint stresses. This soundboard assembly when properly loaded with the downbearing force of the string plane can enable an active acoustic response.

Some soundboard builders may utilize procedures implementing various combinations of deck and rib curvatures.

7. If crowned, what radius is used? Traditionally, a 60-foot radius has been used. For example, a soundboard panel with a width across the grain at a selected location of 48" will exhibit a little more than 3/8" of crown. Some pianos, Mason & Hamlin for one, used a higher (smaller radius) crown. A blanket axiom worth slightly more than the value of this magazine page states that high-crown soundboards produce "sustain" pianos, ones with flatter soundboards are "volume" pianos.

8. Glue used for rib/soundboard joint. Again deferring to tradition, a hard glass-like glue has been used for its energy transmitting capacity. Numerous respondents indicate a preference for aliphatic resin glues, however.

9. Thickness taper the soundboard panel? All respondents indicated they perform this procedure. In theory, the panel is thinned in thickness in approximate correlation to the feathering of the rib scale beneath to promote flexibility of the assembly where it is in close proximity to the inner rim. Some may remove material (and to the same degree) around the entire circumference, others may not.

10. If so, what process is used? Factories enjoy the luxury of tremendous machinery costing considerable amounts of capital to make light, quick work of numerous, otherwise tedious, labor-intensive tasks. In general, rebuilders don't. One such machine is the drum sander, larger models of which are capable of abrading the entire surface of a soundboard panel in one swift pass. This machine can additionally be manipulated to judiciously remove more material in some areas than others, thereby performing tapered thicknessing.

The independent bellyman, without the assistance of such an aid, usually starts out with a panel extremely close to finished dimension at the center and then manually removes material to a desired final thickness around the circumference. Some respondents make sample cuts to the final depth with a gouge or saw and then plane down to those marks, much like a downbearing setting procedure. Others employ a router operated vertically from above which cuts to the desired depth near the edge of the panel and gradually recedes as it nears the center. No matter the procedure, the entire panel must be fine sanded afterwards to eliminate the removal scars. To eliminate the possibility of visible scarring altogether, Clair Davies thicknesses the underside of the soundboard panel.

11. Again if so, is this performed before or after the ribs are glued on? Strictly from a manufacturing standpoint, it's easier to work the thickness of the panel uncrowned. It's flat, it will lay flat on a work table, and progress is easily measurable. However, some rebuilders aren't comfortable with a potentially compromised rib/soundboard glue joint if a panel of varying thickness is used in their belly press cauls.

12. Honor crown (concave belly) on underside of long bridge? Most fine quality grand pianos utilize a crowned gluing surface on the bottom of the long bridge to promote crown along the grain of the soundboard.

13. Bridge cap material used. Very hard, tight-grained solid lumber has traditionally been used for capping bridge trunk lines. Quartersawn maple is the overwhelming choice of manufacturers and rebuilders alike. Many fine quality pianos of the past used dogwood or boxwood in the two top treble sections for its extreme hardness and tight grain which promote the utmost in energy transmission and resistance to splitting.

14. Style of press used to glue bridge caps to trunk line. As with rib gluing, consistent pressure along the length of the joint is required to produce an intimate, virtually invisible joint. An excellent dry fit is perhaps more important here than any other belly area joint as both members (cap and trunk) are hardwood and are unlikely to yield in any attempt to close gaps.

15. Style of press used to glue bridges to soundboard. Again, factories have only to concern themselves with several models and can build fixtures that conform to the bridge curves of their product line without worrying about universality. These presses are most often pneumatically operated. Rebuilders need to improvise a method which will accommodate all candidates they are likely to encounter. With the exception of Clair Davies' recently well-documented fixture, all respondents use a mechanical means to make this joint.

16. Glue used for bridge/soundboard joint. As with most belly joint adhesives, good energy/vibration transmitting properties are important. On this joint in particular, ease of clean-up is cosmetically important as this is the most noticeable joint on the top of the piano. Virtually all respondents indicated they are well-versed in cleaning up the glue of their choice.

17. Final method of fastening ribs to bridge (through soundboard). Most grand pianos have a fastener at the rib locations to anchor the rib to the bridge, usually either a dowel or a screw. Screws have an advantage as they serve as lifelong clamps, yet they can make bridge pin hole drilling a challenge. The use of a wooden dowel eliminates this problem. Del Fandrich, however, chooses to use no fasteners here as he does not want to weaken the rib at the point at which he feels it needs to be strongest.

18. Replace wooden nut/dowel assemblies where bridge floats off soundboard? Long bridges on many grand pianos are hollowed or "floated" on the bottom between ribs in the low tenor area to promote soundboard flexibility. Many manufacturers use a large (7/16" or 1/2") diameter dowel glued into the bottom of the hollowed section which passes through the

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soundboard and is attached to the back of the soundboard with a large hexagonal shaped wooden nut to maintain some mechanical coupling of the bridge to the board. Most of our bellymen duplicate these fixtures, however, Rick Butler feels they defeat the purpose of the floating design and deletes them.

19. Method of gouging bridges for setting of downbearing. Again, ingenuity and necessity rule here. The method merely need be convenient, quick and accurate. Ever one for invention, Shawn Hoar is gouging and planing his bridge caps with an overhead router.

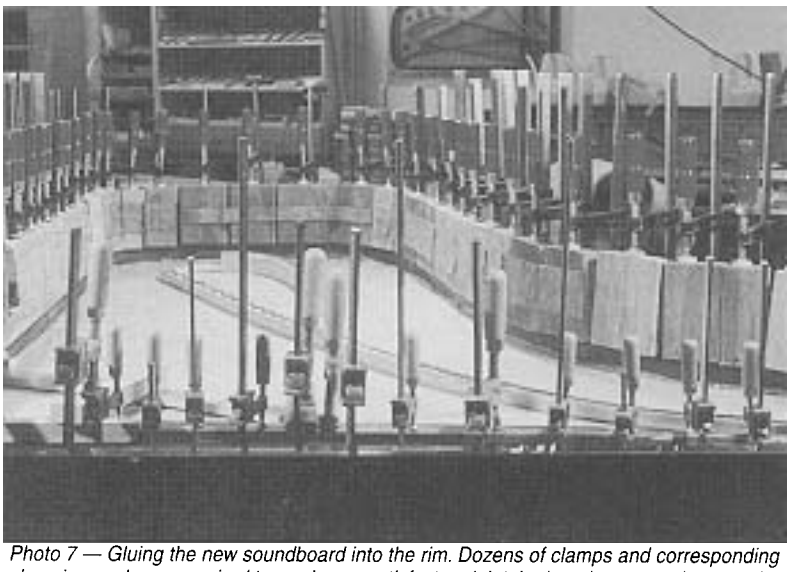

Photo 7 — Gluing the new soundboard into the rim. Dozens of clamps and corresponding clamping cauls are required to produce a satisfactory joint, both to the rast and across the belly rail. PHOTO COURTESY TED SAMBELL, RPT.

20. Soundboard loading condition at the time of setting bearing. At the time the bridges are gouged for downbearing the soundboard may be either relaxed or pre-loaded. Those who do so relaxed are probably loading the structure lightly, those who compress the board are likely aiming for something heavier. Typically, those who pre-load their soundboards are doing so to anticipate the amount of crown drop the structure will exhibit when the instrument is strung to concert pitch. In yet another approach, Chris Robinson compresses his soundboard until the ribs are straight and then sets a "zero" downbearing.

21. Soundboard installation condition during setting of bearing. There are only two choices here – the board can be "dry clamped" into the rim or it may be finally glued in. For pianos bellied with the outer rim attached, in a factory environment the setting of downbearing and bridgework performed with the soundboard finally glued in is neither efficient nor convenient. The restriction of accessibility the outer rim imposes slows production. Such manufacturers merely clamp the assembly into the rim so it may be removed to the worktable for subsequent operations prior to final glue-in.

A significant number of respondents, however, said they prefer to perform downbearing setting with the soundboard glued in as they feel more comfortable with the finality of the results. Paul Revenko-Jones leaves his options open to go either way on this issue, choosing the latter when working on unfamiliar pianos with unknown crown deflections.

Obviously, if the soundboard is glued in here, it will be also for the next two operations.

22. Soundboard installation condition during planing of bridge caps. If one uses a hand plane of some sort, the outer rim will be restrictive at the extremities of the bridges. Therefore, performing this operation is easier out of the piano (soundboard not glued in). If excess material is routed off from above with a fixture that attaches/references to the top of the outer rim, then plate removal is all that is necessary and the soundboard may be finally glued in.

23. Soundboard installation condition during bridge notching. Again, the case is restrictive for this operation. Those who drill and notch bridges in the piano are a seriously dedicated lot, should be treated with the greatest respect, and may moonlight as contortionists!

24. General bearing load on soundboard. This question goes hand-in-hand with question #20 (soundboard loading). Let's assume a rebuilder does not load his soundboard during bearing setting and then places a "light" load (via short total bridge height) on the soundboard. In periods of dryness, such a structure would be hardly loaded, if at all. This may be desirable in certain extremely damp climates. Additionally, all things being equal (which they never are) this would be an example of a piano designed for big volume and short sustain.

Let's assume another rebuilder really wedges his soundboard down (well below crown deflection at A-440) during bearing setting and then places a "heavy" load (via tall total bridge height) on the soundboard. This piano might perform well if shipped to a drier climate than the one in which it was assembled.[5] And, contrary to the above instrument, this one should exhibit minimal volume with long sustain. It goes without saying that both these examples represent extreme cases.

Obviously the amount of pre-loading the soundboard receives during bearing setting and the amount of bearing placed on the bridges are infinitely variable. A long list of factors needs to be considered when determining the correct recipe for a given soundboard design – including rib depths, rib feathering, soundboard thickness and tapering, soundboard grain direction, rib array, and on and on.

Responses were requested for bearing load in each section of the scale - bass, tenor, treble #1, treble #2 - relative to each other. Nick Gravagne was the only respondent (bold enough!) to mention adjusting nosebolts to fine tune downbearing, as was alleged to be common factory procedure at Steinway with their "tulip" style cap nuts.

25. Approximate thickness of finished bridge cap on long bridge. This question is a sleeper. Innocuous at first glance, it has the potential to reveal much of a rebuilder's total game plan. Let's assume the plate is installed at the original elevation within the case so that its vertical relationship to the rast (inner rim soundboard gluing surface) is unchanged. Therefore the soundboard/bridge assembly must "make up" the vertical distance between the level of the rast and the elevations of the string rest/aliquot areas on the plate – this is a finite number. The two prominent figures

which total this distance are the amount of crown in the ribs and the height of the bridges. The thickness of the soundboard panel would have to change considerably (under the bridges) from the original dimension to noticeably affect this constant.

Further assuming the height of the trunk portion of the bridge remains in original dimension and a soundboard crown radius of 60 feet, a thick cap would indicate a heavy downbearing load, a thin cap just the opposite. Soundboards with high crown (tighter than a 60-foot radius) will necessarily display thin bridge caps. Those that are shallower will need more bridge height. Some rebuilders prefer to lower the height of the trunk line of the bridge considerably to eliminate the original bridge pin voids. Caps of more than 1/2" thickness are usually an indication of this procedure.

26. Method of drilling bridge pin holes. This meticulous job of drilling approximately 450 holes through the bridge caps requires accuracy, with comfort and speed being desirable fringe benefits. The bridges of 100 years or more ago drilled without the benefit of the various power tools selected by our respondents are standing testimony of the craftsmanship of factory workers now long gone.

27. Type of drill bit(s) used. One would think drilling a series of holes in a piece of wood would not be a challenge. Nonetheless it is, and the type of drill bit employed can mean the difference between success and frustration. The diameter of the bit, its point, the manner in which it ejects waste and other factors all contribute to the resulting tightness of the bridge pins, and hence the efficiency of energy transfer in the belly of the instrument.

The wide variety of answers is ample evidence of the individuality of soundboard builders. It would appear Paul Revenko-Jones wins the award for "most expensive product" in this category!

28. Method of bridge notching. Traditionally this has been done by hand with a chisel. Many factories and some rebuilding shops use router/shaper power machines to perform this operation very quickly. To spotlight the Knight piano again as an example, its bridges were beautifully "carved" by an overhead router equipped with cutter knives. This machine was counterbalanced over the bridge/soundboard assembly via a pantograph and was guided from unison to unison by a factory worker with an experienced eye and a steady hand. Not only is this type of procedure speedy, it is almost essential for carving bridges made of laminated stock bearing alternately oriented grain direction.

29. Method of attaching treble bar to the top edge of soundboard. Although often confused for trim, this batten serves as a permanent clamp holding the soundboard against the narrowest point of the belly rail in the top octave and a half on the instrument. Some manufacturers and rebuilders feel it serves tonal purposes as well. It may be either beveled into the front edge of the soundboard or rectangular in cross section and sit atop the soundboard, and in either case is fastened down with six or seven screws.[6] Some manufacturers delete it altogether and screw through the soundboard alone into the belly rail.

30. Method of clamping soundboard to rim. Eventually the fruits of a bellyman's labors must become part of the instrument. The use of bar clamps in conjunction with cauls that fit down inside the outer rim and bear against the soundboard is the unanimous mechanical method of choice. Who would have thought twelve rebuilders could agree on something?! Depending on the size of the piano, it can (and does) require dozens of well-made, heavy-duty clamps, the cost of which alone is enough to persuade those toying with the idea of bellying their own pianos to reconsider.

This is an operation for which a pneumatic method would perhaps be well suited considering the form-following capabilities of air hose, but to my knowledge no one utilizes it.

31. Glue used for soundboard/rim joint. Glassiness and extended open time are the desirable traits here. If the glue begins to skin-over prior to the installation of the soundboard and the application of pressure, the joint is compromised. Indeed, one of the handful of initial reasons for replacing a soundboard is the suspicion or evidence of a failed joint here. This is arguably the most important joint in the instrument. As such, it is crucial to be able to make this joint quickly and confidently. In referring to their choice of glue, Joel and Priscilla Rappaport probably put it best by saying, "We know how to use it."

32. Finish used on soundboard/rib/bridge assembly. The main function of the finish applied to the soundboard is to provide humidity control. Some products are better by several percentage points at retarding moisture gradients than others - all do a good job.[7] A secondary purpose for the finish is cosmetic beauty. Although arguments for tonal enhancement have been made since the inception of the instrument none of our respondents listed this as the reason for selecting the product of their choice.

33. General EMC of the assembly during various operations. Four important stages of soundboard construction were selected. They are: a.) soundboard/rib gluing, b.) setting of downbearing, c.) applying finish to the soundboard, and d.) gluing the soundboard assembly into the rim.

The EMC of both the components and the whole may be manipulated throughout the entire process to control the behavior of the finished instrument. As such, these four questions have direct bearing on virtually every question posed in the study.

Referring to stage a.), the EMC of the components during rib glue-up goes hand-in-hand with the resultant amount of crown desired in the completed assembly, along with the contour of the ribs and press cauls. This is to say the EMC of the panel at the time of ribbing can be used as a controlling factor in the resultant sound of the instrument. Similarly, if the assembly is artificially "wet" during downbearing setting (stage b.) the rebuilder would anticipate a decrease in downbearing force in the finished instrument in normal household humidity. As an example, Dale Erwin sets bearing at a fairly high EMC (8%) and puts a medium-to-heavy load on the soundboard. This type of construction would be expected to "settle down" more than others.

Regarding the application of finish (stage c.), some apparently feel lumber should be at a low EMC when sealed, others don't.[8] And, as a reciprocal to stage b.), an artificially "dry" soundboard assembly when glued into the rim (stage d.) would be expected to belly upward upon reaching a higher ambient humidity.[9] None of our respondents indicated the need or desire to humidify (add moisture) to their product during construction.

The reader can gain considerable insight as to the style (tone, amplitude, sustain, etc.) of piano a bellyman is

Continued on Next Page

A Survey of Bellymen on Soundboard Building

Continued from Previous Page

attempting to produce by comparing his controlled EMC values with his entire assembly process.

34. General impedance of completed soundboard. A paper the length of this magazine could be written to discuss mechanical impedance, and there are those better qualified to do so than I. What the questionnaire attempted to capture was the relative stiffness or flexibility of each rebuilder's finished product. Again, the variables are vast, but think of it as a matter of whether the string plane is controlling the soundboard or vice versa. This vibrating diaphragm can be made to be soft or hard,[10] and it needn't be a homogenous structure at that. It is conceivable that a designer may wish to have a soundboard be flexible in some areas and rigid in others. Respondents were urged to render an answer reflecting the "average" impedance of their finished structure when installed in the case and loaded at A-440.

35. Who was/is your soundboard building mentor? This question has little to do with building pianos and everything to do with inspiration. Getting into full-blown bellywork is more a matter of initiative and determination than that of clamps and glue. Seeing how it's done by others provides the push to take the plunge. Those named in this column offered that opportunity to us who have followed. Some of these mentors are unfortunately no longer with us. Had it not been for their tutelage however, the craft of soundboard remanufacture and its now-widespread acceptance would probably have remained guarded lore. Thank you, gentlemen.

Acknowledgements

This article, such as it is, would not have been possible without the cheerful participation of the eleven members so noted. I trust I have represented their procedures accurately and to their satisfaction. These are the people, many of whom instruct regularly at PTG seminars and conventions, who are paving the way for the next generation of piano rebuilders, as their mentors did before them. At the risk of singling one person out for recognition, Ted Sambell went above and beyond the call for this project, submitting several explanatory letters and dozens of photographs of his procedures. If his involvement in PTG has instilled this fervor for our craft in him, then we all can learn from his example.

It is hoped everyone with an aspiration for building soundboards can take something from this paper and put it to good use.

Footnotes:

1. I am aware of one clever rebuilder who constructed his go-bar deck floor of concrete with embedded copper tubing through which hot water was circulated to keep the panel warm and assist glue set-up.
2. ...as in one step ahead of spontaneous combustion.
3. On the order of 3 percent to 4 percent.
4. On the order of 5 percent to 6 percent or higher.
5. ...if it hadn't already totally self-destructed prior to arriving there.
6. Consider these thoughts: nearly all the flitches of the soundboard situated under the bridges exit the belly rail in this area. These are the planks which are first excited with the energy from the strings. In lumber, mechanical energy is transferred most efficiently along the grain. It could be said, therefore, that this energy might "leak" out the front of the structure if unimpeded. However, if a reflector could be placed to dam this energy in (a piece of rigid, dense lumber attached to the end grain of the soundboard panel), more of if might get reflected back into the structure. So perhaps a treble bar which sits on top of the soundboard is acting as a clamp alone, one which is beveled into the edge may be serving more than one purpose. Although feasible for the entire front edge of the soundboard, the components of the damper system make such an addition impractical, especially from a manufacturer's profit-and-loss standpoint.
7. Source: Conversation with Bruce Hoadley, PTG Annual Convention, Orlando, Florida, July, 1997.
8. Chapter 10 of Bruce Hoadley's book *Understanding Wood* deals with applying finishes. There is no mention therein of desired EMC values for workpieces at finish application. Wood will absorb and desorb moisture at will, irrespective of "sealing" finishes. A workpiece finished when unusually "wet" will eventually dry down and crack (compress) its finish off, one finished when overly "dry" will eventually swell up and blow (tension) its finish off. Take your pick. Common sense might dictate finishing a workpiece at median R.H. and temperature values using a product bearing flexibility as a property.
9. This upward bellying after final installation in the rim is not as pronounced as when the soundboard is free-standing in the shop due to the constriction of the soundboard/rast glue joint. The opposite sides of the panel across the grain are no longer free to draw inward toward each other. Also, once strung the downward force of the string plane limits its vertical growth. As has been well-documented by others in this publication, this unavoidable phenomenon can lead to the birth of compression damage to the structure.
10. Analogy: think about the mattress you're going to sleep on this evening. PTJ

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Trigger Point Self-Massage for Piano Technicians – Part I

By Clair Davies, RPT
Bluegrass, Kentucky Chapter

This new series marks the end of my career as a piano tuner and rebuilder. By the time you read this I will have graduated from the Utah College of Massage Therapy.

Does it seem odd that a 61-year-old man, at the height of his success in a business he has pursued for almost 40 years, should suddenly dump it all to start at the bottom in a completely new field? I think my reasons will interest you.

The Background

Over the last several years, I have gradually become aware that every piano technician I've ever known, from my first teachers to virtually all my friends today in the Piano Technicians Guild, have had debilitating work-associated pain in the neck, back, arms and shoulders that threatened their happiness and often their very livelihood. I've been through it myself more than once. During my latest crisis with work-related pain, it hit me that there really wasn't any help for us out there. Conventional treatments didn't really work, nobody understood our special problems, and it began to make me mad. I decided to take my retirement and, before senility set in, to try to do something about it.

This adventure began one January morning two and a half years ago when I came in from shoveling snow in my driveway with an oppressive little pain in my shoulder. As I went on with my shopwork and tuning, favoring the shoulder more and more, everything I did seemed to irritate the condition, whatever it was. Through the following months, the pain grew worse until it was so bad that I regularly had to get up in the night to seek relief with ice rubs and hot showers. I rubbed at it all the time too, but nothing I did had any lasting effect. Finally I began looking for help.

Some years before I had gone to a massage therapist for chronic pain in my arms and hands, and it had been a good experience. Before I found her I had no reason to hope I would ever get better. I figured I was just experiencing the inevitable and all-too-precipitous decline of old age. But in only three sessions she succeeded in ridding me of an affliction that had possessed me for as long as I could remember. Yet, now, with the new shoulder problem I was at a loss. This wondrous woman had moved away, and I had no choice but to set out to find someone else with a similar gift for healing. It was a fruitless search.

Variations on the theme of "exercise and stretch" were all that I heard, despite my protests that my muscles reacted badly to stretching and got worse, not better. At one point I realized that the physical therapist who was treating me for my frozen shoulder was herself secretly suffering from exactly the same affliction! She couldn't fix herself and she couldn't fix me, but she expected payment just the same. All the massage therapists I tried seemed just to tinker with the problem. I had a sense that everyone was faking it regarding shoulder problems, that nobody really understood shoulders. Doctors offered to do "exploratory surgery." Not in this lifetime, thank you just the same.

I couldn't raise my arm and I couldn't sleep. Somehow I did manage to continue working. In fact, that was during the time when I was designing and building the new version of my pneumatic soundboard press. It was heavy work and my shoulder hurt with every move I made. A sudden move would give me a jolt that felt like an electric shock and would double me over for several minutes, grimacing and breathless.

Convention time came and I was determined to go despite my disability, naively hoping the break from work would help. But sitting all day in classes, not moving my arm, holding it defensively at my side, only seemed to aggravate the problem. I rubbed at my shoulder continuously. I squeezed it. I tried to relax it. I tentatively and cautiously flexed it. The only result was an ache that rose in intensity throughout the week.

On the last night, the pain was so unremitting that not even the deadening effect of the ice treatments had any effect. I lay in bed in the hotel at two o'clock in the morning and I cried like a

baby. Evidently, all I could hope for was to outlive the problem, that somehow my shoulder would eventually heal itself. I had heard that on its own a frozen shoulder took about a year to fix itself. If it *did* fix itself.

Lying there in my misery, I happened to remember a pair of medical books that I had seen many times on the desk of the therapist I had liked so much. They dealt with anatomy and pain and apparently had helped her know where to press and rub most effectively. I realized for the first time that I really wanted to take care of this myself. I *had* to, but I just didn't know enough. The minute I got back to Lexington I called and ordered the books, volumes I and II of *Myofascial Pain and Dysfunction, The Trigger Point Manual*, by Doctors Janet Travell and David Simons. I bridled a bit at the price but finally had to ask myself: What is this knowledge worth? My shoulder answered for me.

When the books came, I entered a world I hadn't known existed. In *The Trigger Point Manual* I found hundreds of beautifully executed illustrations of the muscles of the body. They showed the likely trigger points for each muscle and their typical patterns of referred pain. I understood that "myofascial pain" was muscle pain, but what were trigger points and these patterns of referred pain? I had only a fuzzy idea.

The exact physiology of a trigger point appeared to be a matter for argument among microbiologists, but it seemed to me that a trigger point, for practical purposes, could be viewed simply as what I'd always called a "knot." A trigger point, or knot, in a muscle could be actively painful or it could exist silently, manifesting no pain at all unless touched. Or it could *sneakily* send its pain somewhere else. When pain was felt other than at the site of the trigger point it was termed "referred pain." I gathered that much of my pain was probably this mysterious displaced pain, this referred pain. I had never been able to figure out why all the rubbing I had been doing had never done any good. Now I understood. *It was a mistake to assume that the problem was at the place that hurt.*

The pain in the front of my shoulder was actually coming from a muscle on my shoulder blade, the *infraspinatus*. The pain on the back of my shoulder — and on the back of my wrist, of all places — was coming from a muscle *under* my shoulder blade, the *subscapularis*. And the back pain at the inner edge of my shoulder blade was being sent by a group of small muscles, the *scalenes*, at the base of my neck! It was no wonder that nobody knew what to do for me! I began to think that this might be a job for someone with a technician's mentality, somebody who liked mechanical puzzles. I had a sense that a person who was mechanic enough to rebuild a grand piano might have a good chance of figuring out the technology of muscle pain.

"I had never been able to figure out why all the rubbing I had been doing had never done any good. Now I understood. It was a mistake to assume that the problem was at the place that hurt."

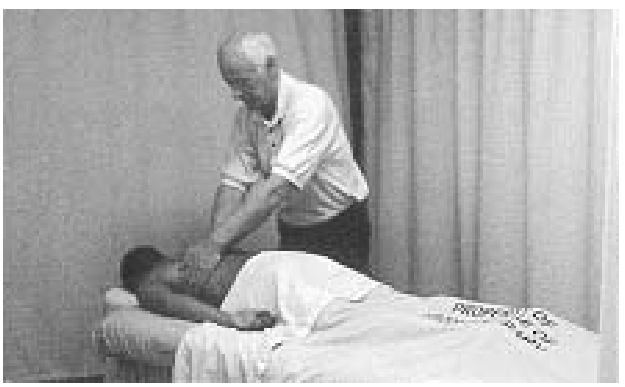
Shoulder pain is usually diagnosed by the healthcare community variously as inflammation, tendinitis, arthritis, bursitis, repetitive strain injury, rotator cuff injury, ligament and muscle tears, and who knows what all. I realized that none of those labels could possibly help me, because none of them were operationally accurate. Nobody looked inside my shoulder before starting to tell me what "itis" I had. These were speculative diagnoses, just guesswork, and *none* included a treatment plan that was guaranteed to work.

This all-too-convenient labeling completely ignores the reality of referred pain and the elusive trigger point. It was clear to me that all I had was a massive number of knots in the muscles in my shoulder — knots in *20* muscles, as it turned out. I reasoned that these knots, these trigger points, could be softened and removed with basic massage techniques if I could locate them by accurately interpreting the clues given by their referred pain patterns.

Driven by my misery, I studied Travell and Simons day and night until, after only about a month of assiduous application of what I was learning chapter by chapter, I had succeeded in fixing my own shoulder ... *my own shoulder!* I was astounded. The pain was gone. I could raise my arm. The stuff really worked!

I saw that I had in my hands the tools to take effective care of myself, at least in this one area. I supposed that I might be able to treat any trigger point I could reach and thereby extinguish virtually any pain I might have. I could develop a system for it, a kind of "new technology," and maybe other people would be interested. That was when I started thinking about massage therapy school, aiming to broaden my knowledge and gain credibility for when I began promulgating my new ideas.

In the last two years, I haven't had a pain that I haven't been able to fix with Trigger Point Self-Massage, and this includes pain in many joints. I'm able to execute massage on more than 40 of my own muscles and muscle groups, which is essentially everything. The only difficulties were in figuring out how to reach the unreachable places and how to use my hands in the best way. By considering my fingers, thumbs and knuckles as tools, I was able, as a mechanic, to be my most inventive.



Scalene Trigger Points

Beginning with this issue, Trigger Point Self-Massage will be explained and illustrated in an eight-part series, giving enough detail so that you can try it for yourself. In a later installment, I'll tell what I learned about the origin and development of my shoulder problem and the details about how I

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Trigger Point Self-Massage for Piano Technicians

Continued from Previous Page

solved it.

First, though, I want to tackle a muscle that causes piano tuners more ongoing discomfort than anything else I know of. It's actually a nest of four small muscles called the *scalenes* in each side of the neck.

Trigger points in the scalenes are activated by working with the arm held out in front, the classic tuner's stance. Straining and lifting are particularly bad for them, as is sitting for any length of time without elbow support. Long hours of typing and giving massage put them under stress, too. Forced breathing and over-exertion during sports activities tax the scalenes severely. These little muscles are prone to tighten up and stay tight in self-defense.

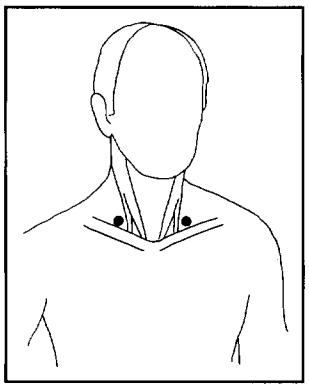

Figure 1 — Scalene trigger points.

The paradox is that pain is rarely felt in the scalenes themselves, but instead is typically referred to the back, along the inner edge of the scapula. Through all the years I was working as a tuner I was always reaching over my shoulder to rub the sore spot beside my shoulder blade. I was convinced the trouble was in the rhomboid muscles, which connect the scapula to the spine. The rubbing felt good but never really got rid of the pain. Then I read the chapter on the scalenes in Travell and Simons. Now when I feel the old familiar ache behind my shoulder I reach for my scalenes instead, and the back pain magically goes away.

Referred pain from the scalenes can also be felt in the pectoralis minor muscles of the chest, in the triceps, the biceps, the deltoids, and in the web between the thumb and first finger. Occasionally, the hand and fingers tingle or feel numb from the pressure the scalenes can exert on the brachial nerve, which passes through them. The brachial nerve is the trunk line for all of the arm. According to Doctors Travell and Simons, these sensations in the hand and wrist from unhappy scalenes are too often misdiagnosed and mistakenly treated as carpal tunnel syndrome!

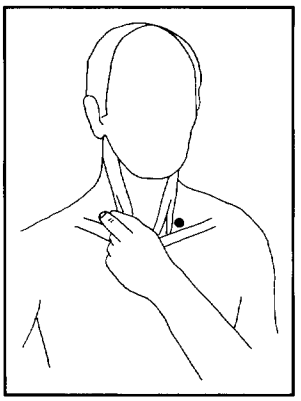

Figure 2 — Massaging scalene trigger point.

In Figure 1, the locations of the clavicles are shown running from the top of the sternum toward the shoulders. The sternocleidomastoid muscles, which travel diagonally down the sides of the neck from the mastoid bones behind the ears, divide to attach to the top of the sternum and to the clavicles, at a place about a third of the way along their length. The black dots on either side, at the junction of the clavicle and the clavicular branch of the sternocleidomastoid, are the primary trigger points for the scalenes. If difficulty is encountered in locating these landmarks, consciously tightening the neck for a moment will make them stand out. Note also that the black dots are on a line straight down from the ears.

> *"By considering my fingers, thumbs and knuckles as tools, I was able, as a mechanic, to be my most inventive."*

In Figure 2, the index and middle fingers of the opposite hand are placed on the black dot and pulled across the trigger point, digging down behind the clavicle. The routine is to make a stroke about one inch in length, turn loose and stroke again, repeatedly. The idea is to work the trigger point just at the threshold of pain, the level where it "hurts good." Doing this, you restore circulation, which has been restricted by the contracted tissue, and accomplish a very conservative and controlled, localized stretching of the acutely contracted muscle fibers. The pressure on the trigger point also interferes with the nerve impulses that perpetuate the so-called spasm cycle.

If your scalenes are in trouble, even very light pressure on them will be extremely painful. You will be tempted to just leave them alone, but don't let the pain discourage you. The worst thing you can do is to do nothing. Begin with light pressure and, over time, gradually increase it until you can really get down deep behind the collar bone. While massaging the scalenes you may feel pain being triggered in your chest muscles, in your back, or even on down the arm into the fingers. Provided that you have the will to withstand the discomfort, you can expect some relief immediately. With persistence, you may see the complete extinction of pain and other symptoms within a week or less.

While giving Trigger Point Self-Massage a try, it would be best to put off the exercises you've been doing, especially any stretching exercises. Although stretching seems to have become almost a religion in this country, stubbornly defying any challenge, in my experience it's wrong to stretch a muscle that is in pain. Stretching risks making the muscle tighten and hurt even more, because it simply doesn't deal with the extreme irritability of trigger points. Stretching and exercise for rehabilitation do work, but only after the trigger points and most of the pain are gone.

Use a very patient, conservative approach to trigger point massage, doing just a little at a time, never trying to kill the thing in one go. Do the massage often, for 15 or 20 seconds, six to 12 times a day, until the muscle lets go and the trigger points go away. The best reasons for doing your own massage are that you have complete control of where the rubbing is done and how much is done, and you can tend the problem as often as needed. I do recommend regular professional massage, if you're lucky enough to find someone who knows what they're doing. But when you're hurting, the worst thing about being dependent on any kind of professional help is the wait until a week from next Tuesday for an appointment.

Next month, for all those who work and *worry* hard, I'll deal with the upper back, the top of the shoulders and the posterior neck muscles.

The Way it Was

A Tuner's Tool Kit from a Century Ago

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

Introduction

A few months ago, as I was putting a piano together following a service call, the owner of the piano started talking about one of his ancestors who was a piano tuner. It was all very vague, and I wasn't paying close attention to what he was saying. Not until he said, "I've still got his tools;would you like to see them?"

Photo 1

He brought out a fragile-looking little leather satchel and handed it to me. Carefully opening its latch, I looked inside and saw a most interesting collection of well-worn tools, some of them apparently homemade. One by one, I lifted each tool out and considered what it might have been used for. The owner said, "You can have them if you like." Somewhat surprised and humbled by this offer, I agreed to take the tools, but promised to feature them in a *Journal* article and to find a good permanent home for them, such as the PTGF Museum in Kansas City.

About The Tuner

The owners of the tool kit don't know much about its original owner. There is even some doubt as to exactly which ancestor it was. In any event, though, it seems that our mystery tuner did some carpentry and farming and was an amateur musician who picked up piano tuning as a necessity for the community. Perhaps he responded to an ad such as this one, which appeared in *The Etude* in 1909, and received training by correspondence course. (And thanks to Charlie Huether, RPT, for copying and sending this ad to me.)

The age of the tool kit is also in question. My guess, based on its condition and the tools it contains, is that it must date from around the turn of the century.

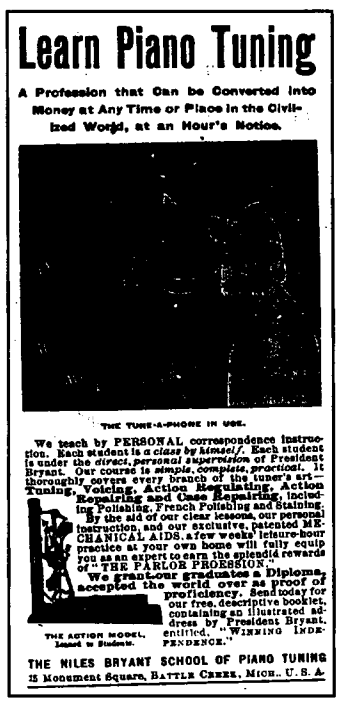

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Figure 1 — Niles Bryant School ad in The Etude, 1909

The Case

As seen in Photo 1, the tool case itself is made of a textured leather, possibly pigskin or cowhide. Remnants of a now-missing leather handle still remain in metal clips at the top of the case. The metal clasp mechanism still functions perfectly; it opens by means of sliding the button on the top, which releases the two metal fingers. The user then simply pulls on the small hanging bead to open the case.

Resembling a smaller version of the doctor's bag common in the old days, this case has definitely seen many years of use. The folds on one end of it have given way to holes and tears in the leather. Originally dyed black, the surface of the leather has abraded from wear to the point that it is now light brown in color.

The Tuning Hammers & Tips

The tuning lever shown in Photo 2 is not that much different than its modern-day counterpart. The handle appears to be made of ebony, or possibly of some variety of rosewood darkened by time and use. A professional extension model, it features a brass ferrule and thumbscrew in place of the now-common collet to hold the shaft in place and allow for extension. The back of the tuning head is broad and flattened, suggesting that it actually was designed to be used as a hammer. The tuning tip is a star tip, and it appears to be fashioned in a single piece with the head.

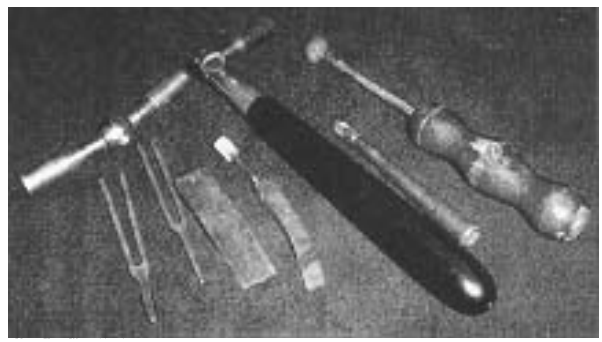

Photo 2 — Tuning tools from old tool kit.

An additional tuning head/tip combination, the "butterfly" head shown at the upper left in Photo 2, gave the tuner the means to deal with uprights and larger grands having oblong tuning pins. One tip has the oblong socket at 90 degrees to that on the other one, meaning that the tuner can easily find a workable tuning hammer angle simply by flipping the tuning hammer over to use the other tip when necessary.

Finally, the kit contains a T-handle tuning hammer which breaks down into two pieces (shown to the right of the tuning hammer in Photo 2) for ease of storage in the case. The steel member fits into a mortise in the wooden handle, and is held in place by a long pin running through the length of the handle. The tuning tip of this hammer is oblong, and this would have been the tuning tool of choice when dealing with an earlier grand or square where great torque was not needed to turn the pins.

Only two mutes survive in this tool kit. One is a wide black rubber mute with no handle,

and the other is a 3/8" rubber mute with a wire handle and an ivory knob on the end. The rubber of this mute is completely petrified and the tip has broken off.

Regulating Tools

The kit contains only three tools which might be construed as regulating tools. The first is made from a nail with the head bent over at a 90-degree angle and the tip flattened out to form a medium screwdriver blade. The second is a 1/16" screwdriver. The third tool is probably a stringing hook, but it could possibly be used to adjust a butterfly repetition spring. From this dearth of regulating tools, it seems that either precious little regulation was performed by the owner of the kit, or the actual regulating tools were removed from the kit at some point.

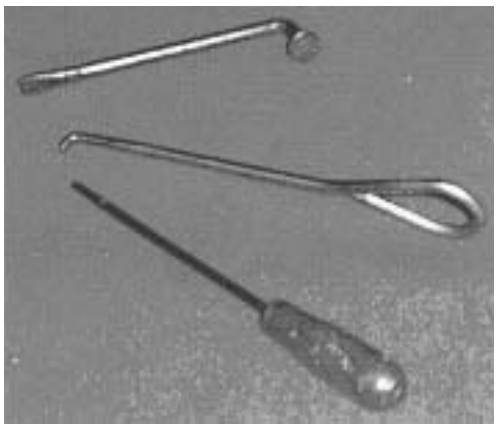

Photo 3 — Tools possibly used for regulation.

Voicing Tools

On the other hand, this tuner's kit contains four tools I would call voicing implements. As shown in Photo 4, three needling tools are included: one with one needle, one with two, and one with three. The needles in all three cases are left quite long and appear to be mounted permanently in the wooden handles, with no provision for easy replacement in case of breakage.

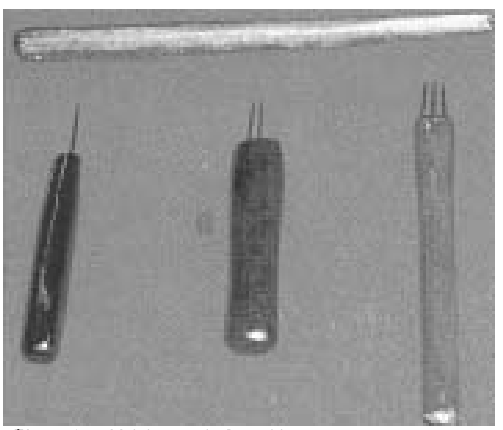

Photo 4 — Voicing tools from kit.

The fourth voicing tool is a piece of wood whittled down to about 1/8" at one end, with a distinct groove in this end, suggestive of the drumstick-type tools sometimes used for seating strings on the bridge.

Repair Tools

A number of the tools are related to common repairs such as string and felt replacement and fixing squeaks in keys and pedals. As shown in Photo 5, the only cutting tools are a small file and a straight-edge razor (sans handle). A round music-wire gauge in its own carrying case is evidence that our mystery tuner performed string replacements, as

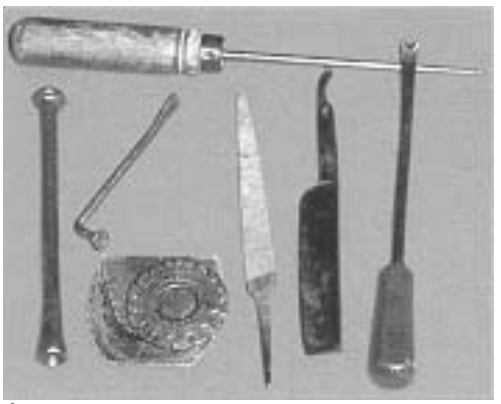

Photo 5 — Assortment of repair tools contained in the kit.

are the coil lifter (right side), the tuning pin punch (left side, made from a ***very*** large nail) and the string hook mentioned earlier and pictured in Photo 3. The tool shown across the top is a scratch awl, handy for a number of repair tasks such as punching holes in leather or felt, and starting screws.

A small metal tube with a removable cap contains what appears to be powdered graphite, which probably would have been the most common dry lubricant at the time. Shown next to this tube is an ivory-handled brush apparently used for cleaning.

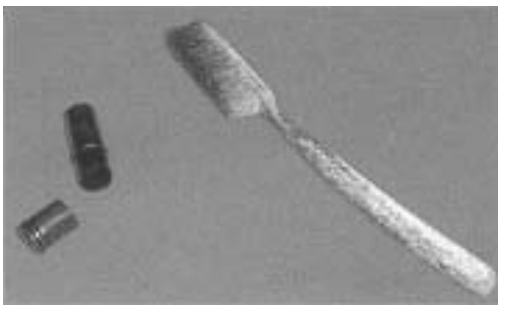

Photo 6 — Metal storage tube containing powdered graphite, and ivory-handled brush.

Mystery Tools

This interesting tool (see Photo 7) has stumped the author as well as other technicians who have seen it. It consists of a slit metal tube flared out on both ends, with a constricting ring which can be slid to either end or can rest in the middle of the tool. A wooden dowel (about hammer-shank size) goes through the tool, but cannot be removed. This dowel has a groove in one end which looks like it was made by pressure on a piano string, but I doubt that it was primarily used for seating strings. Someone suggested that the tool was a string-height gauge, and someone else thought it might be a shank clamp, but since the dowel in the middle refuses to budge, it's hard to see how the tool could function as either. Is it perhaps a screw-holder? The dowel doesn't come completely to the left end, which would allow the end to be slipped over a flange screw head, and the constricting ring could then be slid down to apply pressure on the screw. If anyone out there can identify this tool, please contact me at any of the numbers or addresses shown on page 2 of this issue.

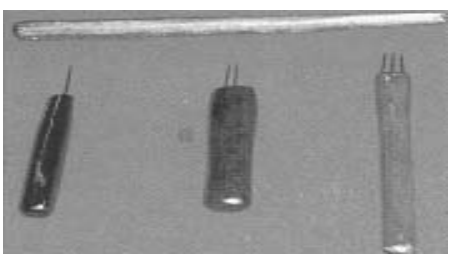

Photo 7 — Mystery tool.

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The Reyburn CyberTuner

By Mitch Kiel, RPT
Puget Sound Chapter

Reyburn CyberTuner™ is a computer software program that turns a laptop computer into a visual tuning device (VTD). Since its debut in July 1996 at the PTG Annual Convention in Dearborn, Mich., Reyburn CyberTuner™ has garnered a lot of praise and created quite a stir. Why?

- Reyburn CyberTuner™ (RCT) is the first VTD to take full advantage of a computer's graphical monitor screen, fast processor speed, and large storage capacity.
- RCT tunings are extremely accurate because it samples multiple partials from up to six notes throughout the keyboard's full range and calculates tunings using advanced aural principles.
- RCT automatically creates optimized tunings on pianos of almost any size or scale.
- RCT is easy to use and accommodates all experience levels, letting beginning tuners "point-and-click" and offering advanced tuners almost unlimited stretch choices.
- Pitch raising with RCT is extraordinarily accurate and fast.
- Because it's software, RCT can be easily revised, allowing constant innovation – three major upgrades in a year and a half, most recently on March 15, 1998.

Six Parts to Reyburn CyberTuner™

1. Chameleon 2 measures and records sample notes, lets you select the stretch and tuning partials, then calculates "target pitches" for all 88 notes.
2. CyberEar visually indicates if a string is in tune.
3. File Management lets you name, save, and manage tunings.
4. Exam mode measures and scores the RPT Tuning Exam.
5. Pianalyzer measures pitch, inharmonicity, sustain, and volume for partials 1, 2, 3, 4, 5, 6, 7, 8, 10, and 12 of any note.
6. MIDI Control enables RCT and a MIDI-equipped SAT to exchange tuning data.

Chameleon 2

The most crucial part of any piano tuning, aural or visual, is deciding where to tune the notes. No matter how precisely or rock-solid, if you're tuning a string to a poorly chosen pitch you're wasting your time and your customer's money. Chameleon 2 is RCT's decision-maker. It measures and records a "partial ladder" (a set of 3 or 4 partials) from sample notes spread across as many as six octaves. It then creates an 88-note tuning by directly matching coincident partials, adding the amount of stretch you want, and smoothly blending transitions between all notes – just like a skilled aural tuner.

To start RCT's sampling process, click the Record button. Chameleon 2 asks you to play A4 and automatically measures and records partials 1, 2, 3, and 4. Then the pitch of A4 is displayed to ± .01 beats or cents, helping you decide if you need to pitch raise the piano (added in RCT 2.0). Then you play A3, A2, A1, A5, and sometimes A6, and Chameleon 2 automatically measures and records their partial ladders. The entire sampling process takes about two minutes.

Experienced tuners prefer Chameleon 2's Advanced mode, where they can click one button to choose one of ten overall stretches (called an Octave Tuning Style, or OTS) from almost pure to extremely wide. In RCT 1.1, additional tuning partials were added, letting you tune 12:6, 10:5, 8:4, 7:3.5, or 6:3 octaves in the low bass.

In RCT 2.0, Easy mode was added because some beginning tuners were a little overwhelmed by all the stretch and partial choices. Easy mode hides most of Chameleon 2's buttons and menus, and automatically selects the correct settings.

After sampling is completed, click the Calculate button. In less than a half second, Chameleon 2 calculates a tuning by smoothly fitting all 88 notes within a framework based on three parameters:

1. beat speed of A2-A3 as a 6:3 octave
2. beat speed of A3-A4 as a 4:2 octave
3. A7 octave type (anywhere between single and triple)

Then two other OTS parameters – Double Octave Maximum and, added in RCT 2.0, Single Octave Minimum "inspect" this tuning and, if necessary, automatically adjust and re-calculate it.

For example, let's say you've selected Octave Tuning Style 4. (OTS 4 approximates the stretch used by most aural tuners on residential pianos, is the most popular OTS among RCT users, and Easy mode's choice.) OTS 4 tells Chameleon 2 to tune A2-A3 as a 6:3 octave .32 bps wide, A3-A4 as a 4:2 octave .32 bps wide, and the high treble to a pure double octave. Using the recorded partial ladders, Chameleon 2 directly matches partials to calculate the exact pitches for all notes in those intervals. In effect, Chameleon 2 is tuning A2 A3 with a m3-M6 6:3 test, A3-A4 with a M3:M10th 4:2 test, and A5-A7 with a M3-M17th 4:1 test. The partial ladders also contain measurements for A2's 4th partial and A4's first partial, so Chameleon 2 can precisely predict the beat rate for the A2-A4 4:1 double octave. OTS 4 specifies a Double Octave Maximum width of 1.00 bps, so if A2-A4's predicted beat rate exceeds 1.00 bps, Chameleon 2 tells A2-A3 and A3-A4 to "shrink-to-fit" until A2-A4 no longer exceeds 1.00 bps. This typically occurs on spinets, consoles, or short grands. In effect,

OTS	1	2	3	4	5	6	7	8	9	Exam
A2-A3	0.20	0.24	0.28	0.32	0.38	0.44	0.50	0.60	0.72	0.32
A3-A4	0.20	0.24	0.28	0.32	0.38	0.44	0.50	0.60	0.72	0.32
DMax	0.80	0.86	0.93	1.00	1.06	1.14	1.25	1.40	1.60	0.75
SOM	-0.12	-0.08	-0.04	0.00	0.04	0.10	0.16	0.22	0.27	0.00
A7	1.50	1.67	1.83	2.00	2.16	2.33	2.52	2.75	3.00	1.60

Beats per second, except A7 for which 1.00 = single octave, 2.00 = double octave, 3.00 = triple octave

Octave Tuning Style Specifications

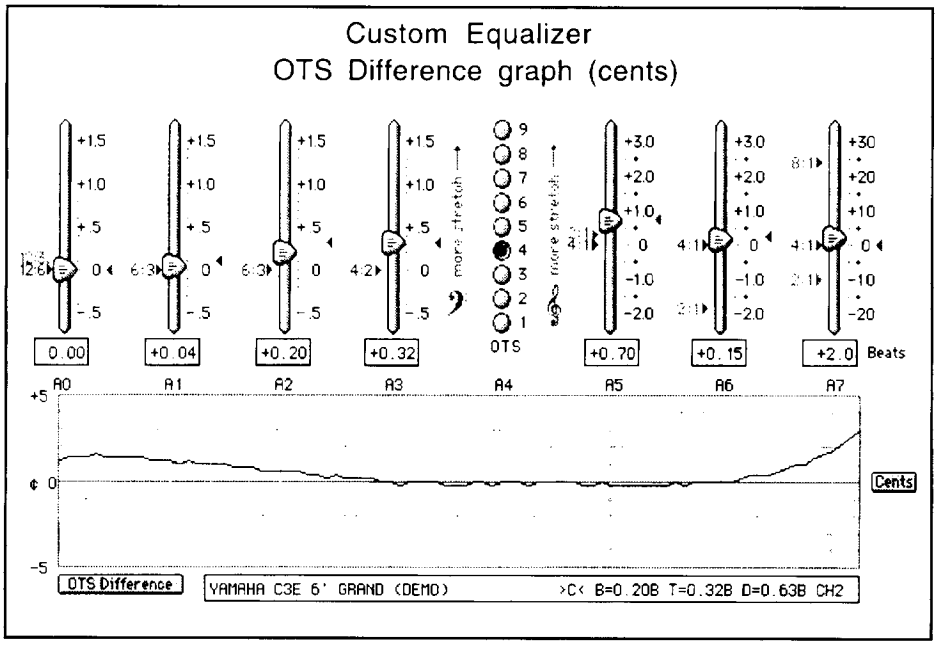

Figure 2 — Custom Equalizer showing OTS difference graph in cents.

this is exactly what aural tuners do on short-scale pianos: narrow the single octaves to prevent the double octave from getting too wide.

But on some scale-challenged piano-shaped-objects (is that being polite enough?), inharmonicity can be so extreme that, to keep the double octave within 1.00 bps, the single octaves would have to be narrow! As aural tuners know, narrow midrange octaves sound pretty awful and the piano would sound better if the single octaves were pure and we let the double octave "float."

That's what Single Octave Minimum does. It won't let Chameleon 2's Double Octave Maximum shrink A2-A3 and A3-A4 past pure and instead forces the A2 A4 double octave as wide as necessary. When Single Octave Minimum was added in RCT 2.0, Chameleon 2 became smart enough to fully emulate an aural tuner's decision-making process: tune some foundation intervals, listen to them, and make prioritized compromises as necessary.

Custom Equalizer

Custom Equalizer, included in RCT 2.0, is a major innovation, bringing visual tuning and aural tuning closer together than ever before. Custom Equalizer lets you micro-adjust the stretch of every octave and view some ingenious analysis graphs, allowing creation of highly personalized tunings and offering "tuning adventurers" a powerful research tool.

In Custom Equalizer you first select an Octave Tuning Style to set an overall stretch, then click-and-drag seven sliders to micro-adjust the stretch at every octave, during which you're seeing constantly updated predicted beat rates for various intervals on the seven slider tubes. Stretch can be altered as little as .02 bps in the bass and midrange, .05 bps in the treble, and 0.5 bps in the high treble. Like Chameleon 2, Custom Equalizer automatically smoothly blends transitions between ranges and settings. Up to ten sets of "tweaks" can be named, saved, edited, and re-applied to any other piano.

Custom Equalizer has two very powerful graphs, their horizontal scale the piano's 88 notes and vertical scale ±5 beats or cents (user selectable). Whenever you move a slider or select another Octave Tuning Style, the graphs are automatically re-drawn. The OTS Difference Graph shows the effects of moving Custom Equalizer's sliders. The Aural Intervals Graph shows the widths of octaves (12:6, 10:5, 6:3, 2:1), 3:2 fifths, and 3:1 twelfths.

CyberEar

Reyburn CyberTuner uses a simple yet precise graphical system to help you tune the strings. CyberEar's Spinner looks like a colored pie with two slices removed. The Spinner rotates clockwise and moves to the right in proportion to a note's sharpness, and counter-clockwise and to the left if flat. The Spinner shows deviation as either beats or cents, and is adjustable between extremely sensitive (one cent or beat per revolution per second) and very coarse (16 cents or beats per revolution per second). For example, many people use 2¢/rev/sec for fine tuning and 8¢/rev/sec for pitch raising. Almost everyone sets the Spinner to cents rather than beats because cents are much more sensitive in the bass and controllable in the treble. For example, with the Spinner set to 2¢/rev/sec, you can

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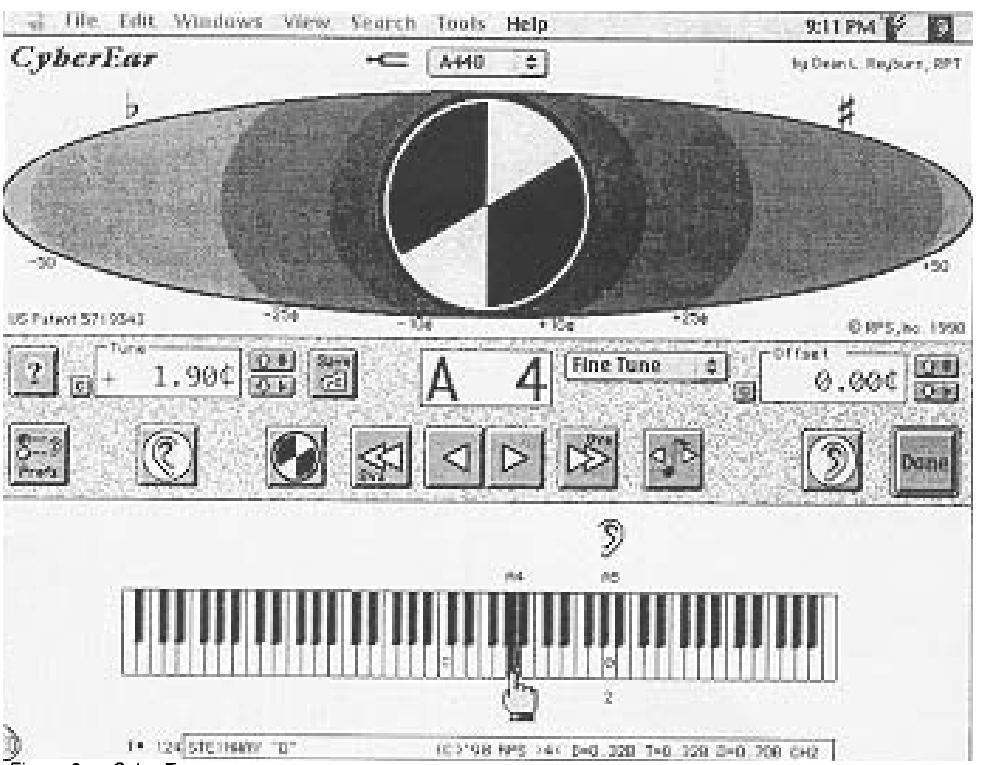

Figure 3 — CyberEar.

The Reyburn CyberTuner

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tune virtually perfect unisons in the high treble using only RCT.

Other New Stuff

- You can set a different Spinner rate and color for every tuning mode: Fine Tune, Small Pitch Raise, Medium Pitch Raise, Large Pitch Raise, and Manual Pitch Raise.
- Aural Temperament mode lets you create your own tuning sequence of up to 25 notes.
- Smoothing helps stabilize Spinner response for unstable strings.

Targeting

Targeting is RCT 2.5's coolest feature. When a string is very close to perfectly tuned, Targeting makes CyberEar's Spinner "blush" by displaying a light-colored small ball behind it.

With the Spinner set to 2.0¢/rev/second, if the string is within 0.3¢ the "blushing ball" is half the Spinner's diameter. If you continue to fine-tune the string, the ball gradually increases in diameter until it completely fills the Spinner when the string is within 0.1¢.

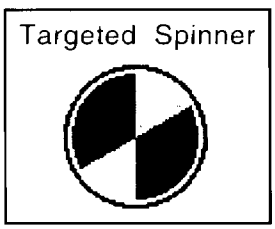

Figure 4 — Targeted Spinner.

Targeting parameters self-adjust proportionately to Spinner sensitivity. For example, if the Spinner is set to 1¢/rev/sec, Targeting begins at 0.15¢ and is full at .05¢; at 4¢/rev/sec, Targeting begins at 0.6¢ and is full at 0.2¢. Targeting also works if the Spinner is set to beats.

To put these tolerances in perspective:

- Full blush at 0.1¢ is equal to .025 bps at A4, also equal to one beat in 40 seconds. Even the most expert tuner on a very stable concert grand has to work darn hard to get full Targeting.
- In the RPT Tuning Exam, any unison within 0.9¢ has no points deducted.

Targeting helps make fine-tuning more accurate, faster, and more stress-free because you don't have to sweat stopping the Spinner's rotation stone-cold. Whenever you see a half-blush, the string is extremely close. If you get full-blush Targeting, you're assured the string is virtually perfectly tuned. Targeting also feels amusingly human. Wouldn't you blush if someone said you're unimprovably perfect?

Other CyberEar Improvements

- The Tune box and the Offset box are adjustable in increments of .01¢.
- Specify any tuning mode and starting note when CyberEar opens.
- Automatic both-ways chromatic note switching is up to three times faster.

Pitch Raising

RCT's speed and accuracy in pitch raising is extremely impressive, due to every note being auto-selected, auto-measured, auto-calculated with its own unique overpull percentage, and auto-offset.

Based on user feedback, in RCT 2.5 the pitch-raise overpull percentages for the (user-specifiable) lowest plain wire note were adjusted from 35 percent to 32 percent; notes immediately above were adjusted to retain the smooth curve (32 percent, 31 percent, and 30 percent). Other pitch-raising additions and improvements:

- Large Pitch-Raise mode is designed for pianos over 100¢ off-pitch, including chip tunings.
- The five-note trailing average of overpull cents, which helps smooth out notes inordinately off-pitch, now auto-resets at the lowest plain wire note.
- A Pitch-Raise Progress Bar over the graphic keyboard indicates which notes have been recorded and enables you to selectively re-record any note.

Exam Mode

In July 1997, Reyburn CyberTuner was approved for measuring and scoring the RPT exam. In RCT 2.0, auto-measuring and auto-recording were sped up; recording an aural tuning (e.g., an Examinee tuning) now takes about 12 minutes. With Targeting, examiners can easily verify the accuracy of a recorded note, so tuning exams will take less time and be more consistently accurate.

More RCT Changes & News

1. Smith-Kettlewell Eye Research Institute of San Francisco, CA is custom-designing an RCT interface for visually impaired piano tuners.
2. Complementing RCT's updated 138-page User Manual (printed and on the computer's hard disk), an eight-page QuickStart manual helps make RCT easy to learn.
3. The Chameleon 2 Library, a storehouse of already-calculated piano tunings included with RCT packages, increased in size from 200 tunings to 2,000 tunings. (An RCT tuning file can hold 240 tuning records. A 750 megabyte hard disk can hold about 12,000 tuning files containing 2,880,000 tunings.)
4. New laptops use Lithium Ion batteries with twice the power per ounce as the old Nickel Metal Hydride batteries.

Conclusions

In the January 1997 *Journal*, Kent Swafford wrote, "CyberTuner is for real, and is advancing the state of the art in visual tuning devices."

Kent now says, "RCT is still the premier tuning device, and it is so by an even wider margin than ever. In my view RCT is clearly and without question the standard by which other tuning devices must be judged." Given Reyburn CyberTuner's power, progress, and potential, it's hard to disagree.

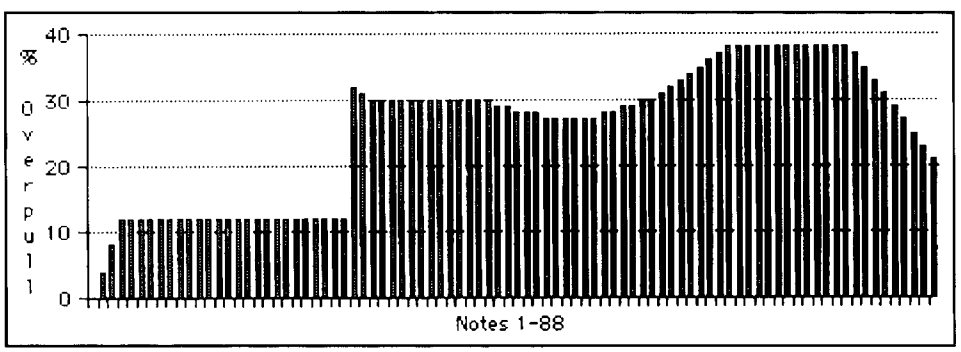

Figure 5 — Pitch-raise Overpull Percentages Graph.

TuneLab97 – The PC Alternative

By David Porritt, RPT
Dallas, Texas Chapter

TuneLab97™ is a program for Windows 95™ available from Real-Time Specialties Inc. It is shareware written by Robert Scott and can be downloaded from the World Wide Web (http://www.wwnet.net/~rscott). It requires at least a fast 486 computer — a Pentium is better. On the practical side, you also need a laptop or notebook computer that can be set up near the piano that is to be tuned. Almost all new notebook/laptop computers come with the necessary sound card and built-in microphone.

I must admit that my first attraction to TuneLab97 was because it is a Windows 95 Program. I had three PCs (now four!) and the task of switching platforms seemed Herculean and expensive. Once I got the program, I really liked the functionality and accuracy of it. And at $34, the price is simply unbeatable. We as a profession are fortunate to have all the new tools that are now available to us.

When I first loaded TuneLab97 on my computer, I thought it had one big shortcoming. After working with TuneLab97 for a couple of weeks, this "shortcoming" became its biggest asset! Let me explain.

After nearly 20 years as an aural-only tuner, I bought a Sanderson AccuTuner™ six years ago. I am familiar with the FAC method of creating complete tunings. I have seen demonstrations of the Reyburn CyberTuner™ and its method of creating a tuning from reading all the "A"s of a piano. TuneLab has no automated tuning generator! The program provides all the necessary tools for *you* to create a tuning for any given piano. The tuning creation tools are quite complete, but all choices are yours to make.

By making your own tunings from "scratch" you can take scale breaks, bridge breaks and unusual jumps in inharmonicity all into consideration as you make a tuning that is truly "for that piano." You can decide where in the scale to begin reading on the fundamental or any other partial. This can all be done with either the text-type editor, or with a graphical editor that gives a helpful visual picture of your tuning.

The text-style tuning editor that comes with TuneLab97 is very easy to use. You can enter values for specific notes of an area, then have the program interpolate values between them. This way you can select several key notes in different areas of the piano you are working on, and have the program fill in the rest. The values on the right of Figure 1 are the reference points for a piano I recently tuned. The values on the left are the settings for each note as interpolated from the reference points. The graphic in Figure 2 is a picture of this same tuning.

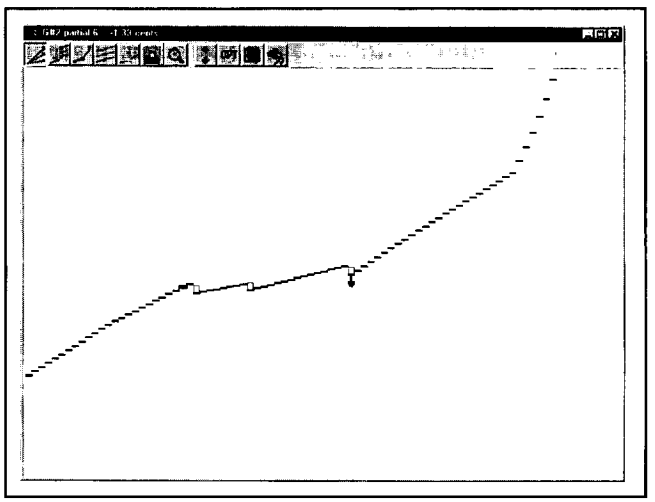

Figure 2 — TuneLab97 graphical Tuning Editor.

The graphical editor shows each note as part of a graph. You can put in anchors and handles on the graph and manipulate the tuning with the mouse. This is much easier to do than it is to write about.

Inharmonicity can be measured for any note to help in creating your tuning. Just select the note, click on the appropriate button, and play the note. The measurements are made, and a "grade" is given for the quality of the reading of each partial. If the computer didn't "hear" one of the partials well, or that partial is very weak, the "grade" will help you decide how much confidence to place on the inharmonic value. It gives values for partials 1 - 8, plus 10 and 12. This gives you the data you need to make a very

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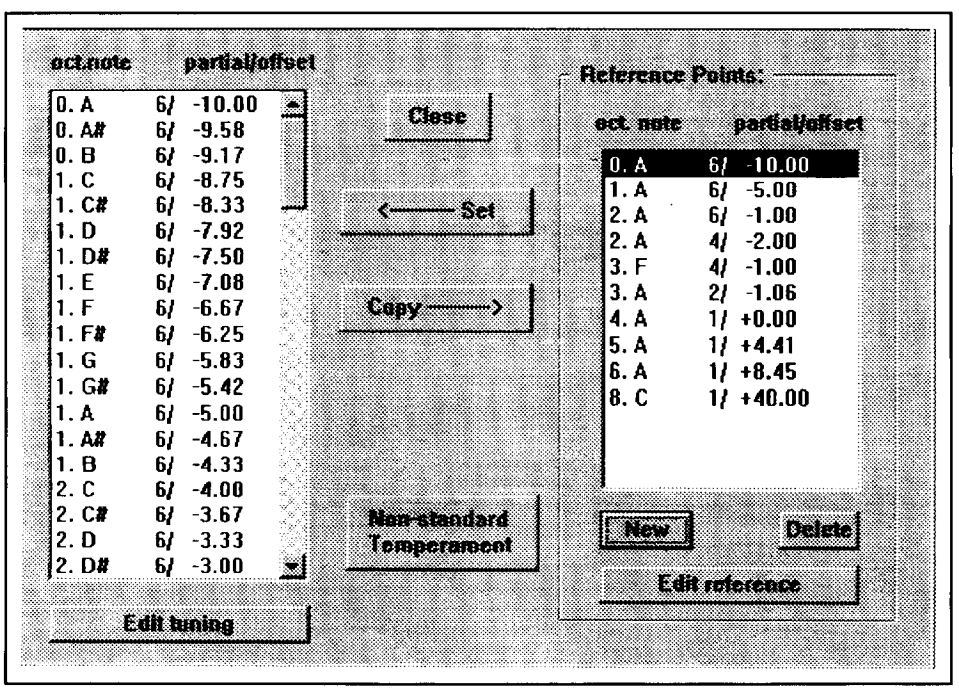

Figure 1 — TuneLab97 text-based Tuning Editor.

TuneLab97 – The PC Alternative

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accurate tuning.

Another part of TuneLab that I really like is the pitch indicator. It is a wide bar on the screen and little blocks move to tell you if the note is sharp (moves to the right) or flat (moves to the left). It is very easy to read, enabling great accuracy. (See Figure 3).

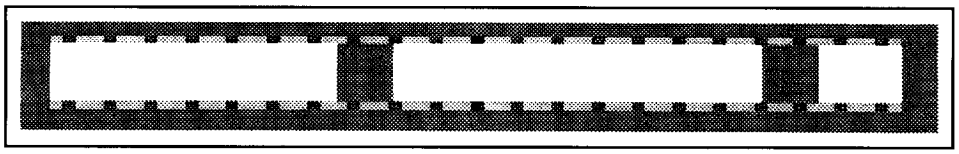


Figure 3 — TuneLab97 Pitch Indicator display (moving bars).

There is also a frequency spectrum display (Figure 4) that can operate in two different modes. If a note is so far off pitch that the moving-bar phase display is not meaningful, you can use the spectrum display to get close to pitch. Then use the bar display to fine tune. It is also good to use this display when the note has poor coherence (like with bad false beats). It is just one more tool to help you get the job done.

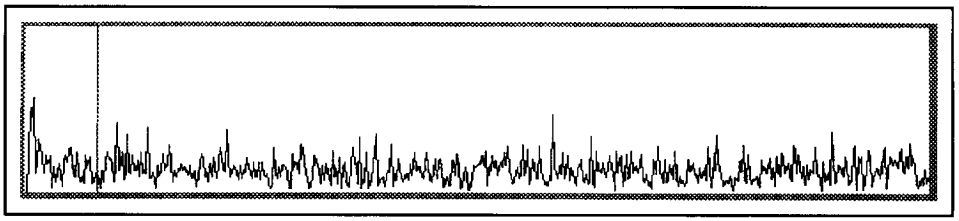


Figure 4 — TuneLab97 Spectrum display.

Some other visual tuning aids let you program your temperament sequence so you can set the temperament aurally and check it with the VTD. The problem with this is that seldom do we go straight through a temperament sequence without going back and forth checking 3rds, 4ths, 6ths, etc. With TuneLab97 you can use Auto Note Switching and it will follow your sequence to any note no matter how many times you check things. After you set your temperament, it is faster to switch to AutoOneNote mode. The program can follow you more quickly if it only has to decide if you have gone up or down one chromatic step. The third mode is manual note switching where you hit an arrow key to change notes.

Non-equal temperaments are easy to use. You just click on a temperament file and the differences from Equal Temperament are superimposed on the tuning file for that piano. You can even set historical temperaments to keys other than "C", but I doubt you will be called on to do that very often!

This is ***not*** a program for Harry Handyman to use to tune his own piano. While it could help a novice learn aural skills, it does demand a certain amount of competence to use it. In my mind this is not a negative thing. When setting up a tuning for a particular piano, I verify many intervals aurally before entering them as reference points. To me this is the best of both worlds. A tuning created with the best the ear can offer, and the consistency and accuracy of digital equipment.

Setting up a tuning for a piano I have not tuned previously takes five to eight extra minutes and I do this as I am tuning the piano. I take some measurements and set the area from F3 - A4 then tune that section and verify it aurally. I then take a couple of new measurements and aurally verify them and tune to the top of the piano. Last, I take about three or four readings (it depends on the scale of the piano and where the bridge breaks are) and tune from F3 down to A0. It is easier to create a tuning on well-scaled pianos. Instruments with large inharmonicity jumps and poor scaling are a little more frustrating — but isn't that always the case! Save the tuning with a filename that fits that make and model and the next time you tune that or the same model piano the whole process will be even faster and easier.

Pitch raising can be done easily with an "overpull" file. You can determine which part of a piano needs to be raised (or lowered) more, and the overpull function will help your first pass to be an accurate pitch raise. When the piano is up to pitch, just cancel the overpull and tune normally.

Measuring notes is done with the "Lock" button. That name isn't very intuitive and it took me a while to figure out to use it to measure the pitch of a note. It does read quickly and accurately.

Much of our tuning time is spent checking and verifying octave sizes, accuracy, stretch, etc. This is what takes our time. When you have confidence in a tuning you have made with TuneLab97, you can skip a lot of the checks you would make when tuning aurally only. This is the time-saving part.

TuneLab97 is a great program for Windows95 notebook users and already-proficient tuners who want the tools to assure good, consistent work. It does require some aural skills to get the most out of it, but the end result is a tuning that is very clean and well-constructed.

Using a Cabinet Scraper

By Bob Hohf, RPT
Milwaukee, WI Chapter

A cabinet scraper is the most difficult tool in the shop to sharpen with any consistency. It takes considerable effort to develop the technique, but once you get it you will not regret the time. I don't use full size, rectangular cabinet scrapers, but have made a set of smaller scrapers with the various flats, angles, and curves necessary to get into the nooks and crannies of pianos. I recommend using Sandvik™ scraper material since it seems to hold an edge the longest. It is important to remember that, on all cutting tool edges, it is the "wire edge" which actually does the cutting. Scrapers are no different. The wire edge is a microscopic burr which forms on the edge of steel when it is worked (see Figure 1).

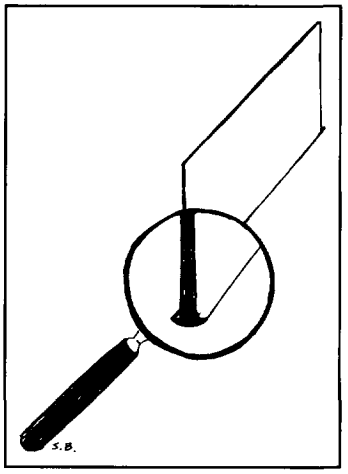


Figure 1 — Close-up showing wire edge of scraper.

The direction the wire edge is pointing, the degree to which it is polished, and its size determine how the edge will cut, and how long the edge will last. This is true of a scraper: how you sharpen it will determine what it will scrape, and how fast it will get dull. The angle you burnish the wire edge to will determine the angle to hold the scraper at when scraping. Holding a scraper at too low an angle for the edge will "roll" the edge and ruin it in one pass.

Here is how I sharpen scrapers:

1. The scrapers I use are relatively small so I put the file on the bench and file all edges of the scraper by hand. With larger scrapers this is often done with the scraper in a vise (see Figure 2). This produces a large, rough wire edge on both sides of the scraper. Even with burnishing, this edge will cut poorly and dull quickly.

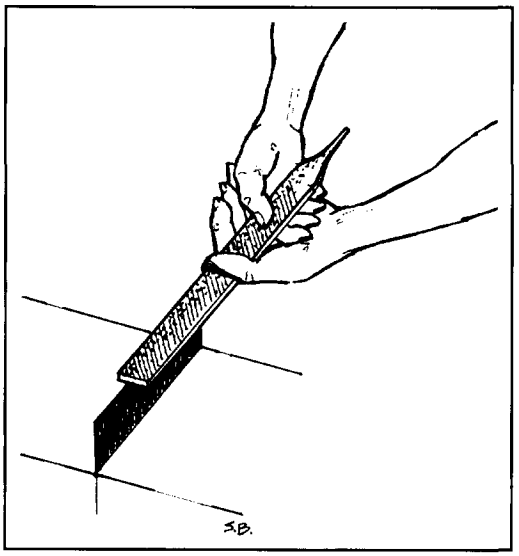


Figure 2 — Filing edges of scraper.

2. Rub the same edges you filed on an 800-grit waterstone until the scoring from the file is gone (see Figure 3). Feeling the small surface of the scraper edge flat on the stone is one of the tricks you need to develop to do this effectively. Not having the small surface flat on the stone will remove the wire edge from one side.
3. Rub the same edges on a 6000-grit waterstone until the narrow edges of the scraper are nicely polished.

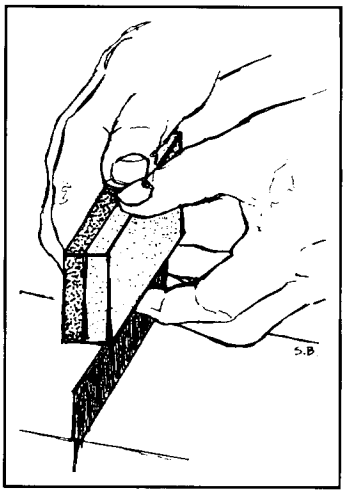


Figure 3 — Rubbing edges of scraper with sharpening stone.

4. Put the scraper flat on the 6000-grit stone, turn the wire edges perpendicular to their original direction and polish the underside (see Figure 4). "Turning" the wire edge wrong here can ruin the edge. The first pass must be "away" from, not "into" the edge. Once it is turned, polishing can be done with back-and-forth or circular motion.

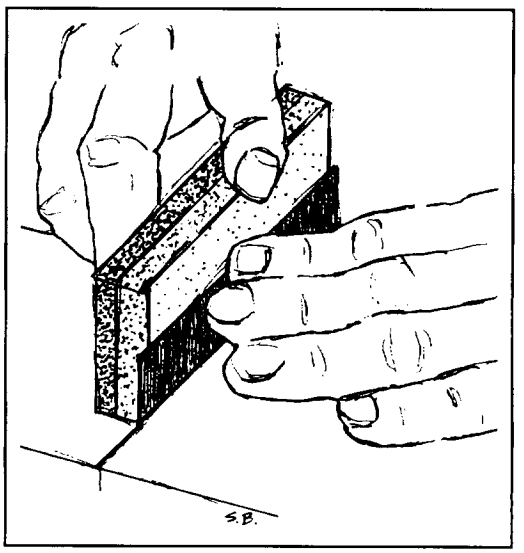


Figure 4 — Polishing sides of scraper with stone.

5. The wire edge is now very small, very sharp, and perpendicular to the direction you want it. Burnishing must be done with very hard, very smooth steel. Most screwdrivers are neither hard nor smooth enough. I use a Kunz™ triangular burnisher (Woodcraft Supply) with all machining marks removed, and polished on waterstones. With the burnisher "roll" the wire edge back over with several passes (see Figure 5). This takes practice.

A four-sided scraper can be sharpened with eight usable edges. Curved edges scrape finish better than flat. One of the beautiful things about a scraper with small, very sharp wire edges is that it will remove finish from spruce without cutting or tearing the wood. I can scrape an entire, medium sized (old) soundboard in about 40 minutes, without having to re-sharpen the scraper. New plastic finishes are more difficult. Before gluing maple, I always scrape the

Continued on Next Page

Proper Perspective

The Tuner's Life

I recently encountered one of those rare young children who watched my entire tuning. Since I always play something as my final check, I told her I would play something for her, if she would play something for me. For her piece she chose a perfectly played one finger version of *Ode to Joy*. I asked her if she knew who wrote it. When she said she did not and I told her Beethoven, she indignantly said, "That's a dog, silly!"

After I played most of a Liszt etude, her mother came in to pay and said, "That is the best the piano has ever sounded." Before I could modestly respond, the young daughter proudly said, "That was me!"

I left with a completely regulated perspective.

— Mick O'Brien, RPT
Florence, WI

Accidental Advertising

The Tuner's Life, II

It was a pleasant afternoon and I was returning home from work in a neighboring state. There was little traffic on the road. As I came over the top of a rise in the road I noted a familiar landmark on the left hand side of the road and state road crew workers installing a new guardrail on the left side of the road. As my gaze drifted back to the road in front of me, it was horrifying to see a line of traffic stopped. I slammed on the "no skid" brakes and started skidding. I eased back on the brake to regain control and just nicked the right rear fender of the car ahead of me before going into the ditch.

"A fine mess you've got yourself into," I said to myself.

The gentleman whose car I'd hit and his passenger dismounted to survey the damage and tried the trunk to see if it would open. It would. They looked over the inside contents before closing the trunk.

I dismounted and said, "At least the trunk still works."

The driver came close and murmured, "We've just been to our neighboring state and bought a month's supply of whiskey. It's Okay."

"Don't worry about the cars," he said, "They're only metal. The insurance and the garages will fix 'em up better than ever." He was driving a Lincoln Town Car.

About three months later I received a phone call from him asking me to come tune his wife's piano.

Could this be a new way to advertise?

— Robert W. Soule, RPT
Randolph, Vermont

The Way it Was

A Tuner's Tool Kit from a Century Ago

Continued from Page 33

What's missing?

Beyond the general lack of regulating tools, one tool which seems to be missing is a pair of pliers with a wire cutter. Since the tuner was obviously otherwise equipped for string replacement, it seems likely that there was such a tool in the kit at one time.

There are also no tools for repinning action centers. It's impossible to say for sure if our tuner did repinning or not, but since not one repinning tool has survived, be it center pin extractor, flush-cutting pliers, center pin supply, reamers, center pin gauge, or micrometer, it seems probable that he did not.

The fact that no repair supplies, such as felts, leather, veneer, glue, etc., appear in the kit, is not surprising. Glue is relatively perishable and was likely removed long ago. The other accoutrements of field repair may well have migrated to the bottom of the case and been thrown out, deemed as junk and clutter, by the first inheritors of the kit.

But the biggest question in my mind about this tool kit and its original owner is this: does it seem logical or reasonable that a tuner who does practically no regulating or repinning, would have possessed so many voicing tools and the skills to use them?

Using a Cabinet Scraper

Continued from Previous Page

surface with a flat scraper to remove any machining irregularities. This leaves the surface flat and glassy smooth.

If you have never used a scraper that is this sharp, I highly recommend that you spend the time to develop the technique.

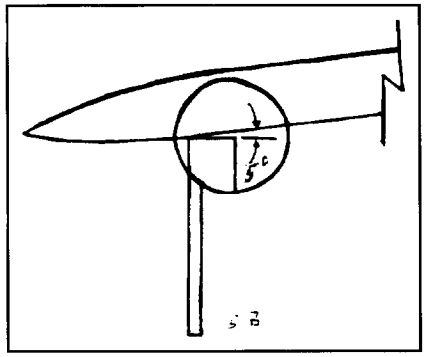
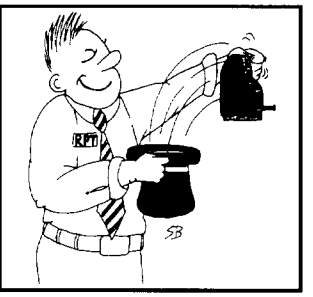


Figure 5 — Rolling edge of scraper with burnishing tool.

Scrapers are great. You will not believe what can be done with them.

Grand Illusions ...

The Page for Serious Cases



Piano Makes Mice Smarter, Study Shows

By Doug McKay

Two scientists at the Dutch Institute of Late Afternoon Research announced what may be a major breakthrough in how we understand the brain, at least the mouse kind. Drs. Hans Doonderpans and Jan der Ooverdere claim that mice living in pianos become smarter.

"They run the mazes faster, they react better to sounds, and they always pick the lowfat dressing instead of ranch," claims Dr. Doonderpans.

"And they can always solve the Jumble, that crazy mixed-up word game," added Dr. der Ooverdere.

The researchers are unsure just what about the pianos causes this change. "Of course, we think it's the music, but it also could just be having all that nice felt to munch on," said Dr. D.

"Yes! It's tasty and full of fiber!" added Dr. der O. "Or ... or so I've heard."

Does this imply anything about the effect of the piano on humans?

"I'm not sure," pondered Doonderpans. "People living in pianos? It doesn't seem practical...." His face lit up. "We could build a really ***big*** piano...!"

"I smell ***research grant***!" chimed in his colleague.

Doug McKay may be reached c/o RPT Mark Stivers of the Sacramento Valley, CA. Chapter

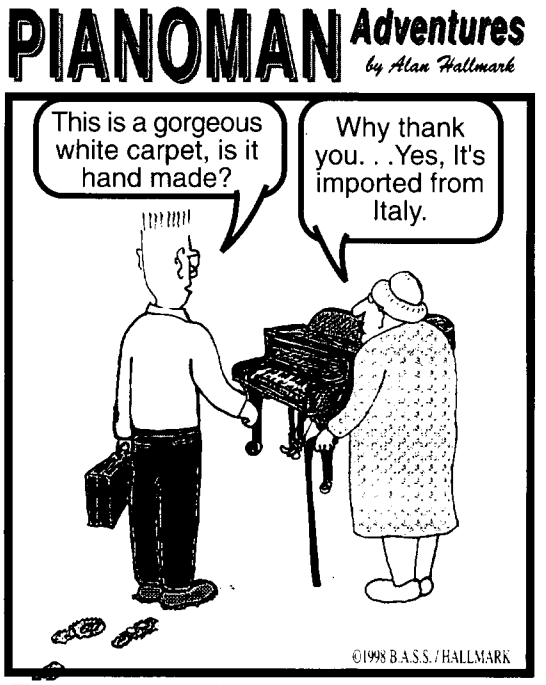
Be a Craftsman! (Or just look like one)

By Doug McKay

When people look for a piano tuner, they're not just looking for someone to fix their piano. They're looking for a real craftsman – a throwback from a bygone age. They're looking for Geppetto from Pinocchio.

You need the Old Craftsman series of accessories from Valley Hi. First, we have black leather shoes with one big buckle on top. (Are they as uncomfortable as they look? Yes, they are!) Then the old shop apron, made of real pre-worn leather. It has over a dozen pockets, all stuffed with tools that look mysterious and old. (Don't try to use them – they're glued in.) Square wire-rimmed glasses add charm. And for the crowning touch, we recommend our Craftsman's Wig – a gorgeous mountain of snow-white hair.

If you buy the full set, we'll throw in, at no additional charge, our set of three audio tapes, *How To Speak With a Middle-European Accent.*



The shortest distance between your car and a lawsuit is across the lawn.

PTG Review
PIANO TECHNICIANS GUILD
DEDICATED TO PTG NEWS • INTERESTS & ORGANIZATIONAL ACTIVITIES

A Good Time Will Be Had By All

By Evelyn Smith, RPT
Institute Director

You'll certainly learn a lot at the Providence convention, and there's no reason you can't have a good time while you're at it. We want to be sure you'll enjoy yourself, so in the fun category here's some of what we've planned for you:

We've changed the traditional line-up of evening events to make them even more enjoyable this year. For starters, our witty and astute *Journal* editor, Steve Brady, will be master of ceremonies of the Opening Ceremony on Wednesday night. Don't miss him or you'll miss some of the best lines of the week. After the ceremony, Young Chang/Kurzweil artist Cory Allen will entertain us with his jazz combo at the lively reception to follow.

The award-winning Waterplace Park, an easy walk from the Convention Center, will be the site of the Steinway concert on Thursday night. Touted as the most magnificent new urban park in America, Waterplace Park is the ideal place for a summer evening's concert. Plans are being finalized for this outdoor extravaganza, and Steinway will serve up a gala evening of great music and delectable food.

We've moved the Golden Hammer banquet to Friday night this year so you can enjoy this important gathering while you're still fresh. After the meal, Kawai will be our host; their artist, Hsing-Ay Hsu, will perform a classical program on the EX concert grand, followed by a tasty reception. Plan to join us for the evening as we enjoy the good music, good food and good company.

And Saturday night, following the time-honored Barbershop Chorus performance at 8:30, the Yamaha party will get into full swing. This year we scheduled it so you can live it up at their annual bash and only have two classes to live through the next day! We really do have your best interests at heart.

Finally, Providence is a great site for a convention. It's pedestrian-friendly, with award-winning restaurants and Colonial architecture within walking distance of the Rhode Island Convention Center (RICC). The RICC itself is a modern facility with a classroom layout that makes getting around a snap. The new Westin Hotel, adjoining the RICC, is luxurious. And all of New England is an easy drive from Providence, including gorgeous beaches, opulent Newport mansions, and the exciting city of Boston.

Don't miss Providence '98: there's a lot to learn, and much fun to be had while doing it.

Packing Your Bags for Providence

By Evelyn Smith, RPT
Institute Director

Congratulations – you've decided to invest some of your valuable time and money in the convention and institute. You've bought your ticket and made your hotel reservations for Providence; but how can you make sure that your investment will pay off?

While you're making your plans and packing your bags, here's a checklist to keep in mind:

1. Jot down some questions you'd like to ask. Whether it's a question about business practices or technical matters, someone there will have answers for you. Make a plan to seek out advice and suggestions from instructors and other attendees.
2. Take advantage of the incredible array of tools and technical know-how in the exhibit hall. Make a list of items to look for in the exhibit hall, and plan to spend some money to upgrade your tools and supplies.
3. Put a message on your answering machine telling your customers that you're investing in your continuing education by attending PTG's Annual Institute. It serves the dual function of impressing your customers and letting them know you're out of service for a few days.
4. Try to leave your worries at home. If at all possible, leave the day-to-day chores of the business behind. Ask someone else to screen your daily calls and notify you if there's an emergency. You'll be able to participate more fully in the convention if you're not trying to negotiate long-distance business deals.
5. Plan to relax and have fun. We all work better when we take an occasional break from the daily routine. There's no place like the annual convention to meet new friends, renew old acquaintances, and get a sense of perspective on the wonderful career of piano service work that we've all chosen.

You're Invited – Set Sail for Providence

Come celebrate. As the Northeast Regional Vice President, it is my pleasure to invite you to the PTG event of the year. Providence, R.I., is the place to be next month for our 41st Annual Convention and Technicial Institute. The Institute Committee has planned an excellent educational opportunity; the manufacturers will entertain you in style; your host, the Rhode Island Chapter, will direct you to any number of first-class restaurants and places to see; the city of Providence welcomes you to explore its cultural and historical treasures, and New England is ready to share its unique flavor.

In this column, over the past seven months, contributors from the Boston, Rhode Island and Connecticut chapters have introduced some of the special attractions in and around Providence. They have tried to highlight various activities to pique your interest in traveling through our region. New England is rich in history, culture and scenery unique to these eastern states. Scattered between the large, once great industrial cities you'll find quaint towns with a white steeple church on the green. Travel to the coast and find clapboard sided homes of an 18th century fishing village which used the sea as its highway. Hopefully you'll be able to spend some extra time either before or after the convention exploring some of New England's preserved past.

New England encompasses six states; Maine, famous for its rugged coast line; Vermont, with its beautiful Green Mountains and small communities; New Hampshire, with a tourist playground in the White Mountains; Massachusetts, best known for the shot heard round the world at Lexington & Concord, Boston's Freedom Trail, and Cape Cod with miles of sandy beaches, antique shops and quaint towns; Connecticut, with stone walls running through the rolling hills, and not far from Providence the Mystic Seaport, a living working museum of the whaling days; and Rhode Island, the Ocean State, best known for Newport which became the summer home for some of the nation's wealthiest families.

A side trip to Newport only 45 minutes from Providence, to see what the wealthy called their summer cottages, will be an experience beyond compare. These stately mansions are furnished with gold, marble and treasures from around the world. One day will be a treat, but it takes two or more days to see all of the homes open to the public. Newport, a colonial seaport, has a wealth of 18th century homes and shops clustered downtown by the Newport Harbor.

If you venture no further than the city of Providence, you can find a wonderful selection of historical buildings within a few blocks of the hotel. A stroll along the brick-walked Providence River will reveal many of these treasures. The contrast of architectural facades include impressive colonial clapboard houses dating from the early 1700s, churches, stone and brick commercial buildings of the 18th and 19th centuries as well as modern structures.

Providence has developed Waterplace Park, near the hotel, and just below their stately 100-year-old capitol building where you can start the river-walk tour. For that special treat, you can travel the river by gondola powered by the gondolier – your guide. The Steinway concert is scheduled to be held at Waterplace Park, weather permitting.

There's something for everyone at the Museum of Art of the Rhode Island School of Design with its world-renowned collection. Maps and information on downtown museums, attractions and tours will be available at the host chapter table.

Eating in this city poses no problem. The restaurant possibilities within walking distance or a short ride are numerous. They range from McDonalds to the more formal Federal Reserve. The city is known for its award winning restaurants. The Rhode Island Chapter, our host, will have available a complete list with price range and directions.

For those of you who will spend extra time here, the best source for detailed information on historical sights, points of interest, restaurants and places to stay is the American Automobile Association (AAA) *Tour Book*. The book gives historical information, location, times, cost and telephone numbers. It is available free to AAA members, but not sold to nonmembers. If you're driving, it might be worth the cost of AAA membership to get the *Tour Book* and have the peace of mind with their road service benefits. Another good book is the *National Geographic Guide to America's Historic Places*. Check your local book store for other tour books on New England. Speaking of driving, head for I-95 and take the downtown Providence exit. It will bring you by the Westin Hotel and Convention Center.

I certainly hope you will join me and fellow PTGers in this wonderful city this July. We'll have fun, get some learnin' and perhaps find a new tool at the exhibits.

See you soon,

—Jim Birch, RPT, NERVP

Tuning Tutoring

By John Ragusa, RPT
Assistant Institute Director

Looking to pass the RPT test? Or maybe you're just interested in having someone evaluate your skills. You can do it this summer in Providence. We offer you one-on-one tuning tutoring. Get the experienced ear of a tuning expert for one and one half hours. You can tailor it to meet your needs entirely. Whether it's aural or electronic, we've got what you need to improve and be the best you can. Those of you wishing to upgrade your aural skills can work with Virgil Smith, RPT, Mike Miccio, RPT, or Tom Sheehan, RPT, (Bill Garlick and Steve Fairchild will not be able to make it to Providence). Electronic tuners will be able to go right to the source of these electronic marvels. The Sandersons will teach you on the Accu-Tuner™. Dean Reyburn and Mitch Kiel will instruct you on the CyberTuner™.

All levels of tuning tutoring are available from beginning to advanced. Opportunities of this magnitude await you in Providence. You must pre-register for tuning tutoring. Slots are limited. Call Sandy at the Home Office or John Ragussa for further details.

1998 Technical Institute Class Schedule

	1st Period	2nd Period	3rd Period	4th Period
Thurs.-Sat.	8:00-9:30	10:30-12:00	1:30-3:00	3:30-5:00
Sunday	8:30-10:00	10:30-12:00		

○ 1 class period
⬭ 2 or more class periods

Regional Meetings will be held on Thursday, July 9, at 5:30 p.m.

	THURS-9				FRI-10				SAT-11				SUN-12		ROOM
SPECIAL CLASSES	1	2	3	4	1	2	3	4	1	2	3	4	1	2	
Body Tuning for Tuners - Anne Ingard	■	■	■	■	■	■	■	■	○	■	○	■	■	■	15
FRIDAY'S SUPER SEVEN															
Understanding Wood - Bruce Hoadley, Ph.D.	■	■	■	■	■	■	○	○	■	■	■	■	■	■	1 & 2
Tax Strategies - Murray Bradford, CPA	■	■	■	■	■	■	⬭	■	■	■	■	■	■	■	5 & 6
Between Artist & Technician - Steve Brady & Judith Cohen	■	■	■	■	■	■	⬭	■	■	■	■	■	■	■	3 & 4
Advanced Tuning - Jim Coleman, Sr.	■	■	■	■	■	■	⬭	■	■	■	■	■	■	■	9 & 10
Piano Anatomy - Del Fandrich	■	■	■	■	■	■	⬭	■	■	■	■	■	■	■	11 & 12
The Belly of the Best - Chris Robinson	■	■	■	■	■	■	⬭	■	■	■	■	■	■	■	13
Everyday Piano Service - Isaac Sadigursky	■	■	■	■	■	■	⬭	■	■	■	■	■	■	■	14 & 15
SUNDAY SPECIALS															
Temperament Festival - Skip Becker	■	■	■	■	■	■	■	■	■	■	■	■	⬭		1
Cybercafe	■	■	■	■	■	■	■	■	■	■	■	■	⬭		3
Rebuilding Skills Workshop	■	■	■	■	■	■	■	■	■	■	■	■	⬭		12
Business Roundtables	■	■	■	■	■	■	■	■	■	■	■	■	○	■	4
Kids and the Piano - Alan Fox	■	■	■	■	■	■	■	■	■	■	■	■	■	○	5
ACTION & REGULATION CLASSES															
Action Geometry - Rick Baldassin & Chris Robinson	■	■	○	■	■	■	■	■	■	■	■	■	■	■	15
Action Geometry - Rick Baldassin & Chris Robinson	■	■	■	■	○	■	■	■	■	■	■	■	■	■	5
What Happens If? - Richard Davenport	■	■	○	■	○	■	■	■	■	■	■	■	■	■	4
Grand Regulation - Focus on Aftertouch - LaRoy Edwards & Terry Niimi	■	■	○	■	○	■	■	■	■	■	■	■	■	■	9
Vertical Regulation: Tips and Tricks for the Visually Challenged - LaRoy Edwards	■	■	■	○	■	■	■	■	■	■	■	■	■	■	6
Action Power - Del Fandrich	■	■	■	○	■	■	■	■	■	○	■	■	■	■	2
A Focus on Vertical Regulation - Dean Garten	■	○	■	■	■	■	■	■	■	■	■	○	■	■	10
Vertical Regulation - Soup to Nuts - Ben McKlveen	○	■	■	■	■	■	■	■	■	■	■	■	■	■	9
Vertical Regulation - Soup to Nuts - Ben McKlveen	■	■	■	■	■	■	■	■	■	■	○	■	■	■	14
Taming the New Grand Action - Kathy Smith	■	■	■	○	■	■	■	■	■	■	○	■	■	■	10
Grand Action Diagnostics - Willis & David Snyder	⬭	■	■	■	■	■	■	■	■	■	⬭	■	■	■	3
The Whippen Support Spring - David Stanwood & John Foy	■	■	○	■	■	■	■	■	○	■	■	■	■	■	2
Unlocking the Mysteries of the Steinway Grand Damper System - Kevin Stock	○	○	■	■	■	■	■	■	■	■	■	■	■	■	11
Servicing the Sostenuto: Grand & Vertical - Doug Wood	■	■	■	○	○	■	■	■	■	■	■	■	■	■	1
HANDS-ON REGULATION															
Grand Regulation and the Technical Exam - Doug Wood & Mitch Kiel	■	■	■	■	■	■	■	■	■	■	⬭	■	■	■	12
Vertical Regulation - Dale Fox & Brett Dearing	■	■	■	■	■	■	■	■	⬭	■	■	■	■	■	3
BUSINESS & COMPUTER CLASSES															
Taking the "War" Out of Warranty Work - Brian DeTar	■	■	■	■	○	■	■	■	■	■	■	■	■	■	12
The Other Keyboard - Jeannie Grassi	■	○	■	■	■	■	■	■	■	■	■	■	■	■	14
More Than You Bargained For - Beverly Kim, David Hanzlick & Jerry Kiser	■	■	■	○	■	■	■	■	■	■	■	■	■	■	14
Close the Back Door - Gary Neie	○	■	■	■	■	■	■	■	■	■	■	■	■	■	14
The Ins and Outs of Piano Rentals - Anthony Pascone	■	■	■	■	■	■	■	■	■	■	■	○	■	■	14
Pricing Piano Service - Dale Probst	■	■	■	■	■	■	■	■	■	○	■	■	■	■	15
Internet for Piano Technicians - Andy Rudoff	■	■	○	■	■	■	■	■	■	■	■	■	■	■	14
Internet Evening Session - Andy Rudoff	5:30-7:00 p.m.				■	■	■	■	■	■	■	■	■	■	14
Increase Your Income Now by Selling Piano Climate Control - Teresa Severin	■	■	■	■	■	■	■	■	■	■	○	■	■	■	7 & 8
COLLEGE & UNIVERSITY TECHNICIANS FORUM															
Tone Production as a Function of the Bridge - Michael Wathen & Richard Harris	■	■	○	■	■	■	■	■	■	■	■	■	■	■	7 & 8
Fortepiano Voicing & Regulation - Allen Wright	■	■	■	○	■	■	■	■	■	■	■	■	■	■	7 & 8
DESIGN, CONSTRUCTION & MATERIALS															
Basic Knowledge of Different Types of Glues - Andre Bolduc	○	■	■	■	■	■	■	■	■	■	■	■	■	■	1
Basic Knowledge of Different Types of Glues - Andre Bolduc	■	■	■	■	■	■	■	■	■	■	○	■	■	■	4
Wood Technology - Bruce Hoadley, Ph.D.	■	■	■	■	■	■	■	■	○	○	○	○	■	■	1

	1	2	3	4	1	2	3	4	1	2	3	4	1	2	ROOM
Manufacturing Systems and Quality - Joe Pramberger			●												11
All About Bass Strings - Albert & David Sanderson	●			●											15
EXAM CLASSES															
Preparing to Take the PTG Written Exam - Marc Poulin	6:00-9:00p.m.														12
Preparing for the PTG Technical Exam - Chuck Erbsmehl	7:00-9:00p.m.														9
Technical Examiner Training (RPTs Only) - Richard Bittner	7:30-9:00p.m.														1
Preparing for the PTG Tuning Exam - Keith Kopp	5:30-7:00p.m.														9
Tuning Examiner Training (RPTs Only) - Richard Bittner	6:00-7:30p.m.														1
PLAYER PIANOS & ELECTRONIC CLASSES															
Introduction to Servicing the Disklavier - Bill Brandom		●													7 & 8
Disklavier Piano Service - Master Class - Bill Brandom									●						7 & 8
Approach to the PianoDisc System - Mark Burgett					●										7 & 8
The QuietTime System - Mark Burgett & Michael Zarate	●														7 & 8
From Bench Warmer to Player - Norman Cantrell		●													5
SOUNDBOARD & BELLY WORKSHOP															
Soundboards - Old to New - David Betts	⬭														13
Building the Pneumatic Soundboard Press - Clair Davies			⬭												13
Soundboards - Pre-Crowned to Install - Nick Gravagne					●										13
Jigs, Fixtures and Woodworking for the Belly Man - Shawn Hoar											⬭				13
The Bridge from End to End - David Hughes									⬭						13
REBUILDING & SHOP CLASSES															
Details of Soundboard and Plate Refinishing - Marcia Davis				●											9
Details of Soundboard and Plate Refinishing - Marcia Davis										●					14
Piano Shop Trade Secrets and Other Helpful Hints - John Hartman												●			7 & 8
Practical Woodworking for the Piano Technician - John Hartman				●											11
Restringing the Grand Piano - Greg Hulme		●										●			4
Action Centers - The Secret to Consistent Touch (Vis. Imp.) - Don Mannino			●												6
Grand Hammer Installation - A Factory Method - Joel & Priscilla Rappaport			⬭						⬭						12
Installing Vertical Hammers, Shanks and Butts - Ted Sambell					●				●						14
Replacing the Grand Pinblock - Ted Sambell		●	●												1
Grand Piano Teardown - Alan Vincent	●	●													12
SERVICE & REPAIR CLASSES															
Bringing Up Baby - Allan Gilreath		●			●										15
Do It Yourself Poly Repairs - Phil Glenn									●	●					11
What a Difference a Day Makes - Nick Gravagne & Richard Davenport											⬭				5
Tool Systems for the Professional - Jim Harvey	●														10
Tool Systems for the Professional - Jim Harvey											●				11
Troubleshooting - Ernie Juhn	●								●						5
The New York City Tool Kit - Dan Levitan					●										10
The New York City Tool Kit - Dan Levitan												●			11
Everything You Have Wanted to Know About Humidity and Humidity Control - Bob Mair										●					7 & 8
Pedaling From the Ground Up - Joyce Meekins				●						●					4
90 Practical Tips for In-Home Servicing of Vertical Pianos - David Patterson				●											5
90 Practical Tips for In-Home Servicing of Vertical Pianos - David Patterson					●										6
Performance Regulation and Voicing for Everyday Pianos - Dan Reed			●		●										3
Applied Skills									6:00-9:00 p.m.						12
TUNING, VOICING & CONCERT PREP CLASSES															
Pitch Raising, Nice and Easy - Gina Carter			●							●					5
Tuning for Beginners - Jim Coleman, Sr.											●				9
Tuning - Let the Piano Talk to You (Vis. Imp.) - Jim Coleman, Sr.	●														6
Voicing Small Grands - Brian DeTar				●											3
Voicing Small Grands - Brian DeTar												●			15
Tone & Touch - What Matters Most (Vis. Imp.) - Nick Gravagne		●													6
Muting Master Class - Dan Levitan	●								●						4
Tuning Stability - A Wholistic Approach - Christine Lovgren		●							●						9
Piano and Hammer Voicing the Kawai Way - Don Mannino	⬭										⬭				2
Aural Checks for Electronic Tuners - Randy Potter					●										2
Basic Tuning Theory and Practice - Randy Potter												●			9
Introduction to Reyburn CyberTuner - Dean Reyburn & Mitch Kiel									●						10

	1	2	3	4	1	2	3	4	1	2	3	4	1	2	ROOM
Advanced Reyburn CyberTuner Techniques - Dean Reyburn & Mitch Kiel										●					9
Tone Regulation with Steinway - Kevin Stock					●										11
Bringing Out the Best in Performance Grands - Kent Webb			●							●					10
MINI TECHNICALS															
10:30 a.m. - 11:10 a.m.															
Piano Moving Innovations - Lowell Wakker						◖									1
String Splices, Loops and Winding Removal - Michael Tocquiny						◖									2
Pain Prevention! The Pianist's Perspective - Charlotte Eschman						◖									3
The Tuning Hammer Dance - Joel Jones						◖									4
The Pressure Stops Here - Mark Haas						◖									5
Shaping Tails for Great Checking - Nevin Essex						◖									6
Ivory Keytop Maintenance - Debra Cyr						◖									7
Keeping in Touch - Kim Fippin						◖									8
Increasing Profits Through Accessory Sales - Ed Mashburn						◖									9
Making Bridge Templates - Tim Coates						◖									10
The Duplex Frontier - Dan Franklin						◖									11
Making Solid Bridge Repairs with Superglues - Allan Day						◖									12
Exposing the Capo - Paul Revenko-Jones						◖									13
Raising Pitch - How and When - Bruce Dornfeld						◖									14
University Life - Choosing the Right Piano - Lonnie Young						◖									15
11:20 a.m. - NOON															
PAZ - A New Tool to Measure the Color of Sound? - Odd Aanstad						◗									1
Bedding the Grand Keyframe - Paul Dempsey						◗									2
Carpal Tunnel Syndrome - Malinda Powell						◗									3
Do it Right...Do It Fast! - Carlos Ralon						◗									4
Growth vs. Aging in Your Business - Peter Stumpf						◗									5
Grand Hammer Tail Sweeping and Weight Reduction - Dale Fox & Brett Dearing						◗									6
Insecure Lyres - Kathi Voss						◗									7
Treat Verdigris - Hans Sander						◗									8
Picking the Best Temperament - David Lamoreaux						◗									9
Everyday Muting/Pitch Correction Techniques - Mark Cramer						◗									10
The Mouse and the Piano - Norman Cantrell						◗									11
Therapeutic Self-Massage - Clair Davies						◗									12
Nifty Shop Tools and Techniques - John Dewey						◗									13
Putting Service in the Service Call - Dave Campbell						◗									14
Key Weights and Touch - Bob Hohf						◗									15

The Westin Hotel is located adjacent to the Providence, Rhode Island Convention Center, headquarters for the 41st Annual Piano Technicians Guild Convention & Technical Institute

Room Rates:

Westin Hotel —
401-598-8000
One West Exchange Street, Providence, RI 02903
Before June 11: Single/ Double $113, Triple/ Quad $133

Holiday Inn —
401-831-3900
21 Atwells Avenue, Providence, RI 02903
Before June 18: Single $85, Double $90, Triple $95

Individuals must indicate they are with the Piano Technicians Guild to receive the rates quoted at left.

Southwest Offers Providence Discount

Southwest Airlines is offering a 10 percent discount on most of its already low fares, for travel to and from the 41st Annual Piano Technicians Guild Convention & Technical Institute. Call (or have your professional travel agent call) the Southwest Airlines Group and Meeting Desk at 1-800-433-5368, Monday - Friday, 8 a.m. - 5 p.m. and Saturday, 8:30 a.m. - 5:30 p.m. and refer to I.D. Code S7178. Call by no later than five (5) days prior to first date of travel to take advantage of this offer. Call right away as fares are subject to terms and availability.
(Because advance bookings are accepted by Southwest only through dates for which schedules have been opened, reservations may not yet be available for confirmation.)
Travel in or out of Dallas Love Field is subject to the requirements of the Wright Amendment.

"Pleased to meet you ... Where did you get my name?"

By Carl D. Root, RPT

Paraphrasing the Rolling Stone's Mick Jagger may seem like a strange way to start an article in the *Piano Technicians Journal.* He doesn't even have a guitar to tune, much less a piano. But he did attend the London School of Economics, so connecting him with an Economic Affairs article is perhaps not such a stretch.

Economic News & Views

Referrals are the key to a successful piano service business, but how many of you keep track of your sources for new customers? Do you know how many clients came from teachers, advertising, stores, other technicians, as well as piano students and other amateur musicians? Finding out where new customers heard about you is more than just idle curiosity. Positive things can be done to encourage various types of referrals. Time and money spent on each of these sources can be tracked to see if they are productive and cost effective. Many technicians claim to have enough work already, but I have to believe that they would gladly trade in a poor quality piano located some distance from home for a fine musical instrument located nearby.

Even if you welcome new referrals, it may not seem possible to influence the number and source of new clients. They seem to be generated at no cost and at a fairly predictable frequency. The number of new clients is, of course, influenced by their inclination to tell others about you. The quality of work you do, the fees you charge, your appearance, personality, and punctuality at appointments all affect the successful generation of referrals. The literature you leave with your clients and how you deal with the subject of referrals when you are in their home are also important. Do they know that you would be grateful for referrals? You can leave a thank you card that tells them that you value their business and that referrals are appreciated. Then give them something that will be kept as a ready reference for your phone number. I have found that the PTG technical bulletins are useful as a source of information but are saved only occasionally. The bookmarks are more likely to be in evidence at your next visit. Ideally, I would like to have something different to give each client with every visit that has a good chance of being saved, but even with cards, bills, bulletins, brochures, and bookmarks available, I find this challenging. I have yet to try the imprinted pencil idea, but perhaps an imprinted pencil holder would be better since it may help keep pens, pencils and other miscellaneous objects away from the piano's innards.

My latest handout seems to be the most effective so far ... a refrigerator magnet. I found a good caricaturist who did a skillful rendering of me tuning a piano. The accompanying text on a business card-sized magnet is limited to my business name, phone number, and "...since 1972."

I now have a 12" x 24" version on each side of my business vehicle. I remember Susan Graham, RPT, warning us about the real message that street punks read when they see a sign, like ... "tools in here." I've had my tools ripped off twice, long before I thought of putting up a sign. It was the same neighborhood both times. I don't go back there anymore, and if I did, I would do a lot more than remove the magnetic signs prior to the service call. Technicians should determine the risk factors in the neighborhoods where they live and work before making their business vehicle an aid in their promotion. Does this sign get much new business? Only a few clients have mentioned it so far, but it also identifies me to nosy neighbors (who once called the police while I sat in front of a house eating my lunch) and forgetful piano owners who happen to glance out the window and see me walking up the driveway.

The effectiveness of Yellow Pages ads varies. I have poured through dozens of major metropolitan phone directories in the library and have found that, consistent with PTG survey results from several years ago, most RPTs have chosen to have no more than a simple business phone listing, if that. The unaffiliated tuners, many with the lowest prices, seem to rely more on Yellow Pages for new customers. Years ago, I took out a larger than average in-column ad and found that although I got a fair number of phone inquiries, most were price shopping. The ad was cost effective – every fourth tuning paid for the ad space – but I decided that the frequent nuisance calls were not worth the hassle. I'm back to a one-line listing that promotes my RPT status. It generates about one new client a month, always within five miles from my house as before. A simple business listing also provides a place for older clients to find me who have lost my card. I can imagine that in a different type of market, a large ad might be more effective. If you live in a small town, all the various forms of advertising might reinforce each other more effectively than in a large sprawling metropolitan area.

Public radio stations and private schools have approached me from time to time soliciting a donation of a tuning for a fund raiser. Although there are public relations benefits here, be aware that the piano you end up servicing will likely need a lot more than just a tuning with expectations that everything will be covered by the donation.

I currently have ads in a few small directories. The local elementary school directory may produce a new client or two during the school year and is placed, again, primarily for public relations. A music teacher's directory ad is a way of showing appreciation for past referrals, some of which have come from teachers whom I have never met.

It has been said that teachers can make or break your business. If they like you, they will tell a long list of people. If they don't, the list will somehow double in length. I value the teachers in my clientele, but I have found through tracking my referrals and other record keeping procedures that teachers' value to my business vary greatly. Some have piano shaped objects that don't even get tuned annually. Some of them have only a few students, or don't take an interest in encouraging them to have their pianos serviced. But I am very grateful for the teachers with nice pianos who service them regularly, and for the efforts many of them make to look after the service needs of their students' instruments. Professional camaraderie is yet another bonus. We really do need each other to keep the interest in piano playing alive.

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"Pleased to meet you ... Where did you get my name?"

Continued from Previous Page

Piano retail outlets take a lot of flack from piano technicians. They sell pianos that we don't like. Their prep procedures are not what we think we would do if we were in charge. We are uncomfortable with some of the sales practices that we've heard about. Many of us stay at arm's length, but there are constructive ways to relate to stores.

I actually sold new pianos on a small scale for several years. Sales presentations were by appointment at my home/studio mostly on weekends and evenings. I mention it here because although I gave up retailing for a variety of reasons, I still service quite a few of the pianos I sold. It was an unorthodox way to get new piano service clients, but it worked especially well for me.

A more common way to relate to stores, especially for those just entering the profession, is as an employee. Twenty-five years ago, a store gave me my first piano service job. I tuned floor stock and did dealer prep full-time. I got some training, worked on my hammer technique and made a livable wage (barely).

When I was ready to do outside service calls I was allowed to keep those clients (although not all stores permit this). This source of customers was very important in my early years, and I would recommend it to other newcomers to the profession. As you become more experienced you may want to wean yourself from this source, but don't burn your bridges! Every store needs access to a good technician to service their top-of-the-line pianos and salvage sales by troubleshooting thorny problems in the field. This can be a good way to get some very appreciative clients. Let stores in your region know that you would be glad to help them out if they get in a bind. I charge my regular fee unless I'm given a full day's work in one location on a fairly regular basis.

Don't overlook the value of referrals from other technicians. These take place in several forms. If you have some flexibility in your schedule, you may be able to help out with short notice requests. Sometimes technicians will exchange clients or more commonly, give away clients who live in a distant area. The pot of gold is the retiring technician who wants to sell his clientele. If you have the opportunity to buy the solicitation rights to a technician's clientele, consider it seriously. I bought a modest sized business more than 20 years ago and it was the best investment I have ever made.

Working in public areas allows piano-owners a chance to be introduced to you. Tuning in hotels, nursing homes, and some schools often produces walk up traffic that creates service calls. One-time events such as writing an article for the local newspaper, being a guest on the radio, or giving a lecture for a music teachers association can create a considerable number of new clients without any previous contact or referral.

Some new customers are added to your list unintentionally. Have you ever arrived at a new clients' home and knocked on the door only to find that you were at the wrong house? Turn this embarrassing situation into an advantage by offering your business card with a smile. In the era before cellular phones, I used to knock on the next door neighbor's door when no one was home for a scheduled appointment. The available block of time is sometimes irresistible to the neighbor who has been putting off a tuning for years. I don't recommend using this as an intentional "tactic," although I know of one technician who solicits door-to-door and swears that it works.

Ruth Ann Jordan, RPT, once asked a rhetorical question that gets to the heart of any business plan. Throughout this article, I have assumed that your goal is to generate repeat business, but if you do poor quality work leaving lukewarm or even hostile piano players in your wake, repeat work may not be possible. Ruth Ann asked simply "Do you look forward to following your own work," I hope you answer "yes." It may be because you know the old business axiom that it costs five times as much to find a new client as it does to keep an old one, but let's hope that the real reason is that the pianos you take care of regularly are a pleasure to play as well as a joy to service.

PTG Membership Has Its Benefits

Members of the Piano Technicians Guild receive a broad range of exclusive benefits designed to enhance professional growth, business profitability and personal planning.

Professional Growth

Registered Piano Technician (RPT) — The Registered Piano Technician (RPT) designation provides members with the ability to demonstrate their competence in piano technology to their peers through a series of three rigorous examinations. PTG actively promotes the RPT designation to the piano-owning public. The RPT designation is the public's assurance of the proven abilities of their piano technician.

The Piano Technicians Journal — The monthly *Journal* is the finest monthly publication anywhere on piano technology.

Annual Convention & Technical Institute — PTG's Annual Convention and Technical Institute is an information-packed 3 1/2 days of top-quality technical instruction from the top experts in their fields.

Peer Activities — PTG has 163 chapters in the United States and Canada. Most chapters meet regularly to offer technical presentations. Many produce newsletters. The opportunity for one-on-one contact with fellow technicians in your area is invaluable.

Other Publications — PTG offers a wealth of instructional publications at substantial discounts for members, including study guides for PTG's tuning and technical examinations among many others.

Business Profitability

Business Instruction — In addition to technical information, the PTG Annual Convention and Institute, regional conferences, chapter meetings, the *Journal*, and specialized PTG publications all provide the latest information on managing your business for increased profitability, marketing your professional services and tracking your financial goals.

Client Education/Relations Information — PTG publishes high-quality educational materials for your clients on a variety of general interest and technical topics, including brochures and technical bulletins on various aspects of piano service and care.

Business Liability and Tool & Bailee Coverage — This important insurance protection, developed specifically for piano technicians, is available exclusively to PTG members. For further information, please contact Jerry Kiser of Potter, Leonard and Cahan, Inc., P.O. Box 82840, Kenmore, WA 98028. Phone 1-800-548-8857, or 425-486-4334.

Industry Relations — The Piano Technicians Guild works closely with other industry organizations to promote music, the use of the piano, and the interests of piano technicians.

PTG and Industry Resources — PTG also publishes and distributes free to all members an annual membership directory and a "Guide to Resources in Piano Technology" that lists a broad range of businesses and services in the industry.

Personal Planning

Life and Accidental Death & Dismemberment Insurance — Each Registered Piano Technician and Associate membership includes $1,000 in accidental death and dismemberment coverage and $1,000 in life insurance. Coverage begins as soon as the individual's membership application is completely processed by the Home Office and membership dues are paid.

Additional life insurance coverage can be obtained through the same underwriter. For information, please contact Lupe Sherman, Gallagher Woodsmall, Inc, 2345 Grand Blvd., Suite 800, Kansas City, Mo 64108, or call 1-800-934-4624 or 816-395-8683.

Other Insurance Coverages — PTG members are also eligible to obtain a full range of health, disability, and supplemental health plans also offered through Ralph Passman & Associates. In addition to health and disability insurance, other plans include:

- *The American Worker Supplemental Health program* — designed to work in concert with the high deductible health insurance plans favored by many self-employed professionals.
- *Discount dental, pharmacy, and vision plan* provides subscribers with substantial discounts on these health services and products when purchased from participating health professionals.
- *A Supplemental Cancer plan* provides additional coverage to assist with the costs of this illness.
- *Long-Term Care and Home Health* coverages provide peace of mind.

For more information on these insurance programs, please contact Ralph S. Passman & Associates, 4200 Somerset Drive, Suite 100, Prairie Village, Kansas 66208, or call 1-800-255-6029

PTG MasterCard — PTG members may obtain the quality service and competitive credit card rates offered by MBNA. The toll-fee number is 1-800/847-7378.

Viatication — To assist members and their families at times of greatest personal and financial need, PTG offers members the benefit known as "viatical settlement," which enables individuals facing a terminal illness to sell their life insurance and receive immediate cash proceeds. For more information, please call 1/800-281-2700.

Real$ave Discount Program — PTG members may purchase the Real$ave package of discounts to save money on everything from restaurant meals to oil changes, film and developing, groceries, and golf games and Caribbean cruises. The program costs just $24.95 and comes with a money-back guarantee. Call 1/888-650-8272

Magic Kingdom Club — PTG members may request a membership in Walt Disney's Magic Kingdom Club and enjoy discounts on entrance fees.

PTG Home Office — 3930 Washington, Kansas City, MO 64111
Phone: (816) 753-7747 / Fax: (816) 531-0070 / E-Mail: ptg@unicom.net

New RPTs Pass The Test in April . . .

Congratulations

REGION 1

101 New York City

Dan Franklin
181 Avenue B, #1
New York, NY 10009

REGION 4

452 Cincinnati, OH

Jonathan J. Ralinovsky
172 E. Herman Street
Yellow Springs, OH45387

REGION 7

981 Seattle, WA

Bruce A. Vredevoogd
4981 E. 26th Drive
Bellingham, WA 98226

APRIL NEW MEMBERS

REGION 1

21 Boston, MA

Robert Franklin
258 Blanchard Road
Belmont, MA 02178

Andrew J. Pettey
52 Cedar Street
Taunton, MA 02780

54 Vermont

David D. Gaillard
P. O. Box 1098
24 Highland Avenue
Hardwick, VT 05843

122 Capitol Area, NY

David L. Maynard
84 Church Avenue
Ballston Spa, NY 12020

180 Lehigh Valley, PA

Steve P. Taylor
4905 Davis Drive
Doylestown, PA 18901

REGION 2

201 Washington, DC

Harunah Iwasa
82 Beltran Street
Malden, MA 02148

Patrick E. Presnell
10570 Old Mill Road
Lusby, MD 20657

231 Richmond, Va

Alexander M. Brusilovsky
8313 Pamela Drive
Richmond, VA 23229

274 Central North Carolina

Wiley T. Porter
600 West Pine Street
Mt. Airy, NC 27030

381 Memphis, Tn

Dennis W. Holland
3615 Carroll Drive
Horn Lake, MS 38637

REGION 3

752 Dallas, TX

David A. Koelzer
1165 Calvert Drive
Cedar Hill, TX 75104

799 El Paso, TX

Salvador Ortiz
1205 Cerrito Bello
El Paso, TX 79912

REGION 4

441 Cleveland, OH

Mary L. Miklovic
27 Milan Manor
Milan, OH 44846

481 Detroit-Windsor, MI

Roberta L. Brown
417 Hendrie Boulevard
Royal Oak, MI 48067

493 Western Michigan

David M. Braun
1200 Leonard, NW #2r
Grand Rapids, MI 49504

549 Appleton, WI

James D. Maas
1038 Crawford Street
Green Bay, WI 54304

549 Appleton, WI

Jeremy A. Tourville
411 S. Westhaven Drive, #102
Oshkosh, WI 54901

601 Chicago, IL

Richard A. Spears
807 Surrey Lane
Glenview, IL 60025

616 Peoria, IL

Matthew R. Tomlianovich
3813 N. Sheridan Road
Peoria, IL 61614

REGION 5

553 Twin Cities, MN

Joan M. Page
3974 Woodview Drive
Vadnais Heights, MN 55127

REGION 6

901 Los Angeles, CA

Michael J. Jackson
215 So. Irena Avenue Apt. A
Redondo Beach, CA 90277

George Minosyan
501 E. Palmer Avenue, #5
Glendale, CA 91205

Michael D. Renneker
17455 Manteca Street
Van Nuys, CA 91406

921 San Diego, CA

Carl E. Mccullough
Paraiso Avenue
Spring Valley, CA 91977

REGION 7

841 Salt Lake City, UT

Craig N. Ord
1 West 2000 South
Bountiful, UT 84010

Bonnie R. Woodard-Hill
1468 Logan Avenue
Salt Lake City, UT 84105

972 Portland, OR

William J. Benjamin
555 2510 E. Evergreen Blvd.
Vancouver, WA 98661

Richard K. Wheeler
1928 SE Washington Street
Milwaukie, OR 97222

985 Puget Sound, WA

Nick M. Kramarevsky
4023 So. 301 Place
Auburn, WA 98001

Eric W. Mau
10243 Rainer Avenue South
Seattle, WA 98178

George D. Mounce III
7402 91st Avenue, Sw
Lakewood, WA 98498

In Memory . . .

Charles Flippin, RPT
Memphis, TN

In Memory

Pianomaker, Manufacturer Steffen Seiler Dies

Steffen Seiler, founder of the Seiler Pianofortefabrik in Kitzingen, died suddenly in March 1998. Born in Dresden on January 6, 1923, Steffen Seiler was at the head of this family enterprise, first founded in 1849 and now in its fourth generation, right to the last. In him, the world of music has lost its grand old man of pianomaking and a great entrepreneur.

Steffen Seiler first learned the art of piano making in Vienna. In 1946, after the war, a period spend in Russian captivity and deportation from his home town, he first found work in his chosen profession in Bremerhaven, where he also taught himself to repair and tune accordions. It was with these skills that he took on a job in Copenhagen in 1950. The name Seiler first reappeared as a firm in its own right when Steffen Seiler founded the Danish firm of Seiler in 1954. Two years later, this was followed by a German enterprise based in Nuremberg. After setting up shop on the premises of the former cabinet-makers, J. Kleber & Co. in Kitzingen, Seiler went into production in 1962 and since then has trained whole generations of pianomakers and cabinet-makers at its factory in Kitzingen.

Now on the threshold of its 150th anniversary, Seiler has become the piano factory with the greatest production depth in Europe as well as being one of the largest enterprises of its kind in Europe. Its expertise combined with numerous German and European patents and its high standards of craftsmanship mean that Seiler now produces grand and upright pianos of worldwide renown. Today, its pianos are still made in Kitzingen for export the world over.

In 1989, Steffen Seiler was awarded the German Service Cross with Ribbon. In addition to his business activities, he was also an honorary citizen of Houston, Texas and was involved in numerous professional associations for makers of musical instruments. Furthermore, he was also a great patron and sponsor of musical activities and was a member of the board of the Academy of Music in Wurzburg.

Steffen Seiler put his house in order in good time. His wife, Ursula Seiler, has shared the management of the enterprise with him for a number of years and will continue the business in keeping with her husband's wishes. Steffen Seiler's daughter, Manuela Seiler (24), is currently studying Music and Business Studies so that when the time comes, she too will be ready to take over the management of the enterprise in the fifth generation.

Calendar of Events

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

October 9-11, 1998
OHIO STATE CONFERENCE
Location: To be announced
Contact: Bob Russell (440)449-5212
1414 Lander Rd, Mayfield Hts, OH 44124

October 15-18, 1998
TEXAS STATE ASSOCIATION
Marriott - Greenspoint Area
Contact: Roy Escobar (281)745-0231
2710 Durban, Houston, TX 77043

October 17, 1998
NYSCON
Holiday Inn, Plainview, NY
Contact: Michael Slavin (516)781-8888
2409 Wood Ave., Bellmore, NY 11710

October 22-25, 1998
NORTH CAROLINA REGIONAL CONFERENCE
Holiday Inn Select, Richmond, VA
Contact: Alan Hallmark, (804)346-8068
email: pianomanadventures@erols.com
Or Contact: Lewis Spivey (919)937-4777
15 Rachel Dr., Nashville, NC 27856

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.

Phyllis Tremper
PTGA President

AUXILIARY exchange

DEDICATED TO AUXILIARY NEWS AND INTERESTS

Dear Members,

I want to remind you to bring your by-laws revisions to convention so that each of you may have your own copy. We will not be making more copies at the hotel as the costs of such things are really too high. I hope you have had time to read over and think about these revisions as we will be voting on them Thursday, July 9, in Providence. If you have any questions, please e-mail or write to Evelyn in the next few weeks to receive an answer. Evelyn Ternstrom and her committee have done a wonderful job and have spent many hours on this project. Thank you Evelyn, Betty Hallett and Eileen Guthrie.

I also want to take this time to remember many of our members who are ill with life threatening illnesses. Our thoughts and prayers go out to them. Please use your PTGA stationery and drop notes to members that you know could use a word of encouragement. We are all on this earth for such a very short time, let's remember each other.

A message from one of my college year books that I received the other day. *Life is like a roll of toilet paper – the closer to the end, the faster it goes!* I believe that we can all identify with that.

I trust you have made your reservations at the Westin Hotel by now. Time is growing short and it's time for another wonderful time together. See you very soon.

— Phyllis K. Tremper, PTGA President

Adventures in Piano Moving

It is time to make your reservation for the annual PTG Convention in Providence, R.I. I am hoping that you intend to join the Auxiliary program. It is not too late to register. We have many exciting things planned for you to enjoy. Please introduce yourself to me, I am anxious to meet you.

Each year when we attend a convention, we take a few days for vacation. We also deliver pianos from one side of the country to the other. Recently, we delivered a piano from New Jersey to South Carolina. It was a piano that had been rebuilt for Sue, an elite woman, who was moving to South Carolina.

Sue gave us the address of 419 Elm, but when we arrived in her town, there was Elm St., Elm Ave., Elm Road, and Elm Place. At the first house on Elm Street, we asked the man lying under a car, "Are you expecting a piano delivery?" He replied, "Thank God, my prayers have been answered, I've waited all my life." This was the wrong house.

Finally, we found the correct house, and Sue was waiting for us. Her first sentence was, "I think I'm drunk." There were several other problems with the delivery. Problem #1: manpower; We had asked for three strong men to help get the piano off the truck. She did not have anyone to help. Solution: Sue stood in the middle of the street, and asked drivers passing by to help.

Big Bob volunteered, he said Sue was drunk but she promised him $20 and he could fish in her stream. Then, a girl with a new baby said "I can lift anything, I'm a mountain girl."

Problem #2: Delivery; on one side of the house was a cliff with a creek at the bottom or over a cesspool. Solution: Over the cesspool, but very carefully.

Problem #3: Entry; The doors were nailed shut. Sue couldn't remember why. Solution: Gain entry into the house.

While pushing and pulling the piano up the ramp, Sue said "Bob, you are working so hard, I'm going to give you $40 and you can fish in my river anytime. By the way, "I think I'm drunk."

Big Bob, the Mountain girl and Sue got the piano safely in the room and Sue volunteered to pay them $60 and more fishing rights. The next step was to put the legs on the piano and they got another pay raise to $100.

With the piano assembled, Sue gave them each $200 and they can fish in her lake anytime. Did you say you would like to go on the next trip with us, and did you say you have a piano that you needed to be moved?

— Marilyn Raudenbush

Secret Pals

Secret pals. Anyone interested in having a secret pal? Patsy Escobar has suggested that this would be a good way to make new friends in PTGA. Anyone interested should send me the following information about themselves: name, address, e-mail address, phone number, marital status, spouse's name, children, grandchildren, interests, hobbies, work status, birthday month and day, and anniversary date. Feel free to leave out any information you do not wish to share, but please add other things if you like. You should limit your gifts to your secret pal to $10 total since some people are on limited budgets. We want everyone possible to participate. I will also have forms available in Providence.

Rose Recital Afghan Raffle

The accompanying photo is of the Rose Recital Afghan which I have

completed. It is to be raffled off at the convention in Providence. The tickets will sell for $1 each or 7 tickets for $5. All proceeds will go into the Scholarship Fund. Bring money! Buy lots of tickets! You may win!

— Beva Jean Wisenbaker

PTG Auxiliary Tour

Friday, July 10, 1998

The Tour departs at 9 a.m. and returns at 5 p.m.

Enroute to Newport, "America's First Resort," a tour guide will narrate the history of Rhode Island and point out interesting sites. Upon arrival in Newport, enjoy a guided tour of the spectacular Marble House, built by Richard Morris Hunt for William Vanderbilt in the Louis XIV style. Lunch is included at Christie's Restaurant with its wonderful views overlooking the harbor. There will be free time for shopping at scenic Brick Marketplace and Bannister's Wharf. To complete the day you will have an overview of this exciting city-by-the-sea through a narrated driving tour to include beautiful Ocean Drive and Bellevue Avenue lined with spectacular mansions.

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.

Ads appearing in this publication are not necessarily an endorsement of the services or products listed.

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Kansas City, MO 64111-2963.

FOR SALE

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REYBURN CYBERTUNER—Reduced prices on all packages! RCT and laptop computer now starting at $1395. New features: • Target glows when string is within 0.3¢ and increases gradually til 0.1¢ • Custom Equalizer graphs 5ths, 12ths, octaves, double octaves in beats or cents • Chameleon Library contains 2000 tunings • Super-fast automatic note switching. Reyburn CyberTuner 2.5 $795 (software only) Mitch Kiel, RPT, 1-888-I-LUV-RCT (1-888-458-8728) mitchkiel@reyburn.com www.reyburn.com

SANDERSON ACCU-TUNERS from Authorized distributor. Consignment sale of used Accu-Tuners and Sight-O-Tuners or new Accu-Tuner customers. Call for details. Rick Baldassin, 801-292-4441.

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ACTION PARTS AND HAMMERS for the rebuilder. Highest quality Encore, (by Abel) and Nu-Tone (Knight) piano hammers. Try the new refined Tokiwa Action Parts (now some of the finest action parts made today). For the classic American piano sound, we recommend Encore hammers on walnut moldings. Encore hammers are made to the strictest specifications of Wally Brooks by the Abel Piano Hammer Company of Germany. Quality boring and shaping. We also specialize in pre-hanging grand hammers on new shanks for a $109.00 pre-hanging fee. Write or call: Brooks, Ltd., 376 Shore Road, Old Lyme, CT 06371, Phone: 800-326-2440, FAX 860-434-8089.

DAMPP-CHASER PRODUCTS, PROTEK LUBRICANTS. Fully stocked inventory for same day shipping on all orders. Free installation advice and tech support. Call today to place an order or for a free price list. PIANO CLIMATE CONTROL SUPPLY, Steve Cunningham 1-800-443-7509.

EDWARDS STRING COVERS is enlarging and now offers: 1. GRAND PIANO STRING COVERS (Beautifully custom made from 100% woven wool. Keeps clean and protects piano, improves tuning stability) 2. FOAM BAFFLES for underside of grands and back of verticals (Reduces volume around 1/3. Great for traditional pianos, retrofit player systems and Disklaviers) 3. ALL DAMPPCHASER PRODUCTS (New distributorship) Our promise is Quality and Fast, Knowledgeable Service. For full information and free sales kit contact EDWARDS STRING COVERS, attn: LaRoy or Judi Edwards, PO 646, Brookdale, CA 95007. Ph. 408-338-1828, FAX 408-338-4580.

FRANKLIN DUPLEX SLIDER. This exciting and ingenious new tool was invented and designed by a tuner for tuners exclusively, to tune any kind of rear adjustable duplex harmonic bridge, individual oliquot or contiguous. Call or write. SINGING TONE Box 2063, Peter Stuyvesant Sta., New York, NY 10009. (212)677-5760.

SANDERSON ACCU-TUNER FOR SALE—Serial#2823. F.A.C. $800.00. Call Larry Hodge (703)631-4628.

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E-Mail: imatuner@primenet.com

SOUNDBOARDS BY NICK GRAVAGNE. Ready-to-install crowned boards or semi-complete. Over 130 new boards out there! New expanded and updated installation manual $20. P.O. BOX 273; Sandia Park, NM 87047; 505-281-1504.

PianoDB & PianoDB 95 - DATABASE FOR WINDOWS. MS Access 2.0 & 7.0. Easy to use graphical interface-Manage Clients, Pianos, Service Notes, Suppliers, Supplies-More. See it on the Internet: http://www.dcalcoda.com/ $250 kenhale@dcalcoda.com D C AL CODA (916)272-8133, Send for Infopacket, 126 Doris Dr., Grass Valley, CA 95945 (Ken Hale, RPT).

FORTEPIANO MAINTENANCE HANDBOOK. For Owners and Technicians. Technical but well-explained. Stringing, Action, Damping, other topics. Builders, suppliers listed. $20 plus $3 s&h. Margaret Hood Fortepianos, 580 West Cedar Street, Platteville, WI 53818.

SAT Cozy, a padded sleeve with retaining strap/handle made to fit SATs with an overhang to protect the corners. (Material from Instrument Covers) $35 US. Newton Hunt, 74 Tunison Road, New Brunswick, NJ 08901, 908-545-9084. nhunt@jagat.com

HAVE YOUR HAMMERS & BASS STRINGS MADE BY SOMEONE WHO CARES What they will sound like after 1,2 or 5 years. A. Isaac Pianos, 308 Betty Ann Dr., Willowdale, ON M2R 1B1 CANADA. (416)229-2096

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"LOWELL" COMPONENT DOWNBEARING GAUGES give readings in degrees (string angle) and thousands of an inch (dimension). Available at most supply houses. 1024 Court St., Medford, OR 97501. (541)772-1384.

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PTOOLS - COMPUTER TOOLBOX FOR TECHNICIANS. WIN & DOS Client Management, Mailmerge, Correspondence, Import/Export, Labels, Envelopes, Autodial and more. Measurement Conversions. Trade Specifications, Zipcode, Supplies, and Resource Databases. Conversions, Specifications, Calculations, Repair Formulas, and more. $30.00. http://ourworld.compuserve.com/homepages/ptools. Tremaine Parsons, RPT; 530-333-9299.

DOING YOUR OWN KEYTOPS? For resurfacing your keys, the newly re-designed PETERSON Router Guide is now the finest, fastest and most accurate system going. Also, removes fronts slick as a whistle. $125 plus $7.50 S&H. Peterson Piano Service, 11530 North 6000 West, Highland, UT 84003. (801)756-9786.

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SOUNDBOARDS, PINBLOCK MATERIAL AND TUNING PIN DRILL BITS NOW AVAILABLE FROM GENEVA INTERNATIONAL! Geneva International Corporation, exclusive U.S. distributors of Petrof and Weinbach pianos, is pleased to announce the availability of European spruce soundboard blanks, 7 ply quarter-sawn beech pinblock material, select hard maple Marion plywood pinblocks and 6 1/4" fast spiral helix drill bits. Get the best material at the best price! Call Alan Vincent at 1-800-533-2388 for pricing and more information.

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TRAINING

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October 22-25, 1998. Holiday Inn Select,Koger South Conference Center Richmond, Virginia.
National and Regional Instructors along with Major Piano Manufacturers and Preferred Exhibitors will be on hand for 2-1/2 days of comprehensive training for the professional piano technician. Spouse activities include a Richmond tour with riverboat luncheon. For more information contact Alan Hallmark, RPT (804) 346-8063.

Review Harpsichord Maintenance and Historical Aspects of the piano with Thomas and Barbara Wolf at the 1998 NORTH CAROLINA REGIONAL CONFERENCE.

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Supplemental All-Day Refinishing Class with Webb Phillips. October 22, 1998 at the NORTH CAROLINA REGIONAL CONFERENCE.

PianoDisc Two-Day Certified Service Seminar. October 21-22, 1998.
Prior to the NORTH CAROLINA REGIONAL CONFERENCE in Richmond, Virginia. For more information contact Alan Hallmark, RPT (804) 346-8063.

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See our ad on page 3.

VIDEOS

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

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

WANTED: DOLMATSCH-CHICKERING Harpsichord by Michael W. Hart, PO Box 268, Corbin, KY 40702. (606)528-8760.

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WANTED: Very old Chickering Grands to restore. Also, very old square pianos. PTG member, technician would appreciate your referals. Contact Michael W. Hart, P.O. Box 268, Corbin, KY 40702 (606) 528-8760.

PIANOS! PIANOS! PIANOS! !!!Free phone appraisal!!! Buying all types of usable pianos. Cash or bank check on pick up. Won't hesitate on price. Call us first for fast professional service. "Steinway, Mason-Hamlin command specialty prices." Jay-Mart Wholesale, P.O. Box 21148, Cleveland, OH 44121. Call Irv Jacoby 1-800-411-2363, or collect 216-382-7600/FAX 216-382-3249.

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WANTED early square pianos—any make, or condition-especially original condition. Michael W. Hart, Box 268, Corbin, KY 40702. 606-528-8760.

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PianoDiscussions™

June 1998

News From The World of PianoDisc

Walt Burchfield and Linda Carter at her new Schimmel Pegasus with PianoDisc.

Gentlemen, start your ... *pianos?*

You almost expect to hear a racetrack announcer's call when you see the Ferrari-red Schimmel Pegasus with PianoDisc that Walt Burchfield just delivered to the Texas Motor Speedway.

Burchfield, owner of Dallas Piano Warehouse and a longtime PianoDisc dealer, sold the customized instrument to Dallas business and sports figures, Don and Linda Carter, for their penthouse condominium at the raceway. The Carters are part owners of the raceway and avid race fans.

As Walt tells is, "Mrs. Carter actually ordered the Pegasus as a surprise for her husband. He knew they were getting a piano, because they have one in every home they own (all equipped with PianoDisc, by the way), but he had no idea that it would be as fabulous as the Pegasus!"

While this latest addition to their collection is by far the most exotic, Walt says the piano is only half the story. "How we delivered it is the really amazing part!"

"First of all, we had to have it lifted into the building by crane — up 12 stories — and then through the window of the condo next door to the Carter's because their own slant outward at a 30 degree angle. Their neighbor, by the way, is Ross Perot. We also had to have the wall between their two condos torn down to get the piano in. Of course everything was back in place and ready for the opening of the racing season. I understand that more than 2,000 people went to several parties the Carters hosted that weekend, and the piano was the hit of everyone! PianoDisc made a custom disk for the occasion that got a lot of attention, too. At first you hear the usual announcement: "Gentlemen, start your engines!" Then there's the roar of the race cars, followed by the *William Tell Overture*. They played the life out of it!

Walt reports that the Carters and their Pegasus have been featured on quite a few local Dallas television programs. When reporters ask the inevitable question, "Do you play the piano?" Mrs. Carter has just the right answer: "I **pay** ... and ***it plays***!"

Don't miss PDisc, Mason & Hamlin events at PTG Nat'l

Be sure to add the PianoDisc sponsored classes and Mason & Hamlin factory tours to your list of "must do's" at July's PTG National convention in Rhode Island. There's limited space available for each, so make your plans and reservations as early as possible.

The Mason & Hamlin tour promises to be the hot ticket item at the convention. A chartered bus will take a group of 50 from convention headquarters to the factory in Haverhill, MA. During the hour and a half bus trip, Mason & Hamlin veteran Paul Monachino will give a presentation on the piano's history, from 1854 through today.

Once the bus arrives, lunch will be served, followed by a tour of the factory conducted by company president Kirk Burgett and plant manager John Patton.

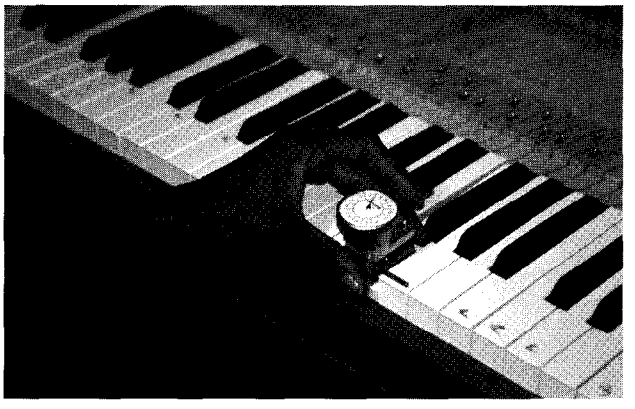
For more class and tour information and to make reservations, please contact PTG convention organizers.

Tech Gazette

Yamaha Service June 1998

The Yamaha vertical pianos built at YMM are all engineered to have the same key travel as Yamaha grand pianos. In this way a student practicing on a Yamaha console or studio piano, at home, does not have to experience a change when taking a piano lesson on the teacher's grand piano.

Two major conditions must be met in the area of establishing key travel. The first is establishing the key height, the starting point of key movement. Setting key



height is a subject for another article. This time we will cover the second part: creating the correct amount of downward key movement from a pre-established key height.

The pictures show a unique measuring tool that makes it simple to measure the present movement of a key, and shows the technician the change that needs to be made to

make the key move the specified amount. The tool is a dial indicator, attached to a metal base with enough weight to depress each white key. An arm extends from both sides of the gauge and rests on the top of the adjacent keys to the one being measured. These arms move the needle on the dial. The face of the dial displays the color and the number of paper punchings that need to be inserted or removed.

Again, this shows just another sample of the attention to detail YMM takes in creating fine pianos.

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

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