PIANO TECHNICIANS

Journal

Official Publication of the Piano Technicians Guild

January 1996

Vol. 39 • #1

Inside:

- *Preventing the aches, pains and hearing loss often associated with piano work is the focus of this month's Journal*

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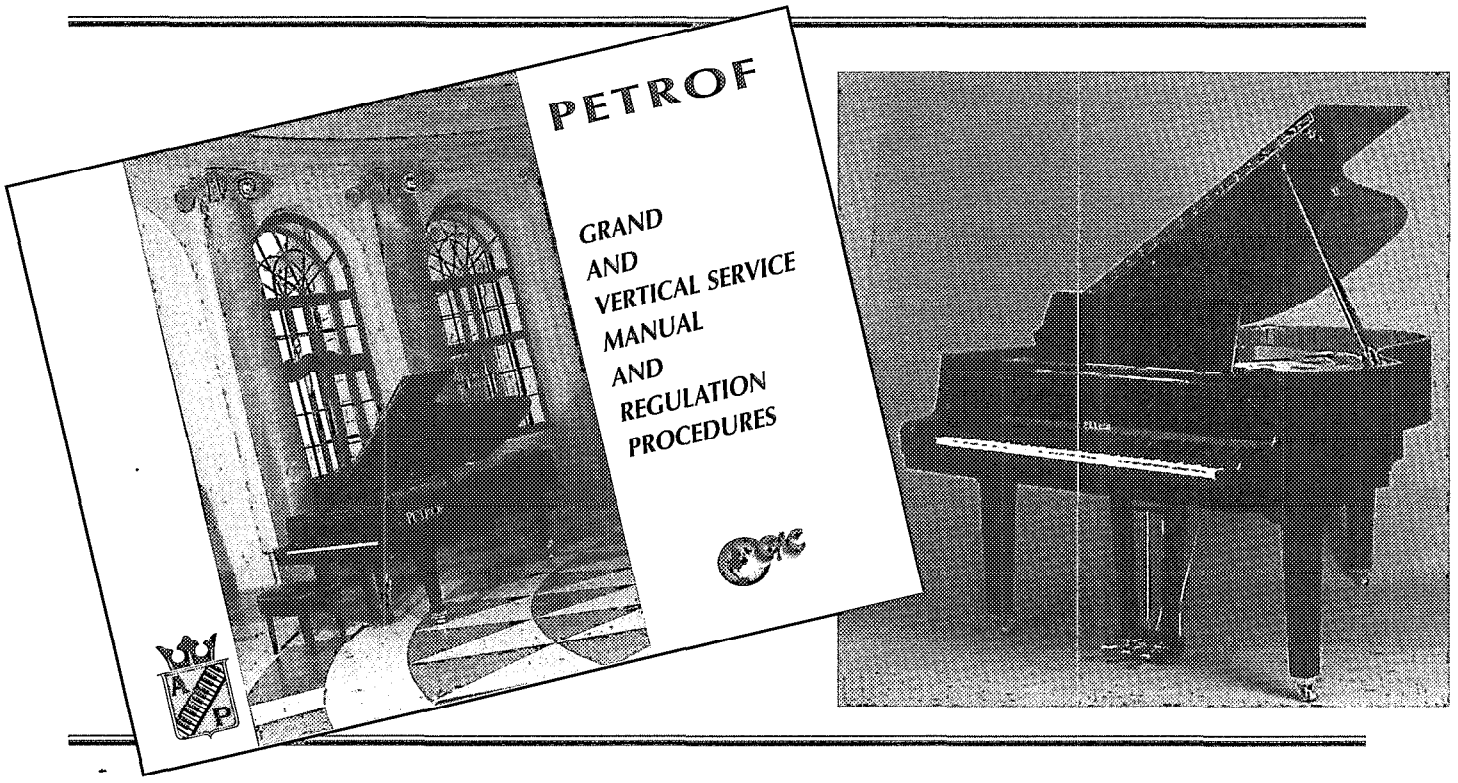

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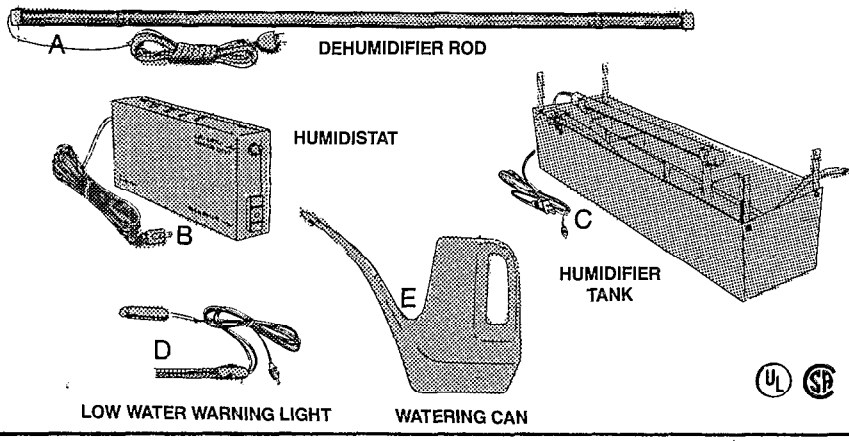

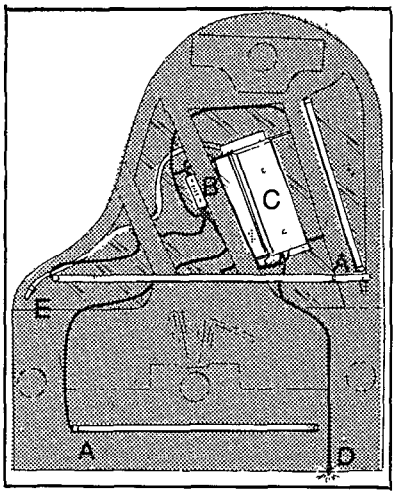

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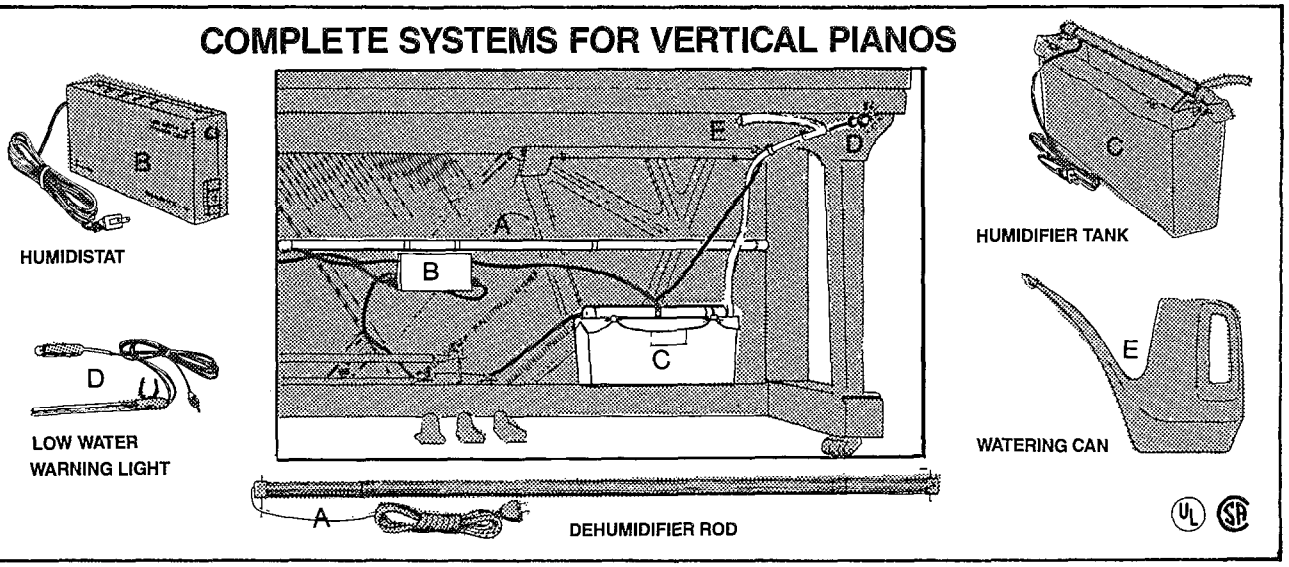

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Editorial Perspective

Tuning the Tuner

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

I've had plenty of opportunity over the past 23 years to watch other tuners. Initially, these were role models, such as my teacher, Lynn Hansen, and his colleagues, like Merrill Cox and Jack Reeves. Later, as I started attending conventions and regional seminars, I was exposed to more great role models—some "famous," others with a fairly low profile. I tried, in one way or another, to emulate many of these fine technicians. Of course, there were role models of another kind as well. I saw the technicians who were hopelessly naive about business practices, the ones who were careless about personal grooming and appearance, the ones who had no interest in upgrading their knowledge and skills, the ones who didn't have the drive and motivation necessary to succeed in this work. I've always thought, it takes all kinds to make a world.

Somewhat later, and with growing emotional involvement, I began to notice how several of my older colleagues, including some I deeply admired, were beginning to deteriorate physically. There's nothing shocking about that, of course. I know that we all can expect a gradual decline throughout middle age and the "golden years," but seeing so many of my valued colleagues with hearing aids and problems with this or that or the other thing, has made me wonder how much of our decline is normal, and how much is related in some way to what we do. I've often recalled the statement of my teacher that, "with every tuning you do, you lose an infinitesimal amount of your hearing acuity. You need to make sure that you amortize your hearing."

I'm not talking just about physical problems either. Although many of my students (and no doubt many others who have entered our field in the last 15 years), have come to piano work as a refuge from some other line of work where they had "burned out," piano technology as a profession offers no special immunity from burnout either. The stresses of being self-employed, of being overworked and underpaid, can themselves contribute to much dis-ease of body, mind and soul, in the form of headaches, emotional distress, unhappiness, and, yes, burnout.

As I've entered the "middle-age decline" myself, I've spent more time wondering why my body and mind don't react to stress the same way they did 20 years ago. I think I handle some kinds of stress better now than I did then, especially in the emotional sense. But physically, it's a different story. A four-tuning day, which used to be a breeze, now leaves me hurting. I've wondered if there aren't preventive measures that can be taken to forestall or perhaps alleviate these problems completely. With that in mind, I began almost a year ago to plan a special issue of the *Journal* which would treat some of these topics

This issue of the *Journal*, devoted primarily to health topics specific to our profession, is specially dedicated to all of you, in the hopes that you'll find something here which will make your work easier, safer, more satisfying, and more comfortable. Sure, there are topics which really could and should be included here, like "toxic chemicals in the workplace," and "how to use certain tools safely," to name a couple, but there is a limit to what we can do in one issue. I hope we can cover some of these other subjects in future issues.

Special thanks to non-piano technicians Bonnie Swafford (an RPT of a different kind, who is married to our own Kent Swafford), Dr. Robert Levy, and Dr. Jack Vernon, for their contributions to this month's *Journal*.

If you are a potential contributor to the *Journal*, please send articles, tips, questions, and letters to me:

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FEATURES

PACE
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Sometimes accidents are unavoidable, but in this month's Journal, *devoted to health-related issues, a variety of experts explain how to prevent long-term hearing loss, and the aches, strains and stresses associated with piano maintenance.*

COLUMNS & COMMENTS

DEPARTMENTS

IN ADDITION

PIANO TECHNICIANS
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MARKETING — A Journey, Not an Event

PTG President
Leon Speir, RPT

Someone asked me the other day, "What happened to our marketing program? I don't hear as much about it today as I once did." I think that's a reasonable question to ask. So, is marketing a done deal? Have we finished our job and now can lay down the effort? Have PTG and RPTs now been effectively marketed so we can go on to bigger and better things! *Hardly!*

Developing tools for marketing was a very visible activity. Providing start up funding and planning a marketing strategy required a lot of discussion and decision making and, therefore, it was at the forefront of Council and Board activity. So, where are we now, you ask? Well, we have developed many tools for marketing PTG and our businesses: Brochures, Tech Bulletins, Business Resource Manual, Logo, Service Records, Reminder cards, Book Marks, Dealer Service Tags, educational tools, a list of RPT members on the Internet, etc. More tools may be developed and current ones further refined. It would be nice to have reminder cards that work on computer printers for instance. But we do have a wider, more coordinated array of business aids than ever before.

So where is marketing today? I guess I would rather ask, "Where are *you* in *your* marketing efforts?" When was the last time your chapter gave a program to a teachers group, a school assembly, or a radio talk show? Has your chapter volunteered to man the phones during your local public TV station fund raising week? Do you regularly make brochures available to inform piano owners about proper piano service. What is *your* chapter doing to market your members? We've developed the tools, and *Journal* articles by the marketing committee have suggested many ways of using them. Now it's up to members and chapters to put them to work to promote PTG, RPT and enjoyment of the piano.

Efforts will continue at the national level to develop and refine tools and methods of marketing. Ads in teachers' publications, articles contributed by members for publication in various magazines, and continued interaction with manufactures and dealers are all areas in which PTG will continue its efforts. Building a demand for the services of our members is one of the primary missions of PTG.

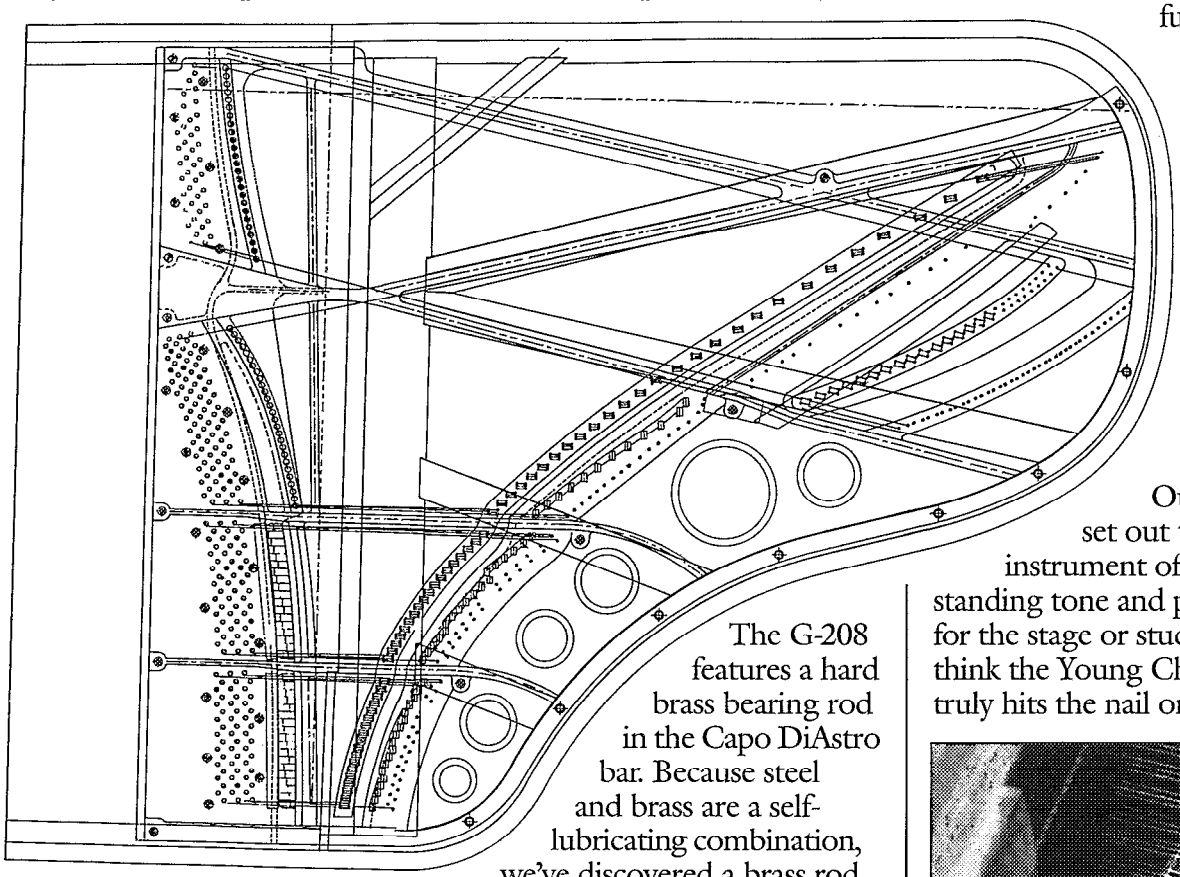
I encourage each chapter to develop a program for the coming year to market your members to your community. This is where marketing has to happen. The most effective marketing takes place at the local chapter and member level. PTG's most effective marketing tool is *you.* Armed with the resources PTG has provided, members and chapters can deliver a strong, consistent message that works.

Leon Speir

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

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

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

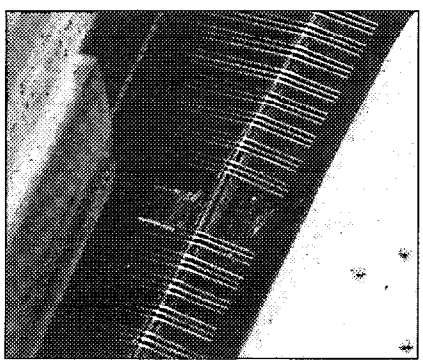


The G-208 features a hard brass bearing rod in the Capo DiAstro bar. Because steel and brass are a self-lubricating combination, we've discovered a brass rod offers better control of strings during tuning. In addition, the brass rod is easily replaced later in the life of the instrument eliminating the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

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

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

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



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

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

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Do You Have the Right Temperament?

The recent convention in Albuquerque was particularly interesting for me because of the demonstrations by Professor Owen Jorgensen on the effects of playing music in a range of historic temperaments. I wonder how many of the members appreciated that two of the piano recitals at the convention were given on Victorian temperament tuned pianos.

Historic temperaments have been used by the North Bennet Street School as the first temperament that one learned to tune because their simplicity made it easier for a new student to get going.

While equal temperament has now become so ingrained that many do not appreciate that there is a choice, this was not always the case. Since it is by far the most difficult temperament to tune, many articles are devoted to the techniques of developing a logarithmic tuning using only aural means. Few, however, question whether such a temperament is necessarily the best musical choice for a particular circumstance.

I was disconcerted the other day when a professor of music, an internationally renowned lecturer and concert pianist, informed me that equal temperament had been the norm ever since the time of Beethoven. His proof being the series of pieces written for the well-tempered clavier. In reality these pieces were written in part to demonstrate that when using well temperaments all keys could be used, but that each key had its own particular color.

Well temperaments are certainly *not* equal temperaments (there can, incidentally, be only one true equal temperament). Such is the depth to which equal temperament has become ingrained today. It is true that composers from Beethoven onwards knew about equal temperament, however, many of them spoke scornfully about it with its noisy thirds and harsh fourths. They felt that the compromise was worse than the problems it sought to cure.

The situation may be about to change. I was researching the latest in electronic pianos for a customer who was moving to a home and wanted something smaller to replace his Mason & Hamlin A, (you see my motive). I was surprised to see that they all offered a choice of several temperaments. It is really a unique experience to be able to play a piece of music on an instrument and then, without changing to another instrument or retuning, to be able to hear the same piece in a different temperament. This is perhaps the first time in history that such experiments can readily be performed by pianists.

Modern musicians are willing to try anything unusual that they can lay their hands (and perhaps feet) on. I am sure that many purchasers of these new electronic pianos will try their music out using different temperaments. Many will be pleasurably surprised at the new tonal colorations available to them with historic tunings.

Equal temperament is by no means universal, even today. Any orchestral musician knows the difference between A sharp and B flat and will adjust the intonation accordingly. Just chords are the foundation of barbershop singing. The recently rebuilt organ of the Old North Church, (Paul Revere's Ride, etc.), is tuned to Thomas Young temperament. Only those instruments where the player has no control over the pitch intonation of the notes are obliged to strike the compromise that so occupies us tuners. Life might be more interesting for us if we occasionally were able to offer other choices.

So, the thought is, what to do when a customer who has both an electronic and acoustic piano says to you how much he or she likes a new jazz piece using Werkmeister III on their electronic piano. Can you do that for them on his Steinway?

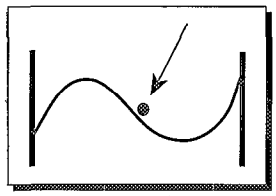
Incidentally, an historic temperament sounds nice on a spinet. It lowers some of the harshness inherent in short string pianos when played in keys that are not too adventurous. I always snoop at the music in the benches of my customers to appraise their level of pianistic talent and it seems to me that most of my spinet and console customers do not stray too far from the key of C.

It is a pity that Owen Jorgensen's little yellow book on equal beating temperaments, (Raleigh: The Sunbury Press, 1981), is difficult to find these days. Historic temperaments are quite easy and fun to tune. At one time I had all the pianos in my shop tuned to different temperaments! Try them on your own pianos. It is fun and makes a change.

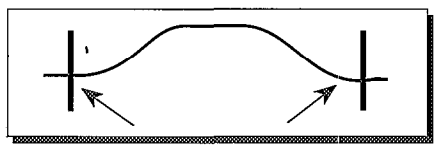
— Chris Day, RPT
Boston Chapter

More On Inharmonicity

I saw a lot of confusion about inharmonicity and wire stiffness in the April 1995 *Journal*. The idea that nodes take up length is, I believe, quite incorrect. The opposite is true: radius of curvature is least, and bending stronger, at the antinodes. At the node, the string is, for a short distance, rather straight. (See illustration at right.)



The string has a finite thickness. Low partials hardly feel this, except at the terminations. There the wire must make a sharp bend because it is fixed beyond that point. I suspect that this is a strong part of the "primary" inharmonicity. (See illustration below.)



Higher partials have shorter wave segments. The shorter they are, the larger is the ratio of diameter to wavelength; the wire looks more bar-like to the short wave and is tougher to bend. More stiffness, relative to the attempted bending, means higher frequency. Similarly, the end-point bend has a stronger effect on the short wave.

— Norm Albers
Rogue Valley Chapter
M.S. Applied Physics, Stanford University

P.S. Duplex scaling complicates the end-point physics, but the shorter the duplex length (towards the pinblock), the stiffer it is, and the more it is alike to the bridge-end, where there is no flex beyond the first pin.

Yes, there is vertical motion in the bridge, but, hey, I can't claim to have it all figured out!

Quick Sandpaper Tricks

3M's Stikit™ sandpaper has many shop applications. It is great for recovering wooden action rails before mounting new action parts — just stick it on and trim the excess. Hammer filing paddles can be made quickly by wrapping coarse-grit paper around a piece of quarter-inch plywood, stick two pieces of different grit papers together to make a durable sanding strip for "shoe-shining" hammers. A strip of sandpaper on a straight-edge makes cutting felt and bushing cloth a non-slip operation.

— Paul Rice, RPT

Test Your Hearing Over the Phone

(Reprinted from the Baltimore Chapter Newsletter)

By dialing "Dial-A-Hearing Screening Test (DAHST)," at 1-800-222-EARS (3277), 9 a.m. through 5 p.m. Monday through Friday, you will be given a local number to dial for the actual test. This DAHST local number is available 24 hours a day.

Tuning Tips

(Reprinted from the Western Michigan Chapter Newsletter)

I do not consider myself a super tuner, like a lot of the articles that I read, but then again, I have probably helped at least 40 different people either improve or learn to tune a piano. I had a hard time learning to tune a piano, but I learned by my mistakes so I am able to pass them on to other people. What is a sign of a good piano tuner? Someone who talks a good game, someone who sets a solid pin, someone who can play the piano well, someone with extra-good hearing, someone who can tune very fast, or just someone that can get along with people and has a good personality to go along with it?

I would feel that maybe all of these signs would fall into making a good piano tuner. I have seen people with a good personality go a long way in the piano tuning business, but do a lousy job of tuning the piano. You can go just the opposite way — to the person who can tune the piano without a beat out of place, but their personality stinks. They will not be as successful as the first person.

The first thing is to get a good teacher whom you can ask questions of and help you get started holding the tuning hammer the right way. You don't want to grip it like it is going to get away from you, just relax and use a mild grip. To gain your speed you have to learn how to pull the string just the right amount above the proper pitch and then push down so the pitch is just the right amount sharp. Next, you will use a miniature impact hammer effect to set the pin. Most beginners will try to put the pitch right on after pulling the string a little sharp, but you still don't have the pin set, so now you have to go through the whole operation again. Setting the pin means getting the pin in a neutral position in the block and getting the wire in a neutral position on the bridge and v-bars all at the same time. Sounds easy, doesn't it?

The next point I would like to touch on is pounding. Some people will tell you that the only way to tune a piano is to pound hard. This is not true. You should first set the pin with gentle, firm blows, and then, after you have the pin set, go ahead and smack it a good one if it makes you feel more secure. Also, a steady pounding all day is going to tire out your ear, and you will have a harder time hearing the beats. Most people who pound hard and fast can not set a temperament, mainly because they can't hear the beats.

I don't know who invented the impact hammer, but they sure had the right idea. I don't mean to run out and buy one, but use the theory in setting your tuning pins, and they will be much more stable with less effort and more speed. Your speed should just come naturally, but learn to set the pin first.

— Harry Buyce, RPT

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

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

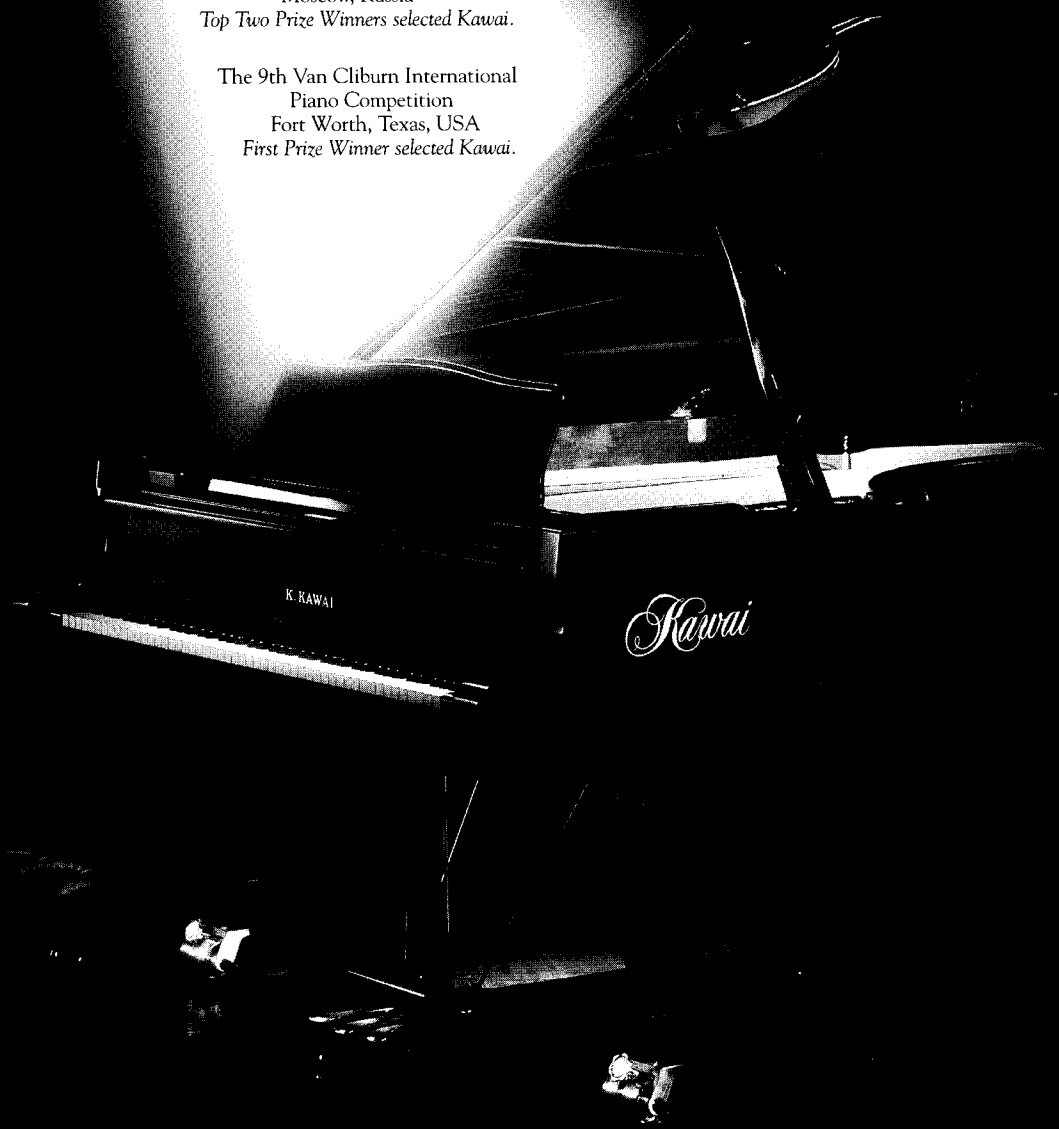
The 45th Ferruccio Busoni
International Piano Competition
Bolzano, Italy
First Prize Winner selected Kawai.

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

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

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

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



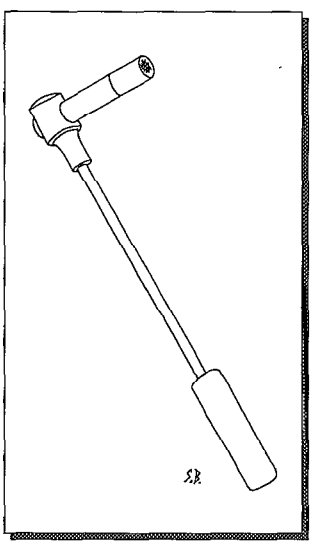
It's becoming a familiar refrain.

Q Impact Tuning Hammers

I've been using impact levers to tune recently, and I like them so far. It seems as though the rebounding of the lever might allow the pin to rebound, so that the twisting and bending introduced by the moving of the pin do not remain in the pin immediately afterwards. Is this the way it works? Some pins seem to retain more twist than others when impacted. Any info on impact tuning would be appreciated.

— Mark Olree

A From Jim Johnson, RPT



As I use the impact hammer, I'm not aware that there is any kind of twist left in the pin. The way I understand it, when the tuning lever "impacts" the pin it sends a shock wave down the length of the pin. As the pin vibrates with this shock wave, it reduces the amount of contact between the pin and the pinblock, which allows the pin to move easily in one direction or the other.

You can use the analogy of trying to move a 20' two-by-four laying on the ground. If you're trying to move it, say, an eighth of an inch by pushing on it, it's pretty hard to do. By the time you've pushed hard enough to break it loose, it wants to go farther than an eighth of an inch. But if you can tap on the end of it with a hammer and get it vibrating, you can easily move it in tiny increments. To me, that seems to be the secret of the impact tuning hammer. By sending these little shock waves into the pin, you overcome the friction between the pin and the block and you can get the pin to turn in its whole length, controlling the pin's movement in very fine increments. To some extent, I think these shock waves also help overcome the friction between the strings and their various bearing points; I visualize the shock vibrations passing through the strings as they are tuned. Now, this is all just theory, based on my perceptions. I have no way of proving these things, but I've never seen them disproved, either.

For those who are unfamiliar with the impact lever and its use, it is held at the joint between head and lever arm by the tuner's entire hand. With the tuning tip in place on a tuning pin, the lever can move freely for about 30 degrees of motion before actually causing pressure to be exerted on the pin. When the free motion stops suddenly at the end of the range of movement, the momentum of the weight at the upper end of the lever does most of the actual work of turning the pin; the tuner does the work of moving the weight.

One thing I would suggest is that you always keep a little bit of downward and outward pressure of your wrist on the tuning lever. As you turn the pin, you free it up, but you want to make sure that when you're done, the pin is settled down into the lower edge of the hole. When I tune with the impact lever, I tend to use it pretty much like I do a regular tuning lever, in terms of going slightly sharp and then settling it back to the pitch I want. However, I've found that with the impact lever if you happen to hit the pitch you want on the way up, you can leave it there. With a good test blow at that point, which I always give, 99 percent of the time it won't go anywhere.

I use an impact hammer for all uprights I tune, and I use it all the way to the top and all the way to the bottom. The only exceptions are old player pianos, where I can't get behind the spool box with this type of hammer, and pianos with extremely loose tuning pins, especially if the pins are just barely holding. On some of these marginal pianos, you may possibly find a way to get the tuning pins to hold by using a regular tuning hammer, if you're really careful. But with 30 degrees of "swing" on an impact lever, it can be too much for some of these very loose pins. The other thing is that on some pianos with really tight pins, especially some made roughly 10 to 15 years ago, if the pins are really tight and jumpy, the impact hammer can make it even more difficult to tune.

I began using the impact tuning levers over 20 years ago. I was tuning piano classrooms full of George Steck uprights at San Jose State University at the time. I went through 90 of these pianos in a month using an impact hammer, and at the end of that time I was very comfortable with it. Within the month, I cut my average tuning time for uprights by about 20 minutes.

Another thing that I associate with using the impact lever is about an 80 percent reduction in string breakage. I attribute this to the same "shock wave" idea I

Continued on Page 14

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mentioned earlier. The shock wave going through the string seems to help in overcoming friction at the bearing points, meaning that the tension on the string segment closest to the tuning pin doesn't get so high before the string moves as it might otherwise. I used to use the impact lever only for pitch raises, after which I'd get my regular hammer out to do the fine tuning. On one occasion, I raised the pitch on a piano by about 50 to 100 cents, without breaking strings. I used my regular hammer for the fine tuning, and ended up breaking three or four strings during the fine tuning.

Maybe the biggest advantage — when you get to be my age — is that I don't have to stand up when I tune big uprights. There is no way I would ever go back to tuning uprights with a conventional tuning hammer. I think, literally, I would find another occupation if I had to give up using the impact lever.

Q Restringing Pianos Using Original Pinblocks

I do quite a lot of restringing and usually do not replace the pinblock unless it is determined that the old one is no longer usable. This saves me a lot of work and the customer a considerable cost.

I'm sure that other technicians have the same circumstances that I encounter in that when the job is finished you encounter a few pins with low, barely acceptable torque. I use all the old standard techniques of:

- Care in removing old pins,
- Making sure the holes are clean, and
- Generally increasing the size of the new pins by two sizes.

I have found over the years that this procedure works in 90 percent to 99 percent of the cases. It's that small percentage that bothers me.

It seems that perhaps with modern technology there must be something that will give 100 percent results. I have tried swabbing the pin hole with a little epoxy. This does make the pin tighter but the pin does not move smoothly.

Perhaps other technicians have experimented and found something that gives the desired results.

— Ralph Tuckfield, RPT

A From Delwin D. Fandrich, RPT

Over the years I have followed — and occasionally participated in — many experiments conducted by several different, very competent technicians attempting to overcome the same problems you've encountered when repinning old pinblocks with either standard or oversize tuning pins. I've seen a wide variety of both epoxy and polyester resins used along with a dizzying assortment of various other chemicals and elixirs[1]. To the best of my knowledge none of the treatments or techniques tried so far have been successful. They have all shared problems similar to those that you have observed with epoxy-swabbed holes. Some techniques do — at least temporarily — tighten the pin in the hole, but since none of them come close to matching either the friction or the resiliency characteristics of wood, they all leave the pin with a funny "feel." Just to keep us all interested, though, once in a while one of these experiments does seem to work fairly well at first, only to deteriorate quickly over time. So far, none of them have shown a life expectancy even approaching that of a new pinblock.

The products that I am aware of that have been used to "restore" pinblocks usually fall into one three basic categories:

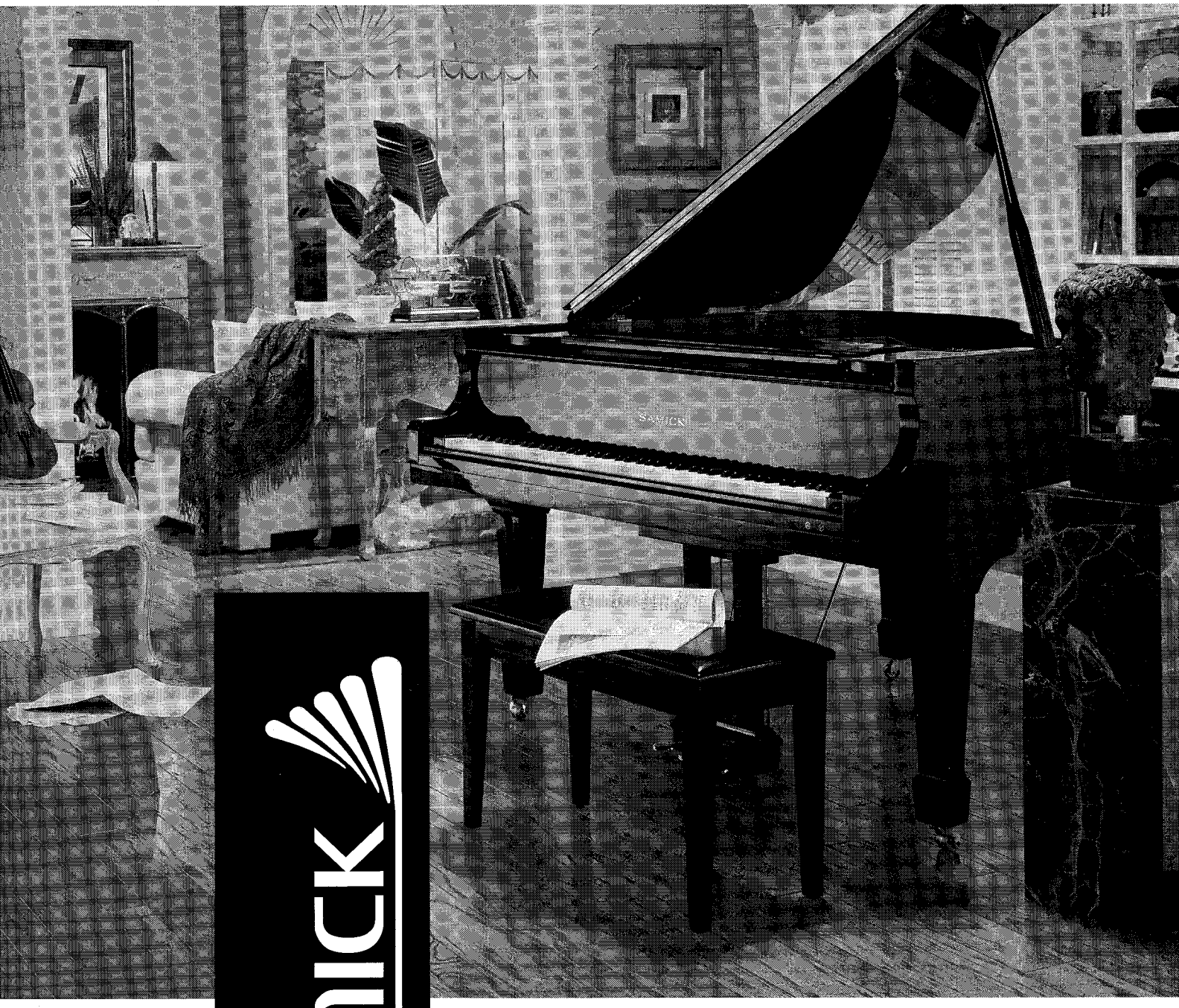
- Ethylene glycol-based formulations that are supposed to attract moisture to the wood around the tuning pins, which is supposed to cause the wood fiber to swell and — at least in theory — grip the tuning pin more tightly. Although these chemicals and products are usually advertised as alternatives to restringing, in various recipes they have also been used to swab down the surface of the tuning pin hole prior to restringing. These products seem to work a lot better on paper than in actual practice.
- Polyester products — so-called "boat resins" — that are often sold as wood coatings or wood adhesives even though polyesters are not particularly adept at bonding to wood. I began to hear of experiments using polyester resins to build up the damaged wood fiber in old pinblocks at least twenty years ago. These experiments generally took on three basic forms:

1) The inside of the tuning pin hole was swabbed down with liquid polyester and the tuning pin was driven in while the polyester was still wet.

2) The inside of the tuning pin hole was swabbed down with liquid polyester and the tuning pin was driven in after the polyester had cured.

3) The tuning pin was dipped into liquid polyester just before it was driven into the old pinblock, using the polyester as a type of pin driving fluid. (Since catalyzed polyester resins "kick-over" fairly quickly, it is usually floated in ice water to cool it off and give the material a

Continued on Page 16



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longer working time.)
None of these experiments were particularly successful, although many of them were originally very promising.

• Epoxy resins that are usually sold as wood adhesives and sometimes as coatings. Over the years the material of choice for these experiments has shifted to various types of epoxy that are being formulated for the wooden boat building industry and which are being used in much the same methods as those outlined above for polyesters. The materials I hear the most about these days are epoxies that have been designed to "repair" or "restore" wood fiber damaged by so-called "dry rot."[2] These are simply epoxy resins that have been diluted with various solvents to a consistency which more easily penetrates the damaged wood surface. They are said to saturate the damaged areas and restore the wood to a usable condition and, indeed, in some applications they can return a wood part to usable condition, but they don't do so by restoring any wood fiber. What they actually do is form another material entirely — a type of fiber-reinforced plastic — by encapsulating the wood fiber in hardened plastic resins, a process which does nothing to reverse or restore any actual wood fiber damage that has already taken place.

Why haven't any of these processes worked very well in pinblocks? First of all, pinblocks deteriorate for one basic reason: the wood fibers surrounding the tuning pins have been compressed to the point of crushing the fiber and in the process these fibers have been damaged beyond their ability to recover—they no longer exhibit the resiliency necessary to grip the tuning pins tightly enough to prevent them from slipping in response to the torque developed by the tension of the attached strings. Resiliency[3] is the property of wood that enables a pinblock to stand up to the destructive ravages of repeated tunings and time. The problem is that none of these products are able to restore that resiliency. To elaborate...

New pinblocks are drilled with bits ranging in diameter from about 0.250" to 0.272". The desired diameter depends on the species of wood used, the thickness of the individual veneers, the way in which those veneers are oriented, the type of glue used, the pressure and heat (if any) used during manufacture, the final density and resilience of the block, etc. It seems that every pinblock maker has a favorite recipe for making the perfect pinblock. These pinblocks are then (usually) pinned with 2/0 tuning pins that are approximately 0.281" to 0.282" in diameter. Since the pins are substantially larger in diameter than the drilled holes they will compress some of the wood fiber when they are driven into the pinblock. This is how tuning pins get their grip. The natural resiliency of the wood fiber causes it to press tightly against the tuning pin creating a high friction interface between it and the tuning pin. Even though pinblocks are usually made of either hard maple or beech—both relatively hard and dense woods that have only fair resilience, or resistance to fiber crushing— there is just enough resilience in the wood fiber so that the initial fiber damage is minimal if the hole is sized correctly. The wood fiber will press tightly against the tuning pin creating the high friction necessary to prevent the pin from turning easily inside the hole. Even though some fiber damage inevitably does take place when the pin is driven in, there will be enough residual resilience to enable the wood to grip the tuning pins tightly for many years.[4]

Unfortunately, the destruction to the wood fiber does not stop immediately after stringing. The wood around the pin is further damaged by the stresses put on the tuning pin each time the piano is tuned. Not all of the forces put on the pin during tuning are rotational. Even if the piano is only tuned by tuners using very good tuning hammer techniques — which cannot always be counted on — there will be much "flagpoling," further damaging the wood fiber. Especially so at roughly the top third of the hole.[5]

Weather also contributes to the deterioration of the pinblock wood. As the wood absorbs and desorbs moisture, the pinblock swells and shrinks, which further compresses and relaxes the wood fiber. Moisture, of course, also encourages the formation of rust on the pins which, even in very small amounts, further contributes to the breakdown of the wood fiber. In older pianos there is the additional complication of the delamination of glue joints within the block due to deteriorating and failing glue — remembering that animal hide glue was used to make pinblocks well into the 1920s and 1930s.

Even if a piano were never tuned and were stored in a hermetically sealed room, the wood in the pinblock would still deteriorate over time. The wood fiber around the tuning pin is highly stressed and all wood fiber under stress will tend to relax over time. Considering what pinblocks go through during manufacture and subsequently in use, it is really quite remarkable that they last as long as they do.

You have, of course, put your finger on the fundamental difficulty encountered when repinning an original block with oversize tuning pins. Even initially there are going to be a few pins with unacceptably low torque. Wood fiber will only take so much abuse before it succumbs to catastrophic failure. *Once this failure has occurred nothing will restore the wood to its original condition.* And so far none of the magic elixirs tried have worked their charms well enough to overcome the destruction of the natural wood fiber.

Unfortunately, those few loose pins are not going to get any better over time. In fact, it is almost inevitable that they will soon be joined by their neighbors as the wood fibers around them continue to deteriorate. Then what? The pinblock is now pinned with 4/0 (0.291" to 0.292") pins, what can be done to fix those loose pins? Replace them with 5/0 (0.296" to 0.297") pins? What if that doesn't work? Use 6/0 (0.301" to 0.302") pins? Shim the holes with sandpaper/veneer/whatever? None of these are questions one should have to consider on a recently restrung piano. Certainly, the piano owner shouldn't have to be concerned with them. There are very few good arguments in favor of repinning that

Continued on Page 18

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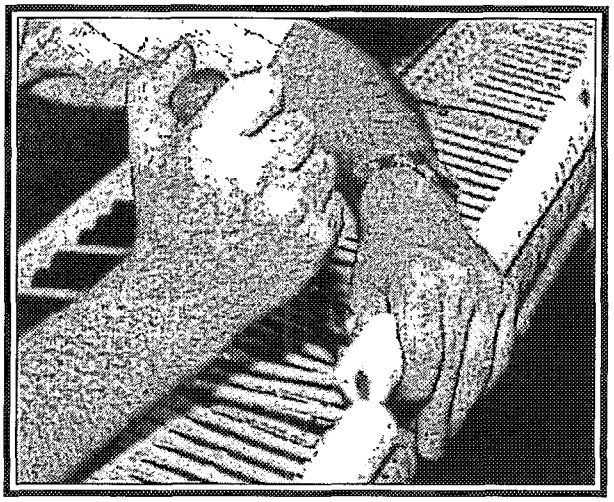

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original pinblock with oversize tuning pins and a number in favor of replacing it.

Replacing a pinblock really needn't be all that time-consuming or expensive. Certainly not when compared with the total cost of rebuilding a piano. Those of us who lived through the great tuning pin shortage of the 1970s probably have some advantage here. I didn't replace many pinblocks prior to those days. Partly because the Portland, Ore., climate was particularly kind to pianos and pinblocks, partly because the pianos were 20-odd years younger then than they are now and partly because I simply didn't know any better at the time. Then for a couple of years we could not get oversized tuning pins. Piano rebuilders quickly learned to replace pinblocks very efficiently, or were just as quickly on their way out of business. And here the magic elixirs did indeed help — using filled epoxy as a bedding material it should be possible to cut and fit all but the most difficult pinblocks in a couple of hours. Drilling and fitting the block back into the piano shouldn't take much longer than that — more or less, depending on the design of the piano.

Fundamentally, I have to wonder if we can give our customers good value for their money if we don't replace the pinblock during rebuilding — indeed, can we conscientiously call a piano "rebuilt" if we have left out something as fundamental as a new pinblock? — even though it may save them a little bit of money up front. It strikes me as being a bit like rebuilding a car engine using the original piston rings because they're not "broken." Not in my car, thanks all the same! My mechanic may get the "rebuilt" engine to kind of work at first, but how long will it last? If you have a few loose pins immediately after stringing, how many more will you have in a couple of years? Or in 10 years? Or 20 years? What happens when the owner moves to a less kind climate?

So, to the bottom line. Is it ever appropriate to re-pin an original pinblock? I've already confessed — I've done it in the past and I'm sure I'll do it again in the future. Two situations come to mind. We will repin the original block without argument when it is likely that either the strings or the soundboard will have a shorter life span than the pinblock. This is often the case with concert pianos, studio rental pianos and some church, nightclub or school pianos, just to name a few. We will reluctantly repin an original pinblock for owners who insist on "saving" the cost of a new block. But this only after they have had the drawbacks fully explained and they knowingly accept financial responsibility for the decision, understanding that it is often a temporary and/or failure prone measure. Our written proposal will indicate that these pianos will carry no warranty. At least not from us.

There is a third possible situation in which it may be appropriate to try some heroic repair measures to salvage an original pinblock. Some early instruments — mostly pre-1900s — have pinblocks that can be true nightmares to remove, duplicate and replace. When the pinblock is fully mortised into the sides *and* its top surface is both beveled and curved to match the curve of the agraffe line *and* its surface is exposed because the piano uses an intricately fitted 3/4 plate *and* it is an integral structure with the stretcher, etc., it is appropriate to at least consider some alternative measures. I've done enough of these now to appreciate the amount of work—and cost—involved and I don't look forward to it. Alas, we have one of these in our shop right now awaiting our decision as to what on earth to do with it. If I come up with something simple that works, I'll let you know!

Indeed, there may well come a day when some magic elixir is discovered that will successfully eliminate the need to replace pinblocks. Unfortunately, I don't believe that day has yet arrived.

Notes:

1) My dictionary defines an **elixir** as "a hypothetical substance sought for by medieval alchemists to change base metals into gold or ... to prolong life indefinitely," which pretty much describes what we're trying to do here.

2) There is actually no such thing as "dry-rot." This is really a subject for another time, but briefly, the various types of wood rot are the results of fungus growths which require the presence of both oxygen and water. Truly dry wood does not rot.

3) There is no actual measurement, or specification, for the property of resilience. It is simply a way of referring to a given wood species' ability to resist a compressive stress and restore itself to it's original shape after that stress has been removed.

4) It should be noted that tuning pin torque is not a constant, even in new pianos with new pinblocks. A piano with tuning pins that torque at 175 lbs./ft. immediately after stringing may torque at 110 to 125 lbs./ft. or less a month later. After this initial rather radical drop, torque will stabilize somewhat, although it will continue to decrease naturally over time whether the piano is used and tuned or not.

5) Plate bushings do little, if anything, to protect the pinblock from flagpole damage. Nor, in the long term, do they do anything to improve tuning stability. Plate bushings function as drill guides when the pianos using them are being built. Without them workers using hand-guided self-feeding drilling machines cannot reliably center the drill bit in the hole in the plate tuning pin panel. If this hole is drilled off-center the tuning pins can, and often do, bear against the plate. This is not necessarily harmful to the piano, but it sure doesn't look very professional. Once the pinblock is drilled, they have accomplished their purpose in life and are expendable. Whatever other benefits they may have been able to contribute are pretty much gone after the first three or four tunings or the first two or three weather cycles the piano goes through—whichever comes first.)

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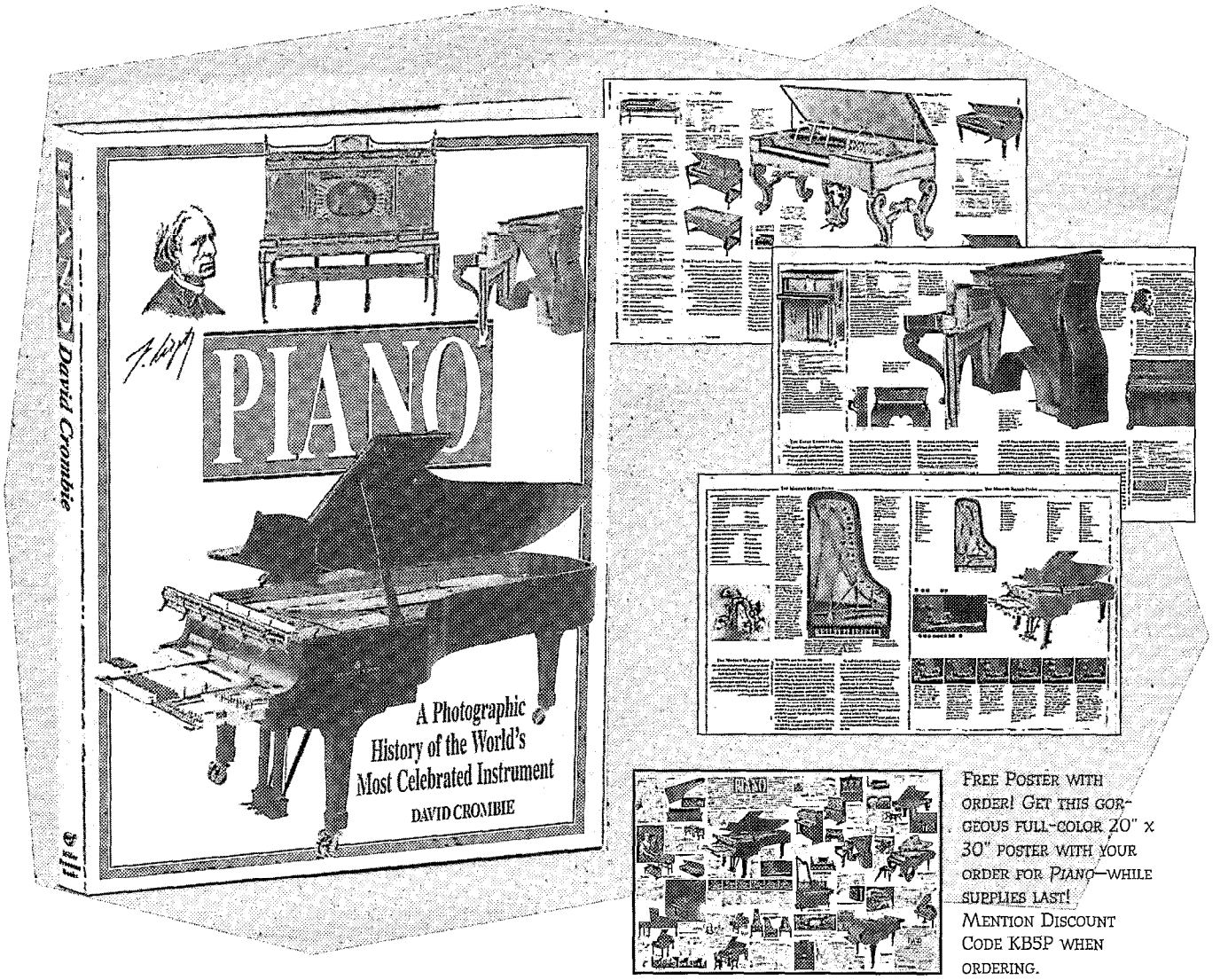

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Tuning and Hearing Protection

Steve Brady, RPT
Journal Editor

Over a period of several months last winter and spring, discussion on "pianotech," the Internet listserver for piano technicians, turned to ways in which tuners protect their hands and fingers from the trauma of "pounding 'em in" while tuning. At a certain point, the topic changed to ear protection.

Our cast of characters this time: David Porritt, RPT; Dale Probst, RPT; Conrad Hoffsommer, RPT; John McKone, RPT; John Baird, RPT; Dennis Johnson, RPT; Mark Stivers, RPT; John Musselwhite, RPT; Newton Hunt, RPT; Israel Stein, RPT; Jeff Stickney, RPT.

Dave Porritt: We've discussed ways to pad our hands and treat our fingers, but our ears take a beating from these thunderous blows. My principal concern here is the ears. Some recommend ear plugs and I have used them on rare occasion. However, all the ones I have tried block out the wrong frequencies. They wipe out the high ones most. Listening to 4th, 6th and 8th partials is how we do our best work. If anyone knows of ear plugs that are better than what I've found, please let me know. I really want to work another 20 years. Consequently, I need to be able to hear well for at least that long.

Dale Probst: I have tried a couple of different types. Currently I use a white foam plug sold at drugstores that I toss when they get brown (dirty). When I was target shooting there was a plug that had a valve that closed on loud sounds but I find the attenuation of total sound a help in really noisy environments. The only problems I've had are with very old & worn pianos that have no tone projection — I just take one out and all is well. After using plugs for five years, I am not comfortable without them on the occasions I misplace them. (I carry spares everywhere now, one advantage of the disposables, they are cheap.) Hope it works for you.

Conrad Hoffsommer: After seeing references to using hearing protection while tuning, I decided to experiment during a "bulk tuning" period, getting ready for second semester. On the whole, I was encouraged. I found that I wasn't aurally burnt out at the end of the day, and some pianos sounded better than they had for a while. The ones which seemed better were [Baldwin] 243s in small practice rooms, and Asian grands in practice rooms which aren't that much bigger.

Contrary to one comment, I found that I could hear all the beats I needed to tune the temperament. The cleaner tunings I feel resulted from a couple of factors.

1. The small room and ultra-bright pianos contributed to sensory overload, and the volume attenuation allowed me to concentrate on what I needed to hear. The upper treble octaves were easier to hear, and less high harmonics helped me do those 2:1 things. Unisons, especially with false beats were free of multiple false-beating harmonics.

2. The softer sounds just plain made me concentrate more. My speed didn't suffer, however.

To those who may be practicing safe hearing: What form of protection do you find works best — cotton balls, rubber plugs, wax plugs, muff-type external, or something else entirely? I tried rubber plugs, but I removed that cute orange tether since I wasn't too worried about hunters.

John McKone: I've been using the custom musician's earplugs for about nine months now, and swear by them! I no longer have to fight ear fatigue during the last tunings of the day, and find that I can actually concentrate and isolate harmonics better with the plugs, since they block out a lot of those annoying little background noises.

As someone who spends time tuning big grands in small practice rooms, the plugs now seem almost indispensable to me.

I originally got the plugs after noticing that the slight tinnitus I've had in one ear (from back in my rock & roll days, I'm afraid) was starting to get worse. Since I've used the plugs, the tinnitus actually seems to have almost disappeared.

The only downside I've found to all of this is explaining to customers why I put in ear plugs to tune their pianos.

John Baird: There's a science to this ... and a wide range of expense. I just use foam ear plugs.

But I certainly agree with the use of ear plugs. The piano simply produces more sound than I need to do approximate work during pitch raising and even for much of the pounding in of fine work. If I am asked about using earplugs, I sometimes draw the analogy of an airplane pilot wearing sunglasses. Technically, the sunglasses impair the pilot's vision, but of course the pilot actually sees better because the sunglasses cut down the glare. Earplugs also cut down the "glare."

McKone: Musicians plugs are especially designed to reduce volume levels by 15 or 25 dB without equalizing the sound in any way. (If you stuff cotton in your ears, you lose lots of highs, but not many lows, with these plugs, everything sounds exactly the same as without them — just quieter.) These plugs are the only way I've found to cut out damaging volume levels without losing the ability to hear those high harmonics.

They are only available from professional audiologists, and are quite pricey. (Mine were about $125.) For me, they have been worth every penny. These plugs are custom fitted to your ear. A technician takes molds of your ear canals, and then sends them off for production of the plugs. The plugs are then fitted with removable filters that can either cut the spectrum by 15 or 25 dB. I always use the 15 dB filters.

Please, please take care of those ears folks, we all have followed not-so-old techs who have lost the ability to hear the top octave. I plan to be doing high quality work when I'm 80.

Dennis Johnson: Where specifically do you order them from? I use the cheap foam type, but I decided to quit using them in homes when one customer apparently asked me if I'd like a glass of water and I answered, "Yeah, this really needed to be tuned."

McKone:

Minneapolis Hearing Aid Professionals (part of Minneapolis Ear, Nose & Throat Clinic)
2211 Park Avenue S.
Minneapolis, MN 55404
(612) 871-2445

The product I use is called: Etymotic Research flat response hearing protector. The molds were made by Westone laboratories.

Steve Brady: I became a believer in tuning with earplugs after tuning two concert grands together, one right after the other, last January. After finishing the second tuning, I played the piano and noted, somewhat absent-mindedly, that it seemed to lack projection and brilliance. I came back the next day to play and listen to the piano again, and it seemed to project very well. I wondered if perhaps my ears hadn't just decided to "shut down" for a while after absorbing so much loud sound during the tunings. I picked up two different kinds of plugs and started using them during my tunings. The small ones with little handles (see figure 1) really block out a lot, and are great for very loud and brash-sounding pianos, as well as for pitch-raising. The other kind (which hang around your neck when not in use), block less noise but seem to be plenty effective. I tend to use them the most because they're so convenient to pop in and out (see figure 2). It's true you can't really tune the top octave or so with these things in, but it's amazing how fresh my ears are when I get to the top octave after doing the rest of the piano with the plugs in. Both types cost somewhere in the $5 range.

Mark Stivers: I'm all for protecting our hearing. But if the piano is that loud, shouldn't we protect *everybody's* hearing by making it softer? Incidentally, I once talked to a professional audiologist and she told me that she didn't see any reason why a piano should damage anyone's hearing.

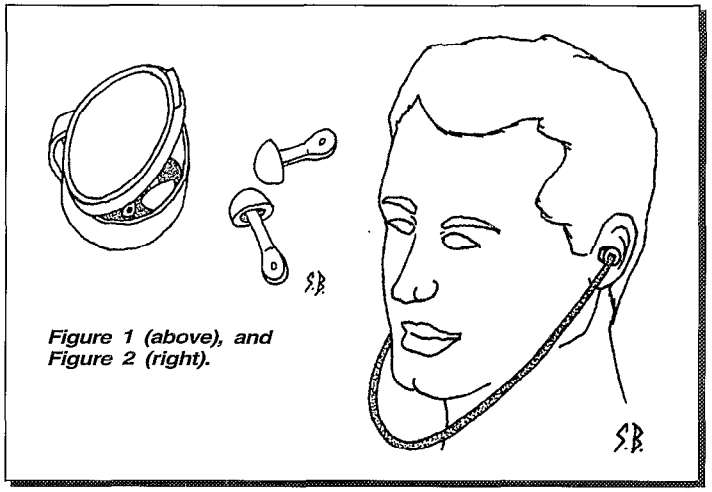

Figure 1 (above), and Figure 2 (right).

John Musselwhite: The audiologist should do some investigating before she makes a blanket statement like that. Has she ever sat by a piano with a dB meter while you're tuning? Has she taken into account the high-impact volume level of test blows? A dB meter may not even have a fast enough response for that to show properly.

Remember that test blows, particularly on very large pianos, put out somewhere around 95 dB or more (if I recall), and you're only a couple of feet from the source. What would she say if she knew you were being subjected to decibel levels that high a thousand times a day (I wish I were that busy!)?

From what I understand, small high-inharmonicity pianos create another set of problems — those dealing with distortion as well as high dB levels. I know if I tune some spinets or bad small grands (or concert grands) I have to take a longer rest between tunings than I do if it's a Yamaha or Kawai. Is that just because they're harder to tune or does noise fatigue play a larger role than might be expected?

It's been said that it takes about five thousand decisions to tune a piano — decisions which for the most part are made by ear. When many of those decisions are separated by something almost like a gunshot it's no wonder hearing loss is (or should be) something we have to take into account and prevent any way we can.

Newton Hunt: Mark, I have used a peak-reading dB meter while tuning several pianos. I read from 100 to 110 dB while tuning in the treble of several good grands. Over a long period that is very definitely detrimental to your hearing.

McKone: Most players don't create the kind of dB levels that we do with a solid test blow. In addition, most players don't expose them to high dB levels for as long as many of us do each and every day. Both volume and length of time exposed contribute to hearing damage.

Unfortunately, serious players do expose themselves for many hours a day, often in small practice rooms or faculty studios. These are the same people who have the technique to get the most volume out of the instrument, and also insist that the pianos they use respond to their demands for more sound. In my opinion, many performers are putting themselves at risk for hearing loss. I think the subject is worth a gentle mention to a client when appropriate.

My audiologist said the same thing to me. But then she started asking about time exposure, stating that if I were tuning more than four hours a day, I should limit constant volume levels to 80 dB or less. Well, just to test, I got myself a dB meter and found that on an average test blow, console pianos typically would peak out at 100 dB, small grands at 110-120 dB, and a Yamaha C7 in a concrete practice room at the University of Minnesota peaked at 135 dB!

I got scared, and I got plugs.

Hoffsommer: Peaking over 135 dB sounds a little out of line, but then, I wasn't there.

OSHA regulations state that readings be taken on the "A" scale set at slow response. I took a lot of readings this past winter in practice rooms, and could scare myself with dBa or dBb on fast response. I still got 105 dBa slow out of a Yamaha C3 in a small (is there any other kind?) practice room.

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Tuning and Hearing Protection

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I gophered OSHA and downloaded 30 pages of rules and regulations. If you are into "legalspeak" it is fascinating, but even if you aren't, the charts for maximum time exposure in varying noise levels can scare if you realize how much time you spend tuning during those "bulk tuning" times.

US Department of Labor extract, a.k.a. OSHA

dBA Slow	Hours/day (max)
90	8
92	6
95	4
100	2
102	1 1/2
105	1
110	1/2
115	1/4

Yamaha C3 in 8.5'x7' room (small, no?)

Temp/octaves	88 - 90.dBA
Unisons	96 -105 dBA
Unisons	110 - 115 dBA (fast)

Young Chang G-175 in same size room

Temp/oct	89 - 93 dBA
Unisons	98 - 106 dBA

Steinway B - student playing Ravel = 98 dBA

Yamaha C3 - student playing Beethoven = 96dBA

2 cu. in chain saw - 14" bar = 105 dBA idling/117dBA wide open/no load

Friendly trumpet professor 121 dBA @ 4' (nice friend ...)

Readings on pianos were taken from approximately ear position, at first ....

The S & S D's and SD-10's were equally loud to the ear distance, but as they are in large halls the attenuation was what you always were taught. The sound level decreased exponentially inversely with the distance.

The practice rooms were a different matter. I found that I got the same readings at the tuning pins, at ear placement, on bench beside me, on bench — meter turned away, and on floor as far away as I could place it. In fact, at one place on the floor I got higher readings (must have found an antinode).

McKone: It looks like Conrad has done a lot more (and more carefully controlled) testing than I have. I was giving approximate dB levels taken at the "fast" setting with a very cheap meter at about ear position, just to get a sense of what I was up against. Please take his numbers as more accurate than mine.

Israel Stein: Several years ago we had a professional audiologist speak at a PTG Boston Chapter meeting. He had actually made a study of the decibel levels generated by piano tuning and his conclusion was that the constant exposure to test blow decibel levels will cause hearing loss over time.

The sensitivity to higher frequencies is most easily damaged. He recommended ear protection. I don't remember his name or the numbers he cited, but he was very emphatic about the actual physical damage that we cause to ourselves.

Musselwhite: The "cheap plugs" I usually carry are called "Sonic II" and are not really recommended although they are better than nothing. I've used them since my rock & roll days and still wear them in an emergency. They are *no* substitute for the real thing — custom-fitted plugs. I keep foam plugs around too, and cut them in half if I need to wear them when tuning.

The Sonic IIs work by using a diaphragm with holes in them to block out high-intensity, low-frequencies, but pass much of the treble, so for our purposes aren't that great at reducing the actual sound pressure level. At least if you go to a loud gathering or have to be backstage at a rock concert they keep the "noise hangovers" down.

One time they paid for themselves was when I had to tune an acoustic piano backstage at an outdoor rock concert while a band was playing on stage a stone's throw away. The only top-end leakage I got was from the stage monitors since the mains faced the audience and I was behind them, but the low-end was enough to curdle whatever was in my stomach. The Sonics filtered enough of the noise to allow me to (barely) hear what I was doing.

I wish promoters wouldn't forget to call the piano tuner before the concert starts. They caught me on my cellular phone while the first act was playing and I had to fight the traffic into the racetrack where the concert was held to get there in time to do anything. They paid the bill (suitably inflated) without even a flinch. For those interested, the band was called "Midnight Oil," but I didn't stay to hear them ... My tastes lean more toward Mozart!

Jeff Stickney: After the discussion of earplugs a while back, I decided to take the plunge and invest. These things are definitely worth it. I got the Westone so-called "musician's plugs." They retail for $125, but calling around I got them for $80. At a recent factory truckload sale I "whipped through" 13 pianos in one day with the plugs on and actually felt fresh enough to play softball afterwards. It really reduces the stress, especially on your ears. You do tend to feel even more like you are in your own little world, but re-entry is instant when you take the plugs out. It also reduces the distraction of background noise and enables you to focus on the tuning more — yes, I think my tuning is better with them and I tune without an SAT. So, now my hammer has a big end on it, my ears have plugs — it won't be long and I'll be dangling one of those key pounder things from my wrist and wearing knee pads and a helmet!

One message that comes through loud and clear, both from this discussion and my conversations with other tuners around the country, is that many of today's piano technicians are concerned about protecting their hearing while they tune — not just when they're working with noisy shop equipment. The added benefits of this approach are the screening of unwanted background noise, and possibly more solid tunings because you tend to deliver harder test blows with earplugs in than you would without them. Although it takes a little getting used to, I hope you'll give it a try. SB

Tuning Technique
Part 1: Physical Technique

By Daniel Levitan, RPT
Contributing Editor

Most tuners would probably agree that the hardest part of learning to tune is not training one's ear, but rather mastering the physical act of getting a piano into tune and making it stay there. An accomplished tuner is not necessarily someone who knows all the ins and outs of beat rates and inharmonicity, but someone who can make piano strings behave. If all you needed to tune a piano was to know where to put the notes, many of our clients would go out and buy electronic tuning devices, and that would be the last we'd see of them. But the physical difficulty of getting a piano to stay in tune makes the likelihood of that ever coming to pass very small.

The Importance of Technique

The reason we can tune pianos so that they hold tune — more or less — and our clients can't is that we have acquired some tuning technique. We have developed for ourselves, consciously or unconsciously, ways of holding the tuning hammer, of striking a test blow, of muting the piano, which enable us to get piano strings to stay — more or less — where we put them. The more we develop these techniques, the better we can tune. As our standards become higher, our everyday tuning becomes more and more refined.

For this reason, it's much to our benefit to continue to pay close attention to our tuning technique whenever we tune. Technique can be endlessly refined, and as our businesses grow and we find ourselves tuning more, it's important that we continue to strengthen our technique to keep us from developing chronic pain or from burning out from mental fatigue.

Tuning pianos is, for many of us, the bread and butter of our piano service business. We may enjoy regulating, voicing, repairing, rebuilding or refinishing, but most of us find that there is also steady money to be made turning the tuning pins of our clients' pianos two, three or four times a year. Unfortunately, the act of tuning, which should be a pleasurable experience, can become instead a burden if it is accompanied by pain. The pain may be physical, as in numb wrists or aching backs; or it may be mental, as in the frustration of wasting time backtracking over areas of the piano that we've already tuned. In either case, the association of discomfort with tuning leads many technicians to avoid tuning as much as possible, and to dislike tuning when it can't be avoided. But there is no law that says that pain, mental or physical, must accompany the act of piano tuning. Tuning should be a pleasure, and one way to keep it that way is to continue to perfect our technique.

To me, good tuning technique boils down to basically one thing: tuning with as little effort as possible. By making it a part of our daily work to bring to consciousness the sources of excess work — of strain and stress — in our tuning, and by striving to eliminate them as much as possible, we can keep finding ways to improve our technique. Then, rather than working to keep ourselves healthy to counteract what we perceive to be the deleterious effects of tuning, we can focus on making tuning itself as painless an act as possible.

In this series of two articles, I'll present some of my thoughts on the pursuit of good technique. In my mind, I divide tuning technique into two major areas, which might be called the physical and the procedural. This first article will be concerned with physical technique, by which I mean the way we use our bodies in tuning, ideally with as little wear and tear as possible. Next month's article will look at the strategies we use in muting, pitch-adjusting, tuning octaves and so forth, with the goal of reducing frustration and boredom so that we can tune with a maximum of accuracy and efficiency and with a minimum of wasted effort and repetition.

No "One Right Way"

I'll say right off the bat that I certainly don't claim to have discovered the one right way to tune pianos. In fact, I hope that I never do. Like, I imagine, most tuners, I'm always trying to improve my technique, and so I tune a little differently today than I did last month. I keep my ears open to learn new techniques from my colleagues, and I try immediately to rectify the situation when I notice that I'm developing small pains or am habitually wasting time in some aspect of my tuning. As a result my technique today is different from, and, I hope, a little better than, it was last year, and I fully expect that by next year a few aspects of my technique will have changed again.

Often, when we discuss tuning technique, we focus on the basic approach — right hand versus left, sitting versus standing, strip mutes versus single wedges. I think this emphasis on basic approach may be somewhat misplaced. After all, every approach seems to work well enough for someone. You don't

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"No, we'll never achieve the perfect technique that will have us bounding away invigorated from every tuning; but on the other hand, we don't necessarily need that perfect technique. We just need to get through our lives as tuners without causing ourselves undue harm."

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have to look far to find a tuner who swears by any one of them. It might be more helpful to look for basic principles that can apply to every approach, so that as we monitor our technique, whatever approach we take, we'll have a basis on which to continually fine-tune it in response to new ideas — our own or someone else's — or in response to subtle feelings of stress and pain. In the long run, reducing effort in our tuning technique isn't based so much on *what* we do, but rather in the fine details of *how* we do it.

When we first learn to tune, we generally receive some advice about our basic approach, such as whether to stand or sit, which hand to hold the hammer in, and so forth. But each of us has a unique way of using our body, and even if we attempt to follow these general instructions to the letter they translate for each of us into a unique set of physical actions. Using the same approach, some people will seem to fall naturally and easily into tuning, while others will continue to feel awkward for years.

As we continue our study of tuning we may try to obtain and follow the advice of other tuners in matters of technique, but there will always be subtle — seemingly insignificant — differences between the way someone else holds a tuning hammer or strikes a test blow and the way we perform the same actions. Those subtle differences can translate into enormous differences in the amount of stress we subject ourselves to. When all is said and done, it's nobody's problem but our own if the way we tune results in physical impairments that prevent us from doing the work we love.

Physical technique is an extremely personal and individual matter. We are the only ones who know what it feels like to do things in just the way we do them, and so ultimately our physical technique has to be our own personal responsibility. For this reason, I think it's important for each of us to establish our own personal criteria that allows us to judge for ourselves whether or not a particular technique will help us tune with less effort.

The Purpose of Pain

Fortunately, we all have a tailor-made internal feedback system designed for just this purpose, and I think it's probably our most valuable ally in improving our technique: pain. Unfortunately, pain is often pushed to the back of our minds because it's so ... painful! It's a natural tendency to ignore subtle signs of pain when we are tuning, especially since, for the most part, the little aches tend to disappear as soon as we put down the hammer. Any pain, though, no matter how slight, is worth becoming conscious of. Not only is it valuable feedback, it may be the first sign of something that could develop into a serious problem if it's not addressed early enough. Even slight pain usually means that we are stressing some part of our bodies more than we should, and very likely more than we need to. It's a clue that we should look for some way to redirect or reduce the effort we're expending.

There's no need to blame our aches and pains on our choice of profession, and leave it at that. After all, even the most sedentary of occupations, which require nothing more of someone than to sit at a desk all day, if done without regard for their physical consequences can result in chronic pain — witness the rise in carpal tunnel syndrome among people who sit at computers all day. It's much more productive to try to find out why we have developed a certain ache, and to try to correct it. No, we'll never achieve the perfect technique that will have us bounding away invigorated from every tuning; but on the other hand, we don't necessarily need that perfect technique. We just need to get through our lives as tuners without causing ourselves undue harm.

Of course, there are other reasons besides relief from stress to work on improving our physical technique, such as improving accuracy or increasing speed. It has been my experience, though, that improvements in techniques which lessen stress also tend to improve accuracy and increase speed. The reverse is not always true. As many beginning tuners know, it's possible to achieve great accuracy at glacial speed, using completely contorted techniques. And we are all familiar with "tooners" who combine tremendous speed with minimal accuracy. I've consistently found that, for me, the best results follow when I try to relieve stress first, and let speed and accuracy follow.

An important step in becoming one's own teacher in matters of technique is to learn something about how the body works. It's not a bad idea for anyone to see some sort of professional in the field of body movement. There is a wide variety of approaches to this subject in common currency today — physical therapy, kinesiology, the Alexander technique, and the list goes on and on. Any experienced practitioner in one of these fields can be counted on to have a familiarity with the capabilities, the strengths and weaknesses, of the human body. They each take a different approach and emphasize different aspects of the mechanics of the body, and some will make more sense and feel more comfortable to you than others. But you'll find that there are quite a few points of general consensus among all the approaches concerning the ways the body functions most efficiently. Learning something about the human body can be of tremendous benefit in giving you a general framework within which to channel your thinking — not to mention a professional to consult with — when you're trying to find out why a particular part of you is aching, and how best to fix it.

Be a Switch-hitter

When we're tuning, our bodies have two distinct functions, and generally we divide these two functions between our two hands. The first function is to turn the pin; the second is to play the keys and deliver test blows. Each of these functions presents its own problems and potential for stress. Since it's a safe bet that we will never fully eliminate all the stress from either of these functions, one obvious way to reduce stress is to vary occasionally which hand we use for which function. In other words, if we habitually hold the hammer in our right hands and strike the keys with our left, we can give ourselves a little break if we sometimes switch hands. Of course this feels awkward, especially at first, and it's unlikely that you'll be able to switch-hit and produce a tuning right away that's up to your usual standard.

There's a great deal of pressure against trying out this suggestion, or, for that matter, any other new technique, because, while it takes some time to feel comfortable with any new way of tuning, we all still need to give our clients our best work. And nobody will ever go home and practice tuning after a day of work. I get around this difficulty by trying new techniques, such as switching hands,

during pitch adjustments. By using pitch adjustments as a proving ground you can try out new ideas without adding any, or at least not much, time to your work day, and you can practice new ideas at a time when accuracy is not at such a premium. My pitch adjustments may take a few minutes longer this way, but to my mind the advantages of improving my technique make that worthwhile. Even if you eventually find yourself only switching hands in limited areas — for example, in the high treble of grands — you'll still benefit from having given your hands a break from their usual routine.

"Physical technique is an extremely personal and individual matter. We are the only ones who know what it feels like to do things in just the way we do them, and so ultimately our physical technique has to be our own personal responsibility."

The "Tuning" Hand

Quite a bit is asked of the hand that holds the tuning hammer, and much of the pain associated with tuning can probably be traced to that fact. First of all, the tuning hammer hand has the contradictory requirements that it be able to apply a powerful force to the tuning hammer while maintaining at the same time a great deal of control. On top of that, this tremendous but finely controlled force has to be applied to tuning pins that are in an awkward position relative to the body as a whole. This is especially true in upright pianos, where we have to apply force in the plane of the pinblock cantilevered out from our center of gravity.

Again, I don't feel there is only one correct solution to these problems, but there are, I think, some general principles that apply. First of all, we should keep in mind that even the slightest of us has, in theory, ample strength to move the tightest tuning pins. The large muscles of the legs, trunk, and shoulders are very powerful; they have no trouble in moving around the weight of our entire bodies, and so, in theory at least, they ought to have ample power to move the end of a tuning hammer.

The hard part, of course, is channeling that power from the large muscles and bones to the tuning hammer without diminishing it and without harming the smaller bones and muscles along the way. (Pianists, by the way, have a similar challenge in transferring the power of the body down to the tips of their fingers.) There seems to be a natural, relaxed configuration of the bones of the arm, wrist, and hand in which the limb is at its strongest, and the nearer we can manage to keep the bones to that configuration the more solidly they seem to be able to transfer power, and the less subject they are to stress. Clearly, this will be difficult to achieve if we have immobilized some part of the power train — if, for example, in an upright, we have planted our elbow or fingers on the top of the pinblock, or, if we stand, we have braced our thighs against the key slip. If we fix our arm in place and manipulate the hammer using only the muscles of the wrist and hand, even if those muscles are strong enough to move the hammer, we have to bend the wrist. In that bent position the wrist is subject to more stress than if it were kept in its position of maximum strength, acting simply as a conduit for the power of the whole body.

Another advantage to keeping ourselves from contacting the piano is that the body is then free to move, free to make constant, minute positional adjustments. Not only does this allow us to continually fine-tune the precise way we are handling the tuning hammer; the constant activity has an enlivening effect, and lessens the chance that we'll maintain for a long time a position that is inefficient or harmful. The more fixed and rigid our stance, the more likely we are to harm ourselves by applying the same stress over and over to the same parts of our bodies.

Similarly, the more natural and the less contorted our grasp of the tuning hammer, the less likely it is that our hand will be stressed by our grip. In addition, it makes sense to me that, whatever grip we use, we maintain the same grip whether we are pushing or pulling the hammer. If we have to change grip every time we change the direction of force we'll tend to lose our feel for the pin, not to mention waste a lot of time.

It may be that some tuners instinctively grip a ball handle in a more natural way than a straight handle. In that case, the use of a ball handle for those tuners is probably a good idea. But let's keep in mind that it's not the handle that makes the difference; it's the way we use the handle. I think it's a good general principle to be wary of looking for the solutions to problems of technique solely in terms of the shape of our tools. Yes, the shape of a tool can have a big effect on the way we hold it and use it; but it's preferable, in terms of technique at least, to use a poor tool in a sophisticated way than to use a sophisticated tool in a poor way.

Even if we can channel the strength of our bodies into our tuning hammers without hurting our shoulders, elbows, wrists, and hands, we still have the problem of controlling that force to the degree necessary for fine tuning. This is a matter of experience, and becomes easier and easier as the new technique becomes more habitual. Still, there are bad days and bad pianos, and the best course is sometimes to revert to old, bad — but reliable — habits. Sometimes just making any kind of change will help in getting past a cantankerous instrument.

The Striking Hand

The hand that strikes the keys as we tune is subject to a different set of stresses. It's well-known that pianists can develop such disabilities as carpal tunnel syndrome because of the way they use their hands, wrists, and arms when playing. It would seem that anyone tuning full-time might actually be playing the piano almost as much as a professional, and therefore might be concerned about the same problems. However, piano tuners don't seem, for some reason, to trace any difficulties they might have with their keyboard hand to poor playing technique. Instead, the blame seems to fall on the test blow, which is applied with the same hand, but which is much more forceful.

While I have heard that there are

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tuners who can set a solid pin without using a firm test blow, it seems that for most tuners, a test blow is necessary for solid tuning. It's unquestionably true for me that my tunings are only as good as my test blows. It's essential, therefore, that anyone who makes frequent use of the test blow be able to give that blow without the slightest hint of pain or discomfort. A test blow must be entirely effortless, otherwise we will eventually begin to unconsciously shrink from it, and our tuning will suffer.

I've heard of all kinds of approaches to the delivery of firm test blows. I was inspired by the PTG tuning exam to develop the approach I use. To test stability, the tuning examiner lifts an eight ounce weight to a height of six inches and lets it drop, delivering a firm blow to the note being tested. I imitate that blow by lifting my hand, which weighs more than eight ounces, above the keys, using my elbow and to a lesser extent my shoulder as a pivot. Then I simply let the hand drop onto the note I'm tuning. It's the same approach that a pile driver uses: the only energy expended is in lifting the weight, not in bringing the weight back down.

When I first adopted this approach I found it surprisingly hard to do. There's an almost irresistible tendency to help things along by pushing the hand down. Curiously, though, I find that the blow is louder when I concentrate on not adding any strength to the blow and just release my arm to let the weight of my hand do the work.

This kind of test blow certainly reduces effort, but it may not reduce stress on the test blow hand. Hands are just too big to hit only one key if they drop onto the keyboard in a relaxed, open position. If it is to be useful, the energy must be focused to a point as small as a single key. The hand and wrist might be harmed over time if that point is not solid enough to absorb the blow easily.

One way to focus the weight of the test blow hand would be with some sort of appliance, such as a modified hammer head. I've never tried this, but I do know that many technicians have had good luck with it. I've preferred to explore a wide variety of hand positions. It makes sense to me that by changing my hand position, as I could not with an appliance, I'm reducing the chances of subtly stressing it over time.

The position which I've noticed is most widespread among tuners involves using the middle and ring fingers together to strike the keys, sometimes with the addition of the index finger. I find that this position works well on all the keys, sitting or standing. On the other hand, it's not as solid as one might like, as the fingers are unsupported except by each other and there is a certain springiness in all the joints in the line of the blow.

Another position I often see, and which I adopted for a number of years when I was first tuning, uses the unsupported side of the thumb at the knuckle between the joints as the contact point. It's easy to fall into using this position because the thumb is already on the key if one is tuning the note as the upper note of an octave. However, I don't think the position has much to recommend it, and I often hear of tuners having trouble with it after they've used it for a while.

The hand can assume a huge variety of shapes, though, and it's interesting to try to discover other hand positions for the test blow.

Sitting at the keyboard, I find a good hand position for testing the sharps keeps the hand relaxed in an open fist, with the thumb side of the fist tilted up at about forty-five degrees. There's a large bone in the wrist that faces straight down when the hand is in this position, and it works well for me as a contact point with the sharps.

The naturals, being closer together, are more problematic. Here I usually use the edge of the hand below the pinky as my contact point. I imagine that this position has the potential at least to be very sturdy, since I notice that karate experts often use it to break stacks of pine boards. Still, I've found that if it's not done just right, it also has the potential to stress the wrist, which is unsupported.

From a standing position, when testing a sharp I find that, even though I have to lower my body slightly, I am comfortable with the same position I use when seated. The karate chop to the naturals, though, is too awkward. Instead, I use either the trusty ring-and-middle finger combination, or another position in which I extend my thumb along the line of my arm and then curl my index finger around the thumb so that the second joint is just beyond the tip and the thumb and at right angles to the line of the thumb. I use the outside part of the second joint of the index finger, supported solidly in this way by the thumb, to strike the keys.

Another hand position that works well for me from a standing position takes a few seconds to get into, and so I only use it when I'm tuning a stretch of single notes, as when I'm tuning a string of unisons from under a strip mute. It looks like the trick your grandfather did when he pretended to take off your nose: the hand is in a fist, but the tip of the thumb is extended out from between the proximal joints of the index and middle fingers. The tip of the thumb, supported by the hand, makes a good contact point for both the sharps and the naturals.

By the way, if you have a hand position I haven't mentioned that you find useful in giving test blows, I'd be interested in hearing about it. My address is correct in the current Guild directory.

Of course, you'll know if you're stressing your hand if you feel pain. But there is another indication of the stress level in your hands that can be very useful because it gives feedback even before the first signs of pain. It's the temperature of your hands. If your test blow or your tuning hand feels cold after you've been using it for a while, very likely it's being overtaxed. On the other hand, when your hands get warm as you use them to tune, even slightly moist, you have a good indication that you're having success in your effort to keep your basic piece of tuning equipment — your body — in good shape.

"But there is no law that says that pain, mental or physical, must accompany the act of piano tuning. Tuning should be a pleasure, and one way to keep it that way is to continue to perfect our technique."

"That's for Other People"

By Beverly Kim, RPT
Puget Sound Chapter

Have you ever found yourself casually leafing through your daily mail, then coming across a white, business-size envelope with the words "Internal Revenue Service" printed in the top left hand corner? Your heart starts beating a little faster and your hands begin trembling. With all the poise of Indiana Jones in a pit full of snakes, you coolly rip open the envelope only to be greeted by the opening statement, "You've been selected for an audit of your tax returns from 19...." It doesn't matter what follows because you've broken into a cold sweat, your knees are shaking like autumn leaves and you can't even focus on the rest of the word

Maybe this scenario has never happened to you, but you can imagine the stress that it could create "for other people." This article is an attempt to provide an understanding of stress, identify some of the behaviors resulting from stress, and describe some interventions that might help manage it.

Stress in the Modern World

First, let's look at the way lifestyle changes have increased the levels of stress in today's world. Unlike previous societies of hunter/gathers and agricultural/farmers, the industrial/corporate peoples have made huge strides in mastery of the environment. We've reshaped the physical environment to conform to our psychological needs and wants. If we tire of one environment, we jet away to another.

Where people once had to work hard just to survive, we now have leisure time for self-realization and personal development. We drive ourselves, however, relentless for personal achievement and the acquisition of material goods, and increase our life-stress in doing so. We want to have it all.

Our diets include less fruits and vegetables and more saturated fats. There is more use of alcohol and tobacco, less exercise because our technological advances make us sedentary. We rarely relax because there is so much to do, so many new things to acquire, so many choices to be made.

As our material well-being in this life has increased, our interest in the next life has declined in equal proportions. All of these various changes tax the body's capacity to cope effectively, and increase our life-stress.

Changes in types of disease have occurred also. Included on the list of diseases which have increased in both type and quantity: atherosclerosis, hypertension, stroke, heart disease, cancer, diabetes, cirrhosis of the liver, lung disease, and emphysema. Heart disease, now the leading cause of death, was not even on the list of the ten leading causes of death in 1900.

Change is occurring with greater frequency. We know that the science and technology, demographics, politics, education, legislation, social mores, family structure, healthcare, employment, diversity of our communities, socio-economics, competition, etc., are different today than just five years ago. Learning adaptive skills and keeping up with the information overload make additional demands upon our stress tolerance.

What is Stress?

So what, exactly, is stress? Stress is the state of discomfort that arises when our problems exceed our resources to cope with them. Stress is present until the problem is solved, and illness may follow if the problem remains unremedied for too long. There are models of stress which indicate that people need a certain level of stress to be productive; however, when the level of stress creates discomfort, we must find ways to intervene.

Everyone has experienced situations when his/her stress level affects his/her behavior. We experience frustration, impatience, abuse, obscenities, intolerance, anger, hostility, irritability or withdrawal. Some people change their smoking, drinking, eating, spending or sleeping habits. If life-stress is untreated, it can create mental distress and harm to oneself and to others.

De-Stressing

In his book, *Becoming Stress Resistant Through the SMART Program*, R.B. Flannery describes six characteristics of persons who are stress-resistant. These are people who:

- Take personal control
- Are task-involved
- Make lifestyle choices
- Create a social support system
- Have a sense of humor
- Have religious values

1. Take personal control. They take an internal control, a psychological state of self-initiated, self-directed problem solving. People who think of themselves as being in charge

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behave accordingly. Such persons size up the problem and think out strategies to resolve it. Planned, organized, self-directed behavior results in less stress and less subsequent illness.

Effective time management is essential to managing stress. Alec Mackenzie, author of *The Time Trap*, says, "The value of time management is not control of time per se, but the ways you can use time to improve your life. Rather than allowing ourselves to be placed in positions of constant stress and then teaching ourselves coping techniques, we focus instead on managing our time more effectively. This way, we prevent most of the stress that time shortages inflict on us. So time management is stress management of the highest order."

Mackenzie goes on to provide tools for assessing how one spends one's time via a daily time log, models for allocating time, a list of 20 of the biggest time-wasters and how to cure them. Here's his top 20:

1. Management by crisis
2. Telephone interruptions
3. Inadequate planning
4. Attempting too much
5. Drop-in visitors
6. Ineffective delegation
7. Personal disorganization
8. Lack of self discipline
9. Inability to say "no"
10. Procrastination
11. Meetings
12. Paper work
13. Leaving tasks unfinished
14. Inadequate staff
15. Socializing
16. Confused responsibility
17. Poor communication
18. Inadequate controls
19. Incomplete information
20. Travel

If you see yourself experiencing any of these time wasters, check out Mackenzie's book. It is filled with diagnostic techniques, samples of solutions and personal checklists to help evaluate changes in habits and progress.

2. Are task-involved. Personal involvement in — and commitment to — a personally meaningful task leads to better individual health. Stress-resistant people are rarely bored; they make it a point to find meaning in life.

3. Lifestyle choices. These choices are known to improve one's sense of health and well-being and can gradually be introduced into our daily routines over a period of several months. Since these seven factors are known ways to increase stress resistance, it is in our own best interest to implement them in own lives in small manageable steps. These are seven simple ways to take control of your body to be better ready to cope with life stress.

1. Stop smoking
2. Moderate or stop drinking
3. Get enough sleep
4. Eat a nutritious diet
5. Eat breakfast every day
6. Maintain normal body weight
7. Exercise regularly

In addition to regular aerobic exercise, Flannery suggests relaxation exercises. A recent newspaper article about stress-reduction techniques suggested that we: rotate repetitive and exhausting jobs, delegate better, avoid overtasking, leave weekends free, diversify activities, throw ourselves into a cause outside of piano service, take work breaks, plan a vacation, prioritize work, build at least 30 minutes of rest and exercise into our daily schedules, take slow, deep breaths, retire to a quiet place and narrow our field of concentration.

Many books, classes, businesses, and clubs are available to assist us in addressing these seven "lifestyle" areas. If any of the seven seem to need modification in your daily life, seek out the appropriate resource.

4. Social support. Many of us piano technicians are an independent lot, people who would prefer to "fix it ourselves." That self-sufficient spirit serves us well in many cases. However, when it comes to our mental health, it helps to have some resources around us that will provide the support necessary as we struggle to return to that more comfortable state of being. There are not-for-credit classes, libraries, social service agencies, advisors/counselors, friends and family, etc., to whom we can turn for help. Don't forget that unremedied stress can be harmful to ourselves and others.

5. Have a sense of humor. Let's face it, piano technicians worry about a lot of little, little details. The direction of the nap of buckskin, felt density, cents, sandpaper grit, and on and on. While we need to be conscientious about our work and the methods and tools we use, let's be sure to look at the bigger picture and be sure we are having fun along the way. Here's an excerpt from Dave Barry, syndicated columnist.

"Recently I was in my office with a lot to do, including write a column, when I got a phone call informing me that the electric company had cut off my power.

"Years ago, I would have responded to this petty annoyance with a pointless, immature outburst of anger. But since then I have learned that stress management is vital to health. So I hung up the phone, took a deep breath, exhaled slowly, then punched my desk so hard that I could not make a fist for three days."

6. Have religious values. Regardless of one's spiritual beliefs, stress is reduced when we have a set of values that gives us a sense of our boundaries. Our ethical, moral and spiritual foundation may be a lifelong journey for some, but we find comfort and stability when we have a fundamental sense of our values.

From these six characteristics emerges the philosophy of stress resistance that we have noted: reasonable self-mastery; basic stress management practices of balanced diet, aerobic exercise and relaxation periods; caring attachments to others and a concern for helping and loving others.

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Repetitive Trauma Injuries in Piano Technicians:

A Preliminary Study

By Robert Levy, M.D. and Steve Brady, RPT

In the past decade, interest in what have come to be called "repetitive stress injuries" or "repetitive trauma injuries" (RTI), has increased substantially. Collectively, these produce symptoms of pain, numbness, tingling, swelling or stiffness of one or another body part which has been subjected to minor but highly repetitive motions, often against some resistance and sometimes in positions of poor mechanical advantage. For example, the ubiquitous use of computer keyboards has led to a huge increase in the incidence of carpal tunnel syndrome and tendinitis/ tenosynovitis at the wrist. This has spawned an entire industry with specialists calling themselves ergonomic engineers or industrial ergonomic consultants. It is their job to analyze workplace designs with regard to the tasks being performed by the people working there. Consultants find fertile ground in industries where workman's compensation claims are soaring.

The most common areas affected by RTI are the low back, wrist and elbow, with the upper back, neck and shoulder less often involved. After hearing of several instances of RTI in piano technicians, we decided to try to ascertain the prevalence of RTI in this professional group and see if there are ways the risk of injury could be reduced.

Who has RTI?

We began by conducting a computerized search of the medical literature for the past 10 years, using the co-associates "piano technicians/ tuning" and "RTI/carpal tunnel syndrome/tendinitis/neuritis." No articles relating these key words were found. We then put out a simple questionnaire to members of the "pianotech" listserver group on the Internet, asking these technicians if they had ever had carpal tunnel syndrome, tendinitis, tenosynovitis, pinched nerve or numbness, tingling, pain, or swelling of the hand or wrist. We asked that respondents try to relate these symptoms to a specific procedure, if possible. Those who had none of these symptoms were asked to answer "none."

Approximately 250 piano technicians are known to subscribe to "pianotech." In less than a week, a total of 54 technicians responded to the questionnaire. Of these, 22 said they had no symptoms while 32 said they had one or more of the symptoms queried. Although there was no way to verify diagnosis on the basis of an Internet response, we used the diagnosis reportedly given by physicians or symptom descriptions to establish probable diagnosis. If we assume that people with symptoms are three times more likely to respond than those who are well, it appears that about 45 percent of the piano technicians subscribing to "pianotech" have had some RTI which may be occupation-related. Even if all the technicians who did not respond were actually free of RTI, the 32 who did report symptoms would represent about 15 percent of the queried population. Although this premise would need to be confirmed by a much larger survey (a disproportionate number of technicians on "pianotech" are college and university technicians), it seems likely that RTI are a problem for a significant number of piano tuner-technicians.

Even though we did not specifically ask about functional loss, seven respondents volunteered that they had to take time off, lighten their schedule, or make some adjustment in their style because of their symptoms. The most commonly reported problems were carpal tunnel syndrome (or symptoms compatible with CTS) and tendinitis, with 12 reports of each. Six respondents reported a pinched nerve. Three specifically noted problems from tuning studio uprights. Remarkably, seven of the 12 people with CTS reported symptoms in the hand used to perform test blows while tuning. Moving pianos was associated with some morbidity. At least some "pinched nerves," two cases of tendinitis, and several unsolicited comments about low back pain were reported with this activity.

All told, it appears from this preliminary survey that piano technicians, as a professional group, may be particularly predisposed to a variety of RTI. We therefore did a preliminary ergonomic assessment of piano-servicing tasks. These can be conveniently divided into tuning, voicing, and regulating, and then subdivided into grand and vertical piano models. As we will see, tuning, particularly of uprights, provides the greatest ergonomic stress.

Doctor Talk

First, a few words about terminology. When the arm is held with elbow away from the body, it is abducted, the shoulder held in abduction. When the forearm and wrist are rotated so the hand is palm-down, the wrist is pronated; with the hand held palm-up, the wrist is supinated. When the wrist is bent toward the palm, it is flexed or volar-flexed (see figure 1); when bent backward it is extended (or dorsiflexed). If the wrist is angled toward the thumb side of the hand it is in radial deviation, if toward the little finger it is ulnar-deviated (see figure 2). Varying degrees of combinations of these motions are, of course, possible. Throughout this discussion, always remember that the ideal functional position of the wrist, that is, the position providing maximum power and least stress on the wrist and forearm, is 15 to 30 degrees of extension in neutral position, i.e., no radial or ulnar deviation (see figure 3).

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Servicing Grand Pianos

In general, grands are ergonomically easier to tune than uprights. Most right-handed tuners sit at approximately a 45-degree angle to the keyboard using the right hand on the tuning hammer and the left to play intervals and strike test blows. Proper adjustment of seat height (we recommend carrying a firm four-inch thick cushion as part of your equipment) will allow the technician to rest the right arm on the stretcher and/or plate in 45 to 60 degrees of abduction. This reduces stress on the shoulder and right neck muscles. The hammer may be held with its handle parallel to the strings and pointing either away from or toward the keyboard or somewhere in between. Many people will find the wrist to be in the best functional position with the hammer handle at approximately 45 degrees from the down-string position, but the best positions for any individual must be determined by trial and error.

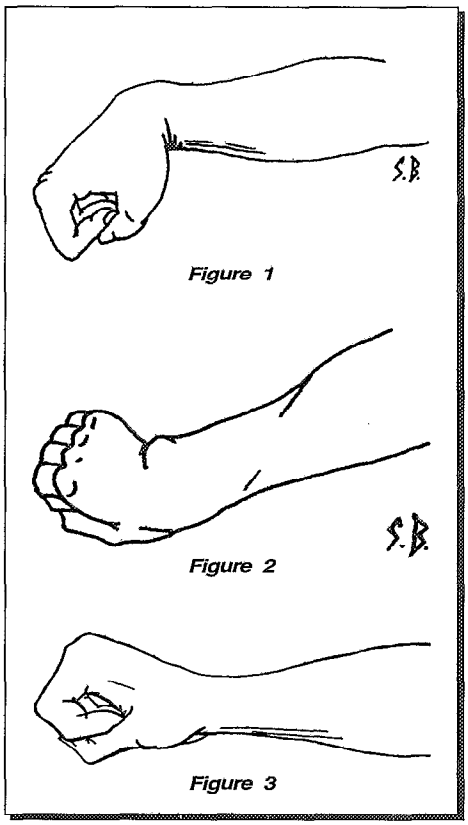

Figure 1

Figure 2

Figure 3

The tuning hammer can be controlled either by steady pressure or by a short rocking or jerking motion. This is a matter of personal preference since each has its ergonomic price; even here you don't get something for nothing. The steady pull is more likely to produce strain on the outside of the elbow — a tendinitis or, more accurately, an enthesitis (inflammation of tendon insertion into bone) commonly called tennis elbow. The rocking style puts far more stress (from rapid back-and-forth movement) on the extensor tendons at the wrist. This problem can be greatly reduced by using a working wrist splint (see figure 4).

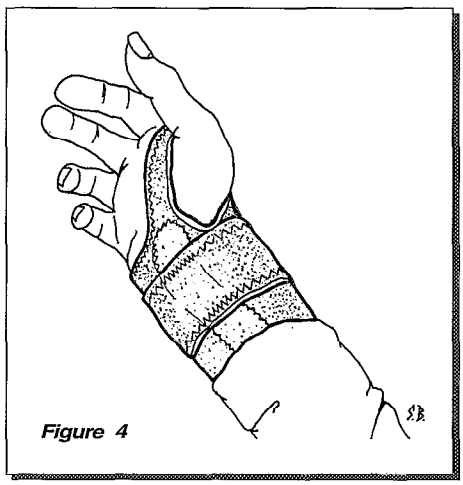

Figure 4

These are identical to bowlers' splints and can be purchased in medical supply stores (too expensive) or bowling alleys (about $12.95). Ideally, it would be good to limit the amount of pronation of the tuning hammer wrist and forearm by tuning with the thumb up, as is possible with the ball-type tuning hammer.

Some technicians prefer to control the tuning hammer (especially when tuning left-handed) with the palm of the hand. Unfortunately, the force is usually taken in the groove between the two meaty parts of the palm near the wrist. This is directly over the carpal tunnel. Repeated minor trauma in this area often leads to scarring in the carpal tunnel with entrapment of the median nerve, i.e., a carpal tunnel syndrome. This produces variable hand discomfort, swelling, or numbness, generally in the second, third and fourth fingers. If you cannot avoid tuning this way, learn to work wearing a leather glove with the fingers cut out. Weightlifters' gloves, available at sporting goods stores for $5 to $10 dollars a pair, fill the bill nicely.

Many who responded to the survey reported problems with the hand used to strike test blows. Many technicians hold the striking hand with the wrist slightly flexed using a neutral to 45-degree-flexed motion striking on the third fingertip. Other fingers are used less often. Some raise the entire arm and allow the force to be generated by the weight of the arm falling on the key. This motion will be performed thousands of times during a single tuning. In the first instance, the positioning of the wrist combined with repetitive "squeezing of the carpal tunnel is the perfect scenario for a median nerve compression (carpal tunnel syndrome). Pounding on the fingertips leads to terminal nerve branch injury, a phenomenon called traumatic neuropathy. These problems can be greatly reduced by adjusting chair height, using a wrist splint and/or wearing a protective glove on the fingertips. An archer's glove would be ideal for this purpose. This is composed of three or four leather fingertips attached to a wristband (see figure 5). Archers use them to protect their fingertips from bow strings. Another very good way of protecting the fingertips is the rubber finger protectors found in

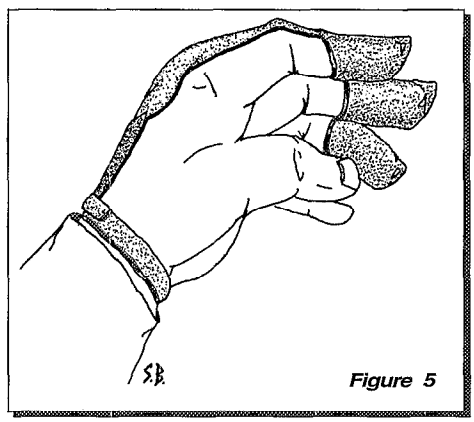

Figure 5

office supply stores.

Tuners who use the full arm-drop technique spare their wrists somewhat by transferring some of the impact and stress to the arm, and the elbow and the shoulder take more responsibility for the action. An alternative striking technique uses a "key pounder" — a solid metal, wood, or plastic cylinder or rod with a padded end. This is held in a light fist and produces far less stress on the hand and wrist than bare-handed methods.

Voicing seems to be the job of the elbow and forearm. We could find no way to perform this task any more easily than the way it is conventionally done. For those who find this difficult because of elbow or extensor forearm pain, we recommend a forearm band. This is a soft Velcro closure band that is worn just below the elbow and serves to change the angle of pull of the tendon on the elbow bone. They can be obtained at medical supply stores and are not expensive. Technicians who must perform voicing frequently on very hard hammers might consider using a mechanical voicing device or an alternative means (such as steam, or alcohol and water) of restoring resilience to the felt.

When regulating a grand, the let-off screws are turned with a small wrench, with the action in place in the piano. If this is done from a sitting position, the technician must bend sideways to view the let-off screws, a position designed to produce a literal pain in the neck ... and back and shoulder. Try doing this while kneeling on a cushion and you may not have need for that hot tub after all. The small screw, spring and wire-bending adjustments required for regulating drop, backchecks, jack alignments and repetition springs, etc., produce minimal strain and, if done in a comfortable position, should give little trouble.

Servicing Vertical Pianos

Many respondents to the survey reported problems from tuning uprights. This is no surprise since, other than laying the instrument on its back, there is no absolutely

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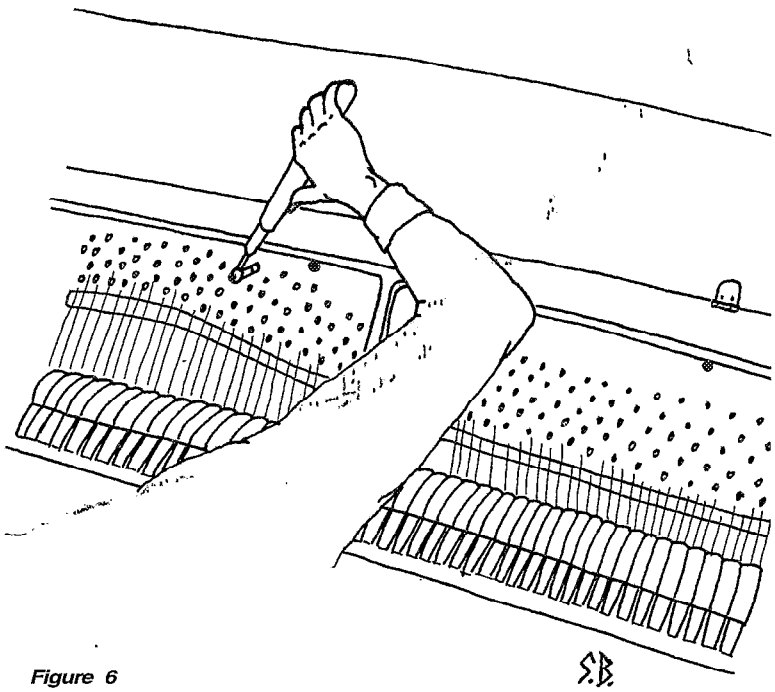

Figure 6

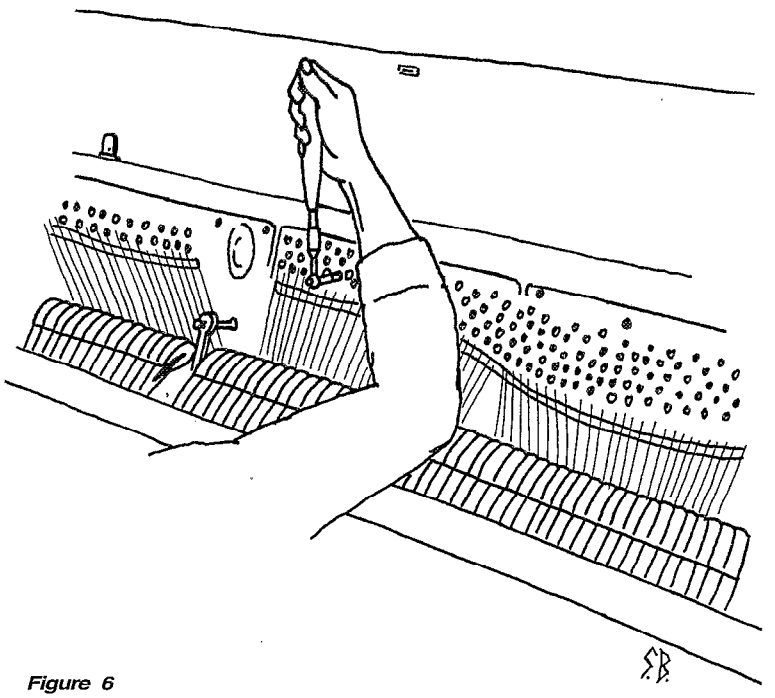

Figure 6

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mechanically stress-free way of performing this task. The important elements here are the height of the chair, height of the tuning arm, and the angle of the wrist on the tuning hammer. We are referring here to studio uprights in particular, although the same principles apply to any size upright. The technician may be standing when working on taller instruments.

If the chair is too low, the shoulder must be held in high abduction with the elbow near shoulder height. Try raising the seat (using the firm cushion mentioned above) until the elbow is 30 to 45 degrees from the body. Adjust your body angle and tuning hammer arm so the wrist can be slightly dorsiflexed. If you hold the handle with the thumb up, your elbow can be held even lower (see figures 6 and 7). If your arm can be rested on the instrument without restricting arm movement, so much the better.

A word about tuning hammers. The conventional tuning hammer provides a steady resistance although it may be difficult to position for minimum strain on the wrist and arm. The impact hammer (See this month's Q & A section.) requires little shoulder, elbow or forearm motion, but can unduly stress the radial and ulnar deviation mechanism of the wrist. If a tuner suffers from shoulder, elbow or forearm injuries, the impact hammer may be a good choice. However, if the tuner experiences wrist or hand problems, the impact hammer could actually make them worse. Tuning hammers with ball handles (see figure 8) allow technicians of different sizes and styles to maintain the wrist in the least stressful position.

Regulating uprights seems to present no great problems ergonomically, since no awkward postures are required to set let-off, lost motion, backchecks, etc. As with all other procedures, common sense and listening to your body should be your guides here.

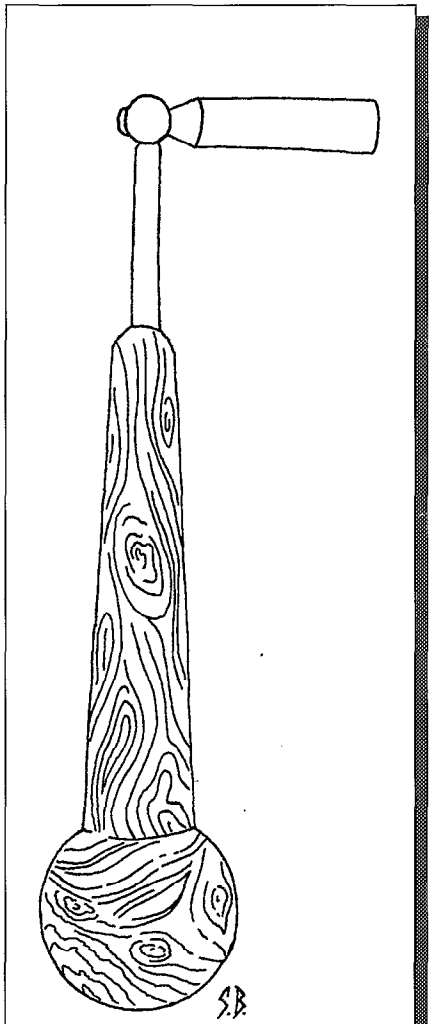

Figure 8

Conclusion

Now that you know more about zebras than you ever wanted to know, we can get to the bottom line, the take-home message. Ergonomics is not magic and need not be high-tech unless you have a grant that requires you to produce numbers by measuring everything. Ergonomics is common sense. Remember, a piano has 88 keys. Every motion you make is repeated for 88 keys times the number of repetitions per key. This may be several thousand repetitions of a given motion for a single tuning as, for example, when striking test blows or wiggling a tuning hammer. Every additional strain caused by poor mechanics or improper positioning is magnified several thousand times per tuning. If you tune four pianos a day, some motions may have been repeated 10,000 times by the end of the day. This adds up quickly, even if the excess strain per motion is very small. Listen to your body. If some activity seems awkward or produces aching, fatigue, or even an unexpected awareness of some body part, you can probably improve the way you perform that task. Don't be committed to a style or form just because "that's the way I was taught" or "I have always done it that way."

Remember a few basic principles

- Work from proper height
- Arm resting if possible
- Elbow 30 to 45 degrees from body if arm not resting
- Wrist dorsiflexed, neutral deviation
- Minimum supinating/pronating (rotating wrist and forearm)
- Use wrist splints, fingertip guards, forearm bands as needed — they don't make you a "wuss"
- Whenever possible, pull rather than push
- Rest as needed
- Limit schedule if needed — most RTI improve when trauma ceases

We hope this brief discussion will provide you with some tools to evaluate your own style of work. Individual problems may, of course, require specific medical attention. In the presence of persisting or worsening symptoms, we urge you to see your doctor for more definitive care.

(Robert Levy, M.D., practices rheumatolgy in Olympia, Wash.)

Taming Woodworking Noise

Your machines may be even louder than you think, but protection is available

By Jack Vernon, Ph.D.

(Reprinted from *Fine Woodworking* with permission of the author.)

Those tools that we most need to use are the very ones that offer the greatest potential danger to our ears. Common woodworking machines such as routers, planers and tablesaws can cause permanent hearing damage. The good news is that there are easy ways to protect your hearing while continuing to work wood with power tools. But first it helps to understand the problem.

Hearing-damage basics

Loud sounds damage hearing in much the same way that earthquakes damage buildings. Loud sounds simply shake apart the delicate inner-ear structures called hair cells. These hair cells are highly specialized nerve endings designed to receive sound energy and convert it into neural impulses. In turn, those neural impulses produce our ability to hear. Sound waves strike all parts of our body, but only the hair cells of the inner ear can convert that sound energy into what causes us to hear. Once destroyed, the hair cells are gone forever.

Open a pea pod, and take out one pea. That is about the size of your inner ear, and amazingly, it contains 30,000 hair cells and approximately the same number of nerve fibers leading away from the hair cells up to the brain. You can easily appreciate that the inner ear is not only a very delicate structure, but it is compacted into a very small space.

Measuring Woodworking Noise

As might be imagined, damage to the ears produced by loud sounds is a combination of the intensity of the sound and the length of time for which one is exposed to that sound. Sound measurements of what we commonly call loudness, which actually measure the sound pressure level (SPL), are expressed in decibels (dB). Decibel units represent a logarithmic scale because the human ear can perceive such a large range of different intensities. Logarithmic notations are expressions of ratios; for example, if one sound is twice as intense as another sound, it is 6 dB more intense. If one sound is 10 times more intense than a second sound, the first sound is 20 dB more intense.

The federal Occupational Safety and Health Administration (OSHA) standards limit industrial workers to 90 dB SPL for an eight-hour day. For sound levels of 95 dB, only a four-hour work day is allowable. At a sound level of 100 dB, the allowable work day is two hours, for 105 dB one hour, 100 dB 30 minutes, 115 dB 15 minutes and so on.

To study how woodworking machines affect hearing, members of the Oregon Hearing Research Center staff measured the intensity (loudness) of the sound in the conventional manner, at the ear level. But we also used special equipment — a miniature microphone — to measure sound intensity inside the ear canal at the ear drum itself (see photo). The chart lists our measurements of typical woodworking machines under appropriate and normal operating conditions. Keep in mind, however, that tools vary from maker to maker with some being louder than others.

The sound measured at the ear drum is significantly louder than that same sound measured at ear level. In practical terms, that means that the ear canal leading to the ear drum produces some amplification of the sound intensity. For

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example, the noise generated by the 15"-planer was 9 dB more intense at the ear drum than when measured at the ear level. On average, the sound produced by the machines we measured was increased by the ear canal about 7 dB (and remember an increase of 6 dB is a doubling of the sound intensity). In other words, sounds are more than twice as loud at the ear drum.

Photo courtesy of *Fine Woodworking* magazine

Another problem with woodworking power tools is that when we hold them, we stimulate our ears by bone conduction (sound traveling through the body), as well as by airborne sounds. Ear muffs and ear plugs block out sound coming to the ear through the air. When bone conduction of sound is involved, it would be desirable to use the power tool in short bursts to minimize any accumulation effect. Anti-vibration gloves may also help, but we have not tested them.

Warning Signs of Hearing Damage

When other parts of our bodies are damaged, the warning signal is pain. But for the ear, the warning signal is tinnitus (ringing in the ears). Ringing in the ears after exposure to a woodworking tool means that tool was too loud for your ears and that you should always wear ear protection in the future when using that tool. Don't be guided by the actions of others. Some people have tough ears, and some people have tender ears, and all grades in between. You may have noted that Norm Abram of *The New Yankee Workshop* seldom wears ear protection. I would assume that Mr. Abram has tough ears.

The way in which hearing impairment starts can be deceptive, so deceptive as to go unnoticed initially. Imagine the inner ear laid out like a piano keyboard, the low frequencies to the left and the high frequencies to the right, with each frequency systematically spaced in between. It is the high frequencies that are damaged initially by loud sounds, so one can sustain a considerable amount of damage before the ability to hear the lower pitches becomes impaired. The sounds to which we pay attention and which we commonly use are restricted to the low-frequency portion of the ear, starting with about 4,000 Hz (cycles per second) and moving to lower pitches.

The typical course of hearing loss is something like this: With the initial hearing loss, the person has no difficulty hearing and understanding speech as long as the person is in a relatively quiet place. But when there is background noise present (in a restaurant or at a cocktail party, for example), the person will hear speech, but he or she will not be able to understand it. This condition is an early warning of hearing loss. Moreover, that kind of hearing loss often can be compensated by a pair of properly fitted hearing aids.

Ear Protection

There are two common forms of ear protection: ear muffs and ear plugs. In extreme cases, it is advisable to use both types at the same time. Much has been made of ear plugs as a protective device, and it is true that ear plugs work about as well as ear muffs. Ear plugs such as the foam EAR brand plugs available in most drug stores, are good protective devices, and they are inexpensive. A disadvantage of ear plugs is that they can be difficult to insert correctly. And it takes time to get them inserted. In addition, the ear plug is vulnerable to jaw movements, which can break the sound seal. Place your finger in your ear and move the jaw, as in chewing or talking, and note the amount of ear canal movement. It is this movement that can make ear plugs less effective.

Properly selected ear muffs offer as much sound protection as do custom-fitted ear plugs. More importantly, ear muffs are easier to put on and take off, provided they are available at each noisy machine. If the muffs are on the other side of the shop from the tool being used, there's an inclination to say, "This is a very brief task; I don't really need ear protection." We recommend that a pair of ear muffs be placed on each machine capable of producing ear-damaging loud sounds. The ear bows of safety glasses can break the sound seal for some ear muffs, but our research showed the cuffs on the Thunder 29 ear muffs (available from Safety and Supply, 595 N. Columbia Blvd., Portland, Ore. 97217; 503-283-9500) are sufficiently pliable that they can be worn over glasses without any loss of sound protection.

Quieting Woodworking Machines

In addition to ear protection, it is possible to reduce the amount of sound generated by certain machines. Several manufacturers are marketing so-called quiet saw blades. We tried the Silencer 10", sawblade (available from Everlast Saw and Carbide Tools, Inc., 9 Otis St., West Babylon, N.Y. 11704; 516-491-1900), and we found it reduced tablesaw noise level by 9 dB when compared to a regular carbide blade. Remember that reducing sound intensity by 6 dB means cutting the intensity in half; a reduction of 10 dB means a reduction of three times. Thus the 9-dB sound reduction provided by the Silencer blade is significant.

Many machines, such as the bandsaw, produce some of their noise by the resonance of their metal panels. Attaching pieces of plywood to these panels helps reduce the sound generated by the saw. For example, the noise produced by a 16" Grizzly bandsaw was reduced from 92 dB to 89 dB by loading its panels with plywood. Mounting tools on rubber isolation blocks or wood mounts can reduce sound levels.

Keep tools in good working order. Dull tools tend to make more noise than do sharp ones. Misaligned belts and pulleys can generate excess drive-train noise. Worn or poorly lubricated bearings will add to noise.

Think about your hearing when you purchase woodworking equipment. Some designs and individual tools are louder than others. Machines with universal motors tend to be louder than those with induction motors. Gear-driven tools are usually louder than belt-driven or direct-drive tools.

In general, shielding, insulating and muffling can reduce machine noise. The degree to which these procedures are effective depends in part upon the conditions of the individual shop, such as size, shape, surface of the walls, ceiling construction and ceiling height. Each situation requires individual attention. But the point is to look for ways to reduce sound levels, and you will find them. John Culp of Peachtree City, Ga., created a muffler for his two-stage dust collector using open-cell foam. He said the effect on the machine's performance was "negligible, but the high pitch whine is greatly reduced, making it much more comfortable for unprotected ears."

It's important to prevent permanent damage by protecting your ears from harmful noise any way you can. Remember: If after exposure to a noise your ears ring, even briefly, then the sound was too intense for your ears, and in the future, use ear protection.

Jack Vernon is director of the Oregon Hearing Research Center at Oregon Health Sciences University in Portland, Ore. Jim Nunley and Jonathan Lay, also members of the research center, contributed to this article. All three men are active amateur woodworkers. Those who already may be suffering from tinnitus can contact the Oregon Hearing Research Center (3515 S.W. Veterans Hospital Road, Portland, OR 97201-2997; 503-494-8032) to learn about relief procedures for tinnitus.

Posture Yourself For Good Health

By Bonnie Bauer Swafford, RPT

Is tuning and regulating a piano a pain? This is not a question about the customer or the type and age of the piano. Do you feel aches and pains long after the technical work is over?

There are many occupational hazards of being a piano technician, but many problems of the muscles and joints can be prevented. A few simple exercises combined with good postural habits and proper ways of moving can be the difference between a "pain in the neck" and a good day of work and play.

Muscles provide movement and support to the body. Misuse of muscles or persistently poor postures can be a source of pain, and over time can cause the development of worse problems. This misuse can cause a muscle to become tight and shortened on one side of the body, creating an imbalance by putting the opposing muscle, that is, the muscle that lets the body perform the opposite movement, in a stretched and weakened position. This imbalance between muscles that are tightened and shortened and opposing muscles that are stretched and weakened results in restriction of normal movement — and pain. Fortunately, however, prevention is often easy and not very time consuming.

Pain

Pain is a warning. Pay attention. Working through pain can cause more serious or permanent damage. The popular saying, "No pain, no gain" is not accurate. Pain is your body telling you to rest so that further injury doesn't occur.

Common Causes of Pain

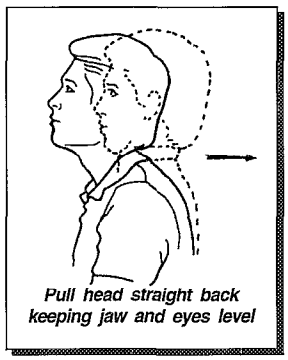
- Fatigue: When the entire body or just one area such as your tuning arm is tired, the muscles are in a weakened state.
- Overuse: Repetitive motions, even ones that do not cause pain today, can cause cumulative trauma, and result in chronic pain and abnormalities such as arthritis.
- Improper positioning: The human body is designed to be upright but if held in an unnatural position too long, muscles are weakened and ligaments over-taxed.
- Mental stress: People tend to get hurt more frequently when they are preoccupied and not fully focused on the activity they are performing.

Correct Posture

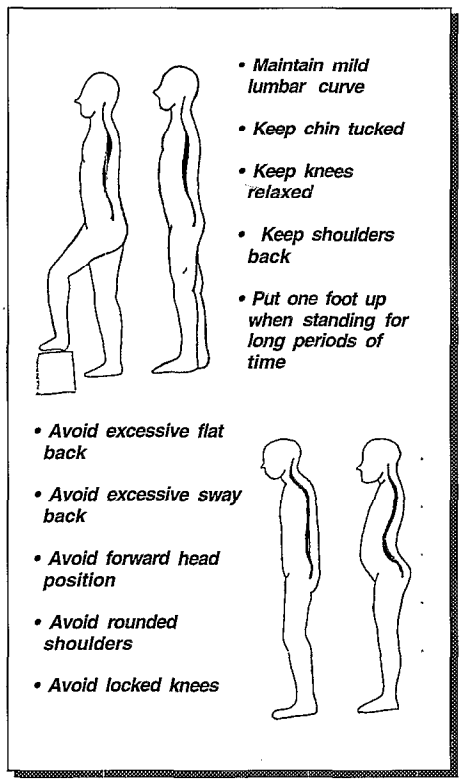
No person can maintain correct body alignment at all times. There are, however, many times during the day when sitting and standing can and should be done correctly. It's a matter of developing good habits.

When seated, there should be a slight curve in the low back, body weight is on the buttocks (not the tail bone), shoulders over the hips and head over the shoulders (not jutted forward). This posture cannot be maintained when tuning but can become habit at other times when sitting.

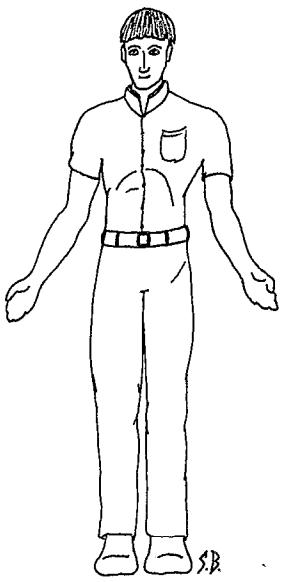
For example, if you drive with your head forward and then also tune with it in that same position, neck and shoulder pain can eventually occur because of that persistently poor posture. An easy activity is to practice chin tuck exercises to remediate this poor posture. From the "tucked" position a slight relaxation will put you into the correct posture.



When standing, ears, shoulders, hips, and ankles should form a vertical line. The low back should not be too arched or too flattened. Weight should be equal on both feet if standing for short periods of time.



A good standing exercise can be done against a wall. Afterwards, relax slightly and maintain this posture when standing and walking.

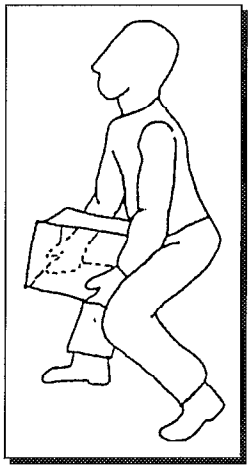


Standing Pelvic Tilt: Stand with your back to a wall, arms rotated so that the palms face outward, and feet a few inches away from the wall. Pull up with your stomach muscles and down with your buttock muscles to tilt pelvis and flatten your low back. Hold five seconds. Relax.

Proper Body Mechanics

Even "strong" people can still hurt themselves if moving and lifting incorrectly. Picking up a tool case many times a day will eventually cause stress and strain if not done properly.

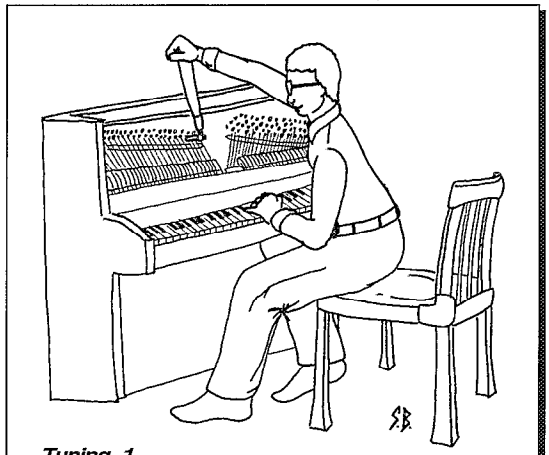
Guidelines for lifting and moving:



1. Bend your knees and keep your back perpendicular to the ground when lifting an object from the floor.
2. Keep the object close to your body
3. Pivot your entire body when turning with an object in your hands.
4. Push and pull using your entire body weight and leg muscles; not just your arms and shoulders.
5. Ask for help; don't over estimate your abilities.

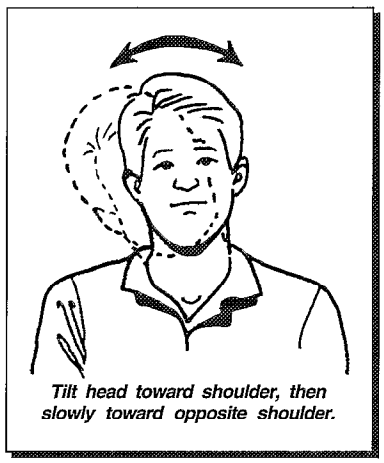
Specific Risks for Piano Tuners

Three key areas are often overstretched during tuning and therefore more likely to have aches and pains.



Tuning 1

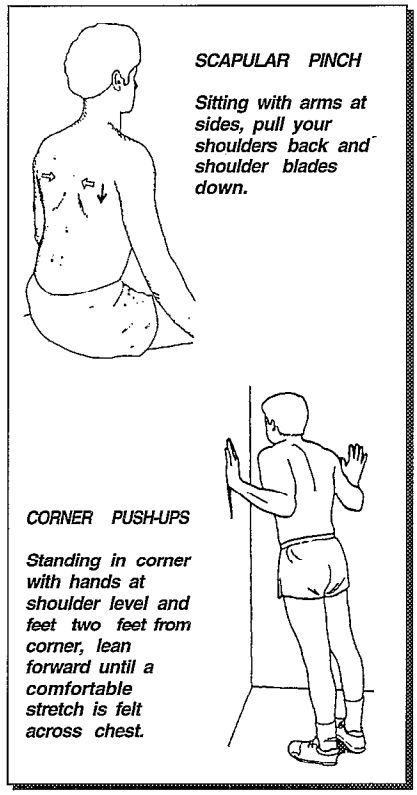
1. *Head and neck.* (See Tuning 2, Page 38.) The head is often in a forward position and increased tension is created in the upper shoulder muscles. In addition to chin tucks, side-bending can stretch the muscles that are on top of your shoulders and help prevent stiffness and sore muscles.

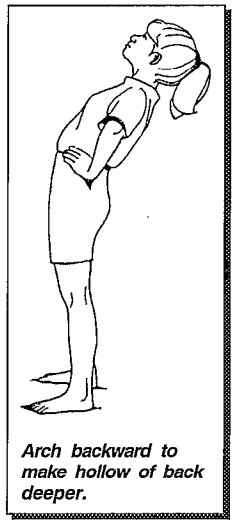


Tilt head toward shoulder, then slowly toward opposite shoulder.

2. *Upper back.* (See Tuning 1 and 2.) This position has the chest muscles in a shortened or tight position and the shoulder blade or scapular muscles overstretched. Scapular pinches should be done every 15 minutes and held for 10 seconds. Corner push ups can be done at home, 2-3 times in the morning and evening.

3. *Low back.* (See Tuning 1 and 2.) The back is bent forward or flexed which puts the front hip muscles in a shortened position and the back muscles overstretched. A standing back extension can counteract this posture.





Arch backward to make hollow of back deeper.

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Posture Yourself For Good Health

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Treatment and Prevention

Most importantly, when hurting, stop what you're doing or take a short rest.

Other treatments:

- Over-the-counter pain reliever medications,
- Ice, if the pain is sudden and sharp, for the first 48-72 hours,
- Moist heat is helpful after the initial injury or if the main symptom is stiffness.

Any pain that does not at least decrease after one to two hours could be another problem. Shoulder pain can be caused by stomach ulcers or heart conditions. Low back pain can be the result of kidney problems or shingles. Contact your doctor for any questionable or long-lasting problems.

Prevention of general pain:

- Avoid prolonged postures by taking occasional 10-second stretch breaks.
- Use proper body mechanics.
- Don't bounce when stretching; hold stretching positions steady for five to 10 seconds and do three to four repetitions.
- General conditioning exercises, such as weight lifting, can keep all muscles strong and healthy. Piano tuning is by nature a physical job and emphasis primarily should be on those areas overstretched while working, such as the upper back muscles.
- Aerobic exercise is recommended to improve endurance of heart and lungs. Work at 60-80% of your maximum heart rate which is 220 minus your age. Start out slowly and work up to 30-40 minutes three to four times a week. Walking is the easiest, least expensive aerobic exercise, but many people enjoy jogging, bike riding, or swimming.

Many of life's physical endeavors involve inherently unnatural postures and movements. Just like ballet dancers, professional football players, and pianists, piano technicians must be aware of, and make allowances for, the detrimental effects to their bodies that their chosen area of endeavor causes. Remember, bad habits will probably catch up with you. Convalescence after an injury is much more time-consuming and costly than a few preventive measures. Use your good sense and keep your body "in tune" for a long and healthy career.

Bonnie Bauer Swafford, Registered Physical Therapist, is the clinical director of Physical Therapy at the University of Kansas Medical Center and teaches posture evaluation to the graduate physical therapy students.

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Kendall, F. and McCreary, E., *Muscles: Testing and Function*, Williams and Wilkins, 1993.

Kisner, C. and Colby, L., *Therapeutic Exercise, Foundations and Techniques*, F.A. Davis Company, 1990.

Saunders, H. D., *Evaluation, Treatment and Prevention of Musculoskeletal Disorders*, Vol. 1, Spine, 1994.

"Posture Yourself for Good Health" is the American Physical Therapy Association slogan for Physical Therapy Month, 1994.

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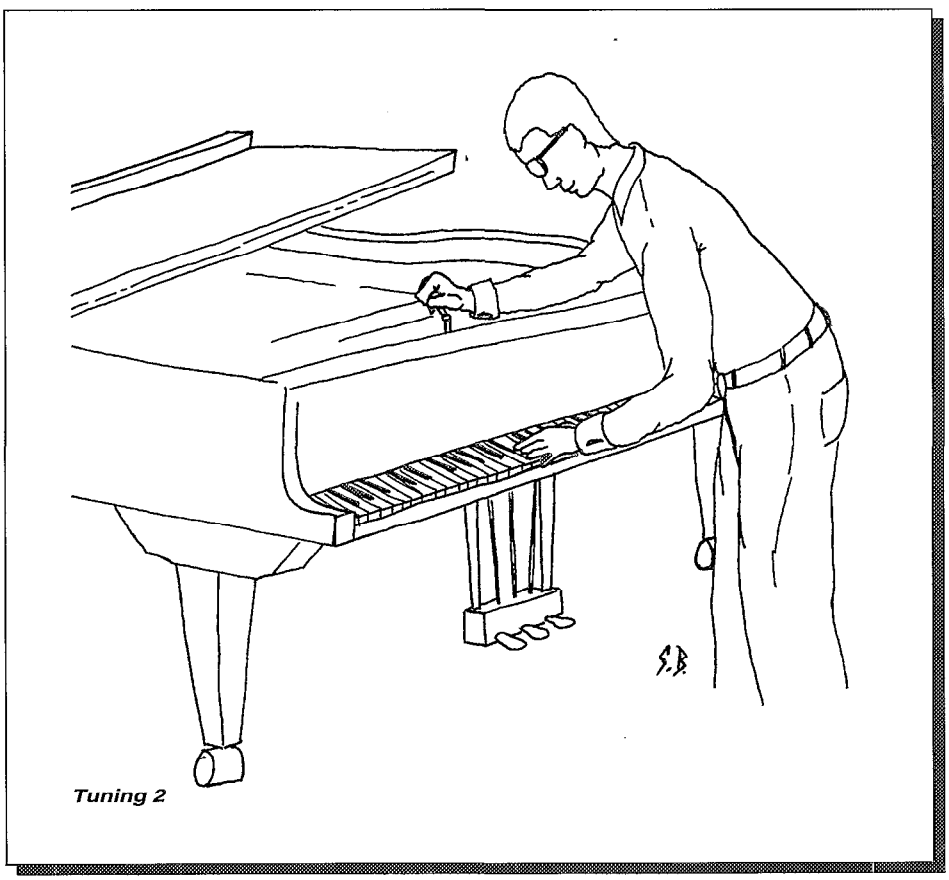

Tuning 2

PACE

Professionals Advance through Continuing Education

LESSON PLAN

Technical Lesson #28

Grand Regulation - Part 9: Adjusting Jack Position, Repetition Lever Height, Let-off & Drop

By Bill Spurlock, RPT
Sacramento Valley Chapter

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

In Brief

Lesson #27 explored the relationship between the let-off, hammer drop, jack position and repetition lever height adjustments, and how they affect action touch. This lesson will demonstrate some methods of actually performing these adjustments on a grand action. A unique action support device that allows many regulation jobs to be done right at the piano will also be shown.

Getting Started

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

Hands-on Session Setup

To teach this lesson in a hands-on format, you will need one or more grand pianos in good condition. Good used pianos in a dealership or practice room pianos at a college are good candidates, as long as they have only light wear. Hammer blow distance and repetition springs should be adjusted reasonably close already. New pianos in a dealership might also be used. Action models are not suitable for this lesson. In addition, meeting setup should include:

- extra regulating tools
- a well-lit work area with tables or work benches

Estimated Lesson Time

Approximately two hours. Participants should perform each of the four adjustments described on several notes.

Tools & Materials Participants Must Bring

For this lesson, participants should obtain the following tools:

- a small, thin flat blade screwdriver for slotted drop screws
- thin-shank tool for spade-head (conventional type) drop screws (the thin shank is necessary to fit between the let-off dowels on some pianos when adjusting jack position). Pianotech #JJS-1, and Schaff #R-30 are examples
- selection of general regulating tools.

Assigned Prior Reading for Participants

PTG Technical Exam Source Book (PTG Home Office, 816-753-7747), pgs. II.8-II.12. (Same as for Lesson #27.)

General Instructions

As explained in Lesson #27, let-off and drop are critical to action performance. They must occur as late in the key stroke as practical for best touch and maximum power. In addition, the repetition lever should contact the drop screw at the same time the jack contacts the let-off button. Then the pianist feels a single, crisp bump rather than a vague, two-stage point of resistance. The timing of the let-off and drop screw contacts is affected by the four adjustments of repetition lever height, jack position, let-off distance, and drop. Thus when regulating, we must consider all four adjustments together so let-off and drop are not only correct but synchronized. This was fully explained in Lesson #27, so this lesson will mainly cover the mechanics and tool usage of doing these adjustments efficiently on an action.

Note: before setting jack position, hammer blow distance must be correct, since knuckle position changes with hammer shank angle. Also, repetition springs must be adjusted reasonably close before adjusting repetition lever height, since spring strength affects the jack's ability to slip back under the knuckle.

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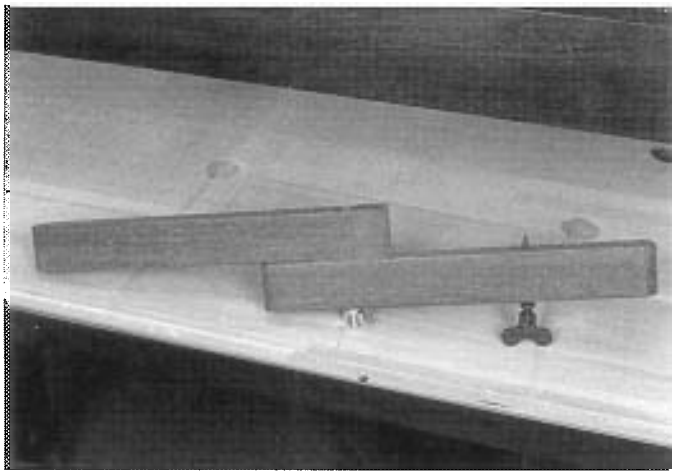
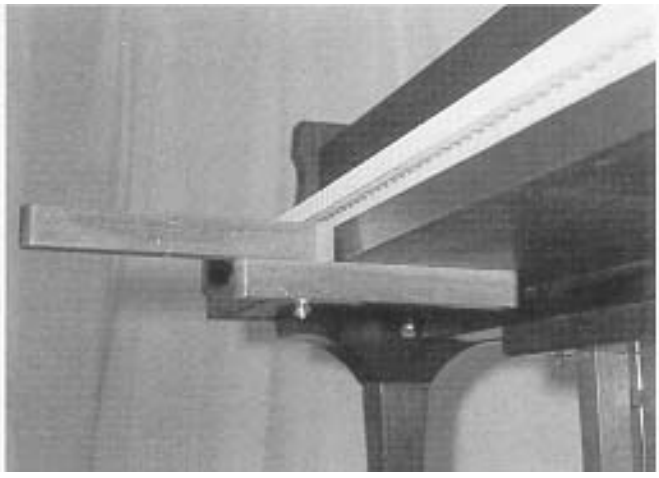
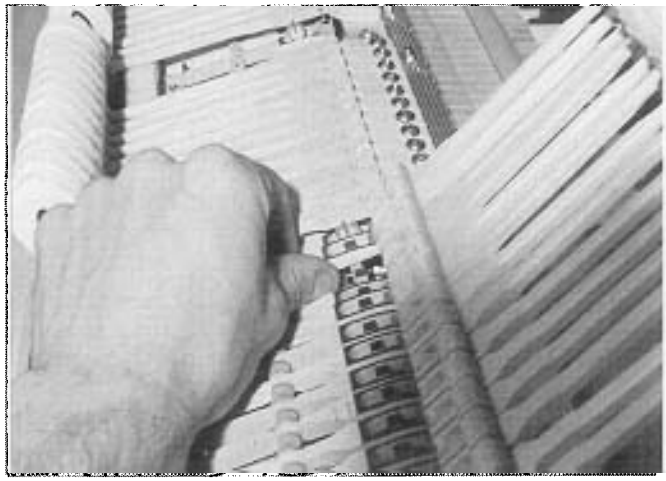
LESSON PLAN





Photos 1 (left) & 2 (right): Keybed Action Support — This handy device attaches to the underside of any grand keybed with a single screw, usually the winged-type keyblock screw, and supports the action when it is pulled out from under the pinblock. This allows you to perform many adjustments with the action on the keybed, rather than moving it to a table or workbench. The action support is available from Kawai America (part #0700KB) and from Pianotek (part #JGK-1).



Photos 3 & 4: Jack Position Adjustment — The back edge of the jack should be aligned with the back side of the knuckle core, for best leverage. In addition, if the jack is too far forward, toward the player, it may skip out on a hard blow. And if too far back under the knuckle, the jack has to wipe across more of the knuckle surface during escapement. This means that escapement must start sooner in the key stroke and lasts longer, causing escapement to feel stiffer.

One method of aligning the jack fore and aft to the knuckle core is shown here. To judge the alignment consistently from note to note, you must maintain your line of sight down the row of jacks, but at the same time see to place the tool on the jack adjusting screw. Having to move your head around to alternately see jack alignment and then find the adjusting screw with the tool can slow the process way down. I suggest the following method* will increase speed and accuracy for most people.

**Thanks to Kawai concert technician Otake Takanori for sharing this method in his class in Albuquerque, July 1995*

1) As shown in Photo 3, use your index finger to depress the repetition lever of the note you are adjusting. (The action can be turned around backwards on the keybed and supported by the keybed action support for this job, or it can be placed on a table.)

2) If adjustment is needed, let up on the repetition lever and use the thumb of the same hand to depress the repetition lever of the wippen two notes away (toward you) as shown in Photo 4. *Maintain your head in the same position.* Depressing the second repetition away from the one you want to adjust opens up a view to the adjusting screw, allowing you to place the tool on the screw without having to look around the front of the action. In this photo, the adjusting screw is indicated by the arrow.

3) Once the tool is on the screw, release your thumb and depress the index finger again to watch the jack position as you perform the adjustment. When done, flip that shank up and repeat the process on the next note. Since your head stays in the same position the whole time, you can do all three steps in succession very quickly on one note after another.

When making the adjustment, it is good practice to lift the adjusting button off its felt pad while turning, as shown in Photo 6. This yields a more stable adjustment by avoiding "scrubbing" the two felts together. To do this, place the tool on the adjusting screw, then apply a slight turning pressure. This causes the tool to grip the screw head, so that lifting the tool lifts the screw with it. Turn to adjust, then let the screw snap back down.

This adjustment is very dependent upon repetition spring strength, and somewhat dependent upon hammer blow distance and jack position. Thus, as you work, if you find one note that seems to require the repetition lever to be much higher than the jack top, stop and check spring strength. Likewise, our test for spring strength is very dependent upon checking distance and other adjustments. Thus the regulation process is like pitch raising in that one adjustment affects others, and a really fine regulation can only be had by circling through the entire regulation sequence two or more times.

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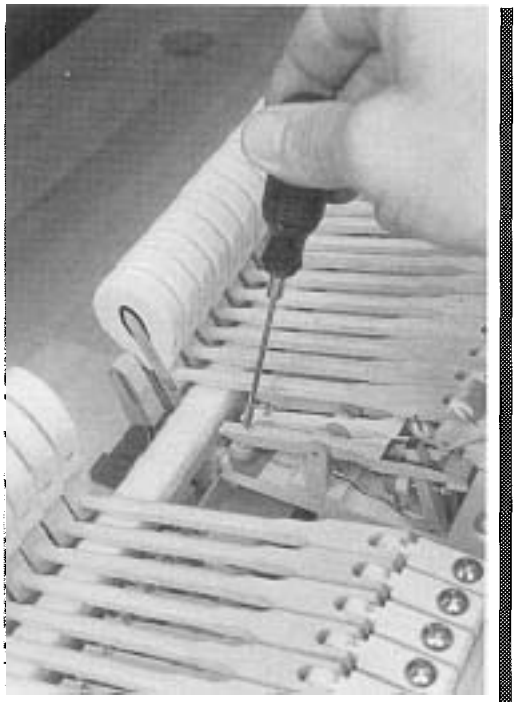

Photos 5 (above) & 6 (right): Repetition Lever Height Adjustment — There should be virtually no clearance between the jack top and the knuckle with the hammer at rest, only enough to allow reliable jack return when the key is released. Excessive clearance robs power and reduces aftertouch by introducing lost motion. It also causes an unstable hammer line, since hammers will randomly come to rest either sitting on the jack top or pushed up slightly by the repetition lever. *Too little clearance* can hurt repetition by not allowing the jack to return under the knuckle.

To test, trip the jack tender with a fingertip as shown in Photo 5. Release fairly slowly, keeping your finger on the tender as the jack returns under the knuckle. There are two clues to a proper adjustment:

1) Visual: If the repetition lever height is correct, the hammer will wink down slightly as the jack is tripped, and wink upward again as the jack slips back under the knuckle. The winking indicates that the knuckle is indeed resting partially on the jack top. If the hammer winks down considerably and the jack cannot slip back under the knuckle upon release, the repetition lever is probably too low, not supporting enough of the shank's weight to allow jack return. And if there is *no* winking, the repetition lever is probably too high above the jack top, so the jack is not even touching the knuckle.

2) By feel: If repetition lever height is correct, you should be able to feel the jack top brushing the knuckle as it slips back under. If you feel the jack tender not returning all the way, the repetition lever is probably too low. If the jack tender returns all the way without any feeling of drag, the lever is too high.

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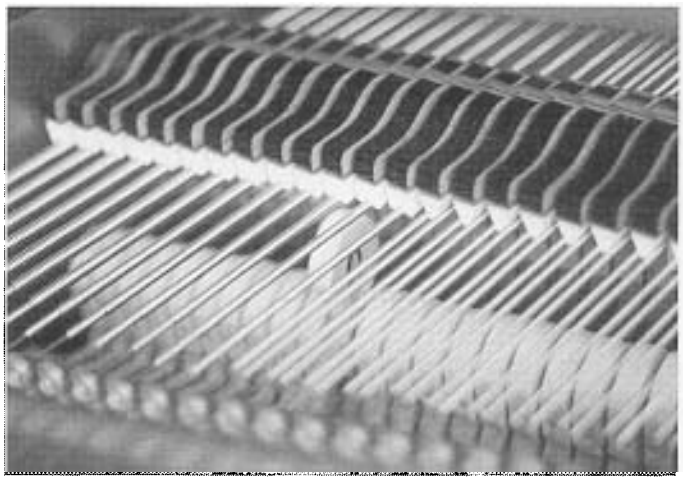

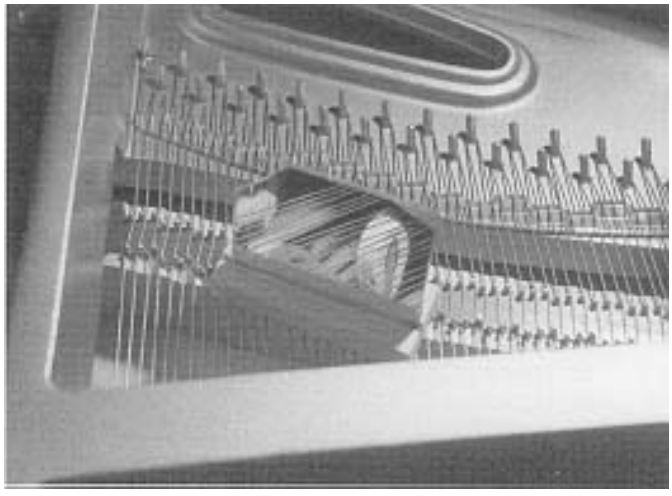

Photos 7 (above left), 8 (above right) & 9 (right): Let-off Adjustment — Let-off can be adjusted by first setting samples inside the piano, then removing the action to the bench and setting the remaining notes using a jig such as a "let-off rack." Another method which is shown here is to set let-off on all notes with the action in the piano.

Let-off distance must be slightly wider in the bass; because the longer strings oscillate in a wider pattern, wider let-off is necessary to prevent hammer blocking. One common criterion for let-off distance is two string diameters. (Note: For wound strings, this means only the core wire, not the overall wrapped diameter.) Thus, you can visualize two imaginary string diameters when setting the let-off distance on a given note. This provides a tapered let-off distance as you progress from the thicker bass wires to the thin treble wires.

The closer the let-off distance, the greater the power and ability to play very softly, *as long as the hammer never actually blocks.* Since let-off distance can change with humidity variation and wear, we must keep both reliability and performance in mind when regulating a given piano.

- Photo 7 shows the action pulled out slightly so the hammers are out from under the dampers for better visibility during adjustment.
- Photo 8 shows a convenient short-handled tool being used on dowel-type let-off screws. Note that a sharp key is being adjusted. To observe the let-off distance accurately the key movement is slowed down by placing a finger under the fronts of the white keys, then "squeezing" down the sharp with the thumb, which is supported by the white keys. With practice, you can "feel" the tool into the dowel without looking, thus avoiding having to look back and forth between hammers and adjusting screws.
- Photo 9 shows use of a mirror in the treble, to avoid having to lean your head over the top of the capo bar. Setting the mirror at an angle to the capo bar provides a side view of the hammer being adjusted.

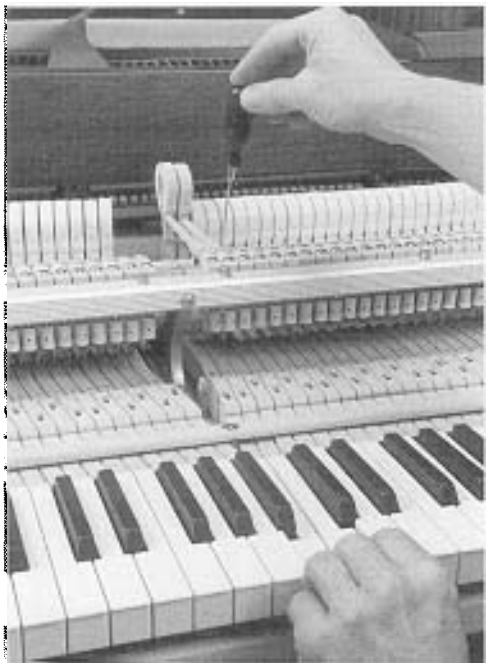

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Photo 10 (left): Drop Screw Adjustment — To adjust drop, I suggest the following procedure:

1) On a sample note or two, adjust drop visually and by feel so drop screw and let-off screw contacts are synchronized, as explained in Lesson #27.

2) Observe the distance the hammer drops immediately after let-off on these samples.

3) Adjust the remaining notes for this same drop distance, while continuing to spot check for a solid feel to escapement as you work.

Photo 10 shows a simple way of adjusting drop at the piano. With the action pulled part way out and resting on the keybed support or on your knee, depress one key slowly and completely so its hammer is held up, *not* in check. While holding this first key down, slowly depress the next key and watch its drop distance, using the first hammer as a visual reference point. Adjust drop on this second note until you see the hammer drop the correct amount, then hold it down as a reference point for the third note and so on up the scale. The stationary neighboring hammer just serves as a reference point for your eye to judge the motion of hammer being adjusted.

As already discussed, the drop screw must disengage the repetition lever from the knuckle so the hammer can rebound from the string. And, the drop screw must stop the repetition lever low enough that the hammer remains out of contact with the string if it is not caught by the backcheck.

In most cases, these requirements will be satisfied if the drop screw is simply adjusted so the repetition lever contacts the drop screw at the same instant the jack contacts the let-off button. However, here again most regulation adjustments are interdependent. If the hammer fails to check, and aftertouch is excessive, the hammer may rise up very close to the string or even block against it. Thus all adjustments must fit together so the end result is maximum power and control, a solid feeling "bump" as escapement begins, complete escapement of both jack and repetition lever, and a comfortable feeling aftertouch. This is the art of regulating — understanding the relationships among all the adjustments and regulating so each performs its function in concert with the others.

Industry News

Dillon Joins Coda as Academic Relations Manager

Brenda Dillon

(EDEN PRAIRIE, MINN.) _ To further strengthen its relationships with music educators nationwide, Coda Music Technology, Inc. has named Brenda Dillon as the academic relations manager of the company's Vivace Division. Ms. Dillon, former executive director of the National Piano Foundation, assumed her new role Nov. 1, according to Ron Raup, executive vice president/general manager, Vivace Division.

Introduced in January 1995, Vivace is the world's only Intelligent Accompaniment™ system — a product which "listens to" a practicing musician's actual tempo and provides accompaniments which "follow" the individual's real time performance. Coda's products are distributed through music products retailers in the U.S. and abroad.

Well-known throughout the music industry as a tireless crusader for music education, Ms. Dillon has built an enviable résumé in recent years. She has served as Division Chair of Fine Arts and professor of music at Brookhaven College, Dallas; as a professor of music at Mountain View College, Dallas; as a clinician and speaker at countless music education association gatherings; as an associate editor of *Keyboard Companion* and editor/writer of the National Piano Foundation *Piano Notes* and SPELLS Update; on the board of directors of the National Conference of Piano Pedagogy, and as chairman of several music associations, including the Music Educators National Conference Keyboard Committee, the National Group Piano Symposium and the Texas Group Piano Association.

One of Ms. Dillon's most notable achievements is the active role she has played over the past decade with the National Piano Foundation (NPF), the educational arm of the Piano Manufacturers Association International, where she has held the position of executive director since 1993. As a significant part of her efforts made on behalf of the NPF, she spearheaded a nationwide campaign for SPELLS (Study of Piano Enhances Learning and Life's Success), a market development program sponsored by the Piano Manufacturers Association International.

Ms. Dillon also received her bachelor of fine arts degree in piano and master of music in oboe, both from the University of North Texas.

Telephone Personality

By Sid Stone, RPT

How you handle business calls says a lot about your telephone personality. The poor chap in Bill Klein's cartoon is sending a negative message to the caller. Taking time to find writing equipment or your schedule book may not lose a client, but it could give the impression that you are not well organized. We need to be competent not only as piano technicians but also as business people who are organized and prepared.

Here are a few general rules for telephone personality: (1) when speaking over the telephone, hold the receiver about an inch from your mouth. It will pick up your voice distinctly and make it easier for the caller to understand what you are saying. (2) Speak slowly and clearly, especially when leaving a message on an answering machine. You know how frustrating it is when *you* have to rerun a garbled message a few times to get a name, phone number or address. (3) Use the person's name in your conversation. There is no sweeter music to a person's ears than the sound of his or her own name. (4) The message you leave on *your* machine should be short and to the point. Do you remember when the answering machines first came on the market? Some of the first recorded messages could put you to sleep listening to their explaining why they were using a machine, apologizing for your inconvenience, letting you know how much your call means to them, and explaining the procedure of leaving a message. A tuning temperament could be set by the time they were finished. Fortunately we seldom hear such rambling massages anymore. The message I leave is "You have reached the office of Sid Stone. Leave a message at the tone." Your telephone personality might convey a comical message or a music-related message, etc. It would be interesting, and even helpful, to hear what other messages are used or heard. Keep it short, but perhaps not as short as one message I once heard: just a single beep!

Your thoughts and words as well as your desk tell something about your telephone personality, whether you're receiving a call or making a call. When a caller asks, "What do you charge for

tuning a piano?," it is likely that the caller is shopping around for the cheapest price. One exception to this supposition is indicated in a call I received several years ago. At that time I was charging $14 (I said it was several years ago). The caller said, "I would like to make an appointment with you. I called two other tuners. One was $10, and the other was $12. You charge more, so you must be the best." How we wish more callers were like that! But, alas, too many of them are concerned more about price than proficiency.

To "make a sale" or get an appointment it has been said that the longer you can keep the caller in conversation, the more certain you are to land a new client. There are numerous ways to answer the question, "What do you charge. . ?" Here are just a few:

- "The charge for piano tuning is (fill in the blank)." That's all folks. If good vibes are not there at the beginning of the conversation, or if your schedule is filled up for the next few weeks, you may not want to waste time with such a shopper. However, if the caller shows interest, that is a different situation.
- "We charge (fill in the blank). There are cheaper tuners in the area, but I would not recommend them, especially *one.*" You don't have to tell who that one is (if there is indeed one); let the caller think it might be anyone in the Yellow Pages except you.
- "My charge is (fill in the blank). There are cheaper tuners around, but you won't get me." A little impudence may be in order if you feel the caller is a shopper. If you charge more than others in your area, do so because you believe you are worth it. Never apologize with such excuses like, "Because of inflation we have had to raise our rates."
- "The charge to tune a piano is still (fill in the blank)." Leave the impression that the tuning fee may soon be increased, so the caller would be well advised to make an appointment *now,* before the price goes up.
- "Our charge is (fill in the blank). There is only one cheaper tuner I would recommend. His/her name is (fill in the blank), and I could give you his/her phone number if you wish." (I have used this ploy to get tunings for my daughter who charges $10 less than I do, but she tunes as well as I). Another referral may be a student or an Associate member of PTG, who may take twice as long, but everybody is happy, perhaps even the piano.

One of my pet peeves, which tells something about my own telephone personality, is another type of caller,

one that may have nothing to do with piano servicing. This type of call can be so irritating that I have a few suggested ways to handle the situation. The phone rings, and a very friendly voice says, "Mr. Stone, how are you?" Now, if you have never received such a call, that means that either you have never contributed to *any* cause, or they just haven't gotten around to you. "Mr. Stone, how are you?" is a dead giveaway. The caller is a solicitor. If you allow him to say anything after that first infiltration, he will thank you for your support in the past, even though you may have never heard of his organization, "The Society for the Prevention of Cruelty to Old Piano Tuners Who Have Lost Their Bearing." Then comes the pitch for a donation. In recent times I do not allow the caller to get past that insidious question regarding my well-being. When I am asked, "How are you?", I answer according to the mood I am in. My telephone personality may be evident in such answers as:

- "How am I? Physically speaking, I am in great shape. Mentally speaking, I don't have Alzheimer's disease yet, though I sometimes feel I have Halfheimers. Morally, I am not sure. Financially, I am broke and owe over $20,000 on various credit cards. Now, what can I do for you?"
- "How am I? I'm broke. I wish I wasn't broke, so I could contribute to all the worthy causes I would like to."

Initiating a call is in some respects more important than receiving a call. There was a time I did not need to call to remind clients for tuning appointments. They called me, but then I was the only tuner in the area. Now there are a dozen or so tuners in that same area. LaRoy Edwards and others eliminate reminder phone calls by making the next appointment when finished with a tuning. I could never understand the feasibility of that until I started working for a piano store that sold a lot of new pianos. Their first tuning is free, and that may be why it is so easy to schedule the next tuning three months or six months away. Some new pianos require regular tunings to maintain the warranty. After finishing with the tuning I ask, "Would you like to set up an appointment now for your next tuning, or for me to send you a reminder card?" Give them a choice, either of which will get more business. The reminder card I use is like the one Isaac Sadigursky uses. I ask the client to address the card which I will send out when the next tuning is due. Receiving a card in the client's own handwriting is more apt to cinch the appointment.

What you say first when calling a client for a tuning appointment tells a lot about your telephone personality. There are proper ways to open the conversation, and there are improper ways, especially if a man answers.

Bad: "Hello, may I speak to Mrs. Mott?"

Worse: "Hello, may I speak to Gayla?"

Better: "Hello, this is Sid Stone, your piano tuner. Is Mrs. Mott in?" (or) "Is this Mrs. Mott?" then in a cheerful voice say, "It's tuning time again. I could tune your piano Tuesday morning at 10 o'clock, or Friday afternoon at 3:30. Which do you prefer?" (Again, give the client a choice which is better than asking a question that can be answered "Yes" or "No"). The important thing is to identify yourself at the very beginning so the guy won't think, "What is he calling my wife for?"

An entire article could be written about the excuses people give for not having their pianos tuned. Here is a list of the more common ones:

- "No one is playing it." You might answer, "If that is the case, would you consider selling your piano? From time to time I have requests from people wanting to buy a good piano." If they do not want to sell it, they should have it properly serviced.
- "It is not being used." How often do we hear that excuse! This client needs to be reminded of the manufacturer's recommendation. If the piano is listed in the PTG pamphlet, "How Often Should My Piano Be Serviced?" ask the client if she or he would like a copy, with that manufacturer's recommendations highlighted, and then send it to her.
- "I can't afford it right now." This indicates that the piano *is* being used. Their piano represents a sizable investment, and it should be kept up according to the manufacturer's recommendation. You might say, "According to our records your piano is long overdue for a tuning. I highly recommend your having it tuned, for the sake of the piano and anyone playing it, whether you have us or someone else."
- "It sounds okay." To the average ear it might indeed sound good. But if a piano is allowed to go untuned for a long period of time, the owner or player may become so accustomed to its going gradually out of tune they may not see the need for a tuning. It's like my seeing my grandchildren every week. I don't notice any change, but if I were to see them only once every year or two, I could see the difference. Piano tuners can tell quickly if a piano is in need of tuning. When you hear "It sounds all right," you might inform him or her that you have the latest tuning testing instrument which can accurately show the state of tuning. Of course there would be no charge for a demonstration.
- There is another approach, if the client cannot be convinced to have the piano tuned; and that is a unique one only the most daring would attempt. "Thank you for saying *no*." That will blow her mind. The explanation is, "Out of ten calls I get one *yes*. Your *no* is the sixth one, so I have only four more to go."

In summary, the telephone is one of the most useful inventions ever made. What would we piano technicians do without it? Let us make it work for us by speaking in a clear voice, being organized, and knowing how to handle difficult situations. Your telephone personality is more apparent to others than you might realize.

TECHNO stuff

Richard Anderson, RPT • Chicago Chapter

Tuning Pin Bushings

Q: What are tuning pin bushings for, and do I need to put them back into a piano that I'm rebuilding?

A: Tuning pin bushings are those wooden doughnuts surrounding tuning pins in the plates of some pianos. Most manufacturers used tuning pin bushings for two different reasons: to act as a centering device for the drill bit when drilling tuning pin holes in the pinblock through the plate, and/or to substitute for properly fitting the pinblock to the plate flange.

The first reason is quite valid and may be an essential part of the manufacturing process. Some manufacturers and rebuilders like to drill the pinblock in the piano with the plate installed. This allows them to drill the holes just before stringing so the holes don't become contaminated with spilled or airborne stuff. Drilling the block in the piano also allows the plate to be used as a drilling template for locating the tuning pin holes. In either case there needs to be some way of centering the drill bit in the much larger hole in the plate. Pressing a wood bushing into the plate before drilling is a convenient way to do so. The drill bit will center itself in the smaller hole in the center of the tuning pin bushing as it passes through the bushing and as a result center the bit in the plate hole as the bit enters the block.

The use of tuning pin bushings instead of fully fitting the block to the plate is one factory method that surely doesn't merit duplication. The bushings, even if made of maple, are no match for tension on the block and it will creep forward. The combined surface area and grain orientation of the bushings are no substitute for the entire edge of the block touching the plate. And the gap left between the block and plate is what causes premature failure of the pin hole and loss of torque in the front row of pins in many pianos.

The choice of whether or not to replace tuning pin bushings is then made on practical rather than technical considerations. Remember, some of our favorite pianos have no tuning pin bushings or even tuning pin holes (open faced pin blocks). The tuning pin bushing adds no torque to the pin, and it could be argued that an unbushed tuning pin feels better.

Many manufacturers use other centering devices or just have the same computer that drilled the holes in the plate drill the holes in the block. Some rebuilders drill the block out of the piano for logistical reasons or for more precise placement of the pin hole within the hole in the plate and do not replace tuning pin bushings on pianos that came in with them.

If you choose to replace tuning pin bushings you may run into trouble installing the commonly available sizes. Many older pianos used bushings with a significantly larger outside diameter to match their larger hole in the plate. The new generic bushings will be so loose in the plate that they will spin on the drill bit or not center it correctly, or they will split when the tuning pin is driven through them and pieces of bushing may even fall out. You might avoid this by gluing the undersized bushing to the block (which was done in older pianos), or soaking the bushing in water or linseed oil to swell it prior to installation.

Richard's rule of thumb for tuning pin bushings: If you're restringing an old block that has them and you're not removing the plate, leave the bushings in. If you've removed the plate and block, remove the bushings, too. Replace them only if you need to or want to, but not as a substitute for properly fitting the block.

My favorite technique for removing old tuning pin bushings from the plate (with the block removed) is to drill through the old bushing with a bit slightly smaller than the hole in the plate. They'll pop out quickly, and you'll avoid damaging the plate finish with a punch. PTJ

The Tuner's Life, One

Could It Be Something I Ate?

By Roger Gable, RPT
Seattle Chapter

About two years ago, I started noticing a couple of problems with my hearing. First, there were certain frequencies that wouldn't come through, or seemed greatly reduced, especially in the high end. I also discovered that I was very sensitive to one particular note on the piano, which was right in the mid-treble. I thought, well, maybe this is old age setting in. But being in the piano business, I wanted to be able to keep tuning pianos past the age of 47, so I started going to an ears, nose and throat specialist. He did a lot of tests, including hearing tests and checking for calcium deposits, etc. My hear-

Continued on Next Page

Huh? Hear Again? You Bet!—By R.L. "Larry" Caldwell, RPT

My wife thought it would be a good idea if I submitted an article to the *Journal* concerning my experiences with ear surgery to correct a hearing loss in my left ear. For a piano technician, dealing with a hearing loss and then the anticipation of ear surgery can be very traumatic. My career was on the line.

I had known of this condition from a previous audiology test taken in 1989. At that time I did not have medical insurance so the procedure was postponed until now. I have been trying to determine when the damage to my ear could have taken place. My first thought was from my days as a tank gunner in the Nebraska Army National Guard. The condition that I had was, in layman's terms, called a frozen stirrup. This restricts the vibrations picked up by the eardrum (tympanic membrane) from being transmitted to the inner ear via the hammer, anvil and stirrup. The stirrup gets a calcium growth around it, restricting its motion. I found that this condition could have started during childhood (about 45 years ago for me), when I had the mumps (only on one side, however). It would be interesting to know which side, but not only was I suffering from some hearing loss, my memory must be waning, also.

The surgical procedure took about 1 1/2 hours to perform, replacing the stirrup with a metal prosthesis (stapedectomy). I was taken to my hospital room to spend the night and was released the next morning. During my stay in the hospital two very interesting things happened. First, an empty plastic bottle fell on the floor without my knowledge and it sounded like a shelf fell down in the closet. Next, they were vacuuming the hall outside my room and I thought it was a truck coming down the hall. My only request now is that people don't refer to me as the "tin ear tuner." As I write this, I will start tuning again in about a week, but my hearing will be fully and permanently restored in three to four months.

The Tuner's Life, Too

Now for the case of hearing protection. Yes, I have recently heard that some of the piano tuner/technicians are using hearing protection while tuning pianos. However, are *you* using hearing protection while tuning? If not, maybe you should be. The way I see it, you could benefit in two ways. First, you will prevent hearing loss due to exposure to high decibel levels for several hours per day. Second, you may very well end up with a more stable tuning because you will be forced to pound the piano into tune equalizing all string segment tensions. *It is also important for you to wear hearing protection when operating a lawn mower, snow blower, power shop equipment such as router, table saws, etc.*

I hope my experience will encourage you to wear hearing protection so that you can conserve your hearing for future years.

Continued from Previous Page
ing wasn't the best, but certainly was average for a person of 46 years.

I let it go for a while, but the symptoms continued to get worse. I spoke to another doctor who was actually a customer of mine. During one tuning visit, I mentioned to him some of the symptoms I had, and told him that my diet seemed to affect the problem. For instance, when I would eat cheese, like in a pizza, my hearing would deteriorate.

He said, "I know what your problem most likely is; you're getting too much salt in your system. Salt will affect a person's hearing because salt causes the body to retain fluids, and you have fluids going through the middle and inner ear constantly. When you get too much salt in your system, some of the excess fluid stays in your middle and inner ear."

He recommended that I cut down on my salt intake, and I did. At first, I noticed that my hearing was improving somewhat, but then it seemed to go bad again, and it may have gotten even worse than before. This could have been due to my inconsistency in following the low-salt diet. In our culture, I found, it's very difficult to eat a low-sodium diet because there's so much added salt in most foods.

I went back to the original doctor and told him what the other doctor had said, and he agreed that retained fluids could be a problem. He prescribed a diuretic, a drug which helps the body to rid itself of fluids, and I began taking it. In about two days, my hearing was right back to normal. I've been taking it for about nine months to a year now, and I haven't had any problems. I still do have to watch my salt intake, though. I can't be reckless about that. And once in a while when I go overboard, particularly when I'm on vacation and forced to eat primarily at restaurants (they really pour on the salt at most restaurants), my hearing will go bad. It seems that my body doesn't handle salt as well as perhaps the average person, so I have a harder time getting rid of the excess fluids than most people.

Another thing the second doctor mentioned was that caffeine can affect your hearing. And I've noticed that, too. Especially if I 've had a lot of Coke or Pepsi during the day, when I go to bed at night I can hear ringing in my ears. It's not persistent — kind of comes and goes — but it's noticeable. It goes away in a day or two.

During the time that we were trying to figure out what was causing my hearing problem, my hearing was very sensitive to certain pitches, and I had a hard time tuning some pianos, mainly the really harsh ones. My arms weren't long enough; I couldn't stand far enough away from the piano to tune these pianos, particularly in the mid-treble. My doctor told me that there are earplugs that are available that will cut down all the frequencies equally. He said they were available from places that sold hearing aids, so I went in and had them fit a pair of the special plugs to my ear canals. That helped a lot with getting through some of these difficult tunings.

The 15 dB attenuation (the least available with these plugs) made it a little difficult to tune a temperament, but it was usually possible. Now, I use the earplugs mainly when I've accumulated too much salt and my hearing starts giving me problems. Another case where they come in handy is when I'm tuning outdoors and I have to compete with noise from cars and planes and boats. You want to put your ear right up next to the string or soundboard at times like this, but that would damage your hearing. With the earplugs on, you can get your ear really close to the soundboard and pound pretty hard without hurting your ears. They also help screen out the background noise. I carry the plugs with me all the time, and I use them when needed. They still make me a little uncomfortable because I seem to lose my sense of orientation to the sound. I think it would be great if the company that makes these plugs would make a version with only three or six dB attenuation. That would be ideal for us. As it is now, I use my plugs on only about one piano out of 20. If they had a three or six dB model of earplug, I would probably use them all the time.

I think my initial hearing damage may have occurred at certain times in the past when I had a high level of salt in my body and had a lot of fluid in my ears, and then I was subjected to extremely loud sound levels on top of it. I've at least put the brakes on hearing loss from that source. My last three hearing tests, taken over a period of a year and a half, show no further losses. But I don't know what I can do about hearing loss due to old age!

Survey Says . . .

When we talk about PTG members, whom are we talking about? We hear a lot about "the membership," but really, who are this incredibly diverse group of people? With an October 1995 membership survey, we're one step closer to answering that question.

Although this 1995 survey was mailed to a smaller group of people than the 1993 "Member Needs Assessment" survey, it achieved a slightly higher response rate. These excellent responses, especially with no added incentive for respondents to participate, points out the interest and commitment of PTG members.

In the 1995 project, a 43-question survey document contained questions designed to elicit both demographic information and members' opinions. The questionnaire was mailed to 1,000 randomly selected members in the U.S. and Canada. The names of all PTG members were sorted by ZIP code, after which every fourth name was selected to receive a survey instrument. The questionnaire was designed to be anonymous, although respondents were offered the opportunity to enclose written comments.

Questionnaires were mailed to a random sampling rather than the entire membership for two reasons: cost, and to expedite analysis of the responses so that information could be available to a strategic planning meeting in November. Responses were entered into a database and the Home Office computers were used to analyze the results. Responses received after October 20 were not considered in this analysis.

The survey was mailed to 25 percent of PTG members. It received a response rate of almost exactly 50 percent. Statistically, therefore, responses could be expected to be reasonably accurate. As a check, however, survey results could easily be compared with data from our member database. The variances in most cases were one to two percent. Significantly, the largest variance, the percentage of RPT respondents, was several points higher than the actual percentage of RPT members. However, this could be explained by the fact that RPT members, by virtue of their investment of time and energy, feel a greater level of ownership in the organization and might therefore be expected to participate in greater numbers.

Each question was analyzed using four cross-tabulations: PTG region, respondent age, respondent membership status, and question 10: "Are you self-employed?" Questions one through seven deal with basic demographic information: membership term, location, age, membership status, gender, education and training. Questions eight through 15 discuss work-related issues: part-time/full-time, employment, and the respondent's level of activity. The next three questions concern their ownership and usage of technology. Questions 19 through 34 deal with PTG's educational offerings, first by measuring reaction to the *Journal*, then exploring their participation at conventions and seminars, and finally, by asking them to fine-tune the mix of topics emphasized in our various offerings. Finally, questions 35 through 43 explore their opinions on organizational issues, first by posing a statement and then asking not only whether they agree or disagree with that statement but whether acting on that statement should be a high priority for the organization. The final question asks that respondents rank those issues in order of priority.

VISION 2001
A PIANO ODYSSEY

We'll only scratch the surface this month with a discussion of the first section. You'll learn more in the months to come.

Questions 1-7: Who We Are

More than half of the survey respondents have been members of PTG for more than 10 years. As might be expected, most of those individuals are Registered Piano Technicians, are older, and are primarily self-employed. Almost half of those who have been members for more than 21 years are 66 years of age or older.

More than a third of the respondents were in the 36-45 age range. However, more than 15 percent are older than age 66. Of those, only a fourth claimed to be retired, and an additional 40 percent are self-employed part-time. As might be expected, more of the young technicians are Associates, and more of the older group are RPTs.

Significantly, a third of RPTs are also in the 36-45 age range, and almost three-quarters of RPTs are self-employed full-time. An eighth of RPTs are 66 or older, and almost five percent are retired. More than half of Associates, on the other hand, are 45 years of age or younger. Fewer than half of them are self-employed full-time. Approximately 10 percent are not self-employed at all, and slightly more than a third are self-employed part-time.

It's a well-educated group, with more than half possessing a bachelor's degree, and almost a fourth owning a graduate degree. Almost two thirds of the half with bachelor's degrees are RPTs, a slightly higher percentage than in the membership as a whole.

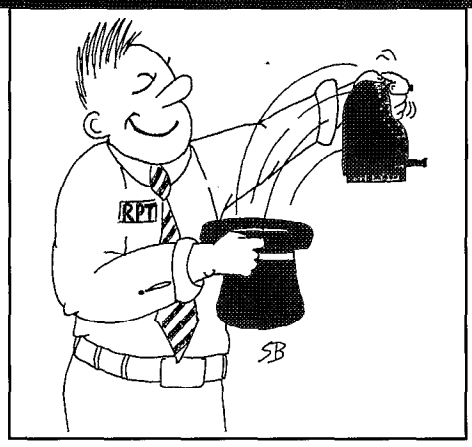
The question regarding the source of respondents' training in piano technology allowed them to select as many responses as appropriate, and most selected more than one. Slightly more than half (53 percent) selected the "self-study" option. Half also claimed to have served as an apprentice to another technician, while approximately a fourth completed a correspondence course and a fourth attended a "piano technology residence school, technical school or college-level program" for their training. A high percentage of those who attended such a formal training program were RPTs (71 percent), while fewer than half of those who completed a correspondence course were RPTs (48 percent). More than two-thirds (68 percent) of those who had served an apprenticeship were RPTs — again, slightly higher than the percentage of RPTs in the general population. Those who had served apprenticeships (68 percent) or had attended a formal training program (65 percent) were also slightly more likely to be self-employed full-time.

Next month: What We Do, and High-Tech Technicians.

Grand Illusions ...
The Page for Serious Cases

My Perfect World

*By Joe Mehaffey, PDYS**



In my perfect world, I drive to my appointments in a silver Lexus. It's got a CD player, a cellular phone/fax, a microwave oven, cable TV and a wet bar.

All my customers are delighted to see me; they either want to have sex with me or lend me money. In either case, I decline, because I'm happily married to Cindy Crawford, and I'm already fabulously wealthy.

I charge twice as much as my competitors, but my customers say, "Is *that* all?"

In my perfect world, all pianos are Hamburg Steinways, and all my customers have private live-in masseurs who can give me a rubdown while I'm tuning.

The piano is practically in tune, because I service it once a week. After touching it up, I play part of my latest concerto.

"You're a genius!" they say. "Won't you stay for dinner?"

Of course, I do. During the meal, I perform magic tricks, climaxing by turning the main course into a giant block of ice.

Suddenly the President calls me to rescue some pianos being held by international terrorists. Of course I succeed, because it's a perfect world.

**Prima Donna Yuppie Scum*

Seven-Eleven Etiquette

By Joe Mehaffey

You may have been raised in a good home and know to always use the outside fork. But that didn't prepare you for the realities of eating on the road. Here are some tips for dining at the convenience store:

- Always carry a spare T-shirt and sneakers in the glove compartment (No shirt, no shoes, no service!).
- Always put the ice in your Big Gulp *before* filling it; if you put the ice in last, you risk splashing the person next to you.
- Try mixing Diet Coke with Cherry Coke or Diet Seven-Up — *yummy!*
- Mustard *before* relish but *after* catsup.
- If you spill food on a magazine, you should probably buy it (the magazine).
- *Never* lick the relish spoon.
- In consideration for the cashier, do not start eating until *after* you have received your change.
- On your way out, always pick up one of the free papers to put in you lap while eating.
- Always eat in your car; never eat while leaning over the garbage can.
- The left hand is for steering; the right hand is for holding the hot dog and shifting; the thighs are for holding the Big Gulp.

The History of Felt

First in an occasional series on our piano heritage.

Primitive man had no felt. His piano hammers were made from granite or some other hard stone. They were heavy and difficult to voice. However, few primitive piano owners got their pianos tuned, let alone voiced.

Thousands of years later, there lived a French monk, Frere Jacques Flange. He was walking from Burgundy to Zinfandel when the road took him past a flock of sheep. He suddenly realized that his tired feet would be much more comfortable with wool underneath them, so he quickly strapped a sheep to the underside of each foot. This worked only as long as both sheep were going in the same direction at the same time. To solve this problem, Frere Flange invented the sheep dog.

Years later, the monastery, which depended on the income from its winery, suffered a terrible winter which wiped out the grape crop. Resourceful Frere Flange decided to use wool instead. Stomping on the wool not only produced a delicious and healthful wool wine (which, strangely, is no longer popular), but left a residue of felt, which the brothers quickly realized would be great for strip muting.

Today, piano hammers are made of felt. But in homage to our prehistoric ancestors, our piano makers treat the felt until it is as hard as granite.

Joe Mehaffey may be contacted through Mark Stivers, RPT, Sacramento Valley Chapter.

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

Introducing the PTG Vertical Regulation Curriculum

By Gina Carter RPT
PTG Vice President

It is interesting that, despite the age of our profession, there are surprisingly few really comprehensive books available on piano service. Certainly there are a number of books covering general piano maintenance, and most manufacturers publish service manuals. But few cover the subject as thoroughly as we might like, and many simply list steps without explaining the why of what we do. Whatever the reason for this, it seems that PTG has been a focal point for talented technicians and educators to produce some of the best current publications available in our trade. I am proud to say that PTG has recently made a major contribution to the field of piano technology with the publication of the new "Vertical Regulation Curriculum."

What is the Vertical Curriculum? The Curriculum consists of a 105-page workbook and 21-page instructor's manual, and is intended to be used by any educator wanting to teach a hands-on course in vertical piano regulation. Typically, the course would have around four to eight students, with one teacher per two to three students and one piano per student. Those familiar with Yamaha's Little Red Schoolhouse course on grand regulation will see much similarity between the two.

The Curriculum was written by LaRoy Edwards, RPT, and edited by Bill Spurlock, RPT, and Fern Henry, RPT. The adjective "comprehensive" is hardly adequate to describe this publication. The workbook covers the regulation process in 32 steps, each illustrated with wonderful photographs (done by Jim Johnson, RPT) and many drawings. Each step is first outlined in chart form, then explained further with additional tips and illustrations. The manual includes many innovative methods as well as tips on tool use. This is possibly the most thorough, up-to-date, and best-illustrated manual on vertical regulation that has ever been produced.

The idea for developing this curriculum originated in discussions between the PTG Board and industry technical representatives in Milwaukee in 1993. That fall, our Special Panel on Education studied the idea and agreed that it would be a good way for schools, manufacturers, and PTG to work together. Board and Council approval was given in 1994, and the book was finished in July, 1995; shortly afterward a copy was sent to all schools of piano technology and all piano manufacturers. PTG wants to support and assist quality instruction by offering quality books and instructional materials for sale. So far, the response is very positive! Already one school has decided to offer a four-week course next summer using PTG publications as texts (see sidebar); and other schools and individual instructors have expressed interest in integrating it into their programs.

The manufacturers are also responding. Yamaha has given us their fine curriculum on grand regulation, taught for years at the Little Red Schoolhouse, and other manufacturers, particularly Kimball, have been very helpful in providing material from their own publications. We will continue to work to build these partnerships, a goal that the 1995 Council adopted in its "Resolution on Educational Goals."

Is it Beginning or Advanced?

The "Vertical Regulation Curriculum" is designed for intermediate and higher-level students. To quote from the Instructor's Manual, "True beginners will find this instruction over their heads. Students should know the names and functions of the action parts, have a complete set of regulating tools, and be familiar with basic regulation steps. They should have passed at least the written portion of the RPT exam or had some equivalent experience, such as completion of a piano technology course or an apprenticeship with an experienced techni-

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WIT Incorporates Curriculum for Summer Institute

Western Iowa Tech Community College, Sioux City, Iowa, has announced that PTG educational materials, including the newly created "Vertical Regulation Curriculum," will be used during the school's "Summer Institute For Piano Technology" June 3-28, 1996.

The vertical regulation materials will be used during the first week of the four-week Summer Institute, according to instructor Doug Neal, RPT. Neal said that the course was organized in one-week segments so that students could take either the entire course or those segments that interest them. Each segment also includes a tuning tutorial using the book "On Pitch," by Rick Baldassin.

Other PTG publications used in the Western Iowa Tech course include the "Grand Regulation" PACE lesson plans and *Journal* reprint kits on "General Repair"; "Dampers, Trapwork & Action Centers"; "Keys"; and "Hammers & Touchweight." The Technical Examination Sourcebook also will be used extensively during a two-part technical examination review during the final two weeks of the program.

Business Tips

By Bob Russell, RPT
Chairman, Marketing Committee

Bill Spurlock of Vacaville, Calif., loves bookmarks and loves knowing that all his clients recognize the RPT logo and know that he's a Registered Piano Technician. He's convinced that the bookmark serves as a consumer's introduction to PTG and RPT, so that when they see the RPT logo on his business card and invoice, they know what it means and appreciate that they've chosen an expert. Bill finds the PTG literature invaluable — the Finish Care TB is his favorite, because clients frequently ask about finish care, especially if their pianos are new. He finds the clients' reactions to receiving the brochures rather interesting — as though he had given them a gift.

Ed Whitting of Orange County, Calif., has discovered a great way to increase his income with very little monetary investment — offering various products and services to his customers. Some of these are: string covers, instrument covers, caster cups and benches. He also encourages the "See & Hear" home study piano course, which helps customers enjoy their previously unused piano, increasing their need for service.

Evelyn Smith reports that her ***Central NC Chapter*** of PTG volunteers to answer the phones during their local public radio station's fund raising week every year. The on-air personalities mention the PTG chapter and each individual volunteers several times. The percentage of public radio listeners who own pianos is higher than average, as is their education level, so this seems like a great way to get exposure for PTG in a local market.

Jim Coleman of Tempe, Ariz., has great success with a three-ring binder he carries with him at all times. It's filled with Technical Bulletins (TB) and literature on bench covers, lamps, polishes and other items. A pocket in the back is stocked with PTG brochures. While he's working on a piano, he has the customer read a TB related to their service. They often end up browsing the binder like a catalog, and he has sold lots of accessories this way. As they browse, they sometimes stop to read TBs on other subjects, leading to discussions of further service options.

Welcome to our new feature. The Marketing Committee encourages you to submit your business tips and ideas for publication. Mail your ideas to Bob Russell, RPT, 1414 Lander Road, Mayfield Heights, Ohio 44124.

Vertical Regulation Curriculum

Continued from Previous Page

cian."

This curriculum is more complete, up to date, innovative and well illustrated than anything else on the subject, so in that sense it can be considered advanced. And since the average technician works mostly on vertical pianos, this course should be very relevant to just about all working technicians. Just as hundreds of experienced technicians have benefited from Yamaha's Little Red Schoolhouse, Steinway School, Kimball University, etc., they should find this course on vertical regulation equally valuable. During its development, the curriculum was put through a trial run with eight students having from two to 10 year's experience. Most had completed a piano technology course and had attended many PTG classes. All students gave the course a strong thumbs-up and rated it as a very valuable learning experience. Impressively, the instructors stated they learned even more themselves while teaching the course!

Who Might Use the Curriculum?

This curriculum is intended to serve as a resource for educators, just like any other quality text. It can be used by piano technology schools, individual technicians who train apprentices, or by chapters who might be equipped to sponsor a special seminar.

Because it is specifically designed to be used in a hands-on format with a high instructor-to-student ratio, it is sold only in kits of at least four workbooks and one instructor' s manual. It was the Board' s feeling that making it available in this way would support the hands-on teaching situations that produce well-trained technicians. Many piano technology schools have long used PTG resources as teaching aids. These have included our *Journal* articles, convention class handouts, and information the instructors have gleaned from PTG classes. By making this high quality vertical regulation curriculum available to educators, we hope to promote the highest quality training and, in turn, the best quality piano service for clients.

A Project to Be Proud Of

One text I've read states that the first vertical piano was patented some 190 years ago. One might think that over the many years since, there would be nothing left to write about the subject of vertical regulation. However, as any PTG member knows, when you combine the many talents of our members, good things happen. It is a testament to the value of PTG that we provide a forum for this talent to come together. Over the years, this sharing of ideas and skills has improved the craft of piano technology tremendously. We can be proud that the Piano Technicians Guild has created, through its members, what just might be the best vertical regulation book of its kind!

Technical Exam is Step to RPT

By Curtis Spiel, RPT
Chairman, Technical Exam Committee

The Technical Exam is one step along the way to becoming a Registered Piano Technician. Like all exams, the likelihood of success depends mostly upon the preparation undertaken by the examinee. You must first pass the written exam before attempting either the tuning or technical exams. If you are unsure of your written exam readiness, I suggest you request a copy of "The PTG Written Exam: A Study Guide" by Beverly Kim, RPT. These are available from the Home Office free of charge. The next logical step is to request a Written Exam Pre-Screening from an RPT, probably one who is involved in testing in your Chapter or Region. Finally, take this test and pass it!

Once the Written Exam is out of the way, preparing for the Technical Exam could begin with a pre-screening from an RPT. Take careful notes of the material covered, and be sure to follow up on any suggestions given by the pre-screener. Be sure to practice everything until you are thoroughly familiar with how to do it and what might go wrong! If you find yourself unable to do some of the procedures, there are several places to turn to. PTG publishes a Technical Exam Source Book (a bargain at $29) and the current PACE series in the *Journal*. Attend Chapter, Regional and Annual Conventions for excellent classes, and ask for help from an RPT. Making contact with a qualified technician is, I think, essential. No matter how much you have read, or practiced, or studied, get feedback from a working professional. Be prepared to pay for this person's time, or at least buy lunch for them. Just like the pre-screening, follow up any advice with more practice.

Once you are ready for the exam, you must make an appointment with the test center of your choice. Make arrangements to pay the $60 fee, and be sure you know exactly where the exam site is. Arrive fed, rested, comfortably dressed and a little early. Plan on spending four to five hours for the whole exam. Bring your tools, supplies, Reclassification Form, and relax! You will survive this day!

There are three sections of the Technical Exam: Vertical Regulation, Grand Regulation, and Repairs. You must score 80 percent or above on each section to pass. Once you pass any section, you need not retake that section if you fail another. For instance, a passing score in Grand Regulating and Repairs with a failing score in Vertical Regulation (a common occurrence!) will require you to retake only the Vertical Regulation section. The cost of retakes is currently $20. Be sure to understand all of your penalty points, especially if you fail a section. This will help you prepare for the real work ahead, that of a working piano technician!

What follows is a description of the exam with time allowances and some preparation hints. the order of the sections will be determined by your examiners. Be sure you understand the instructions, which should be written out and left with the examinee. If you can accomplish these tasks in the time allowed, you have an excellent chance of passing the test. Good Luck!

Vertical Regulation: "You are to assemble, space and align action parts, regulate pedals, reinstall keyslip and fallstrip and regulate all three notes of this vertical action model, setting the key height to fit the case parts and setting the white key dip to that specified on the card attached to the model. Consistency is as important as accuracy; a perfect adjustment on two notes will not count if the third one is in error. You will have one hour." Vertical regulation has the highest failure rate! Perhaps it is because performance expectations for vertical pianos are often lower than for grands, so we don't often get to practice regulating these instruments. Practice this by borrowing an action model, or if you have a vertical piano, deregulate three notes (one black surrounded by two white keys), remove the punchings (and throw some extras into the pile, just like in the exam) and give yourself an hour to put it back together. Pay special attention to the dampers, as they are 30 percent of your score! You will not need to perform any repairs in this section, just be sure that screws are tight, parts line up with strings, and all elements of regulation (i.e. hammer-blow, let-off, checking, key level and dip, and aftertouch) are correct and even. If you can barely get done in 60 minutes, I suggest you practice more to get your time down. A little extra time at the end can be spent checking your work and making small corrections. But don't decide your regulation specifications are all wrong with seven minutes to go, just make things work as best as you can!

Grand Regulation: "You are to assemble and regulate this grand action model setting the key height and dip to the specifications noted here; you should properly space and align action parts. You will have one hour." You will need to repin and assemble a single note grand action model, including a damper assembly. The key height and dip specifications will be given to you. Make sure your finished regulation has these measurements absolutely as given. Beyond that, the action will work, so just be sure of all the elements of regulation being present, and that parts travel in a straight line. Once again, try several practice sessions on an action model, and here more than ever get an RPT to evaluate your finished practice regulation. There are some details of this task, like repetition spring tension and jack pinning, that you really need feedback on to get correct.

The Repair Section has seven stations: grand shank rebushing (10 min.), key rebushing (8 min.), stringing (20 min.), hammer shank replacement (20 min.), hammer filing (8 min.), fitting your rebushed key to a keyframe (2 min.), and trimming and repinning your previously rebushed grand shank to its flange (10 min.). Once again, do each of these procedures several times until you can accomplish each one well with time to spare. Be sure you have the correct bushing cloth, and it would be wise to have at least two thicknesses with you at all times, not just during the test. The exams use "standard" parts, whatever that means, so we are not out to trick you with odd sizes, but still, variations do occur and you need to be able to handle them. You will be provided with 13 gauge wire for the stringing section. You need to be able to install one shared string on a hitch pin, one single string with a hitch pin loop, and you must splice (tie) a broken string between the agraffe and tuning pin. Restringing a whole piano is good practice for this, or at least practice replacing strings on your own piano if you haven't a piano to restring. Splicing strings on a vertical is usually very difficult due to lack of space between the capo bar and the tuning pins, so if you don't have a grand to practice on, ask to see a stringing jig

Continued on Next Page

What's in Store for Dearborn?

By Paul Olsen, RPT
Institute Director

I hope you are planning to attend the Annual Convention in Dearborn this July. A great deal of time has been placed into creating what we believe will be a great convention and institute.

Much of the institute is a result of requests and recommendations we received from PTG members, both from convention evaluation forms and verbal input. Like many of us in PTG you may believe, like I did, that convention evaluation forms are a formality and never considered. That is far from the truth. Every form is read by every member of the institute committee and all recommendations are considered and many are implemented. The result is an accumulation of ideas that are worked and molded into a great event which comes to fruition in July. It is the PTG Annual Convention and Institute.

In Dearborn this July, some new programs will take place along with some old programs with a new twist. There will be an "Exhibitors Showcase," which isn't completely new. It has been done at regionals, but as far as I know never at a PTG Annual Convention. The showcase will be a classroom set aside strictly for exhibitors. It will be run in conjunction with classes and in a sense will be an added class. These classes will allow you an excellent opportunity to learn about the various products, tools and services that we deal with each and every day.

A second area of change is "Mini Classes." Mini classes themselves are not new, but the format in which they will be presented is. There will be approximately 30 mini classes, each being 40 minutes in length with a 10 minute break between classes to allow getting from one class to another. They will all be held during one 90 minute time slot, which means you will be able to attend mini-classes without the conflict of general classes. In other words, everyone attending class during that time slot will be attending a mini-class. Mini-class topics will range from tuning to annealing brass, and will cover many subjects that are not dealt with in general classes. I can assure you they will be interesting and educational.

Yet another change will be the hands-on "Applied Skills" classes. This is a change from the PACE classes of Kansas City and Albuquerque conventions. In Dearborn there will be a classroom set aside for "Hands-On." This will be a two period or three hour class where, for a nominal fee of $20, individuals can go in and travel to various work stations. You can spend as much or as little time as you wish at each, obtaining individualized hands-on instruction. Each station will employ one or more tutors to help you with whatever project is represented at that area. Stations will consist of various repair and regulation activities and will offer the opportunity to get valuable hands-on experience.

There will also be two separate classes included in the "Hands-On" category but separate from the "Applied Skills" class. They are "Hands-on Grand Regulation" and "Hands-on Vertical Regulation." These classes are not new but are valuable to those looking for practical first-hand regulating experiences. There will be two instructors at each which will allow for much individualized instruction. These are two period classes and will have a fee of $35.

Still another area that deserves mention is the rebuilding workshop that will take place over two days. This will be a series of rebuilding classes that will cover eight class periods and include everything from tearing down a piano to soundboard replacement. Individuals may attend as many or as few of these classes as they wish, but if you are a rebuilder or have an interest, this is a must. Wally Brooks has put together an excellent series of classes with some of the finest instructors available. To attend this alone will be well worth the convention expense.

A convention book is being planned which will hold information from the various classes plus will have available space for notes and comments. You will be able to include hand-outs and other convention information and use this book as a reference manual for future use.

A half-day class on player pianos will be held at the shop of Mark Haas, who is the president of the Detroit-Windsor Chapter of PTG. His shop is located in Dearborn just a few minutes from the Hyatt, and being that close will allow us to transport people to one of the finest player shops in the area. What better place is there to learn than on-site?

There are many other classes that will teach you such things as how to make more money, expand and diversify your business, use care and safety in the shop, deal with springs in the upright action, pitch raise in minimum time, and voice the hard and soft hammers.

This is only a small example of what's in store, so begin making plans for Dearborn. It'll Be A Classic!

Technical Exams

Continued from Previous Page

and make one to practice on, or maybe you can talk another technician into letting you tie strings on a grand in a shop for rebuilding before it is torn down. You must replace, not repair, a broken hammer shank. Watch the side to side, strike-point, hammer tail, and catcher alignments. Extracting the old hammer shank cleanly will facilitate this. Be sure to bring a few straight hammer shanks. You will be filing one straight and one angled hammer. Get the surface smooth, symmetrical, and square to the sides of the hammers. You may use paddles or sandpaper strips. Fitting your rebushed key to the keyframe might just consist of dropping it on! Be sure, though, that it moves freely. If the bushings are too loose because you used the wrong cloth or too-big bushing cauls, there is nothing you can do at this point but take your lumps, but hopefully you measured carefully and test-fit your cloth and cauls when you installed the bushings. Measure twice, install once!

Lastly, you will trim the cloth and repin your rebushed grand flange. This is a tricky thing for many, but if you have done it a dozen times successfully, you will be okay here. Make sure your pin is tight in the bird's-eye, that the hammer passes the "swing test," and that the cloth and pin are trimmed neatly.

Finally, I hope you noticed the theme of this article is "practice!" Take these skills seriously, and master them. These are not the only skills you will ever need as a piano technician, but these are basic skills we all use frequently enough to have carried their way into the Technical Exam. Many of these things I don't use every day, but I'm glad to know them each time I use them. Take this test, and good luck!

Passages

Associates Pass The Test

REGION 1

054 VERMONT

ODD AANSTAD
HUSER, ASMALOY
1684 VESTEROY NORWAY

061 .OTTAWA, ON

DAVID G. RENAUD
121 RIEL BOULEVARD
HULL, QC J8Y 5Y4 CANADA

REGION 4

481 DETROIT-WINDSOR, MI

CLEM FORTUNA
1305 HARTRICK
ROYAL OAK, MI 48067

STEVEN H. SCHULTE
3310 LUDWIG ROAD
OXFORD, MI 48370

REGION 6

941 SAN FRANCISCO, CA

MARK S. SKOWRONEK
1144A IRVING STREET
SAN FRANCISCO, CA 94122

REGION 7

974 EUGENE, OR

JEFFREY T. HICKEY
2671 SHERIDAN AVE.
NORTH BEND, OR 97459

In Memory . .

November 1995

MORDECAI LURIE, RPT
ROCHESTER, NY

CALENDAR Events

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

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

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

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

February 16-18, 1996
CALIFORNIA STATE SEMINAR
Hyatt Regency Monterey,Monterey, CA
Contact: Richard Des Wilson
125 Northridge Drive
Scotts Valley, CA 95066
408-438-7708

March 16, 1996
BLUEGRASS SEMINAR
Transylvania University, Lexington, KY
Contact: Ben Griffith
101 Crestwood, Frankfort, KY 40601
502-875-2297

March 21-24, 1996
PA STATE CONVENTION
Sheraton of Bucks, Langhorne, PA
Contact: Webb Phillips
Box 543, Hatboro, PA 19040
215-674-2555

March 29-31, 1996
PACIFIC NORTHWEST CONFERENCE
Seaside Convention Center
Seaside, OR
Contact: Randy Potter
61592 Orion Drive, Bend, OR 97702
541-382-5411

April 12-14, 1996
FLORIDA STATE SEMINAR
Holiday Inn Crown Plaza, Tampa, FL
Contact: Robert Carr
320 West Rich Avenue
Deland, FL 32720
904-736-0551
E-mail: rvcarr@aol.com

April 26-28, 1996
CENTRAL WEST REGIONAL SEMINAR
University of Nebraska, Lincoln, NE
Contact: Richard West
5 Westbrook Music Bldg.
University of Nebraska
Lincoln, NE 68588-0100
402-472-2568

April 27, 1996
HOSPITAL FOR HOPELESS PIANOS
Sherman Clay, LA
Los Angeles, CA
Contact: Jon Longworth
6926 Bellingham Avenue
N. Hollywood, CA 91605
818-982-2431

May 3-5, 1996
NEW ENGLAND/EASTERN CANADA REGION
Westin Hotel, Waltham, MA
Contact: Anthony Malionek
23 Winthrop Ave, Beverly, MA 01915
508-922-0711

July 17-21,1996
PTG CONVENTION & TECHNICAL INSTITUTE
Hyatt Regency Dearborn
Dearborn, MI
Contact: PTG Home Office
3930 Washington
Kansas City, MO 64111
816-753-7747

New Members In November

REGION 2

331 SOUTH FLORIDA

SEBASTIAN MARTINO
6535 NW 78TH DRIVE
PARKLAND, FL 33067

337 SOUTHWEST FLORIDA, FL

OVID L. JONES
2144 MCKINLEY STREET
CLEARWATER, FL 34625

381 MEMPHIS, TN

RICHARD F. BOYINGTON
4261 COCHESE
MEMPHIS, TN 38118

REGION 3

752 DALLAS, TX

JIMMY T. BARDIN
5550 TEXAS AVENUE
ABILENE, TX 79605

871 NEW MEXICO

BERNADETTE P. KOH
2713 INDIANA, NE
ALBUQUERQUE, NM 87110

REGION 4

600 WAUKEGAN, IL

DAVID M. LUTZOW
2575 ERIE STREET
RIVER GROVE, IL 60171

RONALD H. LUTZOW
2575 ERIE STREET
RIVER GROVE, IL 60171

REGION 5

549 APPLETON, WI

PAUL R. BIRSCHING
1199 ROLAND LANE, APT. #9
GREEN BAY, WI 54303

JEFFREY S. PILEAY
500 S. MILITARY AVENUE
GREEN BAY, WI 54303

551 MINNESOTA-NORTH IOWA

LINDE R. HINKEL
2014 15TH STREET, NE
ROCHESTER, MN 55906

REGION 6

917 POMONA VALLEY, CA

KEVIN E. RAMSEY
P. O. BOX 831
JOSHUA TREE, CA 92252

936 FRESNO, CA

GARY D. GREEK
41243 PAMELA PLACE
OAKHURST, CA 93644

951 SANTA CLARA VALLEY, CA

PAUL R. KUMMER
1551 REGENT STREET, #19
REDWOOD CITY, CA 94061

JUDITH L. THOMPSON
123 W. PORTOLA AVENUE
LOS ALTOS, CA 94022

REGION 7

001 CALGARY, AB

MARK CALKHOVEN
3624 CEDARILL DRIVE, SW
CALGARY, AB T2W 3X8
CANADA

ROBERT B. KIDDELL
11052 81ST AVENUE
EDMONTON, AB T6G 0S4
CANADA

981 SEATTLE, WA

JUDITH E. CARBO
319 S. 20TH STREET
MT. VERNON, WA 98273

SUSAN L. DAVIS
23119 165TH AVENUE, SE
MONROE, WA 98272

TIMOTHY P. MONTE CALVO
530 RAILROAD AVENUE
P. O. BOX 828
DARRINGTON, WA 98241

AUXILIARY EXCHANGE

Dedicated To Auxiliary News and Interests

Happy Holidays

Happy New Year! Did you have a good time over the holidays? I sure hope you did. One of our daughters, Cindy and her two boys, are coming (yes, I say "are" because I am still back here in November writing this) anyway they are coming down from northern California, by train, for Christmas. We are going to take them all to Disneyland. We'll have lots of fun. This also means we can get all the grandchildren together for a rare photo of all five in one picture!

January 10, 1996 is going to be a very special day for me. I turn 50! I'm still trying to decide how to celebrate it in a special way. I told Claudia I didn't want any "surprises" this decade. When I turned 40, she had a huge surprise party for me. It started with a High School Marching Band playing Stars and Stripes Forever, as they marched through my offices! She had invited more than 200 people, including all of the Los Angeles City Council Members and the Mayor! Holly cow, was I surprised! This decade I'm thinking about going somewhere very special, as well as having a smaller party with my family and close friends. I'll tell you about it in a few months.

Well, have you sent in your reservation for the Annual PTG Convention yet? Don't wait. There is only one hotel within reasonable distance to stay at. Once this hotel is sold out, the other hotel choices will be more expensive and far less convenient. You will love this year's convention. We will eat like royalty and have more fun than ever. Hans Sander will play for us again at our Luncheon, too. If you missed him last year, make sure to catch his performance in Dearborn. Hans plays the piano and many other instruments, simultaneously, by using a MIDI system.

L. Paul Cook
PTGA President

There will be some excellent classes available for you on Saturday where you can learn valuable hints and tips for your business or personal life. The tour will be very special, too. The auxiliary tour will be a passport to some very special venues not available at any other time.

I hope you sent your membership dues and information mailed in time to get your name in the annual Directory. If not, send it today to Carolyn Sander our VP and membership chairperson. Her address is on the left side of this *Journal* page. See it? Good, now send her $15 with you name, address, phone number, and if you are a new member, include your birth month and day along with a signature of the PTG member sponsoring you.

As I write this, Claudia and I are enjoying a cabin in Tahoe, California and getting ready to be joined by two of our three children, their spouses and three of our five grandchildren. Tahoe is 490 miles from our home and quite a bit higher in elevation. On our drive here we crossed over one pass that was 7,382 feet above sea level. The elevation of Lake Tahoe is 6,200'. The lake is 12 miles wide, 22 miles long and 1,645' deep. It sits on the angle point of the border between California and Nevada. Every day an average of 1,400,000 tons of water evaporates from the surface, but the lake only drops 1/10 of an inch. There are 13 golf courses here. The name "Tahoe" came from a Washoe Indian word meaning "big waters," but the Indians didn't call it by that name. Ski season officially opens Thanksgiving day each year. There is lots to do. Gambling casinos are just a few miles away over the Nevada State border. You can also go horseback riding, hiking, fishing, waterskiing, parasailing, boating or for a ride to the top of the mountain on the tram. Tahoe is

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January through December — We'll Have Moments to Remember ...

By Judy Rose White, PTGA Corresponding Secretary

As I prepared to write this article for the *Journal*, I reflected on the past year and decided it was time to set new goals. I will be difficult to match the accomplishment of a master's degree — with the writing and defense of a research paper — or the flying high feeling of a hot air balloon ride in Albuquerque. However, I know there is much in store for me.

My new year will continue with care for myself. My daughter will be attempting her first marathon (Forget it, I'm not into running!), and I desire to continue walking in a more dedicated fashion.

Secondly, there will be more formal learning ... the first class I signed up for after completion of my master's was "Humor in the Classroom." Doesn't this sound delightful?

Next, my family will continue to take a precedent. There are relatives to meet and roots to search. A class in genealogy has captured the interest of both Chuck and me. This will also prompt plans for a return trip to Europe — although in all probability, this will not happen until 1997.

Renewing and sustaining friendships plus developing new networks will continue as a goal. The PTG Annual Convention in Michigan in July will be anticipated. Visitors from Scotland will take top billing space in the month of October. These special friends are the family I lived with while teaching in Inverness, Scotland in 1993 and 1995.

It is with great anticipation that I start 1996. I will undoubtedly have daily challenges that will call for a great deal of my strength and yet, I believe that I have been given the gift of faith and the shoulder pads to handle each scenario and continue to grow. It *is* a great life ready to be filled with *more* ... "moments to remember ...." Happy New Year to all of you.

Happy Holidays

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fun.

Thanksgiving last year we were here, in this same cabin. The weather we enjoyed was a huge blizzard which dumped 3 feet of snow in one day. It was both gorgeous and unseasonably cold. This year it is just the opposite. It is quite warm. The days are about 60 degrees and about 25 at night. It's clear and there is no snow in sight. Tahoe did get some snow and ice on the morning we drove home, oh well. We love it here in any weather.

It's so nice to get away from the hustle bustle of our working life. The phone has yet to ring. Back in Los Angeles Claudia and I each have a voicemail system at my office and another pair at home to check and answer. Then there are the mail and the E-mail, the fax machine and two newspapers to read as well as all the magazines, too. Oh yea, I almost forgot about my pager. I'm on overload, we both need this break.

Besides being your president, I am also the president of my engineering, land surveying business as well as president of our homeowners association, president of a group called Taxpayers United for Fairness and Vice President of the Countywide Citizens Planning Council, a 50-person council appointed by the Los Angeles Board of Supervisors.

They say if you want something done, ask a busy person to do it. Well, I'm busy! However, this is getting ridiculous! I must bail out of some of these positions or all groups will suffer.

If you want to send in an article for the *Journal* or the PTGA newsletter, please do. Both of our editors are listed in this *Journal* each month for that purpose.

In case you didn't know, we accept donations to our scholarship fund all year long. People donate gifts to the fund in memory of a loved one or in remembrance of special peoples birthdays and anniversaries, too. Tell us what the gift is to honor and we will publish your name, the honored persons name and event you are honoring in the Journal for any gift of $10 or more. You may also donate confidentially, if you would prefer.

Here's another way to help the scholarship fund; you may sell items from our Scholarship store on consignment. Just let me know a month or so, in advance of the event (or as soon as you can). I'll arrange shipping to you.

Another way you can help the PTGA is to invite one other person to join the auxiliary. Just one, is all I ask. See above for instructions on information needed to sign them up. No official form is necessary.

Claudia and I will be attending the California PTG Convention in Monterey, California, this February. Remember your membership in the PTGA will get you a nice discount in most conventions and seminars.

The PTGA telephone board meeting was postponed last November to January. We will publish the minutes for this meeting in the Spring issue of our newsletter. If there is something you want the board to consider, please send your information to me. As you just read above, I can be reached any one of a number of ways. My address, fax number and phone number are listed on here, in the Auxiliary pages of the PTG Journal. If you want to E-mail me, my E-mail address at home is: cookies2@ix.netcom.com. The board will consider whatever you would like us to consider. Your input is always welcome and appreciated.

So until next month, take care and enjoy life.

FOR SALE

PIANO BUSINESS FOR SALE! Moving out and must go! Well established business in growing Las Vegas area. Call Jose Alexandre at 702-795-2051.

FOR SALE—Steinway B #494011 (1985), Walnut, with Pianocorder and Tapes. Excellent Condition, Chicago Area. $35,000. Call Richard Anderson, RPT 708-464-4500.

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.

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 or 203-434-0287; Fax 203-434-8089

SOUNDBOARD AND PINBLOCK PANELS: Finest quality Bolduc Soundboard Panels made from Canadian white spruce. Pinblock panels of 1/4 sawn Canadian rock maple. For information and price contact Wally Brooks, Brooks, Ltd., 1-800-326-2440, Fax 203-434-8089.

FOR SALE— *"A Guide To Restringing"* Hard Copy - $15.75, Paperback - $12.75 (Please include $3 for shipping & handling). Send Check or Money Order (Sorry, no C.O.D.'s) to John W. Travis, 8012 Carroll Ave., Takoma Park, MD 20912, (301) 431-0870.

CLASSIFIEDS

Classified Advertising rates are 35 cents per word with a $7.50 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.

Send check or money order (U.S. funds, please) made payable to Piano Technicians Journal, 3930 Washington, Kansas City, MO 64111-2963.

ENCORE GERMAN SHANKS & FLANGES—now available for replacement on New York STEINWAY grands. The Finest Quality Workmanship Available. The value of a Steinway is determined by its final tone and action. "When you're striving for excellence—begin with quality." Encore Hammers and Actions Parts available only through Wally Brooks, Brooks, LTD., 376 Shore Rd., Old Lyme, CT 06371; 1-800-326-2440.

A new book! DIFFERENT STROKES: Hammer Techniques for Piano Technicians. 109 pages of techniques, illustrations and humorous anecdotes. Endorsed by Owen Jorgensen, Daniel Bowman, Taylor Mackinnon and Ron Giesbrecht. $13.95 plus $3.50 for shipping. Write Ken Burton, 1 Willow Cres SW, Calgary, AB, T3C 3B8.

SUPERIOR INSTRUCTIONAL TAPES ** All videos at one price, $50 @ ** Beginning Tuning, Upright Regulation, Aural and Visual Tuning, Grand Action Rebuilding, Exploring the Accu-Tuner, Grand Action Regulation, Voicing, Pinblock Installation, A to A Temperament, Baldassin-Sanderson Temperament, Bass Tuning - 3-Ways. Superior Instructional Tapes; 4 W. Del Rio Drive; Tempe, AZ 85282; Ph. 602-966-9159.

SANDERSON ACCU-TUNERS NEW & USED. BOB CONRAD 800-776-4342.

ATTENTION!! CORY POLISH EAST COAST FACILITY is now opened to service all your ordering needs. Save on shipping! Our East Coast warehouse will handle all orders East of the Mississippi. East Coast 24 hr. TOLL FREE ORDER LINE: 1-800-582-3783.

PROTOTYPE—Small Mahogony Piano, four octave, H33" x W28" x D18". Built by Baldwin. Pictures and details on request. $5,800 Call David 501-253-5221.

GRAND PIANO STRING covers. Are you ready for an item that can keep the piano clean, prevent corrosion, improve tuning stability, make your clients happy and make you money besides? Custom made, it rests above the strings, covering soundboard, tuning pins and plate for complete protection inside the piano. Made from finest quality woven wool, available in black, light brown, brown, burgundy, and white. Personalized name applique also available. No inventory or investment required. For free brochure and samples call: Edwards Pianos, 408-426-1295, 145 S. River Street, Santa Cruz, CA 95060.

MUST SELL: Kawai Grand Piano GS-60, 6'10", 1 Year Old, Black Satin, $14,500 o.b.o. Call Judy Crago, Maitland, FL, 407-331-3811

HAMMER BORING GUIDES. All metal, weigh 15 lbs. Accurate and easy to use. $180.00. Instructions and photo available on request. Kent Gallaway, 709 Thorne, Ripon, WI 54971; 414-748-3265.

JIM GEIGER'S famous Piano Moving Dollies—$250 plus shipping. 1-800-588-8511.

GRAND PIANO STRING covers starting at $69.95 +s/h. Custom made from quality wool. Wool absorbs moisture and keeps strings, tuning pins, plate, soundboard looking new. Also, Accu-Tuner thumbswitches, $28.95. Action Piano, 714-364-1073.

STEINWAY K52, Serial #518851, walnut, $7000 o.b.o. Ph. 813-932-6745.

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WOULD YOU LIKE to have a way to keep your name and phone number literally in front of the customer? We can supply you with a useful giveaway item that costs under $1, that piano owners will keep on the piano, that never wears or runs out. Sound too good to be true? Write for free sample: PIANO NOVELTY, P.O. Box 328, Shelburne Falls, MA 01370.

HANDCRAFTED SOUNDBOARDS BY NICK GRAVAGNE. Ready to install crowned boards or semi-complete. Your choice. Ordering and installation instructions $15.00. 20 Pine Ridge; Sandia Park, NM 87047; 505-281-1504.

COMING SOON! NEW BOOK BY NICK GRAVAGNE. "Downbearing: Theory and Practice" — A handy, no-nonsense shop guide for setting bearing on old or new soundboards.

WONDERWAND: Try the Tuning Lever you read and hear about. Enjoy Less Stress; Better and Faster Tunings: $65.00 p.p. Charles P. Huether, RPT, 34 Jacklin Court, Clifton, NJ 07012

ONE YEAR OLD Accu-Tuner II. Maxed out in memory and all the goodies. Rarely used. Includes two pickup magnetics, one (new) foot switch. Please send inquires to Computer Ink, 26900 Newport Road, Suite 121-122, Menifee, CA 92584.

"SALE OF PIANOS" — All models and styles. Specializing in players, art case and conventional pianos. Floor ready and as is pianos available. We also specialize in one of a kind and hard to locate pianos. Call collect Irv Jacoby 216-382-7600/FAX 216-382-3249. Jay-Mart Wholesalers — Pianos since 1913.

COMPONENT DOWNBEARING GAUGES (bubble type) give readings in degrees (string angle) and thousandths of an inch (dimension). Available at supply houses. Box 3247; Ashland, OR 97520

PROBLEM PIANO? Changes in humidity could be the problem. Protect your customer's piano with DAMPP-CHASER humidity control systems. Instructional video demonstrates grand and vertical installation procedures for $10.00 (includes shipping). Call DAMPP-CHASER at 1-800-438-1524.

BUCKSKIN for recovering grand knuckles and backchecks, upright butts and catchers. The "original equipment" supplying the industry for 140 years. Richard E. Meyer & Sons, Inc., 11 Factory Street, P.O. Box 307, Montgomery, NY 12549; 914-457-3834

KEY LEVELING SYSTEM — As seen at National. Unique straight edge and calibrated gauge plus all parts to improve and simplify your leveling jobs. Includes video tape. $100 plus $15 S&H. Carl Meyer, 2107 El Capitan Ave., Santa Clara, CA 95050, 408-984-0482.

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PIANO COVER CUSTOM MADE to your specifications. Rehearsal covers now available. Specializing in custom colors and fabrics. Call or write for brochure. JM FABRICations; 10516 Ohop Valley Extension Road, Eatonville, WA 98328, 360-832-6009.

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RELIABLE ACCU-TUNER NOTESWITCH! One year guarantee! Includes coiled cable, thumb switch and attaching hardware. Fits all tuning hammers. $49.00 includes s/h. Dean Reyburn, RPT, Reyburn Piano Service; 2695 Indian Lakes Road, Cedar Springs, MI 49319, 616-696-0500

*Bluthner 6'4" 1910 Ebony, ornate plate w/clouds and angels $12,995; 1917 Steinway A, 6'1" Mahogany, $12,000; *Steinway 7' B, 1896, Ebony gloss, $19,500; *Steinway 6'1" A, 1912, Mahogany, $19,995; *Steinway 5'10" 0, Dark Mahogany, $16,500; *Steinway 5'10" 0, 1920, Light Mahogany, $16,000; *Steinway O, 5'10" 1917, Ebony, $8,900; *Steinway D, 9',1899, Ebony, $28,900; *Mason & Hamlin 5'8" A, 1916, Brown Mahogany w/Piano Disc, $16,000; *Baldwin 7', Ebony gloss w/Pianocorder, $15,000; *Baldwin 6'3" L, Ebony gloss, $14,995; *Mason & Hamlin 5'8" 1926 "A" Brown Mahogany, $5,900; *Fisher Bby Grand, 5'4" 1915 Circasian Walnut, $4,895.. Call SCHROEDER'S PIANOS for a complete list of used pianos, 800-923-2311.

NEW FROM SPURLOCK SPECIALTY TOOLS—Soundboard shims to match my custom carbide bit and soundboard routing system. 39" and 78" lengths and three widths. Quality quarter-sawn Canadian white spruce made by Andre Bolduc. Spurlock Specialty Tools, 3574 Cantelow Rd., Vacaville, CA 95688, 707-452-8564.

VICTOR BUYS Pre-1940 Steinways, Bostons, and Mason Hamlins, Pre-1975 Baldwins built in Ohio. Yamahas & Kawais made in Japan - not USA. Harps & Harpsichords 400 Fine Grands for sale. We need a Piano Technician, Church Organ Salesperson, Organ Repairman. 300 NW 54 St, Miami, FLA 33127, 305-751-7502.

PIANOS - Yamaha and Kawai grands $1850 and up. 23 Steinway grands and verticals. Large quantity of used American grands from $700 up. We buy pianos. Ed's 504-542-7090.

New from PROTEK: Pro*lube* Spray Lubricant. Protek Pro*lube* is an advanced state polymer lubricant. Designed around the successful CLP formula, Pro*lube* is for higher friction areas like the keybed and frame, shift and sostenuto mechanisms. Great for front and balance rail keypins and anywhere you would use a spray lubricant. Provides long lasting durable lubrication with virtually NO ODOR! With the addition of Pro*lube* along with CLP and MPL-1, Protek offers safe, high tech task specific tools for every lubricating need. Ask for Pro*lube* at the supply house you do business with.

REPAIR CHIPPED IVORY IN 20 MINUTES. "AcryliKey" ivory restoration system produces a strong, color-matched, nearly invisible repair. Kit contains material enough for 50+ repairs plus pigments, mixing utensils, sanding pads, and complete instructions. $39.95 ppd. Richard Wagner, RPT; 7709 S.W. Pfaffle, #40; Tigard, OR 97223; 503-624-7360.

SERVICES

STRAIGHT SIDES, SQUARE FRONTS and crisp notches are the benchmarks of our quality key recovering. Tops with fronts $115 plus return shipping and insurance. Call or write for free list of our key and action restoration services. Yvonne Ashmore, RPT and Associates, 12700 La Barr Meadows Road, Grass Valley, CA 95949, 916-273-8800

KEYBUSHING: We use over 20 different sizes of Spurlock Precision Cauls. Send the micrometer measurement of the key pins and we will give you a perfect fit. Both rails high quality felt $85.00 or leather $95.00 plus return shipping and insurance. Write or call for free price list of our key and action restoration services. Yvonne Ashmore, RPT and Associates, 12700 La Barr Meadows Road, Grass Valley, CA 95949, 916-273-8800.

ADD ADDITIONAL $'s to your income. Rebuild player pianos for your clients. Send us the player parts. You restore the piano and we will return the mechanism in restored condition. We guarantee our work. For more details, call or write: Jim Brady, 2725 East 56th Street, Indianapolis, IN 46220, 317-259-4307

SOUNDBOARDS INSTALLED, topsides rebuilt. Bridge-conformed, scale-diaphragmized boards with truly quartersawn ribs (sitka, eastern, or sugar pine). You send us the case, we'll return you a piano. Quality's the bottom line. David G. Hughes, RPT. 410-429-5060. Baltimore.

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SENECA PIANO KEY. Quality key services at competitive prices. Sharps replaced, key bushing and the finest key recovering at any price. Write or call for price list and information on quick return of your key work. Seneca Piano Key, Ted Oberhaus, 4977 Frontenac Road, Trumansburg, NY 14886; 607-387-3095

52 PIANO KEYS RECOVERED— .075 tops with fronts (molded plastic) - $95.00; .050 pyralin - $100.00; .060 pyralin - $105.00. Gloss sharps (3 1/2") - $50.00. Keys rebushed: premium cloth - $75.00; leather - $95.00. Other services available. Call or write for price list. FREE return freight on prepaid orders of $50.00. Walker Piano Service, 554 State Route 1907, Fulton, KY 42041, 1-800-745-6819.

SIGHT-O-TUNER SERVICE: Repairs, calibration & modifications. Fast, reliable service. Richard J. Weinberger; 18818 Grandview Drive; Sun City West, AZ 85375. PH. 602-584-4116.

TRAINING

WELL-TEMPERED TUTOR. Learn to tune by ear with your Macintosh computer. Use pre-programmed temperaments or create your own. If you have trouble hearing beats, this program can isolate the beats for you. Score yourself with the PTG exam. Twenty-one historical temperaments also available. Demo disk available. Mark Anderson, RPT: 510-524-0390 (California). Great teaching tool!

NILES BRYANT OFFERS TWO HOME STUDY COURSES: Electronic Organ Servicing: Newly revised. Covers all makes and models — digital, analogue, LCT's, synthesizers, etc. Piano Technology: Tuning, regulating, repairing. Our 87th year! Free booklet; Write or call NILES BRYANT SCHOOL, Dept. G, Box 19700; Sacramento, CA 95819— (916) 454-4748 (24 hrs.)

BILL GARLICK SEMINARS-Upgrade your skills at intensive six day resident seminars at Bill's home. Applications are invited for upcoming seminars in tuning, grand action regulation, historic tunings, harpsichord maintenance. Tuition includes instruction and use of facilities, private bedroom (share baths), breakfast and lunch. Write or call for information. Bill Garlick, RPT, 53 Weeks St., Blue Point, NY 11715; 516-363-7364.

THE RANDY POTTER SCHOOL OF PIANO TECHNOLOGY— Home Study programs for beginning students, associate members studying to upgrade to Registered Piano Technician, and RPT's wanting to continue their education. Tuning, repairing, regulating, voicing, apprentice training, business practices. Top instructors and materials. Call or write for information: RANDY POTTER, RPT; 61592 ORION DRIVE; BEND, OR 97702; 541-382-5411. See our ad on page 3.

PIANODISC—TROUBLE SHOOTING THE SYSTEM. PTG Members and non-members who will attend the 1996 California State Convention are invited to attend a special class on troubleshooting the PianoDisc system at the convention headquarters, Monterey Hyatt Regency, on February 15, 1996. There is no fee for the class. Non-members who take the class, stay for the convention and then apply for PTG membership will have their $90 convention registration fee rebated. Contact Don Dusenbury at 916-567-9999 for details. Space is limited.

VIDEOS

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

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

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

WANTED: TINY PIANOS such as the Wurlitzer Student Butterfly or other small types. Call collect: Doug Taylor, 607-895-6278. I'll pay shipping!

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

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

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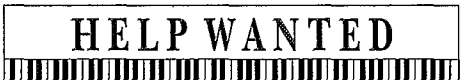

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PianoDiscussions™

January 1996

News From The World of PianoDisc

Winter NAMM — be there!

Jot down this booth number: Hall D, #2836. That's where you'll want to be on the 18th through the 21st of January, 1996 — at the Music Systems Research booth, Anaheim Convention Center, for the '96 Winter NAMM show.

Now we're not suggesting that you have to spend all day, every day, of the show with us, but we've got a lot of new products to show you, a few special guest star appearances planned, and some new video presentations. We've been busy this past year, and frankly, it'll take a while to show you what we've been up to.

The very first thing you'll want to see is the new PDS128 Plus. It's our latest version of player piano technology that combines the features of both the PDS128 and the PianoCD system into one product. There have been some software enhancements that will make the PDS128 Plus extremely user friendly and our new treble and bass controls offer optimum sound quality.

Next, take a look at our new diskette and CD packaging and point-of-purchase displays. There will be a new music and product catalog too. New designs with great eye-appeal.

Video presentations have always been a big attraction at our booth, and this year is no exception. Of course we'll be showing our new PianoDisc product video starring one of television's greatest stars and innovators, Steve Allen. This special version will involve Piano Video technology. We'll also be showing past favorites like the Floyd Cramer video and our brilliant quartet performance of The Jazz Suite by Claude Boling. Watch for some new things, too, that should attract the kind of crowds we've come to expect.

Guest appearances are scheduled for each day of the show. We're saving you a few surprises here, but one we will tell you about is the great Floyd Cramer. You'll be able to meet Mr. Cramer and some of our other great PianoDisc artists at days and times to be announced.

Now, do yourself a favor (if you haven't done this already): call the sales rep for your area today and make an appointment. We expect this show to be our biggest and best ever, which also means our busiest. You'll be awfully disappointed if you miss seeing our latest and greatest.

See you there!

MarianMcPartland: we love her madly

What can we say about the incomparable Baldwin artist Marian McPartland that hasn't been said a thousand times before? That "she is an exceptionally lyrical ballad performer, expanding the harmonic and melodic essence of every theme"? Leonard Feather beat us to it. That "she moves beyond adroit adulation into her own special realm"? Whitney Balliet said that in the *New Yorker.*

It's hard to find words of praise that are original and grand enough to express just how magical her music is and how warm and wonderful she is as a person. What we can say, however, and with tremendous pride, is that Marian McPartland is now a PianoDisc recording artist.

Over a four day span in November, Ms. McPartland recorded a sensational disk for us which includes songs by Ahmad Jamal, Bill Evans, Stevie Wonder and Dave Brubeck, as well as some of her own.

"Marian is such a sublime pianist," commented Artist Director Jan Kiser. "She can swing with the best of them but she has a real corner on the jazz ballad. When PianoDisc owners play her disk, they'll hear the inventive phrasing and harmonics that have made her one of jazz's most enduring stars."

In addition to her wonderful disk, Ms. McPartland gave her fans at PianoDisc the very special pleasure of her company. It was time spent with one of the truly great artists in the history of jazz. To paraphrase Duke Ellington, We Love Her Madly.

NEW DISK RELEASES:

Artist Series: Judy Carmichael (PD5010)

Artist Series: Dick Hyman Plays Boogie Woogie And The Blues (PD5012)

Artist Series: Butch Thompson's Christmas (PD9007)

PianoDisc Installation Training 1995/96

- Jan. 22-27
- March 25-30
- April 22-27

1996 Continuing Education Series

- April 1-3
- April 29-May 1

Tuition for the Installation and Continuing Educatio seminars is **free**, but a $50.00 refundable deposit is required for confirmation.

The PianoDisc Continuing Education Series seminars are restricted to PianoDisc certified technicians in good standing.

For more information about attending a PianoDisc Installation Training seminar or a Continuing Education seminar, call PianoDisc during our office hours (see box next column).

PianoDisc

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

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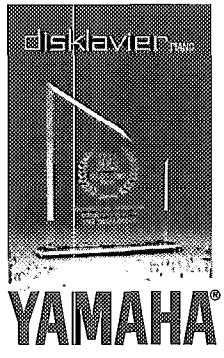
Our telephone lines are open daily (except weekends and holidays) from 8 AM-5 PM Pacific Time.

1994 KEYBOARD PRODUCT OF THE YEAR



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