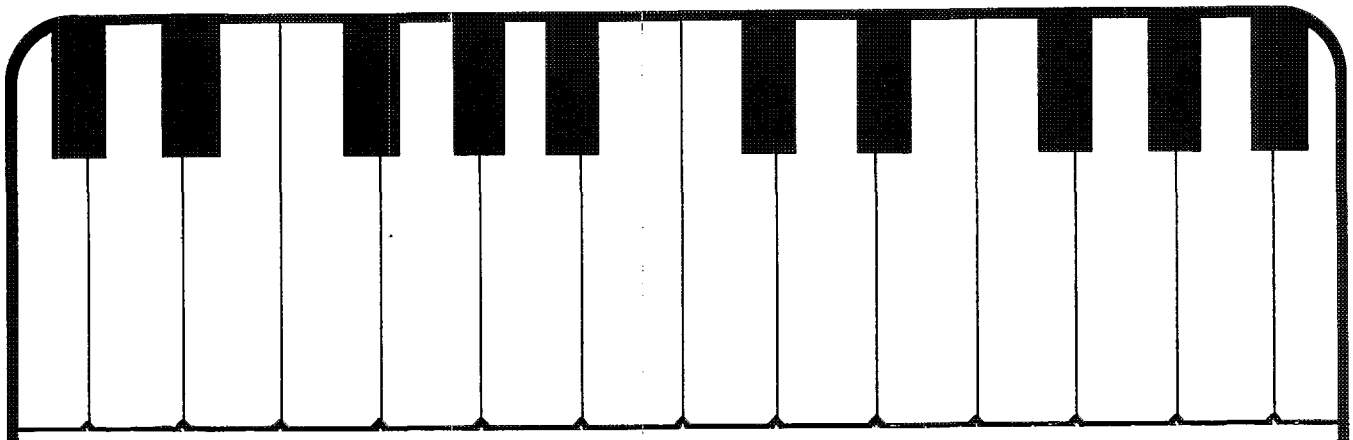
PIANO TECHNICIANS
Journal
Official Publication of the Piano Technicians Guild

August 1998 Vol. 41 • #8

Inside:


Caring about our world.
ISO 14001
In the fall of 1997, the International Organization for Standardization made Kawai the first in the piano industry to receive ISO 14001, the world's foremost certification for excellence in environmental management.
It was the crowning achievement of our multi-year effort to fulfill the "Kawai Environmental Preservation Charter" through re-forestation, energy conservation and natural resource preservation.
These vital efforts will continue to be a part of every piano we build. That's our promise to you... and to our world.
KAWAI
Kawai America Corporation • 2055 E. University Drive • Compton, CA 90220 • www.kawaiius.com



SCHAFF

THE HOUSE DEDICATED TO SERVICE

Has expanded their services to include a full line of

YAMAHA®

ACTION PARTS, TOOLS AND SUPPLIES

Culminating many years of discussions with the Yamaha Corporation, an exclusive agreement now exists whereby Schaff can sell and distribute any Yamaha piano part, tool or supply item that is not being replaced under warranty.

Such items as grand and upright piano action parts, felts, hardware, keytops, as well as adjustable chairs, tools and polishes are now in stock. Other items can be specially ordered.

Please call or write requesting our latest brochure with prices.

THE HOUSE DEDICATED TO SERVICE

Schaff PIANO SUPPLY COMPANY
451 OAKWOOD ROAD,
LAKE ZURICH, IL 60047-1516

24 Hour Hot-Line
Reg. (847) 438-4556
T-Free (800) 747-4266
Fax (847) 438-4615

PIANO TECHNICIANS
Journal
Official Publication of Piano Technicians Guild

David Hanzlick, CAE
Publisher/Executive Director

Steve Brady, RPT
Editor

Jim Coleman Sr., RPT
Del Fandrich, RPT
Contributing Editors

Jeannie Grassi, RPT
Editorial Assistant

Susan Kline, RPT
Anita Sullivan
Feature Writers

Joe Zeman
Director of Communications

Sandy Roady
Director of Member Services

Jerri Dowdy
Assistant to the Executive Director

Catherine Wilane
Director of Finance

Midge Sheldon
Advertising/Merchandising Coordinator

Home Office
Phone: 816-753-7747
FAX: 816-531-0070
E-Mail: ptg@ptg.org

Editorial

Piano Technicians Journal will accept unsolicited materials, photographs and ideas, however, unsolicited materials will not be acknowledged unless accepted for publication; it is advisable, therefore, to submit copies of original materials, including photographs or transparencies. Without prior arrangements with the publisher, all materials submitted for publication will be retained by the *Journal*.
DEADLINE: No less than 60 days before publication date (i.e., September 1 for November issue)
Send materials and letters to: Steve Brady, *Journal* Editor
205 McGraw Street • Seattle, WA 98109
Fax: 1-206-285-7610 • E-Mail: sbrady@u.washington.edu.

Subscriptions

Annual subscription rates: $55 (US) for Members; $85 for Non-Members (US)/1 year; $155 (US)/2 years;
Single copies: Current year/$10; 1 year/$5; back copies/$2 if available. Piano Technicians Guild members receive the *Journal* for $55 per year as part of their membership dues.

Address Changes/Subscription Problems

Send or FAX a description of the problem and your current address to: Subscriptions, 3930 Washington, Kansas City, MO 64111-2963 or call (816) 753-7747 between 8:30-5 p.m. CST — Monday-Friday.

General Information

© 1998 The Piano Technicians Guild, Inc. Articles published in the *Piano Technicians Journal* represent only the opinions of the author and not those of the Piano Technicians Guild, Inc. All rights reserved. No part of this publication may be copied or reproduced in any form without permission from the publisher, The Piano Technicians Guild, Inc. The words "Piano Technicians Guild, Inc." and the Registered Piano Technician emblem are registered with the U.S. Patent and Trademark Office — Unauthorized use is strictly prohibited. *The Piano Technicians Journal* (ISSN 0031 9562) is the official publication of The Piano Technicians Guild, Inc., 3930 Washington, Kansas City, MO 64111-2963. The *Journal* is published monthly. Periodicals postage paid at Kansas City, MO and at additional mailing offices, US ISSN 0031 9562 foreign and domestic.
POSTMASTER: please send address changes to:
Piano Technicians Journal, 3930 Washington,
Kansas City, MO 64111-2963

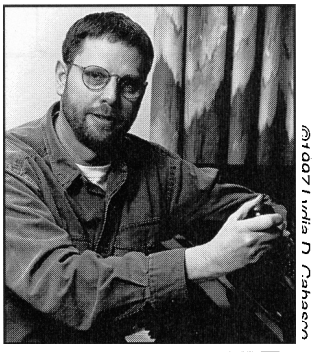
EDITORIAL PERSPECTIVE
R-E-S-P-E-C-T

It was well past 10:00 in the evening when the phone rang, and I nearly didn't answer it.

"Steve, it's Ben," said the voice at the other end. "Have you got a minute?"

Sure, why not? It had been months since I'd had a chance to catch up with my old friend, Ben Marcato, RPT. But I knew I was in for much more than "a minute," so I sat down in my favorite chair and prepared to listen.

"I've had it up to here," he said, no doubt gesturing to indicate exactly up to where he'd had it. "Why do so many piano tuners have to undervalue their work? Why do they refuse to give themselves a chance to make a decent living? All they do is whine about how the public doesn't give us the respect we deserve."


Steve Brady, RPT
Journal Editor

I can't argue with that.

"Look around at the people who service your car, your dishwasher, the people who clean your carpets and drapes. Are they professionals?"

Well, I guess you could call them that. They sure charge enough. I've always thought of them more as tradespeople, though.

"What about us? Are we professionals?"

I like to think of myself as a professional, and I like to think of piano service as a profession.

"And so do I," said Ben. "But it bothers me that many of my colleagues just don't seem to have thought things through."

What do you mean?

"How long does it take to learn, really learn, the skills to be a competent piano technician?" Ben asked.

Maybe five years or so?

Ben sighed. "Maybe. But that's only if you had the advantage of a really solid initial training. If your training is haphazard, you may take 10 to 15 years to get really competent. Or you may never, ever become very good. But solid initial training takes a sacrifice — in terms of both time and money — a sacrifice many people aren't willing to make, so they settle for second- and third-best options. But let's say, for the sake of argument, that you had good training, and that you've supplemented it by frequent attendance at PTG conferences and Institutes, you've read the *Journal* faithfully, you've taken and passed the exams to become an RPT. You're a professional! You should act like one."

And if I haven't done those things?

"Then you could be any number of things, but you're not a professional. You see, by getting thorough initial training, by involvement in PTG, by earning a professional credential, you've taken the steps necessary to be respected as a professional. You've got all the benefits of a professional association behind you. By contrast, look at the guy who cleans my rain gutters, or take the Roto-Rooter™ guy. Both of them charge more than most piano tuners, but how long did they have to train to learn those skills? Do they attend continuing education programs? Somehow, I doubt it."

But with their trucks and equipment, don't these people have higher overhead than we piano tuners?

Ben snorted. "What? Don't you drive a vehicle to your jobs? Don't you own an electronic tuning aid? How much do you have invested in your field service kit?"

Maybe $3,000, all told.

"Some of us have spent that much on a tuning machine alone," Ben replied, unimpressed. "How much do you have tied up in your shop equipment?"

Maybe another $4,000.

"On the cheap again!" Ben crowed. "I know rebuilders who've spent more than that on one power tool. How much do you think the rain-gutter cleaner spent on his equipment, an extension ladder, a power-wash nozzle for my hose?"

Okay, okay, I see your point. But these people are servicing necessities; pianos are a luxury item for most people.

"You really don't get it, do you?" Ben asked. "Most people who own hot tubs spend more money maintaining them over a year's time than the average piano owner spends on maintaining a piano. And we have ourselves to blame for that. As an industry, we've done a very poor job of educating the public about what a piano is and what it takes to keep it in top shape. Consider, for instance, how many people are shocked to find out what a fine grand piano costs. And yet they willingly spend as much or more on a new BMW. They don't understand that a grand piano contains two to three times as many parts as a

Continued on Page 3

Please submit tuning and technical articles, queries, tips, etc., to me:
Steve Brady*, Journal *Editor
205 McGraw Street • Seattle, WA 98109
Fax: 1-206-285-7610
E-Mail: sbrady@u.washington.edu

Continued from Page 2

BMW, and that these parts have to be installed and cajoled into working order by real craftspeople, not just slapped together on an assembly line. And then they'll spend $1,200 a year maintaining the BMW, just because the dealer told them it needs to be done. Why don't piano dealers make a point of telling people what it takes, realistically, to have their pianos maintained?"

A good question, I agreed. I mumbled something about having to get to bed, a busy day tomorrow.

"Okay," said Ben, "but one more thing. As you tune your first piano tomorrow, think about how long it took you to master that skill. Think about how much longer your body and your ears can take that kind of abuse, and what you're going to have to show for it when you retire. Take care of yourself, pal, because if you don't, no one else is going to."

I thought I could hear Aretha Franklin lighting it up in the background. R-E-S-P-E-C-T. Respect... what does it mean to a piano technician? How do you earn it? What form does it take?

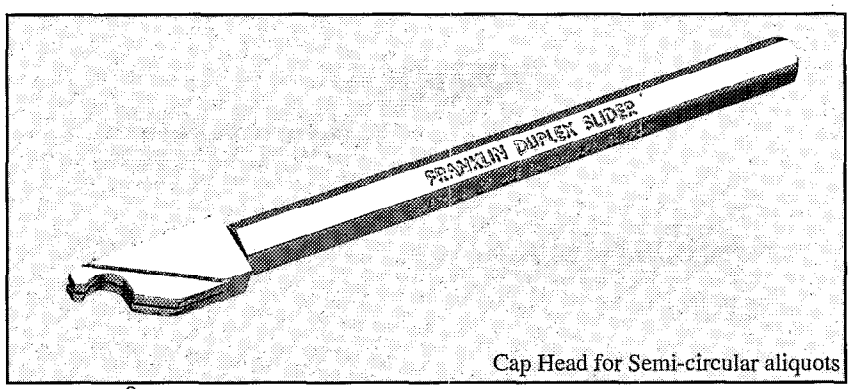
Ben Marcato came back with the last word. "This, Steve, is my question for you: how can we expect the public to respect us if we don't respect ourselves first?"

How, indeed.

Tuning the Duplex Scale can help achieve a "singing tone!"

The FRANKLIN™ DUPLEX SLIDER
US Patent# 5,736,600

$350



Cap Head for Semi-circular aliquots

SINGING TONE™
Duplex Scale Tuning Tools & Technology

Telephone: 212-677-5760
Fax: 212-228-8837
E-Mail: duplexdan@aol.com
P.O. Box 2063 Peter Stuyvesant Station, NY, N.Y. 10009

MEMBER BENEFITS

PROTECT YOUR BUSINESS, YOUR REPUTATION AND YOUR FUTURE

SAFECO Insurance Company is providing an exclusive insurance program to Piano Technicians Guild members. Competitive premiums start as low as $250.

This program provides specific limits to cover tools, your customer's property, property in transit (Cargo) and business liability.

Make sure your business is protected, call Jerry Kiser at: Potter Leonard/Olympic Insurance for a fast, competitive quote.

PHONE 1-800-548-8857 FAX (425)486-4681

Randy Potter School Of Piano Technology
Complete Correspondence Home Study Course. . .
. . .for beginning students & intermediate piano tuner-technicians.

We Teach
- Tuning
- Repairing
- Regulating
- Voicing
- Apprentice Training
- Manufacturer & Dealer Relations
- Business Practices

Courses Include
- Printed Course Manuals
- Video Tapes
- Written Texts
- Apprentice Manual
- Repair Labor Guide
- Manufacturer's Technical Service Manuals
- Wholesale Supply Catalogs
- $5000 Resource Loaning Library

AND MUCH MUCH MORE!

Randy Potter School Of Piano Technology

WE ARE:
- The largest supplier of published training materials and videos
- Recommended by Keyboard Magazine
- Licensed by the Department of Education
- Approved for Veterans Training

AND WE OFFER:
- Advanced training seminars in high level grand regulating and tuning.

WRITE OR CALL
Randy Potter, RPT
61592 Orion Drive
Bend, OR 97702
(541) 382-5411
www.pianotuning.com

PIANO TECHNICIANS
Journal
Volume 41 • Number 8 • August 1998

FEATURES

COLUMNS & COMMENTS

DEPARTMENTS

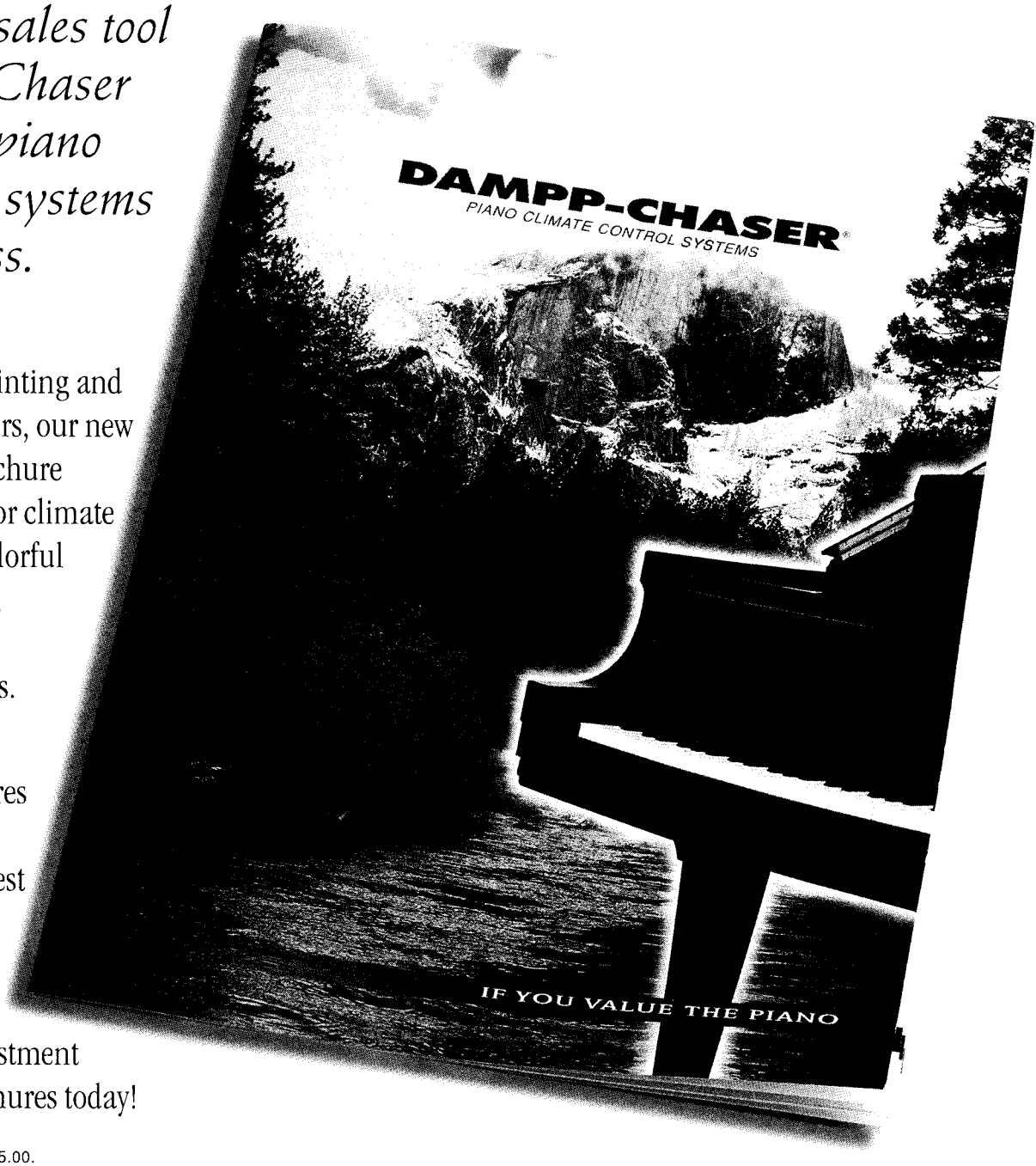
IN ADDITION

COVER ART

Benjamin Franklin's Glass Armonica, ca. 1761, could be called "a tuning frozen in time." This instrument was made of wood, brass, and glass by Charles James in London, England. See Skip Becker's article beginning on page 17. Photo courtesy of the Historical and Interpretive collections of the Franklin Institute, Philadelphia, PA.

Would you invest 15¢* to earn $250**?

This dynamic sales tool from Dampp-Chaser makes selling piano climate control systems almost effortless.



Utilizing four-color printing and the highest-quality papers, our new 8½" x 11", 12-page brochure demonstrates the need for climate control with striking, colorful photos and illustrations, captioned with easy-to-understand explanations.

Dampp-Chaser Corp. is pleased to make brochures available to piano technicians at very modest prices. If you have never sold climate control before, get started now and watch your 15¢ investment pay off. Order your brochures today!

* Purchase 100 brochures for only $15.00. Per copy costs are higher for smaller quantities. Up to 10 brochures @ 40¢ each.

** $250 is the average profit for piano technicians when they install a Dampp-Chaser System in a small grand piano.

DAMPP-CHASER®

PIANO CLIMATE CONTROL SYSTEMS

CALL TO ORDER

800 438 1524

Visa and MasterCard Welcome

IF YOU VALUE THE PIANO

Planning for the Future

I write this in June, about a month before our 41st Annual Convention. Your Board of Directors, Institute Committee, staff and other volunteers are dispatching all the details of the event – determined to make it a memorable one for us all. I could not begin to estimate the hours, the sweat, the mental energy that goes into planning one of these things, and I'm pretty sure that I really don't want to know! It's a mind-boggling effort.

David P. Durben, RPT
PTG President

Leon Speir was still PTG's president when we started the planning for Providence, some three years ago. Since that time the contracts were drawn up, the Institute Director was chosen, the contracts were revised, classes scheduled and rescheduled, and a seemingly infinite myriad of details finally crystallized to become our 41st Convention and Institute. And by the time you read this, it will be history.

Through all of this, the people who worked to make it possible have also continued their daily lives, artfully balancing the cares and needs of often conflicting demands. From the vantage-point of leadership, it is an impressive thing to see: volunteers from across the country making individual contributions that build into an event that easily out-strips the sum of it's parts – all made possible by the careful planning we practice.

Ah yes, planning! That inscrutable concept that has managed to frustrate mankind since we first walked upright; the vanity of mankind working overtime! But is it vanity to believe that we can have a hand in our future? Must we accept the fatalist's position that our fate is unalterably beyond our control? I am willing to accept the idea that we exercise only a limited control on our future, but I cannot accept the idea that it is futile to plan, and that we are only spectators on the theater of life.

Planning has done much to advance the cause of mankind in general, and PTG specifically. Look at this *Journal*, your chapter, our many marketing and education tools, and you will see the results of planning. Each of these may seem small by themselves, but taken together they represent nothing less than the best cache of practical knowledge in our field today. And none of it was possible without extensive planning.

So please, as you plan your days, consider what you might be able to do to help your Guild. PTG today needs volunteers who are motivated to take the initiative to plan for their future and work together to make it as bright as it can be. Everything that you receive in the way of member benefits is there because of the generosity of other members, and it will be that much better for your personal involvement.

I believe that our future is in our hands, and I believe that the best way to approach that future is to plan for it. So plan to be at your next chapter meeting, and plan also to attend a regional event. Then take it another step, and plan to be in Kansas City for PTG's 42nd Annual Convention and Institute. We've been planning it for two years already, and it promises to continue our tradition of excellence. Be there!

What Makes a Piano Truly "World Class"?

Pride

Young Chang, winner of numerous awards and competitions from around the world, is the first piano manufacturer to receive the prestigious ISO 9001 approval for quality manufacturing and design.

Passion

Designer and engineer Joseph Pramberger demands nothing less than perfection in quality, beauty, sound, touch, and value. His passion is reflected in these pianos, and his signature is stamped on each one.

Prestige

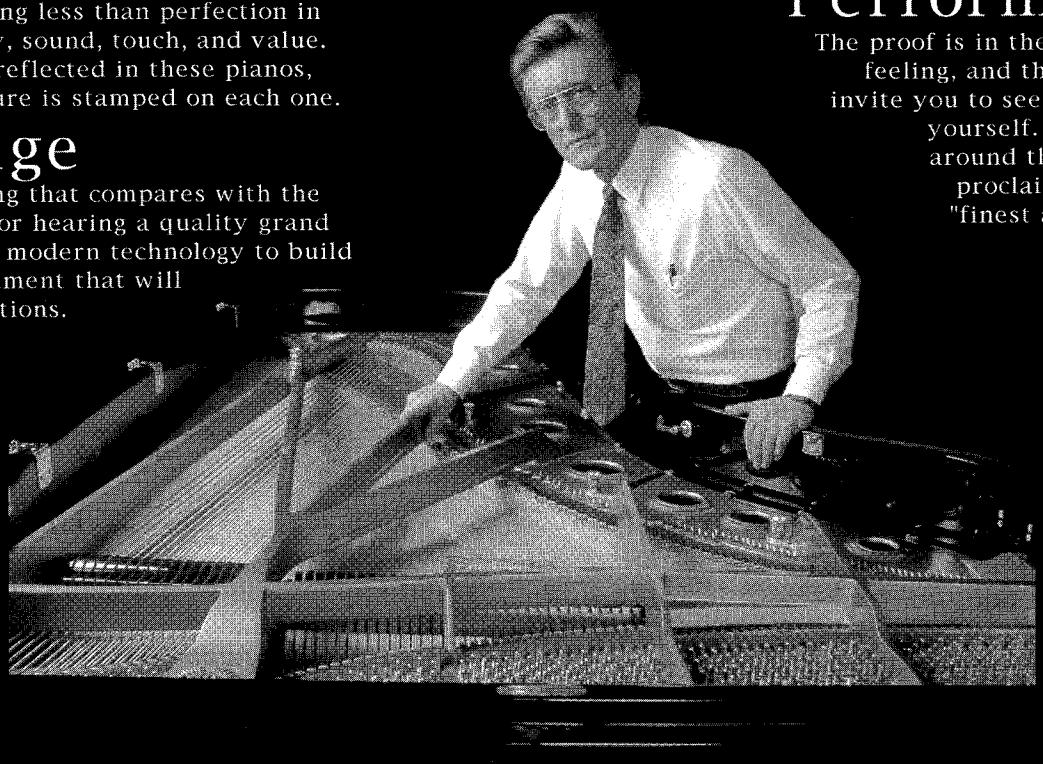
There is nothing that compares with the joy of playing or hearing a quality grand piano. We use modern technology to build a classic instrument that will last for generations.

Pedigree

Young Chang, the world's largest piano builder, uses the finest materials and is the only piano to offer a fifteen year full warranty. Joseph Pramberger's history as a third generation master piano craftsman is legendary.

Performance

The proof is in the playing, the feeling, and the sound. We invite you to see and hear for yourself. Join experts around the world who proclaim this as our "finest achievement."



Pramberger

A Higher Level of Excellence

The New Pramberger Signature Series Artist Pianos from

YOUNG CHANG

P.O. Box 99995, Lakewood, WA 98499-0995 telephone (253)589-3200 fax (253)984-0245
see your authorized dealer or visit our website at http://www.youngchang.com

Letters

Bending Pins

I would like to end the debate on "bending tuning pins." At least I hope it is still a debate, and not that RPTs out there all just say, "Long tuning tips are wrong." Perhaps if I am overly pedantic and clear, we can come to some agreement.

First, all tuning levers bend all tuning pins during all tunings, regardless of how short the tuning tip. This is because the top of the tuning pin is some distance from the wood of the pinblock, and the shortest tuning tip still raises the tuning lever above the pin. Since the force we apply to the pin is coming from above and far to the side, our force will always cause twisting and bending to occur at the same time. If we had a tuning tool like a screwdriver with a socket wrench on the end, we could twist the pin without bending it, but we need more twisting force than such a tool would provide. The question of bending pins is then a question of degree and direction, not a question of bending or not bending.

The question of degree: longer tuning tips will bend the tuning pin more than shorter tips. Can we agree, then, that we should use the shortest tip that we can to minimize bending the pin? I hope so. Yet, in a grand piano, a short tuning tip only works if the tuning lever is placed in certain directions. Is bending the tuning pin the same in all directions?

The question of direction: For simplicity, we can consider the two extremes of bending the pin in the direction of the string, and bending perpendicular to the string. Bending in the direction of the sting (that is, when the tuning lever is perpendicular to the string) changes the tension on the string, which changes the pitch of the tone. Bending perpendicular to the string (that is, when the tuning lever is parallel to the string) does not change the tension or the pitch of the tone. Aha! Now we are getting somewhere!

Let us gather what we have found:

1. All tuning levers bend all tuning pins.
2. We should use the shortest tip that we can.
3. The position of the tuning lever on the pin makes a difference. What difference does it make? Just this: the tuning lever which is placed parallel to the string will not necessarily change the pitch of the tone through its bending of the pin, and the tuning lever placed perpendicular to the string will necessarily change the pitch of the tone through its bending of the pin. Of course, some of us like very much to change the pitch of the tone through bending the pin. But look; you can still bend the pin and change the pitch of the tone when your lever is parallel to the string: simply lift up or push down on the end of your lever. So the real difference between placing your lever parallel or perpendicular to the string is that parallel you are free and have a choice, and perpendicular you are unfree and have no choice.

Some of you out there are so good that you can work at a disadvantage and still be great. But if you are helping a student to become a better tuner, please let them know that there is a difference in which direction they place their tuning lever, and that placing it parallel to the strings, although sometimes necessitating a longer tip, will give them more choices in the long run, and will be less difficult. This is the advice I received from my first teacher, Arthur Reblitz, in his book, *Piano Servicing, Tuning, & Rebuilding.* You should know, too, that no matter how long a tip I have had to use to get over the stretcher of a concert grand, I have never broken a tuning pin in nineteen years of tuning.

—Jack Bresette-Mills, RPT
Austin, TX Chapter

North Carolina Regional Conference

October 22-25, 1998 • Richmond, Virginia

- National and Regional Instructors
- Comprehensive Classes
- Choice Exhibitors
- Major Manufacturers
- Holiday Inn Select Koger South Conference Center
- Entertaining Spouse Program–
  Richmond Tour with Riverboat Luncheon
- Supplemental Training–
  All-day refinishing class with Webb Phillips on 10/22/98
  PianoDisc two-day certified training seminar on 10/21-22/98

*Sixty class periods featuring the finest names in the Piano Service Industry including: Rick Baldassin * Baldwin Piano & Organ Co * Best Piano Services * Dan Bowman * Steve Brady * Ruth Brown * Tom Burge * Mark Burgett * Mike Carraher * Tom Cobble * Judith Cohen * Gerry Cousins * Steve Cunningham * Dampp-Chaser Electronics * Dryburgh Adhesive Products * LaRoy Edwards * John Hartman * Jim Harvey * David Hughes * Inventronics, Inc. * Bob Mair * Gayle Mair * Majestic Piano Company * Mason & Hamlin * Paul Monachino * Webb Phillips * Webb Phillips & Associates * Piano Climate Control Supply * PianoDisc/MRS * Randy Potter * Randy Potter School * Renner, USA * Reyburn Piano Service, Inc. * Al, Dave, & Paul Sanderson * Schaff Piano Supply Co. * Teresa Severin * Willis & Dave Snyder * Lewis Spivey * David Swartz * Steinway & Sons * Kent Webb * Roger Wheelock * Thomas & Barbara Wolf * Wolf Instruments * Yamaha Corp. of America * Michael Zarate and More!*

Early registration deadline
September 26, 1998

PIANO TECHNICIANS GUILD

Hosted by the Richmond, VA & Pamlico, NC Chapters

Continuing Education for the Professional Piano Technician

NORTH CAROLINA REGIONAL CONFERENCE

For registration information contact Lewis Spivey, RPT (919) 937-4777 email: LSpivey@prodigy.net

"YOU NEED PIANOS WE NEED SPACE"

Let's Make A Deal !!

JAY-MART PIANO WHOLESALERS

Call Irv Jacoby

800-411-2363

216-382-3249 Fax

"The Piano Store for Piano Stores"

Spent countless man hours on the Fluffendoofel to have form and function...touch and tone???

So you're in Goober, Mississippi? So what...?

Let the World Wide Web be your marketplace!

P&G Investments

Vintage Instrument Listing Service
For Vintage Pianoforte Instruments

Reduced rates and Brokerage Sevices for the professional RPT.

form and function... touch and tone...

Visit our Website at http://www.pgtigercat.com

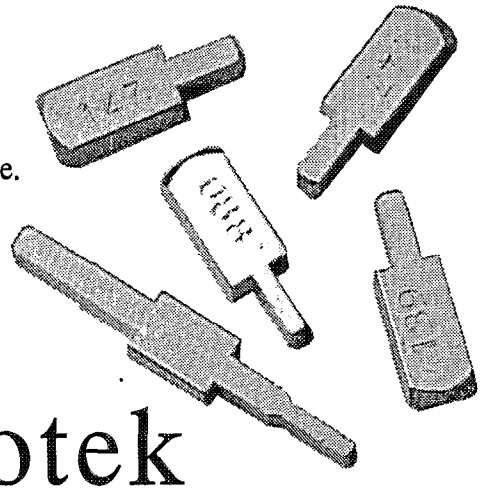
Gale Bullock of P & G Investments
P. O. Box 30139, Columbia, MO 65205-3139 USA
573-445-8918 office, 573-445-0871 fax
Email: mutigercat@sockets.net

Promoting Vintage Pianofortes on the World Wide Web

The finest professional key cauls manufactured.

ACCU-CAULS

* Solid brass.
* 8 sizes available.
* Guaranteed accurate.
* Bushing cloth in 5 thicknesses.
* Bushmaster rebushing tool.



Pianotek

SUPPLY COMPANY **1 800 347-3854**

401 W. Marshall Ave . • Ferndale, MI 48220

Catalog $5.00

Tel. (810) 545-1599 • Fax: (810) 545-0408

The World's Great Pianos

Original Dimensioned Action Parts

Premium Blue Hammers

Hammer Boring & Hanging Service

Universal Underlever Assembly

RENNER INSIDE ® RENNER INSIDE ® RENNER INSIDE ®

Quality Renner Tools

Keyboard Bushing Cloth & Leather

Graphited Flange Bushing Cloth

Free Catalog & Price List Available

Use Genuine Renner Action Parts

Renner®

Renner USA
POB 1223
Weston, CT 06883
Phone: 203-221-7500
Fax: 203-454-7866

Or Contact:
Rick Baldassin
Teaching & Technical Consultant
Phone: 801-292-4441
Fax: 801-298-1441

Tips, Tools & Techniques

Screw Stringer Tuning Tip

Donna Byrd, RPT, of Eugene, Oregon recently came up with a way to keep your place when tuning a Mason & Hamlin screwstringer. Confronted with two rows of square screwstringer nuts just above a long plate flange, with an array of narrow and identical screwstringer elbows below that, she realized that it was going to be very fussy to figure out which nut went with which string. Since there is a lot of slack when changing directions with the tuning tool, it is especially hard to determine if you've put the tool in the right place.

Donna used chalk to mark the nut for the middle string of each unison. She marked the plate just above each middle string nut for the upper row, and marked the front of each middle string nut for the lower row. Since they are spaced evenly, it became very quick and easy to do this: mark, skip two, mark, skip two, etc.

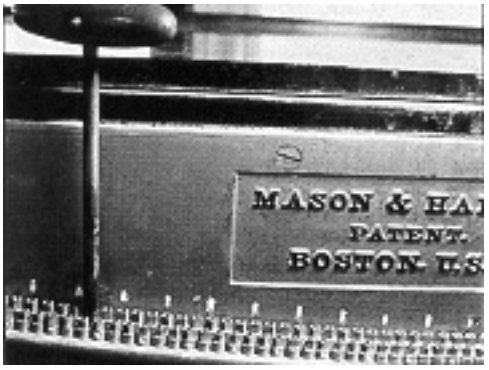


Photo 1 — Mason & Hamlin Screw Stringer upright, showing chalk marks on plate to indicate middle string of each unison.

I was there with her in order to get the feel of tuning the nice 1891 Mason & Hamlin upright. With only a few minutes' practice, I was putting the tool on the right nut every time, without having to think about it.

— Susan Kline, RPT
Eugene, OR Chapter

Coved Molding as Aid to Gang-Filing Hammers

While I would prefer to file hammers one at a time in most cases, there are times when doing some "gang" sanding (more than one at a time) is in order. On both grands and uprights the problem is to maintain the shape of the hammers, get enough felt cut from the lower shoulder, and avoid as much as possible going over the strike point any more than can be helped.

I use a variety of grits of paper, and prepare the strips by backing the paper with masking tape laid down in two layers to give the paper stiffness and durability, then cutting the paper into strips to accommodate three hammers at a time. I then hold the paper against the hammers with a piece of molding coved so that the paper will not run over the strike, but will catch the whole side of the hammer and draw the felt up to a nice cut just shy of the strike. Depending on the pressure I use, I can remove quite a bit of felt rapidly, or shape the hammers relatively slowly, even in gang fashion. Below is the shape of the cove I use. Design your own or copy this.

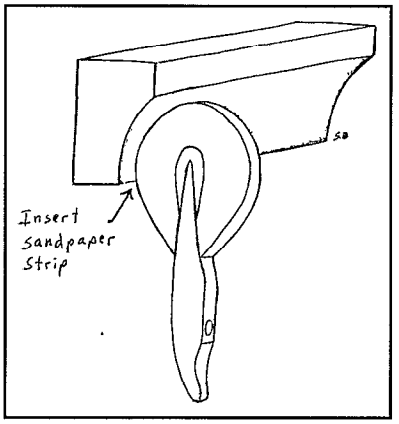


Figure 1 . Sandpaper strip is forced against hammer shoulder by coved molding.

— Paul Revenko-Jones, RPT
Reprinted from The Wippenpost, *newsletter of the Chicago Chapter*

Dual-Purpose Tool

Bruce Winn gave me a wonderful tool tip: We were working on your average Korean-type grand with the hex-head bolts for the legs and lyre. The heads of these bolts have large recessed hexagonal sockets and require a giant sized Allen-type wrench. If you are without the appropriate tools to loosen/tighten these type bolts, look to your collection of coil lifters. APSCO has a great coil lifting tool that just happens to be made of hex-shaped black metal – and the other end exactly fits those bothersome black bolts! This is icing on the cake as this tool is a great addition to your collection – it really works great at its coil lifting job! APSCO Heavy Duty String Lifter - Part #16845. Check it out!

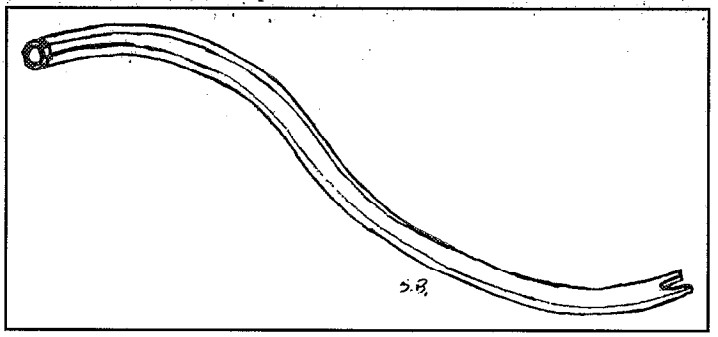


Figure 2 - APSCO coil lifter made of hex steel.

— Bob Bartnik
Reprinted from The Richmond Update *of the Richmond, VA Chapter*

Vertical Piano Touchweight Adjusters

Problem: a U1 action too light for the customer. Yamaha sells little clip-on "things" which go on the catcher and make the action "heavier" for those who feel that they want it.

They call them touchweight adjusters and they can be moved forward or back on the catcher dowel, and that makes them adjustable. A cheaper, just as good, and my own, idea is as follows: Get a piece of vinyl tubing 5/16" o.d., 3/16" i.d. (very cheap in a hardware store). Cut 88 about 1/2"-long pieces and with a single-edge razor blade slit them open (easily done by standing them up on end). Finally, slip them over the catcher dowels of the action. It is cheap, fast, and above all, reversible in minutes.

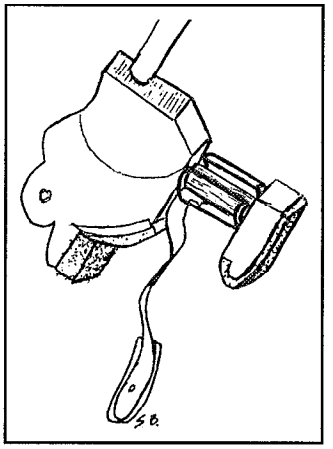


Figure 3 — Slit vinyl tubing attached to catcher shank to add touch weight.

— Ernie Juhn, RPT
Long Island-Nassau Chapter

NYSCON One Day Seminar
Saturday, October 17, 1998

In Home Service

Hosted by the L.I. Nassau Chapter, PTG
Featuring: Isaac Sadigursky, RPT and a special class given by Evan Giller, RPT

Holiday Inn, 215 Sunnyside Blvd, Plainview, NY. 1803. Contact Ernie Juhn (718)-268-7263

www.servtech.com/~asaginar/NYSCON.html

"YOU NEED SPACE WE NEED PIANOS"

Let's Make A Deal !!

JAY-MART PIANO WHOLESALERS

Call Irv Jacoby

800-411-2363

216-382-3249 Fax

"The Piano Store for Piano Stores"

NEED MARKETING SUPPLIES ?

PTG Publications:

Calculating Technician
Members *$13*
Nonmembers *$17*

Piano Action Handbook
Members *$8.00*
Nonmembers *$10.00*

Piano Parts & Their Functions
Members *$18*
Nonmembers *$24*

On Pitch
Members *$18*
Nonmembers *$24*

The History of Midwestern Piano Manufacturing
Members *$18*
Nonmembers *$24*

A Guide To Restringing
Members & Nonmembers *$15*

But You Can Feel It
Members & Nonmembers *$12*

816-753-7747

Fax: 816-531-0070 / E-mail: ptg@ptg.org
www.ptg.org

S.F. Piano Supply Company

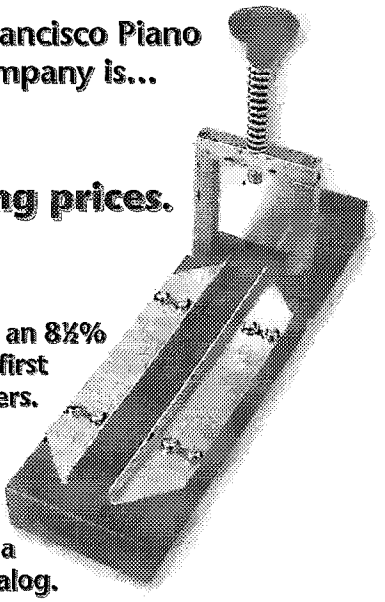
800-247-0702

e-mail: info@sfpiano.com **or** sales@sfpiano.com

website: www.sfpiano.com

The San Francisco Piano Supply Company is...

cutting prices.



We're giving an 8½% discount for first time customers.

Call now for a technical catalog.

Around The World On 88 Keys

PRE-OWNED GRAND & UPRIGHT PIANOS

YAMAHA-KAWAI

BECHSTEIN - SCHIMMEL- BLUTHNER - BOSENDORFER
HOFFMANN - AUGUST FORSTER - SEILER- FEURICH - STEINWAY

Guaranteed Landed Quality

Selection and Inspection supervised by Wilton Sykes

1-800-942-5801

World Class Pianos Since 1950

SYCKES PIANO IMPORTS

129E. Hartford Ave., Phoenix, AZ 85022-2331
Tel: (602) 942-5800 FAX (602) 942-9721

Celebrate

National Piano Month

Sept. 1 – 30

DRYBURGH PIANO SERVICE

distributors of
Satellite City **Hot Stuff**
adhesive products
1-800-GLUE ALL

ask for our complete guide of piano applications

10% discount on first order when you mention this ad

Damper Thump

Q I recently was called to tune a 10-year-old Steinway L. Although the piano is in excellent shape otherwise, it does have a very loud "thump" at the end of the pedal release. Damping is fine, trapwork regulation is fine as well. The felts are pristine, although when I return I am going to spend some time trying to soften the felt a little to see if that helps.

The thump is definitely being caused by all the dampers seating at precisely the same instance. (Both front and rear). Shouldn't the dampers lift just slightly tilted front-to-back (back side lifting first)?

The owner says that this thump has always been there. Of course, any grand damper set will make noise on a rapid release of the pedal but this is really loud. To make matters worse, the piano is in a large open room, hardwood floors, no furniture or drapes and a 12-foot ceiling. Any thoughts, tips, suggestions?

— Paul Dempsey, RPT

A **Doug Hershberger, RPT:** You might try removing the coil spring from above the damper lifter tray. Sometimes that spring and the trapwork spring together are a little overkill. Also there should be nice soft pieces of flat damper felt on the top of each of the dag blocks, that helps to quiet the tray returning.

A **Wim Blees, RPT:** I had this same problem on another piano, (not a Steinway), but the room conditions were similar. My solution, which reduced the "thump" about half, was removing each damper, and "voicing" each felt. It is surprising how hard those felts can get in a short period of time. I also adjusted the pedals and tramp work so that the dampers are raised the minimum amount over the strings, and still allow the sostenuto to work. On a Steinway this might mean removing some leather, and adjusting the sostenuto bar, but it might be worth the effort.

A **Ron Nossaman, RPT:** I had an S&S B in a college auditorium that produced a dramatic "sshhoooo-ssshh-whump" every time you depressed and released the damper pedal. Lifting individual damper heads and dropping them produced "doink" noises that, taken all together, produced the "whump" (nomenclature is my life). This convinced me it was the damper felts, and not the rest of the felts, pads, cushions, bushings, guides, and bumpers in the path between pedal and damper. The humidity control in the storage room adjacent to the stage was/is such that the piano's first summer there produced rust stains on the dampers! I told them I could try to wooly the old dampers up enough to maybe work, at probably half the cost of replacement, or I could replace them. The new dampers worked just fine; "SQRT(shoosh-whump)." We'll see what the summer brings.

A **Dale Fox, RPT:** One could try to limit the pedal to decrease the travel of the damper tray. The dampers sometimes lift much farther than necessary and therefore build up a lot of steam on return. This may not be a viable option, but you can determine that. If you try this option and it works, you should probably get permission from the customer first with the caveat that the pedal will feel a bit different, but the player will adapt easily. There are lots of other possibilities, but this is where I would start. Lots of pianos have similar problems. The causes are many, but that's why we earn the big bucks.

Damper Clunk

Q **Conrad Hoffsommer, RPT:** While we're talking about damper/underlever lift trays, I service a 1957 S&S B which, while fine when releasing, clunks when pressed hard. The customer hasn't complained, yet – but it bothers me.

The problem is that the bass lift-tray pivot pin has apparently made an oval hole in the hinge block. I did check the mounting screws, and they are tight.

Not wanting to completely do a damper regulation, am I inviting disaster if I just move the tray to the right (with dampers lifted) far enough to remove the block? As I recall, it is simply an unbushed hole and may respond to sizing.

A **Ed Foote:** No, but sometimes you may need to loosen the guide rails to avoid bending or breaking things. When you have the block out, it is easy to index the hole's location, and then drill a 1/2" hole, install a 1/2" plug, and redrill the hole. It is more surefire and permanent than sizing.

Tuning Instability

Q How long, after restringing a Steinway M, should one experience tuning instability in the piano?

— Leslie Bartlett
Houston, TX Chapter

A **Don Mannino, RPT:** Leslie, You asked a simple question that has no simple answer. Be aware of all the variables, do everything you can to settle the piano down, and it will do so.

With serious attention to string settling procedures and good tuning techniques, a newly strung piano can be used in a concert very shortly after it is strung - within a week should be no problem. It will, of course, be more stable after many more tunings and more use.

Stability is not an absolute - all pianos are unstable to varying degrees, so the question becomes: How stable does it need to be?

A **Frank Weston:** I restrung a 1922 M about nine months ago, and it has just attained reasonable stability (pitch more affected by changes in humidity, than by settling in). After the restringing the piano was tuned very frequently the first month, half a dozen chip tunings, and maybe a dozen regular tunings. During the next few months, pitch fell off about three cents a week, and tunings were done once or twice a month. About two months ago, the piano was tuned having gone five cents flat over two months. Last week, the piano was tuned, and it was a little sharp due to increased humidity, but, by and large, very close to pitch.

This particular piano did not get a new pinblock, or soundboard. If these components were replaced, I would expect

Continued on Page 14

Journal Advertising

Monthly rates:

	12X	6X	1X
Full Page	$554	$607	$688
2/3 Page	$433	$499	$562
1/2 Page	$318	$365	$409
1/3 Page	$222	$247	$289
1/4 Page	$189	$205	$238
1/6 Page	$126	$138	$163
1/8 Page	$105	$115	$134
2-Inch	$52	$63	$82
1-Inch	$26	$31	$41

•Covers run $120 extra per issue.
•Bleeds run $53 extra per issue.
•Guaranteed positions are 10% above cost of ad.

	Deadliines:
October 1998	August 20
November 1998	September 16
December 1998	October 14
January 1999	November 18
February 1999	December 16
March 1999	January 13
April 1999	February 17
May 1999	March 17
June 1999	April 14
July 1999	May 12

Ask Us About Color

For More Info,
Call
816-753-7747

The Finishing Touches

Dry Transfer Decals

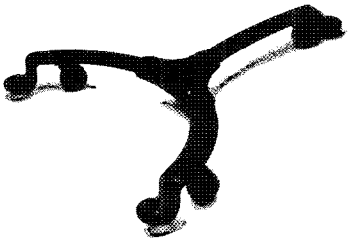
- Fast, easy, no cleanup
- Immediately ready to finish
- Over 700 Fallboard & Soundboard
- Custom Decals - send tracing for

Music Racks

- Authentic Steinway Designs
- Two styles

Grand Piano Carriage

- Made of the finest steel: coated
- Superior engineering and looks
- Two brakes included for added stability



- Smooth and effortless movement
- No finish damage to piano legs
- Shipped UPS

Decals Unlimited **Schroeder's Classic Carriage**
9333 96th St. No.
Mahtomedi, MN 55115 • 612-429-4465
Catalog available upon request

JAY-MART PIANO WHOLESALERS

"The piano store for piano stores"

PURCHASING • SELLING • TRADING

Offering genuine wholesale priced pianos
Entry level through concert quality
Place your order now!

GRANDS • SMALL VERTICALS • UNUSUAL PIANOS

Transportation available worldwide

800-411-2363 (216)382-7600

Fax: (216)-382-3249

P.O. Box 21148, Cleveland, OH 44121

Smoke damaged piano?
Guaranteed Odor Removal
Majestic Piano Company!

(612) 939-0997 *Smoke Damage Restoration Experts*

5 - 7th Ave. North
Hopkins, Minnesota, 55343

- We work with Insurance Companies
- Dealers
- Technicians
- Piano Owners
- Manufacturers

U.S. & Canada

Dave Swartz, RPT

Visit our web site:
http://www.majesticpiano.com

- Diagnostics & written estimates
- Moving services nationwide
- Fully Insured
- Full rebuilding & refinishing services
- Complete written appraisals

"I saw that article in the Journal..... But where is it?
I need it NOW !"

Introducing the new
Cumulative Fourteen–Year Index
of *The Piano Technicians Journal*
1984-1997

Compiled and edited by
Danny & Barbara Boone

Available from:
Piano Technology Resources
9707 Timberview
Waco, Texas 76712

$20.00 (plus $2.50 S&H)
(Canada $4.50 S&H)
Texas residents add 8.25% sales tax
Phone: 254-772-0546

Continued from Page 12

that the settling in period would be significantly longer. An O I did winter before last, (new soundboard and pinblock), has just recently become acceptably stable. Your mileage my vary.

A Bill Ballard, RPT: As Don Mannino says, there's a whole host of forces acting (yeah, pushing) on the tuning causing it to shift from where your last tuning put it. Because you're asking about a piano recently restrung, I'm assuming that you're asking about the pull on a tuning due to the initial (Ha! there's a misnomer) elongation of a fresh stringing. In fact it has a half-life. (I suggested this to Al Sanderson back in '93 and he concurred. He had seen a chart by Klaus Fenner of pitch drop in new wire with logarithmic axes [plural]. The line was a straight one.)

A good A-B test to demonstrate pitch loss due to elongation is the bi-chord note on which you've replaced just one string. The soundboard is doing its heave and sigh identically for both strings on that note. Possibly, the neighboring unisons are stable enough to eliminate playing stress as a factor. If so, the sag in the new bass string is a function of stretch, a stretch which we have all seen continue in subtle amounts for two years or more.

If this is an indication of the elongated time frame for the stretching of new wire, then just imagine that the same process is under way when the entire set of strings is replaced. But when all strings are gently sagging downwards together, that amount of sag after a year's time may not be noticeable given the ambient fluctuations of climate also occurring.

How soon can you play a concert on a fresh stringing? I finished stringing a B on a Tuesday. The dampers went in on Wednesday and Thursday, after which civilized tunings with the action were possible (as opposed to fingernail chippings).

Friday morning it was moved to a private home for a fundraiser recital that evening. I did a rough tuning to bring it up from A-437 to A-440, followed by a good solid tuning. It was stable for that tuning, and (excepting a little softness in the unisons at around #51-52) it was stable for the all-Schubert concert. I was proud of the piano. The next week it went to a local theater for a community orchestra piano concerto. For that, it needed another pitch raise but once again, when at pitch, behaved itself during the tuning and the concert.

Of course tuning stability here is measured in the short interval between the end of the tuning and the end of the concert. But isn't that how you measure it for concert purposes? If so, this old diva passed muster.

A Jim Bryant, RPT (FL): In my opinion there is no hard and fast "correct" answer to this question. Stability in a newly strung instrument depends on the functions of several factors. i.e.;

1. How many times the piano was tuned prior to delivery.
2. Were the strings rubbed? Not over-stretched, just rubbed?
3. New soundboard/bridge?
4. Is the piano going to be in a climate controlled location?
5. Is the piano going to be played regularly? On a daily basis? Weekly basis?

All of these, and more, have an effect on initial tuning stability. As a rule of thumb I tell my customers that if they play their piano on a fairly regular basis, and for a reasonable amount of time, that it will settle down within a year to 18 months. But only if it is tuned regularly during that time.

This, for all the reasons we have spoke of on the list, i.e., coils, rendering at capo/agraffe/bearing surfaces, bridge pins/bridge tension, hitch pin turns, wire stretching, whether the cat sleeps in it, etc.

It seems to me that a newly strung instrument is more affected by humidity swings than is a stable one – just an impression, no evidence to back that up.

A Don Rose RPT: Sounds like the beginning of a consensus. For best long-term stability do the following:

A. Measure the pitch of a particular string with your favorite aid.
B. Tap it down at the hitch pin, double scaling bar, before middle and after bridge, lift (on a grand) before and after capo bar or other speaking length termination point. (For an upright tap at either side of V-bar.)
C. Measure the pitch of the string again.
D. Offset a visual tuning device by the amount of the pitch drop, or 8 cents sharp which ever is smaller (ideas from Mr. Mannino and Mr. Giesbrecht).
E. Tap and lift tuning pin coils as necessary.
F. Tune the piano.
G. Tap all the strings as in B. Unfortunately this will destroy the tuning!
H. Tune the piano again.

Comments anyone?

A David Ilvedson, RPT: I have been tapping the bridge pins themselves and not the string lately. The vibration will seat the string and won't damage the bridge top. Give it a try....

A Roger Jolly: I do this on every new (to me) grand that I encounter. I lightly tap the bridge pins with a hammer shank, particularly at the bridge points. It's amazing what it does for the stability, and cleanliness of the treble (false beat elimination). Due to two dramatic season changes in this region, the concert hall pianos are done twice per year.

It is not unusual to tap a 10-year-old instrument and find that the pitch will drop 50 cents or more in the treble. Probably due to the fact the instrument was never prepped in the first place, but also due to the movement of the board from season to season. Just as important as the stability, you will find an improvement in the consistency of note-to-note power output. With less false beats voicing is less of a chore. Maybe in your climate it is less important, but give it a try. I think you are missing out if you don't do this. Don and I work together quite closely and we both experience the same results in this area.

A Norm Barrett: Let me post my two cents worth about seating the strings. The tool that I made to do this job is a piece of 1/4" brass rod about 5" long. One end I have filed a groove in to help keep it on the string. This tool fits nicely in the combination handle and I can just lightly bump each string down with the heel of my hand. You could probably do the job by simply pushing down gently because the only thing holding the string off the bridge is friction against the bridge pin. This is my humble opinion.

A Dave Porritt, RPT: I'm convinced it's not a matter of time, but how many times the piano has been tuned. After one of our concert grands was restrung last summer I had a graduate student practice in the shop. He

practiced every day, and I tuned every day. After 10 days, the piano was stable enough to use for recitals.

A Willem Blees, RPT: Although it is important to tune a piano frequently in the first couple of weeks, to work out the initial stretch, and to keep the tension up, it doesn't do any good if afterwards you don't keep doing that for a certain period of time. It might be stable enough for a recital, but tuning it often in the first couple of weeks does not make the piano stable in the long run. Why do we encourage our new-piano customers to have their piano tuned at least four times in the first year?

After I rebuild a piano, it gets six tunings in a two-week period in the shop. When I tune it, it is tuned 10 cents high. After the piano is delivered, I give the customer one more free tuning about two weeks later. Most of the time, the pitch will have dropped about 10 cents in that period of time. I do a pitch raise, and tune the piano to pitch. I then encourage the customer to have me come back after two months. If she does what she is told, the piano will be about at pitch. I then return in three months, then four months, and then keep the piano tuned at least twice a year for about three years. By this time, I consider the piano "stable." If the customer calls me in four months, instead of two months, the pitch will have dropped about 25 or 30 cents. By now the piano has become "unstable," and instead of it being stable after three years, it might not be stable for four or five years.

A Dave Porritt, RPT: After 10 days the piano was stable enough for recitals. Yes, it was tuned every week after that, and will be tuned at least every week for the rest of its life. That's the lot of the recital piano. You're right, it does take some time to get that "6 months, only humidity pitch change" but this piano will never go even a month without tuning.

A Rob Stuart-Vail, RPT: Willem and Dave, I agree with what you've said about stability of the tunings (I describe it to my clients as "the strings stretching") because I've seen this happen a lot over the past 30 years. In fact, it's quite predictable, and when I screen a client on the phone before the first appointment I try to uncover information on the age and tuning history of the piano just so I can cover myself and prepare the client for some remediation.

It seems not uncommon to find "stretching strings" on pianos that are upwards of 10 years old if they didn't get their full complement of tunings in the beginning, whether they are new or rebuilt. Getting these instruments stable is an important part of my business.

A Jerry Hunt: In a number of posts recently, there has been mention of tapping (bridge points, coils, etc.) with a hammer shank. Is this preferable to a brass rod? Is a brass rod acceptable?

A Roger Jolly: The reason I prefer a hammer shank, is that it will split before you can kink the wire, (another source of false beats) also less chance of indenting the bridge. I use a four-ounce hammer or the handle of my tuning pin hammer. A very light tap is all that is needed. I have seen some pianos that have been treated too aggressively with the brass drift, and thus become self-defeating. The coils will require the usual steel tools to do the job.

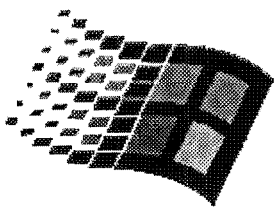
A Newton Hunt, RPT: Brass drifts are okay, but you can use them to the detriment of the tone and bridge. The use of an upright shank will show you if you are using too much force by splitting or leaving indents on its end. You do not need a lot of force, just a light tap with a light tool, like a small vise grips. I learned this idea from Mike Miccio of the NYC Chapter. There are tools made for leveling and lifting coils that are made of tool steel, which they need to be. A hammer shank is not a proper tool for these applications.

The Wrap-up

Thanks for the responses. I got pretty much what I wanted and expected – a lot of thoughts that said everything and nothing. The piano I'm re-tuning tomorrow, I did a couple months ago, then probably four months prior. I restrung it a year ago, and told them it wouldn't really stabilize for a couple of years. But I just wanted to check before I got into trouble.

— Leslie Bartlett

RCT for Windows 95 is here!



Reyburn CyberTuner®

The most advanced visual tuner on the inner planets!

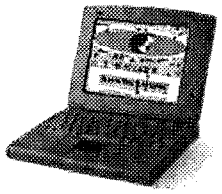
RCT transforms a Macintosh or Windows 95 laptop computer into a stand-alone visual tuning system designed for professional use. ***RCT*** includes four fully integrated software components:

Chameleon 2™ Listens directly to the piano and calculates an aural-quality tuning or use by CyberEar. *You* choose the tuning style to match the piano.

CyberEar™ instantly and graphically shows a string's pitch. ***CE*** features auto-noteswitcher, auto-pitch raiser, and aural temperament sequencing.

Pianalyzer™ Piano spectrum analyzer. Graphically shows pitch, inharmonicity, volume and sustain for up to 12 partials. Great for voicing!

Tuning File Management: unlimited tuning record storage, graph, print, edit, PTG approved scoring, historical temperaments, MIDI to an SAT.



$1395+
RCT /PowerBook
"Luna 1" Package

Reyburn Piano Service, Inc. ☎ 1-888-SOFT-440 **www.reyburn.com**

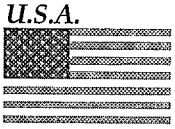
Dean L. Reyburn, RPT
2695 Indian Lakes Rd.
Cedar Springs, MI, USA 49319
Email: dean@reyburn.com

Macintosh or Windows 95
RCT software only: $795 +s/h
30 day money back guarantee
RCT manual or video: $10 ea

Authorized Distributor:
Mitch Kiel, RPT
1-888-I-LUV-RCT
mitchkiel@reyburn.com

World Class craftsmanship...
World Class materials and components...

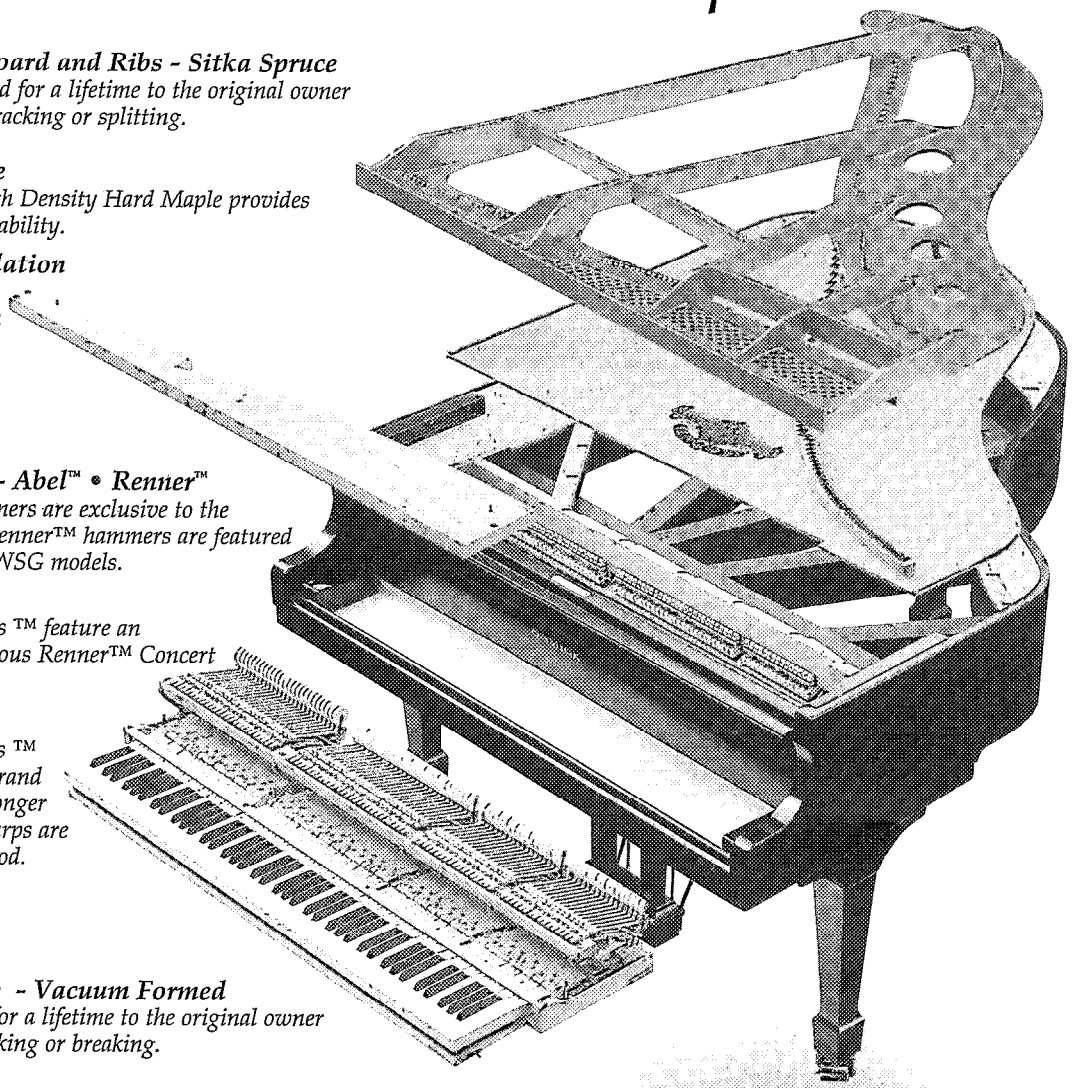
U.S.A.



Soundboard and Ribs - Sitka Spruce
Warranted for a lifetime to the original owner against cracking or splitting.

Pinblock - Hard Maple
Kiln dried Select Grade High Density Hard Maple provides superior tuning and tone stability.

Tone and Action Regulation
All World Pianos are given a final voicing regulation in our California factory to satisfy American tastes.



Germany

Hammers - Abel™ • Renner™
Abel™ hammers are exclusive to the WSG 275, Renner™ hammers are featured on all other WSG models.

Action - Renner™
Samick World Grand Pianos ™ feature an improved version of the famous Renner™ Concert type action.

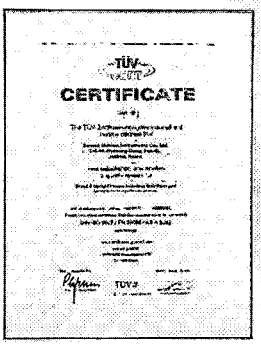
Keys - Kluge™
Samick World Grand Pianos ™ feature full concert length grand piano keys, which are 1/8" longer than industry standard. Sharps are crafted of genuine ebony wood.

South Korea

Iron Plate - Vacuum Formed
Warranted for a lifetime to the original owner against cracking or breaking.

Rim, Case, Structural Components
From hand notched bridges to specially built 100 ton rim presses, the best techniques of age-old artisans mesh with new world technologies to create an instrument your family will treasure for generations.

ISO 9000
Samick was the world's first music manufacturer awarded the ISO 9002 Quality System Certification (from TUV). That means Samick can **guarantee**, through third party verification, that our manufacturing process complies with a globally recognized international quality system standard.*



...It all comes together in the
Samick World Grand Piano™

Samick Music Corp., 18521 Railroad St, City of Industry, CA 91748 • 818-964-4700

SAMICK

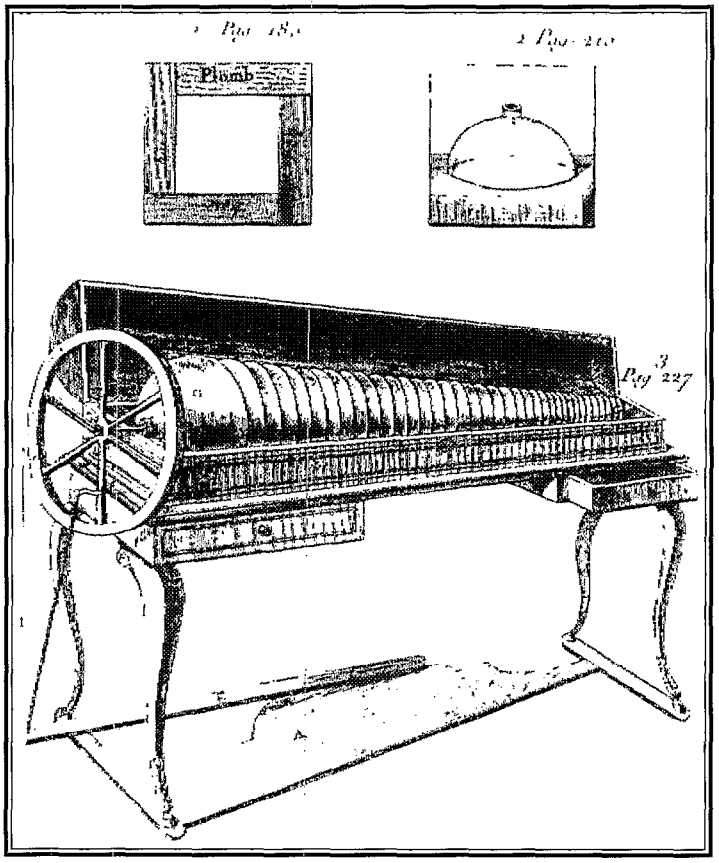
An Essay on the History of Tuning – Part X

By Skip Becker, RPT
Northeast Florida Chapter

Benjamin Franklin and the Armonica

Prologue

Around Noon on November 21, 1776, mid-way across the North Atlantic, two British warships sighted the three-masted sloop *Reprisal.* From her masthead flew the red-and-white-stripes of the Continental Congress. This was the first time these colors were seen this far east of the Colonies. The warships gave chase, eager to seize the raider which was undoubtedly on some mission to France. This impudence alone made her a rich prize. On the pursued American vessel, Captain Wicks had clear orders: escape pursuit if escape was possible, fight only if unavoidable. The captain did not need to reread his orders to know that his 14-gunned sloop was no match for two ships-of-the-line. This was the second time that the Americans had been chased, but this time the British drew much closer. It was touch-and-go for most of the day.



William Temple Franklin, Memoirs of the Life and Writings of Benjamin Franklin. *Courtesy: The Benjamin Franklin Collection, Yale University Library, and The Franklin Institute, Philadelphia, PA.*

Reprisal was loaded with indigo to pay for her voyage, but she had other, far more valuable, cargo. If they were captured, it was certain that at least one of her passengers would be taken to London and hung for high treason. The winter winds were high, and under full sail *Reprisal* was fast; but she creaked and whimpered on the rough seas. Around sunset, the heavy winds began to ease; but the outcome was no longer in doubt. If *Reprisal* would hold together, the men-of-war wouldn't catch her. After dark, Captain Wicks would alter course to the south, and give the British the slip. Wicks looked down to the windward side of the deck, and acknowledged a grateful cheer from passengers and crew. Then he looked to the leeward side, and saw the old man – braced against the cold with a heavy woolen cloak and fur hat – throwing a bucket tied to a rope into the ocean and, with scant sea-legs, hauling it up again. The bespectacled old man (he had invented the bifocals which he wore) was a scientist and inventor, perhaps the foremost in the world. He had also been (among a great number of other positions in public service) Post-Master General of North America, the President of Pennsylvania three times, a signer of the Declaration of Independence, and was now Ambassador (lately eloped under the cloak of plenipotentiary to Versailles.)[1] Dr. Benjamin Franklin would take his measurements of the Gulf Stream when the weather, not the British, permitted.[2]

The crossing was rapid, but rough. *Reprisal* arrived early for her rendezvous with a French squadron, and took two British merchant ships as prizes herself. On December 1st the first ship fully commissioned by the Continental Congress to make the perilous crossing lay in anchor off the coast of Brittany. Captain Wicks intended to sail up the Loire River to Nantes, but the winds would not cooperate; after four days, the Ambassador grew impatient, so Wicks hailed a fishing boat, and the Franklin party was set ashore in the little town of Aunoy (a full two day's journey from Nantes, their intended destination). Franklin later wrote to John Adams (the President of the Continental Congress) that the crossing had been miserable, that *Reprisal* was a miserable ship (she would founder on her return voyage), and Aunoy was so small that no carriage-for-hire was available.[3] When one did arrive the next day, it was a torturous affair as well:

> *The carriage was a miserable one with tired horses, the evening (of December 5th) dark, scarse a traveller but ourselves on the road; and, to make it more comfortable, the driver stopped near a wood we were to pass through, to tell us that a gang of eighteen robbers infested that wood who but two weeks ago had murdered some travellers on that very spot.*

Franklin (1706-1790), then 70, had volunteered for the dangerous mission because he considered himself expendable. He was a widower, in failing health, and broken-hearted that his oldest son had remained loyal to the British Crown.

Continued on Next Page

An Essay on the History of Tuning – Part X

Continued from Previous Page

In his own words, he was at the "fag-end" of his many years of public service. He had told the Continental Congress to do with him what they willed. Everyone knew that the newly independent colonies could not survive for long without strong alliances (and trading partners) in Europe. Reports were that both France and Spain were eager to help. But the news of General Washington's defeat on Long Island and the British occupation of New York had preceded Franklin across the Atlantic. Franklin tried to keep his new position as emissary secret in order to prevent any possible embarrassment to all concerned. However desirable anonymity may have been, it was unavailable.

Franklin was well known to savants in Europe as the philosopher-scientist whose treatises on electricity were the foundation of that science.[4] Common people knew that his inventions (the lightning rod and Franklin stove, in particular) made him a great "friend of humanity." His mere presence in France at this crucial time revealed everything. When he finally arrived in Nantes, he was literally inundated by hundreds of friends of America. News of his arrival spread like wildfire across the Continent. In Paris such was the excitement that every morning rumors circulated that he had arrived there; and every evening that he had not. By the time Franklin did arrive in Paris (on December 28, 1776), the friends of America had swollen to many thousands. The French found in Franklin a patriot hero who embodied Rousseau's unsophisticated nobility (with the wit of Voltaire!), struggling against the overwhelming might of corrupt British oppression. Franklin soon made another discovery, in his long life full of discovery: that he was the most famous man in the world. Within two years the French had given him an epitaph to die for: he snatched lightning from the sky, and the scepter from tyrants.[5]

Franklin the Musician

The perspicacious reader, waiting for the other shoe to drop, may wonder what the above vignette has to do with the history of tuning. No, this most fascinating of our Founding Fathers was not a professional tuner; but it is simply not possible to study the late 18th century without running into, time and again, the towering figure of Benjamin Franklin. He was everywhere. He was a musician, of course; and he knew quite a bit about tuning (or he wouldn't be in this essay!). He sang, played the harp, the guitar and violin. He gave frequent performances for friends in Philadelphia, London and Paris. He also played the glass dulcimer, and experimented with ways to extract musical tones from plates and ceramic bowls. Among his inventions (too numerous to list here) was a musical instrument which made him as famous in the world of music as he was in the realm of science or philosophy. His Armonica (glass harmonica) was the most talked about instrument of the 18th century, not excluding the fledgling piano forte. It was an improved version of the popular musical glasses, being 37 concentric glass hemispheres (three octave compass) graduated in size, fitted onto a spindle with their rims adjacent to, but not touching each other. The spindle revolved, and the bowls were sounded with moistened fingers. Its tones have been described as sweet, ethereal, penetrating, pathetic, and melancholy.

> *The advantages of this instrument are that its tones are incomparably sweet beyond those of any other; that they may be swelled and softened at pleasure by stronger or weaker pressure from the finger, and continued to any length; and that the instrument, being once well-tuned, never again wants tuning (Benjamin Franklin in a letter to Becarria, 1762).*

The instrument caused a worldwide sensation in the latter 18th century (this author is pleased to report that it is experiencing a worldwide revival today).[6] Nothing Franklin wrote in his long life, no experiment which he undertook, absorbed him as happily as this musical invention. Gluck, several Bachs, Mozart, Beethoven, and many others, all composed music for it. Anton Mesmer (of "mesmerism" and "animal magnetism" fame) was a virtuoso, and used it to induce trances for healing purposes.[7] From it's inception in 1761, the Armonica enjoyed a sudden vogue which lasted for decades, until it began to develop a bad reputation because of the harrowing effect it had on the nerves of some performers and listeners alike. It was even banned in some parts of Germany and Austria as a "danger to public safety," after a ten-year-old child died during a performance. It should be noted that neither Franklin nor Mesmer ever experienced any debilitating effect. Even this bad reputation did not prevent the Armonica from becoming one of Europe's five or six most common parlor instruments; but instructions usually included a warning not to play at Midnight (or you'll let in the ghosts!). In the 1820s, manufacturers of the new mouth organ cashed in on the popularity of the name. Today, because his instrument has been virtually forgotten, it is not generally known that Franklin was a musician.

The Musician in London

Back in Philadelphia, in 1756, at the age of 50, Franklin decided to retire from business, and devote the rest of his life completely to public service.[8] He sold his successful printing concern, and his few other investments. It should be noted that he never patented, never profited from the lightning rod (often called the Franklin rod). He spent the next year serving as an intracolonial diplomat. He was then sent by his fellow Colonists to London, where he acted as an agent for Pennsylvania. During this Transatlantic crossing he wrote the 25th and final installment of Poor Richard's Almanac. His fame as a scientist, inventor, and rural philosopher had preceded him to Britain. Shortly after his arrival, he was inducted as a Fellow in the Royal Society (an honor he never expected). There is no question that he was extremely effective representing the Colonies; he would return to London twice more before the Revolution in the same capacity. There is also no question that he enjoyed his life in London. He ran in the best social circles, and was the most sought after speaker by the Royal Society, the Free-masons (Benjamin Franklin was a Free-mason since 1731) and other altruistic organizations. As a Fellow, he rubbed elbows with the foremost scientists in the world.

The modern theory of light was just beginning to develop ("I must admit that I am in the dark about light" – Benjamin Franklin), with wave theory slowly supplanting the orthodox "corpuscle" theory. Franklin shared with Robert Smith, the "Dean" of music science in the Royal Society, the idea that light and sound operated on essentially the same principles. Franklin had previously experimented with light and color. During one Philadelphian winter he had placed pieces of differently colored cardboard on a snowbank. The spectrum of colors ranged from black to white. In a few hours, he noted

that the black card had sunk into the snow by the greatest amount, followed by dark blue, light blue, green, etc. The white card remained above the surface. Always a practical man, he used the information to suggest a military application: soldiers going to the Tropics should wear white uniforms, and those going to Northern climes should wear dark ones. Franklin was also the first modern scientist to analyze the phenomenon of "after-image." He noted that if one stares at, say, a bright window for a minute and then closes ones eyes, the image remains in the eye – clear enough to count the number of panes. If the light source is colored, the eye retains the "reverse-color" image. He reasoned that the ear must employ a similar principle. He wrote a short treatise on music theory (1762), dealing with the still raging "harmony versus melody" controversy, and weighed in on Rameau's side (see Chapter 9 of this present work), favoring harmony.

That we have a most perfect idea of a sound just past I might appeal to all acquainted with music, who know how easy it is to repeat a sound in the same pitch with one just heard. In tuning an instrument, a good ear can as easily determine that two strings are in unison by sounding them separately as by sounding them together; their disagreement is as easily, I believe I may say more easily and better, distinguished when sounded separately; for when sounded together, though you know by the beating that one is higher than the other, you cannot tell which it is. I have ascribed to memory the ability of comparing the pitch of a present tone with that of one past. But if there should be, as possibly there may be, something in the ear similar to what we find in the eye, that ability would not be entirely owing to memory. Possibly the vibrations given to the auditory nerves by a particular sound may actually continue some time after the cause of those vibrations is past, and the agreement or disagreement of a subsequent sound become by comparison with them more discernible. For the impression made on the visual nerves by a luminous object will continue for twenty or thirty seconds. Sitting in a room, look earnestly at the middle of a window a little while when the day is bright, and then shut your eyes; the figure of the window will still remain in the eye, and so distinct that you may count the panes....

Farther, when we consider by whom the ancient tunes were composed and how they were first performed, we shall see that each harmonic succession of sounds was natural and even necessary in their construction. They were composed by the minstrels of those days to be played on the harp accompanied by the voice. The harp was strung with wire, which gives a sound of long continuance, and had no contrivance, like that of the modern harpsichord, by which the sound of the preceding could be stopped the moment a succeeding note began. To avoid actual discord it was therefore necessary that the succeeding emphatic note should be a chord with the preceding, as their sounds must exist at the same time. Hence arose the beauty in those tunes that has so long pleased and will please forever, though men scarse know why.... Most tunes of late composition, not having this natural harmony united with their melody, have recourse to the artificial harmony of a bass and other accompanying parts. This support, in my opinion, the old tunes do not need, and are rather confused than aided by it.

Musical Glasses

The history of musical glasses begins in 1492, with our old friend Gaffurius, who tapped them with sticks performing "Pythagorean experiments." Another old friend, Vincenzo Galilei, was the first person to write about making musical tones by rubbing the rims of glasses, near the end of the Renaissance. In one of his dialogues, Vincenzo described the technique of circling the rim with a moist finger, and then added some more controversial findings. He promises that you will see "the waves in the water of exactly equal form;" then, if the note suddenly jumps up an octave, "there will appear other, smaller waves, which with infinite precision cut in half the first ones." This is all wrong, of course, and experimentation of this sort is probably why the name of Vincenzo Galilei is not well known today.[9]

Musical glasses remained a scientific toy until the 1730s, when they began to appear in churches, used for vocal accompaniment. In the 1740s, an ingenious Irishman named Puckeridge toured Europe, giving concerts on rows of glasses, tuned by filling each with varying amounts of water. In 1746, the composer and French courtier Gluck became a convert. By the 1750s, musical glasses were quite popular. In London (as in most major cities), most of the professional players were women. Anne Ford was the most skillful performer, and she published a book of instructions in 1761. Another was MaryAnne Davis, who became a protégé of the good doctor, and was the first person to give a public performance on his Armonica. One of the many amateur players was Edward Delaval, a classicist and scientist, and a friend whom Franklin had sponsored into the Royal Society. It was Delaval who introduced Franklin to the musical glasses. "Being charmed with the sweetness of its tones, and the music he produced from it, I wished only to see the glasses disposed in a more convenient form, and brought together in a narrower compass, so as to admit a greater number of tones, and all within reach of hand to a person sitting before the instrument." *(Benjamin Franklin letter to Becarria)*

The Invention

Franklin's time in London was spent in a whirlwind of activity. After his three-year enlistment was completed (1760), he was anxious to return home. However, he was so effective as an agent for the Colonies that the original commission was extended by two years. It is not known exactly when the first musical machine was completed, most likely some time in 1761. Thomas Penn visited London, and wrote Governor Hamilton, on April 13, 1761, that Franklin was spending his time "in philosophical, and especially electrical matters ... and musical performances on glasses." From the diary of Dr. William Stukeley (May 22, 1761) we read: "Visited Dr. Franklyn (sic), the electrical genius. He has made a dulcimer of wooden sticks, very sweet; another of glass bells, that warble like the sound of an organ." We can be certain that the Armonica was completed (if not named) by the time of the first public performance, in January 1762. From an advertisement in the Bristol Journal:

The celebrated Glassy-Chord invented by Mr. Franklin, of Philadelphia; who has greatly improved the Musical Glasses, and formed them into a compleat (sic) Instrument to accompany the Voice; capable of a thorough Bass, and never out of Tune. Miss Davies, from London, has performed in the Month of January, several favourite Airs, English, Scotch and Italian, on the Glassychord - being the only one of its Kind that has yet been produced - accompanied occasionally with the Voice and German Flute.

Regrettably, Franklin does not report the preliminary experiments which resulted in the harmonica. He does give

Continued on Next Page

Continued from Previous Page

these instructions to his friend Becarria, in his letter of 1762:

I will endeavor to give you such a description of it, and of the manner of constructing it, that you, or any of your friends may be enabled to imitate it, if you incline so to do, without being at the expense and trouble of the many experiments I have made in endeavoring to bring it to its present perfection.

...The glasses are blown as near as possible in the form of hemispheres, having each an open neck or socket in the middle.... The largest is nine inches in diameter, and the smallest three inches. Between these there are twenty-three different sizes, differing from each other a quarter of an inch in diameter. To make a single instrument there should be at least six glasses blown to each size; and out of this number one may probably pick 37 glasses (which are sufficient for three octaves with all the semitones), that will be each either the note one wants or a little sharper than that note, and all fitting so well into each other as to taper pretty regularly from the largest to the smallest. It is true there are not 37 sizes, but it often happens that two of the same size differ a note or half a note in tone, by reason of a difference in thickness, and these may be placed one in the other without sensibly hurting the regularity of the tapered form.

The glasses being chosen and every one marked with a diamond the note you intend it for, they are tuned by diminishing the thickness of those that are too sharp. This is done by grinding them round from the neck towards the brim, the breath of one or two inches, as may be required; often trying the glass by a well-tuned harpsichord, comparing the tone drawn from the glass by your finger, with the note you want, as sounded by that string of the harpsichord. When you come near the matter, be careful to wipe the glass clean and dry before each trial, because the tone is something flatter when the glass is wet, than it will be dry; and grinding a very little between each trial, you will thereby tune to great exactness. The more care is necessary in this, because if you go below your required pitch, there is no sharpening it again but by grinding somewhat off the brim, which will afterwards require polishing, and thus increase the trouble.

The glasses being thus tuned, you are to be provided with a case for them, and a spindle on which they are to be fixed....

My largest glass is G a little below the reach of the common voice, and my highest G, including three octaves. To distinguish the glasses the more readily to eye, I have painted the apparent parts of the glasses within side, every semitone white, and the other notes of the octave with the seven prismatic colours, viz. C, red; D, orange; E, yellow; F, green; G, blue; A, Indigo; B, purple; and C, red again; so that the glasses of the same color are always octaves to each other.

This instrument is played upon, by sitting before the middle of the set of glasses as before the keys of a harpsichord, turning them with the foot (pedal), and wetting them now and then with a spunge and clean water. The fingers should first be a little soaked in water and quite free from all greasiness; a little fine chalk upon them is sometimes useful, to make them catch the glass and bring out the tone more readily. Both hands are used, by which means different parts are played together. Observe, that the tones are best drawn out when the glasses turn from the ends of the fingers, not when they turn to them.

The advantages of this instrument are, that its tones are incomparably sweet, beyond those of any other; that they may be swelled and softened at pleasure by stronger or weaker pressure from the finger, and continued to any length; and that the instrument, being once well-tuned, never again wants tuning.

In honor of your musical language (Italian), I have borrowed from it the name of this instrument, calling it the Armonica.

The Assembly Line

For his musical experiments, the first thing Ben had to do was get a glass-blower. He contacted Hughes and Company, at the Cockpit Glasshouse, and received the services of Charles James. Working with a scientist must have been an unusual experience for James, who appeared unfamiliar with exacting demands, crucial specifications and timetables. There's no doubt Franklin knew that James was going to be trouble. After his prototype was completed, he went back to the Cockpit Glasshouse for another craftsman. A Mr. Barnes was selected to try his hand, and he provided Franklin an "improved version" of the glasses, which for Ben's purposes, were useless. Even James's work seemed better than that. In June 1762, James went into business for himself. He took out an ad in the London Journal, in which he called himself "the Maker who has been employed by the Gentleman who is the real Inventor, in the first ever made in England, and continues to be honored with his approbation."

Franklin was unhappy with the situation, but was consumed with his departure for the Colonies (September 1762), and had no time to correct it. Writing to Polly Stevenson from Philadelphia, March 25, 1763, he expressed his regret that James, already flagging in production, was "dilatory," and then commented: "I was unlucky in both the workman that I permitted to undertake making those instruments. The first was fanciful, and could never work to the purpose, because he was ever conceiving some new Improvement that answer'd no end: the other is absolutely idle. I have recommended a number to him from hence, but must stop my hand." Complaints continued: in a letter to Francis Hopkinson, August 15, 1765, Ben writes: "...It vexes me to hear that Miss Kennedy's Armonica is so badly made ... James is broke, as indeed his Head, if not his Neck, ought to have been, for serving her so basely, and abusing my Recommendation." It got even worse. When back in England, 1770, a friend asked Ben if the claim was true that James was the official builder. He confirmed the claim to the extent that "James is the only workman here acquainted with such matters, and, a very negligent, dilatory man." James was "now unable to supply one of my Friends because, awaiting the pleasure of Mr. James, at length, he died suddenly." Franklin settled on sending instructions, like the ones above, to persons interested in buying one.

Ben did take one home to Philadelphia (very few ever made it to America), and he kept one in every residence he had for the rest of his long life. There's the charming story that when he unpacked in Philadelphia after this London trip, he secretly set up the Armonica in the attic. When he began to play, his wife thought she had died and gone to heaven – and was listening to the Angels singing!

On The Continent

The instrument was introduced to the Continent by touring English professionals. In 1768, MaryAnne Davies, Ben's protégé, along with her sister Elizabeth,

gave a stunning performance at a royal wedding in Vienna. Everyone seemed eager to try their hands on one of these musical wonders. The Davieses sold their samples to the soon-to-be Queen of France, Marie Antonia, and the soon-to-be notorious Anton Mesmer. They both became MaryAnne's pupils. The real heyday began in the 1770s, and the main builders were in Germany, Austria and Poland. Manufacturers sprang up, each devising their own methods of production. The "Dean" seems to have been Ferdinand Pohl, a Bohemian joiner, who alone made more than 4,000 machines. Mozart, a player since childhood, immortalized the Armonica in Germany. In 1790, he was inspired by hearing his blind cousin Marianna Kirchgessner in recital, and composed for her the Adagio for Armonica solo (K.356), and the exquisite Adagio and Rondo for Armonica, flute, oboe, viola, and cello (K.617). The instrument was so popular in Germany that drug stores carried special "glass harmonica water" - with secret ingredients to play better![10] It should be noted that the history of the glass harmonica has not been forgotten in Germany.

No matter where the instrument was made, there were always production problems. They were expensive and difficult to play well.[11] Also, the bowls tended to break when the instrument was moved; or worse, when played, through their own vibration. This author believes it is fair to say that few of them received the kind of quality control and well-tuning that Franklin put on the few machines that he personally supervised. But in the end, what really did them in was their bad reputation. "Its ethereal vibrations were blamed for various nervous conditions, and stories circulated of strange afflictions that beset players and listeners alike. Some historians suggest that the problems were real, caused by lead from the glass leaching into the fingers of performers..." (Elijah Wald). It is true that both MaryAnne Davies and Marianna Kirchgessner (and other players) became ill, and had to abandon performing. To escape the harmful effects, some players tried to use pads; others tried to convert the armonica into a keyboard instrument. Francis Hopkinson, Franklin's Philadelphian friend, wrote to Thomas Jefferson in 1786 that he was working on the scheme, and had "little doubt of success." Jefferson replied that if it worked out ... "It will be the greatest present which has been made to the musical world this century, not excepting the piano forte." Despite such enthusiasm, no attempt to turn the Armonica into a keyboard instrument proved effective. No instrument with such a modification has survived, even in a museum. In Western Europe, concerts on the glass harmonica were rare after the 1830s, although its popularity in the Eastern provinces continued until the early 20th century.

The Nature of Franklin's Temperament

Interested readers may recall Ben's instructions to Becarria included "often trying the glass by a well-tuned harpsichord." The obvious question arises: What did he mean by that? The answer may lie in Ben's personal Armonica, which is on display at the Benjamin Franklin Memorial, in the Franklin Institute, in Philadelphia.

Ben's credentials as a musical scientist are impeccable. This author believes that Ben would have tuned the harpsichord by which he tried the glasses for his instrument (it seems unlikely BF would have let James do any tuning). We know for certain that in England during the 1760s, temperaments with circulating 5ths were a musical necessity. Today, they are known as Well-Temperaments, but the term was not common in English before the mid-20th century. They were the most common tuning, and were used exclusively by the pioneer professional tuners at this time. If the term "well-tuned" was in common usage, as it must have been, we can only guess that it was the English version of Werckmeister's 1690 term "Wohltemperierte;" synonymous with "common temperament" and Rousseau's term "established temperament" (Dictionary of Music, 1768). The answer should be found on Ben's Armonica, but we won't know for sure what this American musical scientist chose for his temperament until we can do the calculations. And we can't – at least, not right now.

There just aren't many old glass harmonicas. There are a few in museums, and some in private collections. None are believed to be in playable condition; and this includes the one in Philadelphia. The tuning of Ben's Armonica could only be evaluated after a complete restoration of his instrument, a project for which his museum currently has no funds available.

This author is indebted to Gerhard Finkenbeiner, for somehow obtaining and sharing the tuning data from a German instrument, "circa 1800," calculated in 1955. The instrument is believed to be one of Pohl's. The data, in cent deviation with a reference note of A=425 Hz, is both interesting and surprising. From the perspective of modern piano technology, the tuning seems crude. There does not appear to be a recognizable temperament, and the octaves are accurate only within plus or minus 10 cents - or so. Readers are invited to try their hand at the data, footnoted below.[12] If there is no temperament per se, there may be evidence of some intent on the part of the tuner. There is a consistent narrowing of the C-G 5ths, and the C-E major 3rds. There is also a consistently very flat G#. These characteristics lead this author to believe that we may be looking at a rough implementation of a meantone temperament. The answer to the question of "how did they tune it?" seems to be "as well as they could." Tim Nickerson, of Finkenbeiner Glass, admits that glass harmonicas are difficult to tune. He spends 40 percent of his production time on the effort. In the 18th century, few were tuned by the meticulous hand of Dr. Benjamin Franklin.

A Modest Proposal

When it happens, the restoration of Franklin's Armonica will be a great gift to the world of music. It will also be a great gift to our nation and to our posterity. It is the hope of this author that we can be there to help with the Piano Technicians Foundation.

Epilogue

Franklin's nine year service as Ambassador to France is full of anecdotes, most of which have become legend. There were other American Ambassadors during this time in Paris (including John Adams), but the French, and other emissaries (including agents from England) chose to deal with Franklin alone whenever possible. Ben had always affected plain style clothing, and visited King Louis dressed as if he were visiting the President of Congress – without a wig.[13] His fur hat became the emblem of America and her Revolution. Ben's likeness, usually in spectacles and fur hat, appeared in every home in France – in paintings, sculptures, pictures, on plates, cards, snuff-boxes, even on the sides of chamber pots.[14]

Continued on Next Page

An Essay on the History of Tuning – Part X

Continued from Previous Page

He was there to watch the first manned balloon flight, and he chaired the board of scientists who adjudicated Mesmer's fantastic claims for "animal magnetism" (and concluded that there was no scientific basis). He told his ennobled friends not to come to America, "...where everyone who comes must work; though, any who work may prosper." One summer evening, promptly at 8 p.m., he arrived at the country estate of a friend for dinner. The sun was already setting, but he had wanted to enjoy the grounds. He wished that he had another hour of daylight. That wish today is known as "Daylight Savings Time." From the Franklin Institute Home Page:

> *Benjamin Franklin stands tall among a small group of men we call our Founding Fathers. His role in the American Revolution was not played out on the battlefields like George Washington, but rather in the halls and staterooms of governments. His clear vision of the way things should be, and his skill in both writing and negotiating, helped him to shape the future of the United States of America.*

Today, America's leadership and government are found in Washington, D.C. In the late 1700s that leadership was in Philadelphia because that's where Ben Franklin was. Ben stands alone as the only person to have signed all four of the documents which helped to create the United States: the Declaration of Independence (1776), the Treaty of Alliance, Amity, and Commerce with France (1778), the Treaty of Peace between England, France, and the United States (1782), and the Constitution (1787). He actually helped to write parts of the Declaration of Independence and the Constitution. No other individual was more involved in the birth of our nation.

Credits

This author gratefully acknowledges help and support received from the Franklin Institute of Philadelphia: Irene Coffey, Librarian (and staff); and from G. Finkenbeiner, Inc: Gerhard Finkenbeiner; and Tim Nickerson, Music Department Manager.

Notes

1. If only France would recognize him as such.
2. The existence of the Gulf Stream was first noted by Ponce de Leon. Its position had been charted by Yankee whalers during the 1760s, at the behest of Franklin, the Post-Master Gerneral. During his 1776 crossing, Franklin observed current direction, and recorded water and air temperatures by dropping his thermometer four times a day. The data was kept secret until after the war, when it could no longer help the British.
3. Franklin knew something about ship building. He had invented "double-hulled" construction, which employed waterproof bulkheads. Variations of his design are used today (the basic design was employed by both Titanic and Luisitania).
4. Experiments in electricity were all the rage in the mid-18th-Century. In his treatises, BF coined the technical terms: electrify, electrical shock, current, positive, negative, conductor, non-conductor, charged, discharged, condenser, terminal, and battery. His great guess was that lightning might be made of the same stuff which was found in static charges stored in Leyden bottles. He proved it by flying a kite as a thunderstorm approached. An electrical charge collected around the kite, traveled down the string, and charged his previously discharged Leyden jar. In a later experiment, he hung a key chain on the kite string, long enough to reach the ground, and found than the current flow could be diverted by traveling through the metal into the earth; and discovered the basic principle for lightning rods.
5. Turgot devised for Franklin the most famous of modern Latin epigrams: *Eripuit caelo fulmen sceptrumque tyrannis*; but there had been earlier versions of almost the same thought. Immanuel Kant had referred to Franklin as a modern day Prometheus, having stolen the fire of heaven as a gift for mankind. However, in 1778, George III's grasp on his scepter was still very tight. Franklin protested against being given more credit by the epigram than he deserved: "It ascribes too much to me, especially in what relates to the tyrant; the Revolution having been the work of many able and brave men, wherein it is sufficient honor for me if I am allowed a small share."
6. Gerhard Finkenbeiner has established his glass factory in Waltham, MA., as the premier source for glass harmonicas. He has sold over 100 high quality, beautiful instruments to enthusiasts all over the world. There are also recordings of the harmonica available, Classical music through the New Age. Mr. Finkenbeiner invites you to visit his web site: www.finkenbeiner.com
7. Leopold Mozart reports that the Armonica was the only instrument Mesmer played well. In an enthusiastic letter to his wife, in 1773, he writes "Wolfgang too has played upon it. How I would like to own one!"
8. An interesting perspective may be had by noting the ages of our Founding Fathers at this time: Franklin was 50, George Washington 25, John Adams 22, Thomas Jefferson 14, Madison 6, and Hamilton 6 months.
9. In the first place, sound waves are far too small to be seen. One could no more measure the waves produced in a glass of water than one could count the vibrations of a vibrating string. The only other scientist who claims to have duplicated the results was Vincenzo's son, Galileo – near the end of his life, after he was humiliated by the Inquisition, embittered and blind. In the second place, no one else has been able to induce the musical tone of a glass to "jump up an octave" (except, once again, Galileo), including this author; the reader is invited to try.
10. Gerhard Finkenbeiner, the pre-eminent modern reproducer, says the secret ingredient was probably alcohol, for cleaning.
11. When Thomas Jefferson came to Paris as the new Ambassador, in 1787, he found that there were no French builders, and he had to send to London for a harmonica; and was quoted 30 guineas (gold), at a time when a grand piano designated "elegant" sold for 25 pounds (sterling).
12. A=425 Hz — sequence low to high — n/a= no cup/broken

C	n/a, 10, 5
C#	n/a, 10, 0
D	5, 15, 0
D#	n/a, 10, -2
E	-10, 0, -2
F	-5, 5, 5
F#	5, 5, 5
G	0, -5, 2
G#	-20, -10, -5
A	5, -5, n/a
A#	0, 0, 15
B	10, 5, 5

13. Franklin's natural appearance marked the beginnings of the end for the 200-year wig-wearing fashion. In France, the fad disappeared entirely in 1790, when the aristocrats lost their place to put one.
14. There is the story that George III was apprised of this development, and had Ben's likeness painted on the inside bottom of the royal pot.

Some Thoughts on the Design of Bass Strings – Part I

By Richard M. Brown, RPT
Portland, OR Chapter

Introduction

There has been very little discussion regarding bass string design in the Journal *the past dozen years. This is puzzling, because the piano technician knows that he/she can significantly improve the tone and acoustical quality of most instruments he chooses to rebuild. Much labor is expended in repairing soundboards and bridges, replacing hammers and refurbishing action components, regulating and case repair. When it comes to bass strings, the technician usually sends the originals to the supply house for duplication, which carries the risk of perpetuating design errors.*

Shipping old bass strings for duplication entails freight charges, study time for the stringmaker to measure the samples, and complete trust in the wisdom of the original scaling engineer. If the technician could spend a few hours at his desk to design an optimal set of bass strings, he might never ship another string; the specifications from his order could reach the supply house at the cost of letter postage, "fax" or e-mail. It makes little sense to invest months of arduous and meticulous work to rebuild an instrument, yet neglect so essential an element as bass string scaling design. The prerequisites to tackle scaling include: high school algebra, a $50 programmable scientific calculator, and the willingness to invest a few hours developing a rational scaling scheme optimally suited to that particular instrument.

I am not an engineer. Like most of you, I'm motivated by curiosity as to how a complicated mechanism works, and seek an understanding of the underlying principles. Insight can be derived from careful analysis. Patterns emerge that can be described and quantified. It appears that successful designs, developed over decades by trial-and-error techniques, tend to follow patterns of which the designer was probably unaware. ***By discussing these observed patterns, I hope to stimulate a further discussion and possibly galvanize those with real engineering expertise to share their knowledge with the rest of us. This article is not intended to represent the "last word" on bass string scaling – rather, it is offered as a springboard for further development (and perhaps simplification) of these ideas.***

Tension

Tension decisions are crucial to effective scaling. In the impressive compendium *Piano Tone Building*, Dr. Morton of American Wire & Steel describes his equi-tension scale for unwound strings. He recommends 160 pounds per string. Story & Clark, among other manufacturers, incorporated this concept into its scaling design of older grands, and the results are good. One problem with the equi-tension concept is the difficulty of establishing a smooth transition at the "break," where the wound strings begin, and this is especially true of the larger grands.

As we drop two string unisons, power diminishes due to decreased mass of wire. To offset the abrupt decrease in mass, an abrupt increase in tension is a reasonable solution. Dr. Morton's equi-tension concept has been modified into a graduated tension scheme to permit a smoother transition to bichord strings, and to enliven the lower tenor. Dr. Sanderson has published recommended tension ratios of 10:8:7 (monochord: bichord: trichord) but such a relationship probably describes only smaller grands. It may be appropriate to design a 45" monochord in a small grand at 200 pounds tension, but one would find the same note at 350 pounds in a concert grand.

The formulae for calculating tension may seem complex at first, but the technician need only push a button on a programmable calculator to obtain the desired result. For unwound strings,

$$\mathbf{T} = \frac{\mathbf{f^2 d^2 L_s^2}}{\mathbf{434}}$$

Where, **T** = tension (pounds), **d** = string diameter (inches), **f** = frequency (Hz, or cps), $\mathbf{L_s}$ = speaking length (inches).

For A#49 at 440 hz, the standard of western pitch, $\mathbf{L_s}$ = 15.75", **d** = .038" (16 1/2 ga.), **T**= 160 pounds.

A major disadvantage of this formula involves the necessity of looking up the frequency of each note in the treble. The musical scale involves semi-tones, 12 per octave, where the frequency doubles each octaves. Mathematically, the next semitone above the index note is

$$\sqrt[12]{2}$$

Continued on Next Page

Some Thoughts on the Design of Bass Strings

Continued from Previous Page

times the frequency of the index note. Using our scientific calculator, we obtain the coefficient factor 1.0694631, which allows us to simplify the original tension formula:

$$T = 1.55\ d^2 L_S^2 [2^{(N/6)}]$$

where N = note number (1 to 88). This is the basis of the slightly more complicated formula for wound strings (both singly and doubly wrapped):

$$T = 1.55\ (.89D_2^2 + .11d^2)L_S^2\ [2^{(N/6)}]$$

where T = tension (pounds), **d** = core diameter (inches), L_S = speaking length (inches), D_2 = outer diameter (inches).

The diagram at the bottom of the page illustrates the symbols used to describe bass string construction. Examining this formula for bass string tension, we see that the outer diameter is far more important in determining tension than the core diameter. Tension is proportional to the square of 90 percent of the outer diameter. This makes sense intuitively: the more wrap applied, the more tension required to prevent sag.

The ear is the ultimate arbiter of what succeeds and what does not. Let's look at three quality, large grands and see what has evolved in scaling over decades:

Instrument	Length A#1	Tension	T/L
Steinway D	79.75"	368	4.6
Steinway B	59.50"	278	4.7
Story & Clark 7'	61.875"	287	4.6

As expected, there is a predictable relationship between tension and speaking length. Additional measurements support the emerging pattern:

Instrument	Length A#1	Tension	T/L
Yamaha 6'3"	57.125"	258	4.5
Yamaha 6'6"	58.375"	262	4.5
Hamburg Steinway B	59.25"	278	4.7
Young Chang G-175	51.50"	228	4.4

It would appear that the T/L ratio of 4.5 is a very close approximation to a reasonable universal rule regarding monochord tensions, at least the lowest monochords. We can phrase this rule by the formula:

$$T = 4.5L_S \text{ for A\#1}$$

Should the monochord section be equi-tension? Such scaling would seem reasonable if the change in string length is less than 20 percent. The Steinway D, for example, has 8 monochords, from 76" to 79.75", a change of 3.75" (5 percent). There does not seem to be a compelling reason to vary tension within this section. Greater variability in speaking length within the bichord section necessitates a more flexible approach to tension decisions.

If we examine the Steinway B, we find 12 bichord notes (#9-#20), the shortest length 40.625", the longest 53.00", a change of 13.625" (33 percent). Despite some "scatter" when tension is graphically plotted, there is an overall 30-35 pound decrease in tension toward the shortest unison, from 230 to 200 pounds, a tension decrease of 15 percent.

The old Story & Clark 7" grand utilizes a different bichord scaling scheme: it has 14 bichords (notes #9-#22) with a length change from 43.375" to 55.00", a change of 11.625" (27 percent). Tension is tapered in the original scaling, from about 220 pounds to 175 pounds (45 pound difference, a change of 26 percent). Acoustically, the Steinway B has superb balance between monochords and bichords, whereas the Story & Clark has a discernible weakness in the mid bichord section that carries into the "break." If ever one were tempted to "juice" a hammer, it would be to compensate for the dullness of the high bass in the Story & Clark. As you see, a plausible pattern emerges from these considerations: one might taper tension in the wound bichords by half the percentage of speaking length change.

At this point, we have found a rule with which to set monochord tension, and it would appear that we can assign a well circumscribed range of tensions to the bichord section. But what value shall we assign to the lowest bichord? If we examine the Steinway D, the lowest unwound trichord (note #21) has a speaking length of 72.25" and a calculated tension of 202 pounds. This would seem to be the upper limit of tension for unwound strings if we accept the wisdom of the Steinway scaling, and our ears inform us that the balance of this magnificent instrument is excellent. A somewhat arbitrary but reasonable scheme might be the following:

Instrument size	Tension of lowest unwound trichord string
9'	200
7'	190
6'8"	185
6'3"	180
5'8"	175
5'2"	170

Calculation of wrapped bichord tensions in the better grands yield values that are intuitively reasonable: between the monochords and lowest unwound tichords. For the Steinway D, with A#1 at 375 pounds and the lowest unwrapped trichord at 200 pounds, a mid point value of 185 pounds for the lowest bichord fits our new rule and dovetails nicely with measurements of original stringing. We now have five principles with which to guide us in determining monochord and bichord tensions:

a) Determine tension for A#1 by the formula $4.5L_s$

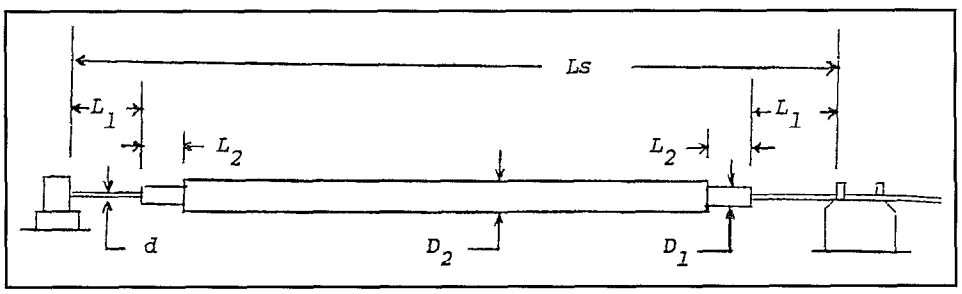
b) If the speaking length change is less than 20 percent in a monochord or bichord section, consider equi-tension scaling within the section.

c) If the speaking length change is greater than 20 percent in a bichord section, consider smoothly tapering the tension by half the percentage of length change (e.g.; if the length increases 30 percent, increase the tension by 15 percent).

d) Determine tension for lowest unwound trichord string by referring to the table above.

e) Assign a value to the lowest bichord tension midway between A#1 and the lowest trichord tension.

Now that we know what tensions to achieve in bass string design, we must calculate how to accomplish this, which will be discussed in the next installment.



Trigger Point Self-Massage for Piano Technicians – Part III

By Clair Davies, RPT
Bluegrass, KY Chapter

One Saturday last winter, when I was in massage school and was preparing these articles in my spare time, I took a break and went over to Bill and Nada's. That was a little old-fashioned cafe near me in downtown Salt Lake, open twenty-four hours. It was four-o'clock in the afternoon, the booths were all full and there was only one seat at the counter. A fella moved his newspaper out of the way for me. Hate to crowd you, I said. Plenty of room, he said.

Bill and Nada's is like stepping through a time warp. Open since 1948 and still just like then. There's a jukebox with tunes from the 50s and 60s, and every booth has a coin box and buttons to push for your selections. Looking around, it's not just oldtimers; there's a lot of young people, a good mix.

It's almost suppertime, but the guy beside me is having breakfast. The waitress holds up the coffee pot and looks at me. Sure, I said, and give me what this fella's having. Poached eggs, toast and sausage links burned up good. Leave off the pancakes, I said. Sell you what I've got for eight dollars, the fella said. I think I can beat the price, I said, and laughed. Can't blame me for trying, he said. I guess a guy's gotta keep knocking on the door, I said. We got into a pretty good conversation. He looked about my age, maybe a little younger. The girl knows everybody's name, I said. This your first time in here?, he said. Been in a few times, I said. It's like a time warp.

We talked a long time, trading stories and life histories, before he told me he came in twice a day to get a decent meal and to get away from his wife who had been drunk since Tuesday. Sixteen years she's been drunk, he said. He stayed home for two years and tried to change her. Then he gave up and went back to work. You can't change them, he said. It's gotta come from inside.

He sat back and looked at me when I told him I had come all the way from Kentucky to go to massage school in Salt Lake. Used to be a piano tuner, I said. Didn't like my life, working alone, living alone. You were like a hermit, he said. Yeah, like a hermit, I said. I watched him turn it over in his mind. Now you're taking care of yourself, he said. Doing what you want, he said. I nodded.

We talked a long time, like we were parched for conversation. The girl kept filling my cup. The fella said his name was Jack. We shook hands and I said my name was Corky, a name I hadn't used outside the family in 30 years. Sounded funny, him calling me Corky. Like a time warp.

He didn't have to go home, he finally said. He could just go get a room and just let her drink, let her kill herself with it. He didn't have to go back. He could have a life, there was time left. My gosh, yes, I said, there's time left, there's your whole life. I told him I was 61 and thought I could live another 60 years. I touched people and got rid of their pain. I was having the time of my life, I said. We left Bill and Nada's together and shook hands again. I said maybe I'll see you around sometime.

What's it mean, bumping orbits like that? Pay attention to coincidences, I read somewhere. Pay attention to accidental meetings. You get messages.

Until I told Jack about it, I hadn't seen that doing massage was a way of taking care of myself. All I'd been thinking was to get a diploma from a good school to give me credibility when I went to teaching self massage. I hadn't thought I'd like giving massage, but I did. I got as much from the massages I gave as my clients did, maybe more. When I touched someone it made a difference in both of us. I saw anger, resentment and frustration disappear, hard faces soften, walls come down. Knowing how to take care of myself made me fit for taking care of others, which made me more fit for taking care of myself. It went round and round.

Head, Jaw, and Facial Pain

Anger, resentment and frustration find their home in the muscles of the face, jaw, head and the front of the neck. The specific muscles in question are the frontalis (forehead), the masseter and the pteragoids (jaw), the occipitalis (the back of the head), the temporalis (temples), and the sternocleidomastoid (diagonally down the side of the neck). Too much pressure and overwork can set up trigger points in these muscles that can last a lifetime. Sudden violent trauma, such as whiplash from an auto accident or a fall, cause chronic trigger points in the sternocleidomastoids that seem to defy most conventional remedies, such as stretching exercises, cervical collars, vertebral adjustments and traction. Pills temporarily take the pain away but only mask the real problem. In the massage school clinic I saw dozens of people still suffering pain from whiplash years after the accident. Nobody during their rounds through the healthcare community had even mentioned trigger points to them.

As noted last month, problems in the sternocleidomastoids cause a multitude of miseries, from headaches to temporal mandibular joint (TMJ) pain. Travell and Simons call the referred pain patterns of the sternocleidomastoid "amazingly complex." Its trigger points can cause toothache, earache, sinus pain, sore throat, dizziness, nausea, fainting, temporary hearing loss, tinnitus, paroxysmal dry cough, and blurred vision – all depending exactly where in the muscle the trigger points occur.

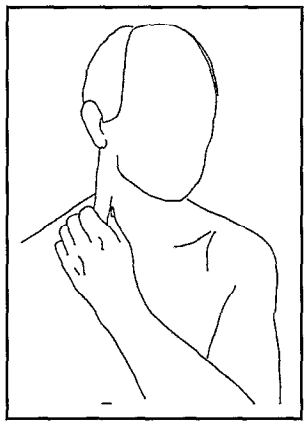


Figure 1

The best way to deal with the sternocleidomastoid is just to take the muscle between the fingers and thumb and squeeze

Continued on Next Page

Trigger Point Self-Massage for Piano Technicians

Continued from Previous Page

it for several seconds, hard enough to make it hurt a little. (See Figure 1) This technique is called "ischemic compression," which is a fancy way of saying "to press the blood out." Any place along the muscle that responds to squeezing with a sharp pain should be massaged periodically during the day, for several days, until the trigger point is deactivated and the pain goes away. Not infrequently, relief is immediate.

Pain is an indicator of an abnormal state. A healthy muscle won't hurt when palpated or squeezed. If a muscle hurts when touched, it is a sure sign that there are trigger points in it, or associated with it. Be aware that the painful muscle could be in some other muscle's pain referral zone. It pays to be a good detective with trigger points and the referred pain phenomenon.

Figure 2

Trigger points in the frontalis, temporalis and occipitalis are found under the scalp, from the eyebrow line to the base of the skull. The most tender places lurk under the eyebrows and in the soft depressions of the temple. Fingertips or the sides of the index fingers work here. (See Figure 2) Coincident pain above the eyes and at the back of the head is usually being referred from a trigger point at the top of the sternocleidomastoid, right at its attachment to the mastoid bone. Again, squeeze or press deeply enough to make it hurt a little. (See Figure 3) Hidden knots can also be found in a three-inch band across the back of the head. Generally, they lie in shallow depressions in the skull and can be massaged with the fingertips. (See Figure 4)

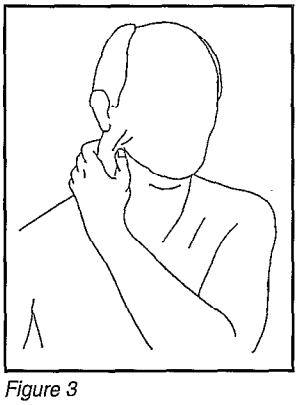


Figure 3

The jaw muscles that operate the infamous temporal-mandibular joint (TMJ) are the origin of a multitude of troubles. I don't have the answer to all the problems produced in this area, because some of the difficulty may come from maloclusion of the teeth or deterioration of bone. A short leg, bad posture or a pelvis that's out of whack are other conditions that have an effect on the jaws. Nevertheless, trigger points due to nervous tension frequently exist in the jaw muscles independent of these other difficulties. Even when the trouble comes from some place else, TMJ pain can often be reduced or eliminated entirely by dealing directly with trigger points in the jaw muscles.

Massaging the jaw from the outside is not enough, but it's a good place to start. Seek painful points all the way from the temples down the side of the face to the underside of the jaw and chin. The digastric muscles and one of the pteragoids anchor behind the back corner of the jaw. This is usually an exquisitely tender place that you may even hesitate to touch. To make progress with trigger points, however, it will be necessary to inflict a little more pain on yourself than you would really like. Many people are reluctant to touch their trigger points for fear of making things worse, but trigger points won't go away on their own. The only way to be rid of their painful influence is to bite the bullet and press, squeeze and rub them out of existence.

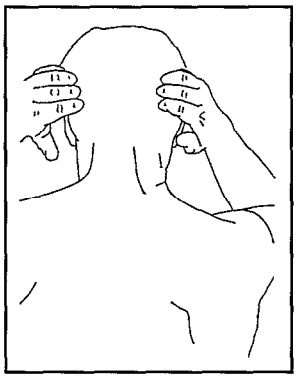


Figure 4

For deep massage of the jaw, the best maneuver is to put your thumb in your mouth and knead and squeeze the masseter, the jaw's main muscle, between the thumb and fingers. (See Figure 5) When I did this the first time on myself, my jaw muscles were so rock hard and sensitive that they hurt for two days afterwards. This doesn't always happen with trigger points if you go at it in a gentle way, but don't be put off or give up if the jaws react with some temporary increase in pain after treatment. It's just an indication of how bad they really are, and how in need of a therapeutic squeeze.

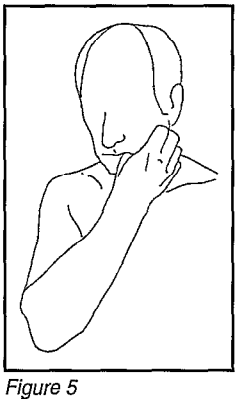


Figure 5

Working from the inside of the jaw with the thumb will produce great results, but working from even deeper - that is, inside the head - may be the only way of permanently ridding yourself of these "from-the-neck-up" agonies. Existential pain, emotional conflict, life issues and disease of the spirit are inevitably the real source of pain in these areas. Look at trigger points as elemental signals that old issues and old habits are begging to be ironed out.

Next month, I want to tell how I fixed my angonizing frozen shoulder. The muscles involved will be the ones that control the rotator cuff – the infraspinatus, subscapularis, supraspinatus and teres minor – plus a couple of others.

Celebrate
National Piano Month
September 1 – 30

World-Class JUNK

By Susan Kline, RPT
Feature Writer

How Firm a Foundation

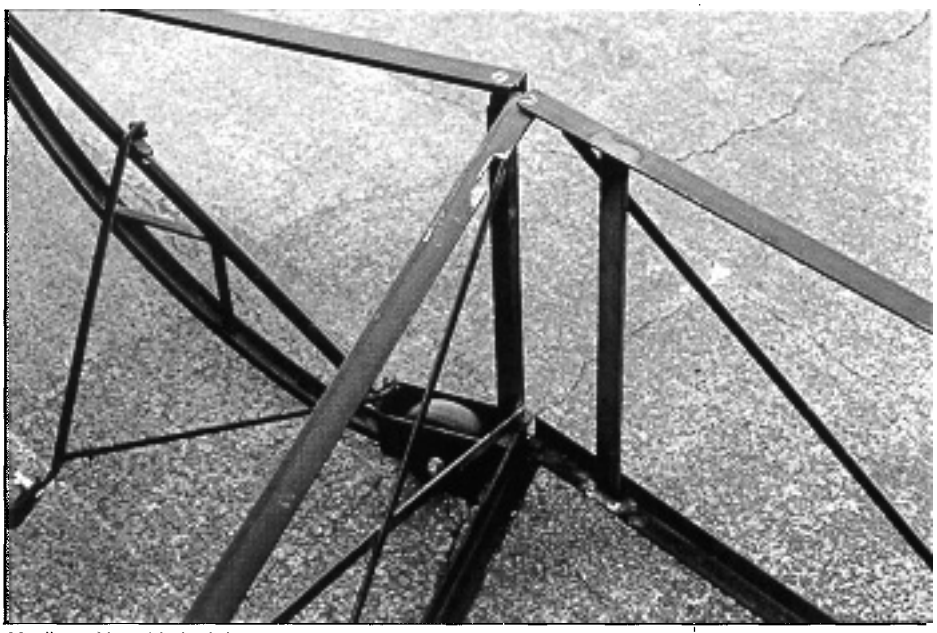
One afternoon my piano tilter succumbed to an overwhelming urge to resemble a pretzel. A pretzel doesn't support a 600-pound upright at all well. By good fortune, the piano was mine, and was in my living room. With the help of some friendly colleagues and four automotive jack stands, the vertical regained its normal upright stance. I could then inspect the twisted wreckage of the tilter.

A weld had failed, and a small wing-nut had split. This allowed the two main sections of the tilter, the triangular part with the handle, and the other part with the semicircular rails, to part company. The triangular part had depended on the other section for vertical support, so once it was on its own it folded.

I phoned Tuners Supply (of late, lamented memory), and told them what had happened, that no one had been hurt, and that the piano was okay. I asked them to replace the tilter. They did. Their letter arrived very promptly, and began, "We are so glad to hear that no one was hurt."

This tilter was much lighter than another I had considered, which weighed 52 pounds. I wanted to continue using it, but didn't want to risk having it collapse again. I took it to a customer who was a welder. He added two braces, so that if the same wing nut and weld failed it would not fold up. (See photograph.)

In fairness, I've never heard of anyone else's tilter collapsing. Tilting a piano is not my favorite task. I only do it when I must, for bass bridge repairs, caster replacement, to treat pinblocks, or to deal with failing bottom boards. You know ... that thing with the pedals mounted on it ... that thing that so often has big cracks and splits in it ... that thing held on by a few loose screws ... that thing that creaks and groans every time the right pedal is used.



My tilter with welded reinforcement.

Nomenclature

I have always felt vague about the name of the board in an upright that has the pedals mounted on it. I call it "the floor" or "the pedal board" or several other things. *Piano Parts and Their Functions* by Merle Mason is my authority for the names of piano anatomy. It turns out that Newton Hunt, a contributor to the "pianotech" e-mail list, did a lot of work for this book. I've found the book a fascinating fount of information about more than just part names. Do you go blank when someone mentions the comma of Didymus? Did you realize that "decal" is just a short name for "decalcomania"? Did someone just leave you in the dark by mentioning the Jankó keyboard? Marpurg's temperament? Winking the spoons? Did you realize that some pianos have been designed with strings on three levels, and they are called "double overstrung"? All in the *Piano Parts and Their Functions* glossary and appendices. It can be ordered from the PTG Home Office for a modest fee.

Mason (and friends) call the lowest part of the piano, with pedals mounted on it, the "bottom (Yamaha); bottom board (Wurlitzer); floor board (Kawai); trap-work board (Laughead)." I've heard that Kawai has changed its mind, and that they and most other people call it a bottom board these days, so I'll stay with that.

For the kick board, Merle Mason offers, "bottom panel; lower front

Continued on Next Page

World-Class Junk

Continued from Previous Page

board; lower frame (Laughead); knee board, kick board." I think bottom panel is probably the most accurate, but knee board or kick board are more vivid and easily remembered. Since I don't really enjoy kicking pianos, I'll choose knee board for now.

Tilting Avoidance

Why do I try to avoid tilting uprights unless I have to? While I can do it, there is some physical effort and risk, and I feel better attempting it with a couple of other people around. This isn't always easily arranged. Either way, the piano must be manhandled from the wall (quite difficult if the casters are missing), and plenty of room must be allowed for tilting. I must make a separate service call, since I don't normally carry a tilter with me. While nothing particularly horrid has ever happened while tilting a piano, I always feel exhausted afterwards.

For processes like treating pinblocks, tilting simply must be done. For smaller problems I put it off if possible. If the bottom board is loose and making noise, but isn't really too bad, and the piano never needs to be moved around the room, it is possible to wedge a board or block under the pedal area. The noise stops as soon as the bottom board is unable to flex. I've used everything from a scrap of lumber to a children's block to support the pedals. Of course this hasn't repaired anything, but it has ended the symptom, costs nothing, and does no harm.

When I showed this article to Jim Harvey, he told me another approach: "A trick I picked up years ago in southern California. I call it 'Raise the drawbridge or lower the water.' Instead of blocking from below, use wedges (strips of pre-cut cabinet wedges from a building supply will work) and drive them between the pedal rail and the bottom board on the inside of the cabinet in select areas. Optionally break off extended portions of wedge. Fast, cheap, out-of-sight, and quite effective in many situations." I can't wait to try that one! It would be something to try for pianos which are wheeled around, too.

Shiny polyester cases can also be noisy as the bottom board flexes, even when it is firmly attached and only flexes a little. If the knee board is rubbing on the rest of the case when the bottom board flexes a little, a thin film of VJ lube along the rubbing surfaces will quiet the noise.

Tilting Basics

The following comments are not the final word on tilting. Others may have more experiences, good or bad, and be in a better position to offer advice. (As mentioned, I don't tilt uprights often.) Be aware that the lid will want to flop open when you tilt. Open it if it is a half-lid, or remove it if it is a one-piece lid. Get rugs out of the way before you tilt. Be sure to allow plenty of room when you tilt and untilt a piano. Having one half-way down and seeing that it may press you against the wall isn't pleasant. Reverse direction, move further away from the wall, and try again.

Use both clamps to hold the tilter to the backposts. In fact, it's better not to trust the clamps that come with the tilter at all. I've heard that the welds can fail, and I've often had a clamp work loose as soon as the piano slides down onto the tilter's feet. Use some regular C-clamps to hold the tilter firmly to the backposts, and/or rig up a ratchet strap around the upper tilter frame and backposts, winding it around enough that it can't slip up or down.

When starting to tilt, a hand over the top of the piano, pulling the piano toward the tilter, is extra insurance. When the piano is half-way down, the hand is better used supporting and guiding the tilter. Do the same thing, in reverse, when putting the piano back on its feet. When "untilting," be aware that the piano may wish to keep going, and fall flat on its face.

Advise any assistants that if anything goes wrong, they should just get out of the way. This is sound advice any time pianos are being moved. People are much harder to repair than pianos.

This all makes tilting sound very dangerous, but the usual reaction of people watching me do it has been, "You mean that's all there is to it?" Still, a 600-pound object "exceeding its angle of repose" should be treated with respect. It's not a good time for surprises.

Upright At Rest, Imitating A Grand

Okay, the piano has assumed a recumbent position and the bottom board fasteners are finally accessible. Assuming the bottom board isn't in fragments or seriously cracked, the next step is to tighten all the screws. You may find some screws missing, loose or seized by rust, or the bottom board may have cracked beside one. The board may have a piece broken out of the edge, so the fastener ... doesn't.

It's decision time. If the bottom board is basically intact, but the original fasteners can't do the job of holding it, simply add additional screws. Of course you brought a number of shiny, brand new flathead wood screws, and your power drill, and the right drill bits and countersink? Then choose some likely places for new screws where needed. Drill the pilot holes, being sure you are drilling into firm wood, install the new fasteners, and untilt. (Very detailed directions for good pilot holes are below.)

However, if the bottom board is in pieces or has huge cracks, the best repair may be to make another board. This is not as drastic as it sounds. I find that 1/2" or 5/8" plywood works fine. Remove the pedal dowels, and label them if the middle and right pedal dowels are nearly the same length. Remove the screws holding the bottom board to the piano, drilling them out if they are rusted in place. If the screws are in good condition they may be reused, but replacing them is better. They are very cheap.

Once the bottom board is off, label the pedal levers and remove them carefully. There may be miscellaneous screw holes scattered here and there. As I remove the pedals and levers I use a 'magic marker' to circle the holes that I will need to copy later.

Determine whether the original pedal lever placement is correct. In less expensive pianos, I often find poor pedal lever alignment from the factory. If two levers are rubbing, if one is rubbing on the case, or if one twists to the side as the pedal is pressed down, it may be possible to improve the alignment. Also, once the "pedal prop bolt" (the threaded rod holding up the pedal) has been removed, you can position yourself directly over the lever and look down through the hole in the end.

Many low-cost pianos use 'univer-

Photo 2 — Tapered drill bits with countersinks for wood screws; three assorted gimlets; and chamfering router bits, with and without pilot bearing.

sal' pedals with multiple holes for pedal prop bolts. Observe which hole in the pedal is directly below the hole in the lever, and see if that is the one being used. If not, the prop bolt may be working at a bad angle, pulling the lever out of true, binding on the hole in the pedal, and making noise.

If the pedals are adjusted correctly, but the far ends of the levers are nearly hitting the toeblock when released, it may help to sand a little off the bottoms of the lever ends. If that fails to provide enough space, use a chisel to remove a little material from the toeblock. This extra clearance will give you more leeway when regulating the pedals later.

If lever placement is incorrect, move the lever to where you think it should go, and replace the pedal prop bolt. See if you can make it work right by just holding it in place. If in doubt, drill two quick pilot holes in the old floor board (see "gimlets"), screw the lever down, and assure that the thing will work in the new position. If everything lines up properly, circle the new holes and cross out the previous circles.

Gimlets

Handy, old-fashioned tools for boring holes quickly. No cord, no battery, no big drill getting in the way. They are good for awkward, tight places. Mine were made in Germany (where the tool is called a Schneckenbohrer, "snail drill.") They are available in four sizes from Pianotek Supply Company, 1-800-347-3854.

Just Make One...

After lever placement has been decided, the process of making a new bottom board is fairly simple, given a few power tools and the knowledge to use them. Place the old board over the plywood, trace around it, and rough out the new blank using a power saw. If there are curves at the corners to accommodate casters, they can be cut out (slowly) with a coping saw, a sabre saw, or a bandsaw with a narrow blade.

Turn the blank over and run a deep chamfer along all edges, using a router and a chamfering bit. A ball-bearing pilot on the bit is nice but not essential. No one will lean over with a flashlight and scold you for a few burn marks on the edges. The diagonal edge profile is to help prevent the floor board from snagging something and splintering when the piano is moved over thresholds.

Most old bottom boards were either black or dark brown underneath. Jim Harvey told me about some ways to finish the new ones easily. "Shoe polish, dye, or sole dressing are inexpensive options for dressing out those newly chamfered edges. No mess, fumes, compressors, fillers or sealing, and (typically) no multiple coats required."

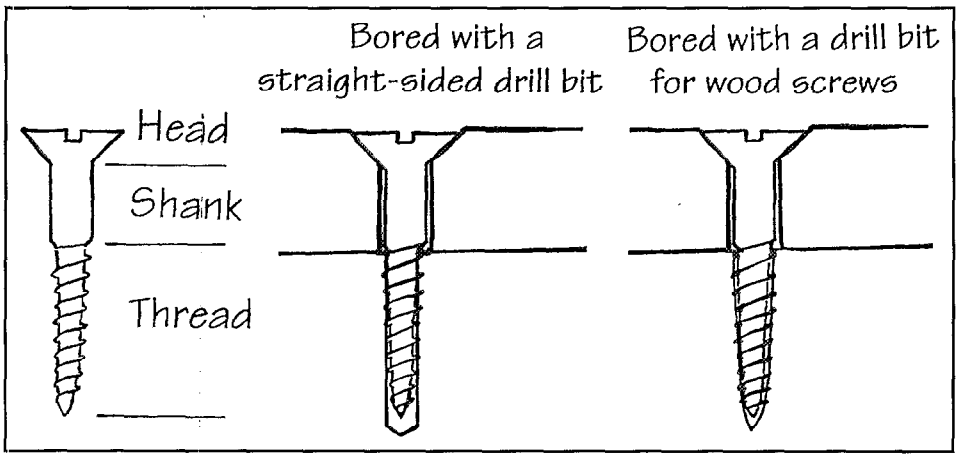
Once your blank is shaped and finished to your satisfaction, it is time to transfer data from the old to the new board. Clamp the old board on top of the new one. Using a brad-point bit, mark the screw locations for the levers and pedal mounts by drilling through the old holes. Use a slow speed - you just want to mark the new places, not drill the pilot holes yet.

For the holes in the edges, where the screws attach the bottom board to the piano, use the marker pen to run a line down the side of the new board, to show where the old holes were. Carefully avoid these places, so that all the screws will have new pilot holes, of the right size and shape, in fresh wood.

Pilot Hole Anatomy

Observe the flathead wood screw. It tapers toward the point. The head is flat so it will not protrude once it is installed. There-

Continued on Next Page



World-Class Junk

Continued from Previous Page

fore, it will not dig into non-flat things such as thresholds or steps if the piano is rolled over them.

The hole must fit the shape of the screw. To accomplish this, it needs a countersink to accommodate the head that might otherwise split the floor board, and would also stick out and catch on things. The more threads in contact with the sides of the hole, the more firmly the screw will grip. However, the unthreaded body portion of the screw must not bind, or the head could twist off when the screw is tightened or, again, likely split the board.

The threaded part of a wood screw has a major and a minor diameter. The major diameter is the same as the diameter of the smallest hole that will allow the entire threaded portion of the screw to pass. The minor diameter is the distance straight through the solid core of the screw. It can be measured by a vernier caliper, using the parts of the jaws which are narrowed to knife edges, or you can hold a drill bit up to the light in front of the screw, and see that none of the solid center portion of the screw is visible.

The screw must pass freely through the board, but thread firmly into the piano case. The pilot hole should have three sections: the smallest, in the piano itself, must be smaller than the major diameter, but larger than the minor. Where it falls between these two measurements determines how snugly the screw will fit. Also, hardwood will require a larger pilot hole than softwood, for the same snugness.

Ideally, the bottom portion of the pilot hole should be tapered, so that the same amount of thread digs into the hole all along its length. The hole in the bottom board (the "shank hole") must be larger than the major diameter, so the screw will pass freely and not bind. Of course, the countersink will be tapered to accommodate the head of the screw.

There are special countersink bits available in various sizes that are already tapered to match the shape of wood screws. (See photo) The countersink is built-in, and may be moved to whatever part of the bit is needed for whatever length of screw is required. The countersink can also be reversed and used as a stop when a countersink isn't needed. Using these bits saves time. First, choose a bit just slightly larger than the center core of the screw. Next, with the new bottom board clamped to the piano, select a place for a screw, and drill until the countersink is large enough for the screw head. The pointed ends of these bits make them easy to start, and they don't 'skate' like a standard bit. Once all holes are drilled, the board can be removed, and a slightly larger (standard) bit used to enlarge the holes (in the board) just enough for the screws to pass freely.

Without these specialized bits, it is necessary to drill the pilot hole through both pieces (clamped together), and to enlarge the hole in the bottom board with another bit later. The drill should be marked (with a flag of masking tape) so it will go just a little beyond the length of the screw. The hole won't be the optimum shape, but it will work.

Note: The separate (standard) countersink, put in an electric drill, will chatter unless it is used first, before the pilot hole is made. It will leave a cone-shaped, easily found, and automatically centered hole for subsequent bits.

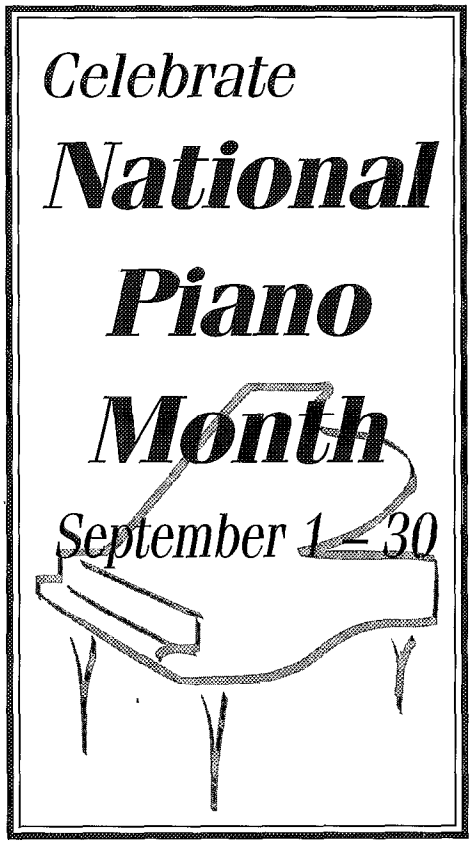
The screws will attach to three parts of the piano: the pedal rail, across the front (this is the most crucial), the sides, and the backposts and/or spacers and plates in the rear of the piano. By "plates" I mean the long pieces of wood in front and behind the backposts and spacer blocks. All of these are substantial, and offer a large area for attachment. If, in drilling a pilot hole, you meet with little or no resistance, try somewhere nearby instead. You may have drilled into a seam, between a backpost and spacer, or between either one and the plates. There are plenty of places from which to choose.

You can judge where to put the screws, and how many to use, by observing what was originally done. It's better to put in a few too many than not enough. The most important place for support is in the pedal area, both in front and in back.

Done at Last!

Once all the pilot holes are drilled for the bottom board, the different sized ones for the levers, and those for the pedal mounts, it's time to attach the pedals and levers to the new board. This is easy with the board off the piano! Remember to put the pedal prop bolts through the right holes in the pedals before the pedals are mounted. A fat front-rail punching makes a good grommet. The rubber type fails too soon. When installing screws for the first time, gently rub the threaded portion of each screw across a dry bar of soap to ease their way, and to prevent cobbling the heads. If you choose the pilot hole sizes correctly, the screws should take some effort to get in, but not enough to raise blisters. Of course your screwdrivers will be the right size and not mashed out of shape! Finally, it is a matter of courtesy to avoid mixing different types of screw heads; i.e., if some of the screws are slotted, make the rest slotted, too, instead of throwing in a few Phillips or Robertson screws. (For non-Canadians, Robertson screws are those with a square socket. I like them. They are far harder to wreck than Phillips screws.)

Going through this entire process, buying good hardware, making good choices, and quietly stacking one detail on top of another may seem like a lot of work, but really saves both time and frustration in the long run. You should end up with a very sturdy foundation for the upright, and the pedals should work in a trouble-free manner for decades, as they were intended to do.



Servicing The Modern Player Piano

By Larry Fisher, RPT
Portland, OR Chapter

I wish to address the issue of servicing the new-generation player pianos. Most of you have made up your minds on what to do when you hear the customer has a pneumatic player (air-operated), some of you run the other way, some of you tell the customer to call someone else, and a choice few of you accept the challenge with varying degrees of success.

The player piano of the most recent generation is just as unique and complex as its predecessor. Its appearance from the outside of the piano can be quite deceiving. At first glance, it would appear that nothing has changed and there's no reason to be concerned about the piano's expanded capabilities. As long as all you do is tune the piano, and don't drop anything inside, or have any reason to service the mechanics of the instrument, then you will find nothing out of the ordinary.

Virtually every player I've serviced, has needed some adjusting of some kind. From automatic recalibration to software manipulation to attaching product specific calibration hardware, every new generation player needs adjusting to keep the electromechanical parts working in harmony with the traditional parts. Knowing which parts to adjust is the key and can be a real trick for those not familiar with the product. Becoming familiar with the various products takes time and experience.

Servicing the electronic parts can be a new experience for most of you. I've been in electronics most of my life, since becoming a ham radio operator at an early age, so replacing a circuit board, or troubleshooting the various sub-assemblies is fairly routine for me. The simple task of taking a voltage measurement can be quite an experience for some. The volt meters of today are so sensitive that they can read the various levels of tarnish found on the metal you're touching with the probe and so your voltage reading will fluctuate, seemingly all over the place. Interpreting this wrong could lead you way off course and cause you to make numerous trips to the customer's home (their arms folded and their toes tapping).

We all know that troubleshooting over the phone can be a real trick. Knowledge of how the device is operated, its various features and the buttons that are pushed to get these features, is crucial to cost effective service. Many times, such things can be explained over the phone. Some customers barely know how to turn it on and get it to play, so explaining details of its operation over the phone is not usually an option with these folks. Then there's the customer who has his computer connected to the internet, their piano, as well as a keyboard, a fax/scanner/printer and would like them all to work same-ol'-timeously so they can hear their piano playing in the background as they perform office work, or they need to make a living composing, compiling, and editing music with their machines and need you to know some things about the software they're using to do all this. Don't forget, there are those who are using these automatic pianos in conjunction with some software and are having problems getting the piano to play soft enough, or with enough expression, or with enough clarity to satisfy.

If you need to repin a flange or do other weight/friction altering repairs, you'll need to recalibrate the player mechanism to accommodate the changes made. On some, pulling the action requires you to disconnect a cable or two, and remembering to reconnect them is usually crucial to proper function of the instrument after you leave the house. Another thing to consider is the re-installation of the action in the action cavity on grands. Some players have been installed in such a way that you have to mash all the keys down, and with the sustain pedal depressed, you slide the action back in. Field-installed players such as PianoDisc and Pianomation may have such widely varied installations from one piano to the next, even within the same make and model, that some technicians find this quite unnerving. Baldwin is insisting that all their Concert Master™ installations look as similar as possible from one to the next, regardless of who installed them.

One particular model that I know of won't acknowledge the presence of the key sensor strip if you power up the unit with the sensor strip unplugged and then plug it back in. Shutting it off at the control panel doesn't cure this problem. You must either unplug the unit from the wall for a few minutes or turn it off at the power supply, then before applying the power again, be sure the sensor strip is plugged in correctly. Concert Masters™ have a separate power switch for the sensor strip which in itself creates some rather frantic moments for dealers, technicians and customers.

In summation, servicing automatic players is like anything else. Experience and exposure to the product creates the best opportunity to become a more knowledgeable and competent technician when called upon to service these things. If you assume that they're like any other piano, only with a few extra doodads attached, you'll be looking good until one day something comes up and you'll be pulling your hair out (if you have any) trying to keep the customer's confidence, while very effectively digging yourself a very deep hole to hide in.

Advice? Well, if you're not confident working with electronics, and don't have a very good mechanical aptitude, refer servicing these piano types to other technicians. If that option is not available to you, call the factory. They're usually used to talking to people with your type of phobia.

- Remember, if you're wearing lots of synthetic fibers (nylon, double-knit, polyester, rayon) or are wearing wool, or you have leather soles on your shoes, these generate lots of static. Static electricity can blow holes in the sensitive electronics of these things when the circuit boards are exposed or out of their protective boxes and coverings. These holes are not the type that the naked eye can see, but under a microscope they can look like an atom bomb went off in the vicinity of ground zero.
- Keep up to date on them as much as possible. Spend time on the dealer's floor familiarizing yourself with the product as time permits. It will be time well spent.
- Carry the factory-recommended minimum parts and service materials to every automatic piano service call. This can be a rather large investment, but for some of you, it may be unavoidable if you're going to service these things on an active basis. Since I was formerly an electronic organ technician, and had developed the skills to troubleshoot the electronics in these things before they were invented, I find I'm quite comfortable doing service calls with a few spare parts, a DVM (Digital Volt-Ohm Meter) and the service/calibration kit from QRS. The rest I can verify over the phone by having the customer answer a few questions or perform a few tasks for me before I schedule the call.
- Know your limits on these things. Plugging something in wrong, or dropping something conductive into small places can create havoc in your life as well as the customer's. Unplug them while you're servicing them ... it's cheap insurance.

Ulrich Gerhartz

The Quest for Perfection

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

The Tuner's Life

At the tender age of 28, piano technician Ulrich Gerhartz found himself in one of the most prestigious and demanding jobs a piano technician could imagine. As Steinway & Sons Senior Concert Technician for the entire United Kingdom, Gerhartz (now 31) supervises a staff of 12 domestic tuner-technicians and maintains the pianos in Steinway's U.K. concert fleet.

Although young for such an important responsibility, the affable Gerhartz brings excellent training and experience to the job, and has already acquired a considerable reputation among the world's great pianists. Artists such as Garrick Ohlsson, Murray Perahia, and Andras Schiff have all enthusiastically confirmed to this writer that Gerhartz has taken the UK Steinway C&A pianos to a new level.

Photo 1 — Ulrich Gerhartz tuning a piano in the basement selection room.

Gerhartz trained initially as a graphic designer, then did a stint of mandatory military service in the Austrian army. After his military service he decided he wanted to become an architect, but thought it would be good to acquire a hands-on skill first. In 1986 the Hamburg Steinway factory was advertising for apprentices and Gerhartz saw this as the opportunity he was looking for. He began an apprenticeship with Steinway and by the time he finished his training three and a half years later, he knew he had found his life's work.

Training at the Hamburg factory started with 10 weeks of intensive training in cabinet-making. Trainees are required to purchase a complete set of wood-working tools, and the work begins with sawing boards and making joints, and eventually culminates in building piano cabinets, fitting pinblocks and making soundboards and bridges. Gerhartz also acquired skills in stringing, action-building, voicing and finishing the cases. Tuning? "From the very beginning," he said, "we learned to tune, starting with chipping on the factory floor."

Photo 2 — Cabinet in Steinway Hall workshop containing Gerhartz's woodworking tools.

I asked Gerhartz how well his initial training at the Steinway factory prepared him for his current job. "Very well," he said, "but there was still much to learn; you continue to learn." Following his apprenticeship he was hired in 1990 by Steinway Hall in London as an assistant in the basement selection room. In 1994, he became the Senior Concert Technician.

In addition to supervising the army of tuners and technicians mentioned above, Gerhartz oversees and cares for a fleet of 13 Steinway Ds and six Steinway Bs (all built in Hamburg) in the Steinway Hall basement and around London. He works "seven days a week" and keeps

two complete sets of tools, one at his West London home and one at Steinway Hall. A typical workday will usually follow one of three basic patterns: a service day outside London, a London concert hall followed by work at Steinway Hall, or a day in a recording studio.

The service day outside London begins with Gerhartz

Photo 3 — Some of Gerhartz's charges arrayed for a selection.

driving to the designated concert hall in another city. "I get a workbench or a trestle table, or I always have a good, solid cover with me so I can cover a piano and then work on top of it. The next thing is to get your vacuum cleaner and all the gear you need from the stage stuff, and then start with clearing the piano out, making it look tidy, check the pedals, prepare the keybed, strip the action down, go through the whole job of tightening everything down, polishing everything up, lubricating everything, and then, depending on the state of the piano, either deep-toning and shaping and regulating, tuning and voicing after that, or just "pulling them over" - polishing the hammers - fitting hammers to strings, regulating, tuning it up and voicing it. A day of outside servicing is at least eight hours work at the concert hall, plus about two hours driving each way."

A typical day in London would consist of "leaving home, going to one of the London concert halls like the Barbican Center, working there for about three hours in one of my maintenance slots where I work my way through the three model Ds on stage, so that they are always well in tune, well-regulated, well-voiced. I would then come from the Barbican back to Steinway Hall, and continue working here on pianos from the concert fleet, get them ready for selection, check them over, or do some major servicing on them, which would include restringing the top two sections, putting new hammers on, and the usual shaping-up, regulating voicing. The other thing at Steinway Hall will always be to communicate with the artists departments of the various concert halls of the UK, who are always advised on how to prepare the piano, how to select the piano, whether to bring a piano in, what to do if a foreign orchestra comes in, whether to pull the pitch up, or to hire a piano at a higher pitch. Also, I do in-house training with colleagues who have started here, and work with the sales department so that all the pianos on the floor are well presented, especially when it comes to selection for concert halls, pre-select pianos and then prepare them so that they can be presented to artists who, very often, are asked to select pianos for the halls. Then, very often, after having spent another five hours at Steinway Hall, I'll go out and do another concert preparation either at the Barbican or at Wigmore Hall, which would get me back home about 10:00 or 11:00 at night."

The third type of day is recording studio work. In the recording studio, "I'm basically only looking after our main artists," says Gerhartz. "I'm not saying there are better or worse artists, but the artists who need more attention, and are important to Steinway that they are happy with the piano, I will go out traveling with them, and provide and look after the pianos. Whereas in the usual case, the artist might come to Steinway Hall, meet me, select the piano, I would prepare the piano, and then one of the tuning staff would go look after the recording sessions." Gerhartz will occasionally travel with an artist for either a concert tour or a recording session, and as it happened at the time I visited him in London, he was preparing to spend 10 days in Budapest on a recording session.

I was extremely impressed with the beautiful voicing Gerhartz had done on the pianos at Steinway Hall. Among the many concert grands in the selection room, he is able to keep a variety of different kinds of sound at the ready. From the extremes, a concerto instrument so bright and powerful as to be almost bombastic and a very soft-voiced instrument he described as the favorite of one artist in particular, through the entire range of everything in between, each piano had a real beauty of tone. I asked him how he approached the job of tone-regulation to produce his wonderful results. "I start with deep needling, low in the shoulders," he replied. "I needle all the hammers, all the way to the top of the treble, and I sometimes needle even below the staple. After I'm satisfied that the shoulder felt is sufficiently resilient, I file the hammers to restore a good shape, and to bring the attack back to the tone, adding a few drops of collodian if necessary. Finally, I polish the hammers with increasingly fine grades of sandpaper: 400-, 600-, and even 1,200-grit. I know a lot of people consider this too much work, and they do a lot of fancy things to the nose of the hammer to get quick results, but this method is the only way to get the sound I'm after."

The sound Ulrich Gerhartz is after: a clear, clean attack with plenty of warmth, depth and sustain underneath. "His conception of tone might be called old-fashioned by some," said Garrick Ohlsson to this writer after playing a recital at Wigmore Hall, "but I love it. It gives an artist such a broad palette of colors to work with. He's done a terrific job with these London pianos."

Continued on Next Page

Photo 4 — Gerhartz at work, with tray for tools in foreground.

The Tuner's Life — Ulrich Gerhartz

Continued on Next Page

Gerhartz keeps a meticulous shop and has a keen mind for organizing his tools. As he worked, he kept his tools on a handy wooden trays he made to keep the tools handy and to protect the stretcher and tuning pin area from damage (See photo 4). I noticed that when fitting hammers to strings, he used a hook between the strings to raise the hammer up (See photo 5). When I mentioned that most technicians in the U.S. raise the hammer by pressing the jack tender against the let-off button, he replied that he knew the technique, but felt that he could achieve a lighter, more consistent touch against the strings by using the hook.

Like all piano technicians, Gerhartz has had a few close scrapes. I asked him to describe his very worst experiences as a piano technician. "I haven't had any real disasters, he said, "but here's one very nasty example. We have a small concert hall in London where they do live BBC lunchtime concerts - live broadcasts - once a month at about 1:00. It was a two-piano recital, and we delivered one from the basement to match the resident piano. I was doing the tuning, and the tuning time is always very limited because the audience comes in before the live broadcast, so you have between noon and 12:45 or even 12:30 and 1:00 to tune. The delivery was not until noon, and when I tried the pianos, one was very much flat to the other one, so I had about half an hour to bring these pianos together - with the clock ticking before a live broadcast. I must say that both pianists were very understanding; they saw me and knew there was trouble, so they left me to it. And you know, it worked very well, which shows that when you're under pressure and you know your stuff, it can be done, but it was not very nice."

Photo 5 — Fitting hammers to strings with hook. Notice tray for voicing tools on stretcher.

"The other terrible thing was a concert with Mitsuko Uchida at the Wigmore Hall. The piano actually came from the Steinway Hall basement, and just before the performance, a string in the middle of the piano broke. It's something, of course, that you don't expect, and something that you've got to fix. So I put on a new string, and, again, it worked, more or less, but you certainly break out in a cold sweat. You know what has happened, and you know there's little one can do about it - the piano goes horribly out of tune in the middle of the concert - other people don't. It's really not a very nice thought."

But the frustrating experiences are vastly outweighed by the positive, rewarding ones, says Gerhartz. He has recently become a big hit as a pre-concert lecturer. "Certainly, one of the most enjoyable things I've done recently was working with [Italian pianistic superstar] Maurizio Pollini as he played the complete Beethoven piano sonatas at the Royal Festival Hall. A nice surprise was on the initial day, after the pre-concert lecture, seeing that the people were really excited about the piano, realizing how important it is for someone like Pollini, who fills a large hall with no problem, how important the piano is for him. It's very rare that one has a chance to get it across to the audience that it's not just the pianist making a nice sound, it's also the piano making the nice sound.

"It's also very rewarding to work for piano competitions, where I have to work on a very low budget and compete with firms that can afford to sponsor a lot of things that we can't, and to prepare the piano in a way that in the finals, five of the six finalists choose the piano that you've prepared, while only one selects the piano that's backed up the huge PR machine. That's very satisfying; it's very stressful as well, but when it all works, it's a very nice experience.

"The other very fascinating thing has been putting together this London concert fleet, selecting all the pianos, preparing them, presenting them to the artists, seeing them become a success." Indeed, during the days that this writer spent visiting with Gerhartz, the phone seemed to ring constantly: "That was Mitsuko Uchida," he said after one call. "She wants to select a piano next week...." And Steinway Hall hosted a seemingly endless parade of famous pianists - Maria-Joao Pires, Garrick Ohlsson, Alfred Brendel - coming by to select a piano or simply to practice in one of several practice rooms scattered around the basement.

"Another very good thing that happened this year was being responsible for the pianos at Wigmore Hall, here in London. I've prepared the two pianos for the hall, and they have been a huge success, so that sometimes when people try the pianos there, they come across the road to Steinway Hall just to say how nice the pianos are, which is something you don't get very often. It's a nice surprise, a great motivation and makes you work even harder."

The hard work, the long hours, and what Gerhartz admits is a low salary, don't diminish his job satisfaction. "I'm working in a very visible and gratifying position on some of the world's best pianos and with the world's greatest pianists. I'm extremely happy in my work. How many people can say that? How can you put a price on that?" The questions seem to hang in the air for a moment, then, as if in answer, a knock comes on the selection room door, and another smiling pianist comes in to try the pianos Ulrich Gerhartz has prepared.

The Puzzler

By Dan Levitan, RPT

Puzzler #10
Stiffness in a Shank

It was a big old upright, and as she helped him take the stacks of music off the top she said, "So, you mentioned it's been a couple of years since you had it tuned."

"That's right," he said. "Do you know old Mr. Smith is? He used to call us every year, but I haven't heard from him in a while. I think he's retired now."

"Yes, I think so," she said, taking off the top front board. Things didn't look too bad inside; the parts were reasonably well-spaced, and mostly original, except for a few new hammer shanks. As she ran a chromatic scale up and down, her fingers tripped over note B4, one of the ones with a new shank. She played it a few times, leaning in for a better look.

"Oh," he said, "that B. Mr. Smith had to fix it last time he was here, and the new part still feels a little stiff."

"Really?" She thought, how can a new hammer shank feel stiff?

"Yes. It didn't feel like that before. Mr. Smith asked me not to play it till the day after, to let the glue dry. Otherwise, I would have asked him about it. Well, I'll leave you to your work." He left the room, closing the door after himself.

She played the B a few more times. There was definitely some resistance in the touch. She pushed up at the abstract and felt the key rock easily up and down. She pushed up a neighboring abstract and compared it to feel of the B's abstract; the B felt stiffer, so she decided the resistance must be in the action, not the key. She pushed the hammer head toward the string and felt resistance, but the hammer came back so easily against the rest rail that she immediately ruled out tight pinning. She got out her flashlight for a closer look. The heads were not rubbing; the shank looked clean, with a generous glue collar at the head and butt; the spring was in its groove, and not bent any differently from its neighbors; the wippen had plenty of clearance; the center pin was not poking out; everything, in fact, looked absolutely perfect - perfect as the F-C fourth in a Vallotti-Young. She decided to mull things over while she tuned.

It was only after she had finished tuning that she realized what was wrong. She took out her screwdriver, her needle-nose pliers, and a pencil, and a minute later the client opened the door and walked in.

"It's mighty quiet in here. Are you done?"

"Yes; and, by the way, try out that B."

"It feels great! What did you do?"

Well ... what did she do?

Puzzle mail (snail mail only) should be sent to Daniel Levitan, Puzzle Editor, 530 First Street #6, Brooklyn, NY 11215. Elaborations on previous puzzles will be printed, even at the expense of the puzzle editor's dignity. Especially welcome are ideas and suggestions for future puzzles, subject to whatever modification the whim of the editor may deem necessary.

Solution to Puzzler #10
Stiffness in a Shank

When Mr. Smith put in the new shank, he had inadvertently let some glue run down into the spring groove, gluing the end of the spring to the butt. The spring, unable to slide in the groove, offered resistance to the player. She used the screwdriver to break the spring free; the needle-nose pliers to crack off the glue stuck to the spring; and the pencil to lubricate the spring groove.

Request the Card That's In Tune With Your Finances

Having the best is within your grasp.

The Piano Technicians Guild has endorsed a credit card because we don't want you to settle for anything less than the best. You deserve:

- No Annual Fee
- 5.9% Annual Percentage Rate (APR) on cash advance checks and balance transfers for a limited time†
- A high line of credit, up to $50,000, if eligible
- A bank that is always available, 24 hours a day
- Worldwide acceptance at millions of locations

The bottom line.

We think the Piano Technicians Guild Gold MasterCard® is far superior to just about any other card you may carry. The combination of economic superiority and personal benefits is outstanding. Try it and you'll be convinced.

REQUEST YOURS TODAY!

Complete the application below and mail to: MBNA America, P.O. Box 15464, Wilmington, DE 19850-5464.

Please check the credit card you prefer:

☐ **Gold MasterCard®** **04-805-4B** ☐ **Preferred MasterCard®** **10-931-Y3**

MasterCard **GAI8**

Print your name as you would like it to appear on card. *Please print clearly in black or blue ink.*

Address

City State ZIP

Social Security # Birth date

Mother's maiden name (for security purposes)

Monthly housing payment $ Are you: ☐ Homeowner ☐ Renter ☐ Other

Home phone ( )

Business phone ( )

Employer (If self-employed, please state the nature of your business.)

Position Years there

Your annual salary $

Other income‡ +$

Total household income $

Source of other income‡

‡Alimony, child support, or separate maintenance income need not be revealed if you do not wish it considered as a basis for repayment.

Please send an additional card at no extra cost for:

Relationship:

X Date / /

MY SIGNATURE MEANS THAT I AGREE TO THE CONDITIONS APPEARING ON THIS FORM.

5.9% APR† *OPTIONAL BALANCE TRANSFER Immediate Savings**

Exact transfer amount $

Make transfer check payable to

Exact transfer amount $

Make transfer check payable to

Please complete only if you have moved or changed employers in the last three years.

Previous address

City State ZIP

Previous school or employer Years there

Annual fee	None.
†Annual Percentage Rate (APR)	17.4% for purchases, which may vary.
Variable-Rate Information	Your APR may vary. The rate is determined by adding a margin to the highest U.S. Prime Rate as published in *The Wall Street Journal* on the15th of March, June, September, and December. The margin is 8.9 percentage points. On September 15, 1997, the U.S. Prime Rate was 8.5%.
Grace period for repayment of balance for purchases	At least 25 days, if each month, we receive payment in full of your New Balance Total by the Payment Due Date.
Method of computing the balance for purchases	Average Daily Balance (including new transactions).
Transaction fees for cash advances and fees for paying late or exceeding the credit limit	Transaction fee for Bank and ATM cash advances: 2% of each cash advance (minimum $2). Transaction fee for credit card cash advance checks: 1% of each cash advance (minimum $2, maximum $10). Late-payment fee: $25. Over-the-credit-limit fee: $25.
Transaction fee for purchases	Transaction fee for the purchase of wire transfers, money orders, bets, lottery tickets, and casino gaming chips: 2% of each such purchase (minimum $2).

†–MORE APR INFORMATION–

The current promotional Annual Percentage Rate (APR) offer for cash advance checks and balance transfers is 5.9% through your first five statement closing dates, commencing the month after your account is opened. When your minimum monthly payment is not received by the close of the first complete billing cycle following its Payment Due Date, or when the promotional offer expires, whichever occurs first, your APR for both new and outstanding cash advance balances (consisting of cash advance check and balance transfer transactions) will be calculated using the Variable-Rate Information disclosed at left. The current indexed APR for cash advance checks and balance transfers is 17.4%, which may vary. MBNA may allocate your monthly payments to your promotional APR balance(s) before your nonpromotional APR balance(s).

***–BALANCE TRANSFER INFORMATION–**

The total combined value of balance transfer checks cannot exceed your available credit line. If the total is greater, MBNA will send you checks valued up to the available credit line. The checks may include full or partial payment of the sums you indicated above. Allow 2–4 weeks from application approval for receipt of checks. **You should continue to make monthly payments to each creditor until you have received and forwarded the checks to them.** Transaction fees are waived on balance transfers initiated with this application. Cash advances and balance transfers may not be used to pay off or pay down any MBNA® account.

–CONDITIONS–

I have read this application, and everything I have stated in it is true. I authorize MBNA America Bank, N.A. (MBNA) to check my credit, employment history, or any other information and to report to others such information and credit experience with me. I understand that the acceptance or use of any card issued will be subject to the terms of this application and the Credit Card Agreement that will be sent with the card, and I agree to be responsible for all charges incurred according to such terms. **Unless I write to MBNA at PO Box 15342, Wilmington, DE 19850, I agree that MBNA and its affiliates may share information about me or my account for marketing and administrative purposes.** I am at least 18 years of age. I consent to and authorize MBNA and its affiliates to monitor and/or record my telephone conversations with any of their representatives to better ensure quality service. **I understand that if my application for the Gold Card is not approved, this request constitutes my application for the Preferred Card.** The information in this application is accurate as of 9/97. The information may have changed after that date. For more current information, please call MBNA at 1-800-847-7378. TTY users, please call 1-800-833-6262. This credit card program is issued and administered by MBNA America Bank, N.A. MBNA is a federally registered service mark of MBNA America Bank, N.A. MasterCard and Visa are federally registered service marks of MasterCard International Inc. and Visa U.S.A. Inc. respectively; each is used pursuant to license.

©1997 MBNA America Bank, N.A.
ADG-IABO-9/97

TO-PF-VR-NF

F-5
ADG-9-37-97

813100310172

PTG Review

Dedicated To PTG News • Interests & Organizational Activities

PIANO TECHNICIANS GUILD

Do You Know Your BMI, RPT?

Lee Santo, RPT
Member Economic Affairs Committee

Economic News & Views

When the prestigious *New England Journal of Medicine* published an editorial on body weight and health on January 1, 1998, the public and press seemed ready to embrace its message: "Losing weight - an ill fated New Years resolution."

Quoting again, the article states that, "Given the enormous social pressure to lose weight, one might suppose there is clear and overwhelming evidence of the risks of obesity and the benefits of weight loss. Unfortunately, the data linking overweight and death, as well as the data showing the beneficial effects of weight loss, are limited, fragmentary and ambiguous."[1]

Press reports followed the editorial's lead, giving the impression that being too fat doesn't really matter much. The article started a fierce storm of debate among public health authorities.

In a letter to the editors of the *Journal*, former U.S. Surgeon General, C. Everett Koop, called the message "A disappointing one that trivializes the second leading cause of preventable death in the U.S."

Indeed, a prescription for good weight doesn't come in pills or whacky diets. There are no harmful side-effects and it comes in just two simple steps.

First – perform 30-40 minutes of continuous physical activity, such as a brisk walk or running, or biking consistently during the week. (Check with your Doctor for how many days per week you might need).

Secondly – eat a healthy well-balanced diet, low in fat with plenty of fruits and veggies and low-fat dairy products. Also, pay attention to portion sizes, especially at restaurants.

Below is a chart of Body Mass Index. Find your weight and your height and look it up. Optimum BMI is between 19 and 25.

If you are not on the chart, here is a short method for calculating your Body Mass Index. For a person 5'5" and weighing 149 pounds:

1. Multiply weight in pounds by 703 - 149 x 703 = 104747.
2. Multiply height (inches) by your height (inches) 65 x 65 = 4225.
3. Divide answer in step 1 by answer in step 2 to get your BMI-104747 ÷ 4225 = 24.8-or 25 BMI.

BMI Category	Health Risk Based Solely On BMI	Risk Adjusted for the Presence of Comorbid Conditions and/or Risk Factors
<25	Minimal	Low
25-27	Low	Moderate
27-30	Moderate	High
30-35	High	Very High
35-40	Very High	Extremely High
>40	Extremely High	Extremely High

WEIGHT / HEIGHT	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250
5'0"	20	21	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
5'1"	19	20	21	22	23	24	25	26	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	43	44	45	46	47
5'2"	18	19	20	21	22	23	24	25	26	27	27	28	29	30	31	32	33	34	35	36	37	37	38	39	40	41	42	43	44	45	46
5'3"	18	19	19	20	21	22	23	24	25	26	27	27	28	29	30	31	32	33	34	35	35	36	37	38	39	40	41	42	43	43	44
5'4"	17	18	19	20	21	21	22	23	24	25	26	27	27	28	29	30	31	32	33	33	34	35	36	37	38	39	39	40	41	42	43
5'5"	17	17	18	19	20	21	22	22	23	24	25	26	27	27	28	29	30	31	32	32	33	34	35	36	37	37	38	39	40	41	42
5'6"	16	17	18	19	19	20	21	22	23	23	24	25	26	27	27	28	29	30	31	31	32	33	34	35	36	36	37	38	39	40	40
5'7"	16	16	17	18	19	20	20	21	22	23	23	24	25	26	27	27	28	29	30	31	31	32	33	34	34	35	36	37	38	38	39
5'8"	15	16	17	17	18	19	20	21	21	22	23	24	24	25	26	27	27	28	29	30	30	31	32	33	33	34	35	36	36	37	38
5'9"	15	16	16	17	18	18	19	20	21	21	22	23	24	24	25	26	27	27	28	29	30	30	31	32	32	33	34	35	35	36	37
5'10"	14	15	16	17	17	18	19	19	20	21	22	22	23	24	24	25	26	27	27	28	29	29	30	31	32	32	33	34	34	35	36
5'11"	14	15	15	16	17	17	18	19	20	20	21	22	22	23	24	24	25	26	26	27	28	29	29	30	31	31	32	33	33	34	35
6'0"	14	14	15	16	16	17	18	18	19	20	20	21	22	22	23	24	24	25	26	26	27	28	28	29	30	31	31	32	33	33	34
6'1"	13	14	15	15	16	16	17	18	18	19	20	20	21	22	22	23	24	24	25	26	26	27	28	28	29	30	30	31	32	32	33
6'2"	13	13	14	15	15	16	17	17	18	19	19	20	21	21	22	22	23	24	24	25	26	26	27	28	28	29	30	30	31	31	32
6'3"	12	13	14	14	15	16	16	17	17	18	19	19	20	21	21	22	22	23	24	24	25	26	26	27	27	28	29	29	30	31	31
6'4"	12	13	13	14	15	15	16	16	17	18	18	19	19	20	21	21	22	23	23	24	24	25	26	26	27	27	28	29	29	30	30

Imagine, with your new image how your business will improve, and maybe you can get into those college day trousers or blue jeans, along with your tools seeming a bit lighter.

Visit the Web site -Shape up America. http://www.shapeup.org.

1. Science News, May 2, 1998

Calendar of Events

September 19, 1998
Pomona Valley One-Day Seminar
Location: California Poly University,Pomona
Contact: Thomas Schultz
(909)593-0766
244 Hickory Ave, Pomona, CA 91767

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

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

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

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

All seminars, conferences, conventions and events listed here are approved PTG activities. Chapters and regions wishing to have their function listed must complete a seminar request form. To obtain one of these forms, contact the PTG Home Office or your Regional Vice President.

Once approval is given and your request form reaches the Home Office, your event will be listed six-months prior and each issue until the month in which it is to take place.

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

Foundation Scholarship Sends Two to Convention

The 1998 Piano Technicians Guild Foundation Associate Scholarships were awarded to Mrs. Alice Alviani of Waukegan, Ill., and Ms. Cate Carulli of Millers Falls, Mass. This scholarship covers the winner's registration for the PTG Annual Institute and Convention in Providence, R.I., and the fee for either the technical or tuning exam. A $285 value! With this kind of opportunity available, tell me why only 10 out of 1,565 Associate members applied? If you are an Associate member, you really ought to consider applying for next year's scholarships. Two out of 10 are pretty good odds, and as they say in the lottery advertisements, you have to play to win!

Cate Carulli is a graduate of the North Bennet Street School, class of '86. Servicing pianos is her full-time job. She is a College and University Technician who also has many private customers. Cate joined PTG in 1987 and served as Treasurer for the Western Massachusetts Chapter for eight years. When asked why she wanted to become an RPT, Cate said she wanted to measure her skills against the standard. Cate Carulli is a bright, caring and motivated woman, I expect she'll more than measure up!

Alice Alviani is first, and foremost, a wife and mother of two young sons. Alice is an amazing wealth of information on many topics and loves to "tinker with piano guts." She joined PTG in the spring of 1994 and has been a very active member of the Waukegan Chapter ever since. Most Chapter meetings are held in Alice's shop. Alice helps with the Chapter Newsletter (the award-winning Partial Post). She's the first person to volunteer for almost any job and does even the most mundane tasks with a cheerful, sunny attitude.

When Alice decided to become a piano technician, she never thought she wouldn't become an RPT. She feels the RPT exams are important credentials. She says: "I don't want to be half baked! I just want to be excellent." Alice will take her technical exam in Providence and is grateful for the financial help this scholarship brings.

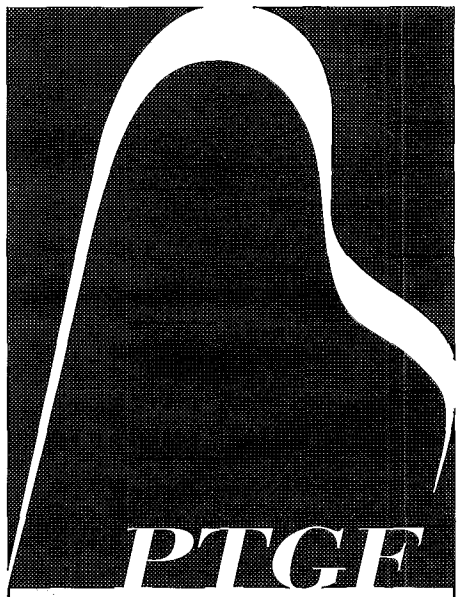
MTNA member, Jane Karwoski was awarded a $1,000 financial assistance grant from the PTG Foundation for advanced study to improve teaching skills. PTGF offers this annual grant to a MTNA member who has held the MTNA Professional Certificate, or Associate Certificate for at least six years and is at least 28 years of age.

Jean Karwoski has been an independent music teacher since 1986, currently instructs 25 students a week, and intends to use the PTGF grant for continuing education, attending a seminar on improvisation with Lisa Lopez at the University of New Mexico as well as complete an independent study project of Dr. Edwin Gordon's music learning theory.

The PTGF is proud to impact piano students and piano owners in these very positive ways. PTGF is committed to helping Associate members upgrade and become fully franchised members of this organization. We are also proud to offer piano teachers a chance to further their education and expand their teaching skills.

I thank you for your donations this year and I hope you will continue to support the Foundation so that we may continue to fund these worthwhile programs.

— Laura Kunsky
PTGF President (1997-1998)



The PTG Foundation Needs Your Help!

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

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

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

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

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

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

New RPTs Pass The Test in June

Region 1

191 Philadelphia, PA

John J. Campbell
236 Second Ave.
Phoenixville, PA 19460

Region 2

212 Baltimore, MD

David M. Long
1740 Swinburne Avenue
Crofton, MD 21114

274 Central North Carolina

David G. Feeny
3455 McConnell Road
Greensboro, NC 27405

William J.Huesman
9206 N NC Hwy 109
Winston-Salem, NC 27107

Region 3

787 Austin, Tx

Ricki Klos
4515 Highland Terrace
Austin, TX 78731

Region 4

431 Columbus, OH

Wallace F. Wilson
700 Boso Avenue
Ravenswood, WV 26164

481 Detroit-Windsor, MI

Mayer Gluzman
6062 Anne Drive
W. Bloomfield, MI 48322

Region 5

641 Kansas City, MO

Daryl S. Durand
6719 NW 70th Street
Kansas City, MO 64151

653 Ozark, MO

Kenneth A. Zahringer7681 W.
Henderson Road
Columbia, MO 65202

Region 6

921 San Diego, CA

Robert E. Peters Jr.
3385 Wisteria Drive
San Diego, CA 92106

JUNE NEW MEMBERS

Region 1

21 Boston, MA

Alex Cole
3105 W. Scenic Drive
Danielsville, PA 18038

Liu Cun Wu
170 Lake Avenue
Newton Center, MA
02159

050 Maritime Provinces

Johnathan K. Burchill
P. O. Box 702
Hampton, NB E0G 1Z0
Canada

Arn E. Wickens
P. O. Box 29104
Moncton, NB E1G 4R3
Canada

054 Vermont

Clair A. Dunn
Rd 1, Box 730
Fairfax, VT 05454

061 Ottawa, ON

Colin D. Mack
745 Stiles Crescent
Glouster, ON K1J 6Y9
Canada

101 New York City

Valeri Smirnoff
2018 Voorhies Ave., #A12
Brooklyn, NY 11235

117 Long Island-Suffolk, NY

William S. Rogers III
922 Peconic Street
Ronkonkoma, NY 11779

Region 2

223 Northern Virginia

Craig C. Turner
4775 W. Braddock Road, #3
Alexandria, VA 22311

274 Central North Carolina

John P. Johanson
3705 Manor Drive, Apt. A
Greensboro, NC 27403

337 Southwest Florida

Terrence M. Farrell
214 Hidden Lake Drive
Brandon, FL 33511

282 Charlotte, NC

Thomas W. Marett
2221 Ferris Road
Rock Hill, SC 29732

Region 4

452 Cincinnati, OH

Steven D. Bryan
1302 Arrowhead Trails
Loveland, OH 45140

454 Dayton, OH

Charles R. Roark
352 South Street
Leesburg, OH 45135

467 Indiana

Charles T. Wesco
13765 Jackson Road
Mishawaka, IN 46544

489 Lansing, MI

Christine M. Brown
105 W. Dill Drive
Dewitt, MI 48820

493 Western Michigan

Curtis R. Isakson
303 East Alice Street
Whitehall, MI 49461

601 Chicago, IL

Ron J. Koval
423 Fairview
Elmhurst, IL 60126

Region 5

553 Twin Cities, MN

Steve R. Williams
202 1/2 E. 2nd Street, #A1
Hastings, MN 55033

571 South Dakota

Curtis Bauer
420 Spruce
Rapid City, SD 57701

581 Minn-Kota, ND

R. James Mulrooney
301 Co. Rd. 446
Bovey, MN 55709

801 Denver, CO

John D. Busch
6463 S. Holland
Littleton, CO 80123

Region 6

851 Phoenix, AZ

Arnold M. Studebaker
440 E. 400 S.
Kanab, UT 84741

901 Los Angeles, CA

Raffi Kechichian
4375 Allott Avenue
Sherman Oaks, CA 91423

945 Golden Gate, CA

Kenneth J. Pettipiece
3465 Little Valley Road
Sunol, CA 94586

Region 7

841 Salt Lake City, UT

Todd H. Campbell
566 Eastpointe Circle
North Salt Lake, UT 84054

James W. Jensen
8831 Long Drive
West Jordan, UT 84088

In Memory . . .

Herschel Kochenower, RPT

Avon Lake, OH

Phyllis Tremper
PTGA President

AUXILIARY exchange

DEDICATED TO AUXILIARY NEWS AND INTERESTS

Two Views of Spring

I was sitting on my front porch last night rejoicing in my handiwork of the day. I had spent the whole day mowing my large lawn and trimming and pulling weeds in my flower garden. It was a wonder to behold.

I am sure the people who lost their homes, and, yes, their love ones, due to the rages of El Nino would not share this joy with me. However, because of El Nino and all the rain we've had this spring, my yard looks like a tropical paradise – not to take a backseat to Hawaii. We even have a bluebird family in our yard this year. It is the first time I have even seen a bluebird other than in the Audobon picture encyclopedia.

The devastation of a tornado can be awful, and I am so sorry for the people who were in its path. We felt the aftermath of one several years ago when we lost many, many of our beautiful oak trees. But the weather is not in our realm of control, so all we can do is enjoy it when it is good.

I am sure by the time your read this in August, we will be praying for rain, the likes of which we received too much of in the spring. But the beauty of nature is a wonder to behold. When it is good, it is very good; when it is bad, it is very bad.

Enjoy your summer. News and pictures of convention coming next month. Stay Well.

— Phyllis Tremper,
PTGA President

There is only one way to happiness and that is to cease worrying about things which are beyond the power of our will. — Epictetus

1997-1998 PTG Auxiliary Executive Board

PHYLLIS TREMPER
President
413 Skaggs Road
Morehead, KY 40351
(606) 783-1717
E-mail: f.trempe@morehead-st.edu

CAROLYN SANDER
Vice President
527 Knob Creek Road
Shepherdsville, KY 40165
(502) 922-4688
Fax (502) 922-9452

AGNES HUETHER
Recording Secretary
34 Jacklin Court
Clifton, NJ 07012
(201) 473-1341

BEVA JEAN WISENBAKER
Corresponding Secretary
1103 Walton
Houston, TX 77009
(713) 864-6935

MARILYN RAUDENBUSH
Treasurer
20 North Laurel Street
Millville, NJ 08332
(609) 825-2857
E-Mail: Raudy88@aol.com

PTGA Honorary Life Members

MARION BAILEY
Altus, Oklahoma

IVAGENE DEGE
S. Pasadena, California

VIRGINIA SELLER
St. Paul, Minnesota

JULIE BERRY
Indianapolis, Indiana

LUELLYN PREUITT
Independence, Missouri

JEWELL SPRINKLE
Roanoke, Virginia

DESSIE CHEATHAM
McPherson, Kansas

RUBY STIEFEL
Louisville, Ohio

Plenty to See & Do

Do you have an interest in history? Would you like to visit a famous cemetery that is the resting place for two U.S. presidents and 25 generals? How about a nice, leisurely luncheon cruise? If these activities sound fun, then I invite you to consider attending the North Carolina Regional Conference to be held in Richmond, Virginia on October 22-25, 1998 at the Holiday Inn Select Koger South Conference Center.

We are planning a wonderful Richmond Sampler Tour for Friday, Oct. 23, from 8:30-4:30. Our guided motor coach tour will take us around town to see many historical sites and Victorian style homes, plus we will tour a 15th century English manor house that was dismantled, brought over the ocean to Richmond and rebuilt in the 1920s. We will board the riverboat, Annabelle Lee, for a luncheon cruise through the lovely fall foliage along the James River while enjoying a great Southern-style buffet lunch and entertainment. On Saturday morning, Oct. 24, you will have the opportunity to attend the following classes:

"Taxes" – taught by Randy Potter

"Office Procedures for Fun and Profit" – taught by Lewis Spivey

"50 Ways to Make More Money in the Piano Service Business" – taught by Gerry Cousins.

The last class is over at Noon. Then at 12:15, anyone wishing to car pool over to the mall will meet and drive over for lunch (on your own) and shopping. Our return time to the hotel will be decided by the group.

If I have stirred up your interest, then start looking for the registration form in the mail. As a matter of fact, it may have already been delivered by the time you read this article. My husband, Alan Hallmark, is conference director this year – he says to make sure you register by September 26, so that you can take advantage of extra savings when signing up for the Spouse Program and the banquet. Plan now to make the trip to Richmond this fall. You can't afford to miss this seminar – your spouse will come away with practical knowledge to apply to his/her business, and you will have the chance to participate in worthwhile activities and meet new friends.

See you in October!

— Brenda Hallmark
Richmond, VA

CLASSIFIEDS

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

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

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

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

FOR SALE

SANDERSON ACCU-TUNER DISTRIBUTOR—James Acheson, 7906 Elliott Street, Vancouver BC V5S 2P2 Canada. 604-325-6751.

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

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

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

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

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

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

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

HAMMER BORING GUIDES. All metal, weigh 15 lbs. Accurate and easy to use. Improved since Journal article of June 1995. $200.00. Instructions and photo available on request. Kent Gallaway, 709 Thorne, Ripon, WI 54971; 920-748-3265.

FOR SALE: Two Baldwin SD10 9ft. concert grand pianos. Have been used and maintained as concert instruments at a major performing arts center. Gorgeous instruments, one needs extensive case work (perfect for recording studio). Asking $10,000, other one asking $20,000. 718-636-4136.

FOR SALE— 2 oz. brass string level-level $25.00 delivered. Mothergoose Music, 410 Ada Road, New Plymouth, ID 83655. 1-800-278-5257.
E-Mail: imatuner@primenet.com

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

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

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

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

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

GREAT PIANO MOVING VAN FOR SALE. Ford Diesel 7.3, fully equipped. Comfort package, large tailgate lift, e-track. $11,000 or trade for pianos. Call 1-800-411-2363.

"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 1-800-411-2363, 216-382-7600/FAX 216-382-3249. Jay-Mart Wholesalers — Pianos since 1913.

FOR SALE—The Complete Randy Potter Piano Technology Course - From tuning through repairs, video tapes, tools, action model, all reference materials included. Call 805-481-6369, or write to Jim Leonard, 337 Ledo Place, Arroyo Grande, CA 93420.

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

HANDCRAFTED TOOLS— For Bearing, Notching, Hammershaping, Ribshaping, and More! Call or write for free brochures. MAZZAGLIA Tools, PO Box 18, Groveland, MA 01834 (508)372-1319

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

PIANO SCALING SOFTWARE for WIN & DOS. Plot inharmonicity, Tension, Break %, and more. Automatic Bass Rescaling, String Winding Sheets, Detailed Manual, and much more. Decimal & Metric. $80.00. Tremaine Parsons, Box 241, Georgetown, CA 95634, 530-333-9299

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

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

WONDERWAND: Try the Tuning Lever you read and hear about. Enjoy Less Stress; Better and Faster Tunings: $65.00 p.p. Wayne Saucier, RPT, 26 New York Ave., Wayne, NJ 07470.

*Steinway Model S, Mahogany, $18,500; *Mehlin & Sons, 1924, 9' Ebony Satin, $7,500; *Knabe 6'4" Walnut, $4,500; *Knabe 5'8" Ebony, $3,900; *Knabe 9' Ebony $5,000;*Howard/Baldwin 5'7" Ebony Gloss, 1994, $6,995; *Baldwin/Howard, W/Pianodisc & Orchestra, $9,995; *Schimmel, 6'9" 1976, Ebony Satin, $14,900; *Yamaha C-3, Ebony Satin, 6'1", 1981, $12,500; *Baldwin 6'3", Ebony Satin, $9,995; *Baldwin 7', Ebony gloss w/Pianocorder, $14,000; *Fisher Grand, 5'4" 1915 Circasian Walnut, $4,895; *Kimball 4' 10" French Provincial $4,900. Call SCHROEDER'S PIANOS Since 1957 for a complete list of used pianos, 800-57 PIANO Visit our web page: 57 piano.com

CUSTOM REFINISHED KRANICH & BACH Square Grand, 1879. Photos available. $2,000. Colorado owner since 1964. Margaret Poremba (303)756-1777.

FOR SALE—Replacement Reeds wanted for use in Parlor Reed Organs. Direct inquiries to: Paul Toelken-supplier, PO Box 25017, Prescott Valley, AZ 86312, (520)772-8914. ptoelken@northlink.com

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.

REPAIR CHIPPED IVORY IN 20 MINUTES. "AcryliKey" ivory restoration system produces a strong,nearly invisible repair in minutes. Kit contains material enough for 50+ repairs. Also: pigments, mixing utensils, sanding pads, and complete instructions. Total cost, (shipping included)$39.95. Richard Wagner RPT; P.O. Box 1952 Lake Oswego, OR 97035 (503) 697-9254. E-mail for extra information. Rjwag@Pacifier.com

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

HELP WANTED

HELP WANTED—Technician in Southern California planning expansion seeks co-investor/partner for piano restoration and sales. Phone (818)905-8870 or e-mail: msmandl@webtv.net

VICTOR'S is expanding. Need Piano Tuners, Refinishers, Restringers. Buy & Sell fine grands, Hammond B3 & Leslies. 300 NW 54th Str., Miami, Fla. 33127. 305-751-7502.

SERVICES

STRAIGHT SIDES AND SQUARE FRONTS are the benchmarks of our quality key recovering, $150/set tops and fronts. Plastic sharps installed $90/set, key bushing using Spurlock precision cauls $100/set. Shipping charges are additional. Key repairs, buttons, and other services available. Visa and M/C accepted. E-mail: ashmore@gv.net, call 530-273-8800. Yvonne Ashmore, RPT and C. Christensen, Keyboard Restorations, 12700 La Barr Meadows Road, Grass Valley, CA 95949.

STEINWAY Action Frame Rails Resoldered, Replaced, and/or Repositioned. For price list write or call John Dewey Enterprises, Inc; 861 E. 2900 North Road, Penfield, IL 61862-9603, phone (217)595-5535.

CALIFORNIA SOUNDBOARDS BY DALE ERWIN, RPT. For prices on soundboards, bridges, pin blocks and complete restoration, call (209)577-8397. Rebuilt Steinways also available. 4721 Parker Rd., Modesto, CA 95357.

REFINISH PIANO HARDWARE in nickel, brass, or chrome. Metal finishing specialists for over thirty years. Parts shipped back to you in 2-3 weeks. Rush jobs can be accommodated. Whitman Company, Inc. 356 South Ave., Whitman, MA 02382. Ph. 1-800-783-2433.

REPLACEMENT SOUNDBOARD PANELS — North Hudson Woodcraft has been producing QUALITY soundboard blanks for over 100 years. We will custom build a spruce soundboard to your specs. Rib stock, shim stock, and quartersawn Hard Maple also available. For information and prices call: NORTH HUDSON WOODCRAFT CORP. (315)429-3105 - FAX (315)429-3479.

RESTORATION OF CARVED WORK, turnings, inlays, and marquetry, including repair of existing work and reproduction of missing pieces. Edwin Teale; 18920 Bridgeport Road; Dallas, OR 97338; 503-787-1004.

PIANO KEY SERVICE—
.075 Tops with fronts - $110.00
.095 Premium Tops with Fronts- $135.00
High Gloss Sharps (3 1/2") - $50.00
Keys Rebushed: Premium Cloth - $95.00
Custom Keys Made - Call for Price
Many other services available. Call or write for price list. FREE return freight on pre-paid orders of $75.00.
WALKER PIANO SERVICE,
554 State Route 1907, Fulton, KY 42041,
1-800-745-6819. www.walkerpiano.com

PIANO KEYS . . . We manufacture replacement keysets for nearly any piano. The cost is often less than reworking the old keys. We use the finest materials, and offer a number of options to suit your needs. Contact: Rick Wheeler at RoseLand Piano Co. (503)654-1888.

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.

KEYTOPS IN THE ROCKIES—Keys recovered with .075 white tops with fronts, buffed and notches beveled - $110.00.
KEYS REBUSHED—$60.00 PER RAIL. EXPERIENCED, hundreds of sets recovered. References on request. Phillip Thurlow, RPT. 7773 S. Elizabeth Way, Littleton, CO 80122 (303) 770-7064 OR (888)586-4683. RETURN SHIPPING WITH PREPAID ORDERS.

TRAINING

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.)

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

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

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

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

EMIL FRIES SCHOOL OF PIANO TUNING AND TECHNOLOGY. Thorough education since 1949 in tuning, servicing and rebuilding pianos. Successful graduates worldwide, blind and sighted. One and two year courses. Emil Fries School of Piano Tuning & Technology. Ken Serviss, RPT, President — Don Mitchell, RPT, Dir. of Instruction. 2510 E. Evergreen Blvd., Vancouver, WA 98661-4323. (360)693-1511,
fax (360)693-6891.
e-mail: dsmitch@pacifier.com /
web page: www.pacifier.com/~dsmitch

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.

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

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.

WANTED

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

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

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

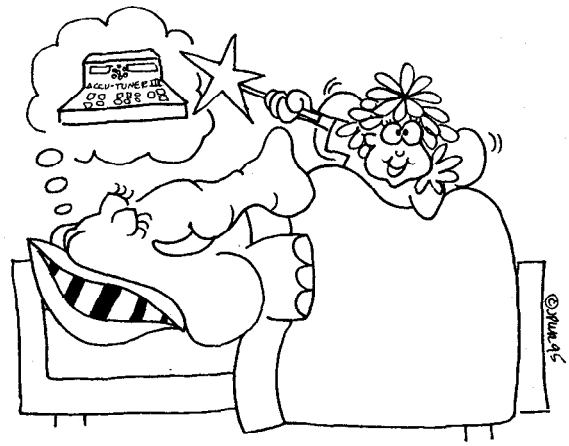
PIANOS! PIANOS! PIANOS! !!!Free phone appraisal!!! Buying all types of usable pianos. Cash or bank check on pick up. Won't hesitate on price. Call us first for fast professional service. "Steinway, Mason-Hamlin command specialty prices." Jay-Mart Wholesale, P.O. Box 21148, Cleveland, OH 44121. Call Irv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

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

WANTED: TINY PIANOS such as the Wurlitzer Student Butterfly or other small types. No more than 50 keys. Call toll-free: Doug Taylor, 1-888-895-6211. I'll pay shipping!

Now the Sanderson Accu-Tuner III™ Is Not Just a Dream . . . It's Reality!

That's right . . . the first new Accu-Tuner™ in ten years has been invented and will soon be available for you to purchase. Much lighter and half the size of the first two versions, the SAT III will actually do more for you. Note the following features, and give us a toll-free call for details . . .



• *automatic note stepper*
• *tunes in any sequence* • *battery charge indicator*
• *tunes in different temperaments* • *adjustable octave widths*

Inventronics Incorporated
1-800-FAST-440

9 Acton Road • Chelmsford, MA 01824
In MA: 978-256-7374 • Fax: 978-250-9293
Email: inventrncs@aol.com
Web: http://www.cris.com/~fast440

Display Ad Index

Advertise your goods and services in the *PTJournal* classifieds. An inexpensive and effective way to get the word out!

Call the Home Office by *July 15* to be included in the September 1998 issue.

Send your classified ad to: PTG Home Office 3930 Washington Kansas City, MO 64111

OR FAX THE AD COPY TO: 816-531-0070.

Include your check or Visa/Mastercard number (with expiration date), along with your name, address and daytime phone number.

Mason & Hamlin

WORLD'S FINEST PIANO
SINCE 1854

HAND BUILT
ORIGINAL DESIGN
PREMIUM MATERIALS
TENSION RESONATOR
MADE IN USA

"Sui Generis"

Once you experience the rich character and beauty of the legendary Mason & Hamlin piano you'll know why it is truly ...

"In a Class By Itself"

Announcing the arrival of the new Mason & Hamlin pianos. Renowned for superior tonal quality, durability, performance and investment value. Experience the difference for yourself. For the location of your nearest Mason & Hamlin dealer, please call or write to us at

Mason & Hamlin
4111 N. Freeway Blvd. Sacramento, CA 95834
(800) 566-3472
info@masonhamlin.com

Tech Gazette

Yamaha Service August 1998

Over the past year, we at Yamaha Music Manufacturing (YMM) have been privileged to present numerous articles that gave a brief overview of our facility in Thomaston, GA.

At YMM, American built Yamaha pianos are a unique blend of the four building blocks of piano manufacturing: engineering, raw materials, facilities and workmanship. Without these four key elements it is impossible to produce instruments of uncompromising quality.

At YMM, building a Yamaha piano takes even more. It's not only the tradition of craftsmanship or the perpetual drive to find new and better ways to use technology, but the personal responsibility that every piano leaving the facility will be played for a lifetime.

You can be confident of that.

Stay tuned for a new series beginning next month in Tech Gazette.

© 1998 Yamaha Corporation of America • Customer Support • P.O. Box 6600, Buena Park, CA 90622 www.yamaha.com