PIANO TECHNICIANS
Journal
Official Publication of the Piano Technicians Guild

June 1995 Vol. 38 • #6

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Inside:

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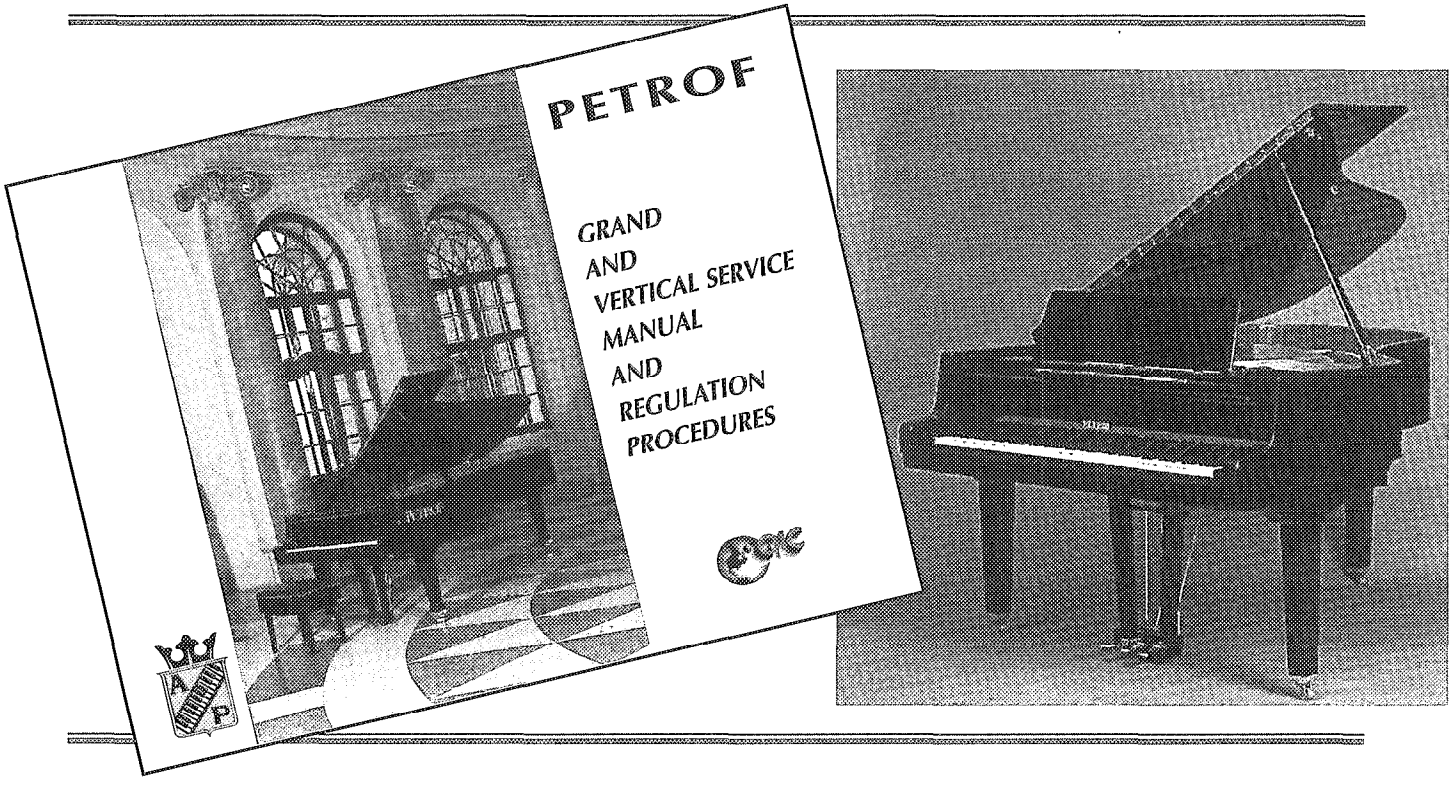

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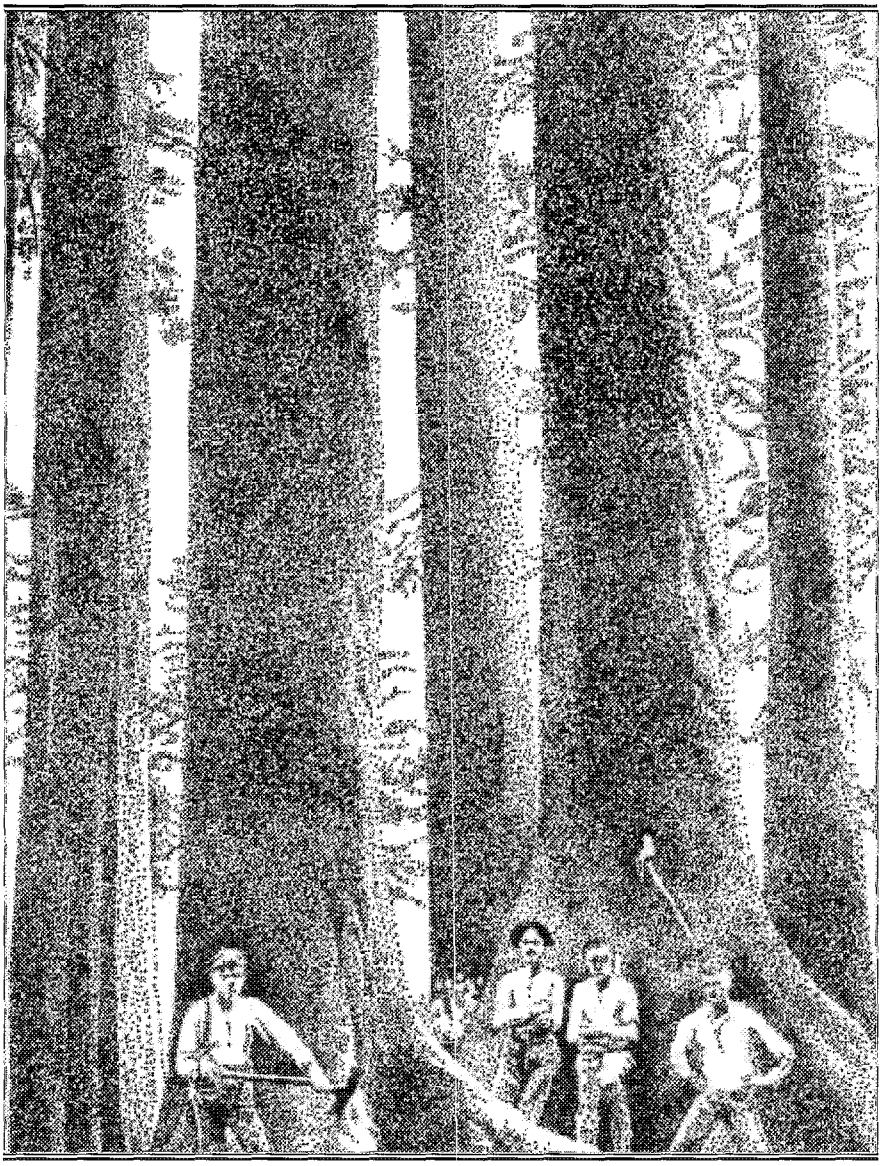

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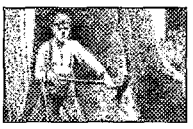

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General Information

Editorial Perspective

Why Are We Tuners?

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

My editorial in the March issue, which included a couple of scenarios most tuners have found themselves in more than once ("are you still tuning pianos?"), drew a number of responses, both on the Internet "pianotech" group and by "snail mail." It seems that everyone has a favorite story about how people can't believe that we really do this for a living!

Mark Stivers of Sacramento feels the reason people can't believe we work on pianos for a living is because it's so much fun. Others responded with "customers say the strangest things" stories, and many included their preferred snappy comebacks. Rick Florence of Phoenix suggested, "Just raise your rates. That'll make believers out of them!" I've enjoyed the feedback enormously, and had a few good laughs, too.

All of this discussion got me thinking about why we do what we do. "Why are we tuners?" was the question posed by a friend to the veteran piano tuner in Studs Terkel's marvelous book, *"Working."*

Why indeed? To many outside our field, it seems ludicrous (to many inside it too!). Here's a job where the public at large isn't even aware that the job exists. Many of those who *are* aware look down their noses at us and all our kind. In an era where many technicians who service other machines such

limelight, but you have to understand my dilemma. The piano in question was a Shoninger spinet which may have never been tuned, ever. It sounded like a Hammond B-3 with Leslie speakers going about half speed underwater. Though just a lad, I cringed at the sound. I couldn't bear to face the music. (Parents and teachers, are you listening?) Compared to grandma's piano, my old upright at home was heavenly.

The heavenly old upright was removed from my childhood home one dark day to make room for a modern console which *looked* much nicer. Although I was a strapping 14-year-old at the time, I wept silently as the movers carted off the old upright. I never made friends with that console; whose keys stuck constantly despite the tuner's best efforts, and whose tone was cheap and bright.

Two or three years later, a family friend purchased a nice new grand piano. As I sat down and played it, I was in ecstasy. It did what I wanted it to do, and it was in tune! It sounded great. In my heart, I swore that someday, somehow, I would own a fine piano, and that I would learn how to make pianos sound good. The rest, as they say, is history.

So, why are we tuners?

"Because we want to hear good sounds."

university technician partner may have expressed it best when she said, "But who would want to work on cars or copy machines when they could be working on pianos?"

■■■

Since several people have asked where all the nice drawings are coming from, I'd like to introduce ***Spencer Brady*** as the artist who has been doing the drawings for the *Journal* beginning with the February issue. He draws freehand from either "live" objects, other drawings, or Polaroid photos, except in the case of the "partying mice" in the last issue. That was strictly his rather warped imagination. A college student studying graphic design and illustration, Spencer admits only to being a "distant" relative of your editor. Actually, he's my *second*-oldest son; I guess that's fairly distant!

■■■

In this issue, we add a new Contributing Editor to our roster. A noted piano designer, builder, and technician, ***Del Fandrich*** is no stranger to these pages or to anyone in our business. We're happy to have him and his piano knowledge aboard.

■■■

Dan Franklin's series on rear duplex tuning will resume in the August Issue. Next month's *Journal* will be a special issue dealing with ivory keytops.

PIANO TECHNICIANS
Journal
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COLUMNS & COMMENTS

DEPARTMENTS

IN ADDITION

FEATURES

PACE
Professionals Advance through Continuing Education
LESSON PLAN

COVER ART

David Severance, RPT, checks out the latest in hammer boring jigs for the technicians who wants to bore their own, in "Comparing Hammer Boring Jigs," beginning on Page 28.

A Curse
—against A.H.,
who does not make instruments

You drove off with the applewood
From that great, bounteous tree that stood
Lightning-battered and storm-tortured
Half a century in our orchard
And whose trunk, 20 feet tall, grew
Hard, dark-toned and 2 feet through
Then, seasoning for 10 years, had lain
Waiting a purpose worth its grain;
You took, besides, our walnut, spruce
And cherry boards for your own use
And warm ivory we'd soaked loose
From piano keys. Grave as a goose,
You gave your promise to produce
An instrument, made an excuse
Instead, then sure as self-abuse
One more excuse, one more, one yet
Till we both knew that's all we'd get.

Now, if you sell that harpsichord
May the straightgrained spruce of its soundboard,
Warping and twisting, wrench apart
So irritable buzzings start
To breed inside that lengthening crack
And pins slip—not enough to slack
Strings though the true pitch won't quite hold.
There, where you signed your name in gold
May random checking split and etch it
Straight through the words, A.H. Me Fecit.

Or if you keep it as your own,
May it ring with a strong, clean tone
At times. But when in public may
Jacks swell and jam so that you play
Garbles of chord and melodies
Gapped like decaying teeth or cheese.
May felts fail so each error lingers
Long in the ear and may your fingers
Slip off the ivory, slick as wax,
So you play always in the cracks
Between keys that go limp or stick
Tearing your nails down to the quick.

May all you set your hand to, buckle,
Breaking your finger at the knuckle
Which, aging, aching, goes rheumatic,
Turns your recorder holes asthmatic,
Your fiddle feeble and your squeeze
Box troubled by a sleazy wheeze.
May your drum rhythms stumble and alter
So that dancers halt, start, falter
And when you lift your voice, may it wobble
As if you'd told things not quite probable.

May far-flung audiences recognize
Just what you are. And may the wise
Try your virginals, guess at their price,
Look long, but think best not to ask it,
Seeing its form's so like a casket
He could go to the boneyard in it
Before you finished him his spinet.

Still, may no formal punishment
Ease your guilt; may each day be spent
Evading lawyers' calls or tax Inspectors.
Falling shy on facts,
On good faith or harmonic rules,
Be fearless around power tools.
Should you pick up some stranger's kit
Or fine wood, switch on your drill bit;
If you should skirt around a law,
Look up once from your band saw;
If you should ever break your faith
May loose hairs wander toward your lathe.

Lastly, may those you trust in break
Their word and for their own sweet sake
Waste your gifts on things to make
Them comfy till the day you die.
Every midnight may you lie
Awake with one who'll scorn and rule
You for a coward and a fool.
That is, I hope you spend your life
Alone—or better, with your wife.

Resolution For Long-Term Educational Goals

PTG President
Leon Speir, RPT

The following **Resolution on Educational Goals** will be presented to Council this year for its consideration:

Whereas the PTG Bylaws say that the primary mission is to provide continuing education to promote professional competency, and

Whereas this continuing education then promotes technical competency, benefiting all members as well as consumers of our members' services, and

Whereas PTG continues to be the primary source of both entry level and continuing piano technology information for its membership, while other industry sources of educational opportunities are being forced to cut budgets and programs,

PTG hereby accepts and endorses the following educational goals and priorities:

- ***To define and promote minimum standards of professional competency.***
- ***To outline the curriculum of study that leads to achievement of those standards***
- ***To work with piano technology schools, piano manufacturers, and all subordinate bodies of PTG to efficiently deliver educational programs based on the curriculum.***
- ***To provide technical information and business resources for the members of PTG.***

The **Resolution on Educational Goals** document will be presented to Council as part of the President's report on long-range planning. This resolution was presented to Council last year, and the preliminary discussions were informative and meaningful. The resolution is being presented to Council again this year to advance the discussion and to set policy for long-range planning in the area of education. Long-range planning is the mechanism used to define who we are and where we want to go as an organization. Once goals are established, Council can then devote its time and energy to an annual review of the goals and to adopting programs that coincide with them. The discussion and action taken by Council on this **Resolution on Educational Goals** will define the role education plays in the future of PTG.

Organizational planning is a complex process involving all facets of PTG. During the past three years we have planned on the basis of the *Members Needs Assessment Survey* results. In January, the Board concluded that strategic planning was an integral part of PTG and began to lay the groundwork for developing a five-year organizational plan. In May, six RFPs (Request for Proposal) were sent to firms and individuals who specialize in planning for non-profit organizations. These proposals will be evaluated by the pre-council board. Professionals who have experience working with non-profit organizations will be able to provide much needed guidance to the overall planning process, however it **must** be members who set the priorities of the five-year plan. The board has established a framework for selection of a steering committee made up of a cross section of PTG members to help develop this five-year plan. Additionally, other groups within PTG will be able to provide input in areas of testing, marketing and education. The goal is to provide next year's council (1996) with a comprehensive five-year plan for its consideration. Education is and always has been an integral part of PTG. Adoption by Council of the **Resolution on Educational Goals** will clearly define educational priorities for this planning process.

Leon Speir

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Letters

More on Capo Bars

I was surprised that no one mentioned (in the February issue Roundtable) that a significant reason for these unwanted sounds is the lack of sufficient angle of the string as it passes under the capo and rises toward the upper string rest. We all know that if this angle is too severe, tuning and stability problems will result — witness that untunable monster, the Steinway upright — not to mention the high probability of string breakage and other gremlins. But, if that angle is too small, I have observed that the capo section of the string will "zing and jangle." Could it be that the speaking length's vibrations are "leaking through," causing its capo section string partner to vibrate?

I have a Steinway D at my school that had a terrible problem with these kinds of noises. No amount of voicing, different hammers, shaping of the capo bar, etc., had any effect on the problem. After numerous disappointments, I began reviewing all that I had done so far to effect a cure. It occurred to me that when I did any shaping or filing of the capo bar I was actually changing the angle that exists between the capo and upper string rest. If that angle were too shallow to start with, then my work on the bar was exacerbating the condition.

As an experiment, and since I could think of no easy way to add metal to the capo, I added individual pieces of formed sheet brass to each upper string rest. The thickness of the brass was .016"-.020". These were covered with felt and the piano restrung. Result: no buzzes, zings or other noises. There are no tuning problems, either. By increasing that angle I also increased the length of the front duplex. Not much, I'll admit, but some.

So, it seems that either the increased length or the increased angle or a little of both served to eliminate the unwanted noises. I have applied this procedure to several pianos over the years, it always seems to work for me.

Paul Dempsey

[Editor's note: Paul's response came over the Internet discussion group "pianotech," and resulted in a number of responses. Some of these appear elsewhere in this issue. See also Del Fandrich's treatment of the topic in his article in this issue.]

Perceived Loss of Power

[Regarding Ken Sloane's answer to Terry Rood's question in the March issue of *PTJ*, pp 16-20]

Ken, I think you made a hard problem out of an easy one. Terry's questions was divided into three parts. I'll answer them one a time, and then explain my answers later.

1) Does a piano regulated with excessive blow distance and key dip develop more power? Answer: Yes.

2) Does excessive blow distance and key dip reduce repetition speed? Answer: Yes.

3) How does reduced hammer weight (from re-surfacing felt removal) figure in? Answer: slightly lighter touch; very slight loss of power; requires re-regulation of let-off if it's an upright, more if it's a grand (repetition spring, etc.).

Explanation: Instead of the terms "power, weight, and speed," I would like to refer to "energy, mass, and velocity." These terms more accurately identify the quantities we are talking about. Inertia is the tendency of a mass to try to maintain the same velocity, whether it be zero, or some big number.

The hammer can't give any energy to the strings that it doesn't have, but it can fail to give energy to the strings that it does have. The rule that never changes is that the energy has to go somewhere — that's a fundamental law of physics. The energy that the hammer stores up as it is accelerated toward the strings is kinetic energy (more about that later on). Kinetic energy is the energy of a mass in motion, and in a piano, it is equal to the work done to the hammer by the whole system — the action — including the finger that drives the key downward. This "work done" is expressed by the equation $W = Fs$, which simply says: Work done = Force x distance. If there is no lost motion, then key dip is directly related to hammer blow distance by the equation: $Fs = wd$, after we subtract let-off from blow distance. This just says that "force x distance on one end = work done on the other end," whether it is a single lever or a system of levers.

If the force (F) stays the same, a longer stroke (s) will mean more work done (wd). Therefore: $W = Fs = wd$. That isn't complicated at all. The reason I'm not saying anything about friction is that friction does not play a big part in action response when the pianist is playing for power (F, FF or FFF), unless something is really wrong with the action. It does play a part in playing softly (P), and it plays a big part in very soft playing (PP or PPP), and that's where let-off is so critical. But what we are talking about here is "power."

If everything else stays the same, increasing the blow distance will slow the repetition, and shortening the blow distance will speed it up.

Loudness depends upon how hard the hammer hits the strings. For the same hammer velocity and same loudness, the farther the hammer has to go, the longer it takes for it to get there and come back again. That's why the repetition suffers when the blow distance is too great. Blow distance is a trade-off between power and repetition speed.

The equation for kinetic energy is: $Ke = 1/2\ mv^2$ where m is mass and v is velocity. Kinetic energy is proportional to a linear function of mass, but a square function of velocity. A hammer moving twice as fast has four times as much kinetic energy. To have four times as much kinetic energy, it has to

Continued on Page 10

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Continued From Page 8

be given four times as much, beginning with the finger on the key. The loss of a little bit of mass (hammer felt) will cause only a tiny loss of power because the loss of mass will be partially made up by an increase in velocity if the force on the key is the same. The reason it won't be fully compensated is that the other parts of the action have mass too, and therefore inertia and stored kinetic energy as well, and that is lost once let-off occurs.

I'm assuming that Terry regulated the let off after he filed the hammers. If not, that could be a big problem. The reason is obvious. With uniform force on the key beginning at time-zero, the hammer accelerates almost uniformly until the *beginning* of let-off when the jack tender touches the let-off button. It takes another three to four millimeters for let-off to be completed, but the *loss* of acceleration starts when let-off *starts*. Up until that time, hammer acceleration is almost uniform if the force on the key is uniform. There are slight variations because of the arcs through which the action levers swing, but the relationships are so nearly uniform that we can consider them as such. Regarding Michael Wathen's findings that grand hammers accelerate during the first half of the stroke, and then decelerate thereafter, a vital statistic is missing. What was the uniformity of the force to the key, and how much was it? That can throw the findings in either direction! Without that, the result is meaningless. A sudden impulse to the key will put all of the acceleration in the first part of the stroke, but a slow-starting shove will do just the reverse. If the force against the key were uniform starting at time-zero and the hammer decelerated during the last half of the stroke, then (unless the key were being played very, very softly) something would be very badly wrong with the action.

With a blow distance of 2.125 inches and a pianist playing for "power," the hammer had 2.125-0.25=1.875 inches in which to accelerate. At a blow distance of 1.875 inches and a very broad let-off caused by butt leathers that were depressed and worn, the actual accelerating stroke was probably down to less then 1.5 inches. That would cause a lack of power. Also, changing the dip from 7/16 inch to 3/8 inch would have a profound influence on the pianist's perception, whether anything else had changed or not.

Jim Ellis, RPT

Ken Sloane replies:

Thanks, Jim, for supplying the engineer's approach to Terry's problem. In your critique of my article, you said: "Ken, I think you made a hard problem out of an easy one." My answer to that is that any attempt to discuss a pianist's perception of power cannot be accomplished within the realm of high school physics alone. Your approach, though very objective, seems to have made a simple problem out of one that is rather complex and quite subjective.

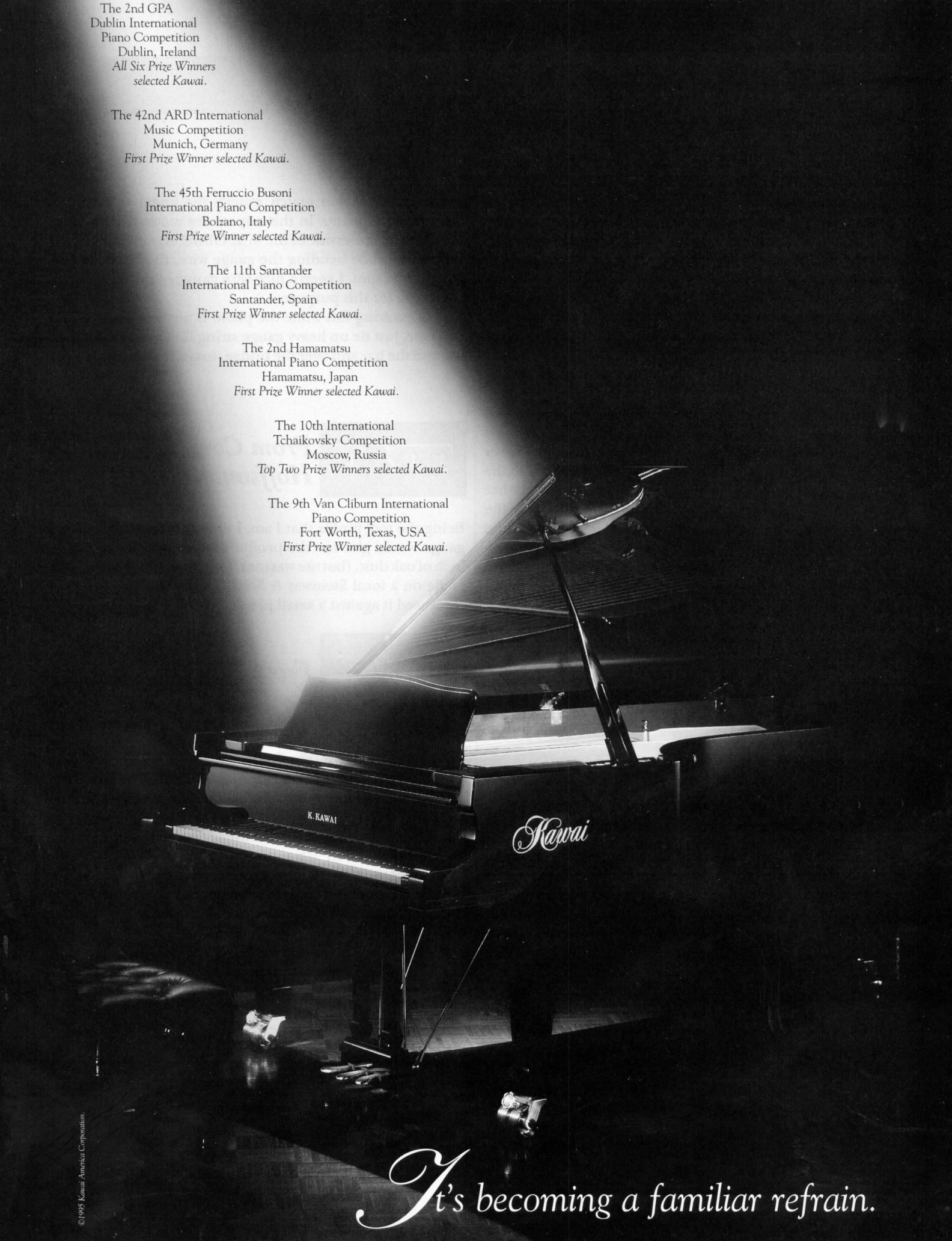
In fact, you initially addressed an extremely important variable in your critique but then did not elaborate. You said: "The hammer can't give any energy to the strings that it doesn't have, but it can fail to give energy to the strings that it does have." I couldn't agree with you more, and you actually may have stated the point I was trying to make in my article more eloquently and succinctly than I did. You see, the condition of the hammer is a crucial variable that plays a huge role in the hammer's ability to give energy to the strings. A few of those conditions are hammer density and the way the hammer "fits" the string. To elaborate, a soft hammer cannot transfer its power to the string nearly as well as a hard hammer — I suspect it actually sits on the strings longer than a harder hammer and "dampens" string vibration — and a poorly fit hammer "wobbles" on the string and probably loses some of its energy in torsional movement of the shank. Alas, I find these variables to be so important, and their effect, unfortunately, cannot be described within the context of an algebraic formula.

I'm afraid I don't agree with your comment about friction. You said: "Friction does not play a big part in action response when the pianist is playing for power... ." I find that a pianist can overcome high friction levels — and inertia levels, for that matter — and get power out of an action in slow musical passages, but see if a pianist feels a piano has enough power if it is loaded with friction and/or inertia and that pianist has to play a difficult piece like a Liszt "Transcendental Etude." As their hands cramp up from trying to play loud and fast, try telling them the piano has enough power. Their comment is likely to be, "I can get power from the instrument, but I have to work much too hard." Alas, not all piano compositions are written with whole notes and rests in between.

As for repetition in an action with excessive key dip and blow distance, I stated in my article: "Certainly, with excessive movement of action parts, the recycling process necessary for repetition to occur will take longer." However, given an action of sound design, I think that keeping checking close to the strings will insure adequate repetition provided the other phases of regulation are "in the ballpark" and dip and blow distance are not ridiculously excessive. I want to emphasize that I don't think your assessment of Terry's question is wrong. You have made some pertinent comments and the formulas you have provided to elucidate your points are definitely applicable to the discussion. I merely feel that other variables are more significant in the analysis of the problem. Allow me to relate some of my personal experience here at the Oberlin Conservatory to support my opinions.

After we increased our staff in the Piano Technology Department at Oberlin and started to do lots of sophisticated action rebuilding, it

Letters Conclude on Page 14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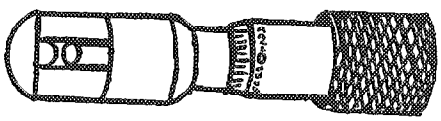
T T & T — A Smaller, More Convenient Micrometer

I use a micrometer which I started carrying in my tool kit last year, mostly because it is lighter and more compact than my standard micrometer. Here in New York, where we tuners don't usually have the convenience of a vehicle in which to schlep around our tools, every gram and centimeter in the tool kit counts. This particular micrometer is made by Starrett (see illustration); it's called a can seam micrometer, catalog number 207, and it's cylindrical in shape, about two and a half inches long and about a half inch in diameter. Since I've been using it I've discovered that it's ideal for several piano-related uses. For one thing, it easily mikes strung wire in any piano. If it won't go between the strings, it goes at a 45 degree angle over the string. Tighten it down, and you can conveniently read the wire diameter right off the back. It has a half-round, rather than a flat, anvil, which means you can mike strings outside the piano without having to fuss about the curl of the wire. And the shape of the jaws makes it ideal for miking centerpins. It's too small to mike the outside diameter of really fat bass strings, and can't be used on tuning pins; but for all plain wire and centerpins, and most wound strings, I've been very pleased with it.



Dan Levitan, RPT

T T & T — Measuring Counterbearing Angles

This is not a straightforward measurement, but I have a technique I've used for some time and can't even remember where it came from. I am not compulsive about measuring the duplex angle however, and anyway the issue is more about solving problems when they occur. If you do find a problem in this area though, it certainly is easiest to deal with it before stringing.

The technique for measuring is simple. Get a short piece of stiff wire, maybe 6"-7" long, and about the same diameter of wire in that section (or slightly heavier if necessary), then carefully bend it with your bending tool and set the outside surface angle of the wire to be your guide. Set this gauge at a good ideal angle to start (19 degrees to 20 degrees), then carefully fit it between unisons (it's easier with the action out) and hold it in place while you compare it to what is in the piano. You may then compare more or less deviation from this standard gauge, say 19 degrees , and rebend the wire by trial and error until you match exactly the angle that the wire follows in the piano. In this way we are measuring the angle taken by the underside of the wire. Obviously, it is important to be careful while bending the gauge wire, the bends must be only in one spot. I keep a nice wire gauge in my desk which is used only for this purpose.

Measuring this while the piano is unstrung is similar. In this case, just tie up heavy gauge string line as tight as you can around the bar and over the bridge, to simulate the string line.

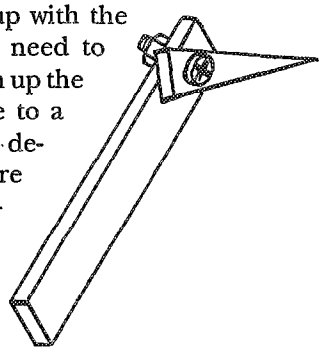
Dennis Johnson, RPT

T T & T — From Conrad Hoffsommer, RPT:

Being the tool junkie that I am, I thought that using a profile gauge would give me the profile angle. After blowing off an inch of oak dust, (last use was making house trim) I checked the angle on a local Steinway & Sons D and found 20 degrees. I measured it against a small plastic protractor.

T T & T — From Paul Dempsey:

I fashioned what amounts to a very small sliding bevel. I used stiff card for the time being, later I'll do one out of metal. The short, moveable leg needs to be short — 1" or so, wedge shaped coming to a sharp point. The long leg is not much longer- 2" to 2 1/2". The two legs are held together with a tiny machine screw and nut. Lay the longer leg on the string(s) and position the shorter leg to line up with the front duplex string length (you need to hold your mouth just so!). Tighten up the nut. Transfer the resultant angle to a piece of paper, extend the lines described by the two arms and measure the angle with a protractor. Similarly, you can measure the angle from the speaking length up from the bar from underneath with the action removed.



T T & T Concludes on Page 14

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Tips, Tools & Techniques

Continued From Page 12

Replace Bridge Pins With Original Size

You can replace bridge pins with new bridge pins of the same size, without using epoxy. Remove the old pins and apply "Woodtite." You will have to drive the new pins in with a nail set and a small hammer after you apply this stuff. It has the consistency of water and you can get it to travel down the hole quite easily. It contains no hazardous solvents.

Michael Wathen, RPT

More Birdcage Tips

This tip was prompted by Sid Stone, RPT's, article on tuning antique and birdcage pianos. After reading his very good article (and very good ideas, also) I thought you might be interested in hearing how I've been tuning birdcages for years. What I do is take thin pieces of wood (the little wooden slats that come inside a box of Renner grand shanks/flanges work great), and cut up a temperament strip into small pieces about 2 inches in length. I then glue these pieces to the ends of the slats so that they are wrapped around the ends. This part only needs to be done once. It's really simple, once you're equipped with these, to "strip mute" the center section by pushing the slats between the hammer shanks. Voila! No removal of the action is necessary. I've used this technique for some time now and it seldom takes me longer to tune a birdcage than any other piano.

Loren di Giorgio, RPT

Letters

Continued From Page 10

became increasingly apparent to me that variations in action regulation would usually not solve complaints about power issues. When any of the players trying the rebuilt actions commented that it was hard to get power from them, believe me, I tried every regulation technique imaginable to improve the situation — increase the dip, increase the blow distance, decrease the let-off, decrease the drop ... you name it, I tried it, and usually to no avail. Another thing I noticed was that you could stray from factory specifications much more that I thought possible and still have a "working" regulation. We would have pianists try out the rebuilt pianos in the early stages of regulation to test voicing levels. The actions were usually roughly regulated with variations in let-off as much as 1/8 of an inch, hammer lines all over the place, but all the notes having enough aftertouch to work. Invariably pianists would comment on the evenness of the actions and their predictable touch. I am certain what they find so pleasing about these rebuilt actions — even though rough regulated — is the uniformity in friction, inertia levels, and voicing. At this point the actions have action centers all pinned evenly and to the proper friction levels, uniformly tight key bushings, and hammers of appropriate shape and weight that are fitted nicely to the strings.

My conclusion? Don't ever attack an action problem by considering regulation only. It's important but only one in a list of many variables that must be considered.

Q — CA Glues in Piano Work

I'd like to get an idea about experiences using superglues (Dryburgh Glue, etc.). Personally, I use it often in field service, but in my own tests in my shop I find it to be brittle. One of the suggested uses is for gluing hammer heads back on broken shanks where the break is right where the shank enters the hammer. This doesn't seem to be the place for a brittle adhesive. So far I don't know of any repairs coming apart, but I often feel unsure about the permanence of these kind of repairs. Where is it best to use this glue, and where is it unacceptable?

Gordon Large, RPT

A — From Dale Probst, RPT:

I use Zap brand from Pianotek, it seems to hold up better in the heat here and I like the applicator bottle better. I've found it very useful for gluing jack heels and other broken wippen parts as well as making "instant" key or key button repairs. I use it in organ repair on plastic parts where it can be beaded in the same manner as welders use. I haven't used it on hammer heads from fear I might have trouble removing them later. If the surfaces to be adhered are prepared properly, it is a very strong, quick material to use.

A — From Bill Spurlock, RPT:

I don't believe that any adhesive will adequately repair a hammer shank broken off right at the hammer head; a long tapered break maybe . . . I think the broken shank thing is just done as a demo in exhibit halls, but clearly there's no longer any continuous grain from the shank on through the hammer head.

I do find the stuff very useful though. In the shop it's great for quick & dirty jigs, attaching stop blocks to fences, etc. In the field, it's good for reinforcing suspect action glue joints and repairing some broken parts:

■ Laminating veneer onto the sides of broken keys: cut the veneer pieces, lick them to moisten slightly, apply medium viscosity CA glue to the key, and press the veneer in place for 30 seconds. (The moisture causes the glue to set up, eliminating the need for the very smelly accelerator.)

■ Upright jack flanges breaking loose from wippens: apply a little accelerator to each jack flange glue joint, then follow with the thin CA glue.

■ Stripped screw holes: this is one of the best uses. As long as the holes are not totally stripped yet, saturate with thin CA glue, apply a little accelerator, and the threads become hardened enough to hold very well, sometimes even better than original in soft wood.

■ Attaching rubber buttons: The type of rubber buttons that fit into holes in the case parts can easily be knocked off if attached with other glues. CA glue welds them to the case for good. Put a drop of medium viscosity on the end of a hammer shank (do this off to one side of the instrument), swab the recess in the case part with it, breath on the rubber button to moisten, and press in place for 10 seconds.

■ One of my favorite uses is for attaching bushing cloth "bow ties" to trapwork parts. For example, upright damper lift rods, where the pedal dowel pin goes through a hole. The modern rubber grommets fall apart quickly. You can just insert two 1 1/4" pieces of bushing cloth, wet one end of each with a little spit, uh ... I mean saliva-based accelerator, apply medium CA to the other ends, and squeeze them together lightly with pliers (not your fingers!) to make a quick, permanent cloth bushing like the older pianos had.

I do not find CA glue to be as strong or as predictable as wood glues or epoxy for structural repairs though.

Q — From Richard S. Frederick, RPT:

I once devised an experiment to demonstrate that strength is proportional to thickness squared. Inadvertently, I demonstrated that the deflection of my test piece was proportional to the cube of thickness. So far nobody has understood, agreed with, or explained this principle to me. Is this formula then valid?

$(T_1/T_2)^3 = F_2/F_1)$

where T= thickness, and F= flexure.

A — From Glen Hart:

This is not true for what we are doing. What I have sometimes stated is that when the thickness of a member is doubled, the resistance to bending is cubed.

Q&A Concludes on Page 18

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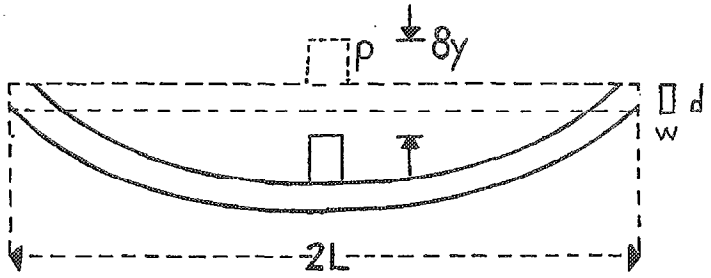

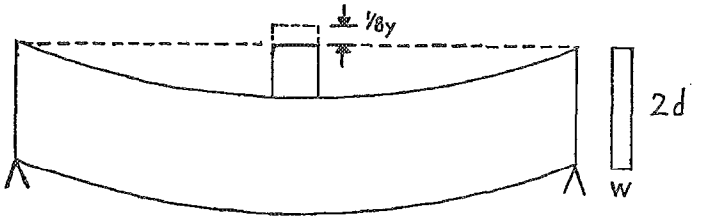

Above: Double the span and the beam will deflect eight times as much. Below: Double the depth and you reduce the deflection to 1/8.

It seems that whenever there is a discussion about rib design it is always stated that when the depth of a rib is doubled, the strength of the rib is squared, which is true. However, we are not concerned with the weight a rib will take before it ruptures. We are concerned about its flexibility, or in other words, the amount it deflects relative to the load of the strings and how much the crown will change with changes in humidity. Most important is how much the soundboard will vibrate relative to the string energy.

The flexural formula is the formula that quantifies the impedance of the soundboard and whether the piano will have short or long sustain or high or low volume (all other things being equal). There are formulas for calculating the actual mechanical impedance of a medium, which include such things as pressure amplitude, particle velocity, wave propagation velocity and velocity amplitude. While this looks good on paper, I've never been able to take the result to the shop and use it to set my table saw or planer! The flexural formula at least gives me some verifiable numbers that are not based on conjecture or assumption, and while it's not the actual measurement of impedance, from a practical standpoint it's very practical for what we're trying to achieve. It can be stated in many different forms. Probably the most useful for our purposes is:

$$Y = K\,{}^{P}/_{E}\;{}^{L^3}/_{wd^3}$$

where Y = deflection; K is a constant according to where the load is placed on the rib; P = load; E = modulus of elasticity of the material (Sitka = 1.57, Engelman = 1.30, White = 1.43); W = width; L = length of span; d = depth of rib.

For a rib loaded at its center, K= 0.25. After the crowned board is taken out of the press the crown is not a result of loading. The board remains crowned because it is an internally stressed member. It doesn't begin to act as a beam until we load it by stringing the piano. The bridge is also a beam which is continually loaded from end to end and therefore has a different value for K. While at the Steinway factory I placed the bridge of a nine-foot model D on a table. The arc of the bridge was at least one inch at the center. It was not shaped to fit the arc of the board as is often promulgated as the "correct" method. This arc is vital to holding a crown in the longitudinal direction of the grain and is why they advertise the double-crowned soundboard.

The Designer's Notebook
V-bars, Pressure Bars and Duplex Scales

By Delwin D. Fandrich, RPT
Contributing Editor

This article, and the one following in August, were prompted by the Round-table discussion on Capo d' Astro Bars appearing in the Journal *recently. This discussion also brought to mind the question asked by Clark Foerster in the May 1994* Journal *about installing vertical piano pressure bars. If you can stand just a little more on the subject, I'd like to start with a short bit about vertical piano V-bars and pressure bars.*

Pressure Bar Height

As Bill Spurlock pointed out in the July *PTJ*, when discussing pressure bar "height," what we're really referring to is the distance, or space, between the surface of the plate and the bottom of the pressure bar. Or, more specifically, the difference in elevation between the top of the V-bar and the bottom of the pressure bar.

As piano rebuilders we're accustomed to setting the height of the pressure bar referenced to its top since that is the easiest place for us to reach with a measuring device. Pressure bars come in a variety of different thicknesses and shapes so the overall height, i.e., the distance from the surface of the plate and the top of the pressure bar, can vary widely among different designs. Each manufacturer will have a specific dimension for this distance for each model they build. In some cases risers are cast into the plate which the pressure bar will seat against when it is at the proper height. Sometimes these risers will also indicate the points in the scale where wire sizes change.

From a design standpoint, however, neither of these dimensions is of much consequence. What we're really interested in is the string deflection angle across the V-bar. This angle is determined by the difference in elevation between the V-bar and the pressure bar (the string offset) in conjunction with the design length of the duplex string segment — that is, the length from the centerline of the V-bar to the centerline of the pressure bar. Assuming that the string offset remains the same, the deflection angle will increase if the pressure bar is moved closer to the V-bar and decrease if the pressure bar is moved away from the V-bar. Looking at it the other way, assume that the duplex length remains fixed, the deflection angle can then be increased or decreased by lowering or raising the elevation of the pressure bar respectively. Once the piano is built, relocating the pressure bar is not very practical, but its elevation can (usually) be changed fairly easily. (See the accompanying drawing which shows a string deflection angle of 15 degrees with a duplex string segment length of 25 mm.)

Some years ago, in an effort to learn more about the basic principles involved in terminating the speaking length of a piano string, I conducted a series of experiments using different string deflection angles across a V-bar typical of modern vertical piano plate designs. To conduct these experiments I built a model of an upright plate in which I could vary the elevation of the V-bar, the elevation of the pressure bar and the distance of the pressure bar from the V-bar. Using this mock-up I was able to vary the string deflection angle from 4 degrees to 25 degrees and the duplex string length from 15 mm to 30 mm. Absolute conclusions were a little hard to come by, but I did learn that, while it is true there is no one correct "height" for pressure bars, there is definitely a correct range for the string deflection angle.

Effective String Termination

To understand the importance of this range we need to first look at what we're trying to accomplish with the overall system. In combination with the V-bar, the pressure bar must deflect the string enough to positively terminate the speaking length of the string, but not so much as to create excessive friction at the string's bearing points. It is the string's deflection angle, in combination with the length of duplex string segment and the mass of the plate casting behind the V-bar, that determines the effectiveness, or the efficiency, of the string's speaking length termination mechanism. (There is a little more to it than just these three factors, of course, but to consider all of them is well beyond the scope of this article.) Obviously, within certain practical limits, the greater a string's deflection angle at the V-bar, the more effective the speaking length termination will be. But that doesn't mean that we can just crank in a high deflection angle on the assumption that "if a little bit is good, more is better." Beyond a certain critical point the improvements are nominal and other problems are introduced.

My experiments revealed that with a duplex string length of 25 mm good speaking length termination could be achieved with string deflection angles of 12 degrees and greater. With string deflection angles of 12 degrees and below several different problems were introduced. Pin setting (while tuning) became moderately more difficult because there was not enough friction at the string bearing points to adequately stabilize string tension along the various string segments and tuning stability began to suffer. Below 10 degrees energy began to "bleed" across the V-bar, and I could detect just the beginnings of various string noises. The deflection angle across the V-bar was no longer adequate to cleanly terminate the speaking length of the string and some false beating began to develop. Below eight degrees this false beating became a major problem, making precise tuning difficult. I could detect no acoustical advantage in using string termination angles below 12 degrees.

At the other extreme, when the deflection angle got beyond 18 degrees or 20 degrees, increasing string friction through its bearing points began to make tuning a little difficult. The

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The Designer's Notebook

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string no longer rendered through the bearing points easily. I couldn't detect any particular tonal advantage or disadvantage to using string deflection angles above 12 degrees to 15 degrees, so it seemed reasonable to consider 18 degrees to 20 degrees to be a realistic maximum allowable string deflection angle in most cases.

Most of these tests were done with a duplex string segment of 25 mm. I also did some testing with both longer and shorter string segments. From 12 mm to 15 mm the string deflection angles could be somewhat smaller, by about one degree to two degrees, to accomplish the same speaking length cut-off efficiency. With duplex string segments longer than 25 mm, the deflection angles had to be increased, again by one degree to two degrees, to get the same clean speaking length termination that was obtained with a 25 mm duplex string length. So, as much as is practical, you should try to achieve a string deflection angle of 12 degrees to 15 degrees at C *f* 88 (See Figure 1), depending on the length of the duplex string segment. In the low tenor section, where the pressure bar often gets quite close to the V-bar, this angle will of necessity increase somewhat, but you should try to not let it get above 18 degrees to 20 degrees unless brass bearing surfaces are used on both the V-bar and the pressure bar. (If brass is used at both the V-bar and the pressure bar, the string termination angle can be increased somewhat beyond 18 degrees to 20 degrees without too much trouble if the physical demands of the design require it.) I've used these basic principles on a number of different upright pianos, both in new design work and in older instruments we've rebuilt; they still seem valid.

Note 1:
The string plane should be approximately parallel to the plate surface from the V-bar to the bottom of the wrap on the tuning pin.

Note 2:
The string deflection angle (in this case 15 degrees) is determined by the string offset (8 mm here) in conjunction with the distance of the pressure bar c/l from the V-bar c/l (in this illustration 255 mm at C-88).

If the string offset remains constant (i.e., the elevation of the pressure bar remains the same), moving the pressure bar closer to the V-bar will increase the deflection angle. Moving it away from the V-bar will decrease the deflection angle. String offset will not change.

If the distance of the pressure bar from the V-bar remains constant (as is normally the case), both the string off-set and the deflection angle will increase as the pressure bar is adjusted closer to the plate surface and decrease as it is adjusted away from the plate surface.

Designs with short duplex string lengths (12 mm to 18 mm) will terminate well with smaller string deflection angles. Designs with long duplex strings (18 mm to 25 mm) require slightly larger deflection angles.

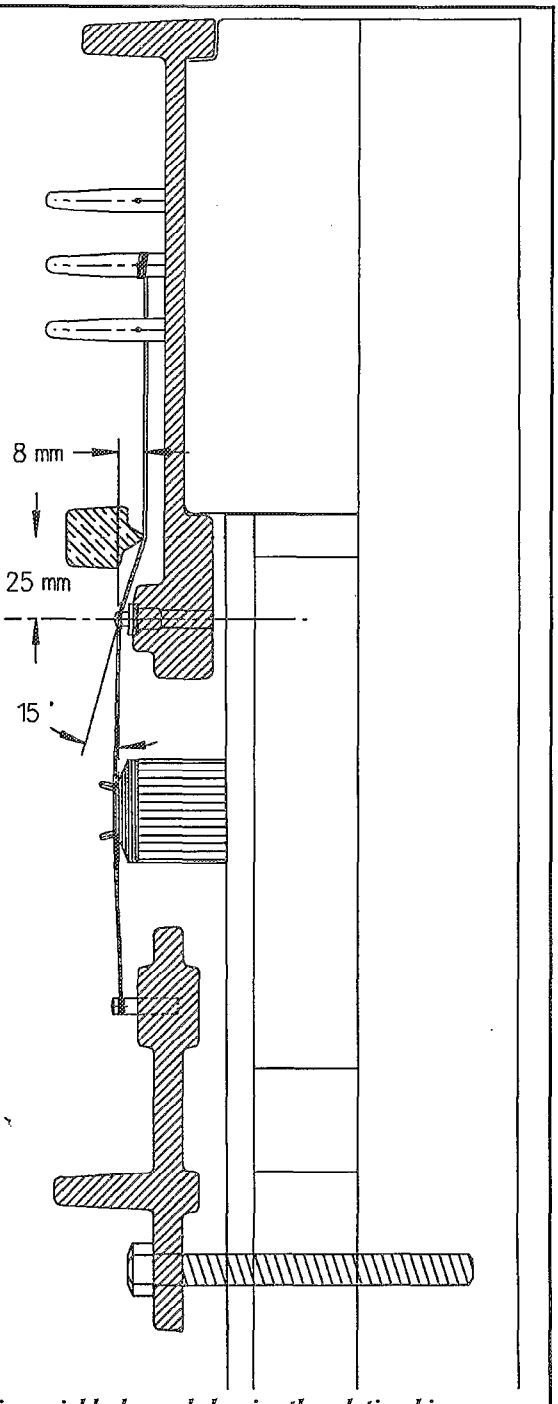

Figure 1
A cross-section drawing of a vertical piano pinblock panel showing the relationship between the V-bar and the pressure bar.

"Tuned" Front Duplex Stringing

So far I've been talking about typical V-bar to pressure bar alignments that are designed to efficiently and positively "cut-off," or terminate, the speaking length of the string. Sooner or later you're likely to come across a vertical piano designed with "tuned" front duplex stringing. With these designs it is physically impossible to come even close to the optimum string deflection angles discussed above. Often the pressure bars in these pianos will have "feet" that seat against the plate at the "correct" height. In most cases these pianos use string deflection angles of considerably less than 10 degrees. I've measured them as low as three degrees to five degrees in the upper treble sections.

In some cases you can grind these feet down a bit to get the pressure bar a little closer to the plate and increase the string deflection angle slightly. This will help some, but you're still going to have problems. You'll just have to accept that tuning the upper tenor and treble sections of these

pianos will be a nightmare, and the tuning you do end up with will not be very solid. Also, the sound will probably be what I call "splotchy." That is, there is generally such a maze of false beats and energy bleed throughout the upper tenor and treble sections that the actual fundamental pitch and the resulting harmonic structure of the unison will be somewhat indistinct and hard to focus on. I'll leave it to the pianist to determine whether this is good or bad. As a piano tuner, I was asked if I could "fix it" more often than not. At one point in my career, I actually did attempt to "fix" one of these pianos. It required modifying the V-bar to raise the string plane and then relocating the pressure bar closer to the V-bar to get a 10 degree to 12 degree string deflection angle — it varied due to the design of the pressure bar. I then recapped the tenor bridge with a thicker cap to raise the string plane to coincide with the new V-bar elevation. (While making the new bridge cap, I took the liberty of updating the stringing scale a bit as well. Had this been a truly "scientific" experiment, this would not have been permissible.) I then fabricated a counter-bearing bar to place in front of the hitch pins to re-establish proper downbearing at the new string plane elevation. In this particular instrument the bass string plane was high enough to clear the new tenor string plane without interference. The action also had to be relocated slightly to accommodate the new string plane. The piano no longer had "tuned duplex stringing," but it did have better power and sustain and a much "cleaner" and generally more pleasant sound. (The original hammers were used.) Tuning ease and stability were both greatly improved. What was lost? Nothing, as far as I could tell, except for a lot of time that I didn't get paid for. Unfortunately, short of this type of redesign and re-manufacture there's not much you can do about these pianos. (I'll be discussing tuned duplex stringing more in next month's column.)

String Breakage

In theory, one of the advantages of tuned duplex stringing is that by allowing the string to pivot over the V-bar it should reduce the bending stress at the V-bar point, thereby helping to prolong string life. It should follow, then, that as the string deflection angle is increased, string breakage should become more of a problem as well. I'll discuss this in a little more detail next month, also, but the results of these tests did not indicate this was the case.

While I didn't test specifically for string breakage, I did run some of the tests out beyond 1,000,000 blows. I did not find any particular problems with string breakage at either string deflection angle extreme, that is either 12 degrees or 20 degrees I didn't do much testing using deflection angles greater than 20 degrees, so I don't know what the results would have been there. I should point out that my tests were not intended to drive strings until they broke. It would take a different type of test to determine conclusively if there would be more or less string breakage at either extreme, but 1,000,000 blows by a mechanical pounder is enough to seriously wear out a typical hammer. It's pretty hard on action flanges, too.

(Several years after running my tests I had a chance to discuss this subject with Lew Herwig and was pleased to learn that he had come to very similar conclusions as the result of his own studies. It also occurred to me that if I'd had the sense to ask him earlier, I could have saved myself a lot of very tedious, albeit very interesting, work.)

String Plane

After going under the pressure bar, the string travels back — OK, we're talking about upright pianos, so the string goes up — to the tuning pin. It should be approximately parallel to the surface of the plate along this distance. (Again, see the illustration.) If the pressure bar is set too low — that is, too close to the plate surface — the string will need to travel "up-hill" to the bottom of the coil on the tuning pin and it will want to walk down the pin toward the plate surface when the pin is turned during tuning. Within limits, it's not quite as bad if the string travels "down-hill" to the pin. This configuration, rare in the tenor and treble sections of verticals, is common in the bass. Unless there is a counter-bearing bar cast into the plate between the pressure bar and the tuning pins, this principle can be used to establish a good starting point from which to determine the correct elevation for the pressure bar. Assuming that the position of both the V-bar and the pressure bar are fixed by the design of the plate, the string deflection angle can be varied only by adjusting the pressure bar in or out relative to the V-bar. There will only be a very small range that will be "correct" for each given design. You can usually get pretty close to this optimum range by setting the pressure bar so that the string plane is essentially parallel to the plate surface between the pressure bar and the tuning pin.

Compared to the Grand . . .

How does this system compare with that found on the grand piano? We'll explore some of the differences between the grand and vertical string deflection systems in next month's column.

The Limits of Theory

Dan Levitan, RPT
Contributing Editor

In recent articles, we've been discussing inharmonicity and its effects on the beat rates of temperament intervals. Our purpose has been to create a theory of the general principles that underlie these inharmonic effects, as well as to draw some general conclusions about the typical kinds of inharmonic scales that we can expect to find in smaller pianos. The reason we've taken this approach to understanding the inharmonicity of smaller pianos is that it's usually more practical to have a set of basic principles that apply to any piano than to have a detailed understanding of the quirks of just one particular instrument.

This month, though, I thought it might be illuminating to take the opposite approach, and, instead of looking at general principles, to see how far we could perfect the temperament section of one individual small piano. I had three reasons for wanting to do this. First, I thought it would be useful to see how well the general theory we've developed applies to a specific case. Second, I thought it would be interesting to see what the limits of our theory are; at what point the unpredictable variations among different makes, models, and individual pianos cause our generalizations to break down. And finally, my piano was, as usual, long overdue for some attention. I always seem to prefer to spend an hour playing it rather than tuning it, and this seemed to be the most likely way of getting it tuned in the near future, apart from hiring someone else to do it. As a fringe benefit, I wouldn't have to mumble something unintelligible the next time a client, after asking me if I played the piano, if I had perfect pitch, and what kind of piano I had, asked me, "And how often do you tune your piano?"

My first step in creating this ideal temperament was to make as detailed a profile as possible of the inharmonicity of the temperament area of my piano, which is a 1981 Yamaha console, model M1AD, serial number 3405433. To make such a profile I would have to measure the inharmonicity of each string in the temperament. I own a vintage, unmodified Sight-O-Tuner, but, even though it's been recently calibrated, it falls short of the accuracy that's recently become possible with some other widely available tuning devices. I chose instead to use a Sanderson Accu-Tuner (SAT). Not only am I pretty familiar with the way these machines operate from my work as a CTE, but they are probably also the most stable and accurate devices on the market. Karl Roeder kindly let me borrow his SAT for a day — thanks, Karl!

Several of my colleagues who use the SAT regularly, Newton Hunt and Norman Snyder, in particular, have told me that they find that the inharmonicity of a given string in a given piano varies slightly from time to time, whether due to changes in tension, in the crown and bearing of the board, in the method of muting the piano, or for some other reason. Norman Snyder, in fact, has recorded his FAC readings each time he has tuned his piano for the past several years, and he has found that the stretch numbers drift more than can be easily explained by taking into account reasonable measurement errors. I'm grateful to Norman for his permission to reprint his data here, in Table 1. By the way, I'd be interested to hear from anyone who has some insight into the causes of these drifts in inharmonicity. The only thing that's clear to me from the data is the fact that Norman tunes his piano a lot more often than I do mine!

Table 1
Steinway B (built in 1980) FAC measurements by Norman Snyder

DATE	RH	F	A	C	NOTES
7/10/92		6.4	7.6	7.3	piano strip muted
9/25/92		7.5	7.8	7.4	piano strip muted
11/11/92	0.45	6.9	8.4	6.4	piano strip muted
11/20/92	0.35	7.1	7.4	6.8	piano strip muted
11/27/92	0.37	6.9	8.1	6.6	piano strip muted
12/10/92	0.43	6.9	7.9	6.6	piano strip muted
1/27/93	0.38	6.6	7.7	6.4	piano strip muted
3/31/93	0.47	7.3	7.4	6.8	- 8 cents
4/15/93	0.47	6.8	7.0	6.6	- 4 cents
6/20/93	0.97	7.0	7.0	6.7	+ 6.5 cents
9/23/93	0.65	7.1	7.8	6.4	piano strip muted
11/20/93	0.48	6.9	7.7	6.6	piano strip muted
12/28/93	0.45	6.8	8.0	6.5	piano strip muted
1/30/94	0.46	7.1	7.9	6.8	piano strip muted
3/7/94	0.46	7.1	7.6	6.5	piano strip muted
4/14/94	0.50	7.7	7.7	6.6	piano strip muted
5/12/94	0.60	7.3	8.0	6.4	piano strip muted
6/10/94	0.45	6.8	7.9	7.3	piano strip muted
7/15/94	0.77	6.8	7.0	6.8	+ 5 cents / offset method
7/15/94	0.77	7.3	7.0	6.7	normal method
7/18/94	0.52	6.9	7.3	7.8	normal method / 2 mutes
7/18/94	0.52	7.1	7.7	7.3	normal method (strip mute)
Averages		7.01363	7.63181	6.7863	

Normal method is per Accu-Tuner instructions tuning FAC to 0 cents.
Offset method measures FAC stretch from pitch of note as is.

Be that as it may, knowing that inharmonicity can vary unpredictably in a string, I decided to be very circumspect about my inharmonicity measurements. My first concern was that I would be inaccurate or inconsistent in the way I measured the inharmonicity. To find out how much variation I could expect to see from measurement error alone, I began by taking two readings each for notes F3 and F4. I muted off the temperament section and measured the inharmonicity of the middle strings of the unisons at F3 (which, on the M1AD, is the lowest plain wire string) and at F4. I recorded the cents deviation for the first six partials (no partial higher than the sixth is needed for tuning the common temperament intervals) by matching the machine as closely as possible to the fundamental pitch of the note, setting the cents deviation to zero, and then recording the cents deviation for the first five overtones. The results are laid out in Table 2. The values for the third and sixth partials have been reduced by 2 cents, and those for the fifth partial have been increased by 13.7 cents, to compensate for the fact that the SAT reads in equal temperament.

I have found that it is difficult to get an accurate reading for the fundamental in this area of the piano; there is little visual difference on the SAT between readings a couple of tenths of a cent apart in this range. In addition, the frequencies themselves tend to drift after the note has been played. Typically, the note may appear to be sharp for a second, then reverse and slowly drift flat. To eliminate errors from this cause, I recorded

Continued on Next Page

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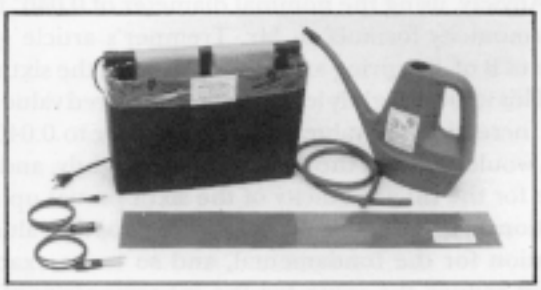

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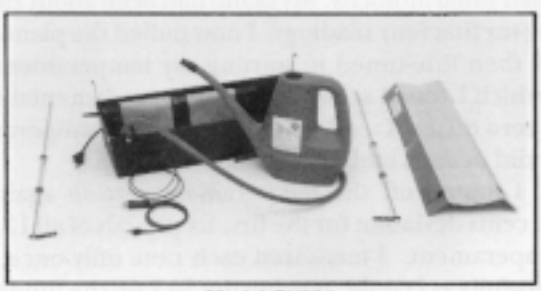

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the cents deviation of each note before I reset the machine to zero, which allowed me to adjust my readings to compensate for any differences in the pitch I originally read for the fundamental. For F3, my two readings of the fundamental varied by one-tenth cent; for F4, they were the same.

Even with this compensation, the two readings for each note vary from each other by as much as two tenths of a cent. I'm sure that someone more experienced with the SAT than I, who had over time developed a more consist measuring technique, would have been able to take readings that would eliminate much of this variation. Still, I think we have come up here against one limit to our theory, namely, a limit in how accurately the pitches of piano strings can be measured, whether with an electronic device or with our ears. A tenth of a cent in this range is about as accurate as a piano string will allow us to be.

Table 2
Inharmonicity of Notes F3 and F4

Note	Cents Deviation Partial Number					
	1	2	3	4	5	6
F3, 1st pass	0	2.5	3.3	4.9	6.9	9.6
F3, 2nd pass	0	2.3	3.5	4.7	7.2	9.7
F4, 1st pass	0	1.0	2.6	5.5	9.0	13.2
F4, 2nd pass	0	1.2	2.9	5.4	9.1	13.3

I was also concerned that the act of tuning notes would change their inharmonicity. My piano had been about 15 cents flat during my first four readings. I now pulled the piano up to pitch and then fine-tuned it, starting my temperament with note F4, which I tuned at the level of the fundamental to the SAT with zero offset. I used a 6:3 octave for my temperament, and then did octaves and unisons up and down.

Next, I muted off the temperament section again and measured cents deviation for the first six partials of all 13 notes of the temperament. I measured each note only once, but I went as carefully as I could, zeroing the SAT on the fundamental, and then rechecking that offset for each note. The data I obtained are laid out in Table 4.

I was particularly interested to see how the inharmonicity of F3 and F4 would change as the piano came up to pitch. As you can see from the tables, the readings for note F3 seemed to increase by three- or four-tenths of a cent, while those of F4 seemed to decrease by about two-tenths of a cent. Since both these discrepancies happened to about the same for all the partials, I'd be willing to bet that they reflect inaccuracies in my zeroing the machine on the fundamental rather than actual changes in the inharmonicity of the strings. I decided not to be concerned that the slight changes in pitch caused by further tuning would change the inharmonicity levels I had already measured to any significant degree.

Now that the piano was at pitch, I thought it might be interesting to make a brief digression and take some measurements of string length and diameter in order to see how accurately the inharmonicity formula that Fred Tremper uses in his excellent article in the May issue would predict the inharmonicity of my M1AD.

Table 3
Inharmonicity of Notes of Temperament Octave F3-F4

Note	Cents Deviation Partial Number					
	1	2	3	4	5	6
F4	0	1.0	2.7	5.3	8.9	12.9
E4	0	0.3	2.0	4.2	7.4	11.3
D#4	0	0.6	2.0	4.0	7.1	10.4
D4	0	0.3	1.8	3.5	6.1	9.4
C#4	0	-0.4	0.8	2.6	4.7	7.7
C4	0	1.2	2.6	4.1	6.6	9.0
B3	0	1.3	2.0	3.7	5.8	8.2
A#3	0	0.8	1.6	3.2	5.0	7.3
A3	0	0.6	1.2	2.8	4.6	6.7
G#3	0	0.5	1.5	3.2	4.7	6.8
G3	0	-0.2	0.6	2.1	4.0	6.0
F#3	0	2.0	2.6	4.3	6.3	9.1
F3	0	2.7	3.8	5.3	7.5	9.9

I measured the speaking length of my F3 as 32 11/16"; the wire size I called 17 1/2, but its true diameter was something greater than 0.040"; more like 0.04025". For F4, the speaking length was 20 1/8"; the wire size was nominally 16 1/2, but again, the actual wire diameter was slightly larger than 0.038".

Anyway, using the nominal diameter of 0.040" for F3, the inharmonicity formula in Mr. Tremper's article gives me a value of B of .24, giving an inharmonicity at the sixth partial of 8.6. This value is slightly less than the measured value of around 9.9. Increasing the value for wire diameter to 0.04025", however, would increase the inharmonicity slightly, and bring the value for the inharmonicity of the sixth partial up to 8.9. In addition, in my measurements I used zero as the value for cents deviation for the fundamental, and so to be exact, I really should reduce the value for the inharmonicity of the sixth partial by the value for the inharmonicity of the first partial, bringing the calculated value down to about 9.7.

For F4, the value of the inharmonicity of the sixth partial, using the nominal diameter of 0.038", is 13.7, which is higher than the measured value of 12.9. The same compensation for slightly greater wire size and for the measured value of the fundamental being zero would enlarge this discrepancy somewhat.

In other words, the inharmonicity formula gets us into the ballpark, but clearly there are other factors at work in producing the actual measured inharmonicity. This points up another limit to theory.

But let's get back to Table 4. There are a couple of interesting features of the data that are worth commenting on. First of all, notice the two jumps in inharmonicity, a big one

between notes F#3 and G3, and a smaller one between notes C4 and C#4. "Miking" the strings, I discovered that these are points at which wire sizes change. Here's another limit to theory, since it's unlikely that we're going to map out the scale of each temperament we tune, and so, for all practical purposes, we have no way of knowing where these kinds of jumps in inharmonicity are going to be located in whatever temperament we happen to be tuning.

Second, notice the negative values for cents deviation for the second partials of notes G3 and C#4. (You can be sure that I checked these data several times!) There must be something in the board, bridges, tension, or what have you that depresses these values. But, since we don't understand these factors, we have no way of predicting their effects — and that is another limit to our theory. It is interesting, isn't it, that both negative values appear just above a jump in wire size. Fortunately for us, these negative values appear in the second partials, which we only listen to in 3:2 fifths.

Finally, notice how the inharmonicity decreases at a more and more gradual rate as the notes descend, finally reversing direction and increasing for the lowest two notes. This lends support to our observations in previous articles that inharmonicity tends to increase toward the bottom of temperament sections. Looking at the bridge of my M1AD, I can see that it makes a sharp curve back towards the upper bridge at just this point in the temperament.

In any case, I then had a somewhat accurate table of the inharmonicity conditions in my temperament. The next step was to use that information to do a virtual tuning on my computer, using the spreadsheet program Quattro Pro. First, I set the frequency of the fundamental of note F4 to 349.228 Hz — the virtual equivalent of tuning the fundamental of F4 to the zero cents deviation from the note F4 on the SAT. Then, I used the inharmonicity data taken from my M1AD to generate the frequencies of the other partials of F4. Next, I took the frequency of the third partial of F4 and set the sixth partial of F3 to the same value—in other words, I virtually tuned the octave F3-F4 as a pure 6:3 octave. I then used the inharmonicity data from the M1AD to generate the frequencies of the remaining partials of note F3.

Next, I took the difference between the frequencies of the fundamentals of F3 and F4 and generated a series of frequencies that divided that difference into 12 perfectly equal steps — the virtual equivalent of tuning a perfectly equal temperament between F3 and F4.

Finally, I compared the frequencies of the coincident partials of all the usual temperament intervals to see how fast the intervals would beat, that is, if they were in a piano and not a computer. The results are given in Table 4. I hope that the layout of Tables 4-7 is self-explanatory. The beat rates of all the intervals appear in the same row as the lower note of the interval. Don't worry for now about the columns marked "Inharmonicity compensation" and "Sharpness factor;" we'll get to those later.

Table 4

Note	Inharmonicity Compensation	Sharpness Factor	ms	Interval Beat Rates M3	P4	P5	P5	M6
F4	0	1		3:2	6:4			
E4	0	1						
D#4	0	1						
D4	0	1	-14.6					
C#4	0	1	-13.6	13.4				
C4	0	1	-14.3	10.4	2.2			
B3	0	1	-13.6	10.2	1.9			
A#3	0	1	-13.2	9.9	2.0	0.7	0.2	
A3	0	1	-10.6	9.0	2.0	0.5	-0.2	
G#3	0	1	-10.6	9.3	1.2	0.5	-0.4	11.5
G3	0	1	-10.0	9.0	2.5	0.7	-0.2	10.8
F#3	0	1	-11.7	7.0	1.1	-0.2	-2.7	9.0
F3	0	1	-11.5	5.8	0.5	-0.1	-2.2	7.8

The tuning generated by our computer is not bad, but it's not great either. Some of its roughness is no doubt due to my inaccuracy in measuring the inharmonicity in the individual strings. Still, some trends come through clearly, and they reinforce the conclusions we drew in previous articles about the beat rates of intervals in inharmonic temperaments. First of all, the wide intervals — the major thirds and sixths, and the perfect fourths — generally progress more rapidly than theory says they should. The narrow intervals progress more slowly — note the minor thirds. Quite a few of the 3:2 fifths are wide, especially towards the upper part of the temperament, and the 6:4 fifths actually progress in a reverse direction. All these trends are consistent with our theory. Let's see if we can't improve the temperament a bit. First of all, let's go back to Table 3. If we flattened the fundamental of note F3, all its inharmonicity readings would be reduced and brought more into line with the rest of the temperament. The same seems to be true, to a lesser degree, for note G#3. Why is this so? Either I misread the fundamentals when taking the data, or the inharmonicity of those notes really are higher for some reason, or both. In any case, let's start our retuning by compensating these two inharmonicity readings, reducing all the readings for note F3 by 0.8 cents, and all those for note G#3 by 0.3 cents. If our data are correct, this would be equivalent to slightly flattening these two notes, and would point up yet another limit to our theory.

The effect of this retuning on the temperament beat rates is apparent in Table 5. The amount I've altered the inharmonicity appears in the column labeled "Inharmonicity compensation." After the compensation, the beat rates become a bit more smooth.

Let's try now to compensate for the two jumps in inharmonicity caused by the scale breaks at F#3-G3 and C4-C#4. We'll leave F3 and F#3 as they are, as reflected in Table 6 in the column labeled "Sharpness factor." In that column I've put the number that we'll multiply the fundamental frequency of the note by to slightly sharpen it. If we multiply by one, of course, the frequency stays the same, so F3 and F#3 have sharpness factors of 1.0. We'll sharpen the fundamental of G3 by multiplying it by 1.001; then we'll gradually lower the sharp-

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The Limits of Theory

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Table 5

Note	Inharmonicity Compensation	Sharpness Factor	ms	Interval Beat Rates M3	P4	P5	P5	M6
F4	0	1		3:2	6:4			
E4	0	1						
D#4	0	1						
D4	0	1	-14.8					
C#4	0	1	-13.8	13.2				
C4	0	1	-14.4	10.2	2.0			
B3	0	1	-13.8	10.1	1.7			
A#3	0	1	-13.4	9.7	1.8	0.5	-0.2	
A3	0	1	-10.8	8.8	1.8	0.3	-0.6	
G#3	-0.3	1	-10.6	9.3	1.2	0.4	-0.5	11.3
G3	0	1	-10.2	8.8	2.3	0.5	-0.5	10.5
F#3	0	1	-11.8	6.8	1.0	-0.4	-3.0	8.7
F3	-0.8	1	-11.3	6.0	0.7	0.0	-2.0	7.9

ness factor as we go up the scale until we get to C#4, where we'll raise it again; and then reduce the sharpness factor back to one for the top notes to keep our octave at the same size, a pure 6:3. The resulting beat rates are much more acceptable. But look at the major thirds. They are still progressing more rapidly than in theory; if we want them to progress at the accepted rate, in other words, if we want the contiguous thirds to beat in the ration of 4:5, we still have more work to do.

I've done this in Table 7. I arrived at the sharpness factors in this table in much the same way I might tune a piano. First, I looked for sharpness factors for A3 and C#4 that would create a chain of major thirds beating at about a 4:5 ratio. Then I filled in the other intervals as though I were going through a temperament sequence, looking for consistent beat rates, backtracking every now and then, not trying for perfection, but just doing the best I could. In so doing, I definitely made some more improvements to the beat rates; but they were still not perfect. Note that all the notes in the center of the temperament are sharp; this reinforces our conclusion in earlier articles about the way temperaments are generally distorted to make them sound more like ideal equal temperament. Notice also the random-seeming nature of the exact values for the sharpness factors.

Table 6

Note	Inharmonicity Compensation	Sharpness Factor	ms	Interval Beat Rates M3	P4	P5	P5	M6
F4	0	1		3:2	6:4			
E4	0	1						
D#4	0	1						
D4	0	1.001	-16.6					
C#4	0	1.001	-15.4	11.8				
C4	0	1.0001	-14.6	10.1	1.8			
B3	0	1.0001	-12.5	9.9	1.6			
A#3	0	1.0001	-12.2	10.7	1.8	0.4	-0.3	
A3	0	1.001	-11.9	8.8	1.8	-0.3	-1.9	
G#3	-0.3	1.001	-11.7	8.4	1.2	-0.2	-1.8	10.3
G3	0	1.001	-11.2	7.9	1.6	0.5	-0.5	9.5
F#3	0	1	-10.7	6.9	1.1	0.2	-1.9	8.7
F3	-0.8	1	-10.3	6.9	0.8	0.0	-1.8	8.8

I'm sure it would be possible to improve these beat rates further if one wished to spend the time, but I doubt they could ever be brought into perfect line. And here, I think, we've hit the final limits to our theory. Beyond a certain point the alterations we have to make to the temperament to improve its sound are, for all practical purposes, unpredictable and irregular enough that we have to rely on judgment rather than theory to make them. To make these minute adjustments we have to depend on our experience in working with temperaments as well on pure dumb luck.

We shouldn't take the data in these tables too seriously; because of errors in measurement, they can't exactly reflect the inharmonicity of my M1AD. Still, their very inexactness is due to some extent to the uncertainty of piano pitch at this level of precision. Further compromises come from the changes in inharmonicity as we go up the scale — some large ones due to such factors as wire size changes, many smaller ones due to Lord knows what — changes which force us to move the notes around in unpredictable ways in order to improve the sound of the temperament. And we will probably never know for certain when or if we have attained an ideal temperament for this piano.

Table 7

Note	Inharmonicity Compensation	Sharpness Factor	ms	Interval Beat Rates M3	P4	P5	P5	M6
F4	0	1		3:2	6:4			
E4	0	1.0007						
D#4	0	1.001						
D4	0	1.001	-16.6					
C#4	0	1.0015	-15.1	11.1				
C4	0	1.0003	-13.4	10.7	1.6			
B3	0	1.0007	-13.4	10.4	1.7			
A#3	0	1.001	-12.7	9.7	1.8	-0.2	-1.6	
A3	0	1.0013	-12.1	9.1	1.6	-0.1	-1.3	
G#3	-0.3	1.001	-11.0	8.6	1.6	0.4	-0.5	10.3
G3	0	1.0013	-10.5	8.2	1.5	0.3	-0.8	9.9
F#3	0	1	-10.4	7.8	1.5	0.4	-1.4	9.6
F3	-0.8	1	-10.3	7.2	1.4	0.2	-1.6	8.8

My last step in this experiment was to transfer the tuning in Table 7 to my piano. I decided to use the sixth partial to do this; my reasoning was that, as the highest partial, it would allow me the greatest precision in my tuning. I took the frequencies of the sixth partials of all 13 notes of the temperament and converted them to cents deviations from the SAT, as in Table 8. Then, after raising each deviation by two cents to compensate for the SAT's equal temperament, I tuned the sixth partials of all the notes in my M1AD's temperament, and listened.

I had to admit: this was an incredibly smooth temperament. It sounded like it had been pureed. I'm used to a chunkier sound. Not only do I tend to let inharmonicity take its course, and leave, for example, my wide intervals, my major thirds and sixths and perfect fourths, progressing on the rapid side; I also rarely take the time to perfect any temperament to this degree. But this temperament was very satisfying to listen

to, and made an excellent approximation to the sound of true equal temperament.

Table 8

Note	Partial 6th Frequency in Hz	Cents Deviation
F4	2111.040	14.9
E4	1991.495	13.9
D#4	1878.729	13.0
D4	1771.714	11.5
C#4	1670.954	10.1
C4	1575.978	8.8
B3	1486.974	8.2
A#3	1402.776	7.3
A3	1323.574	6.6
G#3	1248.384	5.4
G3	1177.968	4.9
F#3	1112.058	5.2
F3	1049.319	4.7

The progression of values for cents deviation in Table 8 is very even, and I would imagine that almost any similarly even series of values could be used to produce electronically a smooth sounding temperament. The progression of beat rates would be different for each temperament, of course, and some of those progressions might not be acceptable, but consistency counts for a great deal in tuning, and all these temperaments would very likely have a consistent, regular sound. This consistency is, of course, one of the chief virtues of tunings done electronically. The one area of the temperament that would probably not sound as well would be the lowest two notes, whose inharmonicity is sharply higher than the notes just above them. Perhaps these notes could be retuned aurally to improve the overall temperament.

At this point in my experiment, I had a couple of hours left, and that presented me with a unique opportunity — to use this meticulously crafted temperament as the basis of a truly exceptional tuning. In an hour or so, taking my time with the octaves and unisons, I could for once have my piano be superbly in tune.

What to do? I pulled out the temperament strip and put the 13 middle strings of the temperament back in tune with their neighbors. After quickly checking up and down the piano, I put the case parts back on and opened up the Goldberg Variations on the music stand. After all, sometimes music can be even more fun than tuning.

Comparing Hammer Boring Jigs

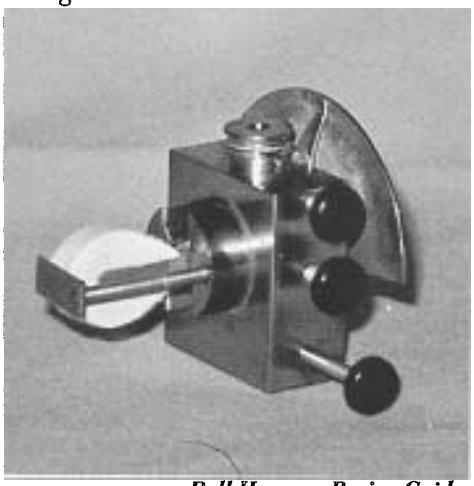
By David Severance, RPT
Eastern Washington Chapter

Piano technicians who bore their own hammers are in the minority today, but 20 years ago they were almost unheard of. Until recently, in fact, jigs to accomplish accurate hammer boring have been almost completely unavailable. Most manufacturers and suppliers use heavy and expensive one-of-a-kind machines that are usually built in-house. The supply houses sell several hammer boring jigs intended only for boring the occasional replacement hammer in the field. Those intrepid few technicians who insisted on boring their own hammers usually had to fabricate a jig of their own design or adapt a tool intended for another purpose. Although the majority of us still order our hammers bored — 80 percent to 85 percent according to several suppliers — I sense more of a desire among technicians to perform this service for themselves. This is probably the result of information made available through articles in the Journal *and the various regional and annual conferences.*

Do technicians now have a large and varied selection of hammer boring tools and jigs to choose from? Unfortunately, no, but more are available now than have been. In fact, I'll bet there are a few tools described in this article that you haven't seen. I own and have used all the jigs that I am going to describe with the exception of the one, manufactured by Renner USA. As I write this, the Renner jig has only been available for a few weeks.

Roll Hammer Boring Guide

The first commercially available jig that I am aware of was the Roll Hammer Boring Guide. I purchased this tool in 1978. This jig was among the several dozen tools that were designed and built by the brothers, Jack and Robert Roll. Jack was a tool designer who worked for both the University of California at Berkeley and the Lawrence Berkeley Laboratories. Jack developed an interest in piano repair and the tools that piano technicians used. With the help of his brother, Robert, a talented machinist, Jack founded Quality Custom Tools and they began fabricating and selling piano tools of their own design. When Jack died in 1977, Robert continued running the business by himself. In 1986 he moved from Northern California to Salt Lake City. A catalog is available upon request. Quality Custom Tools is probably best known for their impact tuning hammers.



Roll Hammer Boring Guide

The Roll jig, unlike the Gallaway and Brooks jigs, centers the drill bit over the hammer molding with a drill bushing. The bushing holds the bit square to the body of the fixture and the protractor. Since the hammer bit is located within the jig by a bushing, the bore distance can be precisely set by adjusting the hammer stop. This feature, along with the jig's compactness, makes it possible for the technician to use this tool in the field with a hand drill. For drilling a set of hammers, the instructions recommend using a drill press. The hammer is placed in the jig tail side down with the hammer strike point against the hammer stop. A set screw on the side of the spindle and the drill bushing secures the hammer in place. The drill bushing automatically centers the bit over the hammer molding. The hammer can then be rotated in either direction around its longitudinal axis. A protractor is attached to the spindle to measure the angles. The spindle is set at the required angle for the first and last hammer of the group to be drilled. This is accomplished by the use of a set of opposing machine screws that move the spindle. The number of turns of the stop screw required to move the spindle from the minimum to the maximum angle can be counted and divided by the number of hammers to be bored. By turning the opposing set screws with the result of this calculation, the technician can perfectly index the jig to drill each hammer of the group at a different progressive angle. Drill bushings and spur bits with stop collars of any specified size are available from the manufacturer

Brooks Hammer Boring Jig

The Brooks Hammer Boring Jig is a product of Brooks, Ltd., a supplier of piano action parts and hammers. Owner Wally Brooks is a well-known piano technician and member of PTG since 1961. Wally said that when he began selling hammers in 1979 he needed a boring jig, but nothing was commercially available.

"The few technicians who were boring their own hammers were just using an angle vise and continuously moving it to keep the bit centered as the angles changed," he said.

Wally began marketing the jig to technicians only after he had designed one for himself that he found to be both simple and inexpensive. Wally has two of these jigs set up in his shop to custom-bore hammers for his customers.

The jig is constructed around two circles, one that holds the hammer and one that mounts to the drill press table. These two circles are indexed to each other and rotate on an axis common to the longitudinal axis of the hammer molding. This insures that the bore hole is centered in the molding as the bore angle changes. The jig is designed to be used with a drill press and vise. The drill press vise is bolted to the drill press table through the index slots. Wally mounts his vise and jig on a pair of boards that simulate a machinist's cross-sliding vise, making it easier for him to locate the drill bit

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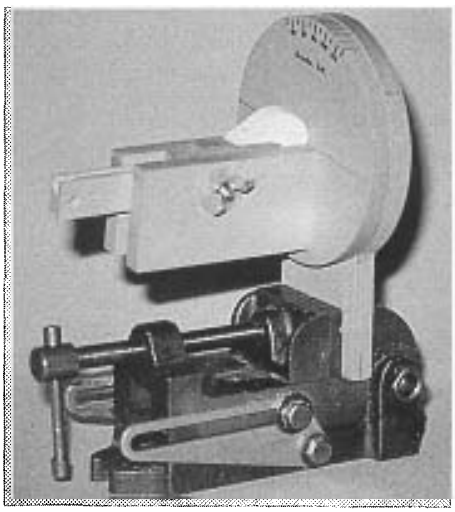
Comparing Hammer Boring Jigs

Continued from Page 28

over the hammer molding. The hammer is manually held tail-side-down against the drill backing insert with the strike point against the center bolt head. The hammer blow distance is adjusted by moving the entire jig to the correct location under the bit. The pitch of the hammer can be adjusted by loosening two wing nuts on either side of the jig and moving the drill backing insert up or down. After setting the jig to a 90 degree horizontal angle (a zero degree hammer angle on the other jigs), you center the bit over the proper location on the hammer molding. The correct bore angle is adjusted by loosening the wing nut on the back of the jig and turning the hammer holder to the desired setting.



Brooks Hammer Boring Jig

The circles are divided into five degree increments and the scale extends 25 degrees in either direction.

Wally told me that simplicity and ease of use was his goal in designing this tool. He feels that this tool works well for the technician who hangs hammers either slightly loose or drills undersize and reams. Wally feels that to be overly concerned with 100 percent angle accuracy is not warranted since the parts we are working with are organic and as such are not uniform.

"We ultimately have to hang hammers slightly loose whether reaming to fit or drilling oversize so severe tolerances are lost," he said.

Wally recommends boring hammers with a sharp jobber bit at high speed with his jig. He has observed that spur bits seem to get slightly deflected by the wood grain.

The drill backing inserts can be turned to expose four fresh surfaces. Wally says the insert is good for at least one hundred sets of hammers and that he supplies replacements free.

Gallaway Hammer Boring Guide

The Gallaway Hammer Boring Guide has only been on the market for about a year, and is designed and manufactured by Kent Gallaway, RPT. Not satisfied with what was available, Kent set out to design a jig that was accurate, easy to use and economical. He felt the answer to boring accuracy was rigidity and precision indexing. He found both of these elements in a machinists spin index. This is a work holder for machinists that permits spacing down to one degree using a vernier hole system. Kent reasoned it could just as well hold a boring fixture of his own design.

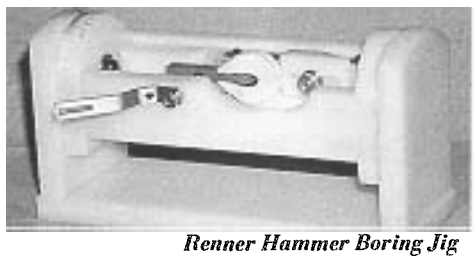
Gallaway Hammer Boring Guide

The hammer is held in the steel fixture by a jaw that can be tightened down with a large thumb screw. The hammer molding rotates around the axis of the spin index when secured in the jig. This again insures that once the bit is centered on the hammer molding with the hammer angle set at zero degrees, the bore hole remains centered within the molding regardless of the hammer angle. The strike point of the hammer is placed against an adjustable stop located at the end of the fixture. The hammer blow distance is adjusted by moving the entire jig to the correct location under the drill bit. The spin index back plate can be turned to the correct hammer angle and pinned in position at one degree increments. Each guide is supplied with a drill backing insert of plywood. I suggest making your own from maple. A simple-to-construct base that mounts to a drill press table is detailed in the instructions. This base permits movement of the guide in four directions, permitting the technician to locate the bit easily. There is no pitch adjustment on the fixture. This can be accomplished in the construction of the base by installing glide bolts or t-nuts and screws at one end of the base to elevate it to the desired angle.

Renner Hammer Boring Jig

The Renner Hammer Boring Jig, manufactured by Renner USA, is the newest of the four jigs. Lloyd Meyer said the jig he sent to me for inclusion in this article is the final version and has only been available for about two weeks. He said that this is essentially the same tool that bored all the hammers that were supplied to Mason & Hamlin. This jig is the result of four years of in-house research and evaluation of a half dozen existing jigs including one that was developed at M.I.T. Lloyd said this design has been thoroughly tested, and at least 400 sets of hammers have been bored with it. Renner has used high-density polyethylene, which they believe has solved the instability problem they had with wooden jigs they first used.

The jig is to be used with a drill press and clamped to the table. The jig is initially set to the standard 11/32" (H) x 7/16" (W) Renner hammer molding size. As long as the hammer molding is of this dimension, the hammer molding is aligned with the axis of the jig. If the moldings you are boring are of different dimensions you can shim to accommodate. The hammer is held in place with a spring loaded toggle clamp.



Renner Hammer Boring Jig

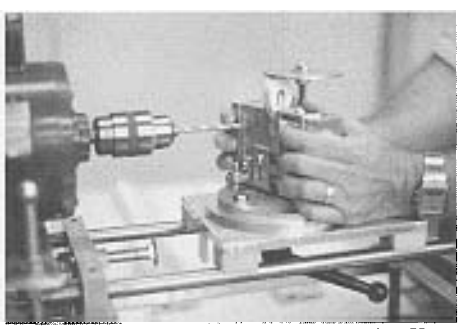
The drill bit is aligned to the jig along what is called the Rake Bar Line. Placing the hammer strike point against an indexed sliding stop sets the bore distance. This allows the technician to mount the jig to the drill press table and not have to move it when changing this measurement.

The hammer holder is a cradle positioned between two pivots that share an axis with the hammer molding. The hammer holder assembly is indexed and can swing 35 degrees in either direction to produce the hammer bore angle. The jig is calibrated and can be adjusted to produce a three- to 15-degree pitch by pivoting the hammer seat block assembly. The Hammer Seat Block serves as a drill backing insert and can be replaced with either wood or plastic of the same dimensions when worn.

Is That All?

Nothing here exactly fits your needs? Make your own jig. Glen Hart of Grand Junction, Colorado designed a multi-purpose jig that is not for sale but may provide inspiration to those of you who wish to build your own. This jig is unique in that the drill is stationary and the work is moved into it on a horizontal track, much like a horizontal boring jig in a wood shop. The moving fixture can be adapted to perform a variety of operations in addition to hammer boring. This tool looks similar to the hammer boring and tail shaping jig that I saw on a tape of the Bosendorfer factory several years ago.

Since I have not personally seen this jig, I can only describe what is pictured in the slides Glen sent me. Glen will be demonstrating this jig at the PTG's 38th Annual Convention & Technical Institute July 19-23 in Albuquerque.



Handmade jib by Glen Hart

In Conclusion

All of these tools have strengths and weaknesses. Which one works for you can depend on many things such as price, frequency of use and mobility. Features that facilitate your particular style of hanging hammers should probably be one of the considerations in choosing a hammer boring jig. I have personal experience with the Roll, Brooks and Gallaway jigs, and I offer these observations.

The Roll jig is beautifully made and can be very accurate. The jig comes with a shim that tilts the hammer in the spindle to produce a 3-degree rake. The drill bushing is a nice feature that positively centers the bit over the hammer molding. This feature also allows the technician to use a hand drill in place of the drill press. You will want to fabricate a base or use a drill press vise when using this tool in the shop. I feel that its strength and also its weakness is size. The tool is relatively small and getting the hammer into the spindle and secured in place is time consuming and somewhat awkward. This contributes to some inconsistency in the bore location and hammer angle. For $75, it's a very nicely made little jig to bore an occasional set of hammers in the shop and also carry in the field.

I've bored dozens of sets of hammers on the Brooks jig. If you buy this tool consider spending some extra money and buying an inexpensive cross-sliding vise for the base. You can find these vises in catalogs for around $40, and they make the job much easier. This tool is simplicity itself, as Wally Brooks designed it to be. It's inexpensive and easy to set up and to use. You can get the hammer in and out of the jig fast and easily change the angles. The only two adjustments on the jig are the bore angle and the pitch. However, I cannot seem to get completely uniform bore location and hammer angles with this tool. The wooden jig tends to flex slightly under load for me. Keeping your bits sharp will minimize this flex. Manually holding the hammer in the jig also seems to contribute to some non-uniformity in the boring. I also prefer to have the hammer angle gauge scaled to one degree divisions. Of course, trade-offs are involved in designing and building anything. I'm sure Wally reasoned that what might be gained in rigidity and accuracy would not offset the increased cost of a jig made of a different material indexed to one degree with some sort of hammer clamping mechanism. All in all, a technician, with practice, can produce a perfectly acceptable hammer boring job with this $89 jig.

I've only bored about a half-dozen sets of hammers on the Gallaway Jig. The tool as I first received it had a serious design flaw. The tool indexed the bore distance off of the back of the hammer molding instead of the strike point. After I pointed this out to Kent all subsequent models were corrected and I'm sure mine would have been too, except I had already had the machinists at Washington State University do the job. The jig, when mounted to the base described in the instructions, is fast, easy to use and extremely accurate. I like the way the hammer is secured while boring and the positive one degree stops on the spin index. Although I feel the lack of a built-in pitch adjustment is a significant deficiency, building this feature into the base is not too difficult. At $180, I consider this tool a good buy for the shop.

Since I haven't had time to bore a set of hammers on the Renner jig, I can only offer some cursory observations. This appears to be a well-thought-out and elegant design with every feature I would incorporate in a boring fixture. It is also the most expensive, at $250. Renner also sent along a hammer angle gauge they developed for use with this and other jigs for accurately measuring samples for duplication. I like the way you can look through the transparent protractor at the hammer you are measuring.

For this article I wanted to talk to someone who had some experience with this jig.

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Features-At-A-Glance

Model:	Roll Hammer Boring Guide	Brooks Hammer Boring Jig	Gallaway Hammer Boring Guide	Renner Hammer Boring Guide & Hammer Angle Gauge
Manufacturer:	Quality Custom Tools Robert H. Roll 6408 South 1680 East Salt Lake City, Utah 84121 (801) 272-7655	Brooks, Ltd. 376 Shore Road Old Lyme, CT 06371 (203) 434-0287 (800) 326-2440 (203) 434-8089 FAX	Kent Gallaway 709 Thorne St. Ripon, WI 54971 (414) 748-3265	Renner USA PO Box 1223 Weston. CT 06883 (203) 221-7500 (203) 454-7866 Fax
Construction:	The boring guide body is machined steel with a brass spindle.	The jig is constructed entirely of European birch plywood with a pear or boxwood drill backing insert.	The boring fixture is machined cold rolled steel. The spin index that holds the fixture is cast iron.	The boring fixture is constructed of high-density polyethylene.
Base:	A base is not included. A drill press vise can be used when using with a drill press.	A base is not included. A drill press vise is recommended.	A base is not included. Instructions are included for fabricating and mounting the guide to a particle-board base.	The boring fixture can be mounted directly to the drill press table.
Bore Angle Adjustment:	This jig uses a 180-degree protractor with 1-degree divisions.	The jig uses a 50 degree scale with 5-degree divisions.	The boring fixture is held in a spin index that has a 360-degree scale with 1-degree divisions and 1-degree stops.	The jig has a 70-degree scale that can pivot 35 degrees in either direction. The hammer holder has an engraved scale with 1-degree divisions.
Rake or Pitch Adjustment:	A shim is provided that will adjust the pitch to 3-degrees.	One end of the drill backing insert can be moved up or down to adjust the hammer pitch.	No pitch adjustment is built into the guide.	The hammer holding mechanism pivots to accommodate pitch directly under the drill bit. A -3 to 15-degree scale is engraved on the hammer holding mechanism.
Additional Equipment Required:	The instructions recommend using this jig with a drill press although it is not absolutely necessary.	The jig must be used with a drill press and a drill press vice.	The hammer boring guide must be used with a drill press.	The hammer boring guide must be used with a drill press.
Method of Securing Hammer in Place While Boring:	The hammer is held in the spindle with a set screw.	The hammer is held in the jig manually for boring.	The hammer is secured in the guide by a steel jaw that is tightened with a large thumb screw.	The hammer is secured in the guide by an adjustable toggle clamp.
Drill Backing Insert:	No drill backing insert is provided. A .062 shim is provided to accommodate thin hammer moldings.	The drill backing insert can be turned over to expose a fresh surface. Replacement inserts are available from the manufacturer.	The guide comes with one backing insert. Replacements can be easily fabricated.	The polyethylene hammer seat block doubles as the drill backing material. Replacements can be easily fabricated.
Instructions:	Detailed instructions are included with the jig.	Detailed instructions are included with the jig.	Instructions are included.	Instructions are included.
Weight:	2 pounds	2 pounds, 8 oz.	15 pounds	5 lbs. 6 oz.
Cost:	$75 plus shipping	$89, plus shipping	$180, shipping paid	$250 for the boring gauge, $20 for the angle gauge, plus shipping.

Comparing Hammer Boring Jigs

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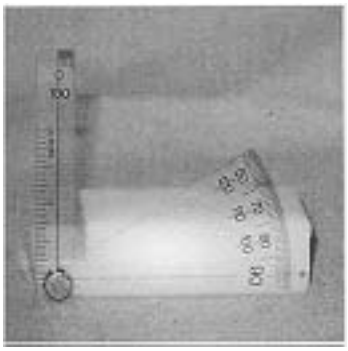

Renner Angle Guide

Lloyd Meyer referred me to Peter Bourassa, a Renner employee who has bored hundreds of sets of hammers (400 sets for Mason & Hamlin alone) with this jig. Peter said that he has used several different kinds of jigs including the wooden jig that Mason & Hamlin used. He found that the wooden jigs he used were not stable enough in a production situation, explaining that humidity changes caused changes in the dimensions of the jig, which would in turn cause boring inaccuracy. He also was not happy with the jigs he used in which he had to hold the hammer manually in the fixture. He found that the bit would sometimes "kick" the hammer off center. Peter particularly likes the ability of this tool to change from boring upright to grand hammers without moving the jig to re-center the bit over the molding. Peter tells me this tool solves all the problems he has encountered. For someone who wants to bore lots of hammers easily and accurately this tool appears to be an excellent choice.

A Look at "The Piano Book"

A Review & Critique
By Alan Eder, RPT

"The Piano Book: Buying & Owning a New or Used Piano, Third Edition, 1995," by Larry Fine, RPT. Now available from the publisher, Brookside Press, P. O. Box 178, Jamaica Plain, MA 02130 or from piano supply houses.

When "The Piano Book" first came out, I asked myself, "Why didn't I think of that?" Not that there aren't other "How to..." books dealing with piano acquisition. It's just that this one is exceptional in its scope, style and overall conception. It is a valuable guide to purchasing pianos new and old that deals in specifics and in depth, while remaining ever user-friendly. I was sufficiently impressed by the First Edition to recommend it both to clients — that is, those taking more than just their lunch break to buy a piano — and to fellow technicians at all levels who want to be well informed. In addition to the usefulness of all the data, Fine's book is an excellent model of how to balance piano evaluation from the tandem perspectives of piano technician and piano player.

One unfortunate — and perhaps unavoidable — abuse of the book is that people tend to use it exclusively like an encyclopedia, taking a specific evaluation out of the context so carefully prepared by the author. The First Edition, by virtue of its numerical ratings, is more prone to this misuse than the Second Edition.

I jokingly suggested to Larry that each page of evaluation should have stamped diagonally across it in bold letters, "Refer to introductory chapters," strong advice that would nevertheless be ignored by some consumers and piano dealers anyway.

The author's support and encouragement of most domestic brands verged on chauvinism at times, although, personally, I have no problem with this bit of apparent bias. If you're going to lean — and face it, we all do — you may as well lean towards home.

Among makers of the ubiquitous Asian pianos, M.F.M. status (Most Favored Manufacturer) was clearly *not* granted to Yamaha. Generally speaking, are Yamahas really "brighter" than other pianos from that part of the world? Is there such a thing as a conventionally-scaled damper system working too efficiently? (While Fine is not a lone voice in this criticism, the struggle for most technicians and manufacturers, it would appear, is to get dampers to work efficiently enough.) Also, the track record of Yamaha's piano service program was not sufficiently factored into the flavor of their overall assessment and, by extension, into the inevitable comparison with their competition. (Yamaha's service program does get more credit in the Second Edition, but for their responsible handling of a product problem rather than simply as the outstanding leader in piano service that they have been.)

Any hints of partiality stand out only because, given its breadth, Fine's work is about as objective as is humanly possible.

Second time around

It is said that we only get to make a first impression once. Similarly, a venture, like a vessel, makes only one maiden voyage.

The First Edition of "The Piano Book" "sprang" upon the piano industry. Fine was, "...politely ignored by manufacturers and industry executives." However, the industry saw the Second Edition coming. The primary reason for publishing a second edition was to update the piano evaluations. The process of preparing the Second Edition compelled Fine to make some format changes and was a kind of baptism-by-fire initiation into what makes the piano industry tick. When I learned of this, I became intrigued, which led to this review.

According to Fine, at the behest of manufacturers, he sent them advance copy the second time around for their reactions and suggestions. The author must have found himself in an awkward position. Does he: one, write in depth and in specifics based on his documented but confidential data plus hours of "unsubstantiated" but no less informative interviews, discussions and conversations, or two, back off and make "safer," although less useful, statements, presented as editorial opinion rather than fact, or three, not write a Second Edition, thereby avoiding any unpleasant repercussions altogether, and find a vocation other than piano reviewer. The more cautious the path chosen, the less useful the book to the consumer.

Fortunately, Fine did write a Second Edition and, in my estimation, did a good job of negotiating between the sometimes hard realities of fact and the refuge of "mere" opinion.

To borrow terms popularized by our most recent war, the "tactical" and "surgical" usefulness of the numerical ratings of the First Edition is greatly diminished in the piano evaluation format of the Second Edition. Nonetheless, a few manufacturers (namely Sojin, Baldwin and Wurlitzer) were still too uncomfortable with what was going to be published about their products to allow reviews of their brands to be printed without legal challenges, according to a notice on page 72, and a loose-leaf addendum included with my copy of the Second Edition. One can only speculate as to what is

ultimately more damaging for these manufacturers; what would have been published about their product, or their non-inclusion?

Similarities and differences

Chapters I and II of the Second Edition (*How a Piano Works* and *Buying a Piano: An Orientation*) are identical to those in the First Edition. Chapter III (*Buying a New Piano*) does contain a few revisions. The notable differences have to do with upright key weighting, laminated soundboards, and the absence of notching of the back (non-speaking length) side of the bridge.

Individual "custom" weigh-off of the keys is as desirable for an upright as it is for a grand. This is one of the last operations performed in a high quality action rebuilding job, particularly if the weight of the hammers (and other action parts) and/or the geometry have been changed. It would also be necessary if a different touch were sought, all other things being equal. However, as the author points out, if all regulating parameters have not been adjusted as closely as possible (including preparatory work, such as pinning), evidence of individual key weighting is not necessarily a sign of superior design or execution.

To date, laminated soundboards have been available to the consumer primarily in lower-end models. According to piano design and manufacturing notable Del Fandrich, they have often been applied in the same manner as solid spruce soundboards (which is inappropriate due to their different characteristics) or otherwise mis-applied. To add insult to injury, laminated soundboards in general have gotten bad press as a result of the piano industry's apparent resistance to change. The superior stability and longevity of a laminated board is not, to my knowledge, being seriously disputed. Laminated soundboards are capable of comparing favorably to a solid spruce board in terms of tone quality, if applied appropriately. A case in point: Several years ago a pianist colleague and I were selecting a Bosendorfer model 225. We did not know until after the fact that one of the three we tried had a laminated soundboard. It did not sound substantially different from the other two, which were both very fine pianos.

Another reconsideration in the Second Edition is whether or not notching the back side of the bridge makes a significant difference. The revised view is that lack of rear notching can lead to buzzing strings and does not reflect favorably on the manufacturer's standards.

Slight modifications were also made in the text dealing with soundboard cracks, the notching of ribs into the rim and the significance of a strike point adjuster. One additional feature is a schedule of depreciation devised by Steve Brady, RPT. It is a useful point of departure for determining the current market value of used pianos.

Steinway

Absent in the Second Edition is the separate chapter of the First Edition devoted to Steinways, which included far more extensive coverage of history and technical features than any other manufacturer received. In the second edition, Steinway reviews are included with those of all other pianos. The portion dealing with buying a used Steinway is part of the chapter on buying used pianos in general. Added to the Second Edition is a discussion of verdigris. (As Fine points out in the Third Edition, many technicians have reported successfully treating this condition with Pro-Tek, a new solvent/lubricant on the market.)

Two factors appear to have led to the reorganization of the Steinway material in the Second Edition. One is the understandable desire of any manufacturer not to have problematic allegations reiterated in print, even if it is at the cost of less extensive coverage overall. The other is that we all have limits to our stamina for negotiation. Most of us have had to navigate the sometimes tricky terrain between consumer (with a piano problem that may be warranty related) and manufacturer (who is usually prepared to rectify a bona fide warranty related problem). Imagine attempting to do this on the grandest of scales, between all the consumers and all the manufacturers at once. Better you than I, Larry!

In the Third Edition, the entire text has been carefully gone over from start to finish making it clearer and more comprehensive while continuing to reflect current trends in the industry. Piano historians of the future would do well to refer to "The Piano Book" as a series of periodical snapshots of the piano industry in the late twentieth century (and, hopefully, beyond!).

While most of the changes made are rather minor, a few warrant special consideration by the technical community.

As is the case with most issues in piano technology, there are two sides — at least — to every coin. This is as true of servicing techniques as it is of materials selected for building or rebuilding pianos. Multilaminate pinblocks of the denser variety are no exception. In the Second Edition they were lauded for being the pinblock material most impervious to environmental extremes. However, as noted in the Third Edition, the very density which makes multilaminate pinblocks so stable also requires more consistent drilling and tuning pin size. Inconsistencies in these areas could turn a multilaminate pinblock from an asset into a liability. Like the laminated soundboard issue between the First and Second Editions, it is not that a given material is inherently inferior or superior but how it is applied that is crucial.

Another point harkening back to the First Edition is what I referred to as apparent chauvinism towards American products. There are a few subtle changes in the Third Edition which compel me to state that my former criticism no longer applies.

Whereas the First Edition contained controversial and much abused numerical ratings of each model of each brand of piano, the Second Edition steered completely clear of allowing such base comparison. With the Third Edition, Fine has aptly struck a balance between the two extremes. *The Summary of Brands and Price Ranges* offers a generalized, relative comparison of most brands (but not individual

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Fine on Fine ... An Interview with Larry Fine, RPT

By Alan Eder, RPT

Once when I was going over some minute detail comparing the Second Edition with the First, Fine spontaneously pointed out that his book is often scrutinized as if it were the Dead Sea Scrolls (and no one is more guilty of this than yours truly!).

AE: The authors of the Dead Sea Scrolls do not have the opportunity to respond to how their written work is being interpreted. But you do ... care to provide any commentary on/context for the interpretation of your book?

LF: I don't mind people scrutinizing the facts I state in the book. But it gets a little out of hand when they start questioning the meaning of practically every word. My book is often placed on too high a pedestal so that every word assumes too great an importance. People lose sight of the forest for the trees.

AE: Now that we got that out of the way, the focus of this interview is to discuss what's new in the Third Edition. What's the same, what's different and why?

LF: All the brand reviews have been rewritten to the extent necessary to bring them up to date. I did a new survey in which about 50 technicians again examined about a thousand pianos. This time I emphasized the follow-up interviews more than in the past — I conducted more than 85 hours of interviews by phone. The interviews yield the most interesting information, though the written part of the survey is useful as a reality check and as an excuse to examine the pianos more closely than a technician is likely to do otherwise. In this edition, a larger number of technical problems are mentioned than in the last, as an aid to technicians who may be inspecting, servicing, or advising about a particular brand or model.

> *Although the book was written primarily for an audience of piano consumers, in fact, it is used in far more ways than I could ever have imagined.*

I also reintroduced prices and ratings, as you mentioned. Over the past four years I have received a lot of feedback from readers that a consumer guide without prices and a summary of ratings was less than completely helpful, especially for novice buyers (and most piano buyers are novice buyers). This time I give prices in the form of a general range for each brand and type (verticals, grands) — not for each model — so I won't have to worry quite so much about discounts, changes in currency values and so forth. Ratings are also given in a more generalized form than previously, and so far I've received very little objection as to how the categories have been described or how the brands have been divided up between categories. I think I've struck a good balance between the problems of controversy and misuse that stem from too much specificity on one hand, and the legitimate need for price and quality guidance in summary form on the other.

Technicians will also be interested to know that Roy Kehl's celebrated list of older Steinway models has been extensively revised, based on Mr. Kehl's ongoing historical research. As you noted, many other small changes have been made throughout the book.

AE: Some of the changes in the Third Edition give the impression that identifying a good dealer from whom to purchase a piano is more difficult than before and that the shopping experience is generally more dreadful. Do you think the objective reality has changed or is it more a matter of your interpretation having shifted?

LF: Both. Actually, I made some major changes to the section on shopping for a piano and choosing a dealer. Before I published the First Edition, one or two people who read the manuscript thought I portrayed salespeople — and the shopping experience — in too negative a light. So at that time I revised the manuscript to emphasize that most salespeople were courteous and helpful. In the meantime, over the past several years the shopping experience has gotten to be so dreadful for so many people that my description became absurdly counter to reality. This time around I made some small but important changes to prepare shoppers for what they were about to experience. I also addressed at some length the issue of mega-sales events, such as "armory" and "university" sales. Last, I have included more ideas on how to negotiate the best deal when buying a new piano.

AE: Kudos on once again succeeding in including every piano manufacturer in your reviews. In the Second Edition there were some holdouts, and in a notice to readers explaining the situation, you also mentioned that you invited manufacturers to have their response to your review of their product printed in the book. No one took you up on that. You once told me that manufacturers are extremely sensitive to everything that's written. Why is that?

LF: They are afraid — with some justification — that competing dealers will highlight the criticisms and selectively use those criticisms to "bash" them. Of course, since dealers of all brands do this, it's a wash as far as I can tell — that is, no one brand is the net beneficiary of this practice. And if my book didn't exist, they'd find some other way to do this; negative selling is not exactly a new idea, after all. The selective misuse of my book is not my fault, but invariably I get blamed for it.

Lest I give the impression that all manufacturers have given me grief, however, I should say that each company has its own distinct way of relating to me and most are very pleasant to work with. Most respect freedom of the press and work with me to insure the reviews are factually accurate, but otherwise don't

interfere. Many have given me a great deal of useful information, and my reviews are definitely the better for having had the input of the manufacturers. Of course, I have always offered to include their response in the body of the review. Strangely, most don't request it as much as they could; perhaps they are afraid of appearing too defensive to readers.

A few companies still seem to assume that I am trying to harass them with my reviews. They try to bludgeon me into submission with quasi-legal threats and innuendoes. This time, though, I stood my ground and made relatively few compromises. Ironically, many piano *dealers* are among my biggest supporters and make very heavy and positive use of my book. In some cases, they have interceded on my behalf with manufacturers who were paranoid about my reviews.

AE: Do you know if your book has led to any changes on the part of piano makers and promoters?
LF: My book has become part of the marketing landscape — to be worked with or worked around. I'm sure that the book has influenced to some extent what models and what features have been presented to the public.

A much greater effect of my book, I believe, has been to increase the dollar value of the average piano purchase. As you know, I have an active consulting practice — people who have read my book call me and pay me for more personalized advice. Many consulting clients tell me that they originally started out planning to spend x dollars, only to realize after reading the book that it would cost two or three times that amount to buy a piano whose quality was consistent with that of other things in their life (car, house, etc.). In most cases, these people's budget are quite expandable, and they will spend more if a convincing case can be made for it — a case which my book makes. This means a larger sale and greater profit for the piano dealer. Some dealers recognize this and virtually insist that their customers read the book, even to the point of giving it away.

> ***"I don't mind people scrutinizing the facts I state in the book. But it gets a little out of hand when they start questioning the meaning of practically every word."***

AE: As a result of having written and twice revised this book, what have you learned about the nature of the piano industry, from manufacturer to consumer, from tree to condemned klunker?
LF: This is a business of great contrasts. I have met some of the nicest people in this business and have great respect for many of the companies. At the same time, I have witnessed incredibly unethical behavior and have met many liars and cheats. (The head of one piano company told me bluntly, "Piano men are liars.")

AE: Your book is addressed primarily to an audience of piano consumers. Is there anything in particular you would like to say to the thousands of piano technicians and others with a keen enough interest in the piano industry to read the *Journal*?
LF: Although the book was written primarily for an audience of piano consumers, in fact it is used in far more ways than I could ever have imagined. For instance, piano dealers use it to train new salespeople. Piano pedagogy instructors use it in training new piano teachers. Technicians use it as a public relations tool — giving it away to smooth over the awkward situation when they must condemn a klunker but still charge for their visit, or to corroborate what they tell the customer about the piano's service needs. I'm now publishing and selling a number of other books — and videos — about the piano that I hope will also have multiple uses.

AE: In preparing each edition of your book you have made a sampling (although not strictly scientific) of observations by piano technicians about new pianos and taken the information directly to the manufacturers for feedback. Could you share any observations from your unique perspective on what technicians think of a given piano and what the manufacturer *thinks* technicians think about their product? What percentage of problems noted by technicians get reported to manufacturers? How does the information get filtered as it flows from piano to technician (to dealer) to manufacturer?
LF: Within the context of the survey for my book, I did a smaller, more informal survey to determine what percentage of actual physical defects got reported to the manufacturers. It turned out that only about 20 percent were reported directly to the manufacturer. About another 25 percent were reported to the dealer, usually in the form of a bill for services. Most technicians said they were sure that most of these never got forwarded to the manufacturer. Although dealers can get reimbursed from the manufacturers for such work, many times the dealer doesn't bother requesting it when the repair work is small because they don't want to get a reputation as a troublemaker. Of course, if the amount of money were large I'm sure they would request reimbursement. Technicians, for their part, usually don't contact the manufacturer because it's easier just to fix the problem; calling takes time and usually serves no purpose unless assistance is needed or authorization is required. Sometimes the technician has alerted the manufacturer to a problem in the past, but sees no purpose in alerting them again and again for the same problem. Many times the technicians note problems on my survey forms but don't actually fix them because the customer hasn't noticed and isn't complaining. *[Note by AE: Grappling with one such situation myself, esteemed colleague Richard Davenport recommended that I "register" the problem with the manufacturer. This involves documenting the problem in writing (and with pictures, if applicable) and communicating it to the manufacturer while the warranty is still in effect. It is the middle ground between stirring up calm waters on one hand and turning a blind eye on the other.]* Technicians are often representing the dealer and don't want to create any unnecessary trouble for him or her. For all these reasons, many of the smaller problems don't get reported to the manufacturers. I was amazed at how many problems consistently mentioned by technicians some manufacturers claimed they had no knowledge of and vigorously disputed.

Technicians were quick to point out which manufacturers seemed most receptive to hearing their complaints and solving

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Fine on Fine ...

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problems. From my perspective, those companies seemed to have the best grasp on what technicians were saying about their products.

AE: Like almost every other product on the market today, decisions about how pianos are made are largely driven by marketing. How important is a vital service department to manufacturers as a marketing tool?

LF: A vital service department is never likely to be much of a marketing tool because manufacturers don't want to give the impression that warranty service will be necessary. And, in fact, most warranty service is handled by the dealer, with the manufacturer only of secondary importance. However, to the extent that warranty service by the manufacturer is likely to be necessary (which varies a lot from brand to brand), I have tried to highlight in my book those companies that are known for the best service.

"The Piano Book"

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models), prefaced with disclaimers about the subjectivity and margin of error involved.

Closing thought

Over the years, Larry Fine has brought and refined meaningful, judicious standards to piano evaluation. When someone calls me to advise them about buying a piano, I tell them this: To get the most out of their investment in my time and the piano itself, they should first invest in "The Piano Book."

PACE

Professionals Advance through Continuing Education

LESSON PLAN

Technical Lesson #21

Grand Regulation - Part 2: Positioning the Keyframe

By Bill Spurlock, RPT
Sacramento Valley Chapter

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

In Brief:

This lesson will cover the proper location of the grand keyframe within the keybed cavity. Participants will determine correct location side-to-side for best hammer/string alignment, and front-to-back for proper treble strike point and fit of case parts. This work will prepare the action for spacing individual hammers to their unisons in lesson #22.

Getting Started:

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

Hands-on Session Setup:

To teach this lesson in a hands-on format, you will need one or more grand pianos in good condition. New or good used pianos on a showroom floor are ideal. (Used pianos must not have grooved hammers, or tone problems will result from changing the action location.) It does not matter whether these pianos have keyframe location problems; the object will be to check keyframe location and adjust as needed. The pianos used must be of the common design with an una corda pedal and a keyframe located by adjustable guides in the keyblocks that engage pins in the keyframe.

Depending upon time and pianos available, this lesson may consist of participants working individually on separate pianos, or taking turns observing and adjusting on a single instrument.

Estimated Lesson Time:

1 hour

Tools & Materials Participants Must Bring:

For this lesson, participants should bring the following:

- medium Phillips and flat-blade screwdrivers
- a small assortment of paper front rail punchings, for shimming the action stop block
- wrenches for adjusting shift pedal rods

Assigned Prior Reading for Participants:

August 1993 *PTJournal*, page 29. A highly recommended resource is Yamaha's video & book set, *Grand Regulation in 37 Steps*, available from Schaff Piano Supply and Yamaha Corporation.

General Instructions

The location of the grand piano keyframe within the piano case affects both parts alignment and tone. Before spacing individual hammers to their unison strings, we should inspect the position of the entire keyframe and action assembly relative to the strings, damper levers, and case parts. Both side-to-side and in/out positions of the keyframe need to be correct.

In/out position: Guides in the keyblocks engage pins in the keyframe to locate each end of the action. There are two requirements for correct positioning.

1) Hammers must strike the strings at the correct point for best tone. This is normally only an issue in the high treble, where differences in strike point as small as 1/32" can be easily heard. See **Figure 1**.

2) The action must not interfere with case parts. The action cannot be so far out (toward the player) that the natural keys contact the keyslip, or so far in that the ends of the sharps contact the fallboard or the hammers contact the damper guide rail or belly of the piano. On a properly built piano, there should be no interference with case parts when the action is located for best strike point.

If you do encounter the rare case where interference with cabinet parts prevents locating the action for best treble tone, one of the following problems may exist: Replacement hammers have been installed on the wrong length shanks, the action frame is located incorrectly on the keyframe, or the fallboard or keyslip are mounted incorrectly.

Normally, the treble end of the action would be located first, then the bass end would be located for an equal gap between keys and keyslip at both ends of the keyboard. However, because the bass strings are angled, changing the in/out location of the bass hammers also affects their hammer-to-string spacing. Thus, in some cases the in/out position of the bass end of the action can be adjusted independently to achieve the best hammer/string spacing in the bass.

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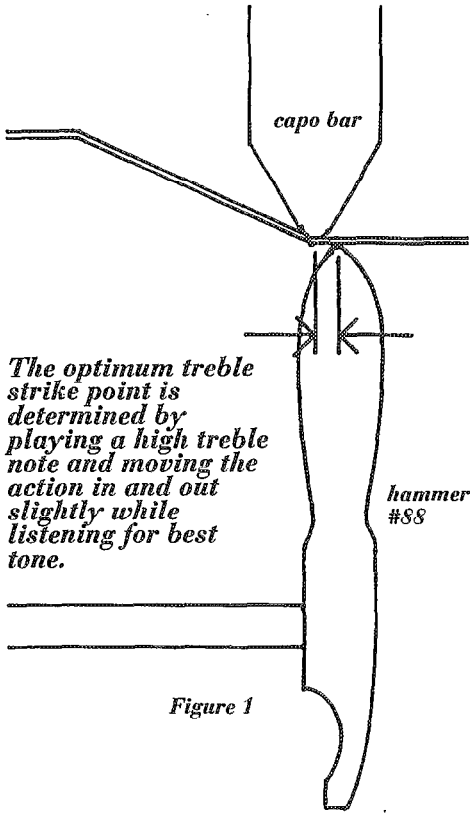

Figure 1

Side-to-side location: An action cloth-covered stop block fastened to the bass end of the action cavity locates the keyframe laterally in its rest (unshifted) position. There are two requirements here as well.

1) The hammers should be well centered to their unison strings while also being lined up directly over their respective wippens. In other words, in most modern pianos the hammershanks should be approximately in line with their wippens (perpendicular to the hammer rail), when the hammers are centered to their strings. If most hammers need spacing to one side in order to center them under their strings, the entire keyframe should probably be relocated instead.

2) The damper lift felts on the keys must not interfere with the damper levers of adjacent keys. In their unshifted position, the keys cannot be located so far toward the bass that they engage neighboring damper levers to the left. Likewise, they cannot move so far toward the treble in the shifted position that they engage neighboring damper levers to the right. See **Figure 2.** However, damper lever-to-key alignment is also affected by the side-to-side location of the damper action within the keybed, and by the extent to which the action shifts with the una corda pedal.

Thus before deciding to change keyframe location, you must check hammer/string alignment, hammershank/wippen alignment, action shift distance, and key/damper lever alignment.

Exercises

The following are typical procedures to use when doing the initial service on a new piano, or when servicing a used piano in good condition. The in/out position of the action should be checked first, because changing it will also affect hammer/string alignment in the bass and tenor due to angled strings.

Step 1: With the piano assembled, check for adequate clearance between the natural keys and keyslip, and between the sharps and fallboard. Note any problems.

Step 2: Seat strings and tune the top two treble unisons, and reshape the top two hammers if they're grooved or very fuzzy, so these keys produce the clearest sound.

Step 3: Remove the fallboard, keyblocks, and keyslip. Replace the bass keyblock to hold the bass end of the action in place.

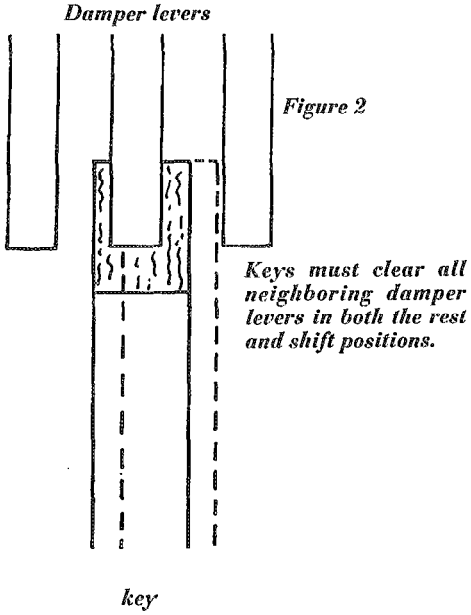

Figure 2

Step 4: Play note 88 using a light to medium blow, while moving the treble end of the keyframe slightly in and out as shown in **Photo 1.** You will notice one location where the tone is strongest, while it becomes weaker on either side of that point. If the tone is strongest when the action is pushed in all the way against the keyframe stop blocks at the back of the keybed, you still may not have reached the optimum position. Some stop blocks have an adjustment screw. If so, it can be adjusted to allow the action to be pushed farther

Photo 1

Photo 2

back to achieve the best strike point.

If there is no adjustment screw, you can move the hammer farther back by lifting up the front of the keyframe slightly, as shown in **Photo 2**. While playing the key, place a small pry bar or flat-blade screwdriver under the keyframe guide pin and pry up slightly. Lifting the keyframe 1/8" at the front will shift the hammer strike point almost 1/16" farther from the capo bar, causing a considerable change in tone. If the tone does improve with the keyframe lifted up, you will need to trim the back edge of the keyframe where it contacts the stop blocks so the action can be moved to the new location.

Step 5: Mark the best treble keyframe position as determined above. Use a sharp pencil, making matching marks on the end of the keyframe down onto the keybed. Next, install the keyslip and fallboard and check for any interference. If there is none, adjust the guide plate in the treble keyblock to hold the action in the correct position according to your pencil marks. See **Photo 3**. Note: some designs may not have an adjustable guide plate. These will have to be adjusted by relocating the entire keyblock or modifying it.

Step 6: Adjust the bass end of the keyframe, if necessary, so there is equal space between keyslip and natural keys at both ends of the keyboard. Check that the bass hammers do not contact the damper guide rail.

Step 7: Next evaluate the side-to-side position of the keyframe in its rest or unshifted position. With the keyblocks in place, raise groups of hammers up to the strings and check hammer/string alignment. This can be done by pressing upward on the jack tenders, using four fingers to lift several hammers at once. Pressing the jack tenders into the regulating button felts causes the hammers to lift all the way to the strings without the jacks tripping. See **Photo 4**. Notice whether most hammers are well centered, or whether most are too far toward the bass or too far toward the treble.

Step 8: If just as many hammers need to be spaced toward the treble as need to be spaced toward the bass, there is probably nothing to be gained by relocating the key frame. Instead, all hammer spacing should be done by shifting individual hammer shanks.

If, however, most hammers need to be spaced the same direction, relocating the key frame in that direction will minimize the number of individual hammers that have to be spaced. In that case, remove the action stop block from the bass end of the action cavity, and adjust its location. To space the action toward the treble, add paper or card stock front rail punchings to the mounting screws, between the stop block and the case. To space the action toward the bass, either plane the block down or remove shim material that may already be present. Screw the stop block back into position, replace the keyblocks, and recheck hammer/string alignment.

Note: If there is a discrepancy in hammer/string alignment between the bass and the rest of the scale, it can possibly be addressed by changing the in/out position of the bass end of the keyframe. That is, because the bass strings are angled, locating the action further out (toward the player) will in effect move the string pattern to the left, and vise versa. Thus the hammer/string alignment of the entire bass section can be adjusted independently of the rest of the piano to some degree, depending upon the amount of in/out adjustment available.

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Photo 3

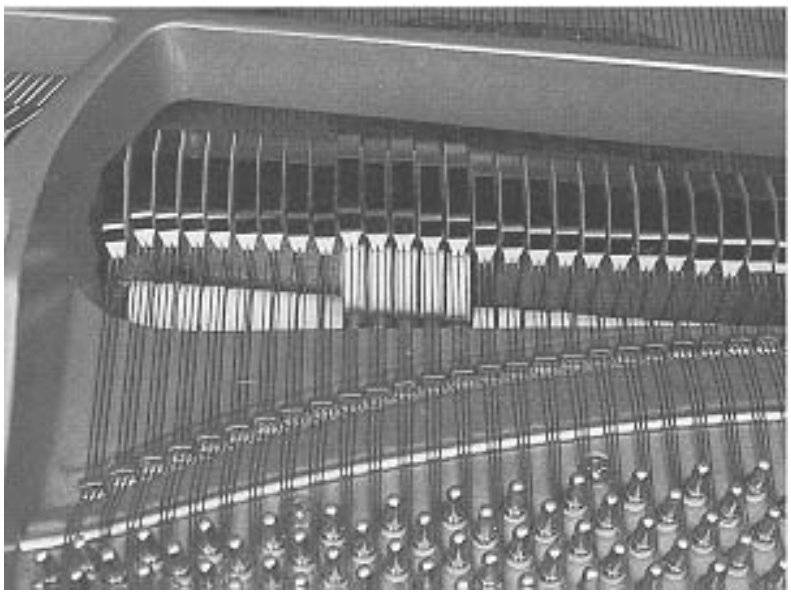

Photo 4

and treble hammers clear their left unison string). Now play each key again, watching that no damper to the right of the key being played lifts or winks. This tests that the keys are not too far toward the treble.

If there is interference with a very few damper levers, it might be correctable by respacing individual damper levers or trimming individual keys slightly. Sometimes the entire damper action may have to be shifted slightly to one side, and the damper wires readjusted as necessary. These repairs are beyond the scope of this lesson, however.

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The best lateral location for the keyframe is that which will minimize the number of individual hammers that need to be respaced, assuming correct key/damper lever and hammershank/wippen alignment.

Step 9: Once the action is located for best apparent hammer/string alignment, check to make sure no keys interfere with neighboring damper levers, as follows: with the action in the *unshifted* position, play each key within the damper section. Watch closely to make sure no damper to the left of the note being played moves at all. This tests that the keys are not too far toward the bass.

Next, depress the left pedal to move the action to the *shifted* position (adjust the pedal and shift stop screw if necessary so most tenor

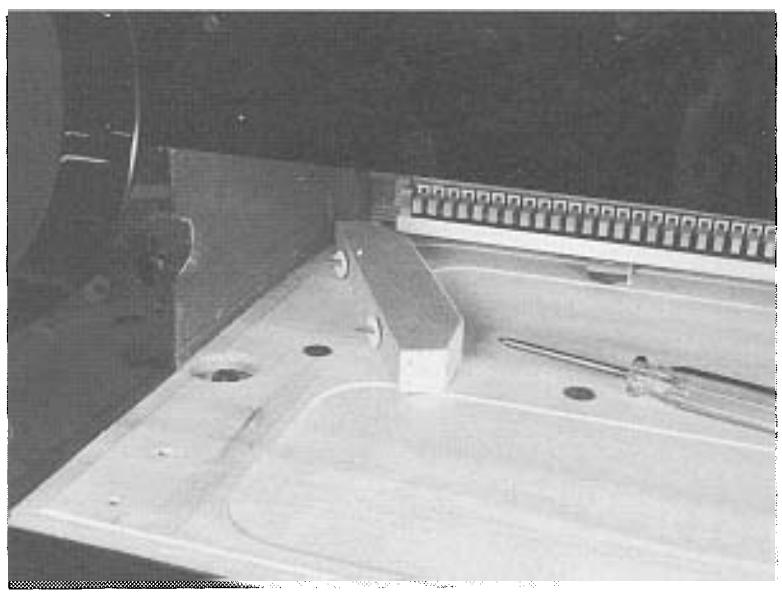

Photo 5

PACE

Professionals Advance through Continuing Education

LESSON PLAN

Tuning Lesson #21

Treble: Part 1 — The M3-M10-M17 Test

By Michael Travis, RPT

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

In Brief

This lesson consists of practice tuning in the range of octaves 5 and 6, known simply as the treble in the PTG Tuning Exam. Participants will tune several notes in each octave, applying the M3-M10-M17 octave test and the parallel M17 test, and listening closely as others do likewise. This is the first of two lessons on treble tuning; the next lesson will emphasize the twelfth and double octave relationships in octaves 5 and 6.

Background

It is with some fear of complicating what many find to be a relatively easy task that we present these two lessons on treble tuning. Experience giving the PTG Tuning Exam has shown that the treble area is about the least likely to cause examinees to fail, which suggests that an elementary technique and a few simple tests are all that's required for an acceptable result here. Indeed, it is possible to achieve fairly good results in octave 5 tuning clean octaves and checking P5s and P4s, and in octave 6 tuning clean octaves while balancing the D8ves and P12s, and fine tuning everything with the parallel M17 series.

At a more advanced skill level, how you tune the treble is somewhat dependent on how you want the high treble to sound with the rest of the piano, since the high treble has its roots in the treble. If you want the high treble to be very bright, then you need to build up to it by tuning wider octaves lower in the scale. The type of treble tuning we feature in this lesson should sound like the "master tuning" of a well-scaled PTG Tuning Exam piano; not a "Picasso" tuning (very wide, noisy octaves, screaming at the top), but not a "Rembrandt" either (overly conservative, pure octaves, somewhat flat but very clear-sounding at the top). There is broad agreement that it is possible throughout most of the treble on a decent piano to tune the middle path — achieving a fair balance between the single octave, the double octave and the twelfth, with no objectionable beating among these consonant intervals, and a top end that sounds neither flat nor sharp. This is the path we will attempt to illuminate in these lessons on treble tuning.

This month's lesson features the M3-M10-M17 test, which is a combination of the 4:2 single (M3-M10), 2:1 single (M10-M17) and 4:1 double (M3-M17) octave tests. Often, you will observe an even acceleration of test intervals' beat rates as you play the M3-M10-M17 test in the lower part of the range, where double octaves and the 4:2 single (midrange) octaves are wide. These relationships will change as you progress toward the upper end, where the double octaves tend toward pure, and the 4:2 octaves toward narrow (and nearly inaudible). The test intervals for the 4:2 octaves become uncomfortably fast even in octave 5, so we wouldn't normally use the M3-M10 test by itself in the treble. The 2:1 octaves remain at least slightly wide throughout the treble, so that M17s will always be at least slightly faster beating than M10s. It would not be unusual in the upper end of the treble to perceive the M10 beating less fast than both the M3 and the M17, which may be beating about the same speed (though they're all beating pretty fast!). However, you can use the test in parallel series throughout the range; shifting the test up or down a semitone should show similar parallel relationships among the test intervals.

Example: To test E5, play C3-E3, C3-E4, and C3-E5. Observe beat rate changes. C3-E5 should not beat slower than either C3-E3 or C3-E4, and the changes you observe in playing this test for E5 should be very similar to the changes you observe when you play the series a semitone higher or lower. If the M17 is slower than either the M10 or the M3, E5 is flat. If the M17 beat rate jumps up suddenly from that of the M3 and M10, the note is likely to be sharp.

As mentioned earlier, in the lower half or so of octave 5, the P5/P4 comparison test is useful. This must be every tuner's favorite test, as it's common practice to tune "octave-fifth-fourth" when going up through octave 5, as a continuation of tuning up from the temperament. In this test, we would like to see the P5 a bit cleaner-sounding than the P4. However, this test is not much use above octave 5, since the corresponding coincident partials for the P4s at least are in the area of the right cheek block! The reality is that P5s and P4s all sound pretty good above a certain point in the scale, so above that point it's a waste of time to use them.

Chapter Meeting Set-up

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

This lesson requires advance work on a piano, preferably a well-scaled 6' or larger grand. It should be on pitch or nearly so throughout, strip-muted and with a single-string midrange tuning up to B4 that can be used as a foundation for tuning the treble, C5-B6. To simulate PTG exam conditions, detune the single open strings of octaves 5 and 6 alternately sharp and flat by about 2 cents to 3 cents: tune a whole-tone scale from C5-A#6, pulling octaves slightly sharp, and then tune a second whole-tone scale from C#5-B6, leaving octaves slightly flat.

Tools & Materials Participants Must Bring

Tuning hammer

Home Study Assignment for Participants

Read *The PTG Tuning Examination: A Source Book:* "Learning to Pass the PTG Tuning Exam" part 7: Treble, by Michael Travis, see esp. "Treble Octave Diagnostics," beginning p. 47; see also "Passing the Tuning Test", by Jim Coleman, Sr., esp. section on octaves, pp. 74-75. Practice tuning the treble, and using the M3-M10-M17 test to analyze your octaves. To do this well, you have to be able to tune a decent temperament and midrange sec-

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tion; otherwise, treble tests may show irreconcilable conflicts. Take any opportunity to have an RPT check out your midrange tuning to make sure it's OK.

General Instructions

Please note that the set-up for this lesson requires that the piano's midrange be tuned in advance, and both the midrange and treble muted to single strings. Divide the 24 notes in octaves 5 and 6 among the participants. The RPT instructor should briefly review the lesson plan. Each participant should have around six notes to tune, about half in octave 5 and half in octave 6. Notes should be tuned in chromatic ascending order starting with C5, so that participants have at least two turns each. Those not tuning should be quietly listening so that all may benefit. Budget time so that you spend about twenty minutes or so on each octave, or about five minutes for each participant on their first turn, and five more minutes on their second turn.

The main goals in this lesson are for participants to practice treble tuning with an emphasis on octaves, and to understand what the M3-M10-M17 test does and how to interpret it. So the first thing to do is talk briefly about the M3-M10-M17 test, and demonstrate what it sounds like in the midrange. Play G2-B2, G2-B3 and G2-B4, and listen to the beat rates. Break the test down into its component parts: the M3-M10 4:2 octave test, the M10-M17 2:1 octave test, and the M3-M17 4:1 double octave test, and compare the sound of the test intervals to that of the intervals being tested.

Have the first participant start tuning his/her first notes in octave 5 as if doing a pitch adjustment. Tune the octave directly, leaving it slightly wide if possible, checking the fourth and fifth down, and re-tuning the octave as needed. Option: play the "Harvey chord" — the octave, fifth and fourth together, and find the quietest spot to leave the tuning. After tuning several notes this way it's time to check some octaves with the M3-M10-M17 test. Try to ensure that the participant properly applies and interprets the test each time, and plays it in parallel to compare adjacent octaves and double octaves. Before going on to the next participant, the first should play all the parallel intervals up to the notes tuned, including P4s, P5s, octaves, double octaves, P12s, and M17s. Consonant intervals should sound clean, and M17s should progress evenly, and the tuning should withstand normal test blows.

Instructor: After all octave 5 notes are tuned in this way, recheck the M17 series from C5-B5, and if anything sounds suspicious, have the person who tuned the suspect note make any needed correction. Now go back and play M3-M10-M17 tests in parallel for the twelve notes, and comment on what you hear for participants' benefit. Be sure to point out how the relationships among the test intervals change from the bottom to the top of the octave.

Repeat the process for octave 6, except don't let any of the participants use P4s and P5s here — explain how it's a waste of time. Suggest they tune octaves first, checking double octaves and twelfths, parallel M17s, and finally the M3-M10-M17 test, on individual notes and then in parallel fashion. Point out differences in how the M3-M10-M17 and test intervals relate to each other in octave 6 versus octave 5, and what that means.

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

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- ☐ Deburr and Polish Capstans (Set of 88) $20.00
- ☐ Custom Made Keys. ..... Call for Price

Other Repair and Rebuilding Services — Call for Information and Prices

Please be sure to enclose your order form inside box with keys

Walker Piano Service

J. Larry Walker
554 State Route 1907
Fulton, KY 42041
Phone / Fax (502) 838-6889

Call for Order & Pricing Information

1-800-745-6819

Work Order From:

Name
Address
City, State, Zip
Telephone
SPECIAL INSTRUCTIONS

Shipping Instructions:

You may ship by UPS, Parcel Post or Private Carrier to Walker Piano Service.

INSURANCE: If you desire to insure your keys on the return shipment, add 40¢ per $100.00 of declared value. (For $1,000.00 add $4.00)

NUMBER ALL KEYS: Number Keys **BACK** of Key Buttons

For Key Rebushings Send **MICROMETER** Reading of Front Rail and/or Balance Rail Pins or Enclose 1 Each of Front Rail and/or Balance Rail Pin. (Please tape pins securely to side of key)

TERMS: **CASH** or **C.O.D.** — Make Check or Money Order Payable to:

Walker Piano Service

Please enclose your payment, any special instructions, your name, address and telephone number inside box with keys.

FREE return freight on **PRE-PAID** Orders of $50.00 or more (within continental U.S.A.) if shipped in **cardboard box**. Please add $5.00 **additional** if you wish to use a keycase.

FROM:

TO: Walker Piano Service

J. Larry Walker
554 State Route 1907
Fulton, KY 42041

Phone/Fax: 502-838-6889

To place your order:

Fill out the order blank (front & back)

Cut out this handy shipping label and follow shipping instructions printed above.

Changing Environment, Part IV
What Do We Do About It?

By Beverly Kim, RPT

Perhaps by now I will have provided some motivation to assess your environment and your methods of providing a service in a profitable and satisfying manner. We've also covered quite a lot about the changing client pool and our need to be aware of the differences that exist in our local communities. The following comments are based on a recent presentation by Fern Henry, RPT and PTG Past President.

To review this series, we have described some of the changing elements in our environment such as our increased diversity of our communities and our need to acknowledge these differences. We've discussed trends in the piano industry, contemporary lifestyles and evolving market place and our need to adapt. I even had the gall to cite reasons why we are resistant to change. From there, we described how a business plan could help us chart our route for serving our clients more effectively and finally, we emphasized the importance of providing excellent customer service.

In conclusion, we need to reiterate the importance of keeping aware of the sequence we've followed because it is perpetual. May we all be effective and satisfied piano technicians!

- Observe environmental changes.
- Identify personal business values and attitudes.
- Create a business plan.
- Provide excellent, efficient customer service.
- Evaluate, reassess each year.

Success in Business

The Purpose of a Business

"The purpose of a business is to create and keep customers."

Other aims may seem to be: making money, servicing pianos, serving the piano industry, etc. However, these all follow from having customers — you have nothing without customers. To create and keep customers you must do the things that will make customers want to do business with you.

A successful business person must:

- Possess Genuine Concern for Customers
- Take Extraordinary Care of Customers
- Introduce Constant Innovation

Other factors are your financial management and your local market. You can hire a financial manager, and you can move to a better market. But — you must use the three key ingredients above to create and keep clients in the long run. No one is ever going to say, "He's a great technician because there are lots of pianos in town." In other words, a good market alone will not assure long-term success in creating and keeping clients.

Possess Genuine Concern for Customers

You can't fake it — customers can recognize indifference. Without concern for the customer, all other marketing strategies will be worthless in the long-range goal of building a competitive edge. We all have our own style of relating to customers. All are valid if they're based upon genuine concern. How do you show concern for the customer, and do good work?

- Keep your agreements, and do good work!
- Show up on time (customers are often surprised when you do).
- Be polite (common courtesy is really uncommon courtesy).
- Use good telephone manners.
- Dress neatly.
- Show respect (remove shoes when appropriate, use a drop cloth).
- Listen to your customers. They perceive your service in *their* own terms, therefore their perception is the reality — listen, and address *their* concerns.
- Handle complaints willingly. Do you view a complaint as a pain that you can eventually recover from, or as a golden opportunity to distinguish yourself from less-concerned service people?

Remember: Common courtesy is the ultimate barrier to competitor entry.

Take Extraordinary Care of Your Customers

Shoddy, unreliable, discourteous service is so commonplace, that you merely have to do the ordinary to appear extraordinary. Fortunately, this is easy.

You can:

Add Value to Your Current Services

- Vacuum inside the piano (very noticeable to the client, and also helps your pride).
- Clean the keys (Wash & Dry moist towelettes work well).
- Take care of little problems (supply lock keys, knobs, tighten loose benches).
- Provide referrals (movers, teachers, dealers, refinishers/touchup, etc.).
- Offer little gifts (pens, posters, books, calendars, polish samples).

Develop Extra Services to Offer

- Disklavier/PianoDisc service
- String cover and Dampp-Chaser installation
- Provide finish care products
- Provide accessories (caster cups, lamps, locks, dollies)

TECHNO*stuff*

Richard Anderson, RPT • Chicago Chapter

Where'd you get that stuff?

One of Richard's Rules of Piano Technology is: *The fact that a supply house sells something doesn't mean you should necessarily use it.* Another rule is: *You can rarely use something just the way it comes.* The most useful and productive tools are often the ones we've customized to our way of doing the job.

A third rule that is closely related to these two is: *Some of the most useful things will come from the strangest sources.* Here are some of my favorite non-supply house tools and supplies.

First on the list has to be ACC cement, commonly referred to as super glue. I buy it at a hobby shop that sells model trains, rockets and cars. It comes in various viscosities and can be accelerated to set almost instantly. I've written about it before, but must mention it again because it has got to be one of the things I reach for most often in my shop (next to my PTG coffee mug). It seems like every day I find a new application for it. Today I was refinishing a set of sharps that were wood with the heavy plastic-like coating or shell. The shell was coming loose from some of the sharps and bubbling out against the neighboring white keys. A little ACC, some clamps, and a shot of accelerator, allowed me to proceed with the refinishing right away, and avoided having to replace the whole set of sharps.

Here's an unlikely source of supply for two common shop items. Looking for some unscented talc, or fine graphite powder? Try your local tractor dealer or farm supply store. Talc and graphite are used as a seed lubricating additive in planters and are sold in gallon sized jugs for just a few dollars.

Here's another farm supply for rebuilders. There's a product called Slip Plate™ that is graphite in a dry film carrier. It's used to apply a non-stick coating to grain handling facilities and mower decks. It works great for fitting pinblocks. It's easy to spray on a graphite film to the plate flange that dries almost instantly and will last through the entire fitting. A 14 oz. can is about $4.

I found one of my handiest tools in a piano. It's a conductor's baton. The tapered fiberglass stick is just the right size for poking into lots of holes and a size commonly found on pianos. You can clean them out, line them up, test their depth, or stuff them with whatever. It's also great for retrieving screws from between the plate and case, or down in the action. It has just the right amount of flex and won't scratch the case.

One of my handiest measuring tools is my set of drill bits. The easiest way to index a plate for removal is to find the largest bit that will pass between the plate and a bridge or the case in a few easily duplicated spots. Note the size for each location and later install the plate so that the bits fit again. You'll have the plate back in place with an accuracy that's equal to the increment size of your set of bits.

A good cordless drill is another tool that I use many times a day. I have 3/8" one with a 9.6V battery and a fast (1 hour) charger. A spare battery is a must, and a keyless chuck is handy. Look for a drill that feels good in your hand, reverses easily and logically, and is solidly made.

Masking tape is one of the little things that can make a big difference. I use it for veneer and felt clamping, depth-stopping drill bits, lining up marks for decal installation, scale marking for chipping, as well as masking for refinishing (almost a whole role per piano). I bought a case of premium masking tape at an industrial supply house and discovered just how cheap that cheap tape was that I was buying on sale at the hardware store. It pays to buy good stuff, even when you're buying stuff to use up and throw away.

Bonus Tip — To avoid damaging or lifting finishes with masking tape, apply the tape to yourself first! Sticking the tape onto your clothes a few times will load the tape with lint and reduce the tack.

Marketing Ourselves

- Insurance appraisals
- Key recovering and other rebuilding services

Introduce Constant Innovation

Do you constantly improve your skills and add new ones, or are you satisfied having just one year of experience repeated over and over? Active PTG members know the value of new ideas, tools and materials, and the personal stimulation gained from learning.

Innovation:

- Improves the quality of your work
- Creates pride
- Relieves boredom
- Makes your work easier
- Increases your income
- Gives you a competitive edge

Some Recent Innovations Many Technicians Have Benefited From:

- The Accu-Tuner
- Improved lubricants, such as Pro-Tek
- Improved variety and quality of replacement parts and tools
- Digital humidity gauges to track climate and pitch data on the new PTG Service Record
- Car phones and pagers
- Computers and business software
- New PTG marketing tools

Creating and Keeping customers as an Organizational Objective

As PTG members, we should think of this theme in a larger sense — not just creating customers for ourselves, but promoting PTG and our standard — RPT — as well as the piano industry. The results are mutually beneficial. As an organization we pool our efforts for a greater impact, in marketing efforts as well as in technical innovation.

Tuning With The Enemy ...
Berkeley Tuner Travels to Havana

By Benjamin Treuhaft

Last year I found myself in the doldrums. There was plenty of work in Berkeley for an established piano tuner, but working largely for well-off babyboomers left me with an empty restless feeling. Past escape attempts had landed me in Europe, tuning for London Bösendorfer and Paris Steinway dealers. I had secured the Paris job by mail, and when I showed up in jeans and sandals and my dog, Jeckel, on a leash, my employer Madame Hanlet invited the dog in but said the footwear would have to go: "One ne travaille pas nu-pieds à Paris." For a while I traveled the Metro lines, tools in one hand, leash in the other, tuning for private customers and concert halls. Jeckel often found himself tied to the base of the Eiffel Tower while I tuned upstairs at the Restaurant Jules Verne. The winter and my inability to find digs other than drab hotels, however, soon brought me back to Berkeley.

The idea of Cuba had vaguely occurred to me over the years. Once, in 1979, I dashed off a letter to the Importer of Musical Machines in Havana saying, "Hey, I heard you had a great revolution, and how about hiring me to tune your pianos?" No response. Then, in 1992, Victor Charles, San Francisco's premier piano rebuilder, died at the age of 75. He was the Marxist son of a Vancouver piano maker, and had been my best friend and mentor. He left a dozen friends and girlfriends little packages of $35,000. He also left his music (he was an accomplished composer), and his shop tools to the appropriate parties. In his honor I wrote to Global Exchange, a group I heard had ties to Cuba, offering to donate my services to the hundreds of frustrated musicians I envisioned playing on worn-out untuned pianos.

Piano tuning in Cuba is a felony under the U.S. laws banning travel to that country. It happened that Global Exchange was organizing the Freedom to Travel Campaign, a project thats purpose is to send waves of Americans to the island in open defiance of the decades-old ban. A 175-strong collection of activists from the ages of four to Abe, who can't tell you how old he is because he can't hear what the hell you are asking, agreed to risk six-figure fines and ten-year sentences in an attempt to jolt the Clinton administration into reversing Ronald Reagan's decree that visiting, patronizing and loving the Cubans is Trading With the Enemy. I decided to sign up and apply for the job in person.

OCTOBER 10 - 17
— HAVANA
Monday:

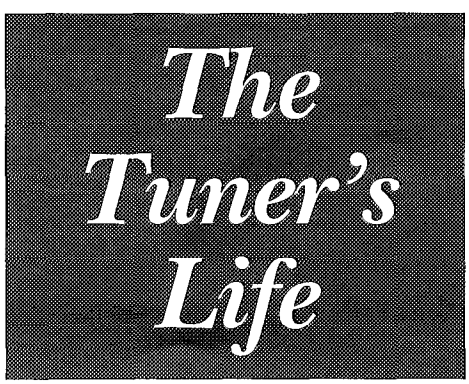
A horde of Yankees arrives at the old Tropicoco Russian resort. In the background a piano tinkles out familiar Play-It-Sam-style tunes as an elderly Quebecois couple watches with amusement as the last few of us check in. It is controlled pandemonium with Mojito rum drinks provided by the hotel staff, everyone exhausted from over-excitement and lack of sleep. The French-Canadian gentleman has a chair off in a corner by the piano where he can survey the spectacle. I practice my French, he tells me we are witnessing an historic moment. The Quebecois, he says, have never understood the U.S. antipathy towards Cuba. He feels the arrival of these upstart tourists is long overdue.

The hotel piano sounds awful, and I am drawn closer. A tall black man at the keyboard peers through gold-rimmed glasses with rectangular frames. He is ancient. I introduce myself during a lull in the music and offer to tune the hotel piano for fun. A plastic ivory is missing and I have brought along a complete set to donate to a school. The pianist, Daniel Duran, speaks good English. We agree that I will tune the piano at 7:30 the next morning, before the guests are up. Then he asks, "My piano at home needs some of those — do you have any extra?" Without thinking I offer him the school plastics.

My tuning the next morning is less than stellar because the terrible old German grand wants to break every other string in the treble, the thin wires having rusted through after decades of exposure to the salty breezes of the hotel lobby. Luckily there are plenty of other things wrong with the instrument and the pianist will like the improvement.

That evening it occurs to me; I want to visit the elegant old musician at his home, and the ivories will provide an excuse to invite myself. The pianist is very kind when I collar him after a song, and he lets me know I have done a fine tuning. His job, he explains, is to rotate amongst the resorts east of Havana and play favorites for the tourists. He gives me his address in Alamar: Zona 6, edeficio_, apartamento_. We are set for early the next morning. Alamar, city of 100,000, is visible from the highway as a mass of concrete-block housing projects left to rot for 20 years. Tropicoco resort residents have to pass it to get to Havana, and it looks depressing; does Socialist Man end up living like this? But Daniel Duran gives his address there with some pride — maybe Cubans see the block houses as bunkers from which to fight the 30-year U.S. economic hostility.

It is raining the next morning. The taxi driver has to stop five times for directions, the Zona and edeficio numbers proving of little use, and I descend when we reach the general vicinity. Without much Spanish it is still easy to find the house by making piano-playing motions while describing a tall, dark old man. The residents must think me quite a sight, a



slightly overfed sport coat-wearing, straw-hatted Yankee dripping with drizzle and sweat, carrying thirty-five pounds of tools in a doctor's bag. Eventually a kid takes me to Daniel's door where a woman lets me in.

My arrival comes as a surprise. Last night's plan, which didn't envision rain, was for me to borrow a hotel bicycle and make the hour-long ride by eight o'clock. Lucky for me, the hotel doesn't loan out bikes before nine and by the time I had organized a taxi I was almost an hour late. I start work on the piano and am deep into tuning when Daniel appears from an interior room. Beautifully dressed (his shift at the Tropicoco starts technically at ten), gracious and soft-spoken, he puts me even more at ease than I already am. He arranges a delicious demitasse of muddy sweet espresso, and we talk as I tune.

He has a Wurlitzer short upright, sold originally in Havana in 1915 when Wurlitzer was producing great pianos. The ivories turn out to be real, so he can't use my plastic keytops after all. As soon as I lift the lid and remove the front door I can see this is an excellent old instrument. The tuning pins are dark brown with corrosion as are the strings, but something in the Cuban air has kept them from getting rusty and brittle — there is only one broken string at the very top of the treble. The pitch is at least half a tone low, but the action — the keys, hammers and all the levers in-between — is in fine original condition. All I really have to do to get the piano in good playing order is to tune it twice to raise it up to concert pitch.

Daniel Duran is beside himself with joy at the attention his old piano is getting. Maybe his play for the keytops was a subconscious ploy to get me to his house. It takes almost as much concentration to do the first rough tuning as the final tuning, and it is hard to concentrate. It is only my second day on the island, and I want to hear Daniel's theories of justice and economics, but I eventually have to insist, "Afinar, no politico," hoping I'm saying "No more politics, just tuning."

The hilarity has subsided enough for me to get past the middle and bass sections and into the treble when Daniel brings out a bottle of fine Cuban rum. I have to laugh. "Daniel. You mean I can drink rum and tune your piano, too?" "Yes! Yes! Are you afraid of rum?" Well, it is about ten in the morning and I am terribly afraid. But what can I do? Laughing and working, I finish up the last couple of octaves along with a coffee-cup of rum. The tuning is fairly raunchy, but the pitch is up where I want it, and I promise to try to return on our last day to give it a fine tuning.

It is pushing 11 when Daniel walks with me to the main road. We are in a slight pickle because we both have to get to the Tropicoco and there is no normal way to travel such a distance in Cuba these days. With the petroleum shortage since the demise of trade with the U.S.S.R., the busses can take five hours to come. No taxis come to Alamar any more. There is a system whereby any open-bed or government vehicle must stop for hitchhikers, but you have to get in a long line. To my embarrassment Daniel approaches an orange-coated hitching-control officer to get priority for his American dignitary. Just then a couple of Cubans come up and offer to sell us a ride for the price of gas plus a couple of dollars. We arrive at the Tropicoco fifteen minutes later.

Friday:

Maria Teresa Linares greets me at the door of her elegantly colonnaded neo-classical Museo Nacional de la Musica at the appointed hour of ten o'clock. Freedom to Travel has been in Cuba five days, Cuban TV has covered the visit intensively, delegations from all levels of government and all sizes of children have been mobilized by an obviously deeply moved population, and here am I, soaked in sweat, recovering from a delicious cigar, looking for a job.

Maria Teresa takes me on a tour of some of the Museo's pianos — three Steinway grands, a 1920 Pleyel-Wolff French grand dripping with brass ornament, and a couple of ornate European uprights. I play a few triads here and there and am relieved to hear that the instruments are in quite good shape. I am surprised to see that these Caribbean pianos soaking in Cuba for many decades have been more preserved by the film of moisture than ruined by it. The only drawback seems to be that piano tools tend to melt in your hands.

In the Museo's small concert hall/meeting room, I meet Raquel Montejo Soto, a student of piano tuning in Havana. She stands with Maria Teresa and the PA sound specialist I have dubbed Protocol, because he knows some English and can translate the odd phrase for Raquel. They watch intently as I begin tuning the rare Art Steinway L, white Louis XIV with subtly decorated side panels. The pitch is close to concert A-440; high humidity won't let the soundboard contract over the years and loosen the strings. Also I learn there was a good *tecnico ruso* (Soviet technician) in years past — he must have administered several solid Russian tunings.

Unfortunately the bass strings are a little dead, or tubby-sounding. This leaves me with a few options. Best would be to restring the seventy-year old piano from top to bottom, a week-long job. I have one day and no strings. Second best is to remove the bass strings from the back end of the piano a handful at a time, tie them in a large loop, run the loop up and down the strings to loosen the corrosion, and reinstall each string with a full twist to tighten the winding. This process takes about an hour and results in a nearly new-sounding bass, but removing strings wreaks havoc with the tuning. Maria Teresa has planned a flute and piano concert for the following day and I won't be able to return to touch up the bass. So I use option three, a trick I learned from my first master teacher, the blind Ceylonese E. Michael Silva of Hayward, California. You briskly loosen and retune each bass string in the hope that some of the old corrosion will break up.

Now you have to see it from Raquel's point of view. Here is a typical American, totally underwater piano tuner, violently messing with the bass strings of an extremely valuable Steinway. She murmurs something about breakage. I am paddling about obliviously, talking to myself and experimenting with removing a few of the wires. Finally Raquel puts her foot down; the piano, she avers, is in perfectly good shape for tomorrow's concert. Luckily I have my C.V. and a letter of recommendation from Steinway's prestigious New York Concert Department tucked in with my passport. I rise to my hind legs and introduce myself as what I am: a hotshot piano tuner with almost thirty years' experience and a training background second to none. I manage to keep a straight face, hand the documents to Protocol and ask him to present them to Maria Teresa. A hush descends on the hall as they all pore over the two crucial leaves. In time — a verdict. I pass. By now it is almost 11 a.m., and I set to work with a vengeance.

Concluded on Next Page

Continued from Previous Page

Maria Teresa asks me to concentrate on the Art Steinway on the stage rather than pursue my plan to tune as many pianos as possible. Raquel is in a chair by my side unable to calm down about having the weird Yankee expert for the day. I answer her questions and give occasional pointers, all the while trying to speed through the concert tuning to get to the sorely-needed action work. Occasionally Raquel sings the note I am tuning—a practice guaranteed to enrage a tuner. "Niños no canta!" is my broken-Spanish refrain — trying to say "Children! No singing!" I myself cannot be prevented from intermittent bursts into song, so happy am I to find myself of use to these benevolent beings on a foreign planet.

A solid tuning is just the first step in preparing a piano for concert. Hammers grooved from years of play have to be resurfaced and fitted precisely to the strings. The hammer height as well as the let-off point must be set. Eighty-eight springs must be adjusted for maximum reliability on repeated notes.

Maria Teresa sets me up in a nearby office with a desk by a window as my workbench. I lug the action to the desk, arrange my tools on an adjacent table and begin the three-hour job of re-shaping the excellent old hammers to the "Steinway shape," in which each hammer is sculpted with a sandpaper file and given the profile of the pointy end of an egg. Raquel watches for a while and asks to take over. I decline, somewhat alienating her. She disappears for a couple of hours.

The Tuner's Life

There is a room off my workshop containing the office of Ligia Guzmán Piantini. I smile as I pass her door and she eventually rises from her desk to introduce herself. She seems to be the Museo's archivist and musicologist. She shows me her name on the cover of a tract and I ask if the Piantini refers to her mother's name and the Guzmán her father's. She says I have the order of Spanish names right and that both her mother and father were well-known Cuban musicians, and that's as far as my Spanish takes me. For some reason I ask her about a song we hear everywhere on the island, "Cuba, Que Linda Es Cuba." She, too, disappears.

I am alone in my wonderful workshop, feverishly shaping the hammers (the Museo closes at five) by the open window in the wet heat, with the sounds and smells of Old Havana intruding from the window, the sound of an advanced guitar lesson coming from the hallway, and the rustling of papers from the office of Ligia Guzmán Piantini.

Ligia enters from the side door to speak with me. She presents me with two pamphlets from the archives. The first is a 1981 history of the Museo with photographs, the fancy 1905 residence contained the offices of Batista's Secretary of State until the Rebel Army took it over, written on the 10th anniversary of the opening of the Museo. One of the full-page photos is of Colonel Arnaldo Tomayo copying out the words to "Cuba, Que Linda Es Cuba" for some workers and young students.

The second pamphlet is her own biography of Eduardo Saborit, composer of that rumba anthem (Ligia's father, Maestro Adolpho Guzmán, turns out to have collaborated on many of Saborit's recordings). She has written a kind note in commemoration of my visit. On the back cover she has written out longhand every word of "Cuba, Que Linda Es Cuba." It certainly is.

At 3:30 Raquel reappears. She at first refuses my request to help out with the action regulating, saying she thought I wanted to do it all myself. I explain I only meant the hammer-shaping, where the style of shape is somewhat unique to each tuner and it wouldn't be good to split the job. She gets to work immediately on setting the hammer-line — the level of the hammers at rest — which has sunk far too low over the decades. She works opposite me at the bass end while I finish up the top two sections. She has a great pair of hands.

Sunday:

It is the last morning, and by 6:15 we will have to be on the buses. I hold back tears in the hotel lobby as our Cuban hosts present farewell speeches. Only hours earlier I got past my sheer admiration of the heart and strength of the Cuban people to finally know some of them in a personal way. Last night I got bored stiff with the farewell festivities planned for us, and ended up in the room of some of the hotel staff talking about rum, politics and work. There were three young men (one so drunk you had to tell him everything twice), two young women and one typical American. We talked until 3 a.m., and in the end I traded shoes with my host, the ever-smiling restaurant worker, Joe. He had told me how much he loved his job, that he was learning every aspect of the waiter's trade, but that life in Cuba these days entails miles and miles of walking every day. When he pointed out the two little holes in the sides of his leather moccasins I looked down at my perfect new adjustable Birkenstocks and immediately proposed a trade. Joe's shoes didn't fit me at all and ended up getting me in a heap of trouble later with Continental Airlines when I tried to board in Cancun barefoot.

The week has been a material success. I made a good impression at the Museo and now it looks like I may be invited to spend a few months later this year working for the Arts and Music School in Havana. Daniel Duran's piano got its fine tuning on Saturday. He arranged for a fine box of cigars for my father. There is only one thing I must do, and luckily I remember, when there are a few minutes left before bus-boarding time.

Brian Viani is a soil scientist with the Lawrence Livermore Weapons Lab. He has top security clearance for his job, which is to design nuclear waste dumps for the Federal Government. We were talking a few days before my trip to Cuba. He and his wife, Tawny, wanted to donate some cash to the Travel Challenge, and when I got up to go, Brian asked me one favor: Could I send a postcard to him at work?

I find one with a gaudy image of our big Russian hotel, plaster a big Cuban stamp on it, address it to him at the weapons lab, and write "GREETINGS."

Can you help me with a project to send 20 rebuildable pianos with parts to Cuba this July? Box up slightly rusty music wire and tuning pins, other parts and supplies you can spare as well as extra tools and books, and give me a call. Another thing they need is string-cover felt to protect the remaining good grands. It costs money, and any funds you send will go to buying parts for the project.

Thank you.

Ben Treuhaft, (510) 843-3823.

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

Diving into Desktop Publishing

Computers make Chapter Newsletters Simple

Jeannie Grassi, RPT
Chapter Resources Committee

Publishing your chapter newsletter can be fun and challenging, but is can also be overwhelming if you've never undertaken the task before. However, if you own *and operate* a computer, it's easier than ever, and new software available offers tremendous improvements in the area of desktop publishing. All the more reason to take the plunge and move into the computer world. However, for those of you who have not yet gotten your feet wet, a good newsletter *can* be produced on a typewriter or word processor, even if it is a lot more work.

In Bill Ballard's *Journal* article, *"Write Now, Ask Me How,"* April 1995, he gave an extensive list of styles of newsletters and the varied topics that can be included therein. And assuming he has convinced you that you *can* write, the rest is the fun part. So you may have questions like: How do I start a newsletter? How do I refine it? Although there are no rules, there are many ways to go about publishing a newsletter. This article will highlight some basic editing techniques.

Layout and Design

There is no single step-by-step recipe for putting together a newsletter, just some common sense and a few basic ideas of good layout and design. If you don't have any desktop publishing experience, you can gain a good sense of what looks good and what just doesn't work, by looking at other newsletters, newspapers, and brochures. When we're learning how to voice, we must listen to many examples of good pianos, in addition to the klunkers, so that we can begin to develop a sense of what to aim for and what we want the end product to sound like. The same method can be applied to design. The more you see, the more you'll begin to recognize how you want your newsletter to look.

The Tools

First, you need the proper tools. As mentioned, a computer makes the most sense these days. The software available now for desktop publishing makes it very simple. If you are using a PC, Microsoft Publisher 2 is the front runner. There are some other popular programs such as Page Magic, Claris Works Publisher, and Arts & Letters, that are supposed to perform just as well as Publisher but cost considerably less. The top word processing programs such as WordPerfect 6 or Microsoft Word 6 now have newsletter templates and macros that make it easier than ever to plug and play. If you are a Mac user, ClarisWorks is considered a top program and Aldus Home Publisher now has a version 2 available.

The Process

Assuming you have the tools, let's examine the process. The concept is basically the same for typewriter or computer. It's just a whole lot easier and more efficient on a computer. Collect your articles or features, such as: date of next meeting, minutes from previous meeting, profile of an outstanding chapter member, description or summary of last technical program, upcoming events, classified ads, announcements, drawings, photos, clip art, etc. These can then be "pasted" into predetermined formats such as columns or text boxes, or sidebars. Most recent software programs have styles already developed specifically for newsletters which allow you to just fill in the blanks with your text, leaving the formatting up to the computer.

But it helps to have an idea of what to aim for. One of the first things to begin learning about is layout. In *How To Do Leaflets, Newspapers, & Newsletters,* (listed at the end of article) Nancy Brigham says, "Good layout rarely calls attention to itself. Instead, it makes reading your paper an irresistible and pleasant experience. Pictures and headlines jump out at readers, beckoning them to each page; stories are easy to read, key information can be found quickly."

Your level of success is directly related to how much you experiment and how creative you want to get. The best way to learn is to jump right in. Then all of a sudden you realize that you know what you're doing, and you are actually having fun.

Some Basic Suggestions:

- ***Keep it simple:*** It's really easy to overdo it. It is very tempting to try out all the bells and whistles that your computer can do, but fight the impulse. The best-looking newsletters look like they took very little effort to produce.
- ***Avoid funny type styles:*** Fonts, or typefaces, can greatly affect the overall look and design of a publication. The best rule is to select one type style for the body text, and one for the headline text. Using too many type styles can

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Desktop Publishing

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actually create confusion for the reader, who may not know what to read or look at first. Save the "fancy" type for things like posters, flyers or advertisements within the publication. And that includes outline, underline and shadow, which will make your newsletter look amateurish. Underlining text only creates a stumbling block for the reader. Use bold and italics to create emphasis for a word or phrase. By the way ... do not use all caps! This will only stop the reader's eye flow and will cause the movement of the page to come to a screeching halt.

• *Nameplate:* The area on the front cover that displays the newsletter's name. The name is usually set in very large type, and it's almost always at the top of the first page. A good nameplate is actually informative. It will tell you whether you are one of the people who should read that newsletter, and whether that issue is the current one. If the name of your newsletter says it all, maybe you don't need much more than the name and the date of the issue.

• *Space:* White space can be an extremely useful tool. Text has a tendency to look gray when it fills an entire page. If this becomes the norm, your eyes will tire of trying to get through all the grayness and you will lose the interest of the reader. When used with basic design techniques, it can be useful in creating page balance and great layout. As Joe Grossmann says in *Newsletters from the Desktop* (see listing), "Here's a graphic technique that's all too easy to forget. Maybe that's because our programs have plenty of tools for adding type, graphics and color, but there aren't any special icons or menu commands for adding white space... There's no better way to draw attention to something than to surround it with a bit more white space than one would normally expect."

• *Columns:* To help break up the text and help the eye move across the page, arrange the text in columns. Two or three columns work best for newsletters. Some programs handle column balancing automatically and a "make it fit" feature in some word processing programs will also make sure all the text fits on your page.

• *Graphics:* One of the best ways to grab the attention of your reader is to compliment your story with a graphic. Graphics can be line art or photos. They can be incorporated into the page layout to create a movement or flow of text. They also serve in the same capacity as white space when they break up heavy amounts of gray text. Clip art books can be purchased at art supply stores or clip art software packages are available at your computer store. But don't let the art get in the way of what you're trying to convey to your readers.

• *Mastheads:* This is one of the most important features a newsletter can have. A real masthead displays the name of the publication and editorial staff and it appears in each issue of the publication, usually on the editorial page if there is one. It is usually set off in a box and can give information about the officers, volume and issue, date of publication, addresses, editor information, etc. It is a resource of information which should be at the fingertips of the reader. The type can be placed inside a lightly tinted box or under a heavy horizontal rule to separate it from surrounding articles. The type doesn't need to be very large — try sizes from seven to nine points.

• *Photocopying:* It is easier to copy an article from another publication, but it is not better. It only takes a few more minutes to type the article in the same type font as the rest of your text, and the look you will achieve cannot be compared. The end product will be far less cluttered resulting in a cleaner, more organized newsletter. Always remember ... give credit where credit is due. Get permission to use the article and then explain who wrote it and in which publication it originally appeared. Always!

• *Print copy:* The cleaner and neater the copy that you give to your printer (whether printing or just photocopying), the better the final result will be. The cleanest copies come from computers with laser printers, 300 dpi or better. Second best is an ink or bubble jet. But even good copies can be achieved when using a typewriter or daisy wheel printer, by making sure the ribbon is new and the type heads are clean. A sure way to lose your readers is if they have to strain to read the text.

• *Paste-ups:* If you are actually doing "paste-ups," use spray mount instead of Elmer's or rubber cement. It is a much cleaner process and will not leave sloppy glue residue on the edges of the work. Also use a straight edge to line up your "pasted" pieces of text and graphics. Well done, the eye may not even be able to detect that it wasn't typed in one sitting.

If you really want to get into desktop publishing, there are plenty of other fun gadgets on which to spend your hard earned money such as a fax modem, CD ROM, laser printer, or a scanner. But we'll save those for another article. And besides, a top quality newsletter can be published with just the basics. The best way to learn is just to try. Don't be afraid to experiment with ideas, graphics, layout and text. There is no limit to what you can create.

The following books may provide some useful ideas:

NEWSLETTERS FROM THE DESKTOP, The Desktop Publisher's Guide to Designing Newsletters That Work, by Joe Grossman, 2nd Ed., Ventana Press; 1994

LOOKING GOOD IN PRINT, A Guide to Basic Design for Desktop Publishing, by Roger C. Parker; Third Edition, Ventana Press; 1993

NO-SWEAT DESKTOP PUBLISHING, by Steve Morganstern, from Home Office Computing

HOW TO DO LEAFLETS, NEWSLETTER, & NEWSPAPERS By Nancy Brigham, PEP Publishers; 1991

An International Opportunity in Albuquerque

By Ed Hilbert

This year's annual convention in Albuquerque will offer PTG members a wonderful opportunity to meet and get to know technicians and their spouses from many other parts of the world. PTG will be hosting the IAPBT (International Association of Piano Builders and Technicians) Convention, directly following our PTG Technical Institute, and all PTG members are invited and encouraged to stay on through Monday evening to participate in the various IAPBT activities.

IAPBT was formed at the 1979 PTG convention, and it is now a worldwide association of piano service organizations and individuals. The purpose of the association is the formation and maintenance of a worldwide fellowship of piano technicians and rebuilders. The objectives of the organization are to encourage, and to provide a means of exchange of technical information and related subjects, and for cooperation in scientific research to improve the quality of pianos. All of this is done on a voluntary basis, much as we do regularly between PTG members and at our meetings and conventions.

This year's IAPBT convention will include members from the following organizations: Europiano, the Japan Tuner's Association, the Korean Association of Piano Tuners, the Pianoforte Tuners Association (UK), PTG, and the Taipei Piano Technicians Association.

If you are attending this year's convention, you will see our guests in several different roles throughout the convention. There will be several excellent instructors teaching classes for us. There will be foreign technicians who will be attending our classes — some of which will be especially adapted for our guests by way of translators, etc. There will be numerous social activities in which we shall all have a chance to mingle, eat, go sight-seeing, and get to know each other. And lastly, there will be the IAPBT Convention itself.

There will be some brief business actions needing to be taken care of, as with all organizations. For example, this year we shall be welcoming both Europiano and the Pianoforte Tuners Association into membership. There will be some activities which will be of interest to most everyone. For those of you who did not get a chance to do any sight-seeing around Albuquerque, there will be opportunities to do so. There will be several dinners providing wonderful food and the good sit-down opportunity to share with and learn from our foreign guests.

Besides all the opportunities for mingling and getting to know each other, perhaps the biggest single event will be a very interesting symposium on Monday afternoon. The topic will be *"The Testing and Accreditation of Piano Technicians in Member Countries and Organizations."* We shall have speakers from each of the represented organizations to talk to us about such questions as: what are the legal issues of tuning in their countries and is tuning a regulated trade? How do technicians learn the art of working on pianos in these other countries? What tests, if any, are given to prove competence? What percentage of technicians in the country are certified? Are there well-defined different levels of competence? How does the general public know of these issues, and do they care?

Most all of us are pretty well acquainted with our own organizations and our standards, but many of us know very little about how these things are done in other parts of the world. For example, did you have at least three years of formal training to become a technician? Or did you serve a formal apprenticeship? In some countries, you might not have been able to have become certified if you didn't. Our tests are tough — or so some of you think — but how do we compare to other countries. Come and hear about this and learn much more about how our counterparts throughout the rest of the world run their businesses and organizations.

Next month there will be an article, written by Doug Kirkwood, RPT, to help us better understand some of our cultural differences so that we can more comfortably meet and interact with our guests from around the world.

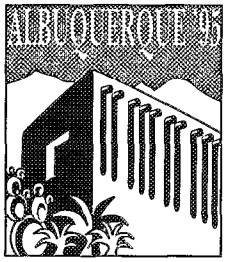
Spice Up Your Business in Albuquerque

By Fred Fornwalt, RPT

Albuquerque '95 is quickly approaching — if you have already registered, we promise you an outstanding institute, if you have not registered, *please take a moment to reconsider.*

Continuing education is the only way we have to stay competitive and, hopefully, to maintain a competitive edge. Many of us operate as sole proprietors, and as such our income is limited by what we can produce — working smarter, not harder, is the key to continued growth and prosperity.

International Flavor...



...Southwestern Spice!

Whether you work on grands, uprights or downright shames — we have a class for you.

- Have you said to yourself, "There has to be an easier way to do this?"
- Has your income peaked or even declined?
- Do clients request work which is above your skill level?
- Have you lost clients because your competition has a higher level of skill?
- Have you lost clients because they don't understand you?
- Do you feel that you just don't have enough time to do everything?

If you answered yes to one or more of these questions — you need Albuquerque '95.

P.S. — PTG needs you in Albuquerque!

Sight-seeing and Southwestern Spice

By Fred Sturm, RPT
Chapter Host President

Many of us like to make convention attendance part of a family vacation, but worry about whether the kids will find enough interesting things to do while we are busy attending classes. That certainly isn't a problem in Albuquerque, and this article will begin by outlining things to do within the city, of interest to children and adults alike. The city has recently begun a "trolley" service for the benefit of visitors, which will make it easy to get to and from most of the places I'll mention here.

Let's begin with the zoo. Due to the generosity and support of Albuquerque taxpayers, the Rio Grande Zoo has become one of the most progressive zoos in the country, both in the design of its exhibits and in its dedication to programs for propagating endangered species. Some of the most popular exhibits include a pair of white Bengal tigers (with three cubs), a seal and sea lion exhibit with underwater viewing, an extended family of gorillas, and a tropical rain forest exhibit with free-flying birds. The zoo is less than two miles west of the convention center, by the banks of the Rio Grande.

Just north of the zoo is "Old Town," the area where Albuquerque was founded. A central plaza fronts the historic San Isidro church, and is surrounded by restaurants and shops of all sorts, catering primarily to tourists. It is an intriguing place to just wander around, and pick up a souvenir or two. On the northeast edge of Old Town is the Albuquerque Museum, containing exhibits dealing with the history of the area, a collection of "Western" paintings, and hands-on exhibits aimed at children.

Across the street from the Albuquerque Museum is the New Mexico Museum of Natural History, with life size bronze statues of a pentaceratops and an albertosaurus standing guard by the front door. This is the newest (by far) major natural history in the country, and quite different from the stuffy display case layout of older museums. Among the exhibits are a model of a volcano you walk through (complete with sulfur smell, sound effects, and a lava flow to cross); a New Mexico seacoast exhibit, with plants and aquatic life designed to replicate the New Mexico of a million or so years ago; and an "Omnimax" theater, which shows films that make it seem as if you are going through the Grand Canyon, into an erupting volcano, and the like. Almost next door, to the west of the Natural History Museum, is the Albuquerque Children's Museum, with lots of interactive programs aimed at children.

About a mile to the northeast is the Indian Pueblo Cultural Center. Run by the All-Indian Pueblo Council (composed of the 19 surviving pueblos of New Mexico), this is a showcase of pueblo culture. Every Saturday and Sunday dancers from various pueblos are featured in the central plaza decorated with large murals painted by prominent pueblo artists. There is also a museum illustrating pueblo art and culture, an extensive gift shop featuring pottery, jewelry, books, and souvenirs, and a restaurant whose menu is made up of unique Indian cuisine.

Other attractions in the metropolitan area include the Explora Science Museum (downtown, within walking distance of the convention center); the Beach waterpark (with artificial waves, long waterslides, and the like); the UNM campus with several small museums (most closed on weekends), a duck pond, and unique architecture; and the Rio Grande Nature Center (with exhibits and hiking and biking paths through the bosque). A new botanical park is under construction just north of the zoo, but I am not sure how much of it will be open by July. Sound like there might be enough to do to while away the hours?

Then there's eating. There are plenty of restaurants featuring cuisine's from China to India to Italy, but the real attraction is New Mexican food. When you go into a New Mexican restaurant, look over the menu, and place an order for some local delicacy, the waiter will invariably ask you, "Red or Green?"* This cryptic question refers to Chile (never spelled "chili" in New Mexico). So what's the difference? Green Chile is picked while still immature (like a green bell pepper), roasted, peeled, chopped and frozen. Red Chile is the same pepper allowed to mature fully, then dried and ground. What you will get poured over your burrito, or whatever you ordered, will consist mainly of Chile: in the case of green, probably sautéed with onion and perhaps a bit of meat; red is reconstituted with water into a paste, and flavored with garlic and perhaps cilantro or cumin. The heat levels of both red and green vary from quite mild to volcanic. You can always request mild, or ask for your Chile on the side, and use only as much as your palate will accept. (By the way, a bowl of Chile here is a stew made mostly of Chile, green or red, a little meat, perhaps some potatoes and onions, and beans by request. No resemblance to that Texan "chili" concoction).

What are all those other dishes on the menu? Most of them consist of a filling inside a tortilla made from either corn or wheat. The fillings are most commonly beef, chicken, beans, cheese, or carne adovada (beef marinated in red Chile). Some dishes made with wheat tortillas are burritos (the filling is just wrapped in a tortilla and usually smothered with Chile); chimichangas (burritos tightly wrapped and deep fried, often served with sour cream); and chalupas (the tortilla is deep fried in the shape of a basket, with the filling then placed on top).

Corn tortillas produce a similar variety of dishes. Soft corn tortillas, either rolled around a filling or stacked with filling in between, are called enchiladas. A tightly rolled enchilada that is deep fried is called a flauta. Probably everyone knows a taco is a corn tortilla deep fried in a folded shape, with filling inside. A flat deep fried tortilla with filling on top is a tostada. A couple of other common dishes are tamales (corn flour paste with filling inside, steamed inside a corn husk); chiles rellenos (whole

PACE Academy has Something for Everyone

By Paul Olsen, RPT

The 1995 Institute in Albuquerque is fast approaching, allowing those who have not yet sent in their registration only a few weeks to do so. For those who are registered and contemplating taking in a PACE class there may still be some openings. The one thing I would like to emphasize is that if you are attending and have the slightest possibility of registering for a PACE class, *Bring Your Tools!* They are needed for many of the classes. The following are highlights of what's in store for this year's PACE Academy.

WRITTEN & TECHNICAL

•PREPARING FOR THE PTG WRITTEN EXAM — *Randy Potter, Randy Potter School*

This class is geared to help Associates gain the knowledge to successfully pass the written exam. Rather than just a question-and-answer session, participants will delve into the how, where, when, and why of piano technology. This class is being taught by Randy Potter, who is a professional educator, and has instructed at numerous conventions and regional conferences.

• PTG WRITTEN EXAM — *Randy Potter, Randy Potter School*

Associates will have the opportunity to take the written exam which will be administered by Randy Potter. Participants are encouraged to attend "Preparing for the PTG Written Exam" prior to taking the actual exam.

• PREPARING FOR THE PTG TECHNICAL EXAM — *Mike Carraher, Central Pennsylvania Chapter*

This class is a must for those contemplating taking the PTG Technical Exam. Participants will be able to see, first hand, the makeup of this exam. Mike Carraher is an experienced and knowledgeable instructor who will take you through areas of regulating to some of the more specific piano repairs.

TUNING

• INTRODUCTION TO THE PTG TUNING EXAM/PARTIALS AND INHARMONICITY — *Jack Stebbins, Western Massachusetts Chapter*

Jack is an experienced instructor who keeps his classes moving with his wealth of knowledge on this topic. His class will be a great asset in helping you to become familiar and more confident with the exam. Learn the basic concepts of partials and inharmonicity, fundamental knowledge needed to master the art of piano tuning.

• HEARING THE BEATS — *Margie Williams, San Francisco, CA Chapter*

Hearing the beats is something all beginning tuners struggle with. Being able to hear, count, and distinguish beats is most advantageous to setting a good temperament. This class will use a special monitor and sound system to make it easier to hear the beats and actually see what notes and intervals are being played. Margie has taught at other conventions and regional conferences, and in fact, is teaching two PACE classes this year.

• PITCH AND TEMPERAMENT — *Ramon Ramirez, Austin, TX Chapter*

Ramon has a masters degree in piano technology performance and this is his second year teaching a PACE class at the Institute. This class will show how to efficiently transfer the pitch from a pitch source to the piano. Ramon will also demonstrate creating the temperament and show how it can be enhanced through setting, testing and improving intervals.

• OCTAVES - EXTENDING THE TEMPERAMENT — *Michael Travis, Washington, DC Chapter*

This class will demonstrate how to extend the tuning from the temperament. Tuning from the low bass to the high treble will be demonstrated showing the various checks used by the examiners. These areas are crucial in creating a fine tuning and the information received from this class will greatly help you develop an improved tuning. Michael Travis is a veteran instructor teaching this class for the second year.

• UNISONS AND STABILITY — *Kent Swafford, Kansas City Chapter*

Clear, precise unisons are of the utmost importance in piano tuning along with good solid stability. Kent will demonstrate and discuss approaches to creating clear solid tunings and participants will be able to practice while receiving individualized critiquing. Kent Swafford is the PACE Tuning Coordinator for this year's convention as he was for last year's. He has taught at regional and national conferences and his work on the exam committee has been well recognized. He also is a contributing editor to the PTG *Journal.*

TECHNICAL CLASSES HANDS-ON — $20 PER PERSON

The best way to learn is to jump right in and take advantage of the practical experience. Being able to rebush a flange, repair a hammer, regulate an action, or repair a string while being guided by some of the finest instructors is a satisfying educational experience. These classes, as with all the PACE classes, are non-intimidating and participants will receive helpful tips and sup-

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Southwestern Spice

green chiles with cheese or other filling inside, dipped in corn batter and deep fried); posole (a soup made of whole corn treated with lye, similar to hominy, with pork, onions and red Chile); and sopaipillas (a common dessert, something like a deep fried wheat tortilla in the shape of a balloon. You bite off a corner and put honey inside to eat one). Got all that?

There are other local specialties, but these should be enough for you to get started tasting that southwestern spice while digesting all you have learned at the Institute. See you all soon!

* During the current session of the state legislature, a state senator has introduced a bill to designate "Red or Green?" as the Official State Question. (I am not making this up. The decision on this momentous bill is pending as of this writing). In this same legislative session, the state senate passed a memorial to change the official spelling of Albuquerque to Alburquerque. So if you weren't sure how to spell it to begin with, now you have a new excuse. Isn't local government fun?

PACE Academy

Continued from Previous Page

port while gaining the benefits of hands-on experience. These classes require appropriate tools. A complete tool list will be sent to those registering through the Home Office. To register, call the Home Office at 816-753-7747 and speak with Mary or Sandy. They can tell you the availability of classes and send you a tool list. There will be a $20 surcharge to help defray costs.

• **BUSHING & PINNING SKILLS** — *Bill Spurlock, Sacramento Valley, CA Chapter*

Bill is one of PTG's most knowledgeable and innovative instructors. His PACE articles are well thought out, detailed and organized but yet easy to follow and understand. His classes are similar with this particular class demonstrating the principles of working with wool cloth for rebushing keys, action centers, and other parts. Each participant will rebush a key, a damper guide rail and a damper flange, and will then re-pin the shank and flange. Those who have attended Bill's classes know that he has an uncanny way of devising fast and efficient ways of accomplishing jobs that produce quality results. Receive individualized training from one of the masters.

• **GRAND ACTION REGULATION** — *David Vanderlip, Orange County, CA Chapter and Kathy Smith, Los Angeles, CA Chapter, John Minor, Central IL Chapter and Richard Raskob, Twin Cities, MN Chapter*

Grand Action Regulation is a popular class in great demand so this year we are running four classes devoted to hands-on grand regulation. To do this we are using two sets of instructors. David Vanderlip and Kathy Smith are experienced instructors having taught this class last year in KC and again at this year's California State Convention, of which Kathy was the Technical Institute Director. John Minor and Richard Raskob, both CTEs, have served on the exam committee and have taught at regional conventions and conferences. Most Associates lack opportunities to regulate grand pianos and consequently do not receive the necessary experience to become proficient at this aspect of the business. This class will cover complete basic grand regulation, and will provide all information necessary for an Associate preparing to take the Grand section of the PTG Technical Exam.

• **HAMMER SHANK REPAIR AND REPLACEMENT** — *Margie Williams, San Francisco, CA Chapter*

Margie is an experienced instructor, teaching this class for the second year. She has made some changes and refinements to this class, focusing on teaching a nearly foolproof method for extracting broken hammer shanks. It is designed for those situations where the shank has broken off flush with the part. This method gives neat, professional results.

• **VERTICAL PIANO REGULATION** — *Doug Neal, Western Iowa Tech*

Doug is an instructor at Western Iowa Tech and has taught at many conventions and regional conferences. He is an experienced educator who loves to teach. Participants in his class will work in pairs and will have the opportunity to do a complete regulation on the same three note action model used for the PTG Technical Exam.

• **HANDS-ON STRING REPAIR** — *Bruce Stevens, South Bay, CA Chapter*

Bruce has taught at conventions and regional conferences with this being his second year teaching this particular class at an Institute. He is a former president of the South Bay Chapter of PTG and was Director of the 1993 California State Convention. Bruce will demonstrate the tools and techniques of efficient string repairs. Using special fixtures, participants will learn and practice complete string replacement, splicing, and making hitch pin loops.

TUNING (Tutoring) HANDS-ON $20 PER SESSION

These practicums provide excellent opportunities for Associates to practice and receive constructive critiquing from qualified tutors. The tutoring is individualized for approximately two participants at each session. These practicums allow you to focus in on areas of need. Whether it be Beat Rates, Octaves, Temperament, or Unisons and Stability you need help with, there is a class for you. Also there is a Comprehensive Tuning practicum for Advanced Students. This is geared for those Associates who feel ready to take the exam but want to first be critiqued and or would like to focus in on areas of concern. There will be a $20 surcharge for these practicums.

PACE ACADEMY ADVANCED HANDS-ON — $35 PER SESSION

• **APPLIED BRIDGE CAPPING- A PRACTICAL APPROACH** — *Willis and David Snyder, Reading-Lancaster, PA Chapter*

Willis and David Snyder have been teaching at PTG Institutes for many years and are among the most respected in the piano rebuilding business. Willis is a past recipient of the Golden Hammer award and he and his son team up to teach this hands-on class. Participants will have the opportunity to fit a bridge with a cap. They will then mark, drill, notch and pin the bridge. Learn from two of the masters.

• **DOWN TO THE WIRE-GRAND DAMPERS** — *Doug Wood, Seattle, WA Chapter*

Dampers can be one of the most frustrating areas of work for piano technicians. With the proper technique and the right knowledge, damper work can be enjoyable and rewarding. Each participant will have a grand action model to work on while learning to regulate and eliminate those irritating zings, buzzes and leaks. Receive hands-on instruction from Doug Wood who is a veteran instructor, teaching this class for the second year.

• **HANDS-ON CHISEL SHARPENING** — *Kevin and Janet Leary, Cleveland, OH Chapter*

Kevin and Janet Leary are experienced instructors, teaching at conventions and regional conferences for many years. Most recently they were directors of the Ohio State Conference held last October. They will demonstrate and show how to obtain that fine edge on cutting tools while participants will have the opportunity to practice themselves. Sharp tools are necessary to produce quality work and this class will teach you the steps to create that fine edge.

• **TURNING TOUCH-UP AND REPAIRS INTO BIG DOLLARS** — *Karl Habijanac, Star Finishing*

This class will move fast with a great deal of valuable information being presented in a three-hour time slot. Put extra cash in your pocket with the tips and priceless information learned. Individuals will be able to practice and develop this skill with hands-on participation.

• **VOICING TECHNIQUES THAT WORK** — *Eric Schandall, Vancouver Island, BC Chapter*

Voicing happens to be one of the most requested classes among piano technicians. Most voicing classes present theory tips and technique with little or no hands-on application. This three-hour class will provide some theory, examine varieties of voicing, demonstrate techniques for building tone, and allow for actual hands-on experience; a valuable and informative class. Eric is an experienced instructor having taught this class at last year's Institute and more recently taught voicing at this year's Pacific Northwest Regional Conference.

An Ounce of Prevention . . .

Pre-screening is ETS's newest addition to everyone's exam arsenal. In the few short months since the Pre-Screening Manual (PSM) has been published, it has proven very useful in re-routing unprepared Associates away from RPT exam failure into more appropriate paths, such as private mentoring, PACE lessons, re-reading the literature, and more practice.

Pre-screening can be administered by any RPT who's familiar with the current exams. Every RPT who pre-screens is doing us all a big favor by increasing PTG's exam efficiency and helping Associates stay on a straight path toward exam success. If you know of an RPT with a commitment to supporting the RPT exam, you should give the RPT a PSM ASAP. This past winter ETS mailed a Pre-Screening Manual (PSM) to every CTE and as many tech examiners as we have listed (call the Home Office if you want to be on that list), and to every chapter president. Pre-Screening Manuals are available free to all PTG members from the Home Office.

ETS had a pre-screening booth at the California State Convention. We'll also have a pre-screening booth at the PTG Annual Convention in Albuquerque.

At ETS's booth in the exhibition hall in Albuquerque, all Associates (as well as RPTs and examiners) are welcome to stop by and chat. We'd be happy to explain exam procedures and answer your questions. Our primary goal will be to try to gain a glimmer about an Associate's exam readiness. If his/her exam readiness is not evident, we'll probably suggest an in-depth pre-screening back home. In that case, after explaining that the PSM was written for RPTs, we'll hand out a PSM to the Associate and suggest he/she find an RPT from their home chapter who's willing to pre-screen him/her, and to give the PSM to that RPT.

EXAMINERS: *We need a few volunteers for the ETS booth in Albuquerque. You're especially needed during class break times, because most of the booth activity occurs then. This means you won't have to give up any class times. Call Mitch Kiel at (360) 264-5112 if you're interested. It's more fun than you think.*

Pre-screening has been around long enough to have generated some interesting anecdotes. Here are a few sent in to ETS from PTG's far-flung membership, including one from a newly minted RPT.

A CTE from the East Coast writes:

A few months ago I pre-screened an Associate at a piano in my shop. I started by asking him to tune A4 to his fork. Immediately, we discovered his fork wasn't properly calibrated. After taking care of that, he proceeded to set A4. Within two minutes I could tell he wasn't ready for the RPT exam, but I didn't say anything. After 10 minutes and three tries, he finally set an A that would pass the exam (within three cents). Then on to the temperament. After 20 hesitant minutes, he'd tuned only five notes. He looked up at me and said, "I guess I'm not ready."

I'm glad I didn't "pronounce sentence" right away. Waiting for the Associate to come to his own conclusion was much more motivating and empowering. He's now attending our chapter's PACE lessons, taking private tuning tutoring, practicing hard and making good progress.

Pre-screening has other more subtle benefits, like building trust and preventing freeway panic.

Here's a story from a CTE who lives in a big city in the Midwest:

Six months ago I was phone pre-screening an Associate from another chapter, a person I'd never met. In three weeks he'd be traveling to my chapter to attempt an aural retake of the electronic tuning exam. I asked him about his first exam a year before. He first admitted his aural scores were very low, then told me about an irritating last-minute scheduling miscommunication that canceled an aural re-take exam one month ago. He finished his story with aspersions about an examiner's SAT competence. I made no comment but just listened.

We talked about his upcoming exam. I explained procedures and time limits for the aural portion of the electronic tuning exam. As much as was possible over the phone, we explored some of his tuning strengths and weaknesses. I gave him some tips, referred him to the various PTG publications (he owned the Tuning Source Book but had not read it!), and recommended he contact a local RPT right away for an in-person pre-screening.

After hanging up the phone, I knew I needed to know more. I called his chapter's lead examiner, who filled in some details. The actual events are irrelevant, but I came to conclude this Associate deserved extra care and attention.

I phoned him again three days before exam day. I repeated some specific tuning tips we had previously discussed. Then I gave him very detailed driving directions to the exam site. This made him feel especially cared for and, since the freeway off-ramps are poorly marked, prevented him from getting lost on exam day, which would surely have ruined his remaining composure.

On exam day, the Associate arrived relaxed and an hour early. He tuned for the allotted time, then watched as we examiners measured his tuning into the SAT. His score was calculated, and his midrange score was 79. One examiner mistakenly announced to the Associate that he had passed because minimum passing score was 70. Quickly, the other examiners hastily corrected this error — passing score is 80, not 70, and he had not passed. Proceeding carefully, we aurally verified every note twice, and spent extra time demonstrating to the examinee why each point was deducted. The result didn't change — he missed passing by only one point.

Throughout this (understandably) traumatic episode, the Associate surprised me by staying remarkably calm, appreciative, and good-natured (more than I would have been). He said he felt

Concluded on Next Page

EXAMINATIONS & TEST STANDARDS COMMITTEE

Movin' On Up!

Mitch Kiel, RPT

Continued from Previous Page

good because his aural scores had improved tremendously from last year's exam, and armed with what we'd taught him that day, he was sure he'd pass next time. He thanked us all for the extra time and effort we'd spent with him. I was so impressed with his reaction that I called him a week later to see if his feelings had soured. Happily, no change — he still expressed the same positive optimism.

I believe this Associate's attitude was due in large part to the trust he'd gained in me as a result of our phone pre-screenings. During those conversations, he learned I was on his side, I knew my job, and that I cared about being fair. I believe this trust prevented a big blow-up that could have caused hard feelings or, at worst, alienated this Associate enough to never take the exam again.

This was a powerful lesson. From now on, I'm going to make sure every Associate, especially those from outside chapters, gets a phone call before the exam to scope out any hidden agendas or undiscovered sore spots.

The moral of this story? Pre-screening can do more than find gaps in an Associate's exam skills. It can also help establish a relationship between examiner and examinee that helps decrease exam trauma and smooth over the inevitable rough spots.

And finally, a happy tale from Ryan Sowers, RPT, of the Puget Sound chapter:

After two and a half years as an Associate, I finally passed my last exam and became an RPT this past February.

As someone who has recently benefited from pre-screening, I maintain that the question all Associates should be asking themselves is not "Why pre-screen?" but rather "Why not pre-screen?"

Whether you've worked on 100 pianos or 1,000, I can't think of one reason why anyone planning on challenging the RPT exams would pass up the opportunity of getting pre-screened. For the less experienced technician, pre-screening is a powerful learning tool that can give a quantifiable analysis of your exam readiness. For the more seasoned Associate, it reveals test procedures and demystifies the scoring process.

My own pre-screening experience was invaluable. I was fortunate to have a pre-screener who had recently taken the tuning exam for his CTE reclassification. In my opinion, having a pre-screener who's familiar with the *current* exam is essential. It's better to pre-screen with a less experienced RPT who has the current exam standards fresh in memory than to pre-screen with someone with 40 years of experience but has no knowledge of the newest RPT exams.

Mock exams and the SAT

An important pre-screening asset is the Sanderson Accu-Tuner. I found it very useful in analyzing my octave tuning, especially at the extremes of the keyboard. It also helped me learn to hear the scoring tolerances for each section of the exam.

My pre-screener used the SAT during several mock tuning exams. This may have been the most valuable part of my pre-screening experience. It was like the red dye my dentist uses to reveal areas my toothbrush hasn't been reaching! It made my practicing more efficient by showing me which of my tuning skills needed the most refinement.

I'd like to emphasize this point. Prior to my pre-screening experience, I was convinced that low bass and high treble would give me the most trouble. Instead, my mock exam revealed that temperament and midrange were my weakest areas. (*Ed. This is a common tendency.*) This fore-knowledge allowed me to concentrate my practice on those specific areas, instead of wasting valuable time practicing skills that didn't need as much improvement. Interestingly, even with all my practicing, my lowest exam scores were in temperament and midrange. This showed me that mock exam was quite accurate in predicting my real exam results.

Time Trials

To pass my RPT exam, I knew it wouldn't be enough to be able to tune well — I had to be able to do it in the allotted hour and a half.

I learned from my pre-screening experience and by reading the many PTG publications that time constraints are a common stumbling block. I found it very useful to practice by giving myself even less time than allowed on the actual test. Playing "beat the clock" raised my efficiency immensely. Once I knew how fast I could go, I was able to accurately budget my exam time.

I can also tell you from personal experience that the Vertical Regulation section of the technical exam is the most difficult section to complete on time. I didn't underestimate it twice!

Don't worry, be happy!

For me and many other Associates, test anxiety can be a major road block on the RPT highway. I believe pre-screening helped me to control the nervousness that set in when the doors closed and the clock started ticking.

Much of this fear comes from not knowing what to expect. It was a pleasant surprise to discover some of my fears were unwarranted. "You mean I only have to tune 85 single strings in an hour and a half? That's not so bad!"

Of course, there is no substitute for practice, practice, and more practice. When it comes to reducing exam stress, false confidence is as dangerous as lack of skill.

Thanks to PTG, good mentoring, pre-screening, and hard work, I had the delicious experience of writing a check for new business cards that now include the RPT logo. It's money I hope you soon enjoy spending, too.

PTG Foundation
Mission Statement

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

Foundation Spotlight

Scott Scholarship Winner

The winner of the PTG Foundation's annual Continuing Education Scholarship for a Nationally Certified Member of Music Teachers National Association is Frances Scott, NCTM, of Hayward, Calif.

The award was announced by PTG/PTGF Executive Director Larry Goldsmith at MTNA's annual convention banquet in Albuquerque, N.M., March 29.

"It is a real honor to accept this scholarship," Scott said. "I am personally very grateful for your support. I am also happy that our two prestigious professional organizations, the Piano Technicians Guild and Music Teachers National Association, can cooperatively nurture the idea of academic and professional excellence by supporting those who are continuing their education." Scott will use the $750 scholarship to pursue a master's degree program at the University of Southern California.

Frances Scott

The PTG Foundation Scholarship was instituted in the early '80s to recognize Nationally Certified members of MTNA and to promote music by encouraging them to continue their professional educations. In a unique cooperative effort by the two organizations, MTNA's Certification Committee solicits applicants for the award through MTNA's magazine, *The American Music Teacher.* The committee then evaluates the applications and the two organizations jointly announce the award at MTNA's annual convention.

Bayless Featured Performer at Steinway PTG Concert

This year's featured performer at the Steinway concert following the PTG Banquet on July 22, in Albuquerque, N.M., will be John Bayless.

John Bayless

Mr. Bayless made his recording debut in 1985 with a Pro Arte album entitled "Happy Birthday Bach," created in honor of the Bach Tricentennial celebration. Two subsequent releases, "Bach Meets the Beatles" and "Bach on Abbey Road," contained his improvisations on Beatles melodies, and were phenomenally well received, the former selected as one of the top ten classical crossover recording of the 1980s by *Billboard* magazine. In 1988, Mr. Bayless released "Greetings from John Bayless" a remarkable collection of improvisations based on the songs of Bruce Springsteen. As part of his new contract with Angel Records, he has released two CD's, "Bayless Meets Bernstein—West Side Story Concert Variations," based on Leonard Bernstein's timeless score, and "The Puccini Album - Arias for Piano." Within five weeks of release, the Puccini recording soared to Number One on *Billboard* magazine's classical crossover chart.

Mr. Bayless makes his Wigmore Hall debut this December in a performance as featured guest soloist in their annual Christmas concert, appearing on the same program with the Philharmonic Orchestra and West Minster Cathedral Choir. He also makes his concerto debut with the newly composed *West Side Story Fantasia* for solo piano and orchestra with the Colorado Symphony in the fall of 1994, and performs forty-five recitals across the United States.

John Bayless' extensive performance background includes appearances at Carnegie Hall, the "Mostly Mozart" festival at Avery Fisher Hall, special programs with the New York Philharmonic and the Cleveland Orchestra. He has appeared with orchestras throughout the United States, performing classical and improvisational repertoire. In addition, Mr. Bayless has made two tours of Japan, performed at the Budapest Spring Festival and was Artist-In-Resident for the London Symphony Orchestra's Leonard Bernstein Festival, performing at a gala for Queen Elizabeth. He has conducted Master Classes in Improvisation at the Juilliard School, Kent State University and the Royal Academy of Music in London.

Proclaimed by *The New York Times* as "An evocative pianist with a lovely piano sound and considerable personal pizazz," John Bayless combines versatility, mastery of classical music and extraordinary technical ability. His virtuosity is highlighted by his extraordinary gift in the lost art of improvisation.

Born and raised in Texas, Mr. Bayless won a scholarship to the Aspen School of Music at 15, and two years later moved to New York to study at the prestigious Juilliard School of Music with Josef Raieff and Adele Marcus. In 1982, Mr. Bayless was invited to participate as composer in New York University's Masters Degree Musical Theatre Program where he studied with Leonard Bernstein, Betty Comden and Adolph Green.

His improvisational talents provided a natural progression to composing. He has received commissions from the Newport Music Festival, University of Maryland International Piano Competition, and composed and performed the score for the Metropolitan Museum of Art's television presentation of the Lila Acheson Wallace Exhibition of 20th Century American Art.

Associates Make The Grade

From Massachusetts, to Georgia, to Ohio, former Associates have taken their skills to the next level. This month the Piano Technicians Guild welcomes six new members who have earned their Registered Piano Technician ratings.

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JOSEPH TRAPPA
IDAHO WEST

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EVENTS CALENDAR

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

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

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

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

July 19 - 23
PTG 38th ANNUAL CONVENTION & TECHNICAL INSTITUTE
Hyatt Regency / Albuquerque, NM
Contact: PTG Home Office
816-753-7747

September 30
POMONA VALLEY ANNUAL SEMINAR
Location: Unknown at this time
Contact: John Voss
2616 Mill Creek Rd.
Mentone, CA 92359
909-794-1559

October 5 - 8
NEW YORK STATE—NYSCON
Howard Johnson Plaza Hotel
Oakville, ON CANADA
Contact: John Lillico
605-200 Queen Mary Drive
Oakville, ON L6K 3L1
800-469-7266

October 12-16
TEXAS STATE ASSOCIATION SEMINAR
Clarion Hotel
Richardson, Texas
Contact: Thom Tomko
114 S. Greenstone Lane
Duncanville, TX 75116
214-780-0143

October 19-21
CENTRAL EAST REGIONAL SEMINAR
Mariott Hotel
Brookfield, WI
Contact: Dave Hulbert
4760 N. 158th St.
Brookfield, WI 53005
414-781-6343

New Members In April

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787 AUSTIN, TX

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RACINE, WI 53405

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SKOKIE, IL 60076

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WALDEMAR S. SUNDET
2161 LARRY DRIVE, NE
CEDAR RAPIDS, IA 52402

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945 GOLDEN GATE, CA

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ASHLAND, OR 97520

AUXILIARY EXCHANGE

Dedicated To Auxiliary News and Interests

Music Moves Johnson

From the earliest memories of my life ring the sounds of Southern Gospel Music. Granddaddy and his brothers sang in a gospel quartet that traveled all over the south plains. They also loved the cowboy ballads, hymns of the church and popular World War II songs.

The piano has played a very instrumental part in my childhood development. Born July 2, 1950, in Lubbock, Texas, the birthplace of Buddy Holly, I was even born into a decade when music began to rock 'n roll.

During my school years, I played the violin and sang in junior high and high school choirs. After graduating from Montery High School in 1968, I spent two years at Texas Tech University. Naturally, I learned to sing and appreciate many styles of music while I worked in a hospital as a ward clerk, and in a gift shop making floral arrangements.

During the summer of 1970, I transferred to Southern Nazarene University in Oklahoma City. Of course, my memories of singing in the chorale are dear.

Graduation in 1972 from SNU, with a bachelors of arts and science in education, led to my first teaching job in Morton, Texas. While teaching in Morton, the opportunity to go to San Diego to the Institute for Creation Research, for the purpose of writing a handbook for teachers became available. This experience truly served as a time of learning and growing academically.

After teaching fourth-grade for six years, I moved back to Lubbock where I have been teaching English for 16 years. During these past years, I have participated in the Lubbock Civic Chorale, sang in the First Baptist Church Choir, taught Sunday school classes for single adults, and went on a cruise to Bermuda. Then, I met Bob...

Music

For the common things of every day
God gave man speech in the common way
For the deeper things men think and feel
God gave poets words to reveal...
But for the heights and depths no tongue can reach
God gave man music, the soul's own speech.

Nine years ago one of my friends from high school asked me if I'd like to go out with her brother-in-law, who had recently been widowed. I asked if he had kids. She said he had four! I said, "No! Thanks!"

She said, "Debbie, he loves music!"

I had no choice but to go at least once.

We celebrated our eighth anniversary in June. (*Editor's Note: The publication of Debbie Johnson's biography was delayed. She and her husband, Bob, will be celebrating their ninth anniversary this month.*)

I went from being single, to being married and the mother of three teenagers and an 8-year-old, adding two son-in-laws and one daughter-in-law, to having our first grandchild. That's what I call fast working!

Bob and I have been attending state and annual PTG conventions for several years. I joined the PTGA four years ago to meet new friends when I attended these events.

I had absolutely no intentions of getting involved. Two years ago Bob became the South Central Regional Vice President. We became involved!

Bob runs our piano business, and I am still teaching English while trying to run a floral design business in my spare time. Right!

We both sing in the church choir, teach a Sunday school class, and are both committed to the advancement of PTG and the promotion and advancement of music.

I look forward to serving as you Vice President of PTGA. God bless each one of you until we meet again!

— Debbie Johnson

President's Message

By L. Paul Cook

Next month is it! Our annual convention will convene in Albuquerque. "More Fun For Everyone" has been my motto since day one and continues to be the driving force behind what I do in the Auxiliary. This year the agenda is designed to give you more bang for your buck! More meals, better tours, quality education and more free time.

Our Council session this year will again be split into two sessions, to give members the opportunity to discuss the issues. The first Council session will be after our welcoming session and continental breakfast in the morning. The second session will convene after the international lunch, recital and tea time. Each chapter should have a delegate and an alternate chosen for this Council session. If you are in a region where there are no chapters, your peers from the region may ask you to represent them at the convention. It is at the Council session that the decisions for the upcoming year are made. Your participation is welcome and necessary.

Friday's tour will take us through the Turquoise Trail, stopping at an artist colony on the way to Santa Fe where we will spend the day. After a short walking tour, we will have lunch next to the Santa Fe Plaza, serenaded by Mariachis, and leave the afternoon free for your shopping and exploring pleasures. Saturday we will have our Installation Breakfast, making the rest of the day optional for you to either attend some of the many fine classes that we have arranged or take off for the day to explore Albuquerque and the vicinity on your own — guilt free. This schedule has been designed to give you the flexibility to do what you want to do.

If you have specific items you would like to have brought up at the Council session, please mail or fax them to me. My fax number at home is (818) 703-1781. If you have not yet made your reservations for Albuquerque, do so now, time is very short. This is going to be one of the best international conventions of this century. In case you did not know, the IAPBT (International Association of Piano Builders and Technicians) will also be meeting in Albuquerque, and they will have their banquet Sunday night. You may want to plan to stay a little longer this year to be with all of our international friends from Europe, Asia and around the world. This truly will be a special, heartwarming time for all of us. I look forward to being with all of you again next month.

Proposals for Change

Proposed Change to the Bylaws

The board recommends that the bylaws be changed to set a time limit for the position of Immediate-Past President to one year. The duties of the immediate past president are to turn over all previous records to the newly elected president, and assist the president as requested in any and all matters pertaining to the Auxiliary in a timely and cooperative fashion.

Proposed Change to the Standing Rules

The Executive Board hereby makes the following recommendations to change the standing rules pertaining to the dues paid each year by members — to raise dues from $10 to $15 annually. This item will be brought up and voted on at the Council session in Albuquerque.

— L. Paul Cook

CLASSIFIEDS

Classified Advertising rates are 35 cents per word with a $7.50 minimum. Full payment must accompany each insertion request.

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

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

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

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VIDEOS

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DISPLAY AD INDEX

PianoDiscussions™

June 1995

News From The World of PianoDisc

PianoCD

We've got a hit on our hands!

After a smashing reception at Winter NAMM, and again at MusikMesse, the product everyone has been waiting for is ready for shipment. PianoCD, the newest development in player technology from PianoDisc, has hit the pavement running. "Sales are brisk, which really comes as no surprise after the enthusiasm dealers expressed," says Tom Lagomarsino, Vice President/Marketing. "We're pleased with the response."

PianoCD uses a standard compact disc as the recording medium. The data that drives the piano is stored in one channel of a CD, while accompanying music is recorded on the other channel. The PianoCD then reconstitutes the stereo separation within the control box. PianoCD is the only CD-based system that can do this.

Other appealing features unique to PianoCD include full individual note expression, and advanced and synchronized volume control.

The PianoCD music library has been launched with 60 exciting CDs which sample very musical genre and include recordings by Grammy winner Peter Nero and country music legend Floyd Cramer.

For more information about PianoCD, call 1-800-566-DISC.

PianoDisc Installation Training 1995

• June	20-24	• Sept.	12-16
• July	None	• Oct.	17-21
• Aug.	8-12	• Nov./Dec.	28-2

Continuing Education Series 1995

• June 15-16 • August 3-4

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

PianoDisc

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Sacramento, CA 95834
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Fax: (916) 567-1941

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

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

Liner Notes

Hyman sizzles on upcoming release

Ask any number of jazz pianists whom they most admire among their peers, and the name Dick Hyman is sure to come up again and again. This megatalent has a range the equal of anyone who has ever played. He can emulate the style of all of the greatest jazz artists (although he modestly insists that no one can completely match the originals), as well as play in his own inimitable style. He is a composer and arranger of many movie scores, including most of Woody Allen's films. His performance schedule would stagger all but the hardiest souls. And yet, this giant of jazz found time to record a disc for us, and even more astounding, to write two songs for it. We're especially thrilled with "PianoDisc Boogie" for obvious reasons.

If this sounds rapturous, it's because we've heard his recording. The words sizzling and smoking come to mind, because this thing is hot. "Dick Hyman Plays Boogie Woogie and the Blues" will be a must in every PianoDisc owner's personal library. A page in the History of Jazz, we think. And it points out one of the most important benefits of PianoDisc: the preservation of the performances of today's greatest pianists in the only medium that can truly reproduce them.

UPDATE

PianoDisc recording artist Earl Rose has just received his seventh Emmy nomination. This one is for his song, "Every Beat Of My Heart." Congratulations, Earl!

Technicians are talking

"There is only one thing in the world worse than being talked about, and that is not being talked about." So said Oscar Wilde, and we agree. To find out what they're saying, we decided to survey technicians who recently attended one of our training seminars. In answer to the question, "Did the class meet your expectations?", we got some interesting responses.

"Yes. It actually surpassed my expectations in that the teaching and organization and the class format [were] succinct, yet flexible enough to not only handle necessary training but to pay attention to questions that deserved extra care in handling." — John Leo Cavanaugh, Hammell Music, Inc., Ann Arbor, Michigan.

"It was really more than I expected as far as [the] amount of information presented and the hospitality of the company. I was pleasantly surprised." — Matthew J. Doudt, Meridian Music, Indianapolis, Indiana.

Next we asked, "What do you consider the most valuable information you received from the class?"

"A great overview about what is already possible and how it is achieved with the PianoDisc." —Hans Sander, Conrad of Corydon, Louisville, Kentucky.

"Hints and ideas for differing situations that we may encounter ... I actually learned a lot from other participants as well." — Matthew Doudt.

This exemplifies the generosity and good will we have witnessed time and again in our classes. Technicians are more than willing to share experiences and information with their peers, proof of a real brotherhood among them. Which brings us to our final question, "Would you recommend this class to other technicians?"

"Yes. One needs to know and understand the total system." — Gerald D. Hammack, Sander Piano Co., Louisville, Kentucky.

"Having had to learn to do other system installations without training, I found this seminar most valuable. I would always recommend this." — Max Kline, Cunningham Piano, Philadelphia, Pennsylvania.

Comments were duly noted and appreciated. One quote we found most satisfying was from John Leo Cavanaugh. And, really, it's what we hope for from all of our technicians.

"I'll do my best for you guys."

YAMAHA®

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WE LOOK FORWARD TO SEEING YOU AT

Wednesday, July 19

Exhibit Hall — *See our new acoustic pianos, new Disklavier pianos and new Silent Series Pianos*

Thursday, July 20

Exhibit Hall — *See our new acoustic pianos, new Disklavier pianos and new Silent Series Pianos*
Secrets of Performance Piano Preparation ..... Class Periods 3 & 4 — San Miguel room

Friday, July 21

Exhibit Hall — *See our new acoustic pianos, new Disklavier pianos and new Silent Series Pianos*

As our way of saying THANK YOU FOR A GREAT YEAR,
we'd like to WELCOME *you to our*
YAMAHA RECEPTION *featuring the famous A440 band (bring your horn!)* 9:00PM

Saturday, July 22

Exhibit Hall — *See our new acoustic pianos, new Disklavier pianos and new Silent Series Pianos*
Disklavier Master Class .....Class Period 2 — San Miguel room
Secrets of Performance Piano Preparation ..... Class Periods 3 & 4 — San Miguel room

Sunday, July 23

Exhibit Hall — *See our new acoustic pianos, new Disklavier pianos and new Silent Series Pianos*

Tech Gazette will resume in July

SEE YOU IN Albuquerque