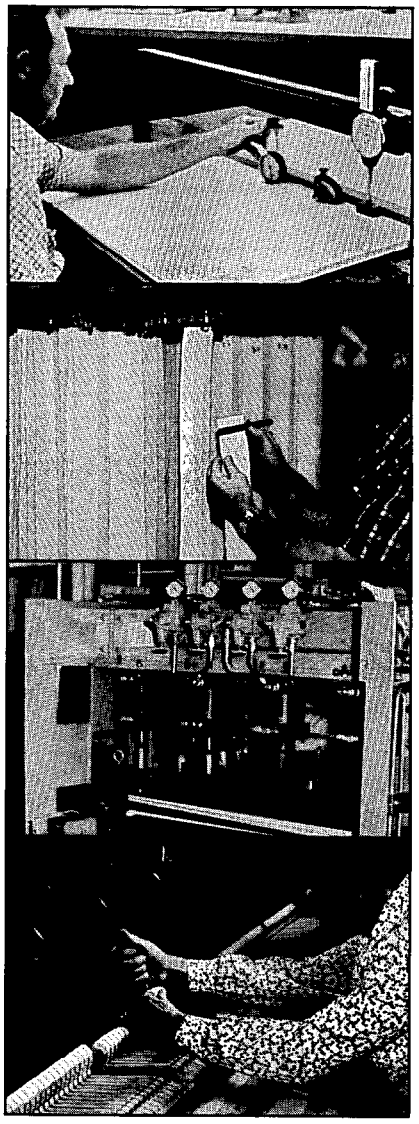
PIANO TECHNICIANS
Journal
NOVEMBER 1989

The Baldwin Piano...
You can see why it sounds better

We firmly believe that hammer making is one of the most critical of all piano building processes. That's why we spend significant extra dollars in materials and time in the manufacture of all of our own hammers for both vertical and grand pianos.

Our special concern starts with materials. We pay a premium price for 100% virgin wool felt made to our standards for weight, thickness, taper, size and hardness. To guarantee that all hammer felt meets our standards, we subject every sheet we receive to stringent testing before accepting it for production.



The same extra concern continues in our exclusive construction procedures. First felt is treated in our moisture-conditioning chamber until it reaches a prescribed moisture content. Then the felt is placed in a special hammer press, designed and built by our engineers. This press has preset closing pressure and automatic cycling for consistency. We use a special thermosetting glue to secure the felt to the moldings. And we check throughout the process to insure that the proper felt hardness is retained.

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For more information contact Kent Webb, Technical Service Manager; for parts contact Linda Gann, Baldwin Piano & Organ Company, Highway 63 South, Trumann, AR 72472 — Phone: (501) 483-6116

Schaff

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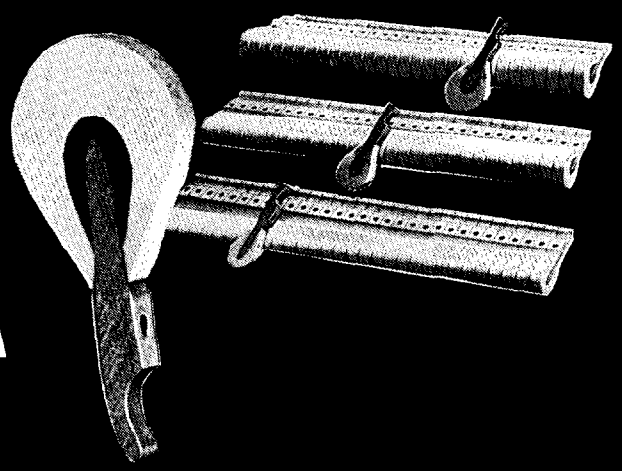

Due to the increase in popularity of Japanese-made hammers the last few years, Schaff has engaged with the Imadegawa Company in Japan to be a nationwide distributor. We will maintain a large stocking inventory which together with our years of replacement hammer expertise, will enable us to provide the finest hammer duplication service in the U.S.A.

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GRAND HAMMERS—A set consists of 30 bass and 65 treble hammers. All bass section hammers are drilled at a 9° angle. Tenor section has 8 hammers at 9°, 8 hammers at 6°, 10 hammers at 2° and the balance of tenor and treble at 0°. A .204" diameter drill is used for the bore hole. All hammer tails are shaped and tapered at no additional cost. On a stock basis grand hammers are available in the following striking distances (as measured at the treble end) of 1⅞", 2" and 2⅛". Also 12 Lb., 14 Lb., and 16 Lb. weights of felt available. Hammers come stapled throughout and can be provided unbored. Except for Steinway style, all grand hammers are made of birch wood mouldings and have the option of being reinforced.

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PIANO TECHNICIANS
Journal

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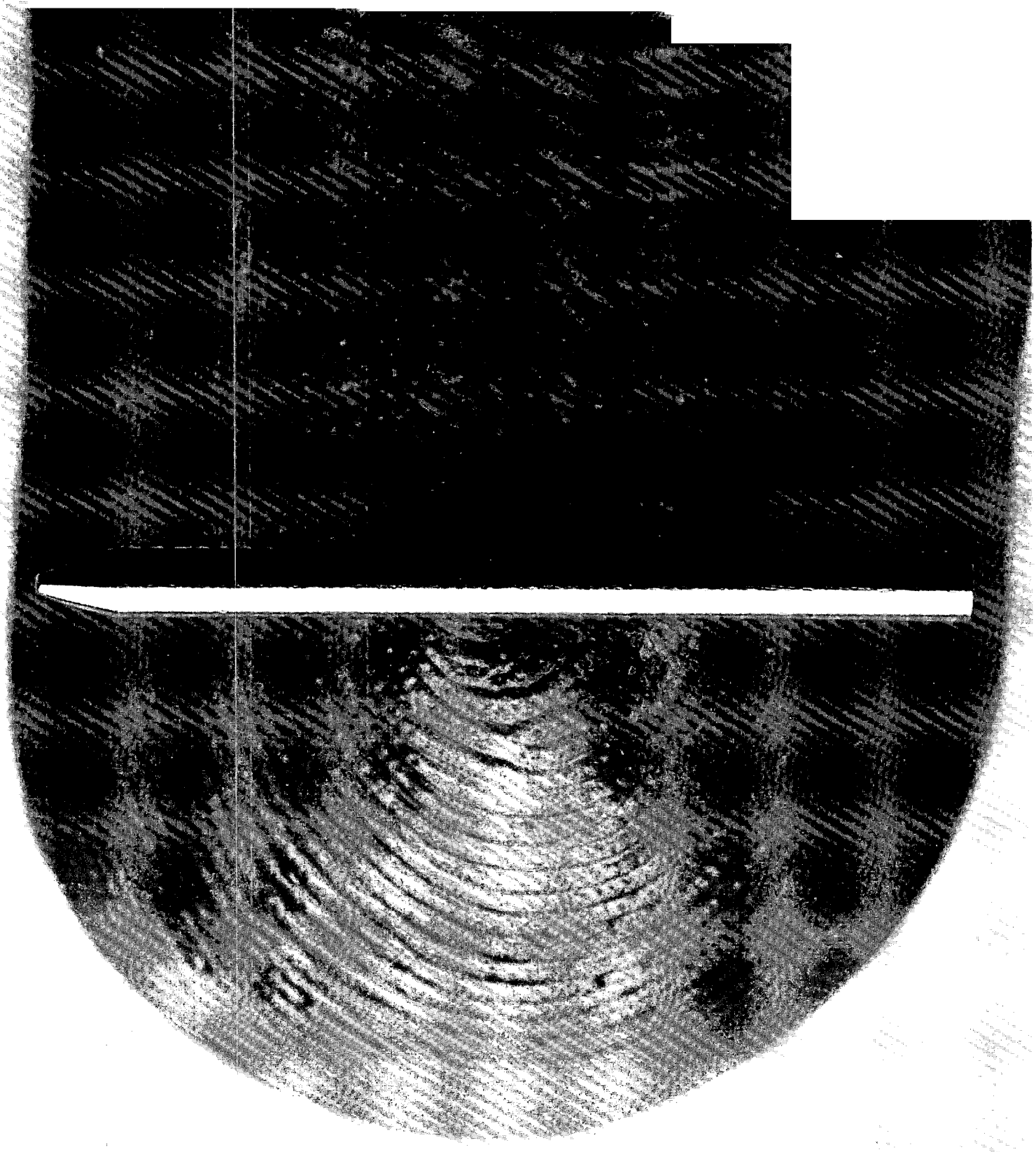

At Young Chang, there's nothing too small to improve.

No one notices a center pin until there is a problem.

Most manufacturers make them out of brass. Eventually they tarnish, and can cause verdigris to form. But it usually happens after the piano has left the sales floor. And often after the warranty has expired.

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President's Message

Behind The Scenes

Ronald L. Berry, RTT
President

There are many different people and factors that make PTG work. Some of these are obvious. Chapter officers are in the forefront of local activity and the Home Office produces the *Journal* among all its other duties. One of the not-so-obvious parts of PTG is its committees. In many organizations, committees are merely titles given with little or no work involved. But in PTG we have many hard-working committees and have had them for many years.

One of the most active committees we have is the Examinations and Test Standards (ETS) Committee. Testing has always been an important part of our organization and is the necessary counterpart of having the RTT category of membership. Over the past 15 years this committee has been responsible for developing a new tuning exam, training personnel to administer it, developing two technical exams which have subsequently been fused into one, and providing exams at seminars and conventions. During my two years as chairman of this committee, I found that the work load was heavier than any office in PTG other than President. This committee has a steady diet of management of CTE's and their training and recertification, along with the training of technical examiners. It seems that this committee has always had some major project to do along with its regular administrative jobs. These have ranged from writing exam manuals, developing the recertification exam, developing written tests, developing countless forms to be used during the exam process, and currently studying the feasibility of making the aural verification a graded part of the test. Every time changes in membership structure or requirements have happened, most of the exam forms have needed to be revised. This alone is a job big enough to consume most committees energies. Under the guidance of Wayne Matley, with Michael Travis and Bill Spurlock as subcommittee chairmen, we have had a committee that has worked hard. Wayne and Michael have been involved with the ETS committee since the early days of the new tuning exam. Keeping up that level of activity for so many years is real dedication.

Another active committee is the Chapter Management and Achievement Committee (CMAC). This committee has been involved with collecting information from chapters not only for awards, but so that the information can be used to help other chapters operate more efficiently and have better technical programs. Their recent program, along with all the regional administration work, is a video contest encouraging chapters to make a video of proper procedure for meetings which can be used as a guide by chapter officers. The chapter management handbook has been recently revised by the CMAC. I found this book quite helpful during my time as chapter president. Under the leadership of Marshall Hawkins and Dale Heikkinen in the past, this committee headed by Webb Phillips is always hard at work. This committee, like ETS has a representative for each region to keep track of activities within the region. This approach has been successful in those committees and we have applied this approach to other committees.

Bylaws revision is an important function in setting the direction that PTG goes. The Bylaws Committee serves to help chapters work out wording for what they want to accomplish, and integrates proposals from various sources on the same subject. The committee is made up of people who are in the know of PTG operations so they can help predict the results of the proposed changes. Based on this they make recommendations to Council for adoption or rejection of the proposals. Sharla Kistler, with her ever-watchful eye for detail, keeps everything in order in a superb manner.

The College and University Technicians Committee was almost deleted because of inactivity until then President Marshall Hawkins asked a group of university technicians to get together and elect their own chairman. Tom McNeil was their pick, and Tom hit the road running. This committee has its own newsletter, and is identifying who the technicians are who do university work, whether PTG members or not. They have just completed a written plan for proposed maintenance of an institutional piano, which can be presented to university administrators to show what the Guild feels is proper maintenance.

The Teachers Relations Committee is another important one. This committee has been set up with regional representatives. They will attempt to see that PTG is represented at all the various meetings of piano teachers within their region. The film developed by the Cincinnati Chapter is a useful tool for presentations to teachers. This committee has developed a handbook on how to give presentations to teachers. This helps them train others to give their

own local programs. This committee is chaired by David Rostkoski. He is typical of the members in his understanding of the teaching profession and how they deal with it.

The Trade Relations Committee has long made sure that PTG was present at the NAMM (National Associations of Music Merchandisers) show to talk with dealers and manufacturers. Brian Mott chairs this committee, and being from Chicago, Brian has been around NAMM shows for some time. PTG's involvement at NAMM is often a place where plans can be made for receptions that manufacturers give at our convention, where we can pick up new exhibitors for our convention, and where dealers can be introduced to the Guild.

The Economic Affairs Committee has brought you regular *Journal* articles on subjects that affect economically rather than technically. This side of our business is often overlooked and is gaining increasing importance. Carl Root chairs this committee and has been instrumental in developing a questionnaire for members. This questionnaire will give us a good picture of who is in this business and how we operate our business. Look for a future article discussing this questionnaire and plans to distribute it.

Another hard working committee is the Internal Code of Ethics Committee. This committee headed by Colette Collier has been given the task of rewriting the Disciplinary Code, which has long needed rewriting. With Colette's detailed approach they should have a new set of codes ready for approval at the next Council Meeting.

The Continuing Education Committee worked last year to find out how to set up a Continuing Education Incentive Program linked with the national CEU (Continuing Education Unit) system. This year Ellen Sewell will chair this committee to work out the details of how such a plan can be administered.

This year, Council made a special committee to work out a bylaws proposal to create a Registered Technician category of membership which would be for those who are competent in technical work but do not tune as part of their business. This committee is headed by Mitch Kiel.

There are many other committees dealing with awards, chapter newsletters, chapter programs, Council minutes, international relations, members rights, membership promotion, nominating, and visually impaired. Committees are an important part of our organization. They tackle problems which are complex and would be impossible for the Council to deal with. They also get on and do the work through the year that is necessary to keep the Guild's projects working. My thanks to those who have agreed to serve on committees to make the Guild work better for us. ≡

Industry News

Dampp-Chaser Introduces New Product Line

Dampp-Chaser Electronics Corporation, manufacturer of humidity control equipment called Piano Life Saver Systems for pianos and organs, has announced their recent introduction of a number of new products and product improvements, according to Steve Smith, President.

The Piano Life Saver Systems, with models for vertical and grand pianos, are designed to stabilize Relative Humidity in any piano at 42% which is ideal for maintaining its pitch and extending its life by eliminating swelling and shrinking of the piano's wood parts (85% of total). The system consists of an electronic control, called a Humidistat; one ore more dehumidifier rods, called Dampp-Chasers; and a humidifier, which consists of a reservoir with wicks, a heating rod and a baffle to distribute warm, moist air around the piano when needed; an Easy-Fill System for putting water into the reservoir; and a Low Water Warning Light, which shows the piano owner when the reservoir needs water. These systems are generally installed by piano technicians, tuners and dealers, and are widely used in privately owned pianos as well as by churches, schools and other institutions.

The new products recently introduced, according to Smith, include:

1. Low Water Warning Light (LWL-2B) that not only flashes for increased visability, but "beeps", as an aid for the visually impaired, as well as for institutional maintenance;
2. New Short Tank (GHN-1ST) for grand pianos such as the Steinway B which lacks sufficient space between the support braces to permit out-of-sight installation of a full sized grand tank;
3. New stripped-down, full-size Grand Tank (GHM) with easy-fill watering tube, but no Low Water Warning Light, for use as a second reservoir in larger pianos, such as the Steinway D, or those exposed to very dry conditions.

Smith noted the product improvement includes new packaging for the Piano Life Saver Systems that make it possible for technicians to order a system with as many as three Dampp-Chaser rods, since many installations, especially in grands, require more than one rod for optimum stability.

Also noted, the brackets for hanging the grand humidifier tanks have been converted to stainless steel, to eliminate rusting from moisture in the tank.

All these new products and features are now available from piano supply distributors who sell Dampp-Chasers. As in the past, these new products and features are based on requests or suggestions from piano technicians who install Dampp-Chaser equipment, and appreciate its substantial contribution to client satisfaction with their work and the performance of their pianos. ≡

From The Home Office

What's It Worth?

Larry Goldsmith
Executive Director

For those of us who work with the Guild's finances, this is a time of evaluation and examination. For one thing, early drafts of the Guild's budget for 1991 are being prepared for this winter's Board meeting and the Council meeting next summer. For another, the annual process of collecting membership dues has begun.

Inevitably, everyone who receives an invoice for his or her 1990 dues will stop to weigh, however briefly, the cost of membership against the benefits received. This is as it should be. In these times of increasing economic pressures, no organization can reasonably expect that its constituents will automatically renew their memberships.

Obviously, we hope that each one of our more than 3,700 members will opt to continue his or her participation for another year. The organization operates efficiently, as shown by the fact that RTT dues have not increased since 1981. Very few things have not increased in price since then — I hope your own fees have kept pace with the economy.

There are tangible benefits such as the *Journal*, our other publications, conventions, seminars, the insurance programs, and our affinity credit card program. There are also intangible benefits, such as the opportunity to meet and work with the leading technicians in your area and around the country, and the opportunity to help set the standards for your profession.

When you receive your membership dues invoice, you should view it not as just another bill to be tossed onto the pile but as an invitation. When you're evaluating the benefits of your membership against its cost, you should also take a moment to consider what you want and expect from the organization. As a franchised member of the Guild, you have as much power as anyone else to make it into the type of organization you want.

Obviously, not everything is possible — the laws of physics and finance can be pretty solid barriers. For example, the current state of the insurance industry makes it impossible to offer the kind of coverage we want for the price we want to pay — the annual cost of our member life insurance program alone has increased more than $10,000 (more than a third) in the past five years, and it seems obvious that that trend will continue.

With those limitations, however, I invite you to help form the Guild into a more effective organization. Communicate with your chapter, your regional vice president, the committees which are responsible for various areas of the Guild's operations, and with the Home Office. Contribute your ideas, your thoughts and your wishes.

Everyone will benefit — you most of all.

Economic Affairs

A Handcrafted Wooden Toolbox

Carl Root
Economic Affairs Committee

Are you happy with your toolbox? I used — and removed from service — four different kinds before finding the right one. The first was a metal box with a tray on top; everything was thrown in loose. Next was a leather tool case that looked great but it had to be unpacked completely for many operations and the trays that slid out of the bottom held only the smallest parts and tools. The next was a vinyl covered plywood tackle box which was poorly made and permitted only limited access to the larger tools in the bottom section because of the overlapping fold-out trays. I then bought a Jensen Super-Deep attache-type case which turned out to be much too big and was my first and last one with pallets. The one I have now has been in use for about nine years and meets my needs beautifully. There is one drawback (although some may see it as an advantage). You have to make it yourself.

The September/October, 1980 issue of *Fine Woodworking* has an article entitled, "A Joiner's Tool Case" written by Tony Taylor, a British cabinetmaker and writer. The tool case he describes has several noteworthy features.

The design is easily adaptable to any size. The article describes a box 15 1/2" x 28" x 7 1/2". Mine is 10" x 14" x 6 1/4". I think I would now increase the width from 14" to 17" to accommodate two 8" wide parts boxes as well as a 12" blade in a combination handle.

The use of drawers makes everything accessible. Removing several items to get to the necessary tool is a thing of the past. Placing a partition or two in each drawer to reflect the space required for each group of tools encourages organization and alerts you to missing items. I made several extra drawers which contain the tools necessary for specialized tasks. They are stored loose in a larger back-up toolbox in my truck and can be exchanged with a drawer in the primary toolbox. The toolbox also holds two 8" parts boxes that are interchangeable with similar boxes which contain such things as punchings, screws, scrap leather, felt and cloth, and miscellaneous parts.

In addition to the three drawers and 8" boxes, I carry a leather tool roll for blades and other long narrow tools. It takes up a little less space, is less noisy, and is made to fit the length and width of the tools I use. I dislike standard pallets because they don't accommodate many tools I use regularly. They can also cause the lid to close unexpectedly. If anything heavy is removed from the bottom of a case with pallets, it can even flip over backwards, spilling the contents all over the living room floor!

My case is always in an upright position, whether it's on the floor next to a piano, being carried, or in the front seat of my truck. Everything remains in its proper place, neat and orderly. The lid serves as a portable office; it is the perfect place for a leather portfolio which holds pamphlets, cards, billing pad, etc. (see insert). The lid can also hold two extra parts boxes as an alternative.

In years past, the joiner's toolbox was useful to prospective employers as an indication of a craftsman's skills. The skills used in building a durable, attractive, well-designed toolbox may seem less transferrable to piano care in the home, but the compliments I've received from my clientele are a bonus nonetheless.

The average piano shop has all the tools necessary to make this toolbox. If you don't have a thickness planer, you can buy 3/8" hardwood S2S (surfaced on both sides) for the top, bottom, and two sides. The front and back panels are 1/4" plywood. The drawers are 1/4" hardwood with 1/8" plywood bottoms. Use dovetails or box joints for the hardwood case parts, rabbet the side edges to ac-

If you are put off by the prospect of building a toolbox as described in the accompanying article, I have another case of sorts that I know will interest you. A leather portfolio—or organizer, whatever you want to call it—that fits in your tool box or can be carried separately, will hold all of your paperwork and other business aids that you use every time you run a service call. The necessary items might include the following:

1. pamphlets and brochure
2. business cards
3. billing pad
4. appointment book
5. service stickers
6. contract forms
7. work sheets
8. thank you cards
9. appointment cards
10. service manuals
11. supply house catalog
12. 8 x 10 photos of pianos you have rebuilt or are offering for sale!!

cept the panels, and cut dados for the drawer bottoms and side runners. A combination dado and rabbet works well for the corners as an alternative to dovetails or box joints. Cut dados in the sides of the case to accept drawer runners before assembly, but do not install yet. Glue up the case so it is entirely enclosed, then mark and cut open the lid with a thin-blade handsaw so the drawer fronts will be flush with the edge of the case. Install drawer runners, sand, and finish to suit. I bought solid brass draw catches and handle at Garrett Wade (1-800-221-2942) from their special hardware catalog. You can also buy acceptable alternatives from your local suitcase store.

The portfolio I use was purchased at a craft fair from a local leather worker and works reasonably well considering it was not designed for the items I carry. It measures 7" x 9 1/2", but I would prefer 9" x 11". This would allow at least two pairs of side by side pockets for pamphlets and other 8 1/2" x 10" sheets folded in thirds. Several PTG members, notably Fred Fornwalt and Bob Smit, have been promoting the idea of distributing an official PTG portfolio through the home office. A portfolio stocked with PTG business aids was available at the convention in Portland, but was not made of leather and was too big to carry inside most tool cases.

I think a sturdy attractive leather portfolio would be a business asset to any technician. Any comments on this subject, or any other business-related subject for that matter, would be welcome. Write or call: **Carl D. Root, 3 Tapiola Court, Rockville, MD 20850, (301) 279-2440.**

Hammer-String Contact

Susan Graham
Technical Editor

To continue last month's discussion of hammer filing/shaping, let's consider the contact between hammer and string. Good voicing requires that the hammer strike all the strings of a unison simultaneously; this starts the unison vibrating in phase, producing a clear, strong tone.

The symptom of irregular contact/vibration within a unison is a nasal or sizzling quality to the tone, similar to a capo or agraffe zing. This can be difficult to isolate by troubleshooting, however. It is simpler and more efficient to begin voicing by insuring that the strings are level and well-seated at the termination points, (often referred to as "pre-voicing", or "voicing the piano") and that the hammers are shaped and fit to strike the unisons correctly.

We sometimes get tunnel vision and think of voicing only as needling or hardening hammers. The preliminaries, tedious and lacking glamour though they may be, are critical for success in final hammer voicing. In fact, the need for extensive needling/hardening is usually greatly reduced once these initial operations are done. As the inimitable Joe Saah used to say, try anything *before* you resort to needles and dope.

Finally, the "pre-voicing" procedures are safe: even a novice technician can be assured of some improvement in tone through wire seating and fitting hammers to strings, and it requires no venture into the murky and hazardous waters of invasive hammer treatment.

It stands to reason that before we fit the hammers to the strings, the strings should be level and seated. This is usually most needed in new or freshly restrung pianos, but older instruments (particularly those which are heavily played or subject to extreme swings in climate) require it as well.

Climate and use are factors because exaggerated movement of the strings or bridges allow the wire to creep up bridge pins and dig into capos, etc. The need for wire seating is also created by the nature of music wire itself: it curves. It is coiled as it is produced, and it retains a memory of that shape. If you cut a string out of an 80-year-old piano and toss it on the floor, it will revert to a curve. This tendency to coil means that wherever the wire changes directions: bridges, capos, agraffes, etc., it tends to take a rounded bend rather than a more acute angle. The result is indefinite termination, less positive contact and poor transfer of energy. Tone is weak and "fuzzy" (and features our old friend, the false beat). Tuning stability suffers.

All those tiny curves need to be turned into tiny bends. This presents a dilemma. The piano should be at pitch, i.e., the wire should be where it is going to be in relation to the various bearing points. Doing otherwise is ineffective, since a major pitch change will change the contact point of string to termination, and possibly can create more trouble by producing a bend in the speaking length. Seating wire, however, will definitely knock the instrument out of tune.

The best solution I have to avoid wasted effort is to do a partial seating job, pitch-raise or lower the piano, re-do a complete seating, and then do a final tuning. Anything which might result in a kink in the speaking length is left out of the first seating but the overall result is more stable since movement of wire during the final tuning is minimized.

Wire Seating

Tools for the job are always a good place to start. Whatever is used must be dull-edged and softer than music wire. I use two brass implements. One looks just like a screwdriver: a flat brass blade as wide as a three-string unison, set in a wooden handle, about 5" in entire length. The other is a 4" length of 1/4" diameter brass rod with one end filed to a similar blade. This fits in the combination handle (one of these days I am going to cut the other end so it can be locked in, although it seems to work just fine merely pressed in with the collet tightened). Some technicians make a tool for wire seating by heating a screwdriver blade until it glows and letting it cool slowly: this removes the temper, softening the blade. Keep in mind that the tool must be long and narrow enough to reach the hitch pins and bridge in the tenor section, under the overstrung bass: that is the purpose for the length of rod. The brass screwdriver is good for seating up under the capo, so I carry them both, as well as a standard string hook. Round off the sides and corners of the blades, removing sharp edges which could mar plate or bridge surfaces.

If a fresh stringing job is involved, it should be complete: wire spaced, beckets and coils tight. Be sure to check plate bolts and screws for tightness.

If the customer is present, explain briefly before you begin that you are about to perform a strange-appearing and noisy procedure and tell them why. Otherwise, it may be little alarming for them to find you wandering around their piano with a hammer and a purposeful look in your eye...

Begin at the hitch pin. Tap the wire down so it is seated firmly, contacting the plate at the base of the pin. Conventional hitch pins are soft steel (made from the same stock as standard nails). Under the pull from a piano string, they will yield if the string has walked or been left "up" on the hitchpin: tuning will be unstable. *The exception is the Baldwin Accu-just system:* this employs a hardened steel roll pin. Bearing is set by the position of the wire on the vertical pin. This system is found on newer Baldwin grands and their large upright, and is easily recognizable by the unusual appearance of the pin.

Seating is done with a light tap: firm enough to knock the wire down to the base of the pin without driving it into the plate finish. The finish on the plate or hitch pin may tend to chip during this procedure; placing the tool to one side of the pin rather than at the back may help (putting fewer coats on

the plate will, too). Simply go along and give the wire a little rap to settle it at the base of the pin. At the same time, tighten any new looped or tied plain wire (not wrapped or bass strings) by tapping the coil back toward the hitch so the loops of wire are tight against each other and the hitchpin. There is a fairly high breakage potential in this move, so I don't do it on old wire: since the wire has been under tension, older tied strings have stabilized.

When the wire is seated at the hitch pins, work toward the tuning pin. If there are duplexes or plate bridges between the hitch and the bridge, seat there, but do not tap the wire directly down on these metal contacts. Rather, tap lightly just on either side of them, where the wire is suspended and can yield a little if you get too enthusiastic. Even a soft tool, if placed on the wire directly on top of a duplex and given a sharp rap, can break a string—go on, ask me how I know.

From the duplexes move on to the hitch-side bridge pin. Wire should be seated in two directions at bridge pins: down onto the bridge, and sideways just in front or back of the pin (where the wire is suspended in the speaking or waste length, not directly against the pin). Here again, light raps: you don't want to drive the string into the surface of the bridge, nor do you want to loosen the bridge pin. Often, the change from curve to angle will be visible, particularly if the wire is new. This can clue you as to how strong a rap is needed.

If this is the first seating, prior to a pitch raise, I do tap the wire *down* at the front or speaking length bridge pin, but I don't knock it sideways yet. It is debatable whether kinks in the speaking length can cause trouble, but it is certainly unproductive to create what should be a small bend at the bridge pin and then move the string so far in changing pitch that the bend moves away from the pin. In addition, when the wire is lifted or forced up against the capo or agraffe, it can lift up off the bridge slightly: seating it down on the bridge will need to be redone anyway.

Seating the wire at the front termination (capo or agraffe) requires that it be forced up against these points. It can be done from above with a string hook, catching each wire in the speaking length and lifting firmly as you slide the hook toward the termination. Do not run a string hook along windings: lift these strings by hooking the exposed core wire, or by prying them up with a twisting motion of the blade tool. If the action is out, I seat wire at the capo with the screwdriver-type tool, propping my elbows on the keybed and forcing the wire up with the blade. Since the blade contacts all three strings of a unison at once, it requires a little effort, but with the leverage of elbows against keybed (padded with a rag), I still prefer this to the effort of lifting each string with a hook. It also tends to result in level strings, since all three are done at once.

Plate configuration prevents running a tool up from underneath in the agraffe section, since agraffes are installed back from the edge of the plate. This section must be done with a hook. Avoid bending over the string as you lift with a hook: otherwise, you run the risk of slipping and taking a hook in the chin—or worse.

An advantage which forcing the strings up from under the capo bar offers is that it is possible to exert pressure against the strings on both sides of the capo. Access to the short length of string between the capo and the counterbearing or plate bridge just in front of the tuning pins is difficult from above, since this segment of wire is so stiff and closely spaced. If possible, however, it is worth the effort to pull or force the wire up against the capo from both sides. Finally, tap down on either side of the counterbearing, as was done at the duplex bars: not directly on the metal surface, but on the wire just to either side, where it is suspended. Even if there is muting felt here, tap anyway.

Chances are that the piano is now dramatically out of tune. Even if it was at pitch before you started, it may have dropped. Pulling it back up may or may not require two tunings; it depends on the degree of drop and on the particular instrument. If the piano started at pitch and wire seating is done quickly with the tuning immediately following, there is little time for the soundboard and bridges to react to the lessening of pressure, and it may be possible to achieve a stable tuning on one round. If a great deal of wire movement is involved, if there is rust, acute angle chances at terminations, or any of a number of the mysterious factors which affect pianos, it may be necessary to tune twice—or at least go over the unisons several times. If there is rust, incidentally, I do lubricate the metal-to-metal contact points. This is done by spraying a rust dissolving agent (such as Liquid Wrench or Joy's Rust-Solv) *on a piece of hammer skiving* which is cut to a wedge. This is used to rub the strings at the contact points. Nothing is sprayed into the piano! Do not use any product containing silicone or oil! Don't goop up contact points as if lubricating your '57 Chevy!

All this fooling around with wire and banging away on the piano has set the stage for stable tuning as well as productive voicing. Now we can get back to the beginning of all this: fitting hammers to strings.

Hammer Travel

As part of either regulation and/or voicing, check hammer travel. We need a hammer which takes an efficient path to meet the strings squarely and transfer energy. If the hammer is traveling to one side, it will not contact the unison squarely. Although the hammer could be shaped to compensate, this is bad policy. Solve the problem, not just the symptom.

It is really the shank which travels: as it rises from rest position, it should not drift or wander to one side, but should follow a vertical line toward the string. Incorrect travel may be due to unevenness in the rail under the flange, or the problem may be in the flange itself. If the hole for the center pin in the flange is not parallel with the bottom surface of the wood, the axis is tipped and the shank will travel to one side (see "Basic Skills" this issue for illustration). Uneven drilling of the holes in the shank produces the same result, as can unevenly worn bushings. Traveling also may be due to irregularities in the flange rail: when shanks are replaced, clean old traveling paper off the rail and renew the rail covering, if necessary, to provide a clean and level surface.

In any case, the cure is to shim the flange to align the centerpin so it is parallel to the rail.

When shanks are installed, traveling is done prior to hammer hanging, and the stack is usually removed from the keyframe. Use the bubble level in the handle of a combination square to level the stack to the bench: observe the location of the bubble while the square is sitting on the bench, and then check with the square on the lip of the hammerflange rail, or across the shanks right at the flange. The desirable condition is that the hammerflange rail be parallel with the bench top; shim under the appropriate bracket feet so the bubble registers the same on the bench and

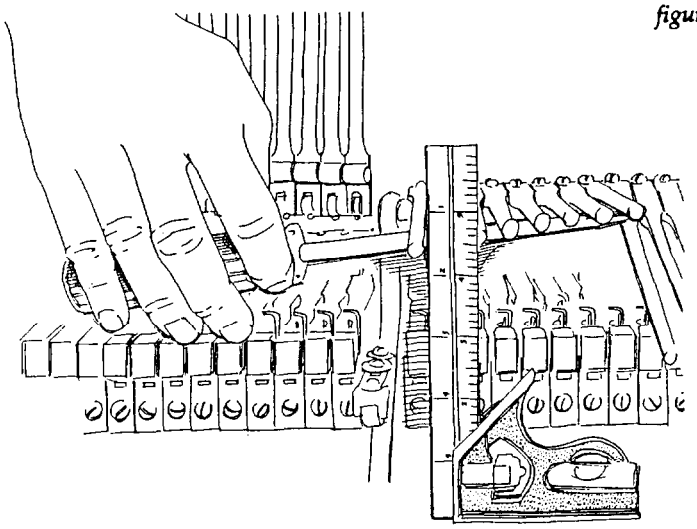


figure 1

"Illustrations by Valerie Winemiller"

resting on the rail or shanks (don't put the level on top of the screw heads, since they aren't necessarily uniform: the same goes for the shank rest cushions).

With the stack level to the bench, the square can be used to set end samples in a truly vertical plane (figure 1). Without doing this, it is entirely possible to travel an entire section of shanks going uniformly off to one side. In reference to each other, the shanks seem correct, but they actually are not.

When end samples are set, the remainder are traveled by comparison. Lift a group of shanks (using the blade of your flange screwdriver) and watch for those which wander. I actually watch the spaces between the shanks more than the shanks themselves; my eye finds it easier to detect narrowing or widening gaps. I also find it best to work quickly: staring fixedly at the same group of shanks over and over is counterproductive. I start at the treble, sitting on the hammerflange rail side, work all the way down into the bass, and then turn the action around and check from the opposite side. In the case of any questions, use the square. As you lift each group of shanks, keep your head still: changing perspective by leaning to one side will confuse the eye and yield inaccurate results.

The cure for incorrect travel is to tip the flange so the centerpin is parallel to the rail. I use plain brown paper packaging tape: the kind which must be moistened to activate the glue. Shari uses 1/8" wide auto detailing tape (they don't have a "natural wood" but the tan is pretty close). I don't recommend masking tape, since is is soft and compresses, changing the result. Other technicians like sandpaper, but I find it difficult to make it stick to the flange and it annoys me to have traveling paper fall out if I have to remove a shank. The flange is papered, not the rail: glue the paper to the flange.

To use paper tape, slice it into strips of varying widths: the wider the strip, the more effect it will have. The closer the paper is placed to the screw, the more effect it will have as well. I make the strip long enough to protrude from the front edge of the flange (so I can see where I've been) but do not to allow the tape to extend under the flange toward the drop screw, where it might make noise against the repetition lever.

Unfortunately, the flange screw must be securely tightened for traveling to be accurate. The screwing and unscrewing involved makes the job a little time-consuming. Other than that, it really is quite simple. It is never necessary to paper both sides of a flange. If shimming one side tips the flange so far that it seems to need a shim on the other side, don't. Remove the initial papering, and replace with either a narrower piece farther from the screw, or possibly a short, narrow strip which doesn't cover the entire underside of the flange. Avoiding papering on both sides is one reason to leave the paper protruding: if it appears that I've papered the wrong side, I check with the square before re-removing the flange, to be sure that things haven't gradually gone askew and the neighboring shanks are fooling me. When traveling is complete, I trim the paper flush to the flanges with a razor blade.

If the hammers are already installed, traveling may need to be followed by re-aligning hammers. Hammers should be vertical: the side of the hammer is at 90 degrees to the plane of the flange rails (except in cases where a section is deliberately tilted to one side—most often in the bass of small grands, where spacing is tight and this is done so the hammers meet the strings).

Since tilting the flange to correct travel tilts the shank and hammer, the hammer must be re-aligned by heating and twisting the shank. A heat gun is the best tool for this, since it is efficient and leaves no smoke marks on the shank. Simply apply heat to the shank, moving the gun to heat the entire length of the shank and twisting it by hand in the desired direction (to square up the hammer). You will feel the wood yield slightly; remove the heat source and hold the hammer for another second or so until it sets. This can also be done with a butane lighter. A match will work in a pinch but usually blackens the shank and lacks that professional touch which distinguishes good piano work. Don't apply heat so vigorously that the shank is burned or charred! A few seconds should be sufficient. Yes, travel does change: some shanks just seem inclined to twist with weather changes.

Well, where are we in fitting hammers to strings? The strings are level and settled, we're sure that the hammers and shanks are traveling in the most efficient path—straight up to the string. The next step is to position the hammers (and action) under the strings.

Alignment To Strings

Check alignment first in agraffe sections, since the wire spacing is fixed and hammers must be adjusted. Before moving individual hammers, decide if the entire action should be moved by shimming at the end block (usually in the bass — opposite end of the keybed from the return spring). If repositioning the whole action improves alignment to the strings while keeping the hammers aligned to the wippens, it is a better choice. In the capo sections either the strings or the hammers can be moved, keeping in mind hammer alignment to wippen and damper alignment to strings to find the best compromise.

I don't usually use the flange cruncher—the tool which is designed to engage the back end of a flange and permit you to turn it while the action is under the strings. It just results in more damage and frustration for me than anything else; it can't be used on actions where the flanges are close together, either. I simply mark the keys, pull the action, space hammers and reinstall the action to check.

Fitting Hammers To Strings

The fit of the hammer to the strings is checked by blocking the hammer up so it stays in contact, and plucking each

string of the unison. Those which are in solid contact with the string will be muted, while those which are not will ring.

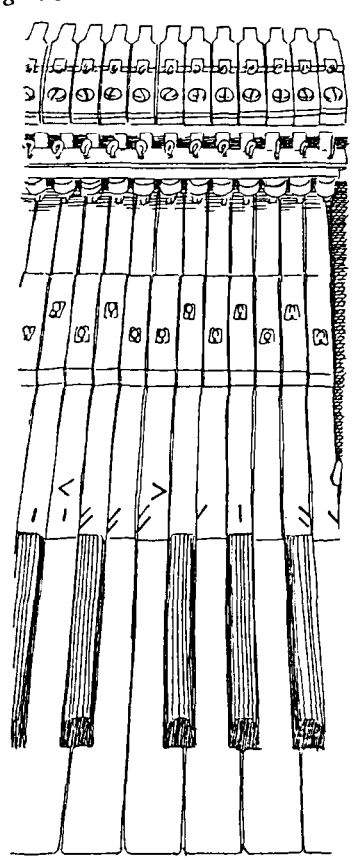
The easiest way to lift the hammer against the string is to reach in with a hook such as a spring hook and hold it up. Unfortunately, this is not accurate. There is potential to pull the hammer slightly to one side, or to exert either too little, too much, or variable lifting force with the hook, getting inaccurate readings. It is better to block the hammer by lifting the wippen by hand. This is done by jamming the palm of the hand against the jack toe, so the jack cannot completely let-off, and lifting the wippen with the fingers at the same time (figure 2). It requires practice, since the jack really does want to pop out from under the knuckle.

It also requires that regulation be correct. If let-off and drop occur too far from the string, blocking the hammer becomes impossibly erratic. If the action is not in good reguation, you shouldn't be trying to voice it anyway; uneven mechanical response results in uneven tone production regardless of hammer treatment. In fact, the "blockability" of a hammer is a good check for uniform, close escapement.

With the hammer blocked up to the string, depress the damper pedal (or wedge it so it stays lifted) and pluck each string of the unison. They should be uniformly muted. If you are being very fussy, vary the pressure which with the hammer is forced against the string to simulate different dynamic levels. Mark on the keys; I mark for strings which don't ring, since that is the part of the hammer I will need to file. Others mark for the strings which are ringing. It makes no difference whatsoever, as long as you remember which it is. As I am doing this, I double-check the spacing of the hammer centered under the string. (Particularly in rebuilt actions, I may have centered the hammers several days previous; with final traveling, regulating, etc., the spacing may drift a little). Needless to say, correct spacing and re-check hammer fit before filing.

Keys being narrow and chalk being rather blunt, it's hard to distinguish whether a mark is in the middle or to one side, so I slant the marks for sides and use a straight vertical line to indicate contact with the center string (figure 3), and use an arrow to indicate a spacing change.

figure 3

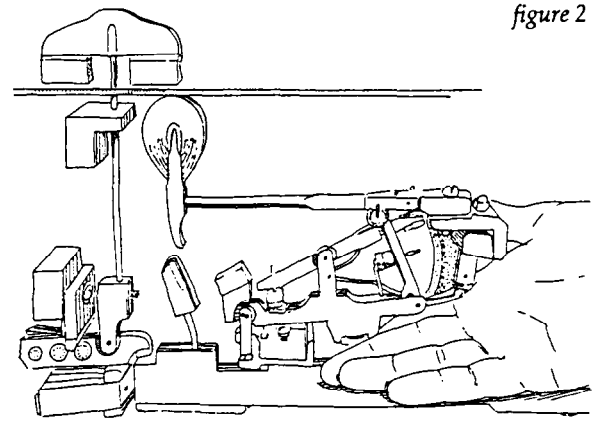


Now we have a keyboard with all these little hieroglyphics on the keys. I use a 1/8" strip of 180 paper, backed with tape (back it before you slice it) to knock off the high spots in the hammer. With this narrow strip, material can be removed from the section of hammer under just one string at a time. It usually requires very little material removal, but care must be taken not to change the shape (profile) of the hammer. The strip is simply drawn along the surface of the hammer under light to medium finger pressure. One stroke across the top and a stroke on either shoulder usually is enough, guiding the shape by placement of the pressure finger (on larger hammers it may also be necessary to take another stroke further down on the shoulder to maintain shape.)

If the hammers have been ironed prior to fitting, it will be necessary to re-iron very lightly. It's easy inadvertantly to alter the shape of the hammer with any ironing. Ironing after fitting requires a light, skillful touch, or the shape may be lost.

Why iron? In the case of soft hammers which may eventually need some chemical hardening, I prefer just to file and iron for an initial break-in period. Ironing gives a little crispness to the tone immediately, so the artist gets some return on his effort and immediate pleasure from the new hammers. I like an action to have at least 40 hours' playing before I add any chemicals to the hammers: this final voicing will be done as part of the follow-up call I include in all rebuilding or extensive regulation jobs.

figure 2



Remember to check both alignment and fit with the una corda engaged. Some pianists prefer that the action shift far enough so the hammer entirely clears one string. Others prefer less shift, so the hammer still catches the third string, but all three strings are contacted by the softer sections of the hammer which do not usually contact strings. If no preference is given, I usually set up the shift in the first style, which will permit full shift if desired and the pianist can exert slightly less pressure if a different effect is desired. The una corda pedal is not an on-or-off switch: good pianists utilize it with many shadings. Una corda voicing may require a very slight rounding of the edge of the hammer nearest the free string; sometimes spacing is too close to permit a particular hammer to clear fully and it will be louder; if a chemical hardener has been used, it may form a slight crust at the hammer edge. It needs to be very lightly knocked off with a sandpaper file.

Well, we certainly have wandered through the topics here. Typical of piano work—no procedure happens in isolation, particularly voicing. The focus on hammer treatment has generated a mystique about the subject. Hammer voicing *is* complex, and can be tricky, especially given the widely varying styles of hammers we encounter. However, string seating and settling, ensuring good power transfer through travel, regulation, alignment and fit—will benefit any piano. They are not only "safe" and beneficial by themselves, but are critical for effective final voicing procedures. ≡

An Interview With Concert Artist Arie Vardi

Rick Baldassin
Tuning Editor

Beginning his artistic career at the age of 15, Israeli-born Arie Vardi has received international recognition as one of that country's finest concert pianists.

After winning the Chopin Competition in Israel, he appeared with the Israel Philharmonic Orchestra, with Zubin Mehta, and upon winning the George Enescu International Competition in Bucharest, he played many concerts throughout East and West Europe. In addition, his concert tours have taken him to the United States, Latin America, the Far East, Australia, and Japan.

In addition to his concert career, Arie Vardi is Professor of Piano at the Rubin Academy of Music, Tel Aviv University. Mr. Vardi frequently gives master classes in other countries and participates as adjudicator at leading international piano competitions. He is Chairman of the Music Advisory Committee of the Artur Rubinstein International Piano Master Competition.

The following is a conversation I had with Mr. Vardi after his performance with the Utah Symphony in Salt Lake City, Utah, in April, 1989.

Rick Baldassin: From your years of experience, are there any words of advice to these piano technicians you would like to begin with?

Arie Vardi: I must repeat that if we are to respect each other, we must not tell each other what to do. I know some pianists that like to teach the technician *what* to do, and this would be just as much as a technician would teach the pianist how to phrase. The pianist has the right to ask for certain changes, but not to tell what to do, just tell his ideas and concepts. Whenever I see good pianists who talk like debutantes concerning some technical problem on the piano, it is quite amazing how we do not know our instrument. Every player knows his instrument. An oboe player knows his reed, I mean a violinist knows his instrument from the inside. We know nothing. Nothing.

When I was younger, I wanted to better understand my piano, as much as any player of bassoon should know his instrument, and I even tried to teach myself and be taught how to tune a piano, and gave up because I simply couldn't do it. I could make little corrections, but I simply couldn't do it. I was so sensitive to many phenomena of the sounds that I could not concentrate on what is needed to tune. And therefore, I appreciate so much the people who can do it well, and I know what it does take.

RB: You, yourself are from Israel. Can you tell me what different types of pianos are used there and in Europe, as opposed to what we are used to in the United States?

AV: I, personally, like many pianists, prefer the Hamburg Steinway.

RB: Is that a very popular piano in Europe, more so than the American Steinway, or is the American Steinway popular in Europe?

AV: Oh, you don't see any American Steinways in Europe. You simply don't see them. Never in a concert hall.

RB: So, beside the Hamburg Steinway, are there any other instruments that you see a lot?

AV: Yes, in Vienna, of course, you see Bosendorfer, and sometimes you must play Bosendorfer. And I must say that the Bosendorfer in Vienna sounds well in this particular ambience. Like in Musikvereins, I would like to play Bosendorfer. The people there are used to this sound. I think I have told you about this new piano, Fazioli, which is quite amazing, and I think it has a great future. I am a great believer in Fazioli.

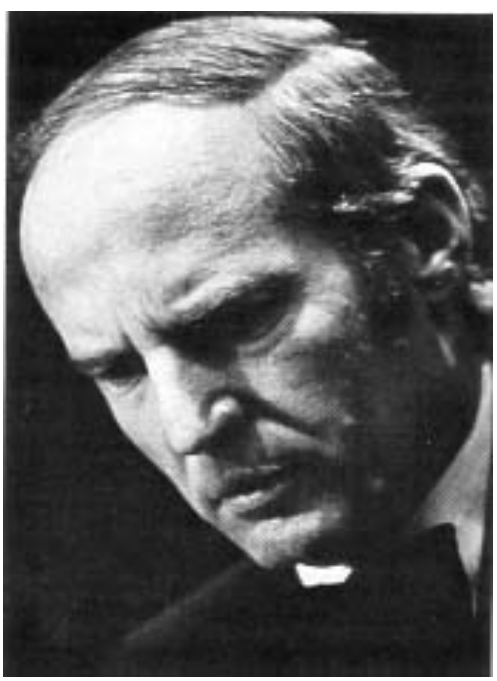
RB: So, it is an Italian piano. Are they appearing in concert halls there?

AV: Yes. I also saw quite a few good Yamahas, and I must say they are making tremendous progress. I remember in the Bachauer Competition here, that pianists changed instruments. One afternoon I asked my colleagues, "Do you know whether this is the Yamaha or the Steinway?" They all started to listen and say, "Well, come to think of it, we are not any more so sure as we were years ago." So I think the international scene now is very interesting. Some other firms are making tremendous progress, like Yamaha and Fazioli.

RB: Are the concert halls in Europe different than they are in the United States?

AV: I don't think so. I think that Carnegie is a very European concert hall, and the hall here is very European in concept. I hear a European sound here in Salt Lake City, and I think I praise this little room very much. It looks very rich and noble and calm, and it sounds the same. It sounds the same as it looks. And it is a wonderful auditorium. One of the best that I recall.

RB: You are involved with the Rubinstein Competition. Tell me what it was like to work with Artur Rubinstein



Concert Artist Arie Vardi

as part of that competition.

AV: I was privileged to know Artur Rubinstein ever since I can remember. He used to come annually to Israel. I think the first time I played for him, I was 12. And I played for him many times since. Just to know that he was listening was really something. He was a wonderful listener. The way he sat and listened was something quite unique, because, you know, today people can play, perhaps, and can talk, but very few are good listeners. And, of course, his touch, his hands were something that is never to be forgotten. Just if you looked at close distance to his hands and fingers, his rich and soft hands, very big, even though he was not a tall fellow. He was very short, very small. Yet his hands were so huge and developed and soft. This softness of the fingers, and then the magic touch to the keys is something that I don't see anymore. I am missing the Rubinstein touch. I heard him during his last concert when he recorded the Brahms First Piano Concerto, when he was 80. Then, I was in a kind of master class which was videotaped in Jerusalem when he was 92, I think. He played theFirst Ballade of Chopin, and he was 100 percent blind, and could not hear very much. Only one of his ears served him, and yet his hands produced the most wonderful touch. Just this softness of the hands and this delicate relationship to the keys, like the man was not playing the keys, he was playing the strings, some direct contact to the strings, is something that is never to be forgotten.

RB: You told me earlier that Artur Rubinstein served on the jury of the first competition, and invited several of his colleagues. Who were some of the people who were there, and what was Artur Rubinstein like as a juror?

AV: This is a very interesting question. Of course, the colleagues were people like Arturo Benedetti Michelangeli, and so on — people who usually don't judge in the competition, and they came just to join (Mr. Rubinstein). We were very privileged to have a panel of judges at the Rubinstein Competition that no other competition in the world would have. As a jury member, I must say he had his preferences. And historically speaking, if I look back, I must admit that he was not always right. I remember that he didn't like the First Prize Winner of the first competition, and this First Prize Winner happened to be a very good one, but he liked another one, and he preferred him or her, and that one did not succeed so much. We know that we are all human, and we have our preferences, and historically speaking, he was not right, or perhaps we were all wrong. Perhaps he was right, and that First Prize Winner was not so good, and the other one was much better. But, who knows?

RB: When you come in to perform with an orchestra on an instrument that you may have never seen before, how long does it take to get used to it, or to adjust to it?

AV: Sometimes, in a very short period of time, like here. Here, I sat at the piano, and I knew right away that I must not experiment with it because the piano revealed its qualities so quickly, so that you knew right away what you have to do. Sometimes it takes much longer. Sometimes you need an hour or two to discover its secrets. Of course, it depends also on how many styles you are playing in one recital or concert. Here, I played only two different styles. I played Mozart and Ben-Haim. But if it was a recital with many styles, I perhaps would have needed much more time to discover each style, sound, touch, and so on.

I must say that there is something which is very important for me in Mozart playing. We know that some of the contemporary pianos have a very hard action, and it serves tone control very well, because when the action is soft, you can't control the sound in many degrees of color, dynamics, and so on. So, this hard action and deep penetration help us very much to control the sound. But on the other hand, when you play Mozart, you would like a light piano, because if not, then the leggero is lost. In Mozart playing, if you don't have any of the leggero playing, it is very bad. I played some early keyboard instruments like the Pianofortes which Mozart used, and when you play these instruments, the leggero comes so naturally, because the touch is so light. It is nothing to compare to the modern piano. The keyboard has been changed tremendously over time. Mankind has not been changed at all. Our hand is the same hand that people at Mozart's time had. So when they played leggero, it was really leggero. They felt physically the leggero. Today, sometimes we have to pretend that it is leggero—we have to work very hard with our fingers, yet pretend that it is light. And this is a very dangerous aspect of Mozart playing today. I was happy that here on this particular piano, I didn't have to pretend that it was light. I felt it was a light piano.

RB: What to you would be the ideal situation, working with a piano technician, coming in to work with an orchestra or giving a recital?

AV: The ideal situation, to speak very frankly, is that the piano is so wonderful that you meet the piano technician and just say to him, "God Bless You!" You have nothing to negotiate, because you negotiate to the person through the piano. Of course, human relationship and friendship are very precious today, and it is nice to meet good people in this profession. But personally, I must admit that I prefer that I like the piano and have no comments to say. That is rare, because usually you have certain problems, because no piano is perfect, and then you need the technician very badly. As I remember the first time I met you, I told you that notes B and D were a little soft. You told me that was a problem of this piano, that you were aware of it, that it was hard to overcome, but that you would try your best to remedy the situation, and so on. This is the kind of human relationship that I appreciate very much, because the audience might not even notice this thing. But this little thing for me is striving together for perfection. This give and take relationship between the technician and pianist. And this little satisfaction of overcoming certain difficulties sometimes is more rewarding than to meet the perfect piano right away.

RB: How do you handle a situation where the instrument has a lot of problems?

AV: Then you need a lot of time to practice and to try your best to know and recognize each tone individually, and remember it during the performance. And this is not so easy.

RB: So that you can compensate for it?

AV: Yes. It can be done, but it is not very easy. Sometimes it requires so much concentration that it is on the account of inspiration and forgetting yourself, which is the ideal of any performer. Sometimes, it happens that when you try too hard to overcome certain difficulties, you even succeed a little better. It is a very mysterious thing. Sometimes having certain difficulties makes you try harder, and perhaps you succeed more. If it is one tone or another one, it is not a major difficulty, but when you

don't like the whole piano, when you cannot enjoy playing it, when the pedal is wrong, when the bench is wrong, when there are major difficulties, that is very bad. When there is a major, general difficulty, then sometimes we feel completely lost. What can we do?

RB: There are problems with tone and problems with the mechanics of the action. Which is harder for you?

AV: I try not to separate it, because I have to remember that for the audience it is the best sound, and not the mechanics that is important. Like the piano we had the day before yesterday in another city. The action was perfect, but the sound was not enough. And perhaps the action was even more perfect than in the piano here. It was a wonderful action, yet the sound was not enough. Of course, we pianists also fail sometimes to separate between the action and sound. Sometimes we say that this piano is very hard, and the technician will tell you it is not hard at all, and will prove to you scientifically that the action is not hard. But we find it always the relationship between the action and the sound. So, if the sound is not enough, we consider it as a hard touch piano.

RB: Because you have to play harder to make the same amount of sound?

AV: Yes, and that is very natural. Sometimes, it is vice-versa. I don't know, for instance, whether this piano has a normal action, or a hard action, because it has a very bright sound, and it is very rewarding, so I couldn't feel if it was hard or not. Can you tell me?

RB: It is normal. It is not what I would consider heavy or light. It is just normal.

AV: For Mozart, I must say it was very light.

RB: Really?

AV: It felt very light. Very light. Also, the difference between una corda and tri corda was quite natural, so I could use una corda naturally, and not get scared that every time I use the una corda, I find a completely different sound. That is something which makes me fear greatly, sometimes, because I love to use una corda, and when it changes the sound totally, it is a major difficulty. I remember, speaking of Rubinstein, he used to say that he loved very much using una corda, not only in pianissimo, but sometimes he played mezzo-forte with una corda, and found great pleasure in doing so. I think good una corda can serve the pianist much more than we think.

RB: It is probably something that we as piano technicians often overlook. We go through and make sure that the piano is so evenly voiced with the action in its normal position, not remembering that it has to shift and still sound even.

AV: And there are various degrees of una corda. Sometimes you press the una corda to the end and it makes a good sound, then you make it three quarters and the sound is a little bit funny, or vice-versa. What I hate very much is an una corda which is only good when it is 50 percent, or 60 or 70. This is very hard to control during the performance. I would prefer an una corda that you can just push all the way, and it still sounds good.

RB: Beside the una corda, are there any other characteristics of the piano that are particularly desirable to you?

AV: Something that we all love to have in the piano is a warm sound. We have to remember that the piano is a very mechanical instrument. No other instrument is so mechanical. There are so many parts in the transmission between the fingers and the strings. The only way to compensate is to have a warm sound. No action, or lightness, or clarity could compensate for lack of warmth. We need a singing and warm sound, and this is the number one quality of the piano. This is the first thing I try to learn about a piano—whether it can sing and has this warmth, or not. This warmth is sometimes the consequence of good tuning. Sometimes a good tuning creates a very harmonious and round sound. Other times, when the tuning creates sudden sharpness, or when the octaves are too sharp, or the thirds are not warm, even a good piano can sound bad. Good intonation can compensate even a bad instrument.

RB: So it has been your experience that a different tuning will drastically change the character of the instrument?

AV: Of course. It goes without saying. We all know it. A different tuner can change the whole piano. I know some pianos very well. If they are tuned by a different person, they sound completely different—a complete difference. I must not tell you your professional secrets, how to make it more brilliant when you sharp a little bit the descant (treble) or when you lower a little bit the bass, all these little tricks which serve so well.

RB: Beside a warm sound and good tuning, anything more?

AV: Good pedals. For instance, when you can use not only the full pedal, but half pedals or vibrato pedals in some pianos, this can create miracles. And it is very important not to have any sound of the dampers on the strings, like once upon a time you had in the Bechsteins. You heard all the time this "swishing" sound of the dampers suffocating the strings. And when you don't have fear of that sound, you can vibrate the pedal, or take half pedals at ease. That is very important, because with half pedals we can clean up the harmony in the middle of the piano and yet keep some basses vibrating, because if you change the pedal only half, it is enough to clean the middle section of the piano, but the bass could be sustained. So being able to control half pedals is something that is very, very important.

RB: So you would admonish us to check our damper regulation more carefully?

AV: Yes, and perhaps try to release the pedal very quickly, to make a spiccato pedal, and see whether it makes any sound when the dampers fall quickly on the strings.

RB: Any parting comments in closing?

AV: That I thank you very much personally. It has been a great pleasure to meet you, and to work with you. We experimented with two different pianos. It was very interesting.

RB: Yes, it was. Thank you very much.

Until next month, please send your questions and comments to:

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Vertical Regulation

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Action regulation procedures are readily available in most manufacturers' service manuals and books on piano repair. These procedures are usually presented simply as a list of adjustments to be made in a certain order. Given a piano in like-new condition with all parts within specifications, following such a list of adjustments will usually give good results. However, in the real world action condition varies considerably; parts wear and change dimension, and felt and leather change texture and friction. Even in a brand-new piano, the materials used in the action and the positioning of the action and keys in the piano case may not be what were originally called for in the plans. All of these variables affect how an action functions, and therefore regulating "by the book" may not give the best result in all cases.

The technician who understands how an action works and who can visualize the operation of each action part in relation to others is in the best position to regulate an action so it will really work well. I feel that we should all be familiar with manufacturers' service procedures, but we should also have a thorough understanding of the logic behind those procedures so we can adapt them as necessary for best results. In this and next month's articles I will present procedures that emphasize regulating for proper action function.

Preliminary Steps

Regulation is the process of adjusting the action parts to give the most efficient operation; in other words, to give the most power, repetition speed, and evenness in touch and tone from note to note. Depending upon the circumstances, regulation can mean anything from touching up capstans, key level, etc. (to improve a slightly worn action) to going through an entire regulation sequence to make each part contribute the most to best action performance. Whatever the situation, the results will only be as good as the condition of the action parts will allow. It is usually not appropriate to spend hours precisely regulating a very worn action; little benefit will be realized from having the let-off set exactly to 1/8" on each note if each hammer has a different tone and each hammer butt leather is worn to a different shape. In such cases the customer might be given the option of either a quick touch-up regulation using wholesale methods to improve symptoms or else extensive parts replacement followed by a thorough regulation. It is important to realize that regulation cannot overcome the effect of deteriorated parts, so when selling a regulation job the technician *must not* promise more improvement than the piano can deliver.

Before we can regulate we must first have the action in good mechanical condition. Hammer shaping, if appropriate, should be a preliminary step. Otherwise re-spacing hammers with visible string cuts will result in very uneven tone as some hammers now strike on the "high spots." Action centers must be free but not wobbly, action felt and leather must be useable (not worn to the point of dysfunction), all action parts should be free of interference or rubbing, and all screws should be tight. It is a good idea to tighten the screws that hold the action brackets to the rails while the action is still in the piano; this way the action frame will be locked into shape to properly fit the upper and lower mounting posts in the piano. (Old upright actions with loose screws will flop back and forth like a parallelogram when removed from the piano.)

Hammers should be checked for traveling and any problems corrected by papering the flanges as shown in Figure 1. For ease of installation, it is handy to use a travel paper that sticks in place. Avery correction tape from a stationery store is one popular type; brown gummed tape cut into strips is also good. Always stick the paper to the flange rather than to the rail, so whenever a new flange is installed it starts out on a bare rail.

One benefit of properly traveled hammers is that they strike the strings straight on, rather than with a sideways motion, and therefore transmit more energy to the strings. Perhaps a more basic benefit is that when all hammers move parallel it is easier to avoid rubbing hammers, especially in the angled sections, since each hammer occupies the narrowest path as it moves toward the strings.

Parts Alignment

Our first regulation step will be to confirm that the action is properly located in the piano and that the action mounting posts hold it securely in that position. Here we are most concerned with action height and the proper strik-

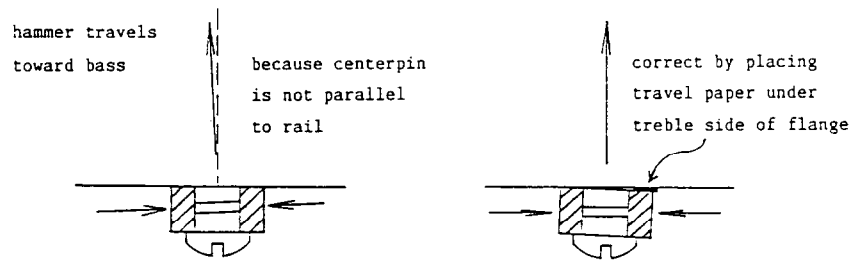


figure 1: Traveling Hammers

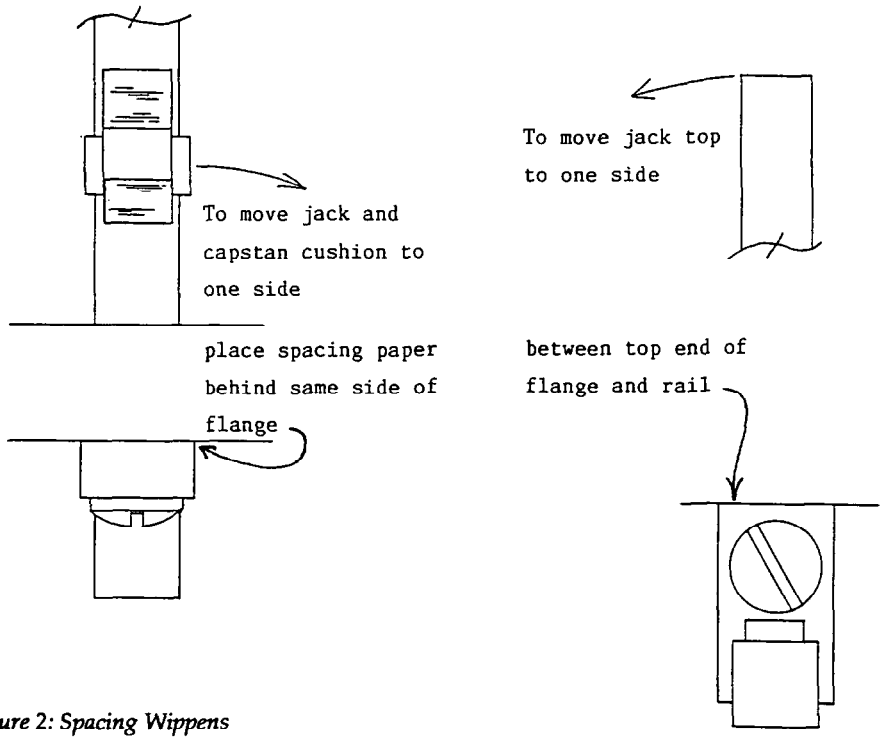


figure 2: Spacing Wippens

ing point for the highest treble notes, since a slight change from the optimum can drastically reduce volume in this area. Hammer #88 should strike its strings approximately 1/8" below the V-bar. After tuning the top couple of notes, the right action bracket can be pried up or down slightly while striking a key and listening for best volume and the clearest tone. Once the best strike point is located, the lower action mounting posts should be adjusted so that the action brackets rest evenly upon them. Next, the top posts should be adjusted by bending up or down so that, as the action is tipped back against them, the "U" of each bracket is snug under its mounting stud. This ensures that as the action is removed and reinstalled, it always goes back in the same location, and thus damper alignment and lost motion adjustments are preserved (see 8/89 *Journal*, "Pulling Piano Actions").

Once the action is properly located, action parts can be spaced; start with hammer to string alignment. Most often it is possible to space hammers by loosening the flange screws and shifting the flange sideways on the rail. Push the flange over in the desired direction with a flat screwdriver blade, then hold the hammer head in position with the fingers as the screw is tightened. Avoid forcing hammers to the side by pulling hard with the fingers, as this can damage pinning. If shifting the flange is not sufficient, or if some hammers point to one side, the shanks can be warped with heat. I prefer the small butane "gas match" type lighters for this. An electric heat gun or the traditional alcohol torch can also be used. Although this procedure is known as "burning the shanks," do not take this literally; you must keep the heat source moving up and down the shank to avoid burning the wood. Hold the hammer lightly to one side while heating and as the shank cools. I am not a fan of the electric shank bending pliers, at least not as they come from the suppliers. They have no heat regulating thermostat and so can easily burn wood once they're really warmed up, and their jaws are curved quite drastically so they tend to cause large dents in the shanks.

Next the key height should be set, and the keys squared and spaced, as described in last month's article. Since squaring and spacing the keys moves the back ends of the keys as well as the fronts, capstan position is affected. Therefore this work should be done *before* spacing wippens on console actions where the wippens sit directly on short capstans.

Having located the hammers and hammer butts, as well as the capstans, we can then space the wippens to center the jacks to the hammer butts. (In the case of older parts that have operated off-center for years, there will be a ridge of un-worn leather on one side of the hammer butt. In this case the spacing is better left as it is; otherwise the jack will be operating only on a narrow ridge of leather which will quickly wear down, causing lost motion to develop.) Wippen flanges can be shifted, and shimmed with spacing paper if necessary to align the jacks, and on console actions to better space the wippen cushions over the capstans. See Figure 2. On actions with dowel capstans mounted on wires, the wires can be bent to align the dowels to the wippens. On actions with stickers, the sticker flanges can be papered to space stickers to the capstans.

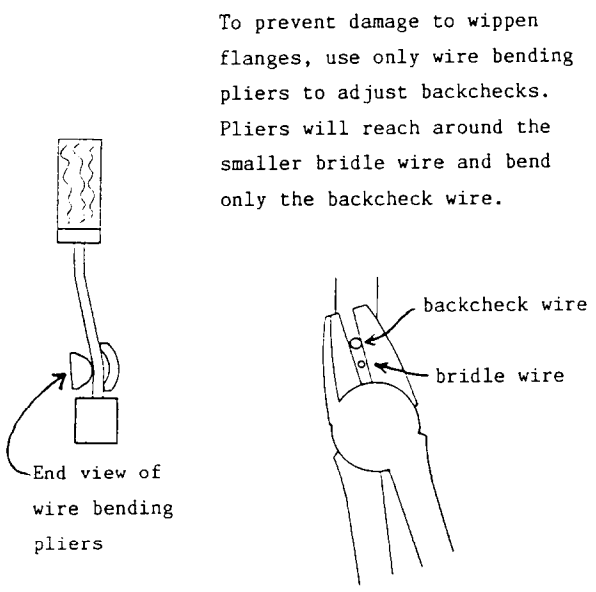
Once the wippens are positioned we can space the backchecks to the catchers. At this point we will only be concerned with side-to-side position of the backchecks and rotation (as viewed from above) square with the catchers. Later on we will adjust the actual checking distance. *Caution!* Many technicians make the mistake of bending the backcheck wires to the side using a straight-on damper wire bending tool, placing it on the wire and twisting the tool handle. The result is that this entire twisting force is born by the wippen flange centerpin, leaving the birdseye ovalled out and the wippen wobbly. Holding the wippen body with parallel jaw pliers can help take some of the load, but a far better method is to use wire bending pliers as shown in Figure 3. While working in this area make sure that the bridle straps are slack enough that the wippen/jack assemblies can drop down enough to allow some lost motion between the jack tops and hammer butts. If they are too tight, the jacks will be unable to get back under the hammer butts, no matter how much lost motion is introduced. Later on we will do the actual bridle wire adjustment.

Choosing Hammer-Blow Key Dip Dimensions

At this point in the procedure we need to decide what our hammer blow distance and key dip should be. "What's to decide?" you might be asking. "Everyone knows that key dip should be 3/8" and hammer blow distance should be 1 5/8" for spinets, 1 3/4" for consoles and 1 7/8" for full sized uprights." As it turns out, those dimensions will probably be in the ball park, but will not necessarily give the best results for a given action. Let's look at what happens when we regulate an action to different hammer blow dimensions and how those settings affect jack escapement.

In Figure 4 we have views of an action with the key dip set to 3/8" but with a different hammer blow distance in

figure 3: Spacing Backchecks To Catchers



each case. Let-off is set to 1/8" for each, lost motion is adjusted, and checking is set to 5/8". Each view shows the action parts as they appear with the hammer in check, with the key held down after a medium blow. In the first case, hammer blow distance is a relatively short 1 1/2". Here the key only had to move the hammer 1 3/8" to get to the point where the jack escaped from the hammer butt (the let-off point); at that point there was considerable key travel still remaining. This additional key travel continued raising the wippen until the key reached the front punching. As the wippen continued to rise, the jack, with its tender restrained by the regulating button, was rotated farther away from the hammer butt. By the time the key was bottomed out and the hammer was in check, the jack was left quite a distance from the hammer butt. This would not be an efficient action. Why? Consider what must happen during fast repetition: A repeat blow cannot occur until the jack gets back under the hammer butt. In this case, since the jack is far from the hammer butt, the key must be released quite a bit to allow the wippen to drop enough for the jack to get back in position for a repeat blow. Jack return depends upon the wippen and key falling faster than the hammer/butt assembly; the backcheck gives these parts a slight head start over the hammer. However, the farther the jack is from the hammer butt, the more likely the key will have to be released all the way to rest before the jack can get back under. LaRoy Edwards uses the wonderful analogy that if you are a door-to-door salesman, you don't stand back away from the door when you knock; instead, you stand right up close so as soon as it opens you can get your foot in the door!

In the second case, the blow distance is set to 1 3/4". Here the key had to move the hammer a little further than before (1 5/8") to get to the let-off point. More key dip was used in doing this, so there was less dip left over after the jack escaped. Consequently, when the key bottomed out and the hammer went into check, the jack had only rotated slightly away from the hammer butt. In this case the jack can move back under the hammer butt more quickly, so repetition should be better than in the first case.

In the third case, the blow distance is set to 2", so the key had to move the hammer much further (1 7/8") to get the hammer to the let-off point. In doing this, almost all the key dip was used up by the time the jack started to escape from the hammer butt, and very little dip was left over to continue lifting the wippen. As a result, the jack was not rotated back away from the hammer butt; rather, the hammer butt bumped into the jack, pushing it back out of the way as the hammer came back into check. In this example, repetition may not be a problem. However, jack escapement is incomplete, so that there is a danger that on a soft blow the hammer assembly will not check but will instead bounce back and forth between the jack top and the strings. This problem is what is known as the "blubbering hammer" or, as we like to call it, "the automatic repeating staccato feature."

The dimensions stated in these examples are taken from experiments on one particular action and would not necessarily apply to other actions. The point is that the relationship between key dip and hammer blow distance is very important to proper action function. In a grand action, we set a dip/blow relationship that results in a certain amount of aftertouch, which we can measure as key travel remaining after the point that the hammer drops. This point is easily identified when depressing a grand piano key very slowly, since at the moment of escapement the hammer drops abruptly. With a vertical action, however, a slow depression of the key does not produce any sudden point of jack escapement. Instead, the hammer reaches the let-off point and just slowly falls backwards, riding the jack top back as the jack rotates away.

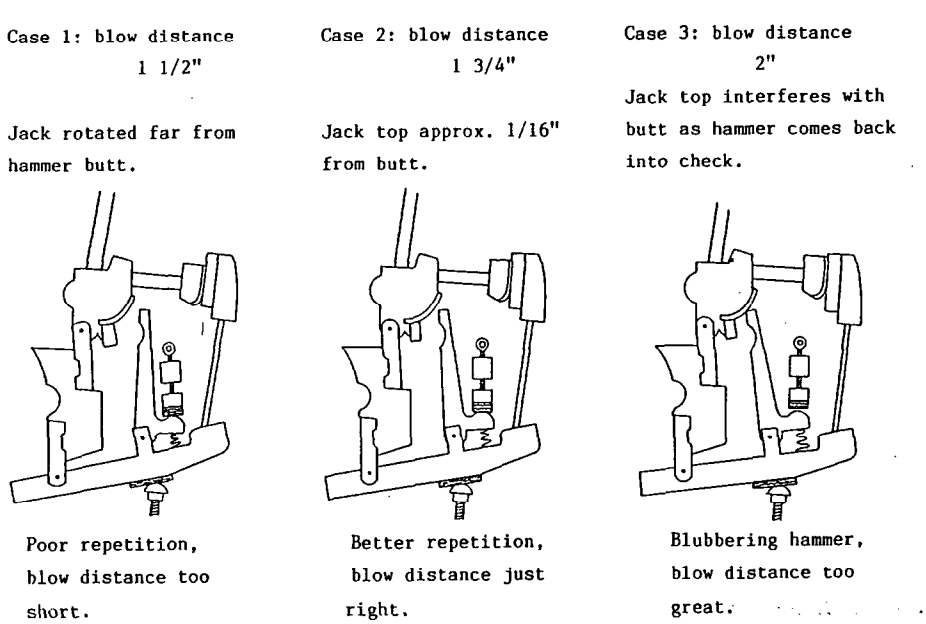
Thus it is not easy to define a specific part of the key travel that we can call aftertouch in a vertical action. However, we *can* define a certain amount of jack escapement as being correct. Actually, proper jack escapement is the most meaningful measure of correct aftertouch in vertical *or* grand actions, and in either case the action will tell us what "aftertouch" (or at least what range of aftertouch) is required for that action. In the case of a grand action, excessive aftertouch will result in two problems. First, if the hammer fails to check, it can rise up to rest against the string as the wippen continues lifting after let-off. Secondly, the jack can be rotated so far from the knuckle that the jack jams into the felt cushion in the repetition lever. On the other hand, insufficient aftertouch can cause the jack to not quite escape from the knuckle, especially on a soft blow, causing a blubbering hammer. In addition, the touch will feel "shallow" and difficult to control since the keys must always be fully bottomed out. Thus, while we might have a certain dimension in mind that we favor for aftertouch, we have to observe jack and hammer motions to see if that dimension will really work.

In the vertical action examples in Figure 4, I held the key dip constant and only varied the blow distance. However *either* dip or blow or both could be varied to achieve the desired jack escapement. It is the proportion of key dip to hammer blow that determines the degree of jack escapement. Regulating with 7/16" dip and 2" blow, or 5/16" dip and 1 1/2" blow, would give results similar to our example of 3/8" dip and 1 3/4" blow. However, since the key is the part that the pianist moves, we should try to keep dip in the "normal" range. Most spinets require 7/16" key dip in order to get enough movement at the back ends of their very short keys. For other pianos, I suggest starting with the manufacturer's recommendation for key dip, or on older pianos using a dip block that is 3/8" thick measured 3/4" back (over the front rail pin).

To summarize, I recommend choosing dip and blow dimensions as follows: Regulate three or four sample

notes across the keyboard by setting their let-off to 1/8", their key dip as above, and their hammer blow distance to a reasonable guess. If the existing blow distance seems too great, just run the capstans up until the hammers stand off the rail at your desired experimental blow distance. If the shanks rest on the rail and the blow distance seems reasonable, adjust the lost motion on the samples to a minimum. Then, test your blow distance by playing the sample keys with a medium blow, holding each key down and observing the jack position. If a hammer does not check at 5/8" just take your free hand and move the hammer until it is 5/8" from the strings. At this point, if the jack is resting against the butt leather there is insufficient escapement so your blow distance is too great. If the jack top is more than 1/8" from the butt leather there is more than enough escapement and you could increase the blow distance. I normally like to have 1/16" to 1/8" jack clearance, knowing that as key dip diminishes and lost motion develops, jack escapement will decrease. Starting out with no clearance will result in blubbering hammers as soon as slight wear occurs in the action. When you think you have a workable blow distance, go ahead and prop up the hammer rail and set lost motion on your samples, adjust the backchecks on your samples so they do check at 5/8" and double check your conclusions.

figure 4: How Hammer Blow Affects Jack Escapement



The Effect Of Worn Hammer Butts On Regulation

As action parts wear, action efficiency decreases. Even though an action can be re-regulated to take up lost motion and bring other adjustments back to standard, there is one change that adjustment cannot correct. That change is the worn profile of the hammer butt leather. This small strip of leather is the focus of all of the force applied through the key, and its shape has a big effect upon an action's touch.

Figure 5 shows the difference in profile of a new versus a worn hammer butt. Notice that on the worn part the butt felt has compacted, so the jack sits further under the hammer butt at rest. Also, the round curve of the butt leather has worn, so the jack now sits in a dent. With the new part, the jack only has to rotate slightly away from the hammer butt before it loses contact with the butt leather. This is because the curve of the butt leather and the arc traveled by the jack top curve away from each other. Therefore the escapement portion of the key stroke is short, beginning late in the stroke. With the worn part, however, the jack has to rotate further before it loses contact with the butt leather. This is partly due to starting out further under the butt, and also because the butt profile does not curve upwards as sharply away from the arc of the jack top. Therefore with the worn part, the escapement phase starts sooner in the key stroke and is more prominent; instead if slipping out from under a cylinder, the jack must force its way over a bump. Because the worn butt profile does not curve away from the jack's path, more jack escapement is needed to prevent blubbering. Thus for a given key dip, the action with worn parts will require a shorter hammer blow.

Even though the worn action can be regulated and will play, it will not be as powerful, and the touch will feel "funny" since the resistance of jack escapement occurs early, around the same time as the dampers start to lift. Because of this deterioration in performance caused by worn parts, I feel it is inappropriate to put new hammers on very worn hammer butts; to get the full tone potential out of a set of hammers the action must be efficient and controllable.

Setting Hammer Blow Distance

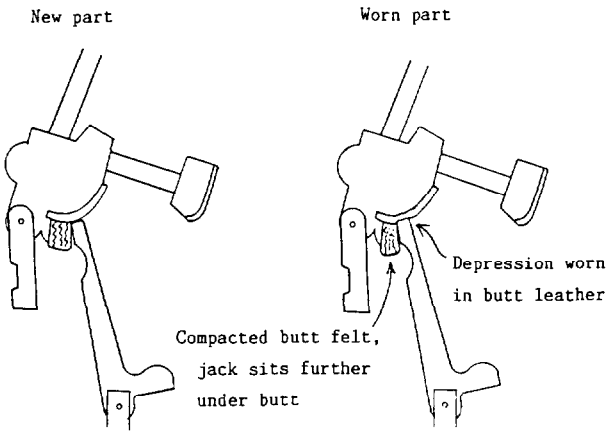
The hammer rail should be propped up with firm hammer scrap felt or leather to set the blow distance to the setting just determined. If the blow distance is uneven across the set, you can either shim behind the hammer rail cloth with thin cardboard or bushing cloth, or bend the hammer rail hangers by grabbing the rail and pulling outward where the blow is too short while pushing inward where blow is excessive.

Often new pianos are found to have the hammer rail resting too far back due to settling of the rail rest felts during shipping. Adding a piece of bushing cloth or a cardboard balance rail punching to each rest felt will quickly restore lost motion.

Adjusting Lost Motion

Once the hammer rail is set correctly you can adjust lost motion. How much lost motion should there be? Once again the piano will tell us what it requires to work properly. Some lost motion, or space between the jack top and hammer butt leather at rest, is needed to allow the jack to return fully under the hammer butt when the key is released. During most playing conditions the jack will return before the hammer and wippen return to their rest positions. However, when the key is released very slowly the wippen and key cannot get ahead of the hammer assembly. In other words, the wippen cannot fall back faster than the hammer and so the jack cannot get back below

figure 5: New Versus Worn Hammer Butt



cannot fall back faster than the hammer and so the jack cannot get back below the hammer butt until the hammer stops at the rest rail and the wippen drops that little extra amount provided by the lost motion.

Excessive lost motion, beyond that required to allow the jack to return reliably, can accelerate wear of the butt leather because the jack hits the butt with a running start when the key is struck from rest. (As Chris Trivelas and Darrell Fandrich point out in their 2/89 *Journal* article, there is always a "dynamic lost motion" during multiple blows, as when playing a trill.) Excessive lost motion also makes the keys feel sloppy and loose.

The correct amount of lost motion is the smallest amount that will allow the jack to snap back under the butt leather, all the way against the butt felt, when the key is released *very* slowly after a hard blow. The sustain pedal should be held down during this test, otherwise the damper springs, acting through the spoons, will help to give the wippen a head start when the key is first released. Assuming the damper spoons are adjusted properly, the dampers will not be acting on the wippens in the last half of the key return. However, by giving the wippens a push as the key is first released they can hide a jack return problem that only occurs when the pedal is depressed.

The amount of lost motion required will vary depending upon the particular action. More will be needed if the hammer butt springs are too strong, the wippen or jack centers are too tight, the key bushings are tight, the jack tops are rough, the jack springs are weak, or if the keys are not weighted. Actions with felt rather than leather on the hammer butts seem to need more lost motion, but this may be partly due to some of the above problems also being present in an economy grade piano.

Sometimes when trying the jack return test the jack will snap back under the hammer butt before the hammer returns to the rest rail, no matter how slowly the key is released. This is a sure sign that the hammer center is too tight or the butt spring is too weak. Either condition can cause the hammer to almost stand in mid-air, allowing the jack spring to push the jack under the butt.

Common wholesale checks for lost motion are: Pull back on the hammer rest rail to see if the hammers follow the rail back about 1/16". If any hammers do not follow the rail, they have no lost motion. Also, tap on the back ends of the keys; if any hammers wink, this indicates that they were standing off the rail. These checks are useful, but it is important to fine tune the lost motion using the jack return test on each key to avoid that call back for the "sticking key."

Conclusion

Next month I'll conclude with final regulation steps and damper regulation. I hope this has not been too tedious a treatment of the subject so far. My object in presenting so much analytical material is to promote understanding of the way action parts work, so that we can correct problems easily rather than just "reaching in and turning things" until the symptoms go away. The only way to really grasp action mechanics is to sit down with an action model and experiment. Try various adjustments as I've suggested here and notice their effects. Watch each action part individually and as part of the whole. Once you can visualize each part's function in your head you will be rewarded with superior diagnostic skills out on the job. Staring at an action model may not be the most exciting way to spend your spare time, but remember, no pain-no gain!

GOOD VIBRATIONS

Del Fandrich At The Portland Convention: How The Soundboard Really Works

Nick Gravagne
New Mexico Chapter

If the title of this class seems audacious, or if it promises what it can't possibly deliver, you probably don't know Del Fandrich. He is the first to admit that the subject matter challenges thorough investigation, especially given the general attitude that there really isn't much more that can be done with a soundboard that hasn't already been done. Besides, solid research takes time. But who outside of our little world cares about piano tone? The big money for research sends people whirling in space shuttles and, according to the theory of "trickle-down," gives us non-stick frying pans. Nonetheless, Del is a prober, a self-starter, and these traits, coupled with many years of total immersion in piano technology (including several years in the R & D department at Baldwin), have whetted an insatiable appetite for "piano things" and what makes them tick.

Most of us have heard tales of piano manufacturing mysteries, of design features and secrets more closely guarded than Star Wars. What actually do we know about how the soundboard *really* works? What do the designers know, or think they know, and are they free to share it with us soldiers in the trenches, or is it that, to borrow from singer Paul Simon, "the information's simply unavailable to the mortal man." Del's instruction, although purposed to scrutinize the scientific and mechanical aspects of the soundboard system, also set out to dispell a few myths along the way.

The first part of the class included a slide presentation and discussion of Baldwin manufacturing processes, something Del ought to know a great deal about. Although the slides were interesting and informative (if not directly translatable in job-shop terms), they were only the appetizer; the real "meat" of the class was still to be served.

Upon entering the classroom everyone received a multi-page, copyrighted handout entitled "How the Soundboard Really Works." This handout, which is in outline form, guided the class through a series of mechanical, acoustical, and scientific propositions and principles. The first part of the discussion was general in nature in that it dealt with mechanical principles which are common to all engineering materials. The emphasis was, of course, on wood. Headings included "The Mechanical and Vibrational Characteristics of Wood" and "The Strength of Wood." Since all building materials, especially those employed in load-bearing capacities, are subjected to a variety of forces, no analysis would be complete without a look at Flexural (bending) Theory. Here the discussion revolved around beam mechanics, types of beams, and bending stresses.

Since the subject at hand is the piano soundboard, these theoretical discussions naturally segued into appropriate piano applications, i.e., the mechanics of the soundboard system. Did you know that the soundboard is a "two dimensional, wave-carrying medium"? Or that it is a "driven plate" and not a "driving plate"? These concepts were defined along with several others as a lively instructor-class dialogue ensued. Also mentioned were the two basic methods for crowning a soundboard, the "compression stress" and the "forced crown." The compression stress method relies completely on drying the soundboard panel to a very low EMC. Straight ribs are pressed flat on the dry panel after which the assembly is exposed to the normal atmosphere where it "bellies." In the forced crown method the ribs are pressed to the board in a curved or "crowned" caul. The ribs can be either radiused or straight but radiused ribs yield a higher crown, all else being the same. No matter how the board is crowned, though, the "long term stability of crown" in the loaded piano is an ever-present consideration for manufacturer and technician alike.

Del explained that it is essentially the function of the ribs to support or maintain the curvature in the soundboard. But there are contrary forces and inherent limits at work which tend to impair, if not actually undermine, the ability of the soundboard system to maintain a crown. One primary limit is the "elastic limit" of wood. Strained beyond this limit, wood will not return to its original shape. Another insidious factor at work is that of "creep and stress relaxation," the final end of which can render an otherwise healthy structure useless *given enough time.* Even with light loading, permanent deformation (not necessarily serious) resulting from stress often takes place in most load-bearing systems after several years, or maybe only several days. Initially, a certain material may pass a stress test indicating that it should be able to support a given load. But "creep and stress relaxation are time-dependent," and "strength characteristics charts are based on 'time under load' (TUL) of three to five minutes." What this means is that, in the short time period of the test, the material (or system) may look strong enough for a particular application. But over the long haul, that material could creep and pull like silly putty until it has essentially failed to serve its function. Such is the fate of most soundboards.

Probably the most intriguing aspect of Del's work in his field centers around "characteristic (or mechanical) impedance of the soundboard system." This impedance is defined as "the ratio of maximum force to maximum velocity. It is an indication of a vibrating

body's ability to accept or release energy." Wave impedance, on the other hand, is a little different; "When a disturbance is set up in one medium (i.e., a piano string is caused to vibrate) and it travels to a boundary between it and some other medium (... the soundboard) a certain fraction of the disturbance (energy) is transmitted into the second medium, and the remainder is reflected back into the first."

In more intuitive terms, it is obvious that a string given a certain energy (vibration) interfaces quite differently with a heavier, stiffer soundboard system than with a lighter, more elastic one. Del related an interesting story of a piano suffering from a bad case of the "wahwahs" and short-windedness in the upper treble. The usual causes were not apparent so it occured to Del that perhaps the string energies were buffeting the lightweight soundboard and bridge in that area. What effect would more mass in the bridge have? Key leads were inserted into holes drilled for the purpose, (Del owned the piano). When the strings were re-connected the "wahwahs" went away and the sustain time increased. The impedance ratios had been more closely matched. That is, the transmitted disturbance interfaced with the reflected disturbance so that neither was master nor slave.

If all this seems like pretty dry stuff, if you imagine class attendees sporting shirt-pocket calculators, or a white-smocked, beady-eyed instructor weilding a pointer like a rapier, then you've been watching too much bad television. After all, this was *Del*, and these were *Piano Technicians*.

A big man with a big voice, Del would not be at a disadvantage if called upon to use Dodger stadium for a classroom. Speaking ex-cathedra one moment, but then inviting an honest opinion the next, Del's ebullient and eclectic style of teaching grew out of carrying a physics book in one hand and a tuning hammer in the other. Equally large is Del's love and knowledge of the piano—and it comes through. But this instructor wasn't the only one in rare form.

The class turned in a performance which paralleled Del's. "What about this?" and "How about that?" they queried. But beware of Del. He tosses out a question like an activated handgrenade, and woe to the one who hastily jumps on it. "Wrong!" he insists, "Anyone else?" A tentative hand goes up. Del nods at it with an amused grin. The question is answered. We all wait. "That's two down. Do we have a third?" The class explodes in laughter but the questioning and answering and relentless probing continues.

Did we find out "how the soundboard *really* works"? Well, yes and no. And Del is quick to admit that the returns are not yet in on the subject. How could they be? Many controlled tests and much tabulated data are necessary in order to isolate the inevitable patterns of soundboard, behavior at given conditions. For many in the class, the instruction conveyed terms and principles which were obviously Greek to them. Others already familiar with the language were curious as to Del's investigations and interpretations. But, whatever the "Greek Comfort Zone," everyone learned *something* more of how the soundboard functions. And we did so under the care of one of the Guild's most animated and knowlegable instructors.

At Large

Learning To Pass The PTG Tuning Exam

Michael Travis
Washington, D. C. Chapter

Part I: Why Bother?

The PTG Tuning Exam, adopted by the PTG Council in Philadelphia, 1980 and most recently revised in Portland, 1989, is the most complete and objective evaluation of piano tuning skills available. The exam is administered under the guidance of the PTG Examinations and Test Standards Committee (ETSC), and requires the direct supervision of a specially trained and functionally sighted Certified Tuning Examiner (CTE).

This exam provides both an objective baseline for minimum or "entry level" tuning skills of Registered Technicians and a sufficient challenge for the masters of our craft. Those who pass this test with scores in the low 80's may congratulate themselves on achieving a milestone in their careers, but should not rest on their laurels; they should continue to advance their skills and perhaps try taking the test again at some point to evaluate their progress. Many examiners who have the experience to associate scores on the exam with how the piano sounds have expressed the opinion that high-level tuning skills are generally indicated only when test scores are in the 90's — the higher the better. To my knowledge, no one has ever scored 100% in all categories on any one exam.

Nevertheless, most who have tried have come away with a sense of the fairness and thoroughness of this exam as an evaluation of their abilities. This occurs partly by design: in the exam manual, CTE's are reminded that "The real success of a tuning examination depends on your ability to make it acceptable and valuable to the person who takes it." PTG examiners want you to succeed, and if you're willing to try, you're already more than halfway there. In this sense, a successful exam does not depend on whether you pass or fail so much as whether you feel your examiners treated you fairly. Whether you pass or fail, however, depends entirely on your performance. You may not perform up to your abilities on a given day, and for a variety of reasons. Among these could be your disorientation with the very process of the exam or a nervousness under pressure, as well as a basic lack of knowledge and/or skills.

When Rick Baldassin asked me to begin a series of articles on tuning and the exam, I had some reservations whether I could add significantly to the information already available in the way I thought he had in mind. Rick proposed a series which does for the tuning exam what the "Basic Skills" articles by Bill Spurlock and Fern Henry do indirectly for the technical exam: cover basic techniques with current information that all Craftsmen should know. As Bill has written recently, on the evolution of the current PTG Technical Exam, "Throughout this process I had been aware that examinees would frequently perceive the exam as unfair if it included content that they were not expecting. After all, if they had been in business for several years and had never done a certain job, that job must not be typical and was therefore unfair; never mind that other technicians might do that job routinely. In some cases the solution to this was to eliminate the test problem. However, the bigger fault was usually a lack of available information on basic technical procedures in Guild and industry media." The "Basic Skills" articles are one way of addressing this need and hopefully improving everyone's chances of passing the technical exam.

Those who require a comparable level of information on tuning, however, have had their needs more adequately met in all "basic skills" areas I can think of. I doubt that technicians who tune suffer from a lack of information on how they might improve nearly as much as from a lack of incentive. Perhaps their clients are not demanding or particularly discriminating, and they are making a good living without taking any tests, thank you. So why bother?

The challenge of beginning this series on tuning and the tuning exam is to stimulate your interest. What can I say that you haven't heard many times before about a group of skills that you probably practice every day? Just this: The local artist who raves about your work is probably not qualified to judge it critically, nor are any of your long lists of satisfied customers; if you haven't had your skills objectively evaluated then you have not taken full advantage of your PTG membership. The PTG Tuning Exam is almost 10 years-old, and we are now fully confident that it provides the most objective evaluation of piano tuning skills available. Your dues help offset the administrative costs of this exam so we can keep the exam fees low. A comparable professional evaluation in other trades could easily cost several times what we charge our members for the RTT Exams. Whether you are an established RTT or a "young whippersnapper," you owe it to yourself to find out just how well you can do, and I'd like to help you.

I am going to try to enlarge upon the base of information available for all those wanting to challenge the tuning exam, and make it specific enough for you to have a clear idea of how to make the best scores that your abilities allow. This information should not in any way

"spoil" the test itself; there is nothing I can say here that will change one crucial fact: whether you pass or fail depends solely on your performance. Of course, if you know what to expect on the test, you may be less nervous, work more efficiently, and be better able to do your best.

I am going to introduce you to the whole tuning exam process next month, and in subsequent articles I'll discuss techniques you may find useful in specific areas. And these are not merely test-taking techniques, but also practical tools you can use to improve your everyday work. From time to time I'll drop hints to you to point out some things you can do or some pitfalls to avoid in preparing for, and taking the test, because that's my slant on the subject. And here's a good place to begin:

Hint #1:

Tune a good-quality grand for an RTT and ask for a critical evaluation of your work. This opinion should give you an idea of whether your tuning would pass and, though not a guarantee, it could save you some grief (and exam fees) later. Get as many evaluations as you can from different RTT's.

Now that I've hopefully whettted your appetite for information, I'll stop here, but remind you that next month I'll be back with a new article on how we run tuning exams: what happens before, during and after an exam, what to expect. Future articles will deal with the specific areas of the test in more detail. In the meantime, you may want to review Jim Coleman's piece entitled "Passing the Tuning Test" in the August, 1988 *Journal*. And by all means, go get that critical evaluation; if you're ready to take the test, don't wait for this series to wind down—just do it! There's no better teacher than experience. I would also welcome your suggestions or questions, so feel free to write or phone; I'm in the PTG directory. ≣

Early Research On Velocity Of Sound In Air

Jack Greenfield
Chicago Chapter

Sound Travel In Vacuum Investigated

Among the questions scientists of the 17th century tried to answer were: Does sound travel as a result of some motion of the air? How fast does sound travel? Although ancient philosophers as far back as Aristotle and Vitruvius had proposed theories of sound waves in the air, some of the later theorists were skeptical since they could neither see nor feel movement of the air. One of the alternate theories advanced was that sound emitted a stream of minute particles in an action similar to the modern concept of atomic radiation. Experiments to determine if sound would travel in the absence of air began about 1615. These and others carried out during the next 35 years were crude, inaccurate tests that produced more confusion than conclusive results.

Kircher's Acoustical Studies

One of the studies conducted around 1640-1643 was described in detail by Athanasius Kircher (1602-1680), a German-born Jesuit, who became Professor of Mathematics in the College of Rome in 1635. Fifteen years later he published his chief work, "Musurgia Universalis," an abundantly illustrated 1,100 page encyclopedia containing a wide range of topics in sound and music. The vacuum tests Kircher described were conducted with a small bell held inside a glass globe from which air had been withdrawn. The iron clapper was swung by placing a magnet nearby just outside the globe and then withdrawing it. The sound of the bell could be clearly heard. While some observers believed this proved that sound could travel in a vacuum, others had the now obvious opinion that the presence of sound indicated that some air still remained inside the globe.

"Musurgia" contains many other items of an acoustical interest, some scientific and practical, others curious and speculative. Kircher's valuable studies on architectural acoustics and the propagation of sound through tubes and horns also includes some oddities he built; such as a portable loudspeaking horn nearly 10' long by 3' in diameter, which projected sound up to four miles away, and statues that appeared to speak or could be used for eavesdropping as sound was carried to and from the statue through a hidden conduit leading to someone who spoke or listened in an adjoining room.

Kircher described many musical instruments of the 17thcentury. He also presented his designs for a "clavicembalo," a keyboard instrument "bowed" by a rotating wheel, and automatic player organs and bells operated by large music box type rotating pinned cylinders.

Later Bell-In-Vacuum Tests

During the next 10 years similar bell-in-vacuum experiments were conducted by the Academia del Cimento, a scientific academy in Florence maintained by the grand duke of Tuscany, Ferdinand II (1610-1670). Tests were also conducted with a small organ pipe mounted inside a cylindrical copper chamber. Air to the organ pipe came from an externally operated bellows. Vacuum in the chamber was created by a hand-operated piston pump, evidently ineffectively, since there was no difference in loudness. The investigators concluded that air was not needed for transmission of sound.

During the same period, Otto von Guericke (1602-1686), an engineer of Magdeburg made tests with a mechanical timepiece that rang a high pitched bell on the half-hour. Air was withdrawn from the vessel that held the timepiece, by a new type of vacuum pump Guericke had invented. As air was withdrawn, the ringing sounds became weaker finally turning into dull thuds which could not be eliminated no matter how long the vacuum pump continued to operate. Guericke concluded "sonorous objects, such as bells, cymbals, glasses and strings of musical instruments produce their ringing by benefit of air," but mechanical, "noise and din is aroused not through the medium of air."

Boyle's Successful Test

Guericke's pump and sound experiment attracted the interest of Robert Boyle (1627-1691) an Irish chemist and physicist who specialized in the study of air and other gases. With assistance from Robert Hooke (1635-1703) an English scientist later famous for work on elasticity, Boyle improved the efficiency of Guericke's pump. He then repeated Guericke's sound experiment but used a watch that was not as loud. Boyle's test was successful with complete elimination of all sounds from the enclosed watch. In the discussion of his experiments in a book published in 1660, he concluded "whether or no air be the onely, it is at least, the principal medium of sounds." Boyle also discussed the mode of transmission of sound through the walls of the enclosure vessel and through media other than air. Final definitive demonstrations by Francis Hauksber in trials similar to Boyle's at 1705 meetings of the Royal Society in England gave confirmation "that actual sound is not transmitted through a vacuum."

Early Velocity Determinations

Serious research to determine the speed of sound began during the 1630's.

Marin Mersenne began the earliest intensive investigations. He used two different test methods. In one, a procedure which Francis Bacon suggested but never actually carried out, the interval between the sighting of a flash of a distant gun and the sound of the discharge was timed. In the alternate method, Mersenne measured the time for the return of an echo from a known distance. Since the clocks available were not accurate to seconds, Mersenne used a pendulum with a one second period. He found that he could pronounce a seven syllable word in one second. When he shouted this word at a reflecting surface 520 feet away, a responding echo followed immediately. His conclusion was that the sound had traveled at about 1,040 ft/sec—about 10 percent less than the presently known value under average conditions. His gunshot tests, less accurately timed, gave figures exceeding 1,400 ft/sec.

Pierre Gassendi (1592-1655), a contemporary of Mersenne also wrote about determination of the speed of sound by gunshot timing although his writings do not indicate whether he had drawn his conclusions from his own experiments or from Mersenne's studies. Gassendi discredited the Aristotelian view that velocity of sound depended on loudness. He pointed out that the simultaneous shots from a small musket and a large cannon could be heard at the same time. However, Gassendi had the mistaken belief that wind speed had no effect on the velocity of sound.

Further studies attempting to achieve greater accuracy were carried on in Florence by the Academia del Cimento. In 1656, scientists of the Academia, Vencenzio Vioni and G.A. Borelli, achieved better accuracy than Mersenne in a series of tests with gunshots and pendulum timing. They obtained a value of about 1,148 ft/sec. Research in France and England later in the 17th century was no more accurate.

Newton And The Theoretical Calculation Of Sound Velocity

Among the scientists concerned with the study of sound, Isaac Newton (1642-1727) introduced a radically new concept, a mathematical wave theory of sound propagation and the determined velocity by calculation. Newton's more general writings on dynamics — the relation between force and motion, were also highly vital to the advancement of the science of acoustics.

Newton, from a rural family in eastern England, had not been an outstanding student at Trinity College, Cambridge where he received a B.A. degree in 1665. He began to conceive his brilliant new theories in mathematics and physics during the next 18 months while at home in seclusion. He then returned to Cambridge and received his M.A. degree in 1668. During graduate work, he demonstrated such mastery of his studies that he was given the prestigious post of Professor of Mathematics.

During the early years of his career, he wrote extensively on mathematics, motion, optics, astronomy, chemistry and theology. He kept his writings in his diary, notebooks, and dictated lecture notes, but published very little, however. The academic world knew of his great learning through his correspondence with leading scientists and the papers he presented to the Royal Society. Finally, in 1687, persuaded by scholar friends, Newton published the treatise with his most important studies on motion and his mathematical theory of gravitation, "Philosophae Naturalis Principia Mathematica" ("Mathematical Principals of Natural Philosophy"). The publication of "Principia" brought international fame. He was accorded the same degree of respect as Einstein in modern times. Besides the Latin and English editions, "Principia" was published in French, German, Italian and Portuguese translations.

Newton had assembled a vast amount of material by earlier scientists including Galileo's studies and Kepler's observations of planetary motion. From this diverse information and his own discoveries, he derived simple, general principles for the relation between force and motion that apply throughout the universe — for astronomical bodies as well as for objects on or near the earth. He defined the nature of mass, momentum, inertia and force and stated the three basic laws of motion, concerning inertia, acceleration and reaction, and his theory of gravitation. He presented his work in the form of propositions, theorems, and problems which he proved and solved by geometrical reasoning and demonstration. Book II of the treatise has a section in which Newton discussed his theories of sound. He considered that sound radiating from a vibrating source, moved through gases and liquids as a series of pulses or compressions and expansions. By a long and difficult series of geometrical steps he demonstrated that such oscillations were the equivalent of the swings of a pendulum. Then, from the equation for motion of a pendulum, Newton derived his formula showing the velocity of sound in a gas equal to the square root of the ratio of the ambient pressure of the gas to its density:

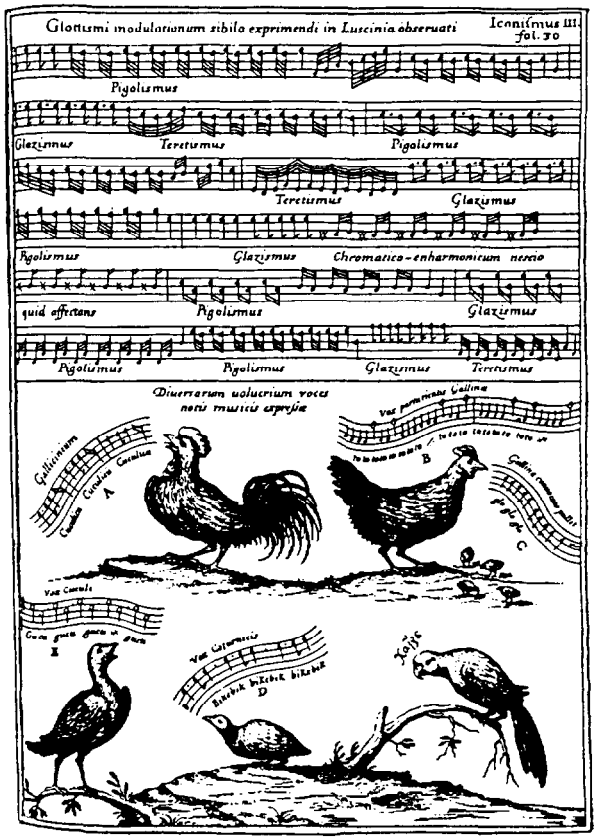
$$\text{velocity} = (\text{pressure}/\text{density})^{-1/2}$$

Newton calculated the velocity of sound in air using information on the physical properties of air then available. Since the value he obtained, about 970 ft/sec did not agree with experimental determinations, he attributed the difference to the inaccuracy of the experimental procedure. However after more careful tests confirmed figures of about 1,140 ft/sec, he began to suspect his formula lacked some factor that would give correct figures. In the 1713 second edition of "Principia," Newton offered a revised formula, but his explanation was implausible. He had made arbitrary and unjustified assumptions that gave him the mathematical figures he desired.

Newton now was not very active in scientific research. He had left Cambridge University in 1689 to enter government service. He had been appointed Warden of the London Mint in 1696, Master in 1699, a position he held for the remainder of his life. During his final years he worked on revisions of his writings and he remained President of the Royal Society after his election in 1703.

Revisions Of Newton's Calculation For Velocity Of Sound

Research on revisions of Newton's calculation of the velocity of sound was continued by others. Leonhard Euler (1707-1783) in 1727, 1749 and 1759, and Joseph Louis Lagrange (1736-1813) in 1759 revised Newton's reasoning and made his theory of sound propagation clearer and more generalized. Their mathematical results however were not much different than those obtained with



FROM KIRCHER'S "MUSURGIA," VOLUME I

Kirscher's Music Notation For Bird Calls

Newton's original formula. In 1738, to eliminate doubts about the accuracy of earlier experimental determinations, the Paris Academy had sponsored tests under carefully controlled conditions. Cannons were fired alternately at opposite ends of a measured 18 mile distance to allow for the effects of prevailing winds. Although the influence of temperature was not considered, temperatures at the observation posts were recorded. The velocity data obtained was quite accurate, close to modern figures.

Effects Of Temperature Change

Experimental evidence of the influence of temperature on the velocity of sound was first obtained in 1740. Count G. L. Bianconi made observations at the same locations in Bologna, first in winter and then in summer. Charles de la Condamine took low temperature measurements in 1740 and high temperature measurements in 1744, each at different locations in South America. For the remainder of the 18th century, the effect of temperature on the velocity of sound drew little interest.

A Correct Formula For Sound Velocity Determined

Soon after the start of the 19th century when physicists had gained a better understanding of the gas laws which state the relations between volume, temperature and pressure and other physics of gases, Pierre Simon Laplace (1749-1827) discovered the answer to the "Newtonian acoustical puzzle." Laplace pointed out that previous calculations did not consider temperature. He theorized that the condensations and rarefications of sound waves in air caused temperature variations too rapid to pass off as heat and cold to the surroundings but they produced pressure changes instead. Reasoning from the gas laws, Laplace derived the following formula:

$$\text{velocity of sound} = (\text{gas constant} \times \text{pressure/density})^{-1/2}$$

Laplace determined his constant for air from relevant data on physical properties observed in laboratory tests. His first constant gave an error of less than 3% in the calculated velocity. With a new constant based on more accurate data available later, Laplace's calculated velocity agreed with the velocity of air observed experimentally.

Laplace's formula was found very useful in acoustical research. Specific heat constants were determined for each particular gas under study. From the relations stated by the gas laws, a new formula was obtained for calculating velocity at different ambient temperatures.

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Velocity Of Sound In Various Materials

Substance	Temperature °F	Temperature °C	Speed ft/sec	Speed m/sec
Air	32	0	1087	332
Air	68	20	1127	343
Carbon Dioxide	32	0	846	258
Water	32	0	4626	1410
Water	77	25	4913	1498
Steel			16700	5100
Pine (along grain)			10890	3320
Maple (along grain)			13444	4111
Spruce (along grain)			15000	4572
Spruce (across grain)			5000	1524

At Large

The PTG Asian Tour

Yat-Lam Hong
Western Michigan Chapter

The 1989 PTG Asian tour started from, and ended in, San Francisco. Covering the period from May 25 through June 14, it was essentially a tour of piano factories in the Orient, during which we visited seven piano factories in all: two in China, three in Korea, and two in Japan. We discovered one of the factories (the one in Xian, China) practically by chance when some of us visited the Xian Conservatory of Music.

The 35-member group that tour director Charles Huether led was a very diverse one. Eleven members had previously been on the 1986 PTG European tour, so about a third of the group already knew each other well to begin with. Of the 35, 14 were Registered Tuner-Technicians (RTT); six were Associate members; and the remaining 15, spouses and tourists. Although the average age of the group was 56, the actual age range was from 25 to 89, and our interest in pianos ranged from all-consuming to nil.

With a group this diverse, I'd be lying if I told you that everyone got along perfectly well with everyone else at all times, that we never argued about petty things like how much to tip our tour guides or whether to pay extra for the romantic notion of "eating Beijing duck in Beijing," or that there were no moments of friction among ourselves throughout the twenty-one days of togetherness. As can be expected in any group this large, we had a few know-it-alls who had no qualms about dispensing their wisdom on every topic under discussion. They soon came to be known as the ones to avoid, and it was dismaying to be confronted day after day with evidence that age and maturity don't always go together.

But on the other hand, we also had our share of clowns, who would break up tense moments with a few well-placed wisecracks. One of us even developed the strange habit of blessing all our buses with stick-mounted dried lizards! It may sound like a cliché to say this, but there was honestly not a dull moment, and we got to know each other better than we ever thought we would.

Our trip was exciting in many other ways, too. Who'd have thought that we'd be attending a wedding in mid-air on our way to Hong Kong? Or eating live snake and eels in Guilin? Or having the Great Wall of China practically all to ourselves? Or dodging machine gun fire in Beijing? Or visiting the super-luxurious Tsumagoi resort in Japan as guests of Yamaha?

As nobody could, or would want to, experience everything, the 35 of us actually had 35 different tours, although physically, we might be in the same airplane, bus, boat, train, hotel, restaurant, factory, etc. This report represents only the highlights of *one* of these tours.

Our first round of excitement came on board United Airlines flight #805 en route from San Francisco to Hong Kong. On this non-stop flight, two members of our group, Claudia Ellison, RTT, and L. Paul Cook, were united in holy matrimony by the Rev. Edwin A. Hilbert, RTT, who was also a member of the group. The idea of getting married on board a plane in flight is surely a novel one, but this particular wedding had another purpose: to enter the Guinness Book of World Records as the world's highest (35,000 feet) and fastest-moving (traveling at 600 mph) wedding that spanned two days (May 25 and 26, as we crossed the International Date Line, which, in our case, was about 1,000 miles west of Hawaii.) The event was elaborately planned.

It was also a very cramped one, as the wedding took place in the landing between the rear emergency exit and the toilets — a space no bigger than 4' x 6'. Jeremiah Clarke's Trumpet Voluntary was played over the intercom (a prerecorded tape with Anne Doerfler on the pipe organ) as the bride and groom, both draped in flowers, walked down the two aisles of the Boeing 747-SP jumbo jet. So that all 202 passengers on board could participate, the entire ceremony was broadcast over the intercom — over the reassuring rumble of the jet engines. Those who managed to squeeze into that tight space were all busy recording the ceremony on tape recorders, cameras, and video cameras — including the several stewardesses, who were taking photos for the United Airlines newsletter. The wedding and celebration lasted fourteen hours, and nobody left early.

After the ceremony, the stewardesses were busy serving champagne. By prior arrangement with the airline, a piece of the whipped-cream-and-fruit wedding cake was served as dessert with everyone's dinner. The mid-air wedding was truly an unearthly experience, and I have no doubt the event will make it into the Guinness Book of World Records. As we flew west and kept gaining on daylight, the sun never set in all of fourteen hours we were on board, which is certainly a good omen for the new couple. Obviously for creative inspiration, our newlyweds bought an educational ivory carving while in Hong Kong, which was also the object of much curious admiration. If you guessed this couple is from California, you're right.

From Hong Kong, we traveled to Guangzhou, China, by train. This is the city long known to westerners as "Canton." The train was a rather slow one, as the 88-mile trip took two-and-half hours, but it provided us with a relaxing opportunity for sight-seeing along the way, which we wouldn't always have at some later segments of the trip — as we rushed to make travel connections.

That evening, we were the guests of the Pearl River Piano Company for a welcoming banquet at a fancy restaurant. It gave us a chance to meet our hosts, who were to guide us through

their factories the next day. This 12-course banquet was an exquisite affair: Every dish came with more food than we could eat, and some food was always left on the serving platter to be taken back to the kitchen afterwards. This was so nobody had to take the last piece of anything. Our plates and bowls were replaced with clean ones after *each* course for *each* person — so the flavor of one dish wouldn't get mixed with that of the next. (This banquet must have been a dishwasher's nightmare.) This kind of elegance is normally reserved only for the most important guests, and we were greatly honored by such treatment. When the chicken dish came, Charlie Huether was served the chicken head, as he was the "head" of our group — a "punny" gesture that Charlie took in good humor.

Pearl River is the largest and the most modern of the four piano manufacturers in China — not counting the various "mom-and-pop" operations scattered throughout the country. Based in Guangzhou, it has two factories: the old one in the city, which we could see from our hotel across the Pearl River, and the new one in the country, about five kilometers to the south. As with most manufacturing facilities with more than one location, the story is the same: By the time the original factory runs out of space, the adjacent land is already taken up by other businesses, and the only way to expand is to build a new facility far away. This means some of the unfinished products have to travel between factories to become completed instruments, and some of the supervisors also have to go back and forth to ensure smooth operations at both locations. Both Pearl River factories are enormous seven-story structures, and we visited the new one in the morning, and the old one in the afternoon, accompanied by about ten supervisors and administrators.

The new factory has a huge lumber yard (50,000 square meters), where large quantities of wood are being seasoned and stored. As large as it is, that lumber yard was already undergoing another round of expansion, as bulldozers were clearing off more land. We were told that, should further expansion become necessary, there's enough land at this site to expand to, and a totally separate third location wouldn't be necessary. Miss Liang De-Yan, the Assistant Manager, told me that they have to be careful about expanding too fast, because seasoning of wood is a process that cannot be rushed, or the quality of pianos would suffer.

Although both factories are equipped to produce complete pianos from scratch, they do specialize. The rough-sawing and seasoning of lumber and case-finishing are mostly done in the new factory, while action work, stringing, tuning, and voicing are done in the old factory.

Obviously trying very hard to become self-sufficient, most materials used in the Pearl River pianos are produced in China. Chinese maple from northeast China is used to make their action parts and 17-lamination pinblocks. Camphor wood, an evergreen native to China and Japan, is used for soundboards. Tuning pins, center pins, and miscellaneous hardware (hinges, pedals, etc.) are all made at the old factory. Some of the imported items include steel strings from Germany, hammer felts from England, and mahogany from Malaysia.

However, most of the machinery is imported from Italy, Japan, and Germany. We even saw some hammer presses that Pearl River purchased from a defunct American hammer manufacturer. It was interesting to note that, as in European piano factories, almost all the machines were painted green — for safety reasons. (Psychologists tell us that green has a "calming" effect on people. Could this be why U.S. currency is also printed in green?)

After stringing, the pianos are to be chipped five times — starting at 100 cents above A=440 Hz., and dropped 20 cents with each succeeding chipping. The final tuning is done at 10 cents sharp (about A=443 Hz.) to allow for settling during shipping. I was delighted to see that every tuner at Pearl River tuned the vertical pianos (the only kind it produces at the moment) with the left hand. Just to make sure this was not a coincidence, I asked one of the supervisors about it. He said, "Vertical pianos should only be tuned with the left hand." Obviously, someone had taught them right. It's only logical to assume that, when Pearl River starts producing grands, they will be tuned with the right hand.

Incidentally, plans for the 5' 6" Pearl River grand have been in the works for several years now. According to Xiao Yong-Long, the technical supervisor and head of research, it'll be going into production soon. And Pearl River grands will only be produced at the new factory, where huge elevators big enough to carry 60 people at a time can simplify moving the pianos around between floors. I first met Mr. Xiao, who speaks only Chinese, at the Atlanta NAMM Show last year, where we had a long discussion on pinblock drilling. (For most Chinese names, the hyphenated or double-syllabic one is the first name, which follows the last name.) It was like meeting an old friend again — seeing him 8,000 miles away.

Of all the factories we visited on this trip, I enjoyed Pearl River the most. It was perhaps an ideal way to visit a piano manufacturer. We spent a whole day at one company, which allowed ample time to see every operation in the manufacturing process — from the lumber yard to the shipping department, where we got to try some of the finished instruments and judge the quality for ourselves. We also had time for a question-and-answer session in a relatively quiet room, which is almost always necessary, since the deafening noise of the machinery in the plant often made conversations impossible.

Being Chinese and fluent in the three main Chinese dialects (Mandarin, Cantonese, and Shanghainese), I had a major advantage over the rest of the group, which greatly facilitated the gathering of information. Much of the time, I spoke in Mandarin and Cantonese with our guides, but when I detected a slight Shanghai accent in one of them, I switched to Shanghainese to make *him* feel more comfortable. This was admittedly an overkill, but it's probably no crime having a little fun.

As long as I'm on the topic of language, I must relate a funny incident in Guangzhou. We'd just gotten off the train and cleared customs, and our tour guide took us to lunch at the Pan Hsi Restaurant — a huge establishment that serves 18,000 customers a day. Already reserved for us were three round tables, each with 12 chairs, which ought to seat all 35 of us. However, seeing the size of some of us, the waitresses replaced some chairs already set with bigger and sturdier ones. Clearly, the intention was to protect us as well as their furniture. However, the few bigger chairs caused a space problem, and the regular chairs had to be squeezed together a lot tighter to make room for them. Obviously thinking that none of us could understand her, one waitress complained loudly to another in Cantonese: "Americans are so fat, a table set for twelve just won't

seat twelve!" I had a good laugh over that remark.

People tend to talk a lot more freely when they speak the same language. Being a curious person, I asked a lot of questions at Pearl River, and our guides answered all of them without the slightest reservation. One of the things that always fascinates me is the working conditions of the people. I learned that the employees there work an average of 48 hours a week: from 8:00 a.m. to 5:00 p.m. Monday through Saturday, with an hour off for lunch, which is heavily subsidized by the factory. (Li Da-Su, the company president, said that, because of his heavy responsibilities, his schedule is from 7:00 a.m. to 7:00 p.m. — also six days a week, and he still gets behind.) Typically, lunch consists of one serving each of a soup and a meat/vegetable dish, plus unlimited quantities of rice and hot tea. The menu varies everyday, but the format remains the same. In addition to having every Sunday off, the employees also get three holidays a year. The concept of a "vacation" (an extended and uninterrupted period of, say, a week or more off) is unknown here. The flat roof top of the factory building offers a nice view of the countryside, and it is available to the employees for parties, dances, concerts, picnics, and celebrations of one kind or another. Salaries vary, depending on the individual's level of skill and responsibility, but the range is rather narrow, which means the president of the company makes more than the janitor, but not very much more. The average salary is 300 Yuan per month (about US $81.00) — not a great amount, but it's a living wage in China. Medical needs are all provided for by the state, which also owns almost everything.

While visiting the old Pearl River factory in town, our hosts treated us to a 14-course lunch, prepared right there by their cafeteria staff. This was literally "factory food." What it may have lacked in finesse, it more than made up with quantity. Not knowing this was going to be a 14-course meal, we ate and ate, and more food kept coming. The expression "pigging out" must have taken on a new meaning that day!

For some reason, Pearl River seems to see South Korea as its greatest competition. There was a huge sign on a bulletin board which listed 12 areas where, in the management's opinion, Pearl River pianos are inferior to Korean ones. The first one read: "Our tuning pins are not as tight as theirs. We must make them tighter." Another one read: "Our hardware is not as well-polished as theirs." It was a no-holds-barred self-evaluation, and I was amazed by its frankness. The fact that this sign was all in Chinese seems to indicate that it was strictly for internal consumption. (Otherwise, it'd be in English, German, Japanese, and other languages foreign visitors could read.) It's clearly a reminder to all employees that there's room for improvement and that everyone must strive to produce a better product. Working long and hard is certainly one way to achieve this goal, and we could see this no-nonsense attitude at work throughout the entire factory. I was truly impressed. In case anyone thinks I'm just being sentimental because this was my first trip back to China after being away for 37 years, let me assure you I wasn't the only one who felt this way. John Ford of New York City, another member of our group, later told me, "When I left Pearl River, I nearly cried. I felt like taking my jacket right off, and get on the production line to work with them, and share with them what I know about pianos."

The annual production at Pearl River is about 25,000 pianos, and the company has 1,400 employees, each earning an average monthly salary of $81.00. A simple calculation shows that the average labor cost per piano is only $55.00, which should give Pearl River an enormous price advantage. I'm sure that, in time to come, Chinese pianos could be a formidable competition in the world market.

We were given Pearl River souvenir pins, tea cups, and miniature soundboards as mementos of our visit. On our way out, we had our group picture taken under a colorful bi-lingual sign made specially for us. Its English portion read: "With Pearl River Pianos heartiest welcomes to International Relations Piano Technicians Guild Inc." In spite of the grammatical errors, the message of goodwill is unmistakable. It's a visit we'll long cherish in our memories.

From Guangzhou, we flew to Guilin on CAAC (Civil Aviation Administration of China) — China's national airline, which operates all domestic flights. It was a short flight (225 miles by air).

Guilin (meaning "forest of cassia trees") is a city of 600,000, and is world-famous for its limestone mountains, which geologists call "karst formations." There are about 6,000 of these craggy, toothlike mountains in Guilin that rise straight out of the plains. Only three places in the world have mountains like these — the other two being Guiyang and Kunming, both also in China — but the ones in Guilin are the most spectacular. They're what attract tourists from all over the world to this city in the Guangxi Zuangzu Autonomous Region, which is also the home of China's largest minority, the Zuang people. As our tour guide said, "In Guilin, we live on the scenery."

Although these mountains can be seen from almost anywhere in the city, we took the famous cruise down the Li River to have a closer view. As we wound our way downstream, the mountains practically came at us like "waves" on both sides, and there were waves behind these waves — for as far as we could see. It was an overwhelming sight. The inspiration of many artists throughout the centuries, these limestone mountains of Guilin have been called the most scenic sight in China, and that's probably not an exaggeration.

For me, one of the fun things to do while traveling is to sample the local cuisine. One evening while in Guilin, two American friends and I decided to have a dining adventure: We went downtown for a meal of snake and eels. The restaurant we picked happened to be an outdoor one — a "sidewalk cafe," if one chooses to use an elegant term. It served live animals cooked to order, and we watched and filmed the preparation from start to finish. It was another memorable experience.

The snake we ate was a poisonous one, about five feet long. First, the chef chopped off its head and tail, and then removed the skin and internal organs. In the last throes of a death struggle, the rest of the snake still wiggled violently on the chopping board, and the chef had to pound it with his cleaver repeatedly to "quiet it down," so he could slice the meat neatly. The sidewalk and curb were littered with animal skins, entrails, blood, etc. If you think the method of preparing the snake was bloody, the way the eels were prepared was even more so. Let's just say it surely wouldn't have earned any certificates of honor from the Humane Society. As we watched all that blood and gore, my friends became a bit nervous, and asked me, "Is this really safe to eat?" Pointing out the obvious, I said, "Yes. The meat is guaranteed fresh." As it turned out, fresh snake and eels were delicious — although that particular snake was a bit

tough. As we left the restaurant, the tail of the snake we just ate was still moving by the curb. It was an eerie sight.

Like countless others, this restaurant had its share of cages where live animals (chickens, ducks, pigeons, turtles, etc.) are kept, which are slaughtered and cooked when customers order them. To Americans, butchering live animals immediately before eating them may seem incredibly cruel and inhumane, but in China and many other poorer countries, it's often a necessity. These animal cages (or fish tanks, for that matter) are really the equivalent of the refrigerator or freezer. They're a means of food preservation: as long as the animal is kept alive, the meat will not spoil, and it's safe to eat. Not only do many restaurants have no means of keeping food refrigerated, the only source of electricity that particular one had was just a single wire hung between trees, which powered two light bulbs. Everything else had to be self-contained: the stove ran on charcoal, and water was carried there in buckets and stored in tanks nearby. If this restaurant were in the United States, before the animal-rights people could picket it, it'd have already been shut down by the government for numerous violations of health codes.

But then, most Americans buy their groceries in supermarkets, where meat almost always comes in neat plastic packages, wrapped in clear cellophane, already weighed, priced, dated, and kept under refrigeration. When they have steaks, for example, the fact that they are eating the carcass of a dead cow probably never crosses their minds — because the killing and the bloody scenarios took place far from the supermarkets, and the customers never have to see them. It's a case of "out of sight, out of mind." But in a poorer country, people are forced to live a lot closer to Nature—as the intervening steps between production and consumption (refrigeration, packaging, advertising, etc.) are costly and have to be kept to a minimum, or nobody could afford the product. Therefore, food has to be eaten while it's still fresh, and when going places, they walk or bike, rather than drive, which is probably not all bad. It's a life-style that has evolved out of necessity over many centuries, although unfortunately, those who don't understand it may see it as "primitive" or "barbaric."

From Guilin, we flew to Xian, the largest city in northwest China, which was also the ancient capital of the country, and the beginning of the historic "Silk Road"— a major trading route of the past. The 600-year-old city walls still stand there, parts of which have been rebuilt and open to visitors. The city has now grown considerably beyond these walls.

The day of our arrival, 12 of us decided to visit the Xian Conservatory of Music while the rest of the group went sightseeing, so we split for the afternoon. Not knowing where the Conservatory was, we decided to go by taxi. As only one taxi was available, it had to make three round-trips to get all 12 of us there, and three more round-trips to bring us back to the hotel afterwards. The driver was patient, and we tipped him accordingly.

Xian Conservatory is not just one building; it's a complex of perhaps 20 buildings. Not knowing where to go once on campus, we just told the taxi-driver to take us to the "piano department" — thinking we'd see its pianos, practice rooms, etc. But the driver misunderstood us, and instead took us to the musical instrument manufacturing division, which makes pianos among other instruments. Thus, we discovered a piano factory purely by accident. Although it's part of the Conservatory, this 60-employee facility is a professional manufacturer of instruments, and not a training ground for students to learn how to build them. Its main product is the "cheng," a large zither-like folk instrument with movable bridges (something similar to the Japanese koto) for which this factory is largely known. Its annual production of 300 chengs is sold to customers in Japan, Hong Kong, Taiwan, Korea, the United States, and other countries. As a sideline, it also makes some 20 violins and 10 cellos a year.

Its piano department produced six instruments (all 47" verticals) last year. This is one of those "mom-and-pop" operations few people have heard of. It's essentially an assembler of piano parts purchased from Pearl River Piano Co. in Guangzhou, and assembled with hand tools. Thus, it may be more appropriate to call this outfit a "workshop" rather than a "factory." All six pianos produced last year went to service in the Conservatory's classrooms. Since the consumption is all internal, the workshop didn't even bother to put any labels on them. It was here that we were privileged to see the first harpsichord built in China: it was still in the shop getting its final regulation. When not building pianos, the shop's technicians are busy servicing the Conservatory's 300 pianos, ten of which are grands. Like students there, most of the employees live on campus in facilities provided by the school. We saw a few chickens (meat, not pets) being raised there as well as small patches of vegetable garden in the back.

We also met Mr. Liu Da-Dong, the director of the Conservatory, who filled us in on some background information about his school. The Conservatory has about 600 students and 500 faculty and staff, although not all employees have dealings with the students. (The instrument factory is an example.) The Conservatory is really three schools in one: elementary school, high school, and university, and its students range from children to adults. Admission is strictly by competition, and those judged to have no talent for music need not apply. The Conservatory offers six areas of study: piano, orchestral instruments, Chinese instruments, voice, composition, and music education. Mr. Liu complained to us about the very small budget the state gave him to run the school. Not only was the budget terribly inadequate to begin with, what's allotted was also constantly being trimmed back — further tightening an impossible situation. He said there's not enough money even to maintain the buildings, and buying new pianos from outside is simply out of the question. In the meantime, life has to go on for his faculty, staff, and students — regardless.

From what we could see, Mr. Liu was not exaggerating his plight in the slightest. The run-down building where applied music is taught was a good example: The paint was peeling; plaster was broken at numerous places; the very long, dark, main hallway had only a single lightbulb in the middle for illumination; the odor of fermenting urine from the bathrooms (located near the entrance) was overpowering. It was in this building where we met a professor of piano, who tried to play for us part of the Grieg Concerto she was learning. The piano in her studio was a vertical built by Hsinghai in Beijing, and it was badly out-of-tune. Apparently, the technicians were way behind schedule in making their rounds. The 800-seat concert hall had two concert grands backstage: a 40-year-old Hamburg Steinway and an 80-year-old Blüthner, both are in dire need of rebuilding, but there was no money to

buy parts with.

That evening, we returned to the Conservatory for a concert by the school orchestra, for which Mr. Liu was the conductor. The ambitious program consisted of a single work: Beethoven's Ninth Symphony. Although at times the orchestra played with more energy than polish, it was a very respectable performance. The soloists and choir in the last movement sang in a Chinese translation, and all from memory. After the concert, we met with Mr. Liu backstage, and presented him with a gift for his school: $150.00 that we had collected among ourselves earlier. It wouldn't solve his budget problems, but it was a small token of our appreciation.

The next day, we visited one of the greatest archeological treasures in the world: Emperor Qin Shi Huang's underground funeral vault, where over 7,000 life-size terra cotta warriors were buried and grouped in battle formation to protect the emperor in the underworld. Built 2,000 years ago, the site was discovered only in 1974, and the digging, repairing, and cataloguing are still far from complete. What was already dug up was an awesome sight. The terra cotta soldiers were left exactly where they were originally buried — about 20 feet underground, and only the dirt around them was removed to reveal these figures. The site measured 200' x 700', and over this vast space, a single roof had been built, so the work of the archeologists could continue without being affected by the weather and the flow of tourists could also continue without interruption. Even though I'd seen the sight before in photographs, they didn't prepare me for the real thing. The scope of the Emperor's project was simply breathtaking. Judging by the number of tourists there, this site has to be a source of considerable income for the government. In addition, photography by tourists is strictly forbidden, as the officials prefer that we buy postcards and slides from the gift shops nearby. This site is about 23 miles east of Xian, and is the major reason tourists come here from all over the world.

We were to leave Xian for Beijing the next day at 2:00 p.m., but shortly before we were to depart for the airport, we were told that our flight had been cancelled, and that we were to take the 7:00 p.m. flight instead. The reason for the delay, we later learned, was that the 2:00 p.m. flight was nowhere near full, and it'd be more fuel-efficient for the airline to combine us with the 7:00 p.m. passengers. Being the only airline in China, CAAC could do whatever it wanted: make the rules, and change them at will. Inconvenience to the passengers is a secondary consideration, if at all, as it doesn't need to worry about losing business to any competitor. But this is a fact of life travelers in China have to resign themselves to.

To fill the extra five hours, our tour guide took us to visit one of the largest communes in Xian, where about 5,000 people live and work together. It had its own kindergarten, schools, medical clinic, animal and vegetable farms, and factories that produce craft items for tourists. We were told that the people were very friendly, and that we could visit any homes just by walking in. We did visit a few, and all of them looked rather prosperous by Chinese standards. For example, one family of four had a two-bedroom apartment with its own living room, dining room, kitchen, and bathroom. The living room had a working color television set, and the kitchen had running water and a refrigerator. For life in the country, it just seemed unnaturally prosperous, which made me suspicious. So, during a quiet moment, I cornered our bus driver, and asked him whether he had been there before. He said, "Yes, many times." That confirmed my initial feeling that we were seeing what the government had wanted us to see: a cleverly disguised propaganda machine. Although they enjoy a few special privileges, the residents there were really being used as "stage props" in a performance to impress visitors.

By the time we arrived in Beijing that night, it was already past 10:00 p.m. It was June 3 — the night the massacre was to take place at Tiananmen Square, although we had no way of knowing that at the time. Our tour guide told us that the Hsinghai Piano Company, which we had hoped to visit, was "under renovation," and could not receive visitors. (Few of us believed that.)

On our long ride from the airport to the hotel, we saw a lot of soldiers in army trucks parked by the roadside, and all of them were surrounded by crowds of people talking to them — just as in U.S. news photos we'd seen. Due to the total news blackout in China, we didn't know how serious the situation had become. The next day, our guide told us that all the sights we were scheduled to see were closed, except for the Summer Palace, which was where we went. Traffic on the way was sparse, but instead of staying on the main roads, our bus driver would zigzag through all the side streets at high speeds to get us there. It looked like reckless driving. What he was really doing was trying to avoid meeting army trucks face-to-face, and risk being stopped and have to answer questions. It was for our safety. Along the way, we could see burnt and overturned army trucks, jeeps, and buses, some still smoldering with flames. Numerous traffic dividers, made of heavy steel bars set in concrete blocks, were twisted like pretzels, and the streets were littered with broken bricks. It looked like there had been a war, but we didn't see any bodies. Still, nobody told us anything, but it was obvious something had gone terribly wrong. We returned to the hotel in the early afternoon in the same zigzaggy fashion. Our tour guide advised us to stay in "until further notice."

Our hotel, the Beijing-Toronto, is right on Changan Avenue (a major thoroughfare running east-west through the city) about five kilometers east of Tiananmen Square. By then, the U.S. Embassy had put up a sign for all Americans staying there, which read: "June 4, 1989. Notice: The American Embassy advises all American guests of the hotel to remain inside the hotel. The situation is extremely dangerous." It was a terse message, but still not very specific. So, we stayed in the hotel the rest of the day, trying to get some news from radio, TV, and newspapers, but none of it told us anything we wanted to know. I learned from the hotel doormen and waiters that, because of the killings in the Square, all tourists were leaving, and the hotel was then only about 10% full — while normally it's so packed that, if anyone arrived without reservation, he had no hope of getting a room there.

Charlie Huether had tried to change our flight, so we could leave on Monday, June 5 — only to discover that United Airlines doesn't fly out of Beijing on Mondays, and that our original scheduled flight for Tuesday, June 6, was the next available flight out of Beijing anyway. So there was no point in rescheduling. As it turned out, our flight was the last scheduled flight out of Beijing. The subsequent ones were all evacuation flights chartered by the State Department to get the Americans out.

Still, we didn't know how bad the situation had become, and we asked our

tour guide if we could at least see the Great Wall on Monday. After much head-scratching, he relented, and said he could possibly take us to the Mutianyu section of the Great Wall. This is the newly restored section, less traveled, and less accessible than the old section (called Badaling), and it's about 50 miles northeast of Beijing. Mutianyu is a lot steeper than Badaling, but it's equipped with a Swiss-built cable car system, and the view from the top is superb. The main reason he picked Mutianyu was that, on this more isolated route, we'd be less likely to run into army trucks and possible trouble, although he didn't tell us that at the time.

Came Monday, and we were off to Mutianyu. The driver again drove in his zigzaggy fashion. One of us made the comment that we were a "dying breed"—a deadly appropriate pun under the circumstances, which broke us all up. Only two thirds of our group went on this trip, while the rest decided to play it safe, and stayed at the hotel.

The 4,000-mile-long Great Wall has had an extensive history. Its first sections were built as early as the fifth century, B.C., and the rest was linked up under Emperor Qin Shi Huang Di in 221 B.C. Since then, the Wall has been abandoned and rebuilt many times. It winds around, following the top of the mountain ridges. The newly rebuilt Mutianyu section has 22 watchtowers, and paved with stones, some weighing as much as a ton apiece, and each one of these had to be carried to the mountain top without the help of modern machinery. This should give you an idea of the immensity of the project. The day we were there, there was only one other bus of tourists. So, we practically had the whole Great Wall to ourselves. Without the thousands of visitors who crowd the place on normal days, it was very, very quiet up there, and we couldn't help being awestruck by the sight. In that silence, we could almost visualize the thousands and thousands of people who had died building, attacking, and defending this great wonder of the world throughout the history of China.

That afternoon, we were again cooped up in the hotel, and became restless. After all, we didn't come all this way just to sit in the hotel, even though the Beijing-Toronto is a first-class facility. We thought about the sign from the U.S. Embassy, and finally decided that the warning was really more for its protection than ours—so if anything terrible happened to us, it could claim, "Don't say we didn't warn you."

It was a dangerous and erroneous conclusion we arrived at, but we didn't know it at the time. So after dinner, five of us decided to walk to Tiananmen Square to see the situation for ourselves. Along the way, people were gathered in groups of one or two hundred every few blocks apart. To get some real news, I'd work myself into a crowd, pick out a person who looked "approachable," and start asking dumb questions. (Knowing the language really makes a difference there.) One exchange actually went like this:

"What's going on?" I asked.

"Lots of people died over there last night," he said, pointing in the direction of the Square.

"What happened to them?"

"The tanks drove over them."

"What tanks?"

With a disbelieving look as though saying "Where have you been?" he started to tell me what he knew about the situation. And then, I'd tell my American friends in English what he said.

I did this five times along the way, and the stories all agreed closely. And the fifth time, we were only half a block away from the Square. As I was talking with a man near a lamppost, suddenly we heard machine gun fire blasting away just ahead of us. He said, "Get down! Get down!"—and we both crouched behind the lamppost base to avoid being hit by bullets. (At close range, machine gun fire sounds just like firecrackers—only louder.) I saw my friends duck behind some bushes near the buildings, and that was the last I saw of them until we got back to the hotel.

As soon as the firing stopped, everybody turned around and ran as fast as possible away from the Square. The hundreds of people who were ahead of us were now behind us. When so many people ran for their lives in the same direction, they created a weird noise that sounded something like a "whoosh" with a crescendo to it. It's probably from the movement of the air, but it was a hair-raising noise that I'd never heard before or since.

As I ran the five kilometers back to the hotel, it was already pitch-dark, and I could see army trucks in the side streets making their maneuvers for another round of action. I couldn't rest until all four of my friends were accounted for. None of us knew we could run so fast, and it must have been the only time I ran this far without warming up first. Anyway, the experience was more excitement than we'd bargained for, and we still haven't seen Tiananmen Square! But, who says we can go to Beijing only once?

The next morning, our bus was parked at the back door of the hotel by the garbage dumpsters, so we could load and leave without attracting too much attention. It was a tense trip to the airport. Once we got there, it was total pandemonium. There must have been several thousand foreigners trying to leave the country. It was a scene of mass confusion: Everyone was waiting in a line for something, and the lines all crossed each other, some more than once. The noise was deafening. The airport employees tried to maintain order by shouting instructions through megaphones, but they couldn't be heard at all. It was here that we learned the importance of two documents: a U.S. passport and a ticket with a confirmed reservation. We had both. Even so, we had to wait a few tense hours before we could board our plane. As soon as it was airborne, everybody broke out in applause. We even signed a letter of appreciation to United Airlines for making the difficult negotiations with the Chinese government to fly into Beijing that morning to get us out. ≡

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Membership Status

Northeast Region	845
Northeast RTTs	545
Southeast Region	598
Southeast RTTs	400
South Central Reg.	325
South Central RTTs	217
Central East Region	624
Central East RTTs	404
Central West Region	368
Central West RTTs	262
Western Region	623
Western RTTs	420
Pacific NW Region	331
Pacific NW RTTs	225
Total Membership	3763
Total RTTs	2473

Coming Events

Jan. 5-6, 1990	**Arizona State Seminar** Aztec Inn, Tuscon, Arizona Contact: Kathleen Kattija-Ari, 4743 East Bellevue, Tuscon, AZ 85712 (602) 326-4936
Feb. 16-18, 1990	**California State Conference** Irvine Hilton, Orange County Contact: Austin Mason, 25842 Ave., Cabrillo, San Juan Capistrano, CA 92675 (714) 661-1416
Mar. 2-4, 1990	**South Central Regional Spring Seminar** Hilton Hotel, Santa Fe, New Mexico Contact: Joanie Wagoner, Rt. 4, Box 50-C, Santa Fe, NM 87501 (505) 984-8179
Mar. 29- Apr. 1, 1990	**Pennsylvania State Convention** Warrendale Sheraton Hotel Contact: David Barr, 524 Jones Street, Verona, PA 15147 (412) 828-1538
April 7, 1990	**East Tennessee One-Day Seminar** Heritage Music, Inc., 7212 Kingston Pike, Knoxville, TN Contact: Tom E. Graves, 228 Hillcrest Dr., Knoxville, TN 37918 (615) 688-0916
April 20-22, 1990	**Michigan State Conference** Lansing, MI Contact: Les Jorgensen, 4201 Wabaningo, Okemos, MI 49964 (517) 349-5959
April 26-29, 1990	**NELCRO Seminar** Hotel Auberge Des Gouverneurs, Québec, Canada Contact: Roland Bessette, C.P. 364 SNCC, Brossard, Québec, J4Z 3N3 Canada, (514) 444-1135 or (514) 465-8076
April 26-30, 1990	**Midwest Regional Seminar** Henry the 8th Hotel, St. Louis, MO Contact: Liz Baker, 16301-A Manch Rd., Glencoe, MO 63038 (314) 664-4914
May 18-19, 1990	**Intermountain Seminar** Provo, UT Contact: Jack Reeves, 486 N. 300 W., Orem, UT 84057 (801) 225-1757
July 7-11, 1990	**33rd Annual PTG Convention & Technical Institute** Hyatt Regency Dallas at Reunion Contact: Piano Technicians Guild, Inc., 4510 Belleview, Suite 100, Kansas City, MO 64111 (816) 753-7747

THE AUXILIARY EXCHANGE

President's Message

Last September America lost one of its truly great giants. While he was not a Macaulay or a Mozart or a Maeterlinck, he will long be remembered. Irving Berlin, born Israel Baline in Russia on May 11, 1888, was brought to the United States when he was five years of age. Raised in poverty on Manhattan's Lower East Side, his only musical training was acquired from his father, a cantor. His public school education was a brief one. His father died when he was eight, and he was forced to drop out of the second grade and earn a living on the streets. An errand boy.... a peddlar's helper...and finally a job as a singing waiter helped to launch his musical career. Although he could never read music and picked out the melody of a song with one finger, he claimed he felt like an awful dope because he knew so little about the mechanics of his trade!

Alexander Woollcott once called him the "creative ignoramus," this man who wrote 19 stage musicals and 15 movie scores! Irving Berlin's ambition as a songwriter was "to reach the heart of the average American. Not the highbrow nor the lowbrow, but the vast intermediate crew which is the real soul of the country. The highbrow is likely to be superficial, overtrained, supersensitive. The lowbrow is warped, subnormal. My public is the real people."

Elementary school children in their music appreciation classes are taught to sing "Alexander's Ragtime Band," "God Bless America" and "Oh, How I Hate To Get Up In The Morning." Cabaret singers, who know and are encouraged to sing the latest songs, invariably resort to the old Berlin reliables like "Say It Isn't So," "Let's Face The Music And Dance" and "Always." When we hear "Isn't This A Lovely Day (To Be Caught In The Rain?)" don't we immediately think of Fred Astaire? And how about "Cheek to Cheek?" Of course we can "see" Ginger Rogers and her dance partner Astaire.

Irving Berlin, reportedly a workaholic, was a very private person who avoided publicity, never made the tabloids or the gossip columns. We do know his first wife died of typhoid five months after their marriage in 1912. Her death prompted the song "When I Lost You." Berlin's second marriage was to Ellin Mackay and they had one son and two daughters. Theirs was a joyous and fulfilling marriage. One just has to string out the Berlin song titles and/or lyrics to learn about their life together. It was "Blue Skies," "A Pretty Girl Is Like A Melody" and "The Girl That I Marry."

This November while we are thinking of or expressing our thanks to an Almighty, for our country, our family, our health and career, we can be thankful for and "Remember" lovely melodies like "Easter Parade" and "White Christmas." "The Song Is Ended" but the memory lingers on.

Agnes Huether, President

Ginger Bryant presents Julian Chen and Su-yen Wong with a certificate of appreciation, in Portland. Chen (high school), and Wong(college), are the recipients of this year's PTG Auxiliary Performance Scholarships.

Scholarship Benefactors

From time to time we will list the names of our Scholarship donors. Early this year contributions were made by Kathryn Snyder, Miriam Snyder and Jean Fornaci. Memorial donations have also been made in memory of Raye McCall and Eunice Hilsenbeck at the request of Ginger Bryant. These contributions are a worthwhile and very special way to remember those whose lives contributed to the world of music and will continue to provide opportunities to the young musicians of the future.

PTGA Scholarship Recipient Wins International Award

Darison Duarte, PTGA's first Auxiliary Scholarship winner, won the $5,000 first place scholarship prize in the Kingsville International Performers Competition according to a recent announcement in *The Piano Quarterly.*

Mr. Duarte received his PTGA award at the St. Louis Convention and thrilled the membership with his skillful and entertaining performance at the Auxiliary Tea.

Darison's continued success should be encouragement to you to keep your generous donations coming so our Fund can continue to grow, and the program keep expanding.

Ginger Bryant, Scholarship Committee Chairman

Want To Join PTGA?????

PTGA is an active support group for the Piano Technicians Guild. For information about joining, please write or phone our membership chairman:

Arlene Paetow, Vice President,
RFD 1, Box 473, High Falls, NY 12440, (914) 687-0364.

Love And Marriage

Do you suppose Irving Berlin's 1937 hit "I've Got My Love To Keep Me Warm" reached all the way to Holland where Willem Blees' parents were planning their nuptuals for June 29, 1939? That song had special meaning for lovers all around the world so it is presumed they knew it too. Since January of this year our member Jan Blees and a select group of assistants were busy planning an elegant Golden Anniversary party. For the convenience of all relatives and friends the date was postponed until August 19, 1989. Kith and kin came from Holland, Spain, New York and California to rejoice with the couple and celebrate their 50 years of happy married life. Jan and her sister-in-law hand-made some 55 or 60 invitations for the party and sent them all over the world. While Jan makes no claim to compete with Elizabeth Barrett Browning, she does enjoy trying her hand at limericks and small verse. She sent the following to us last summer and we think you'll enjoy her rhyming. The verse was enclosed in the party invitations.

Something "grand" is being planned,
And we hope you will be on hand!

For Willem and Liesje, a time of elation;
Their fiftieth anniversary celebration.

They've made music together that's fifty karat gold,
Since the day they vowed "To Have And To Hold..."

In Holland, and then 'cross the sea to new land,
They've played their love song, with children and "grand".

"For better, for worse" through laughter and tears,
"In sickness and health," for fifty "short" years,

"For richer, for poorer," in harmony galore—
With their strong committment, they'll "play" fifty more!

So come at four-thirty, on August nineteen,
To their home in Decorah, their garden so green.

Please bring chairs, and a potluck dish for the table,
Or just buy some fruit or chips, if you're able.

In place of gifts, we request that you bring
Flowers that bloom as perennials each spring.

We're planning to stage a little "mock wedding"—
The flowers will make it a lovelier setting.

And then, when they see them blossom each year,
They'll remember the "grand" time, and you folks so dear.

Besides this, your letters and quilt squares will serve
As meaningful gifts that they can preserve.

So RSVP, and by keeping in touch,
Tine can send you directions and such.

She'll give you suggestions for places to stay,
In Decorah itself, or along your way.

Won't you please join us? Let's make it a date
That their hearts will remember, and long celebrate!

Janet Blees, May 1989

OUR NOVEMBER BIRTHDAY CELEBRANTS:

Nancy Kravendonk	3rd
Marge Williams	5th
Ruth Pollard	9th
Irene Iverson	11th
Helen Desens	12th
Barbara Welton	13th
Margaret Dye	15th
Adelisa Clayton	16th
Arlene Grimley	23rd
Jeanine Geiger	23rd
Lillian Tobias	27th
Virginia Daehnert	27th
Sue Gray	29th
Jean Fornaci	30th

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Wanted

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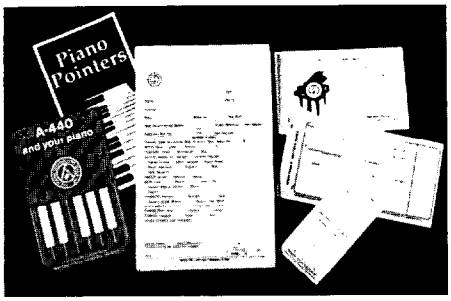


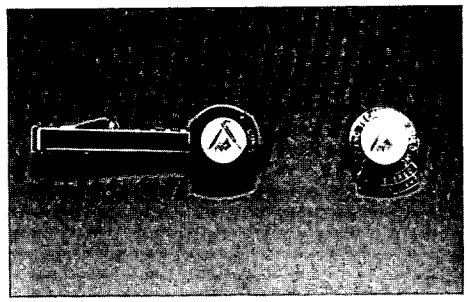

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"Classified Index Supplement" compiled by Merle Mason (covers 1979-1983)		
Member price: $12.50		
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Journal Binders: Brown, holds one year's issues 1/$6.50, 2/$12		
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Merchandise		
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Tie Bar* — as above, with gold clip: $5.50		
Coffee Mug — "The Piano Technicians Guild, Inc." in blue on white ceramic 1/$4.00, 4/$13.00, 6/$18.00		
Pedestal Mug — 10 oz. clear glass, with "The Piano Technicians Guild, Inc." in blue: 1/$5.00, 4/$16.00, 6/$22.00		
"Skill, Integrity, Service" Poster — 16"x 20", color: $1/$9.95		
PTG Neckties — $25.00		
PTG Automobile Sunshade (while quantities last) — $2.00		
Subtotal		
Shipping & Handling (See table below)		
Missouri residents only add 6.125% state sales tax		
Total enclosed		

Please charge to my __Visa __ MasterCard Card # _____ Expiration Date:_____

Name: _____ Are you an RTT? _____ Member # _____

Address: _____ Phone: _____

City, State, Zip: _____ Chapter: _____

Piano Technicians Guild
4510 Belleview, Suite 100
Kansas City, MO 64111

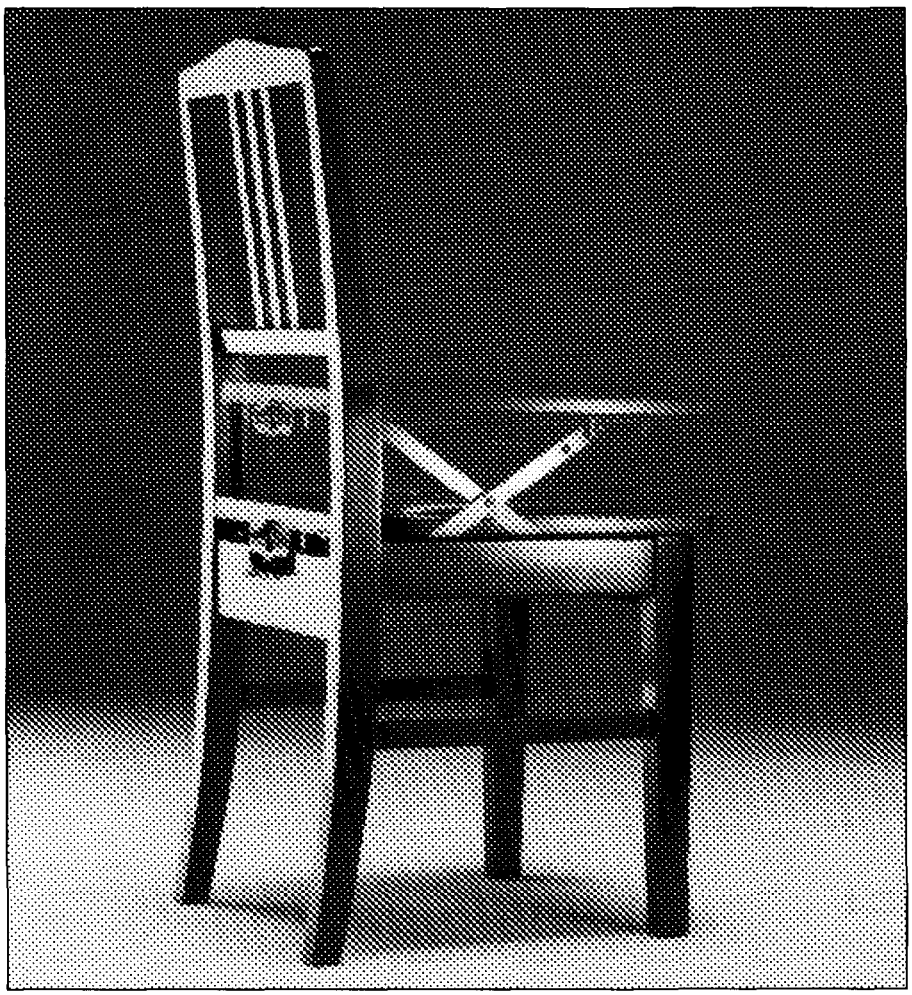
Note: Items marked with a star* are sold only to Registered Tuner-Technicians

Shipping & Handling Charges					
If order totals	Below $5.00	$5 to $9.99	$10 to $14.99	$15 to $24.99	$25 or more
Add:	$2.00	$2.50	$3.00	$3.50	$4.00

Tech Gazette

Yamaha Piano Service November, 1989

The Yamaha® Adjustable Chair



Available in both polished and satin ebony finishes, the Yamaha Adjustable Chair offers a practical alternative to the traditional bench. It is constructed of solid hardwoods, and features a vinyl padded seat that adjusts from 16.5" to 21.5" in height. Whether it's on the concert stage or in the studio, this well-built chair provides a classy touch of elegance. That makes it an economical alternative to the more expensive artist's bench, as well.

For further information, please contact the Yamaha Piano Parts Department at (800) 521-9477.

Yamaha will participate in:

DISKLAVIER™ SERVICE SEMINARS

1989
#5 November 28-December 1

1990
#6 January 30-February 2
#7 February 20-23

PTG SEMINARS

1990
Feb. 16-18 California State

LITTLE RED SCHOOLHOUSE
Jan. 8-12, 1990

WINTER NAMM SHOW
Jan. 19-21, 1990

YAMAHA®