The Violin Makers Journal

JUNE-JULY, 1962

THE OFFICIAL PUBLICATION OF
THE VIOLIN MAKERS ASSOCIATION OF BRITISH COLUMBIA

John Edward Hardwick
Wood-Carver Extraordinary
(see Page 10)

Issued as an Educational Feature to encourage and develop the art of violin making.

The Violin Makers Journal

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EDITORIAL PAGE OF *The Violin Makers Journal*

DON WHITE, EDITOR-MANAGER

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GUEST EDITORIAL

WHY NOT USE THE SCIENTIFIC APPROACH

by Joseph Reid

The study of science is a method of acquiring knowledge.

The problem we are confronted with in violin making is how to produce better violins - better toned violins.

We must, and already are using the scientific method of attaining this goal, so that eventually we will be able to predict in advance the performance of any string instrument. This is extremely well known and has been employed by the world's greatest minds to solve the most difficult problems.

This process of intelligible deduction broadly consists in pursuing the following:

1. Collecting and recording of observed facts (things we know to be true and whose existence are self-evident).
2. Classification of above facts into consistent series.
3. Determination of a formula which will enable the above facts to be satisfactorily and accurately explained.

This method was used to develop the Atomic theory which in turn became the starting point and foundation of the nuclear science of today.

It was used to explain the movements of stars and planets and to predict far in advance their subsequent positions and movements. It enabled science to predict ahead of time the properties of undiscovered elements.

The writer feels that this is the only method which will prove ultimately successful in solving our dilemma and believe that it should be stated in the following form for our own particular use.

1. Collection of all observable knowledge which members possess--regardless of how unlikely it may sound and sorting out of same into facts which are unchallengeable. This requires time and study.
2. The intelligent classification of the above facts into a series which displays a consistentcy and which represents the majority of opinions.
3. Development of theories to explain the facts of number 1 as spotlighted and illuminated by item 2.

A theory may be assumed to be true until proven otherwise.

This method is already being utilized by members but is not employed sufficiently.

Let me provide some food for thought.

It has been stated that the ribs of a violin must be 1mm thick in order to get good tone. In this case we should work backwards by first assuming this concept to be true.

The next logical question to ask is - why are thin sides required? and how does this affect tone production? No one has answered this question.

Can we not use very thick sides and then thin sides and compare the results for tone?

Do not hesitate to work backwards by first assuming certain theories to be true.

The more and longer we apply the simple method of science to our problem the sooner we will be producing better toned instruments.

What I recommend for members to do is to read over all the back numbers of Violin Makers Journal and make notes while doing so. Facts which are not true should be discarded. Patterns of recurring similar beliefs should be recorded.

This will result in some overall general fundamentals of improved violin making. The results obtained by the use of these truths will enable us to proceed still further along the road towards our goal.

Being in a more advantageous position than the old masters (having better and more varied materials) we should be thinking in terms of surpassing not equalling them.

I well realize the difficulties of our particular problems. The governing factors being myriad in number. But does not this make it the more interesting and the greatest hobby in the world. If we solved our problem we would have no incentive to continue and would branch off into some other line. The challenge makes us strive on.

I feel that great things will be accomplished by members of our association within the next twenty-five years--new advances will steadily be made; problems will steadily be solved and there will be a steady improvement in violin-making. But I do not anticipate our coming to the end of our search. The problem of perfect tone will still be just over the horizon!

CONTROL OF TEMPERATURE AND HUMIDITY VITAL IN VIOLIN MAKING

by Herman J. Sammer
Appleton, Wisconsin

In the making of a violin, if it be completed in the environments of controlled temperature and humidity at 68-72 degrees F. 50% humidity, then the finished product is far more satisfactory. All musical instruments are at their best within the range of above mentioned degrees and %. In this day and age we have the control of both temperature and humidity.

Well seasoned wood of fine tonal quality is essential. Wood must be air dried and by no other means. To make a violin, cello, etc., subjected to the ever changing atmospheric conditions usually ends up a failure, plus the many hours of diligent craftmanship applied.

I am of the opinion that the old masters faced the same problem. How come that some of their finest are so good leaving nothing to be desired, when others made by the same man or men are, roughly speaking, lousy?

If you make a violin under constant temperature and humidity control, and the tone is good, LEAVE IT ALONE. Don't waste your efforts on anything that can result in failure.

Good tone depends upon the quality and density of wood and how it is worked. This is attained by good judgement and experience, and not by specific mathemetrical measurements in the graduations. The graduations I gave you I find best as a guide for good tonal results. Regardless the final judgement rests with you, in distributing the tonal balance throughout the plates. The plates need not be glued, use clamps, string up and play the instrument note for note as for its beauty, evenness and carrying power. Pay particular attention to the bass bar and its position, if that part of the fiddle overbalances the other side, trim down the bass bar gradually by repeated testing. Look out for "wolf tones" in positions where usually found. Often a slight change of position of the sound post will correct the trouble. If not then some other part of the instrument is at fault. The neck, pegs could be the offender, or it may be necessary to regraduate in the area where the trouble lies?

LOCAL NEWS

contributed by "I. B."

News has reached us that Mr. Arthur Polson, outstanding Vancouver violinist, has been chosen to take part in the coming Jeunesse Musical of Canada. This important competition is the Canadian branch of the world-wide Jeunesse Musical. Only five players take part in the competition, these players being chosen by a special committee. To qualify for entry, players must be Canadian-born, under thirty years of age, and must have had considerable experience as members of orchestras and string ensembles besides having given a number of successful violin recitals.

Those of us who have followed Mr. Polson's career as a violinist and have heard him play are very pleased though not at all surprised that he is one of the five who will have the honor of taking part in the Jeunesse Musical. Also remembering all his successes in the B. C. Musical Festivals where he has won all the major trophies, and his splendid record as a concert performer and as a member of Vancouver Symphony Orchestra, we know he has every chance of proving the winner among the chosen five.

The Jeunesse Musical of Canada will be held at Magon, Quebec, from June 25 till July 8. During these two weeks the competitors will be given tests of many kinds and the player who finally emerges as winner will undoubtedly be the most gifted player and best musician in the group. The prizes for the winner will include a One Thousand Dollar cash award, radio and television contracts for several thousand dollars, and a debut in New York or Paris; all of which will be of the greatest possible help to an artist trying to build a fine career as a violinist.

We sincerely hope that Mr. Polson will be the one to receive these awards, to help him in the career he has so brilliantly started in Vancouver.

Mr. Kolbinson of Kindersly, expressed his good wishes for Arthur Polson in a tangible form. He is a collector of Old Masters, and hearing that Mr. Polson was on the look-out for a violin, he sent him a fine Amati from his collection. A truly generous loan from a collector to a violinist, and a most sporting gesture, because Mr. Kolbinson's own nephew is taking part in the Jeunesse Musical.

The May meeting of the Violin Makers' Association was unusually interesting. Instead of the usual discussions on various phases of violin-making, the members had the pleasure of hearing the instruments of their own making, played by a professional violinist. Mr. Arthur Polson, who has already been introduced to the readers, was guest player and critic for the evening.

There was a full turn-out of the members at the meeting, and many visitors, all in all, over a hundred present to enjoy the evening.

Mr. Polson entertained them with violin selections of different kinds, some played on the Amati and some on the violins made by the members. About twenty-five violins had been brought for him to test, and after playing on them he commented on quite a number saying they were excellent.

It was an inspiring meeting for the makers of violins. It must have given them a very good idea of the qualities of their own instruments, good and not so good, and helped point out to them what their violins needed to improve them.

Perhaps Mr. Polson will be kind enough to visit out Association again, and play for us, and make a few more friendly suggestions as to how our members can improve their instruments to get a little closer to making the perfect violin.

In a phone conversation your Editor had with Mr. Polson after the meeting, they discussed again the violins he had tried at the meeting.

Asked if our violins were approaching concert performance quality, Mr. Polson said, "Definitely yes!!" He added that many instruments showed quality but were so poorly adjusted that it was impossible to give them a fair test. To be able to play a Concerto or other concert piece, one must have a violin whose bridge was of the correct heighth and curve, and whose strings were of the right length. Failure to make these and other adjustments exactly could ruin the finest instrument!

Readers wishing help with this phase of violin making should carefully study, "The adjusting of String Instruments," by Henry Littleboy, a new column which is just starting in this issue.

OBSERVATIONS ON VARNISH

by Leo Larsson

I will offer these observation and opinions for what they are worth. In the early 1920's there were reports published that formulas of the Strad varnishes were discovered and were held by the Bisiach family of Italian violin makers. There was apparently some substance to these claims as the Italian government became interested and started law suits to gain possession of the material. The outcome of this matter I have never heard but the fact is recognized that the instruments of the Bisiach family are covered with a very fine varnish. I have owned several Bisiach instruments and have seen others, in fact still own one. I will make some remarks on my experience with the varnish of these violins. This violin I now have I obtained from the maker Carlo Bisiach in 1939 and at one period I put in long hours playing on this violin. The varnish developed tiny cracking around the sound holes and one side of the lower part of the top. Also the upper part of the ribs where the hand touches when playing in the upper positions the varnish wore down to the wood and the edge of this wear was black from the moisture from the hand.

After the war, in about 1947 Bisiach was contacted about these conditions with the idea of having the varnish retouched. He explained that the cracking on the top was caused by the breath and suggested the retouching be done here as it would be impossible to match the varnish.

It is almost impossible to evaluate the old varnishes in every way at this date as very few of them are as they left the maker's hands. Over the years they have been rubbed down, layers upon layers of protective clears have been put on and replaced so we are looking at an entirely different surface. However if we go into the writings of qualified observers of the last century such as Hart, Fleming, Howies and a few more, there is reference to some of the Cremona instruments having this cracking condition in the varnishes.

I am no varnish expert but after trying Michaelmans varnishes, then adding them as coloring agents to other varnishes the feeling is he probably has cracked the secret as to coloring but used as a straight varnish it is my opinion the body of the varnish is not there.

It should be added that when the varnish given by Mr. Sangster is applied heavy to get a very deep red color it also develops the cracking noted in the Bisiach varnish.

It is interesting to note that Fry worked on the use of rosin in varnish as has Michelman and of course Sangster. The question is whether Bisiach also has incorporated some of this in his varnish.

* * * * * * * * * *

MY VARNISH RECIPE

by Earle Sangster

I want to thank Mr. Jack C. Williamson for coming to my rescue on this question of varnish, however I cannot understand why he should want to cook the ingredients so long. Boiling the Venetian turpentine and rosin for 20 minutes then mixing it in the linseed oil and cooking 20 minutes. It is so much more simple than that. Once more I will give my method for making varnish and will go into more detail so that there will not be any misunderstanding.

First get a small stainless steel pan 5 inches across the bottom with sides 3 inches high. (I first used a small cast iron frying pan but the sides were so low the varnish caught fire with the intense heat which was a nuisance.)

In my garage I have a small well regulated two burner gas stove. Now into your stainless steel pan put 1 1/2 ozs. by weight of pure raw linseed oil Artist grade, 3 ozs. of Weber's pure imported Venetian turpentine and 3/4 oz. of pine resin. With your ingredients in the pan put it on the gas stove with a good strong heat and melt together stirring all the time with a metal stir stick. When the ingredients get hot and show the first sign of smoking, time them and cook 15 minutes stirring all the time. Now turn flame down about half and add one full tablespoon of pure raw linseed oil, Artist grade, and let cook one minute more. Turn out the flame and let varnish cool ten minutes and dilute with pure rectified spirits of turpentine warmed. If done correctly you will have a varnish of beautiful orange red color but this will not dry without the strong rays of the sun. I dilute varnish enough so that I get the desired color with four or five coats and this is the way I do it. I do not try to varnish until the first of May and I choose a clear sunny day. I warm the varnish in the sun for a short while and sitting in the shade I give violin a coat. The minute I am through I take varnished violin out in the hot sunlight and keep turning it over and over for two or three minutes. The sun shines through the varnish and heats the wood which makes the varnish flow on nicely. Now! I have a white top porcelain table and I lay the violin on

table top, up on two pieces of wood. This allows the sun to see the top and the right hand ribs. After five or ten minutes I turn it over back up. I do this for several hours and by that time the violin is surface dry. I then hang it on clothes line every sunny day for at least four days. It is now ready for the second coat.

Yours sincerely,

E. H. Sangster

P.S. Later I will write you an article on the simplicity of making a violin equal to the old Italians. E.H.S.

FORM FOR ARCHING PLATES AND OTHER INFORMATION

by Edward Stuekerjuergen

In my line of work it has always been my idea to save as much time and hard work as possible.

Since I have been in the cabinet business and violin making as a hobby I always try to figure out the easy way, so after many years of chisling the long arch by hand, I thought of a way to do it with the saw. The sketches shown here should explain better than words how it works. I cannot give many measurements because saw tables vary in size and kind, so I will describe some of the main points as near as I can. In setting up the guide blocks which should have the same radius as the saw and they should project above the saw table the same height as the saw, also be in line with saw front to back as shown in sketch. For the form A for holding the violin plate select a nice piece of flat 3/4" plywood, the arching templates should be fastened to form with screws so they can be removed in case you want to replace them for different arching, the clips for holding the violin plate should be far enough from center so as not to interfere with the cut, because by shifting the fence sideways a little either way, several cuts may be taken removing as much wood as possible, saving that much chisling. I would recommend making the arching templates as long as the form so they will start and end the cut without any sudden bump. Before shaping any plates it would be a good idea to clamp a piece of scrap wood and make the cut to see if everything is OK.

Balance of Plates and Bass Bar

I do not thin the bass-bar too suddenly from the center, except towards the ends. As to the placement of the bar I am still undecided if center of weight should be ahead of bridge or under it. I have tried both and cannot see much difference although the violins where I placed the bar center of weight ahead of the bridge have a better tone especially on the D and G but this could be also on account of leaving more wood in the tops than formerly. Sometimes it seems to me that makers thin their plates too much but of course this is their business, but as for me I am glad that I changed over to a little heavier thickness. Am well pleased with some of the later violins,they have a better tone than I ever expected to get. Just a few more words, among some of the later violins, just for an experiment I made the back the usual thickness but the top is about 7-1/2 / 64 in the center 8-1/2 / 64 in the upper and lower flanks and 7/64 at upper and lower edges after first stringing it up, I did not like the tone then I noticed the sound post was out, a little too far, so I changed it and now it is about the best toned fiddle I have.

I notice that quite a number of makers balance their plates at the bridge line. I don't want to criticise any one's method but I could never understand how they could balance at the bridge line when they are made according to the Strad,Guarnerius, Amati or any standard model since their plates were much the same thickness at both ends, I just happened to think the other day, now when the old makers planned their violins they probably thought that the wood glued to the ribs and blocks does not produce tone, so why balance the whole plate? It would be more sensible to balance the part that's inside of the fiddle. Now supposing we take a piece of cardboard, cut it to a Strad or Guarnerius pattern, mark the bridge line say about 7-5/8" from top edge of plate, now balance it, you will find that it balances about 3/8" ahead of the bridge, now take this same pattern and cut off everything that is around the outside that comes over the ribs and blocks, now balance again you will find that it balances very near the bridge line. Try it and see.

* * * * * * * * *

He also gives us Propolis!

The bee is such a busy soul
It has no time for birth control,
And that is why in times like these
There are so many sons of bees.

Anon.

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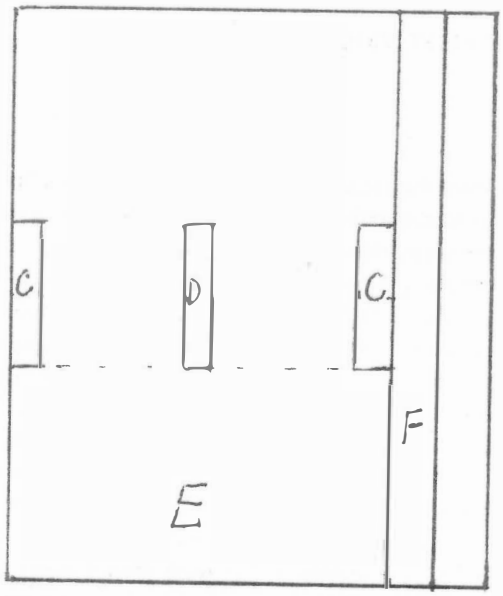
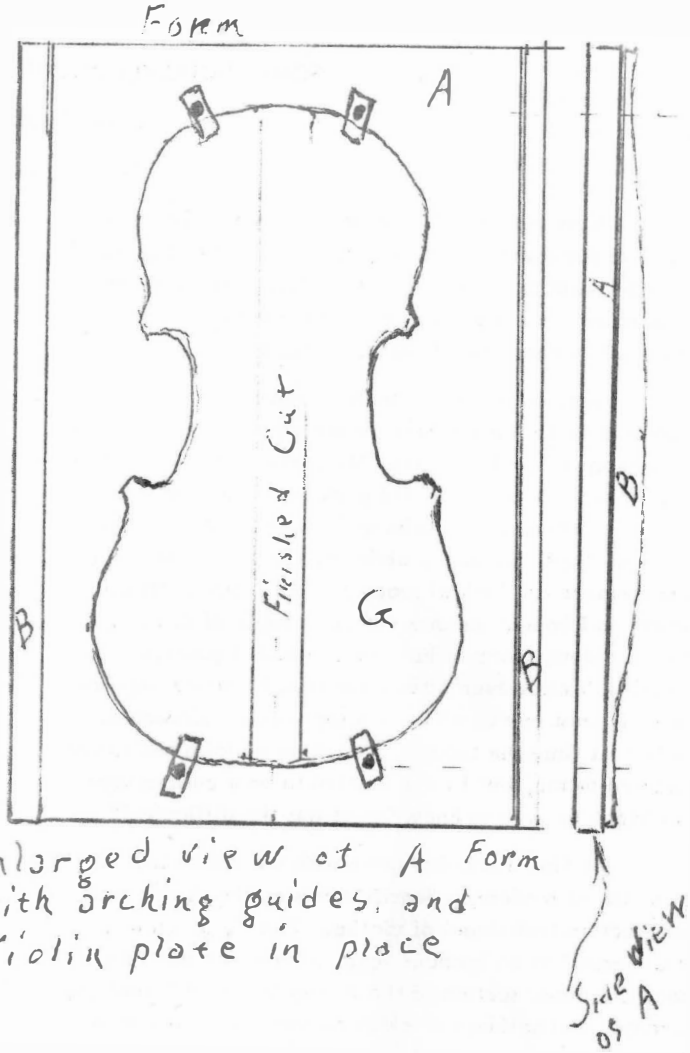
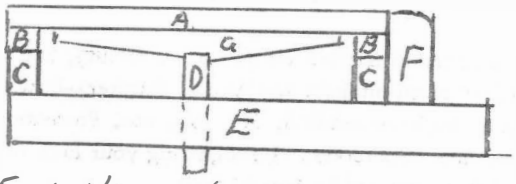


Saw Top View

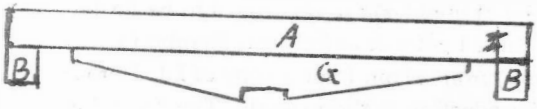


enlarged view of A Form with arching guides and Violin plate in place

Side view of A



End View of saw as seen when making the cut



End view of A Form with Violin plate in place

A should be 3/4" piece of nice flat plywood about 10 1/2x18
B are the arching templates fastened to A with screws
C are guide blocks cut to radius of grooving saw
D is the grooving saw
E Saw table
F Saw fence
G Violin plate to be worked on.

SOME THOUGHTS ON BUILDING MY FIRST VIOLIN

by David D. Kilpatrick

Arlington, Virginia

I have yet to finish my number one violin, but since the comments of a true beginner may be of some interest I want to record a few thoughts. After I finish my number one I will still be a novice surely but no longer a beginner since I will have begun.

There are probably as many reasons for one to become a violin maker as there are amateur makers, plus a few more for professionals. My particular reason is that I have one of those "glorified packing boxes" which Jack Batts cites as one of the principal reasons that violinists give up. I gave up once, about 25 years ago, due to discouragement and lack of progress. But I never lost my desire, so I bought another violin a couple of years ago. It is an elderly German instrument which I now love but it still isn't right even after three trips to various repairmen, at least one of whom is a top notch professional. Up to that time the thought of making a violin had never occurred to me, but I am educated to be a curious type and began to want to know "what was the difficulty?"

My first difficulty came with the realization that there are no modern, scientific texts on the theory and construction techniques of violins. The U. S. Library of Congress has an immense card file on violins, but since the music section of the library is closed Saturdays, Sundays, and holidays it is difficult of access to a man who works for a living. Besides, it doesn't answer the problem of having a good book on hand for ready reference. Making the round of used book stores proved to be futile, but not useless since I got a lead on Oscar Shapiro (a Journal advertiser) from whom I got a copy of Ed. Heron-Allen and my introduction to the journal. The "in-print" catalogs were interesting only in that they confirm the lack of modern literature--only reprints of Heron-Allen, and "You Can Build a Stradivarius." I have not looked at the latter and it may be a respectable book for all I know.

My next problem came from a lack of tools, and this one is still with me since I am proceeding on the basis of "buy it when you need it." Knowing what to get and having assurance of quality at a fair price would have been a big help. I'm in fair shape now, I think, but I still need to expand my collection of rocker planes. Would also be interested in comments on "Exacto knives" vs. regular "violin knives."

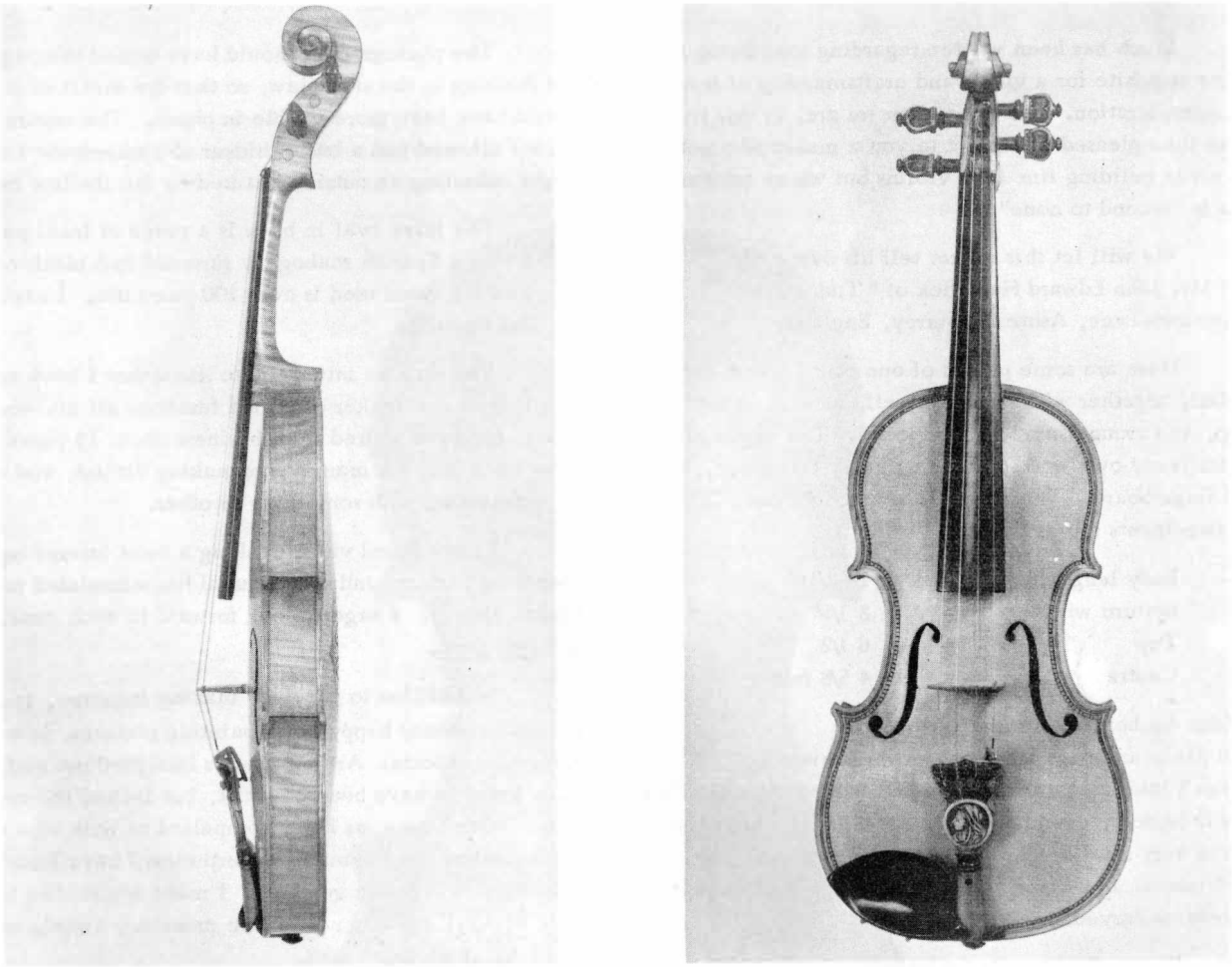
Since I got "on board" with the Journal only three issues ago I missed the early part of Smiley's series. It is evident that he has done much experimentation. I believe that what he has said is, in a nutshell, "the various resonances should be distributed so as to give even, smooth response over the range of the instrument." This is most reasonable to me and is consistent with practise in design of electronic amplifier systems. He did not speak of stiffness or damping, however, as I wish he had. The third element of the vibration equation, weight, he develops very specifically. I think it will turn out that damping is very nearly a constant for all violins and that the critical relationship is indeed between weight and stiffness. Jack Batts article "The Arching of Plates" appears to bear this out, and I would like specifically to encourage him further since he says "I may write something on this subject later if I survive the results of this article."

In fact all professional makers should come to feel that writing and repartee is essential to development of violin making, if it is to be regarded as a science. It is not really in great danger of becoming overly scientific, even if scientific concepts are drawn upon to the maximum. And besides it is likely that those inclined to excessive science will never achieve the highest degree of craftsmanship, but both can give the other type great aid in leaving a heritage of fine violins and elimination of the "glorified packing boxes."

Other thoughts:

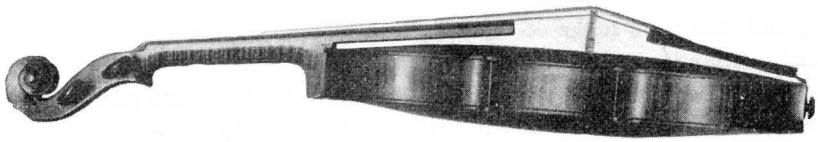
1. In the "living maker" series it would be nice if we could see the makers standard "ticket", know how many violins he has made, and does he have any particular idiosyncracies.
2. A membership resume would be interesting, say annually, telling how many makers and where. Further--how many are there who have made 5, 50, 100, etc. Professionals and Amateurs breakdown. Recognizing your lack of clerical staff this may not be feasible yet.
3. I like the "add-a-sticker" approach to the membership certificate. The real purpose here is to establish a device of veneration rather than a collection of annuals like a barbers licence. I want to show more than "I'm a member now", e.g. "I've been a member since,..., and still am." I know this is not new but it might be a new thought on why people want it.
4. Think the contest idea is great, but concur it should be done right. Believe this includes divisions for Beginners, Journeymen, Masters (perhaps for professional and amateur, but that has a lot of ramifications as to quality of achievement which is what we're aiming for) also for geographic division where there are large numbers of makers, and of course a Best-of-Show. It will be a natural consequence that a caste of violin makers will result and the place in the caste will be determined by acceptance of an entry for competition in the upper divisions of the contest, and that an individual winning Best-of-Show with any consistency

will become known as "the best violin maker in the world." 5. Would an auction following the judging be in order? Would it be optional with the makers or compulsory. This whole item is premature until such time as the contest began to attract considerable attention in violinist circles. 6. Am looking forward to Mr. Henry Littleboy's series. If he runs short of ideas for such a column, converting it to a "Violin Clinic" might give considerable longevity and stimulation. I'm thinking about a problem-answer type thing like "I have a fiddle with a silent E string - requires very bard bowing--what can I try to make it right?" That's a real life problem of mine which I intend to solve by moving the sound post away from the bridge - thereby reducing stiffness.



Side and Front Views of the Hardwick Violin

(see next page)



Living makers AND their instruments

A VIOLIN BY JOHN EDWARD HARDWICK

WOOD-CARVER EXTRAORDINARY

Much has been written regarding tone being the prime requisite for a violin and craftsmanship of secondary consideration. For this reason we are, at this time, more than pleased to present to you a maker who not only excels in building fine tone violins but whose craftsmanship is "second to none"!

We will let this maker tell his own story. We present Mr. John Edward Hardwick of " Tudor Craft", 9 Harriotts Lane, Ashtead, Surrey, England.

Here are some photos of one of my latest carved violins, together with one of myself, at work in my workshop, and around some of my violins. The whole of the violin is my own work, including pegs, tail piece, bridge and fingerboard. The chin rest is a bought one. The measurements are as follows:

Body length	=	14 1/16"
Bottom width	=	8 1/8"
Top "	=	6 1/2
Centre "	=	4 5/8 full

Golden Amber oil varnish.
Tail piece and pegs are local grown Boxwood.
Queen Victoria's portrait carved on tail piece. The likeness is perfect, even to the bead necklace, which is of course very small. The pegs represent crowns. The pegs were turned in a lathe I made from my old bicycle and afterwards carved.

The lathe is made entirely from my old bicycle on a wooden frame. Weight of violin in playing order is 16 ozs. minus chin rest. It has been played by a professional violinist, who states the tone and workmanship is first class.

The photographer should have turned the peg for the A string in the side view, so that the throat of scroll would have been more visible in photo. The centre of back I allowed just a trifle thicker to compensate for the slight reduction on outside, caused by the shallow carving.

The inlay oval in back is a piece of local pear wood with a Spanish mahogany surround and black edging. Some of the wood used is over 100 years old. I have named it "The Royal".

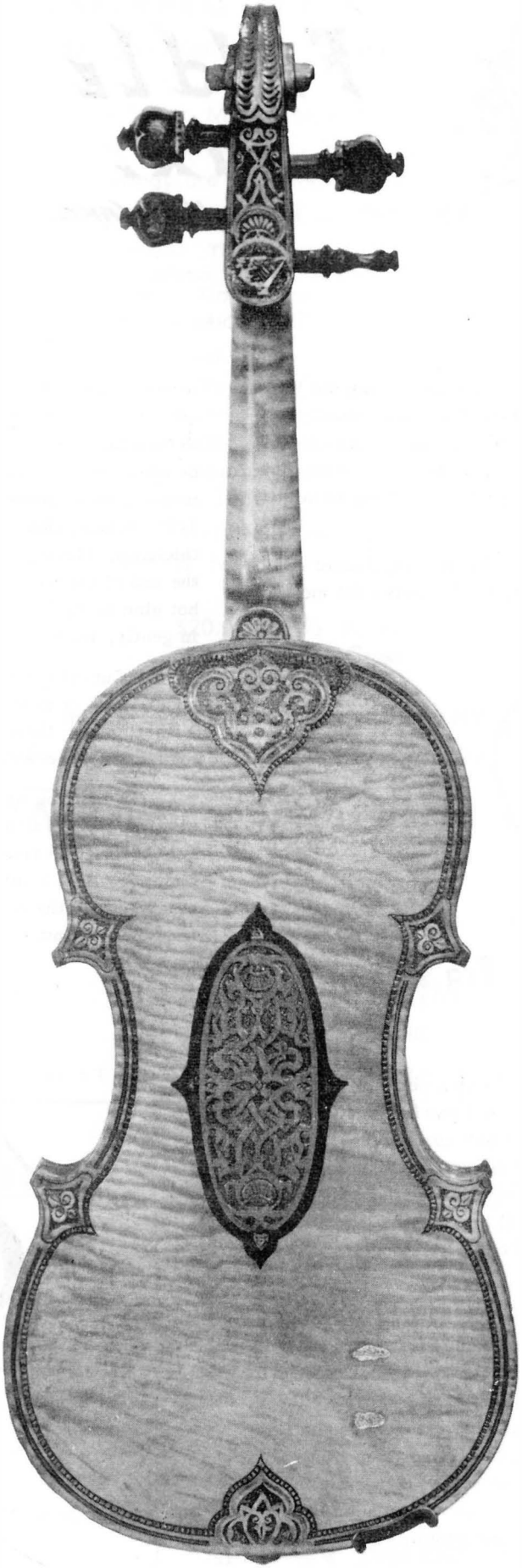
You may be interested to know that I have been a woodcarver and maker of period furniture all my working years, but have retired from business about 15 years and have been busy for many years making violins, and always experimenting with something or other.

I have found violin making a most interesting and absorbing pastime and your journal has stimulated my efforts greatly. I eagerly look forward to each issue. They are real good.

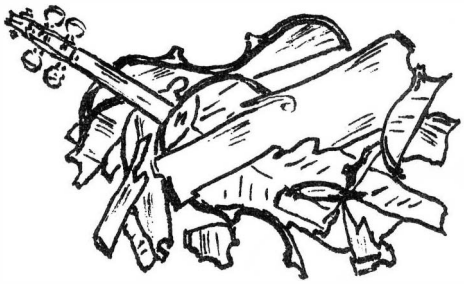
In addition to carving, making furniture, etc., I have spent many happy hours painting pictures, in both oils and water colours. Art has always intrigued me and would have loved to have been an artist, but lacked the opportunity when young; as I was compelled to work at a more remunerative employment; nevertheless I have found real happiness in creative ventures. I make my fiddles for the love of it. Certainly not for the monetary award, as I put too much work into them.

Ever yours most sincerely,

John Edward Hardwick



Violin by Edward Hardwick



Fiddle Fix.

By H.S. Wake.

Not infrequently we find ourselves facing the job of repairing a crack in the pegbox of a violin; usually this same crack has been repaired at some earlier time by someone who was either in a hurry or didn't know any better. Anyway it has to be fixed so we might just as well make a permanent job of it.

The crack as a rule is at the 'A' peg, Figure 1, this being a weak spot and also, the 'A' gets a lot more

Fig.1

use than the others; regardless of which peg it might be, the procedure will be the same; just putting glue in the crack and expecting it to hold won't do, because the pressure of the tapered peg in the hole will act like a wedge, and open it right up again, however if the peg hole is fitted with a bushing, the pressure will be against the walls of the bushing and the chances of the crack ever opening up again will be almost zero.

Order from your dealer a couple of boxwood peg bushing sticks, it's always good to have this material at hand; boxwood being dense and almost grainless is ideal for this purpose. Clean up the work and run some hot glue into the crack, clamp snugly and be sure to put some felt packing between the work and the clamp jaws; try to arrange the clamping so that the hole is accessible for reaming while the clamp is in place and open up the hole: You will not be able to use a violin size peg hole reamer because this will also cut the smaller hole on the other side of the pegbox, and it does not necessarily have to be a tapered hole, so a standard 3/8" reamer would be alright, or you can use the tip end of a 'cello peg hole reamer; the main thing is to open up the hole to about 1/8" oversize; this will give you a 1/16" bushing wall thickness. Having the hole opened up you can now trim the end of the boxwood stick to fit the hole; put a little hot glue in the hole and on the end of the stick and push in gently, leaving it overnight to set.

Cut off the projecting end of the stick leaving about 1/32" or so for final trim which is best done with a small gouge; there is less chance of damaging the surrounding surface with this shape cutter.

When you drill the lead hole through the boxwood plug, put it just a little off center so that when the hole is finally reamed to size for the peg, the wood of the bushing will be a little heavier at the area where the crack entered the hole (Figure 2); this being a little extra insurance against it ever opening up again.

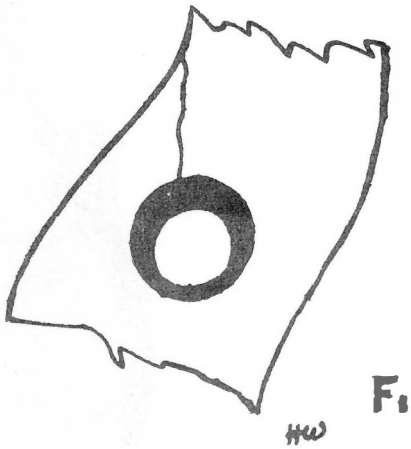


Fig. 2

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The Technique of Violin Making

By Harry Wake

Chapter 4

It will be a good idea at this point to assemble the back (that we have now partially finished) to the rib frame that was completed earlier: This will be only a temporary assembly for the purpose of lining things up as it were; however, it will also show up any discrepancies in your work and give you a chance to correct them before final assembly is made.

Place the rib frame and the back together and secure lightly with clamps; you will have to do a little coaxing here and there to get the edge even all around; this is normal; however if your work has been carefully done you should have little difficulty in this respect:When all is lined up correctly we will drill small holes through the back and into the blocks, top and bottom, for small dowel pins; for these small dowel pins I find that standard round wooden toothpicks are just right; in fact there are many uses for these around the shop; they are tough and are of correct diameter for small dowels: Measure down from the top edge of the back at the right of the button, a distance that would put the dowel in the center of the upper block, and about 3/16" to the right of the center line; drill a small hole right through the back and into the block to a depth of about a half inch or so; the diameter of the drill should be just about the same as that of the toothpick that you are going to use as a dowel, so that you will get a nice snug fit; it's a good idea to try your drill for size on a scrap piece of wood before using it on the fiddle back. Having the hole drilled, remove the sharp points from one of the wooden toothpicks and tap it lightly into the hole; follow the same procedure with the bottom block keeping the hole on the same side of centerline as the upper one; snip off the excess wood of the dowel leaving about 1/8" projecting above the surface of the back: This is only a temporary dowel and will be removed many times before we get to the final assembly. With this much accomplished you can leave the back and ribs secured together with the dowels in place; remove the clamps and put a rubber band or string around the waist and put aside until the top is finished.

Now to get on with the making of the belly; the preliminary phases being identical to those used for the back, it will only be necessary to outline them here as they were covered in chapter three; The two pieces of top wood will be fitted together and glued at the thicker edges as was done with the back; and using the full outline pattern, a line is traced onto the flat underside of the piece thus formed; the excess wood outside of the line is now removed by bandsaw or any other means available but be careful to stay at least 1/8" away from the line; readjust your bench holding board to accommodate the work and clamp to the bench top, plane off the top crest of the work to reduce the plate thickness to approximate height of the arching and proceed to remove all the excess wood to an edge thickness of about 3/16"; having marked a line all around the edges as a guide for edge thickness: having worked down to this line all around, and rough shaped the form and arching, you can trim the outer edge now to the line that should still be visible on the under face of the work; this will be the true finish outline, so be careful to hold your cutting right to the line: Remark the edge thickness line that you have just removed, only this time you can make it closer to the finish thickness and trim down to the line so that you have a flat edge all around from which to start the development of the arching.

The copying of arching and making the arching guides or templates is now taken care of exactly as was done for the back (Chapter 3); however, the arching will be different so take great care in making the templets and follow them carefully to complete the upper surface of the top: The work is now turned over and as before a line is marked all around the bottom face, and the areas of the blocks, as a guide; and the work of gouging out the excess wood is begun; Mark the cross lines as before and gouge out channels deep enough to leave a caliper reading of about six millimeters at the bottom; mark a small X at all points where you have the depth required and then remove all excess wood leaving the X's still visible. This operation is now repeated by remarking the cross lines, and removing wood at points of intersection on the centerline and inside the outer edge until you have caliper readings at all points of 3 1/2 mm except at the region of the soundpost which will be left slightly heavier; having again marked small X's at all points where the desired thickness is reached, the excess wood is again removed and plate thickness finished to from 3 to 3.5 mm all over except at soundpost area which is left at 4 mm.

This resume of work on the violin top is just about exactly as was done in chapter 3 on the back, with the

exception that the thicknesses and arching are different; do all sanding and finishing on the top but do not round off the edges until later as we will need the true edge as a guide for cutting the purfling groove: The top can now be put together with the ribs and the back lined up carefully and drilled for dowel pins into the top and bottom blocks: You can now see that your work is beginning to 'shape up' and look like a fiddle, but there is much to be done yet.

Fitting the purfling will be our next operation and we can do both the back and the top at the same time. There are two methods of doing this work, by hand or by machine; both methods require very careful work as it is extremely difficult to correct any errors in judgement or slips of the tool; A hand purfling channel cutter or a machine can be purchased through advertisers and supply houses; the hand cutter is adjustable and can be set for depth and width of channel; two lines are first cut and the wood is then removed from between the lines with a small narrow chisel or picker; great care must be exercised in the corners to get a nice clean sharp point to the cut so that the purfling can be mitered in. This is the work where the true craftsman can prove his skill, fine purfling and clean corner work will add the final touch of artistry to a well made fiddle; but poor purfling and corners can detract immeasurably from an otherwise well made instrument.

The material for purfling can be purchased in lengths of about three feet; it is obtainable in either wood or fiber, or of course if you prefer, you can make your own. The fiber purfling is probably the easiest to work with, although it can be stubborn on short bends; the remedy being to keep it warm.Don't make the mistake of cutting the purfling groove too narrow or you will run into difficulties later, the material swells slightly when wet and it can get terribly messy trying to force wet sticky purfling into a groove filled with hot glue; cut the channel just wide enough for the strips to drop in easily, and fit all your strips in place on both top and back, then remove one strip at a time, run hot thin glue into the groove, and put the strip back in place immediately. Go right around the work quickly and carefully, making sure that the strips are sunk right into the groove. Now place the work on a flat surface and brush hot water over the purfling all around; this serves a double purpose; first it will enable you to wipe off all excess glue that has oozed out of the grooves; and secondly it will soften the work up sufficiently for you to take the rounded end of a knife or tool handle, and press down hard on the purfling all around to make sure that it is in the groove and at the same time spread it slightly to fill the groove; when this is completed you can put the work aside to set.

The excess purfling is trimmed away with a small sharp gouge to bring it flush with the work, then different grades of garnet paper are used until all is as it should be; the edges can now be nicely rounded off and both top and back completely cleaned up preparatory to the cutting of the Fs in the top; this will be our next undertaking.

You may perhaps have purchased a zinc outline pattern for the F holes which you will use to trace the F's onto your fiddle top, or on the other hand you may have in mind a particular pair of F's that you would like to copy; perhaps with some slight modification; so we will assume that the latter is the case and prepare our materials; actually, you will only need to copy one F so select the one that has the cleanest outline; take a piece of ordinary clean white paper. size 4 x 5", and place it over the F to be copied; set the longer edge right on the centerline of the fiddle top after removing bridge etc.; fasten the paper down with a couple of small pieces of tape. While pressing the paper in close contact with the fiddle surface rub the outline of the F with the side of a medium soft pencil; this will give you the exact outline of the F; be sure to mark the position of the nicks in the side of the F's clearly, as they are important. Remove the paper from the fiddle and place it over a piece of carbon paper with the carbon side up, carefully trace the F outline with a hard pencil and then draw a straight line from the inside nick of the F to the outside edge of the paper which would be the edge that you placed on the centerline when you made the tracing. You now have a right and a left F, one on each side of the paper: to transfer these now to your work, first measure down from the top edge of your fiddle top the stop length which will be 7 5/8" to 7 3/4" on a 14" fiddle, and draw a straight line lightly right across. Place the paper pattern on the work so that the edge of the paper is exactly on the centerline of your work, and the horizontal line that you marked on the paper from the nick of the F exactly coincides with the horizontal line that you made on the wood; fasten the paper down with tape and slip a piece of carbon paper under it with the carbon face down; you can now trace the outline of the F with a hard pencil directly onto the wood. Turn the paper pattern over, being careful not to lift the grain fibers of the soft wood when removing the tape, and repeat the tracing operation for the opposite F. You now have the two F's marked on the wood in exact contra-facsimile. The spacing of the F's on each side of centerline can easily be modified one way or the other when positioning the paper pattern prior to tracing.

This brings us now to the actual cutting of the Fs, and it should be just that, because filing and the use of sandpaper on this work will leave rounded edges and broken away wood fibers; you will need a small thin bladed knife that terminates in a point; the knives that are sold under the trade name of 'Exacto' are good for this work, and can be kept very sharp which is of the utmost importance. A start is usually made by drilling a few small holes and then gradually opening them up with the knife; however I prefer to drill only through the top and bottom circles of the F with a small drill because there is too much danger of the

drill splitting away the wood as it breaks through; with the two small holes drilled, a jeweler's saw can be used to cut out the F fairly close to the line, however care must be taken to keep the cut square with the horizontal plane of the fiddle top. Some of the old German makers used to undercut their F's at an angle away from the top face; this must be avoided at all costs, the cut should be square and true all around the F as was done by the Italian makers, and a keen sharp knife is the best way to accomplish this. Cut first as close to the line as possible without cutting the line itself, and work all around; then work on the body of the F; you will find it a little difficult cutting the top and bottom circles but patience and a keen edged knife will help. Make your cuts in a direction away from the points at top and bottom to avoid breaking them off; when both F's cut you can compare one with the other and with the original, and you will find it necessary to trim off a little here and there; then hold them up before a mirror and check for symmetry. Finally you can cut the nicks and don't make them too big, just the smallest nicks are sufficient.

Having finished the F holes, we can now turn our attention to the bass bar which will play such an important part in the tonal qualities of the finished instrument; the elements of wood density, plate thickness and bass bar are so inter-related that it cannot be said to make the bass bar this way or that way. However, there are a few basic essentials, and assuming that your top wood is of medium density, and that you have worked your plate thicknesses according to these directions, your bass bar should be planed to a thickness of between 3/16" and 1/4"; not more than 1/4" nor less than 3/16" and the lines of the grain should be visible on the narrow edge, not on the broad face of the wood, which should be select straight grain spruce. This is cut to a close fit to the inside curvature of the belly; the outer face of the bar should be nineteen millimeters from fiddle centerline at the top of the bar and twenty-three millimeters at the bottom of the bar. These dimensions may be varied slightly but every effort should be made to stay close to them, as they will place the bar in correct position alongside the F hole, on the right hand side as you look at the underside of the fiddle top. The height of the bar when finished will vary slightly according to the arching of the violin, but should not exceed 7/16" even on a high arched fiddle. The full height should be maintained for the length of the F hole when the bar is in place, then from a point opposite the bottom of the F work the wood down to almost zero in a concave scoop to the bottom e d; repeat this at the other end from opposite the top of the F, and you will notice that it will be a longer and more gradual scoop. Blend the top flat part of the bar which lies parallel with the F, by a gentle curve into the concave drop, then reduce the edge thickness slightly on both sides to give a slight taper to the bar thickness, from where the bar is in contact with the belly, to its top edge; sandpaper lightly all over to remove all sharp edges and our fiddle top is completed.

IN APPRECIATION OF THE SERIES "SCIENCE FOR THE MAKER"

by William Hall

In the series of articles "Science for the Maker" by Smiley. I wish to express my appreciation for these splendid articles, which are so informative in offering solutions to the ma y problems that have baffled violin-makers. One of the prime features of the series is the authentic presentation of the science that existed in the period of the first makers. The articles show a definite scientific principle did exist, as the three greatest makers: Nicholas Amati, his Pupil Antonio Stradivari, and the greatest maker of the Guarneri family Joseph del Gesu arrived at almost the same measurements for plates and the air chamber for their respective instruments, this surely could not have been by accident! Also, it is worthy of notice that the best instruments made by successive makers--apart from country of origin--resemble most closely in appearance and the measurements, the master violins of the Cremona trio.

Smiley builds up a good case for the scientific methods that were at the disposal of the early makers, from the work of Mersenne which is most valuable, as it shows the scientific instruments then in use, the principles of which have not been altered to the present time. There are the Baroque calliper, still being sold by an American firm, and accurate to the nth degree. The monochord, an ancient instrument, and indispensable for training the ear, and invaluable for accuracy in tuning plates, together with the Tuner which is an original conception, and necessary if one wants to get the fundamental of plates. I have used these, and can vouch for their efficiency. What is important, you don't have to be a physics graduate to either make or understand their uses, nor is lack of funds an excuse for not possessing them. My monochord was made from one of the sides of an old spring mattress, which happened to be a well seasoned piece of maple; the garbage collector could salvage one from the dump for you. The old piano tuning pegs, and string I got from the piano tuner. The tuner was made from a length of 2x4. If you want to go modern you can salvage the old radio, and use

its amplifying section, and your only expense will be buying a good meter, which any radio service man can supply, and hook up for a trifling cost. You shall then be in a position to verify what the old scientist found out for your benefit 300 years ago. Do not be frightened by the use of scientific terms, Smiley has put them into simple language, if you have all the apparatus ready, the rest shall fall into line without much trouble. I may mention I always had trouble with tap tones, and think this is due to the over-tones, as well as the difficulty in getting the in between pitches in the half-tones. I find no difficulty when using the M/chord with tuner. Also in teaching children I have found the M/chord invaluable in showing them how far off pitch they play, this visual aid really intrigues them, as they ask for tests.

Taking the measurements given by Otto Mockel, Hill & Sons and August Riecher the famous Berlin Maker, who claims to have repaired over three hundred Strads, and to have taken the measurements of each, as well as having the care of the great violinist, Joachim, instruments, these experts all agree on the fact that a definite principle of measurements was followed, as very little variation is shown in the average measurements given by the combined experts. Practically all agree that the tops were of equal thickness all over. So it must be taken as a fact there was a distinct scientific method evolved by the old masters, it does not make sense to bring into the picture the short neck, low fingerboard, and small bass-bar, these have nothing to do with the air-chamber; or the thickness of the plates, which are in their original state unless tampered with by vandal repairers. The VMJ is the first publication that has brought to light, through the Smiley articles, the knowledge that a science of geometry, and acoustics, did exist as well as the apparatus that could be applied to violin making. Also the historical material that definitely linked Stradivari with the Medici family, whose interest in science, and art in general, is well known the world over. One should not forget, nor overlook the fact, that the Cremona masters inherited one of the greatest Art periods in the history of civilisation. So judging by Smiley's efforts, and the great amount of research work that has gone into the Science Series, violin makers should feel grateful for the material placed at their disposal, which not only enriches the mind, but links them to a past that has no peer in the realm of creative art. So, through physics we try to get an understanding of what makes the violins of the old masters superior to all others, and it is this groping for knowledge that makes violin-making one of the most fascinating pursuits, the lover of beauty in handwork can pursue. It is idle to talk about the superiority of modern instruments, until they replace the old Cremonas of the concert halls, in the hands of the world's leading artists.

W. G. Hall

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"MODERNIZED VIOLIN VARNISHES"

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THE CASE FOR THE MODERN VIOLIN

by C.F.G. WELSTEAD

(continued from the April-May issue)

The commonsense summing up would seem to be that Stradivarius and the violin makers of his time, had reached out from the common plodder craftsmen of the period in the essentials of the art of violin construction, by virtue of careful selection of basic materials. It would seem also, on searching the histories of these great men, that they established the dimensions and shape of the instrument as we know it today; it has been modified to suit the requirements of modern virtuosi, but, in essence, the Amati, Stradivarius and Guarnarius design came to stay.

The Cremonese violin makers, in order to enhance the inherent beauty of the timbers they used, repeated history, in that in so doing, they accidentally created the so-called 'Italian tone'. It is my belief that when a fine fiddle was completed constructionally, the maker then commenced to infuse into the back and belly, a mixture of essential oil, plus a basic natural yelow resin which penetrated the wood deeply, and after this treatment, was taken into the dry air of the Italian climate, and allowed to dry slowly. The term 'dry' would be the one used then, (or at least the Italian equivalent). Today, if the same process were carried out under careful scientific supervision, we would say 'polymerise' or 'oxidate' and here, I believe, lies the final 'mystic' creater of Italian tone. This process was in my opinion continued until the entire unit became covered with a rich homogeneous body of 'varnish'. In the final stages the same rich substance of higher colour being placed over this basic material to impart a final and beautifying finish.

The basic material had become by oxidation, integrated with the timber of the instrument forming a stable and permanent diaphragm, the inherent qualities of which are preserved by the specific nature of the basic varnish which has become chemically and physically, an actual part of an integrated whole.

To accurately analyse this question of tone value, is difficult, for Mr. Cowell has followed in the wake of many by stating that he cannot 'define' this unnameable quantity; it exists, but eludes description. Romantic nonsense! The tone is good, bad, or indifferent. Let us face it. In playing the Italian master, Mr. Cowell was expecting something of exceptional nature, and found it to exist merely by some form of self-hypnosis, for what one hears 'beneath the ear', is of little consequence. Did he listen to the instrument say, one hundred feet in a large hall? This is what matters, and apparently was not considered by Mr. Cowell when he played the instrument which 'almost played itself'. This of course, is merely an expression, for no fiddle plays itself; some are more facile than others, that is all. Mr. Cowell, as a violin maker, should know the primary physical reason for this phenomenon; the greater the mass, the greater the energy required to put this mass in motion, and maintain this motion at every frequency. Since vibration is oscillatory motion, this fundamental law must be applied to the vibrating diaphragms of violins. The 'quality' of this 'oscillatory motion' is of course another matter and I shall attempt to explain what I believe to be its true conception as I proceed.

At this point in replying to Mr. Cowell's letter, I desire to make it manifest, that it is this kind of romantic nonsense which has for decades filled our libraries of musical science, and which has made the field of research narrow, because seven-tenths of the volumes purporting to be genuine research are full of endless ballyhoo, paraphraseology, pseudo-truth, and what have you.

After years spent on research from every library in the world, via the Mitchell Library in Sydney, N. S. W., I emerged with a mind so cluttered with conflicting rubbish, that I decided to abandon this time-wasting pursuit and throw overboard most of the 'evidence' I had collected.

To condense the consensus of opinion to a few words, would, to say the least, be most difficult in face of all that has been written on the subject of the violins and varnishes of Cremona. That much has been written is to be admitted, but the majority of the opinions expressed must be discarded as having any basis except that of romanticism and traditional stories of the 'mysterious witches' pot in which old Stradivari brewed his unanlysable formulae.

The two opposing plates separated by bands or ribs of fine maple wood are merely diaphragms, which, having different frequencies, convey to one another the primary vibration transmitted to them via the vertical vibration conductor, or 'sound post' from the bridge. The balance between these two diaphragms must be exact if the overtones

are to be produced; these overtones are obviously the 'soul' of violin music; it constitutes the difference between a fine and a mediocre instrument.

To analyse the scientific implications of this apparently simple device, one is quickly immersed in an abundance of 'facts' which lead one to believe that Stradivarius and his like were the only 'sound scientists' to tread their alloted span in this world. This idea is, of course, absolute nonsense.

It is a well known fact that if an instrument is played for a long period in the unvarnished state, the tone, strong at the outset, will gradually abate, and eventually become thin and attenuated. The reason for this phenomenon will be understood by any who have investigated the matter at all. Pinewood is by nature a porous, cellular structure of high elasticity, the molecular chains of discs being 'linked' together by connecting fibres of varying lengths, and is, to this extent heterogeneous.

If this heterogeneous plate were attacked by powerful vibrations of a continuous nature, this inherent want of cohesion must eventually disintegrate to a point where the absorption and amplification of sound would greatly abate, rendering the plate (in this condition) useless for the purpose of producing powerful and crisp vibrations. To overcome this lack of natural cohesion, and continuous elasticity, we must evolve a system of permanently bonding the original cellular structure with a substance compatible with the schlerogenous nature of the wood, in order that the diaphragm will become homogeneous, and at the same time retain its original elastic properties.

I believe that a process of mind has achieved this in much the same way as it was accomplished by the old Italians!

It has been argued in this connection that the glorious tone of the old masters has been produced in instruments of odd shapes and sizes - perhaps so, but these vagaries and departures from an established form are an unforgivable offence against primary and secondary considerations which, for art's sake, must be observed; shape, approximate dimensions, and finish. A violin is a violin; many radical specimens have been played to demonstrate tone, but none of these monstrosities have ever to my knowledge graced the concert platform of today - and never will! Tradition insists that, for the professional platform the curves and bulges of a fiddle are as much a part of the art as the quality of the sound produced. It follows therefore, that in following the steps of the old masters in tonal values, we must be consistent and reproduce his shape also! Never tiring in the effort to produce the ABSOLUTE in perfection of finish, inside the instrument as well as outside.

As previously stated, I have for many years given a great deal of thought and study to this all-important study of violin varnish.

Firstly, one must consider as to whether the tone of the old masters existed at the time when they were new (I believe this to be so) or on the other hand is the result of two hundred years of oxidation - the result of the polymerising powers of the ingredients used in the manufacture of the Cremonese varnishes.

From the point of view of my own investigations and experiments, I wish to stress that my personal belief is that the varnish is not alone responsible for the tone produced, but at the same time an excellent fiddle could be utterly spoiled by the application of some substance incompatible with the established balanced mass of a given instrument. It therefore follows in logical sequence that to use a compatible substance, will result in maintain-this aforesaid balance; this I consider is the crux of the matter, and was possibly carried out by the old makers with a half knowledge.

Another point in favour of the accent being on the constructional side of violin making, is the fact that many of the most famous instruments in the world today, are, over a great portion of their surfaces, practically denuded of any varnish whatsoever, above the surface of the wood. This fact leaves us one conclusion in the logical sense, that it matters little what we have above the surface beyond the visual enhancing of the instrument.

To sum up this part of the problem, once the diaphragms have been formed by the processes of oxidation and polymerisation, it would appear to matter little what the final coating should consist of, with the one proviso that the pellicle formed must be elastic by nature, in order that the free vibrations of the diaphragms do not become restricted by some muting substance of hard or brittle composition.

The two violins produced by myself from a prototype of local timbers (to be spoken of later) have so much increased in resonance since the process of rendering the diaphragms homogeneous, that at the moment of writing, I am jubilant to the point of shouting 'Eureka'. The tone values evolved are tremendous now that in the final stages of polymerisation, the plates have stiffened to their maximum elasticity. Possibly, if this oxidation continues for a further short period, resonance will again increase; it is my belief at this point, that the component chemicals which comprise the wood have blended with the varnish to form a definite stable composition by virtue of the formation of a molecule consistent with both factors - the varnish and the wood. Also it occurs to me that this molecular formation reaches a stage where no further absorption of

oxygen takes place because the molecular chains so formed have reached saturation point.

It is at this stage in the natural processes of chemical and physical action, that I believe the maximum volume of sound is produced, in other words, the affinity of the two substances (wood and varnish) should be such, that the vibrating surfaces would represent the intimate mixture of metals which go together to form a bell, in that when struck, the entire surface will respond to the frequency of the pre-selected note.

This comparison between metal and wood is only meant to convey the idea of vibrating bodies being homogeneous; we all know that the back and belly of a violin are capable of vibratory response over an infinite range, whereas the alloy which forms a bell can only respond to the frequency arranged to suit the conditions required.

The dogma claiming that the tone of the old instruments of Cremona is due to the influence of time, does not stand the test. It is not expected that the instruments I have made will be one jot better in two hundred years than they are at present. (One year old.) My investigations indicate that at this period, the varnish has ceased to react with the elements and has become at this point stable; the vehicle has long since evaporated or reacted with oxygen to form some complex substance, possibly a remote molecule of the terpene group. Whatever the chemistry of this (my varnish) it definitely becomes stable, and will not in any sense deteriorate via the usual route by "crazing", "fissuring", etc., for I have made extensive investigations and experiments in an effort to bring this about - without any success at all.

The varnish has been subjected to every possible abuse without showing any signs of reaction. To name just a few: acid and alkali solutions, vapour of the same in high temperature, extreme heat and cold, exposure to strong sunlight over a period of an entire summer, exposure to humid conditions, etc., and yet this varnish remains proof against all my ingenuity to destroy it once the polymerisation period has formed a solid pellicle.

This stated stability did not occur until I got down to the simple ingredients which were readily available to Stradivari and his co-workers. This is a strong point in favour of my varnish, for I have established that chemical and physical reaction reaches a stage of unreactiveness at approximately one year from the date of final coating - nothing I am able to devise has disturbed this most desirable equilibrium after this period.

To give this substance a name, one must designate it 'peculiar' because most varnishes, lacquers, polishes, etc., do react to some influence, either chemical or physical, but the varnish resists every effort to cause it to deteriorate; it is flexible in that a brilliant finish can be given to it either by friction or wet finishing with dilute alcohol. Concerning this latter propensity, George Fry made the same observations in his book "Italian Violin Varnishes', published in 1904, but unfortunately, his varnishes (all of them) were unstable in that they had the undesirable trend of reactive continuity, and were therefore unsuitable for the purpose of coating violins, because at approximately six months after final coating, this continuity of reaction made itself manifest by the appearance of 'fissures' or 'crazing'. I have reproduced each and every one of these varnishes, according to his own processes, and without exception these undesirable factors become evident during the final processes of polymerisation - it mattered little whether one or several coats were involved in these tests.

To preclude any mental or verbal insert here, that perhaps my production of Fry's varnishes deviated from his formulae or processes, I would stress that the varnishes were made with meticulous attention to every detail, and manufactured according to his laws - they were everything he claimed for them except durable.

My researches have, as before stated, followed the line of first endeavouring to perfect a varnish to comply with all the requirements; Homogeneity, Elasticity, combined with uniform texture and Durability; at the moment of writing I believe this has been achieved. It has been subjected to extreme tests, far beyond any degree to which it could possibly be subjected in the ordinary way.

Having reached this stage over a period of years, I endeavoured to convince many, but met with the exact amount of disbelief anticipated - there were none prepared to experiment on their new fiddles with my varnish; I felt no chagrin, for it was to be expected, as I said before.

After much deliberation, I came to the conclusion that the only possible way in which to prove my theories to my own satisfaction (and others) was to become a fiddle maker myself, an art so far removed from my profession of watchmaker, that at first the prospect of success seemed remote. However, after lengthy discussion with Mr. Arthur Smith of Sydney, I became, with his encouragement, convinced that the idea was possible, and so, I now leave the discussion of varnishes to the many who will refute my claims, and move on to the discussion of the primary factor which controls and creates 'Italian Tone'.

(to be continued)

* * * * * * *

The Adjusting of String Instruments

BY HENRY S. LITTLEBOY

Comments and Questions Welcomed.
Address communications to Mr. Henry Littleboy, 7 Sentry Hill Place, Corner of Pump Lane, Boston, Mass., U.S.A.

PART I. BRIDGE CUTTING

The cutting of a bridge is certainly one of the commonest tasks which one is required to perform during the process of violin adjustment. It is seldom if ever that a person who wants a new bridge on his fiddle has any idea of the effort involved or how to judge that the work has been properly accomplished. Therefore I invite both the player and adjuster to follow these comments. I hope that both will have something to gain in the endeavor.

First, I would consider the evaluation necessary to determine that there is need of replacing the bridge. I feel that this work should be started only after this preliminary survey. The straightness of the bridge should be the first thing checked. A properly cut bridge should stand with its back perfectly straight and at right angles to the top of the fiddle. (The back is that side of the bridge closest to the tailpiece.) In this position the feet should perfectly fit the top. If the only problem is that the bridge has warped I would suggest the following method for straightening it. This is particularly useful for cello bridges but works well for the bridge of any member of the violin family. The "moon shaped" cello bridge on the student's instrument is a common sight in any school orchestra.

The process of straightening is simply one of removing the stresses by boiling the bridge in water for about a minute. The trick is to have the water "fiercely boiling" before putting in the bridge and using "baby bottle" tongs to remove the bridge to check for straightness. I have had it take as long as two minutes but I would say a minute is about average. Since the water is at an extremely high temperature drying takes place in a short while. When the bridge is dry a light sanding completes the process.

After straightening the bridge and putting it back on the fiddle I use the square corner of a small steel ruler to check the right angle that must be formed between the back edge of the bridge and the top of the fiddle. The ruler that I have found to be most useful is one which is fifteen centimeters long and has one of its four scales divided into half millimeter divisions. The one I use was made here in Massachusetts by the L. S. Starrett Co. and is number M600 in their catalogue.

The next thing to check is the height of the outer strings above the fingerboard. This measurement is taken at the end of the fingerboard and should be three and a half millimeters for a steel E and five millimeters clearance for the G. The curvature of the bridge is checked by measuring the amount that the top of the A extends above the top of the E and D and then the amount that the top of the D extends above the A and G. These measurements should be taken at the bridge. This distance should be two millimeters. At this time a check of the curvature of the fingerboard should be made. Too often the person refinishing a fingerboard takes wood from the center and not a corresponding amount from the edges. This should always be checked since too flat a fingerboard is detrimental to proper playing of the instrument.

The final check is for bridge thickness. Two millimeters at the top and four at the bottom is a good rule. The most common fault that I have found with bridges cut by amateur fiddle makers is leaving too much wood at the lower half of the bridge and too little at the top of the bridge.

Now, if it is not possible to correct the faults of the bridge it will be necessary to start with a blank and I will now discuss the necessary steps in cutting a bridge.

The first thing is to mark the back of the bridge (side nearest to tailpiece) with a pencil. This will save time in checking if you have to stop during your work. Now, keeping in mind that the back of the bridge must be kept perpendicular to the top, we proceed to fit the feet. Here I would suggest use of both sandpaper and a knife. Holding a medium-coarse sandpaper on the top of the fiddle it is possible to rough the feet to shape by moving the bridge in a line between the inner nicks of the "F" holes. Reducing the distance you move in sanding as you get the feet close to being fitted. The final fitting is done with a knife. Be sure that the bottom of the feet are perfectly flat. Scraping with a knife helps in this flattening process.

In all work on cutting bridges I strongly recommend the use of a "Violin Maker's Knife". It has a continuous blade in the handle and is worth the expense. The blade width should be about seven millimeters for this work.

With the feet fitted I next use the fifteen centimeter ruler to draw a projection of the fingerboard on the bridge. This is accomplished by holding the ruler on the fingerboard and extending it to touch the bridge. Repeat this in several

places and pencil in the curve on the bridge. With the curvature of the fingerboard on the bridge it is a simple matter to draw the top curve of the bridge by placing the E string position three and a half millimeters above the line and the G about four millimeters. I usually make the central part of the curve eight millimeters above the fingerboard line.

Next cut the height to the curve of the line of the top of the bridge. Sand smooth and now, using dividers, position the G and E at a separation of thirty-four millimeters. I do not recommend using a metal template for this since I feel checking with dividers gives more accurate results. Now divide the top by means of the dividers to position the A and D. Use a very thin file and put in the grooves for the strings.

String up the fiddle and bring the strings up to near playing tension. Errors will occur if this is not done at this time.

Check the clearance of the G and E above the end of the fingerboard and the amount that the A and D extend above the adjacent strings. This last should be two millimeters as discussed previously. Use the thin file to perform this adjustment.

Now remove the bridge from the instrument and sand and file the top of the bridge to a curve that leaves room for half of each of the strings to rest in its groove. Now thin the bridge to two millimeters at the top and four at the bottom by sanding the side nearest the fingerboard.

The edges of the side of the bridge are next beveled and the edge of the bridge between the feet is shaped to the same curve as the top of the fiddle.

At this point it is possible to insert either ivory or ebony to prevent the E from cutting into the bridge. I use the ends which are left after fitting a set of ebony pegs.

I take strong exception to the present practice of using parchment glued to the bridge. I think it is at best a sham. To compre the hardness of ebony and parchment is ridiculous. This is a modern inovation for which I can offer no commendation.

Sand the entire bridge with the finest sandpaper. Wet the bridge lightly to raise the grain and after it is dry give it a final sanding.

A really good finish can be obtained by now using medium-fine steel wool. A light coat of raw linseed oil that is wiped off ten minutes after applying completes the job.

Norman Miller's article in the December-January 1962 issue of the Journal does an excellent job of showing how to use different weights of wood and distributions of area to help improve tone. I therefore refer you to that issue for details.

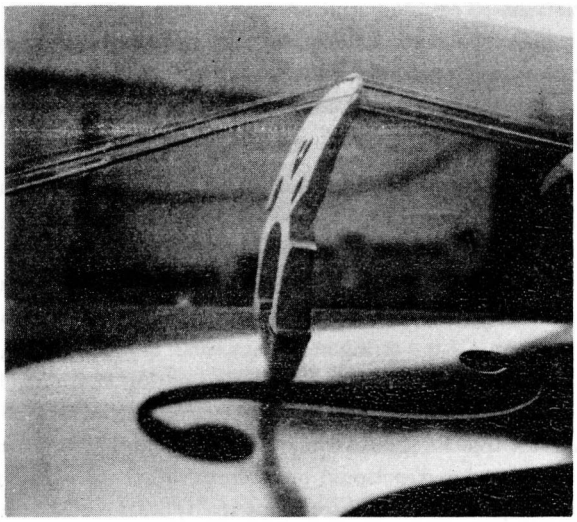
If there are any procedures that you have found to be helpful in the cutting of a bridge, please send them along and Don will be glad to include them in the next issue. Remember we want this to get as many tips as possible into print. Let's hear from you!

PROOF THAT WE NEED THIS COLUMN

Apropos to the comments on adjustment of string instruments in your April/May issue, I am enclosing picture of the mid-section of a cello recently received for repairs. In all my 35 years' experience, I have never seen a bridge warped to such a degree and I just couldn't resist recording it.

If you deem it worthy of publication, I feel it would emphasize more forcibly than the written word, the sad neglect to which a great proportion of instruments are subjected, especially School instruments.

Fred H. Artindale
1243 Palm St.
San Luis Obispo, California.



The String Section

Conducted by
CARMEN WHITE

Perhaps it has not been definitely stated that one purpose of this column is to develop a love and appreciation for the art of violin playing. In so doing, we will not deal with the mechanical aspects of making the violin, but will stay away from technicalities and try to show the young student some definite ways in which he may add to his higher appreciation of the "KING OF INSTRUMENTS". In my opinion, there could be no higher aim to further the cause of music than to help our readers develop a higher appreciation and love for the violin and for violin playing as an art.

Some time has been given to selection of the violin and bow. Let us now change to some hints for the teacher and for the pupil. In no one field of instruction do we find so much variation in methods as in the teaching of the violin. Every individual teacher is a "law unto himself", and his authority is accepted in the same proportion as he produces fine players. Not many years ago, there were two or three great teachers of the violin who produced so many fine players that young students sought them out for guidance. Today, unfortunately, there are few really great teachers of the violin, but many very good teachers. Teaching methods have come under better scrutiny on account of conventions and meetings where teachers exchange ideas, and challenging books and methods are being written and revised -- all to one great end, that of better violin teaching and playing.

One of the newer features of modern violin instruction is the string class method of instruction. The young student is handed a small, cheap violin outfit and put into a class of several others under the guidance of a string teacher. Usually, the string teacher is a person who plays a little on all the stringed instruments, that is, he can play the scales on the violin, viola, cello, and bass, but perhaps he plays neither of these instruments really well. It is felt that he should spend his time learning teaching methods and instructional procedures rather than trying to learn any one of the instruments really well--education courses are considered so valuable that they are required of the string teacher--he must present a required number of semester hours of education on his certificate before any state can pay him as a string teacher. The general result of this procedure is chaos in so far as learning to play a stringed instrument is concerned. The teacher may know "all" about methods of teaching, but unfortunately, he may know very little of the subject matter he is to teach! It should be stated that the greatest teachers of our stringed instruments disagree heatedly on the methods to be used in teaching. Surely these great artists do not give their methods freely to those who teach "education" courses to string teachers; and if they did so, the string teachers would surely be confused as to how to teach the technique of stringed instruments. It must follow, then, as the night must follow the day, that these "string teachers" do not really know how to teach the technique of these instruments.

There is yet another handicap to be considered for these string teachers who teach string classes. That is, of course, that the administrators who are charged with operation of our public schools must be satisfied. Their idea is that the "string program" (as it is called) must be judged on the basis of the numbers of students who insist upon being enrolled in it, regardless of the handicaps. I use the word "insist" here purposely. A student must really insist upon being enrolled to get into a string class. He must be willing to take a $39.95 violin outfit with four steel strings and four tuners, on which Heifetz himself could not play a tune! He must be willing to sit in the large class of students, most of whom are as bewildered and as willing as he is--and he must be willing to progress at the same rate of speed as the "class" progresses. That means, if the "class" learns the G-major scale in five weeks, he must be willing to play the G-major scale five weeks, even though the individual student may learn it in five days! I personally know of one notable example here which must be mentioned; a student in one of these "classes" was quite talented, and her father was a noted concert violinist. He bought the student a fine violin. The "string teacher" (if she could be called such) immediately took the violin away from the student and said that it must not be used, as it would not be "democratic" to give this student the advantage of a good violin in the string class while the other students whiled away the class period with the usual $39.95 outfit!

"By their fruits ye shall know them". If an adage or a great truth were ever worth while, this one should be worth while as a measure to judge these "string programs". The writer has had intimate knowledge of them for more than ten years, and he has yet to see a good string player come from these classes. On the other hand, he has seen many promising string players drop voluntarily from these "classes" with a real hatred of all string instruments and string music--a hatred which bodes only ill for the future of string playing and for orchestra work in general! The conclusion the objective observer will draw is obvious. That is: The young string player must obtain the services of the finest private teacher he can find at once--he must now waste time in "string classes" if he really wants to learn to play his favorite string instrument. This is not to say that string classes could not be successful--they could be--indeed, they should be. But the facts are that they are not. And the reasons for this lack of success? Simple: poor instruments, poor bows, too many players in each class, poor preparation of teachers, and administrative handicaps who demand numbers instead of quality players. Given finer teachers who really KNOW their instruments and who can play; given good instruments, given good bows, and given administrative cooperation for quality students instead of administrative demand for numbers and "no dropouts", we might have a different result.

As these programs are operated today, however, there is only one conclusion to be drawn from them, and that is, if we want a young student to learn a stringed instrument, we must send him to a find private teacher at once for private lessons. The writer has never seen a really good string player come from these string classes; on the other hand, many fine string players have come from the studios of private teachers who not only know how to play their instrument, but also know how to teach it!

If I had a young prospective student of a stringed instrument in my family and wanted to do right by that student, I would attend all of the student recitals by local teachers to find out whose students really played well. I would check the local orchestras to find out whose students held first chair places in string sections, and I would ask orchestra conductors to say whose students were well prepared to come into the orchestra. On this basis, and on no other, I would select a teacher for the promising young violinist, violist, cellist, or player of the double-bass! And unless a string class had actually furnished a number of good players in an orchestra, I would avoid these string classes as I would avoid the plague. Better get a fine instrument, a good bow, and a fine private teacher--and let nature take its course! Only in this way can we get the string players we need for our orchestras and for soloists!

Pardon an abrupt change of subject, but this must be added about violins: Recently, a fine teacher of violin brought a violin for minor repairs. She stated that it was made by a fine second-class Italian maker, and the fragmentary label promised as much. However, the general appearance of the instrument was against such a conclusion, and when played upon, the violin was so poor and weak that such a conclusion was absolutely impossible! This question arises: How many good musicians have seen this violin and have taken it for a genuine work of this maker, and having heard its poor tone, have judged that this particular maker is thus "overrated" and that perhaps all Italian makers are "overrated"! Could this indeed be the basis on which modern makers and others say Italian violins are "overrated" and are weak and poor? I think so. I happen to have played several specimens of this maker's violins and they were all fine. But if I should have accepted this particular violin as a genuine specimen of this maker's art, I would have to conclude he was a poor maker. And this specimen was "guaranteed" by a "known dealer". To me, it appeared as a common commercial German violin somewhat "doctored up" to imitate the style of an Italian maker--it was so weak and poor that no musician who had ever seen a specimen of the actual maker indicated could have any doubt that this was just a faked up fiddle. Ask yourself this question: How many really good Italian (and other) makers have suffered because of such cases of mistaken identity--either intentional or otherwise? And when you read a statement from some "wise guy" that "Italian violins are overrated" and so on, you should keep this incident in mind--perhaps the expert is drawing his conclusions from some "faked up" imitation he has played somewhere. Any comments?

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PABLO CASALS--HIS BOWING TECHNIQUE

Sent in by Herman L. Sammer

Casals has experimented much with bow technic, working away from the habit of playing constantly with all the bow. He wanted, instead of adapting himself to the bow, to adapt the bow to his needs, in control of sonorities and intensities of tone, giving to each part of the bow its own peculiar power of expression. He has what practically amounts to a technic of the fingers on the bow placing special value on the play of pressure between the

first finger and thumb and the fourth finger and thumb and the fourth finger and thumb. (Steinhausen) Through this control both strength and flexibility are attained, thereby facilitating of expression. (Steinhausen) In order to achieve the different varieties of tone color produced by changing from the use of full hair of the bow upon the string to that of a thin edge of hair, he permits the fingers to pull the stick somewhat on the thumb, making the effect a slight roll of the bow, without, however, loosening the pressure of the fingers on the stick.

In slow practice of a scale passage, without the bow, for strengthening the fingers, Casals exacts in ascending an actual vibration of the string through the energy of the stroke of the finger, and in descending a slight plucking of string by each finger as it is lifted, with a pizzicato-like effect. By this practice the fingers are trained to contribute to clarity of tone.

He believes that greater or less speed in the drawing of the bow effects the pitch of a tone, and also that the vibrato not thought out or controlled can be injurious to its purity. In speaking of intonation, he says that where sensitivity of finger in touching the string is quickly checked by a constant alert sense of hearing, there springs a sudden life into the vibration of intuneness. This is the foundation upon which alone it is possible to work out to their full value the effects of expressive intonation.

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DIVISIONS OF THE BOW

For a detailed and useful study of the divisions of the bow, follow the studies of "TARTINI" in this respect who acquired a very high degree in development of bow divisions. He, Tartini remains outstanding.

The three fundamental divisions

The point of gravity of the bow is the fundamental position for the division of the lower and middle third of the bow. Every third division has its own individuality, application of strength to the change of bow and the degree of underarm roll and play axis, in part.

GOOD OLD JOE

My friend, W. A. Schneewind, 3401 E. 38 St., Mpls. 6, has some copies of Miss Taylor's "The Violinist" dating back to the early years of this century. In the March 1913 issue Miss Taylor interviews Eugene Ysaye, who says:

"I have played on very many Stradivari violins, and some of them were very poor. But I have never played on a poor-toned Joseph Guarneri violin."

Carl Farseth

IN DEFENCE OF THE TERTIS MODEL VIOLA

by Charles Vystrcil
Brisbane, Australia.

In the December-January Journal Mr. Carmen White condemns the Tertis Model viola in a manner I did not expect from a violin maker of his reputation. He admits that his experience with violas is strictly limited (to use his own words). Despite this he advises Mr. Slaby not to use this model for his work. He also states that this model looks "horribly". I do not know what instruments he saw that he developed such strong prejudice against the Tertis Model but I presume he saw some badly constructed ones. As far as I know Mr. Tertis worked on his model for many years with one of the best English makers, Mr. Richardson, and they improved this model many times until they got a really good looking and excellently sounding instrument. I do not know these two gentlemen personally so I can not be accused of trying to defend them. I am speaking only from my experience and from the experience of my violin making friends. And here are some facts. I built a viola on this model in 1958 and in spite of the fact that I did not strictly keep to the prescribed thicknesses I got excellent results. My friend, Mr. Alfred Thurlow from Brisbane, who is one of the best amateur violin makers in Queensland, made one also, which is better still. Another was made by Norman Miller who is very well known through the Journal and it was so good that he sold it five days after it was finished. As a proof that the appearance of this model is not "horrible" (to use Mr. White's expression), I am sending colour photographs of two violas Tertis Model, one made by Mr. Thurlow, the other by myself. If they can be reproduced the readers would be able to judge for themselves. I would like to say to Mr. C. White that the best way to be a judge is to make one. I hope that Mr. White will not take this reply as an offence, but merely as a comment on his article.

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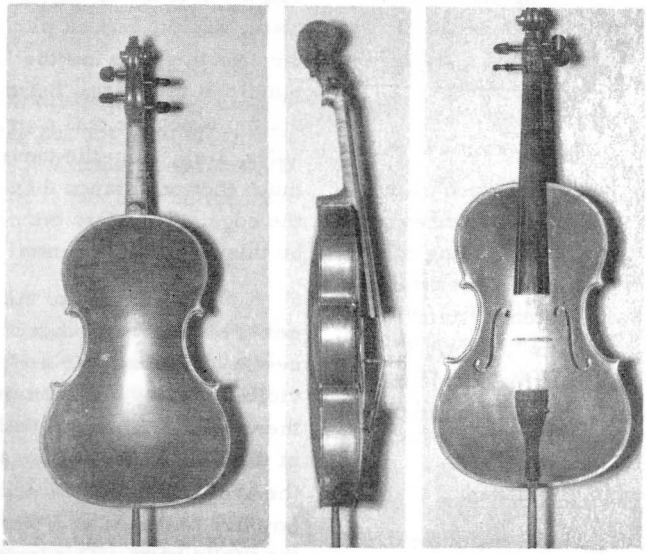
Charles Vystrcil in his Workshop



Tertis Viola made by Charles Vystrcil

SUPPLEMENTARY INFORMATION ABOUT THE MICROTONE SYSTEM IN THEORY AND PRACTICE

By Kristian Skou

(This is the first of three articles)

PART I.

I have been asked to give some further information about the microtone system, also about its theoretical basis, and I shall do this with pleasure even if I find the job difficult. It is hard to know where to start, and where to end? It is all connected together. And I beg you readers pardon me if the following should be somewhat incoherent. It is taken partly from my correspondence with interested people, and partly stated from my further experiments and experience with the system.

Let me start to answer some questions.

In the February issue of "Violin and Guitar Makers and Musicians" Mr. Joseph V. Reid has asked me some questions concerning the Balestrieri violin (described in that journal April 1961, and here in "The Violin Makers' Journal, July and August 1960). As these questions are what perhaps also other readers would have liked to ask I hope Mr. Reid will have no objection to my answering them also here.

Mr. Reid writes:

Kristian Skou's article on the Balestrieri violin was very intriguing. On the first page of his article (the last paragraph) I wish he could make his meaning clearer. When he says central area what area is he referring to? When he mentions blocks - what blocks? neck, bottom or corner blocks? What does he mean by this sentence? "It is important not to let the small thicknesses of the bouts continue across the centre joint along the blocks". This is a matter of prime importance I believe, and I would like to fully understand the meaning of that paragraph.

My answer:

First I must say that this article, in which I am introducing the microtone system, is held in a somewhat concentrated form, and I am aware that something of it has to be elaborated. But I have written another article: "How to rebuild a violin from the microtone system" ("Violin and Guitar Makers and Musicians", Sept., Oct., Nov., and Dec. 1961 , and "The Violin Makers' Journal, April, May and June, 1961) which I hope will serve this purpose.

And now the questions and their answer.

1. The central area. By this term I mean for the top an area with the intersection of the crosslines: bridge - middle joint as centre, and for the back the corresponding area (vertically below). The extension of this area cannot be well defined as it may change from violin to violin, but in the case of the Balestrieri violin it is most of the area between the f-holes.

2. The blocks. These are the end-blocks. The upper block should mean the neck-block, and the lower block should mean the bottom block.

3. The sentence: "It is important not to let the small thicknesses of the bouts continue across the centre joint along the blocks." This I have treated in my second article, but I shall elaborate it somewhat here. The bouts (flanks, cheeks - or what we will call it) of the back will often get rather small thicknesses by microtuning of the back to the top. The reason is that even if maple commonly will have lower tap-tone pitch (plate ring) than spruce for wood of the same dimensions, the maple under the same conditions will commonly have a higher microtone pitch. (The physical laws for tap-tone pitch and for microtone pitch are somewhat different, which I shall treat later on.) For this reason the bouts of the back will commonly be thinner than the bouts of the top, if they shall have the same microtones. Perhaps someone will wonder why under these conditions the central area of the back can be thicker than the central area of the top. But one of the laws for the microtone pitch is: The more wood surrounding the tested area, the lower pitch, i.e., for a plate of the same thickness all over the lowest pitch will be in the middle of the plate, and the highest pitch near the edge, and the greater the area the plate has the lower the pitch will be in the middle of the plate. But the edge of the central area of the top is not the real edge, but the inner edge of the f-holes, i.e., from the centre of the top to the "edge" is a much shorter distance than from the centre of the back to the edge. Therefore the central area of the top will also be thinner than the central area of the back.

But returning to the bouts. If we let the small thicknesses of the upper bouts of the back continue across the centre joint along the neck block (which is often the case in violins of today - and often directly indicated in text books) there will be much too little wood in the backwards extension of the neck (that is in the area along the centre joint between the neck block and the central area, which should never and nowhere be less than 3 mm) to lead the neck vibrations to the violin body. This transmission of the vibrations from the

neck is very important to the intensity of tone, especially on the E-string. (Only notice what happens with the tone, if the neck has got loose!) I have handled and tried hundreds of violins with too little wood in the said area. Not a single one of them had an E-string worthy to play on. Perhaps their makers have had the idea that the vibration energy is transferred from top to back through the sound post, and from there spread all over the plates. This is not the case. Part of the energy is - as said - supplied through the neck, and a little and not unimportant part is really transferred through the sound post. The main function of this is quite another problem, but the main part of the vibration energy is transferred from plate to plate through the inner air volume, and the transmission through the sound post and the ribs (with the corner blocks incl.) is subordinate. Not everyone will agree in this I think. Nevertheless it is the case, and I shall treat this also later on.

But once more returning to the bouts and the centre joint area near the end blocks. The area along the centre joint between the bottom block and the central area of the back must be thicker than the lower bouts of the back, even if there is no need for just as much wood here as for the area between the central area and the neck block. I think many of the readers will know Frederick Rove's "double heart system", and perhaps also Millant's "triangle system". These are only the same principle expressed and performed a little otherwise, and the same principle we find in good old violins.

Mr. Reid writes further:

You will note on the chart for the violin back that the thickness of the back in the immediate vicinity of the sound post is greater than the surrounding area. This has been my theory all along. The back should be thickest and therefore strongest at the point where the sound post contacts the back.

My answer:

Yes, in the Balestrieri back this is the case, and also now and then in other old violins, but not in so many cases that I will call it a common trait. Tonally it is not decisive, but from the view of solidity it can only be recommended.

Mr. Reid continues:

I am putting a new belly on a violin which I could never get any tone out of. The original belly was 3 full tones below the tone of the back. I attribute this to too widespread an interval between the top and back.

My answer:

This is probably not meant as a question, but let me answer it all the same. I suppose that with "tones" is meant ordinary tap tones (plate ring). This is a great interval, and even if the microtones of the top theoretically don't need to be lower than for the back in this case, all probability is that they are so. Now it is a fact that if the microtones of the top all over are lower than those of the back, the violin cannot play, the top being too thin to master the back or to correspond with the back. If the reverse is the case, that the top has higher microtones than the back, the top is able to master the back, and the violin can be able to play very well - this being the case with many good French violins. But the ideal tone quality - with full resonance - can only be obtained with the same microtones for corresponding areas in top and back.

Mr. Reid writes finally:

I cannot believe that each dimension in thickness shown on back and belly was made specifically and individually as shown. It is difficult to try and establish a general pattern of thickness, and if so how and why were they used as such.

The plates seem to be thicker across the edge than you should expect especially in the top plate. Certainly the graduating uniformity is not carried out with mathematical exactness. As Mr. Skou indicated the heaviest section of the belly is just below the lower F-hole circle openings.

I would like to see similar measurements taken of a genuine Strad, and Guarnerius to see if the general pattern is at all similar.

My answer:

1. A general pattern of thickness cannot be established. It seems to be a general acceptance by modern makers that the thickness distribution in the plates has to show a regular pattern, radiating from the centre, and symmetrically with the middle joint, such as it is often indicated in text books, often pretending the pattern to be from some or other old Italian violin. But makers who have had to open fine old Italian violins will know that the thickness patterns are not as regular as shown in text-book. Often it is difficult to find a general pattern at all, and some makers may think the old masters have worked out their thicknesses rather carelessly. But this is only apparently. If we will look at the microtone diagram for the Balestrieri (Figs. 3 and 4) we will find a general pattern: the microtone pitch evenly increasing from the central part towards the edge. The thicknesses as such are directed by this microtone pattern, and under this condition the thickness pattern can only exceptionally be regular. If wood was a homogeneous material the thicknesses would also form a regular pattern, but as we all know wood is rather inhomogeneous, and the wood quality of every spot will be determining for the thickness in this very spot - therefore the seeming puzzlement of

thicknesses in the Balestrieri (and in many other old Italian violins). The gauging calliper can be a guiding remedy to the violin maker, but it must not be the instrument by which we determine the exact thicknesses. These have not to be measured, but to be heard.

2. The plates seem to be thicker across the edge than you would expect, especially in the top plates. Yes, the edge is not the thinnest part of the plate, and the edge of the top is thicker than the edge of the back - for the above said reason (maple having higher microtone pitch than spruce).

3. The heaviest section of the belly is just below the lower F-hole circle openings. Yes, this is often the case, and must be so. This section is vibrating very intensively in the played violin, and if there is too little wood here the tone will be somewhat fluttering (lack of firmness).

4. The last paragraph. I also would appreciate very much if similar measurements could be taken and diagrams published from genuine Strads, Guars, and other fine old Italian violins - and if possible, not only as thickness diagrams, but also as microtone diagrams. Only the two sorts of diagrams together can give us a true picture of the described violin, concerning its acoustical properties. The diagrams should be supplemented with a description of the wood quality, the archings etc. and it is important to know if the violin has been repaired, especially if it has been scraped or padded, and if so just what areas of the plates, as we must not expect these areas to have their original thickness dimensions or microtones. The bass bar is nearly always renewed, and very often we find the bass bar side of the top has too low a microtone pitch, because the maker who has renewed the bass bar has not been aware what to take care of. Partly he has not tuned the bass bar, and partly he has now and then smoothed the wood surface where the new bass bar should be glued in, and thereby disturbed the microtuning of this area. In the very few old Italian violins with original bass bar I have come across the bass bar has also been tuned to the microtone system. It is also important to know which areas of the varnish have been worn off, and if these areas have been retouched, as this may also have altered the microtuning.

I hope to be able to contribute more, myself, with diagrams and description from a violin or two, but I should also very much appreciate such contributions from other makers. (to be continued)

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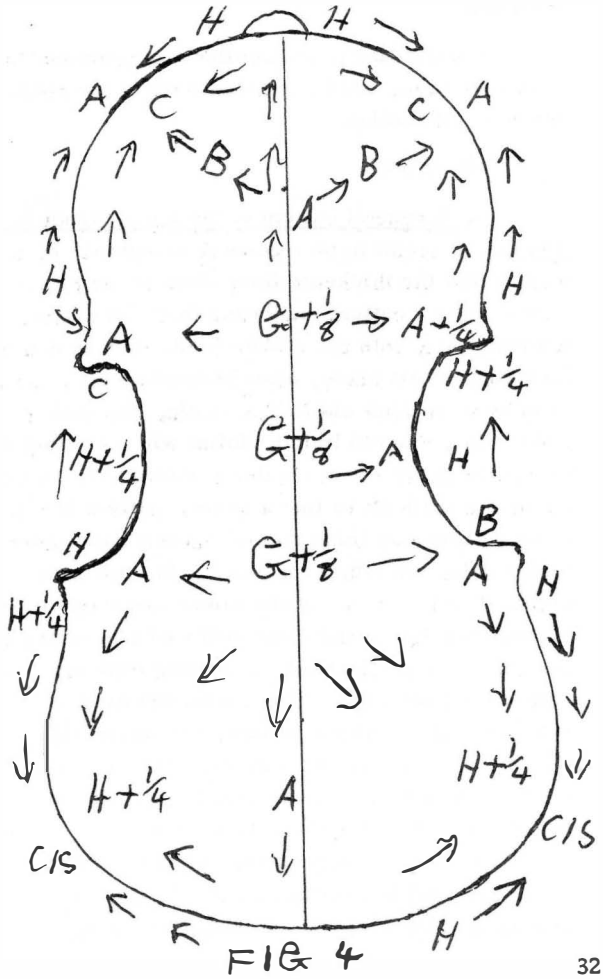

FIG 4

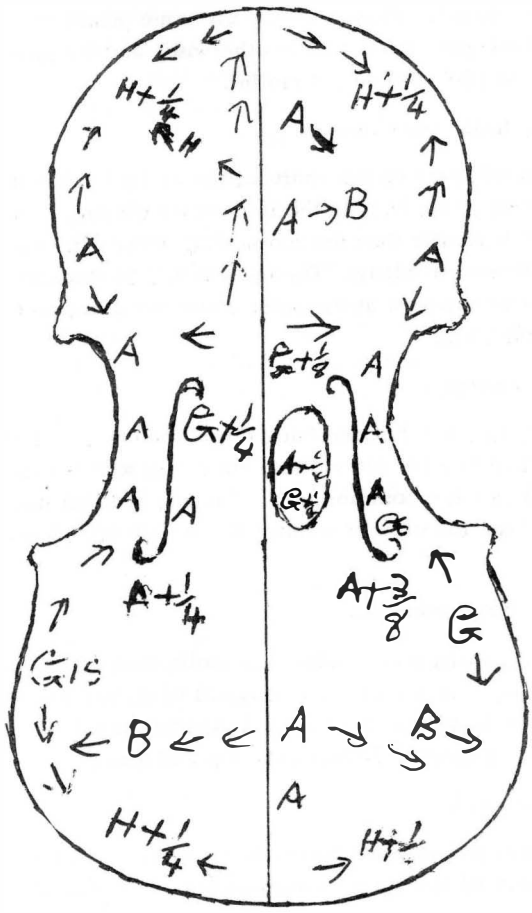

FIG 3