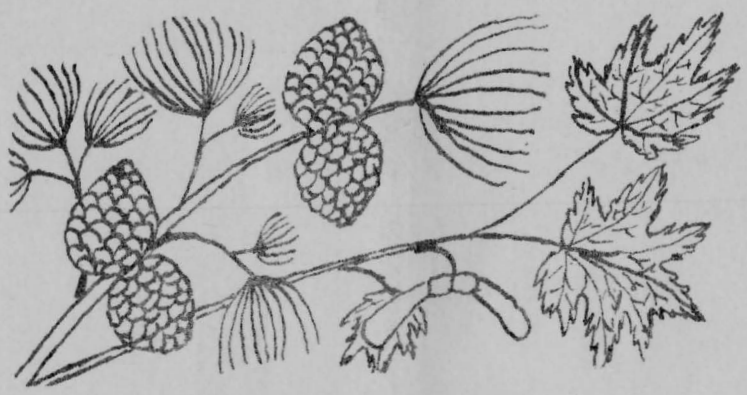
December, 1959

The Violin Makers' Journal

THE OFFICIAL MONTHLY PUBLICATION OF
THE VIOLIN MAKERS ASSOCIATION OF BRITISH COLUMBIA



Devoted to the development and encouragement of the art of violin making in Canada.

THE VIOLIN MAKERS JOURNAL

PUBLISHED MONTHLY BY THE VIOLIN MAKERS ASSOSIATION OF B.C.

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EDITORIAL

CHRISTMAS 1959

The executive of The Violin Makers Association The Violin Makers Journal take this opportunity of wishing all Members and Readers The Compliments of The Season.

To present this Greeting in any original manner seems impossible. Search as you may only one real Christmas theme presents itself: "Peace on Earth and Good Will toward men." After all that message should suffice and it is one that can be accepted by all races and creeds.

If Christmas does nothing else but encourage the idea of peace it is well worth all the time and energy expended on its approach. The Journal therefore leaves that one thought with you. If you can encourage and spread its gospel throughout the coming year well and good, but at least during the Festive Season let the suggestion of permanent peace among men prevail.

Merry Christmas to you all and a real Bright and Happy New Year.

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"GOD BLESS US EVERY ONE" said Tiny Tim.
Charles Dickens

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LOCAL NEWS

BY HAROLD BRIGGS

Hello Everybody:

Our September meeting opened with a period of two minutes silence in memory of a most highly esteemed member of our association, Mr. Ernie Limbegg. Even tho illness prevented him from attending many of our meetings he will be badly missed. The beautiful tone and workmanship of his instruments was an inspiration to all. The last violin he made and which he named "Jenny Lind" was given in [illegible] to be presented to some teen age violinist who must be a festival winner. This instrument along with a lovely bow and case donated by our association was on display at our meeting. It was decided that we should put an engraved plate, suitably inscribed, on the case when the presentation is made.

A letter from The Italian Violin Makers Society was read, conferring an Honary Membership upon The Violin Makers Association of B.C. for their work in promoting the art of violin making. We all feel that this is a great honor.

The balance of our meeting was taken up in discussing plans for the sale and display of our work which we had hoped to hold at T. Eaton & Co. store, but since Eatons have since rejected the whole idea, it would be a waste of effort to report on them at this time.

Our October meeting was turned over entirely to our guest speaker, Professor Carl Piltz, who gave us an outline of the work he is doing in organizing a school of music at the U.B.C. For the first time these musical groups are being sponsored by the university and the students are being given credits for their work. He is starting off gradually, first with vocal choruses and strings, to be followed shortly by the brass and wood wind sections. The University supplies the instruments and the pupils each receive four periods per week of class instruction with no home work. Those who are studying strings are of course most interesting to us and it is especially interesting to note that he intends to give each pupil six months instruction on the violin and viola, the next six months on the Cello and Bass Viol, so that at the end of one year they should all be familiar with all four stringed instruments and would be able to read music in ary Cleff. Professor Piltz expects to work with each group separately at first and then when they have attained a reasonable standard of proficiency, they will all be united to form a complete orchestra. It is hoped that by the end of four years they will all be good enough to go out and teach music lessons so their numbers may eventually be pyramided.

Of special interest to our group was a statement that altho the University is using fairly cheap instruments from Europe at present, as the pupils become farther advanced they will want better instruments and he suggested it might be possible for our society to supply these instruments, possibly on a loan to the University at first where they would be fully insured and later on an interested student would be able to buy one, or the university might be interested in purchasing if the quality and price was satisfactory.

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THE CONFUSION OVER CANADIAN SPRUCE AND SWISS PINE

by Kristian Skou

The Words "Pine and "Spruce" are used some indiscriminately in the English speaking world. England and the European continent where English is spoken, common spruce (Latin: Picea abies) is commonly called Pine, and your Pine (Latin: Pinus) often called Spruce - very awkward, as we have to know from where a man is in order to know what he means. I do not favour to use Latin if we have a word in our own language, but in that case it is nearly necessary. The wood used by the old masters wa a subspecies, in German called "Haselfichte" - that is literally translated: "Hazel-spruce" (I do not know if you have such a word). Also Fir (Abies alba) was used - and is still. Both species (Picea abies and Abies alba) are included in "Swiss Pine" - a somewhat misleading term, as the trees are growing all over the Alps, especially on the slopes facing the south, where the summer is dry, and the soil not very fertile, the wood being ve

Pine (Pinus) is only occasionally used for violins. The sapwood is white or yellow, and the heartwood (also white in the growing tree) turns brown or red brown when exposed to the atmosphere and the sunlight. The heartwood is too resinous for violin making, but if we remove the resin (in a bath of spirit or oil of turpentine) the wood is just as good as Spruce, but we must not use sapwood and heartwood together because of the difference in colour, but also because of difference in their physical qualities. Last summer I found on the peninsula Nugssuaq in West Greenland a trunk of a Canadian Pine (Pinus resinosa). I took some of it home. It is excellent wood, and I will try it for violin making. We have also Sitka Spruce (Picea sitchensis) in Denmark, but the trees are as yet too small.

California Red Wood I have never seen. So far as I know it is a species of Sequoia (Sequoia sempervirens). Perhaps the Editor will send me a small piece.

My Driftwood violin! Well, I am calling it the Pearyland violin because the wood was found there. The wood is Larch (Larix), grown in Siberia for about 5780 years. One of the great rivers there has transported it to the Polar basin, and after years' drift it finished the journey on the coast of Pearyland. Since then Greenland has elevated from the sea, and the wood was found 50 metres above sea level. In the dry and very cold climate the wood was well preserved, and it was taken to Denmark for testing its age. Of course there can be found more similar wood in Pearyland, but not large quantities, and it is only occasionally a geological expedition had anything to do there. I hope to get more of the wood, but it seems somewhat difficult. and there was only wood enough for one top in the sample I got. I should not think that recent Larch is good for violin making, being too heavy and too resinous, but this very old wood was very little resinous, and it had a similar molecular structure as the wood in old violins, and for that reason I made a top from it - with excellent result.

The name of the wood we are using for violin making (be it Spruce, Pine, Larch, Red Wood, Cedar, or anything else) is secondary the wood has the right physical (acoustical) qualities. It should even be possible to say build up the ideal wood for a violin top by means of alternating vertical lamellae of hard and soft wood selected for the purpose - similar to the structure in a plate of Spruce built up by the nature, but here contro I am just trying to build up such a plate.

Testing the wood by physical methods - well! It may be a good help for use in our selection of the wood and our dimensioning of the plates, but deflection tests (as stated by Hecrtman) in relation to the weight is only one of several necessary tests:

the pitch when tapping the sample of wood (in a way another form for the deflection - weight test), the intensity of the tone, the character of the overtones in relation to the key note, the molecular structure of the micro-fibrils in the wood, the hygroscopic conditions of the wood (these have to be very similar for top and back) - and so forth, and all tests have to be combined. I should not say it will be impossible entirely by means of physical tests to select the right wood, but it will be very, very difficult. A great personal experience is the best basis for selecting the wood - and good for that maybe. If we could build violins from a formula, violin making in its best form, cease to be an art.

Re the deflection test Weertman seems to have neglected one important thing: years after a sample is taken from a piece of wood the sample will harden and the resistance to deflection increase, and the maple will harden more than the spruce. If the test shall tell us anything of value the sample has to be placed at least one year in the sun before testing, and the samples have to be of nearly the same thickness as the violin plates, as it mainly is the surface of the wood that hardens. But Weertman's book is not finished in the journal, and perhaps he will return to this question later on. I shall not criticise an unfinished work.

.....

TONE WOOD

by Rev.Geo.R. Wright

I told you before that my prospector friend in the north had promised to send me some Alaskan Spruce and also some Larch. It has just arrived and I am delighted with both.

The Spruce is taken from the logs which were in an old Cabin built over 40 years ago. I do not know the real specie it is, but it is not white, like Englemann or Western White Spruce. It is a pale golden yellow that shines when planed. It is considerably harder than the others. It is fine even grain and rings in a high-pitch note.

I have already started to make an all B.C. Wood violin, with it as belly.

The Larch is white and also a beautiful straight, even grain, and looks like it will make excellent
it.

The more I experiment with B.C. Wood, the more I am convinced
class violin tone wood. Let us dig it out.

.....

LOCAL NEWS cont..

For teaching in this way Professor Piltz favors metal strings with adjusters, mainly because the teacher can reach over and tune a string without stopping the pupil from playing.

During a question period that followed, a question was asked as to the standard dimensions for a Viola. Professor Piltz' reply was that there were no standard dimensions and he didn't believe there would ever be for in order to get the tone most wanted it would be necessary to have an instrument too big for any player to handle. Thus it must be a compromise between the tone and the size of instrument a player can handle.

In conclusion, Professor Piltz was given a much merited vote of thanks by all those present.

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SCIENCE IN VIOLIN MAKING

by Clifford Hoing

It must seem rather contradictory to the observer that several contributors to the Violin Makers Journal claim merit for their methods of violin making but have to admit that they find it difficult or impossible to sell their instruments to professional players.

As regards the method of treating violins before varnishing (that is supported by a certain scientist) if the method advocated was in any way superior or even equal to methods used by other makers, the results would at least be salable. Yet they admit they cannot sell their instruments and still persist in reiterating the advantages of their methods and the quality of their work.

The facts cannot be overlooked and it is something that all violin makers must face. If you make instruments and wish to sell them (even to amateurs) they must be GOOD. If you find on submitting them to professional players that you cannot sell them.....that must be taken as an indication that the goods you make are in some way not up to standard.

Let us face it, players DO buy modern instruments. There is a really big demand for fine toned instruments old or new and if yours happen to be unsalable..... look to your methods.....don't be pigheaded. If a maker has a good demand for his work and he suggests to you that some of the methods you may be using are not conducive of fine tone, he is most likely trying to help you. But don't be offended if he does not tell you how he obtains his results. He has a living to make and cannot afford to create competitors.

If you cannot sell your instruments, please don't make wild statements suggesting that no modern maker can sell his instruments. This is just not true. Moreover, some people may think that you have an inflated idea of your own importance because it seems to infer that no-one can produce better work than yourself.

To those who say that modern instruments are not bought by professional players, may I mention just one of my markets in the U.S.A.. Three of my violas are at present being used by members of the Boston Symphony Orchestra and three more are on order to members of the same Orchestra all within a year of the first viola being introduced to them.

I am of the same opinion as Mr. Walter Jacklin in regard to science in connection with violin (or viola) making. I think that science has done nothing to assist makers in producing better toned instruments. Of course scientific experiments in connection with fiddles may be interesting and even exciting, as suggested by our Editor, but they seem to have got us nowhere in the course of a very long time.

But maybe we can shortly expect some progess as I understand that some scientists are now taking lessons from a practical violin maker!!!!! Well, well, after all these y e a r s, Excuse me if I yawn.....

.....

I had no shoes and complained until

I met a man who had no feet.....

.....

WHERE DO WE GO FROM HERE?

by E.H. Sangster

There does not seem to be much more one can write about violin making that would be any benefit to a practical violin maker. It is universally admitted that the violins made by Stradivari and Guarneri are the finest in tone articulation and carrying power of any that have been made and there are a goodly number still in existence, many of them being played by the great artists. Now! we have wood equally good, we have the dimensions, the thicknesses to copy, and now we have the varnish. There have been and still are thousands of exact copies made yet in the opinion of nearly all great violinists, none of the copies equal the originals. This leaves us with three questions to answer ?

1. Is it because of age? (all the fine old instruments were over one hundred years old before they were played by great players).

2. Is it because they have always been played by great players?

3. Is it because all the old instruments were impregnated with something before they were varnished that gave them greater resonance, easier articulation and finer tone quality?

To sum up I do not think that science can help us solve the problem because we have the fine instruments to copy. (The blue prints of fine Strads are available) Another point to think about? Stradivari made the famous "Tuscan" in 1690 and from 1690 to 1698 he made what is known as long Strads and from 1700 to 1725 he made many violins of the finest yet no two of them are exactly alike. He varied the arching more or less in nearly all of them. This tells us that fine instruments can be made with many types of archings within reason. Nearly all makers have there own theories on how to make instruments and I have known several who had a secret they would not even tell their families. This secret gave their violins a tone equal to a Strad?

I have the blue prints of two different Strads and it is not difficult to make a good copy in every detail but to get the tone, articulation and carrying power is another thing. All you violin makers think about it and experiment a bit and perhaps you will come up with the answer.

.....

MORE ON TAP TONES

by Frank W.Heinonen

Someone was enquiring how you get the notes "C" for the top and "D" for the back of a violin. The answer I find is on page 133 of Heron Allen's Book on Violin Making. It was a little hard to understand, because he mentions where the two nodal lines cross to clamp the plate to the edge of a table by using a cork in between. First balance the plate on a cork and strew a little sand on the plate and hold it down where it is balanced firmly with the thumb and use a well rosined bow on the edge of the plate. The sand will collect at the lower node. Then put the cork underneath at the nodal point and press down firmly with the thumb, and use a well rosined bow. Then you will get a clear "D" on the back part if the thickness is correct.

This is what Heron Allen calls the lowest or natural tone of the plate. In my case in this experiment the tone was E flat as I tried a back I had discarded for the time being as it had not been reduced to proper size.

But in the German book "Die Kunst des Geigenbaues" there is measurements of

cont..on Page 10

VARNISH AND FILLERS
by Norman Miller

Being prompted by a further article in The Strad magazine by Kristian Skou of Denmark on the inclusion of iron in violin varnish, I thought you may like to let your readers know of the result of several experiments in this direction with iron in its various forms and the application to violins and varnish for them. The enclosed transparency in colour shows one of my violins with two coats of a filler which I call No.1 plus one coat of No.2 with one coat of clear varnish. (Harris' pale amber). I think you will agree that the results are interesting. I was impressed by Mr. Skou's articles on the inclusion of iron rust in violin varnish but did not care for the way in which they had to be dried, which was for several days in the sun. After a long period of thinking and some trial and error, I came up with the following formulae that gives the result shown on the transparency.

Filler No.1 Dissolve one ounce of Ferric Ammonium citrate in five ounces of water. Store in a brown glass bottle. Apply to the finished bare wood of the violin, using a soft brush, or a cotton swab. It will dry quickly but leave it in strong light (not sunlight) for at least a day. As it is a water solution it will raise the grain slightly, and will require gentle sanding. For deeper colour another coat or so may be applied. I have found that after the first coat, the subsequent coats do not require sanding.

Filler No.2 Take eight ounces of boiled linseed oil. Add to it one ounce of mineral turps, and one ounce of white spirit, and half an ounce of terebene. This makes a thin varnish. Apply with a soft cloth; rubbing in well all over the violin. One coat is sufficient, but more can be applied if deemed necessary by the worker. Each coat requires 12 hours to dry.

If you desire you can apply your favourite varnish directly over Filler No. 1, without the use of No. 2. I have found that varnish applied over No. 1. alone, will take well and does not sink in. Filler No. 2 does a real good job of sealing and is a splendid undercoat for subsequent coats of varnish. In further experiments I added iron rust direct to No. 2. by allowing water soaked steel wool to rust to a powder and adding it direct to the No.2 mixture this had the effect of adding a yellow brown tinge to No. 2 and adds to the flash of grain when applied either to the bare wood or over wood with No. 1 applied first.

I have found that by using a combination of No. 1 and No. 2 as described that I acheived the same depth of color with added flare of subtle golden yellow tinge, using four coats of Harris' dark brown varnish than previously obtained with as many as 12 to 15 coats for the same varnish.

Instead of Ferric Ammonium Citrate you could use Ferric Chloride which is soluble in both water and alcohol. The ammonium citrate will only dissolve in water. I find it difficult to get Ferric Chlorides here. Both the ammonium and the chloride are sensitive to light, which accounts for their darkening when exposed to strong light, and I can recommend the use of both No. 1 and No.2 before using your favourite varnish. Ordinary drying time for you varnish is not delayed or prolonged with these undercoats, and I feel sure that you will be agreeably delighted and perhaps surprised with the flame of the maple when you have applied both No. 1 and No.2. The spruce front also takes both well and the grain is enhanced. I will be very much surprised to hear from someone with greater chemical knowledge than I have that the Ferric Ammonium citrate will harm or cause rot or decay to become advanced in the wood. On one of my recent violins I have applied No.2 to the inside of the violin and as far as I can judge no damage has been done to the tone, or response of the instrument. I applied one coat only. In application to the outside or inside No.2 can be applied hot if you so desire.

Mr. Skou evidently is a subscriber to your Journal and if you see fit to publish this maybe he will be kind enough to pass some comment. For my part I am indebted to him for prompting the chain of enquiry that caused my experiments in this direction. As I am adopting it as a general measure now with all my fiddles.

And now at the risk of being a nuisance and taking up all your time with the reading of my letters, the following cutting from an Austrailian newspaper, calls for some attention.

VIOLIN WITH A PRISON RECORD: French violinist Devy Erlih, now in Australia for a series of A.B.C. concerts, plays a Guarnerius violin. And the violin has an unusual and romantic story.

It was made in 1726 while Guarnerius was serving a gaol sentence for killing a man while drunk.

In gaol he fell in love with the gaoler's daughter. She used to bring him wood so he could carry on with his violin making.

"Prison wood", they call it now, says Mr. Erlih as he talks proudly of his violin treasure, which is insured for £10,000.

"You can easily tell which violins are made from prison wood because it is different from that which Guarnerius usually used."

I do not know how your Association accepts such a collection of fictional fantasy as is stated in this article by Mr. Devy Erlih, a French violinist at present in Austra lia, but personally I feel that it is a slur to the memory of Guarnerius who supposedly made Erlih's fiddle, and affront to the intelligence of the general public, and does inestimable harm to the efforts of the violin makers of today by adding to the fiction and nonsense given to old violins. If violins are old and have history and tradition, cannot it be kept to truthful facts; facts that are known by history and record. Could not Mr. Erlih and his publicity agent be called to task and disclosed to the public as fabricators. We know that there is no absolute proof that Guarnerius was ever in prison, and most certainly do not know for waht reason, and for Mr. Erlih to state so positively that he was imprisoned on a murder charge is just too much.

Mr. Erlih must be in possession of special knowledge; knowledge that is denied the existing and past violin experts of the world, when he states his facts that his violin was made in 1726 while Guarnerius was in gaol for killing a man while drunk. Mr. Erlih proudly says that "you can easily tell which violins are made from "prison wood" because it is different from that which Guarnerius usually used". I'll say it is. From what I can gather from books of authority on these matters the so called prison violins were made from such inferior wood and so badly constructed that they can be recognised alright, but I do not think that one should be so proud to admit it.

Could not Mr. Erlih be shown that the claims he is making are not helping him as regards his publicity, and that the ignorant peasants to whom he is pouring out this guff may have some knowledge of violins as should be expected as in the main they will make up his audiences, but I fear, no, if he expects such nonsense to be swallowed.

"Prison Josephs" are said to be fakes; if Mr. Erlih's violin was made in 1726, and a "prison violin" it is wrong anyhow, as the period of time when Guarnerius was supposed to have been in prison was about 1744. He cannot have it both ways. Maybe Mr. Erlih fondly believes all this nonsense, if so, could not he be set right?

Perhaps I feel too strongly about this matter, but I feel that if the article

was reproduced, and the facts as known taken from books on violin matters by Jalovec, Abele, and others given, in your Journal. Mr. Erlih may decide to review his statements, and keep them closer to the truth.

Jalovec says; "Up to the year 1730, he (Guarnerius) was experimenting, changing the shape of instruments and sound holes; at this time his workmanship was not of the best, but the tone is always fine and powerful.

1742-1744....At that time he is said to have been held in prison. However the so-called "prison violins" ascribed to him seem to be fakes.

Abele & Niederheitmann say; "For some unknown reason he was for some years incarcerated in prison, and died there in 1745. It is said that the daughter of the imprisoned violin maker took him some wood, and a few indispensable tools, with which he produced the instruments which do him so little honour."....the translator John Broadhouse, says "Doubts have been expressed as to the truth of the imprisonment theory but it is certain that many of the comparitively imperfect productions of the later years of this great man are usually spoken of as "prison Josephs".

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MAN DEGRADES OR GLORIFIES

In The Vancouver Sun

Some people dignify everything they touch, just as some people degrade everything.

Some men make holy things vulgar, gracious things uncouth, beautiful things repulsive, and great truth trivial. Others glorify and hallow all life. So much depends on the touch. Brother Lawrence transformed a kitchen into a chapel.

An American in London during the war reported that one of the songs most frequently heard in air-raid shelters was "John Brown's Body." Listening to the overtones he declared it to be as moving as a chorus in Greek tragedy, especially when the staccato bark of air-defense guns broke into the refrain:

"John Brown's body lies a mouldering in the grave, but his soul goes marching on."

King George the Sixth visited a pottery and handled a plate before it had hardened. The plate was preserved because it had the impress of the King's fingers.

Thus Jesus took a donkey on which to ride into Jerusalem. He set a child in the midst of a crowd. He took a towel and washed the disciples' feet. He gave them bread. He died on a cross.

A donkey, a child, a towel, a piece of bread, and a Cross--Jesus touched them all. One was a thing of ridicule, another of weakness, another a symbol of humblest service, another a symbol of simplest need, and the last a symbol of man's most diabolical cruelty and degradation.

Jesus touched them and they were transformed with such Sacramental splendor that never again can we even mention them without an elevation of thought.

All of us leave our mark on life. The vitally important thing is not what we handle, but how we handle it. Napoleon cut a door through Da Vinci's Last Supper and turned a shrine into a stable for his horses. Jesus turned a stable into a shrine.

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THE TRUTH ABOUT THE DEVELOPMENT OF PRE-TREATMENT OF VIOLIN WOOD

by Joseph Michelman

E.H. Sangster has at last explained his contribution to the pre-treatment of violin wood. He now claims thirteen years after Michelman's book "Violin Varnish" was published in 1946 that he "used the oil treatment in Halifax, N va Scotia, in 1936 and '37, long before Mr. Michelman's book was printed, only we did not know enough to oxidize it so I abandoned it until I came to D llas and violin No. 59 made in 1955, wa the first violin of my own make I treated with linseed oil and oxidized." (Violin Ma Journal, September 1959, Page 3)

Many violin makers throughout the world in the past hundred years may have done as much work as and probably more than Sangster did, because the application of raw linseed oil to a violin in the white is so simple and produces such outstanding results. I personally applied oil to the inside of a violin as early as 1920. Rubbin oil onto a piece of wood or a violin is not an accomplishment, which is about all that Sangster has done. Moreover, he did not know enough to solve the problem and he aban doned it until 1955, by his own admission.

But now that Michelman has solved the problem after many years of research a now that Sangster has fully realized the value of the treatment, it is entirely too l for him to make any claims after thirteen years. The extensive amount of research on the linseed oil pre-treatment of violin wood described in Michelman's book and the number of his subsequent articles should be compared with the absence of any published research on the subject by Sangster. On the other hand, Sangster in the intervening years has recommended to brother violin makers a dubious water-soaking method for vio wood and he wrote at least three articles on his method about ten years ago. This sho indicate that he did not understand the value of the linseed oil pre-treatment at that time and he did not know how to use it.

Sangster's report that he has gotten the finest results from a raw linseed oil pre-treatment of violin wood is deeply appreciated by me, and I want to thank him for his endorsement. But any violin maker who tries the methods described in my book and papers will obtain similar results. Sangster's favorable report on my method is apparently his principal contribution to the pre-treatment of violin wood and develop ment.

Joseph Michlman
6316 Wiehe Road
Cincinnati, 13, Ohio.

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MORE ON TAP TONES: cont..

34 different violins. In some instances they use "F" for the top and "G" for the back. Although in one place they mention using the bow on the side of the plate.

As Heron Allen mentions and it gives the "C" for the top and the "D" for the back.

Also there are several Stradivarius violin measurements given which vary in thicknesses. So it is I find the density of the wood that gives the required tone in these tests.

.....

"Man that is born of woman is small potatoes, and few in a hil."
Rudyard Kipling...

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THE 1944 APPENDIX TO JUSTIN GILBERT'S "CREMONA VIOLIN TECHNIQUE"

by Carl Forseth

There was so much arguing about Justin Gilbert's methods in the Journal some months ago that I summarized his technique in the July issue. (Four errors in my summary should be corrected. Page 8, fourth paragraph, third sentence, read: "But when the pitch of a hard back could not be sunk to about G without too much thinning, Gilbert in 1943 . . . "In next sentence, change "pitch of top" to "Weight of back." Across on next page, change 35 mm. long wedge to 31mm.)

In his 104 page "Cremona Violin Technique" Gilbert mentions the fusing of copal with rosin in discussing varnishing. But he does not think it is necessary in his chapter on "Foundation" to say what every violin maker knows -- that copal and amber must be fused. Then why should I go into this detail in a 5 page summary?

Three ways lie open. Use a batch of copal or amber varnish, fuse the gums and dissolve them in hot oil, or use Martin Beilke's method -- powder the gums and dissolve them in a special linseed oil that does not jell at 650 degrees fahrenheit. (Mr. Beilke of Minneapolis has become one of the world's best bowmakers.)

Mr. Gilbert fused copal with rosin. Like so many violin makers, he was suspicious of linseed oil as a filler. It makes the violin sound like a golden harp for several years. Then after 15 or 20 years the violin sounds like a tin can. Lee McNeese of Buffalo, Wyo., fuses copal with superheated steam.

In June of 1944 Mr. Gilbert added an appendix to his book, which I did not see till the fall of 1959 when Lee McNeese loaned me his copy.

For two years Gilbert had mulled over the virtues of the thick edge, and it took him two more years to endorse it unqualifiedly. In the beginning of his Appendix he devotes ten sentences to praising the thick edge, and later he says: "The rise in thickness of front around the edges is conducive to beauty of tone, breadth, ease of playing, reserve power and responsiveness. "Mr. Gilbert, however, thinned the edges of the back. This is permissible in the upper and lower bouts where even the plate may be lightened with impunity. If he had lived a few more years he would have agreed with the classic makers that the edges of the back must be left solid in the waist.

Mr. Gilbert never endorsed a top ringing lower than F. During the war he could no longer get European sycamore and resorted to harder and heavier American maple of varying quality. Some of the backs threatened to become too thin in the sinking of the tone to .85 note (1.7 semitone) interval (G or thereabouts). He then left the backs as they were, but strove for the following intervals.

For	3.70	oz.	back,	make interval	2 semitones
"	4.00	"	"	"	3 "
"	4.25	"	"	"	4 "
"	4.40	"	"	"	5 "
"	4.50	"	"	"	6 to 8 "

The above table is to match a top tuned to F. If the top rings to F# the adjustment is easier.

Said Gilbert: "In the finished beauty of finesse nothing is quite as good as the tone of the 1.7 interval. "This interval Gilbert made exact. The 2 semitone interval should also be close. The other intervals are not so critical.

Fram all these intervals, fronts and back can be mated. But Gilbert never went by cast-iron rules. He carved several tops and backs at the same time and matched the most vocal, which is an old practice.

In 1944 Mr. C.E. Mertzanoff of New York weighed a 1715 and a 1716 Strad top for Mr. Gilbert. Each weighed about 2.30 oz. and rang between F and F#. Stradivari would have known better if he had lived today! Our best modern "authorities" inform us Gilbert's 2.40 oz. tops are too light.

Justin Gilbert's book is now sold by his estate for $18 through his son Riley, of 28 Chatham Drive, New Orleans. Insist on the following inserts in the book if you buy: Page 91A; Mockel's Strad table; Gilbert's letter of June 8, 1939, and his Appendix of June 1944. In mimeographed form all these inserts add up to about 10 book pages, and the $18 for the book should cover all.

This Appendix may be considered Justin Gilbert's swan song. It is a paean of victory at the success of the thick edge, the solution of the problem back, and especially the success of the master key of the free plate ring.

Work he left undone is a more comprehensive table on weight and tone intervals of top and back, humidity and plate ring, temperature and plate ring, and a closer knowledge of Guarneri and late Stradivari construction.

Justin Gilbert dropped the torch in his eighty-second year. Who is there to pick it up?

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Being Creative is a discovery of ourselves, of our own way of responding to life. It is something we achieve alone, like getting born, or dying.

Everyone has the capacity to be creative, But the answer to the question, "how"?, lies within each individual.

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Herman Levin, Producer of My Fair Lady, tells of the two women who sat in the orchestra, an empty seat between them. At intermission one said, "I waited eight months for my ticket."

"So did I," said the other.

"What a shame -- this empty seat," said the first.

"Oh, that's mine, too," replied the other. "It was my husband's only he died."

"But couldn't you have brought a friend?"

"No," she said, shaking her head. "They're all at the funeral."

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PEDER SVINDSAY WINS IMPORTANT VIOLA AWARD IN ITALY

Word has been received that a viola made by Mr. Peder Svindsay 240 East 5th Avenue, Vancouver, B.C. has won a Silver Medal at the International Viola Exhibition held by the Societa' Filarmonica Ascolana, at Ascoli Piceno, Italy.

This high honor indicates the quality of Mr. Svindsays' instruments which have always been admired for their perfect craftmanship and beautiful tone.

We must also congratulate another of our readers, Mr. Clifford Hoing of High Wicombe, England, who won the Silver Medal for the viola with the most stri king personality of any exhibited. An outstanding win.

Mr. Svindsay, needless to say, is of Scandinavian stock, having come from Norway some 40 years ago. He commenced building Violins as a hobby and superb craftmanship soon became evident. His instruments have been played by many leading artists. In his work Peder uses hardly any other wood than British Columbia Maple and Spruce which would suggest that we have right here just as good material as can be found in Europe.

We hope to give a full story on Peder Svindsays' life and experience in the January issue of the Journal. Meanwhile we say. "Congratulations Peder."

We cannot close this article without mention of the Exhibition itself, which was a huge success. Some idea of its importance and the respect held for this show may be found in the fact that Violas were in competition from every important country in the world. Many of the makers traveled to Italy to view the exhibit and meet other makers. Very helpful conferences were held where the exchange of ideas and methods were discussed. One cannot help but suggest that much useful information has been disclosed which cannot help but encourage the building of this beautiful instrument. It is also possible that some standardizing of the si e of the viola may be accomplished. This is at present one of the things that mystifies the maker.

The success of the Viola Show was mostly due to Professor Pasqualini whose ability of organizing was clearly shown not only in the arrangement of the exhibit but also in the smooth running of the whole affair.

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ARIZONA VIOLIN MAKERS COMPETITION

The Arizona Violin Guitar Makers and Musicians Association held a most successful competition last month over 100 instruments being on exhibit. Instruments were judged on a point system. viz: 100 points for tone, 100 for workmanship, 100 for varnish. Many received a high score for tone but fell down on varnish or workmanship. Some were very high on varnish and workmanship but not so good for tone. These results would indicate that some standard of perfection should be worked out to be used as a basis of judging instruments in North America.

We regret space will not allow the full list of Prize winners. Major awards wet to Bob Wallace Sr., Gilbert, Arizona, F.R. Davidson, Leipsic, Ohio, Irvin Lundy, Mesa, Arizona, Garland Green, Tempa, Arizona, and Joseph Horvath, Cleveland, Ohio.

It is interesting to note that all 4 violins at this competition last year were made from Bob Wallace's "Top Wood". This also applies to all place winners this year, suggesting the high quality of "Bob's" top wood.

The Arizona group are a very lively and progressive one and publish a splendid Journal which goes free with a $3.00 membership fee. Write Mr. Bob Wallace, P.O. Box 522, Gilbert Arizona.

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HIGH HONOR BESTOWED ON THE VIOLIN MAKERS ASSOCIATION OF BRITISH COLUMBIA

Undoubtedly the finest organized group of Violin Makers in the world today is to be found in Rome, Italy.

This of course, is only to be expected in view of the tradition behind makers in that wonderful country. Yet even with such a background the success of The Associazione Nazionale Liuteria Artistica Italiana would be far less pronounced were it not for their indefatigable President Professor Dr. Gioacchino Pasqualini. The efforts of this remarkable man were mirrored also in the success of their recent Viola Show.

We were therefore filled with a very strong feeling of pride when we received word from Professor Pasqualini, word that his Association had bestowed up The Violin Makers Association of British Columbia an honorary membership in their Association.

A translation of their letter is as follows:

Associazone Nazionale Liuteria Artistica Italiano
Rome, September 1, 1959

Purpose: Nomination as "Honoray Member " of the A.N.L.A.I.

The distinguished Association of
"The Violin Makers Association of British Columbia"
Vancouver, B.C., Canada

This Association, at the proposal of the President and with the favorable approval of the Directing Council - taking into acount the cordial reports passing between this distinguished Association, and the A.N.L.A.I., and of your admiration for the modern Italian luthier - according to the rules of your constitution we ask you to nominate yourself "Honorary member of The A.N.L.A.I.

The A.N.L.A.I. trusts that such a nomination will prove most gratifying to y your institution and will help make still more firm, the bonds of esteem and friendship with the Italian Master Luthiers and to spread still further the noble art of luthery, which, firmly entrenched in Italy since its origin, has now spread to all parts of the world, to the great advantage of good music.

The A.N.L.A.I. extends to the President of your Association and to your members, many wishes for good workmanship, and encloses the membership card of "Honory Member of the A.N.L.A.I.".

Yours most sincerely

The President
(Professor Dr. Gioacchino Pasqualini)

.....

If we are afraid others will learn of it, we should not do it....

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VIOLIN MAKING IN NEW ZEALAND

by Norman F. Westwood

Dear Mr. White:

In reply to your kind letter of August 18, in which you enquired as to how Violin Making is progressing in New Zealand, it is a pleasure for me to advise that this small country can boast of over 30 enthusiasts at present. In addition, some seven makers have died over the past years and they left some excellent violins to posterity.

Dating back over the years such names as James Hewitt, Eric Meier, James Flint, E.A. Burr etc. made fine instruments, both in appearance and tonal qualities.

In Auckland we have Norman Smith -- incidentally born in Canada - and Sam McLean of Wellington both excellent repairers whose work compares favorably with any English or Continental craftsmen.

A point of interest is that in Auckland, we have a relative of Mr. E.H. Sangster of Dallas, Texas - one Robert Thain, who evidently has the same Scottish blood and also makes a few good violins.

Some of our later amateurs are making fine progress and turn out violins which compare with some of the contemporary British and Continental makers. Supplies of wood are mostly imported from Switzerland etc. and except in a few cases the model and also thicknessing of the instruments is being very carefully considered. A very few makers seem to delight in leaving enough wood to make two instruments and maintain they have the "big secret" by doing so and although the outlines and finish may be quite good, the tonal qualities are naturally poor. But I expect you have a small proportion of "cranks" on your side of the Pacific Ocean also? I hope your columns will deal with details of Bass Bars for, as an old Cellist, I have found by experience that great improvements can be made by correct weight measurement and position. All of which must suit the particular instrument, and this point, I believe, should engage the interest of our scientific readers for, as it is at present, it appears to be just "hit or miss" with a large proportion of "misses"!

Many New Zealanders own fine old violins and Celli such as, Joseph Guarneri, J. Guadagnini, Ossobono, Strad, Testone, Albani, Gagliano's, Landolfi, Bergonzi, Grancino etc., so that we "down under" are not altogether unsophisticated in fiddle lore and music is very much alive to us.

I must congratulate you in co-ordinating the makers of British Columbia in such an Association as you have done so successfully, and would like the Journal to be read by all our makers in New Zealand who would, I am sure, find it just as interesting as I do.

I wish the Journal long life and increasing circulation in your good hands.

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TEXAS JOKES ALSO GROWING

Even in London they can't resist jokes about Texas Millionaires.

Commenting on the Sale at Southeby's Auction Gallery Wednesday of $2,000,000 worth of French impressionist paintings, the Daily Express said a Texan among the buyers turned to his wife and drawled: "Well, honey, that settles the Christmas card problem. Reckon we can get to buying the presents now."

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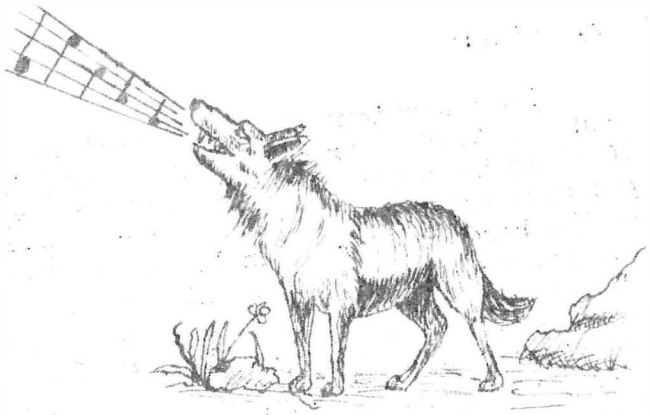
WOOLF NOTES

by The Editor



CHRISTMAS AGAIN:

So here we are again Christmas and also the end of another year. The years roll by and the older we get the quicker they go. Sometimes I pine for those long lost winters on our Alberta farm. 40 below zero , the stock well fed and bedded down for the night - tight, warm, secure. The hushed stillness of a cold winter night with a few snow flakes falling.

Inside the house, with a roaring fire, and the elements shut out, we endeavor to spend a long winter evening- cards, reading, playing the fiddle - anything to pass the hours.

Now, with the cities excitement, time just flies - what a change.

Say, I'm getting quite poetic! All I intended to say was "MERRY CHRISTMAS" and "HAPPY NEW YEAR".

OUR MAIL BAG:

Our Postman has been heavily laden with mail from you kind readers this last month. If I have answered your letters rather briefly I am sure you will excuse me, next time perhaps I will have more time.

I have two letters from England that I feel should be included in these notes. Both are from prominent English Makers. I will present them without comment, except to thank the writers.

Dear Mr. White:

Many thanks for sending the August number also it was very kind of you to send the sample of red wood. It should make a very good toned fiddle. I have already glued it up, and hope to get working on it in the near future. One of the best fiddles also a viola that I have made was filled in with turpentine. It took a few months to produce a surface, but the tone was perfect. Have also tried whole of an egg diluted with vinegar with excellent results. But the best in my opinion is linseed oil. I shall look forward to the September number it is very nice reading about other makers. I only wish we were a bit nearer. Still I wish you every success with your magazine. And best wishes to you and your members. Again many thanks for the wood.

Yours sincerely,
Reginald G. Price.

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Dear Mr. White:

I was particularly interested in a remark made by Mr. E.H. Sangster (whose contributions to The Strad I always enjoy) in the second paragraph of his letter on Page 10 where he refers to the effects of exposure on old pine. I have also observed that old pine when planed on the quarter produces a fluffy texture to the soft portions between the hard reed or grain lines and I think that there can be no doubt that as pine ages the grain tends to harden while soft parts deteriorate. On many old fiddles, even under the varnish, it can be seen that the grain stands out prominently whereas the wood between appears to have sunk. Although I can claim no authority for making this statement, and it may have no support in the science of acoustics, does it not seem that the tone of an old instrument is in some measure due to the fact that the belly or soundboard has become like a grille of hard grain (like steel, as Mr. Sangster remarks) that readily amplifies the vibrations set up by the bow?

For many years it was believed that a violin with "Italian tone" could be made if wood was employed as old as that contained in a Strad, and Jean Baptiste Vuillaume is reputed to have travelled about Europe looking for old pine beams in Swiss chalets or pieces of furniture containing wood from one hundred to two hundred years old. Nowadays it is recognized that wood of that age is unsuitable for fiddle bellies because it can only acquire the necessary acoustical properties if it ages as a fiddle belly and not as part of the roof of a barn. The well known French makers, Messieurs Max and Roger Millant, authors of "Manuel Pratique de Lutherie" mention fifty years as about the age limit of belly wood and give it as their opinion that wood of more than 100 years old would not stand up to the stresses required of it because the softer part has begun to decay.

When it is considered how many violin makers were active at the beginning of the eighteenth century when Stradivari was at the height of his powers, it seems most unlikely that large stocks of long-seasoned wood were available, especially if we take into account the much slower processes of milling timber that were in use in those days. It is quite possible that many of the instruments now prized for their tone were then made from wood no more than five or six years old. Of course they are well seasoned now, two hundred and fifty years later!

I have seen advertised the book by Joseph Reid that you mention but before receiving your letter I have obtained "Practical Violin Making" published in 1933 by Chelsea Fraser of Saginaw, Michigan, which I consider one of the shortest and most sensibly written books on fiddle making that I have yet come across. I have only one criticism to make, and that is that the author counsels the extraordinary procedure of hacking the mould to pieces before taking the ribs off it.

With best wishes for the success of the Journal and kind regards.

H.L. Apps

STRADIVARI OR STRADIVARIUS

I have felt for some time that the use of these two words should be explained, in respect to our revered maker if for no other reason. Receiving as I do scores of letters it is surprising to find how many use them in the wrong sense.

To say that Stradivarius was a maker of violins is incorrect, this maker's name was Stradivari and he made Stradivarius violins. The same applies to Guarneri (or us). Guarneri made Guarnerius violins. Therefore:

Stradivari or Guarneri - men's names

Stradivarius or Guarnerius : Instruments made by these two men or models or reproductions of their instruments.

Will someone who knows please tell us what the Grammatical terms are. The "us" makes it a - noun?, an adjective? or is it possessive case? Also what is the plural of Stradivarius? That one "sticks" me!

MR SKOU'S ARTICLE

Speaking of the incorrect use of words and names, I have always wondered why we in North America used Spruce for violin tops, while in Europe they used Pine! Now thanks to Kristian Skou this mystery is cleared up and it might even be that we will cease to use both woods and change to Red Wood or even Pearyland Drift Wood who knows?

CLIFFORD HOING ARTICLE

Thank you Clifford for giving new violins another boost, in your article this month. I agree that if an instrument has tone it will sell whether it be an "Old Master" or an instrument made by one of our many rising "Young Masters". I should warn my readers that I will probably "blow my top" again over this business of Judging violins for workmanship plus tone, instead of for straight tone and playability. Or maybe I'll cool off before I write "Woolf Notes" again. On this same subject of New Violins I feel I must give you the contents of a letter received from Roelof Weertman. His letter also contains information about Red Wood and other matters.

LETTER FROM MR. WEERTMAN:

Dear Don:

The concert was an enormous success. Theo Salzman, the cello soloist was in splendid form. The principal cellist in the orchestra played my cello the whole evening and now he wants to buy one. He has an English Cello anno 1740 (from Hill of London) but fell in love with mine. Before the concert he tried it out (so did the soloist) and it filled the hall with ease (1,000 persons capacity). So again, professional musicians will gladly use new instruments, but as I said before, they should be reasonably good.

I tested an excellent piece of Redwood sample. Below comparison between the woods of Robert Sayne's cello and the Redwood.

Maple - Mass S.G.66 (somewhat high) E112,320 Gr/mm^2 (very high very desirable) V415,000 cm/S

Sample - 25CM x 2 CM x 1CM (24 CM between supports) pitch 202 CPS
Spruce - S.G. .37 (Excellent) E 89,836 G/MM^2 (average to good) V495,000 CM/S - 240 CPS
Red Wood - S.G. .41 (fairly high) E 83,200 G/MM^2 (fair) V453,000 - 220 CPS

Mass for spruce should not exceed .4 and for maple .6, however if great strength is also is evidence we may go higher.

Deflection for the Spruce was .50 MM and the Red Wood .85 MM under 2600 grams load in the center. For the same deflection as the Spruce we would have to make it $\frac{85}{50}$ or 1.3 as thick. The weight would increase, if we keep the edges as thick as the Spruce roughly 1.3 equals saz 1.1 or saz 10-12% more for a Spruce top of the kind of spruce I use. So while it is not bad at all, and certainly entirely adequate; good Spruce (European that is,might be better). However if the fellows made their tops too heavy (in Spruce) but they used Red Wood instead with the same thicknesses, the tone

would improve of course. However if then they were to remove say 10% out of the Spruce top, the top would even be better than the Red Wood. As you may notice the Maple I got is unusually heavy and very strong. Were it not for the flatter arching, the back would be cut even thinner than the top; compensating for the great difference in mass, I'll have to flatten the back, reducing weight that way, but increase thickness a little (1%) to compensate for loss of strength of a strong arch; so both top and back will be of the same thickness. (My own viola is the same way - it is unusual, but the tone is just as good as the one I made for Gordon, which is quite normal, thicker in the back than the top) Considering the difference in cost, I would advise the fellows to use Red Wood; unless a man makes an excellent instrument already. Red Wood is certainly entirely adequate.

As I read some of your contributors articles, I feel that too many want in some way to "prepare" or "treat" the wood; I am afraid that they feel that the masters thus had a "scret". My own results tend to indicate that just building the instrument along indications of previous testing the woods and along principals laid down in my treatise is all that is needed to create a fair instrument - too good for a fool and good enough for anybody else.

Sincerely,
Roelof Weertman

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THE ROELOF WEERTMAN BOOK

Another instalment of Mr. Weertman's book follows. I will have a few corrections to make on Questions and answers Chapter. These will be done in the January Instalment.

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CHAPTER V

THE BASS BAR

On attempting to give my version about the purpose or rather function of the bass bar, we may make 3 assumptions as to the duty:

1. That the bar works in unison with the top and together support the bridge.
2. That a partly pre-stressed bar relieves the top of a certain amount of load due to the bridge pressure.
3. That the bar is completely pre-stressed and supports the bridge, releiving the top of any load.

Since conditions change immediately after bar and top are glued together, it will be impossible to achieve condition 3.

First of course we have 2 independent structures, the top and the bar, each one free to move independently of the other. But as soon as they are joined the properties change.

Suppose we investigate condition 1. while all of the top resists deformation when loaded, let us assume that a strip say 25mm wide forms a Tee section with a neatly fitted-unsprung bar, glued in, of course.

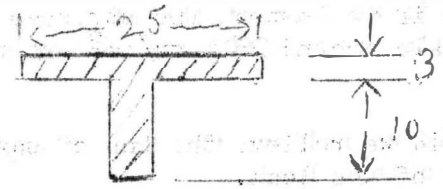

fig. 1.

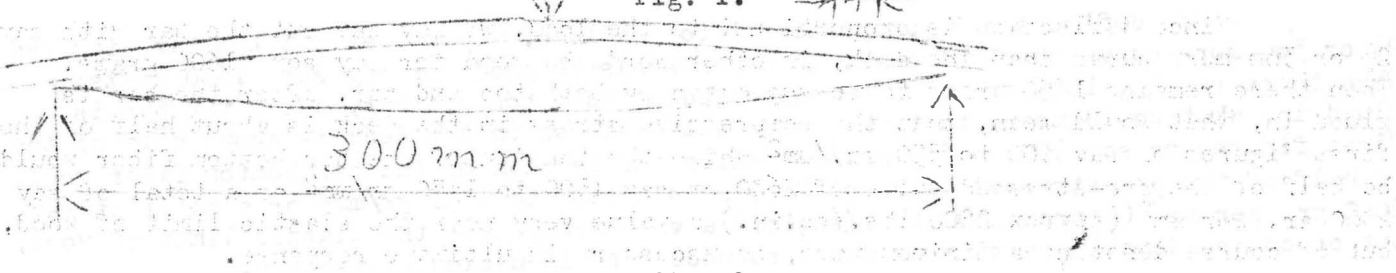

fig. 2.

Having a length wise section as above sketch. For simplicity, assume everything is nice and concentric

$$\left\{3x25 \times (10 - \tfrac{3}{2}) + 10x4 \left(\tfrac{10}{2}\right)\right\} \div (3x25 + 4x10) = 9.23$$

neutral axis is 9.23mm above bottom fiber.

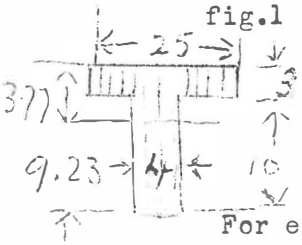

fig.1

Moment of Inertia then is

$$\tfrac{1}{3}(3x25)(3.77 - 1\tfrac{1}{2})^2 + (4x10)(9.23 - 5)^2 + (25x3^3) \div 12 \quad (4x10^3) \div 12 =$$

say 1454

Section modules Top half = 1454 ÷ 3.77 = 385

Section modules Bot half = 1454 ÷ 9.23 = 157

For estimating purpose, assume that this Tee section is supported near the end blocks and that the bridge-foot pressure is 3250 grams applied mid-length. We get then for extreme fiber stress.

Top fiber $(3250 \times 300) \div (4 \times 385) =$ say 630 gr. compressions per mm^2
Bot. fiber $(3250 \times 300) \div (4 \times 157) =$ say 1340 gr. tension per mm^2

Supposing that we try pre-stressing the bass bar, or in other words determine the amount of flexing it takes under the bridge load, and determine its stress:

$$\frac{3250 \times 300}{4 \times (4 \times 10^2 \div 6)} = \text{say } 2600 \text{ gr./mm}^2 \text{ fiber stress.}$$

Deflection would be

$$\frac{3250 \times 300^3}{48 \times (4 \times 10^3 \div 12)E} = \text{say approx } 5\text{mm}$$

Taking an average for $E = 1{,}000{,}000$ gr./mm^2

My latest cello spruce had a value of $E = 88{,}000{,}000$ gr./CM^2 in which case deflection equivalent would have been around 6mm for the bass bar.

Then if we inspect the stresses we find that if the bass bar works alone, its max stress equals around 2600 gr/mm^2 but together with the top the value drops to around 1300 to 1400.

Should we relieve the top of say 50% of the stress, the bass bar must shoulder more than half of the load.

Since deflection is proportional to the load, we may say cut the bar with say $2\frac{1}{2}$ or 3mm more curve than the deck, in other words be good for say some 1600 grams. Then there remains 1650 grams to be supported by both top and bar, after the bar is glued in, what would mean, that the compressive stress in the deck is about half of the first figures or say 300 to 350 gr./mm^2 while the tension of the bar bottom fiber would be half of the pre-stressed value of 2600 or say 1300 to 1350 gr/mm^2 or a total of say 2000 gr. per mm^2 (approx 2800 lbs./sq.in.) a value very near the elastic limit of wood, but of course denoting a minimum mass, so necessary in ultimate response.

Since the violin body is so extremely complex, I am only able to partly analyze the functions of the different parts, but at least it is not a wild guess anymore and I hope that I have found an avenue for better men to get more accurate and definate results.

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CHAPTER VI

EXPLANATION OF TECHNICAL TERMS AND SYMBOLS

NEUTRAL AXIS is the line in the cross section of a bar in a state of Flexure, on which there is neither tension nor compression.

MOMENT OF INERTIA, I, is the sum of products obtained by multiplying each of the elementary areas of which the section is composed, by the square of its normal distance from the neutral axis of the secion, or from any Axis of moments assumed, for purposes of calculation I equals Ar^2

SECTION MODULUS S is the moment of inertia I divided by, n, the normal distance from the neutral axis, to the extreme fiber of the section. The section modulus S is obtained by dividing the bending stress by the allowable unit stress (both values in like units of measure) S equals $\frac{I}{N}$

RADIUS OF GYRATION r is the normal distance from the neutral axis to the center of gyration, the point where the entire area is considered to have the same moment of inertia as the actual area. The radius of gyration r of a section referred to a neutral axis, is equal to the square root of the quotient obtained by dividing the moment of inertia about the axis by the area $r = \sqrt{\frac{I}{A}}$

MODULUS OF ELASTICITY E is the ratio between unit stress and elongation caused by that stress in one unit of length, up to the elastic limit.

YOUNG'S MODULUS Y, Young's modulus is the atmospheric pressure multiplied times acceleration due to gravity. Young's modulus is used to determine the natural frequency of a vibrating body; the vibrations induced by an out side force.

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CHAPTER VII

When we compare a fine Italian fiddle with an average ordinary instrument, we cannot, except for tonal quality, find really too much difference. The violins may even look very much alike. We know from so-called "Study-Violins" how feeble the tone of strings only, can be. It is clear that almost any violin body or soundbox will greatly enlarge and enrich the tone. Thus it seems that the body construction between excellent and merely good instruments do not differ very much. However it is this small difference that concerns us then more than anything else, the more so, since no two strads are exactly alike, also strads and Guarneri differ from one another.

Apparently the old masters built their instruments on an individual basis, each slab of spruce or maple must then have its own peculiar characteristics, resulting in a final design of archings and thicknesses best suited to its properties.

As mentioned previously, if we were to have available woods, that are identical to the woods in the Guarneri that we wish to copy and proceed to make an exact replica, the results would be more than gratifying, making allowance of course, that age hardens wood and much playing makes it more responsive, so the new instrument will not at once have the transparent, yet rich tone of the old one.

While we may acquire great skill copying old masters, how much more interesting it would be if we only really knew, why the instrument sounds so well, so that we may select any good wood and on our very own decide for ourselves thicknesses, balance etc; as certainly the masters pre-determined what they wanted. That then would be violin building in its finest sense. Art and Knowledge combined to achieve the ultimate.

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We must set out to determine the function of each part of a violin. Make drawings - plans - elevations and sections. Some of the information gained may have no particular importance, but we must gather all bits of information. We note the angle that strings make between peg box and bridge and from tail piece to bridge. We determine the pressure of the two feet of the Bridge on the top. Find the location of bridge and sound post - the tightness of fit of the latter. Location of the bass bar. Height of the sides. Height of archings - type of curves in the archings. Graduation of top and back. Projected plan area of the sound box. Volume of sound box. Weight of parts of the fiddle. Acoustic pitch of top and back; to name a few questions that need to have an answer.

Some tests would be difficult to make, or impossible to perform since the lucky owner would perhaps not care too much to have his Strad dissected.

However we may make intelligent deductions from the tests we can perform - evolve formulae to give solutions to equations or questions. Then we shall build an instrument and demonstrate that the "proof of the pudding is in the eating".

Since every instrument is superficially alike, in having the same strings - tuned to the same pitch - the bridge must exert the same pressure on all violin tops. So we must make testing device to measure this pressure. If we substitute a one half inch thick wooden beam for the sound box; the bridge would straddle this beam but the feet would have no support. Flanking the beam with a scale beam on each side, with a pin common to both scale beams that passes thru the main or strongback beam, we have the feet of the bridge rest on the ends of the scale beams. The other ends of the scale beams support just enough weight to keep the bridge in a "Status Quo" where the pitch of the strings does not change.

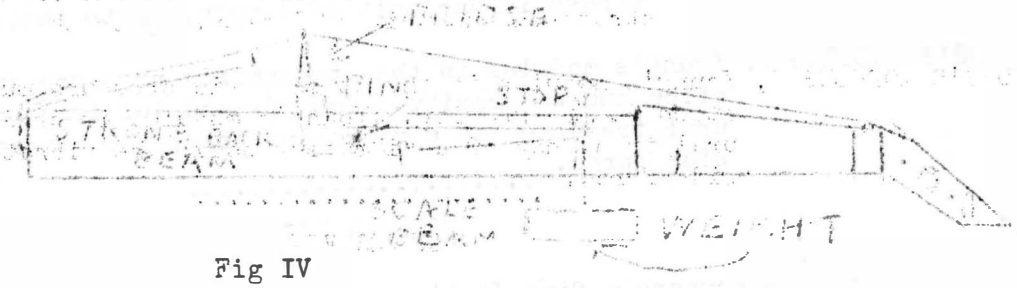

Fig IV

Next we wish to determine the properties of the projected area of the plan of the sound box, the outside outline as well as the inside outline, making allowance for corner blocks and end blocks. First we find the areas of the figures or outline and then we find the center of gravity or percussion. This can be accomplished by means of addition and multiplication as well as by graphic methods.

In the first system we imagine that the figure is composed of a great many rectangles - trapeziums and triangles, we could calculate the area of each subdivision and add the results. However, if we divide the figure into a great many strips of equal widths, then total the lengths of all cross lines and multiply the sum by the width of one strip, we also get the area. We have ignored the slight curves at the end of each strip. some of these curve outwards, some inwards. We applied the so-called trapezium rule. For somewhat greater accuracy the parabolic or simpson-rule should have been used, which in our case is about 2/10% more precise, hardly worth the greater effort. Recalling our illustration carrying the large and the small bucket of water on the pole across the shoulder and thus finding the point of equilibrium or center of balance or gravity, we may predetermine the results by the process of "moments about a point of reference" in our particular case I have the 360 mm long violin body divided in strips 10 mm wide. Number the crosslines o to 36 taking moments about station zero "0" we multiply the length of each crossline times its distance from station 0. We add and total all these 36 products. This sum then must be divided by the sum of the combined lengths