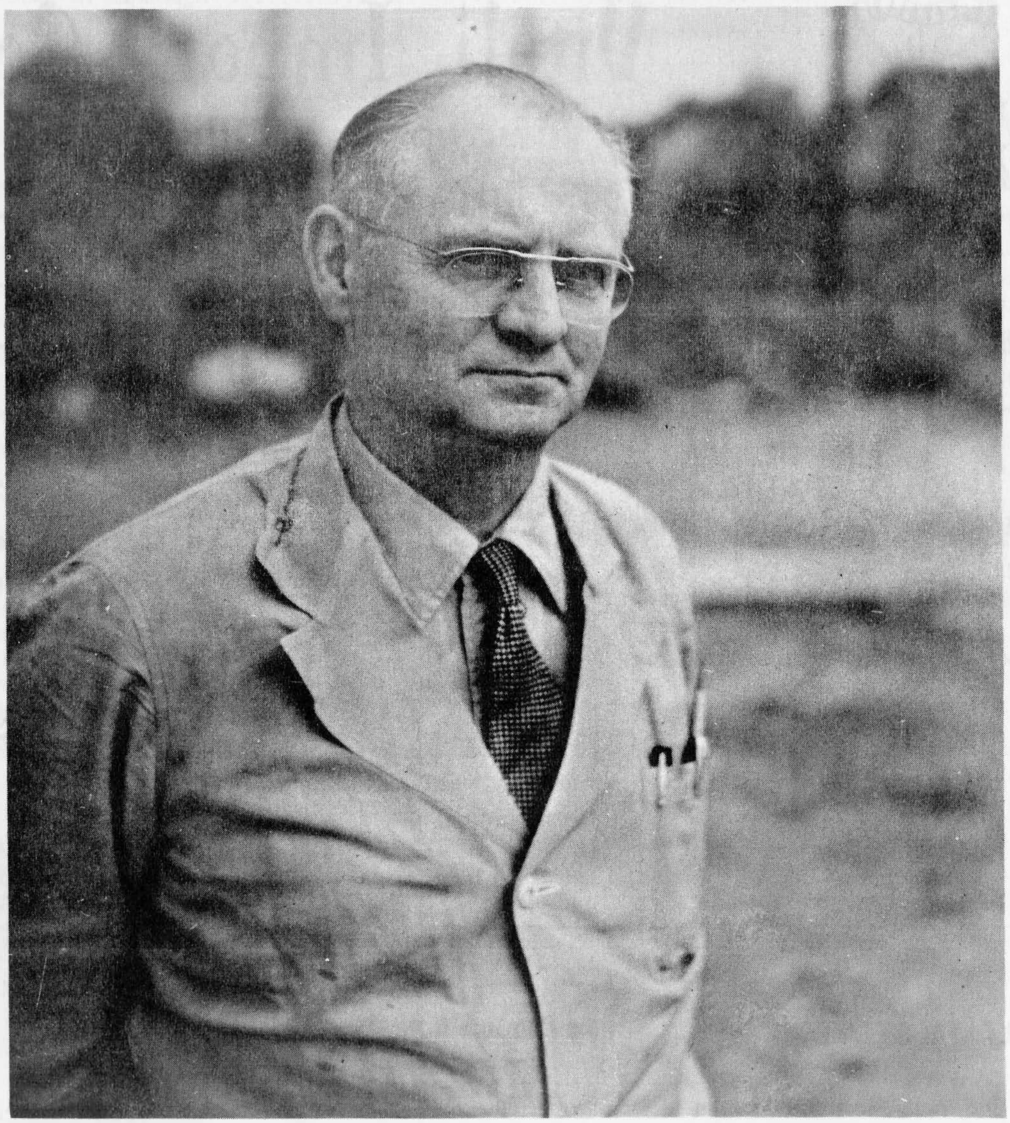
REF

The Violin Makers Journal

AUGUST-SEPTEMBER, 1963

THE OFFICIAL PUBLICATION OF
THE VIOLIN MAKERS ASSOCIATION OF BRITISH COLUMBIA



Gilson Heyworth
(see story on page 4)

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

The Violin Makers Journal

A Non-Profit Magazine Published every six weeks
by The Violin Makers Association of British Columbia

MEETINGS HELD THE SECOND SATURDAY OF EACH MONTH AT 4360 MAIN STREET.

Vol. 6 No. 5 CONTENTS AUGUST-SEPTEMBER, 1963

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EDITORIAL PAGE OF *The Violin Makers Journal*

CLARENCE COOPER, EDITOR

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EDITORIAL

Frustration seems to have been the great impediment we have experienced in our efforts to produce the Journal. Two of these impediments are discussed in our article entitled "The Problems of the Journal", which we trust our readers will ponder. On the other hand, we are happy with the contents of this issue of the Journal. These are the things which keep us aware of the need for the Journal as a source of information for the benefit of all. I cannot resist referring to the last issue of the Journal and the article by Dr. Nichols, setting forth a description and drawing of the outline of the violin. This is a pet subject of mine and I wasted no time in making drawings according to my own ideas of the measurements, based upon the mathematics of the musical intervals. The measurements, as usual, were taken on the inside of the instrument to the inside of the ribs. I am still not fully satisfied with my drawings but feel that we should thank Dr. Nichols for the new approach he indicates to this subject.

In this issue of the Journal our contributors have supplied some gems of opinion. Messrs. Adkins and Yantis, two collaborators of opposing thought on the subject of the bass bar, have given us a delightful account of their experiments. We would like more of this. Mr. Kristian Skou depicts a new design of the brace which appears as a structure based upon engineering principles. Mr. Johnson, of Australia, has ably described certain experiments on the physics of the violin. Mr. Kirkwood, of Scotland, has made some very interesting observations on the structure of the violin and expressed further thoughts on the subject of the vibrations. Our old friend Mr. Sangster, of Texas, creates a counter interest in his article on the geometry of the violin. Interestingly enough, he contends that the old masters never applied it at all. Maybe this is the time for us to make further inquiries as to what other things the masters did to the form of the violin to solve the problem of the beautiful tone.

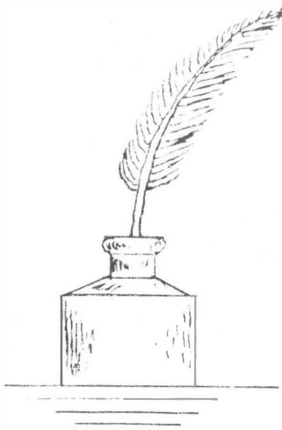
Mr. Frush gives us a short synopsis of things which may affect the tone of the violin. We hope that he will enlarge on many of these things for future issues of the Journal. Our constant friend, Harry Wake, describes in his column entitled "Fiddle Fix" a taper tool and the purfling.

The first of a series of two articles by Dr. Leonard Marsh on "Makers - Old and New", appears in this issue. We also have two items of interest on the subject of varnish. The first, by Hayes, on the use of eucalyptus oil as a solvent and the second one, by Moessinger, explaining in detail, together with tables, the compounds of the Michaelman varnish formula.

We were most impressed with the cello shown in the photographs supplied to us by Fred Artindale, one of our advertisers. So much so that we would like to make a similar cello ourselves. You may wish to correspond with Fred about it and you can find his address in the article. What a fine-looking cello!

Two items of interest have come to our notice. The first, Mr. Lionel Tertis, 42 Marryat Road, London, S.W. 19, announces the Tertis model of the violin, plans for which may be obtained from him for the price of $3.00. Secondly, our advertiser, Wm. Reeves Booksellers Ltd., London, tells us that the "Cyclopedic Survey of Chamber Music", by W.W. Cobbett, is now available.

Finally, a few of the subscribers have written to us inquiring the cause of delay in the delivery of the Journal. We did not answer your letters because we lived in the hopes that the Journal would be forwarded to you promptly. However, it did not turn out that way, hence the frustrations we first mentioned.



LOCAL NEWS

By Al Gough

Greetings again to all our good friends. We have kept you waiting again and so much has come and gone since the last time I said Hello that I hardly know where to start. Perhaps the best place would be to explain why the pictures of the Exhibition were in the middle of last issue when I was asking you, in my local news, to send in your fiddles for the competition. Oh, boy, am I embarrassed! It is a little hard to explain. Anyway, the Journal was at the printers, everything all set to go, and I was sent out of town for a month. When I came back I found that we were short of material to completely fill the issue and, since Clarence is out of town, everything just hung on till I got back ... This also put us behind another order the printers had to fill and there we were... Too late for the Exhibition. George Gow, our printer, was good enough to go down to the Exhibition and take the pictures for us and get them printed and into the Journal. Many thanks again, George.

The Exhibition was a high point of the year. We had entries from Al Pirtle in Michigan and Roy Stevens in Salt Lake City, Utah. Both were good instruments, but the one by Mr. Stevens took a first prize along with a violin by Ragnar Helin, our President. There were many beautiful and good toned instruments and it was interesting to see and hear them. A beautiful cello, complete with case and bow, all made by Peder Svindsay, took a well deserved bronze medal.

Shortly before the Exhibition opened, we had a visit with Mr. Pirtle from Michigan. It was good to talk and visit and compare ideas with him. Perhaps we will be able to have a few of his views written in the Journal soon. How about it, Mr. Pirtle?

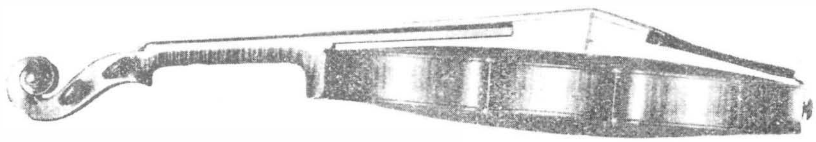
Many people have written in asking for information on the status of the Journal. Is it going to fold up? Why is it late? etc. etc. Well, as Secretary-Treasurer of the Editorial Board I think I can answer you, if not individually by letter, right here. First of all, most of you realize that not all was peaches and cream for the first while after Don White left us so suddenly and tragically. However, people are beginning to feel that we have had enough time to get straightened around by now. Well, it's not that simple. The problems have been threefold 1) time; 2) money; 3) something to print in the Journ complicated, unintentionally, by people sitting back and waiting to see what happened to the Journal before making any move. Just don't get impatient with us as we are all struggling here, even if it doesn't seem like it.

We have had good response to our letters about overdue dues. A few articles are starting to dribble in from some other than our faithful few (to whom we owe many thanks). The work load is being reorganized to spread it around a little. These things all help but don't forget, as I reminded you last issue, this is Your Journal. Your meeting place with makers of violins all over the globe. Your open forum. Okay, let's all get behind Clarence and make this the beginning of bigger and better and more informative Journals.

Those of us who are at the heart of this thing have been a little upset by the rumours that float back to us. Not surprised, just upset. It's a little hard to do your best and try to give your time and interest to something and have people pass rumours around that the last Journal has been printed. By all means, let's have criticism -- that is what makes us grow -- but, as Don White said so many times, let it be helpful and constructive. We are willing to keep the Journal alive, indeed we have many plans for improving and adding features to it. The real answer lies with yourselves. We can't do it alone. Articles are necessary. Don't be afraid to speak your views just because someone may disagree with you. That doesn't make the views wrong. Stradivarius and Guarnerius and many other violin makers of acknowledged genius had ideas and designs that differed. However they were both right. Someone may be helped by your ideas and just because someone else isn't, won't take away one bit from the help you have given. Perhaps your ideas will start someone on a fresh train of thought with a little different viewpoint. The possibilities are endless.

We'll leave it up to you. I know you won't let us down, and believe me we won't let you down.

Best wishes until next issue.



Living makers AND their instruments

GILSON HEYWORTH by Al Gough

Mr. Heyworth was born on a farm about four miles from a small town called Skipton in Yorkshire, England in the year 1893.

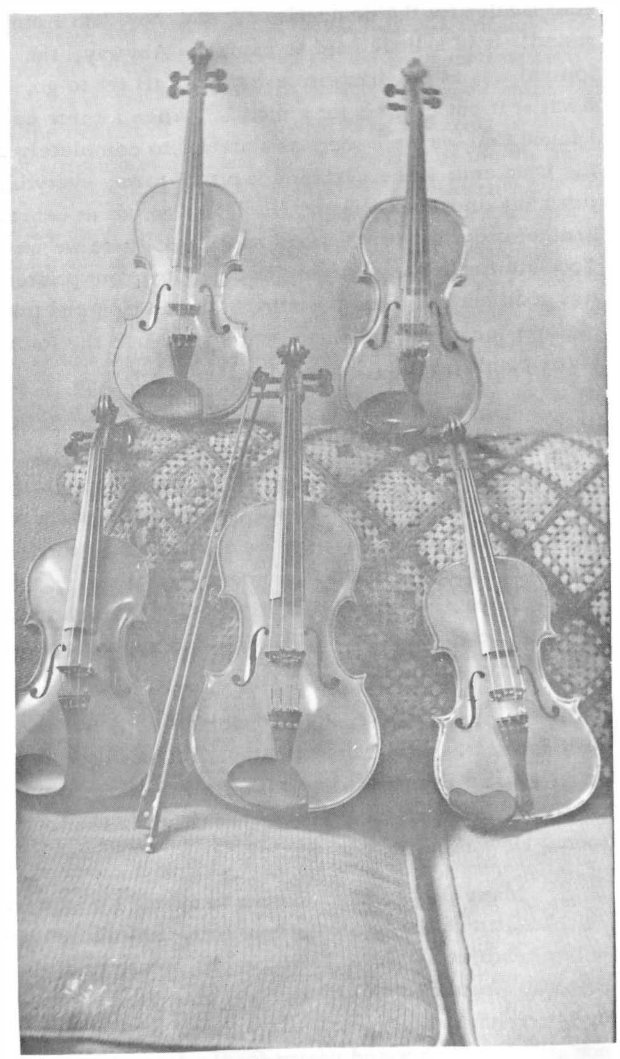
He tells us, "I was educated at Sipton Grammar School, from which I matriculated in 1910. At the age of 17 I emigrated to Canada and landed in Vancouver the same year. My first job was cutting cordwood on some of the vacant lots in South Vancouver. Then I got a job as a printer's devil at the corner of Gore Avenue and Hastings Street, for which I was paid the munificient sum of $5.00 per week. After a few months I went to work for J. A. Tepoorten Co., a wholesale drug house. This paid $6.00 per week.

I then moved over to Duncan on Vancouver Island and went carpentering or, one might say, wood butchering.

After two years I took off for the prairies and wound up cutting cordwood for the steam boats on the Fraser river when the Grand Trunk was building. This was 1913. I sailed down the river on rafts, canoes and what have you, for five hundred miles as far as Soda Creek. Having walked about thirty miles I went shovelling hay at the Onward ranch which is four miles from the 150 Mile House in the Cariboo. I then went cattle ranching, of which I got heartily sick, after 13 years. It was during this time that I made my first violin. I was all alone seven miles from my nearest neighbour and would never see a soul for perhaps a month, and the nights being rather quiet I thought I would make a fiddle. I had no patterns and not even a picture. When it was finished it sounded like a Night Jar or, as it was called in Yorkshire, a corn craike. Nobody, I am sad to say, came along and offered me $500.00 for it.

After my cattle adventure I decided I would make a better use of my education and decided to be a druggist. I spent six months getting my B. C. matriculation all over again.

Then, after four years studying pharmacy, I opened a store at the corner of Renfrew and First Avenue, and have been here ever since. I retired in 1955."



Four Violins and One Viola made by H. G. Heyworth, 1956 - 1962.

THE JOURNAL'S PROBLEMS

The Violin Makers Journal has reached a very critical stage in its existence. We have been unable to get the Journal published on schedule or to maintain any order in forwarding it in the mail. There are two major problems concerning us at this time. The first is the fact that the members have sent in very little in the form of articles for publication or even letters of interest to all members. If we do not receive material to publish we cannot give you a very interesting Journal. The purpose of the Journal is to act as a forum for the viewpoints and ideas of our present-day violin makers and at the same time, give them an opportunity to expound on these ideas. Some members have made various experiments and we are hoping to publish the results for them. Others have described their methods and ways of doing things, and these are always interesting and useful to everyone. Why have we not received more of this type of article and why are the members not sending them in to us? Some members have written articles and series of articles and they tell us they have become discouraged because they have received letters from readers written in a bitter and jibing vein, just because what they wrote did not conform to the reader's ideas of things. We hope such readers will write us and set out what they think should be the proper method of doing things. In this way they can be contributing something useful instead of destroying what may have been useful also.

Now let us have some more material for the Journal!

The second big problem facing the Journal is that of finances. In a nutshell, this is the situation. Each copy of the Journal costs us approximately 40¢ to have it printed. The stamp and envelope in which it is mailed costs approximately 7¢. The subscriber pays 50¢ per copy for the Journal. This leaves 3¢, which is not even enough to buy us a postage stamp to enable us to write you a letter. This is the reason we have not printed the Certificates or been able to send them out to you. You will appreciate that it is not feasible to publish the Journal for the price you are now paying for it.

There are two methods we will have to employ in order that we may continue to publish the Journal. The size of the Journal will have to be reduced, and secondly, we will have to publish less issues each year, e.g., 6 rather than 8.

We propose to follow this course rather than discontinue the Journal.

At the present time we are short of money and are going to have difficulty paying for this issue of the Journal. We are hopeful that our members may voluntarily contribute by sending us a donation to help out the situation. We need approximately $2, 000. 00, so if you can help we will certainly appreciate it.

Now, my friends, it is up to you. Please send any manuscripts to the Editor, in Victoria, and any financial contributions to the Secretary in Vancouver. Your favourable response to these two requests will enable us to continue the Journal. It is our sincere desire to do this and to get it on a sound basis. We are sorry that there have been such delays in sending it to you and this is the sort of thing we wish to remedy.

Editor.

NOTICE

ANNUAL CHRISTMAS PARTY

Our annual Christmas Party will be held on the second Saturday in December, the 14th, at 4360 Main Street, Vancouver, B. C. Refreshments and Entertainment.

VIOLINS -- OLD OR NEW?

By Leonard Marsh

(This summer Dr. Marsh completed a book on his musical reminiscences which he hoped to see published next year. Because of its interest for readers of this Journal he has made available a chapter from his book bearing the above title. It has been slightly adapted to make it suitable for presentation in two instalments.)

Is an old violin better than a new one? What volumes have been written on this question, and what arguments have flowed around it for generations -- not only from players, but from collectors and connoisseurs and from that most forgotten of all groups in the music world, violin-makers! Yes, there are still hundreds of people making violins -- all over the world, as far as I can ascertain: they didn't all live and die in Italy two or three hundred years ago. Can a new violin possibly be as good as a real old one? I think I have an answer to this question; but it won't surprise you if I say it has taken me a long time, and a long exploration, to discover it. So, if you don't mind, I won't reveal it at the beginning. Let me share with you some of the fun, and some of the voyages of discovery, first.

When I was still a youngster, I knew a girl whose fiance took her to a famous music store to buy her a violin as a present. They showed him half a dozen beautiful old specimens, getting a little older (and more expensive) as they failed to impress him. Finally, it appears, he said, "Listen, I don't want any of this old stuff. Haven't you got a new one?" He got a new one -- brand new -- and it was an object of considerable curiosity, and admiration, to those of us who had never seen such a thing before. I'm sure there are still people who think that all violins are old. That what "a violin" is -- an old violin. Yet a new violin, if it is a first-class piece of workmanship, is a beautiful thing to behold -- its lovely lines, its polished grain, its unmarked varnish, its glow as it is turned in the light. A Stradivari straight from the master's workshop must have looked like that once. Remarkable thought -- you mean that Strads were once new?

I wonder how many people, if presented with a beautiful contemporary reproduction of a Guarnerius, and a 1700 original battered by two hundred years of playing (such as disfigured the most famous of them all, the so-called "cannon" of Paganini -- what that instrument must have gone through!), would unhesitatingly choose the beaten-up one? Or if you think that is silly, what about this choice -- between a thoroughly "played in" (or played out?) fiddle from some Mittenwald factory, worn at all the edges, the varnish dull and sweated off altogether at the chin-rest, and revealing in the belly some genuine cracks; and a Hill reproduction of the "Messie" Strad, dated 1912? You may argue surely, the old fiddle would be a better choice. Who would have played on it that long if it wasn't a good one in the first place?

Well, one provocative answer to that question is that both good fiddles and bad fiddles have been retained over the years. There are, after all, many kinds of players. There are plenty of old, old violins that were never used for anything better than square dances: there are plenty of family heirlooms from families in which no player ever got much farther than "The Blue Bells of Scotland". Age, in short, is no answer by itself. The idea persists along with the indiscriminate worship of age, nevertheless, that violins get "played in". It comes in several forms. If it means that a bad violin, poorly constructed of inferior wood, to say nothing of its fittings and adjustment, can be improved by several years of playing, this is a vain hope. Presumably it has to be good playing? There is at least one reputable teacher who has maintained that she can tell when a student has been practising badly and otherwise ill-using his violin. I beg to believe she errs: she is misinterpreting the "sixth sense" and delicate intuition which all good teachers gain about their pupils. But if there were anything in her theory, then bad playing over the years could ruin a violin. I will not deny the possibility -- especially if it were very bad! But instruments deteriorate usually because they are not looked after. They get choked with rosin or with dust, they are exposed to damp, or to heat and dryness; in particular they are given no first-aid when they are poorly adjusted; in particular they are given no first-aid when they are poorly adjusted, so that strains and tensions accumulate in the wrong places and the poor violin cannot perform well in anybody's hand. Poor players are all too likely to be poor caretakers; and in this sense they may easily ruin a basically good violin. What about these aspects of "age"? Infirmity, they had better be called.

Now consider another aspect of a violin, assuming it is being played on today and is not just a museum piece immured in a glass case for its historical values. Take an old fiddle as an example, say a choice Amati or a Maggini dating back to 1650 or earlier. It's in full playing order and it has a tone like an angel. How much of it is old? It must have had a new bass-bar if it is to stand present-day strings rather than the slack old gut of 1700, to say nothing of modern pitch which is half a tone or more higher. This means that the top had to come off, and possibly a few delicate patches were put in to strengthen some weak places, or replace a bit of dry rot, or fill in a spot where some boring beetle got in a hundred years ago. Maybe new corner-blocks were necessary at least here and there. Cracks must be carefully lined up, and everything re-glued. Certainly the strings, bridge, tailpiece, etc., are modern; probably the soundpost has been renewed and almost certainly a new fingerboard had to be shaped and set in at some time, for the angle at which these rise on a modern instrument is much higher (giving more tension), and a longer finger-board is required nowadays because modern music literally uses more notes. The scroll, if you're lucky, will be the original: but if it had to be "rebushed" (cut for new pegs) more than once, or somebody stole it or didn't think it worth preserving, you may even have a new or restored scroll.

Well, you may say, what's left? What's left is the most precious and most fundamental part of the violin - the body, a peculiarly-shaped, varnished, wooden box. Before we forget it, it's no use without all the other apparatus - which has to be supplied by an expert craftsman, usually somebody living today; and if he doesn't know much about his craft, or hasn't the patience and dedication which is the real mark of the true craftsman everywhere, he won't be much use to you. But that little box (or a big box if it's a cello, taking six times as much wood) is vital. There are two bits of magic about it. It has a "wood tone", as we might call it -- something that comes from the quality of the wood itself, and there is an "air tone", which depends on the nature of the box itself. Don't ask me how these must be related to all the hundreds of notes to be played. I said there was some magic here.

Obviously the wood is what matters and there are two kinds of wood in a violin -- hard wood in the back, and soft wood in the top or "belly". Those two "plates" as they are also called, have to vibrate when the strings pass the sound down the bridge, and they are linked together by that strangely-placed little bar of wood, called the "sound-post", just behind the bridge. Nothing can be more critical than the proper placing of that little bar; and everybody quotes with approval the fact that the French call it "the soul of the violin" (l'ame du violon). Very poetic, but it doesn't describe what it does; and I'm not sure that either workshop experience or scientific research (of which there's been precious little) has really settled the question absolutely clearly. What is true, is that an experienced craftsman can change the tone of an instrument out of all recognition, if adjustment is all that the instrument needs. On the other hand, if the wood, and its shaping, and the dimensions of that box, aren't just right, all the adjustment in the world, and all the playing, won't make it any better.

So there is something here in the matter of age: old wood is better than new wood, it seems. But any old wood? Decidedly not: though makers all over the world are forever trying new specimens -- I hear of it in British Columbia, and Scotland, and Sweden, and Australia, and Hawaii -- and there are others who will tell you that the only wood that's any good for violins is the wood the "old Italians" used. It grew in various Alpine regions, so that the Tyrolese were able to get it for their fiddles, and there are Swiss makers today who still undertake to supply it. Is this just chance, or does the tree growing in higher altitudes, where it has to fight the elements to grow tall and straight, have something special? In any case, the wood has to be completely seasoned, and a whole book could be written about that. Let's not write it -- but it is useful to ask: how old was the wood before Stradivari made a "new" violin with it? And then a much more taxing question: if we can get wood as good and as old (well seasoned) as Stradivari used, why can't we do the rest? This is the big unsolved question of the old versus the new violin. At least we've put it in a better context. Let's go on from there, next instalment.

NOTICE

Our readers will be interested to know of the activities of the Violin and Guitar Makers Association of Arizona, by writing for particulars to the Editor of their Journal -- Mr. Bob Wallace, 4118 Mill Street, Miami, Arizona. Also see Bob's ad in our Journal.

A MONTAGNANA CELLO

Fred Artindale

The cello illustrated in this issue is the work of Fred Henry Artindale, formerly of Los Angeles, and now a resident of San Luis Obispo, California.

Mr. Artindale was born in Shanghai and took up the study of the violin at the late age of 16 1/2 years, on a $30 outfit. The desire to build and play on his own hand-made violin became an obsession and it wasn't many years later that he achieved his first opus. Other violins followed.

In the earlier years, violin making and repairing was his chief hobby. We have read of the so-called "prison Guarneri" violins. When Mr. Artindale was interned by the Japanese in 1943, at Lungwha, in the outskirts of Shanghai, in Camps euphemistically known as Civilian Assembly Centres, he had no idea how long he would be interned, but took the precaution of packing in a kit of wood and a half-inch round-nosed chisel. In July, 1943, he completed his "prison" violin which he still has in his possession as a reminder of that dismal period of his life. The label is unusual in that it also bears the signature of the British Camp Representative of the Lungwha Camp. Mr. Artindale recalls the difficulty he had in varnishing and had to pal up with the Camp Pharmacist to get the necessary ingredients to make up a varnish. The violin still shows the traces of potassium permanganate and bichromate! Mr. Artindale was interned for 2 1/2 years, till August 1945, and one of his regrets was that for two years he was unable to do any violin making for lack of materials. After the Second World War, during which he was interned by the Japanese, he applied for immigration to the United States and was fortunate in leaving Shanghai just a few months ahead of the communist take-over. His hobby then became his occupation. He has been active in repair work and operated his own repair shop in the Southern California Music Co. of Los Angeles for ten years until he left late in 1960 for his present address. He has made 18 violins, 2 violas and the cello illustrated in this issue, and plays all the instruments of the violin family. He is a keen chamber music enthusiast, playing in two quartets weekly besides two local city symphonies. He is presently working on another cello - a 'Tertis' model.

The original Domenico Montagnana, Venice, 1739, from which the copy was made, is owned by Capt. G. Allan Hancock of Los Angeles, himself a cellist and a patron of the arts. It was brought to Germany in the middle of the last century from Italy and acquired by Messrs. William E. Hill & Sons after the first World War. It passed through several ownerships until purchased by Capt. Hancock in 1946 from the Rudolph Wurlitzer Co. It is covered by certificates from both William E. Hill & Sons, London, and the Rudolph Wurlitzer Co. of New York. It is of a golden orange brown colour, in an excellent state of preservation and an outstanding example of this Maker's work.

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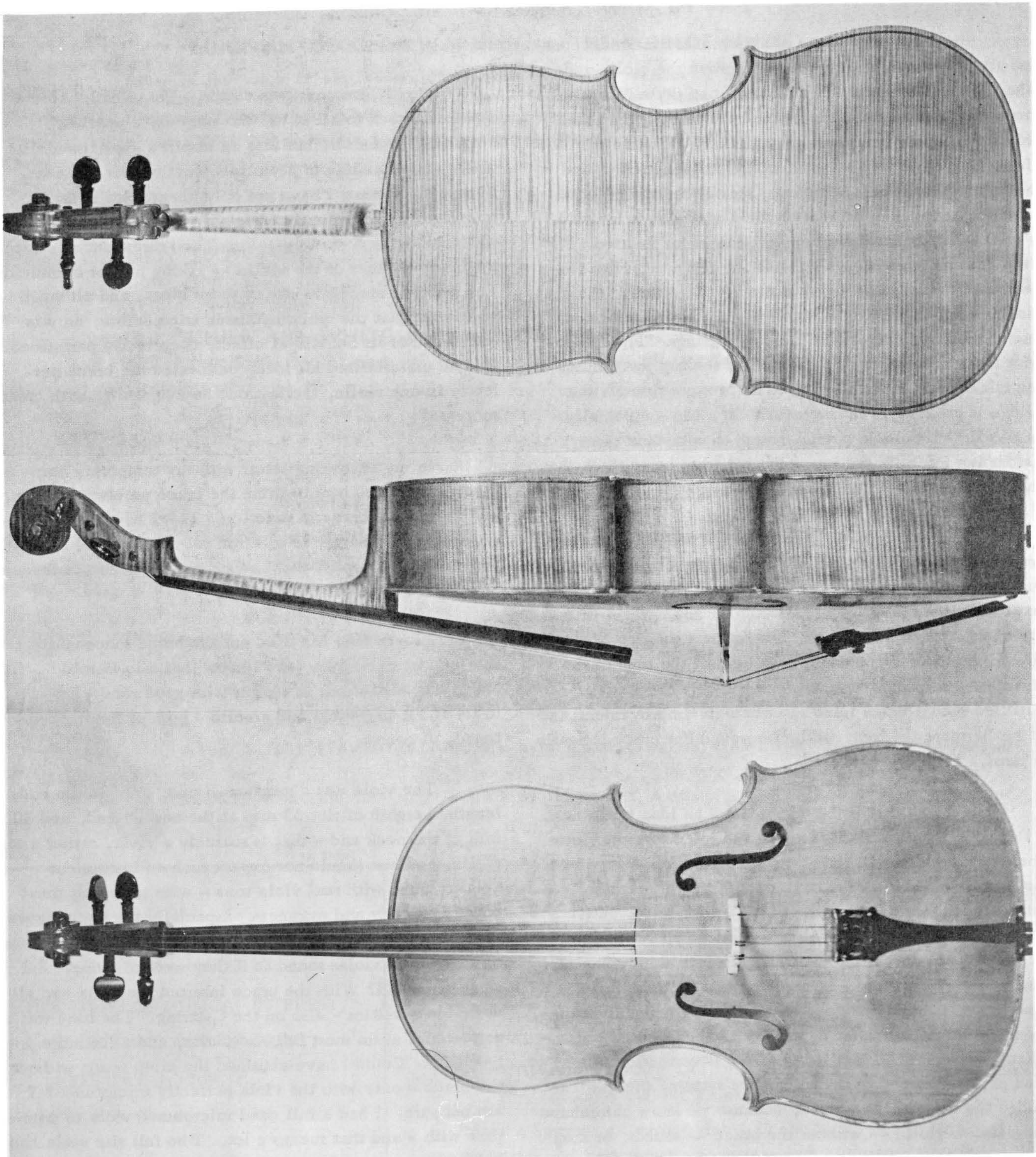
Fred H. Artindale
and
His Workshop



Copy of Domenico Montagnana, 1739, made by Fred Artindale, San Luis Obispo, California. Outline and measurements taken from original owned by Capt. G. Allan Hancock of Los Angeles, California.

THE DON WHITE BRACE

Since the days of the old Cremonese masters countless attempts have been made to improve the violin and other bow instruments. The main part of these "improvements" have not been able to stand the test of time, and only such improvements which fulfilled a demand from the virtuosi have survived -- such as the prolonged neck and the enlarged bass bar. However, this discouraging fact must not be taken as a proof that the violin as it is today is perfect, and that improvements cannot be created. As time goes on it seems obvious that at any rate in one respect the bow instruments are not perfect. A lot of the old violins - and especially old cellos - are badly deformed due to the constant pressure from the strings. The lengthwise tension is pressing up the part of the top just behind the neck block, and the downwards pressure through the bridge is pressing down the breast. If a top - especially in a cello - should be strong enough to withstand these deforming forces in the long run, it had to be so thick that the instrument could not play.

If we could partly take away the lengthwise stress from the top, and more or less place it in a brace from one end block to another, the instrument no doubt would have a considerably longer "lifetime", and note, a "lifetime" as a sound instrument, and not as a wreck. We can, of course, but the condition must be that the tone of the instrument must not suffer from it. If this condition is fulfilled such a brace must be called an improvement, and if furthermore the tone can be improved the brace is nearly a must.

If ? ! -- that is the question. The idea is not new. I think the idea has flashed across the mind of most violin makers, of whom the main part have abandoned it without any trial, and a few ones have tried it out in practice, presumably without the desired result. At any rate, until recently the brace has not been any success. But there are many ways to do a thing wrong -- fewer to do it correctly, and if a violin with such a brace placed between the two end blocks is built by "good luck" the result means nothing, as the good or bad result may be due to many things else than just the brace. But if the violin is correctly built, and perfectly tuned to the microtone system, then we can judge the effect of the brace, because we know beforehand how such a violin -- without the brace -- sounds, or should I say, someone knows it. The maker who does not have this knowledge, but wants to try the effect of the brace, must try the violin before and after the insertion of the brace, of course.

Don White, our late editor, whose death came as a painful shock to all of us, was not only a peerless editor and organizer, but also an inspired experimentalist, whose understanding of a violin's function was eminent. I know it, because I have not only his articles in the Journal to judge from, but a lot of private letters, in which he treated violin problems, and threw out new ideas for improvements of the violin -- asking me for comments. The internal brace was one of those ideas, and although he was aware that the brace had been tried before, he was convinced of its beneficial effect, if correctly performed. And he materialized his idea, performed the brace perfectly in one violin, the last one he ever built, with great success.

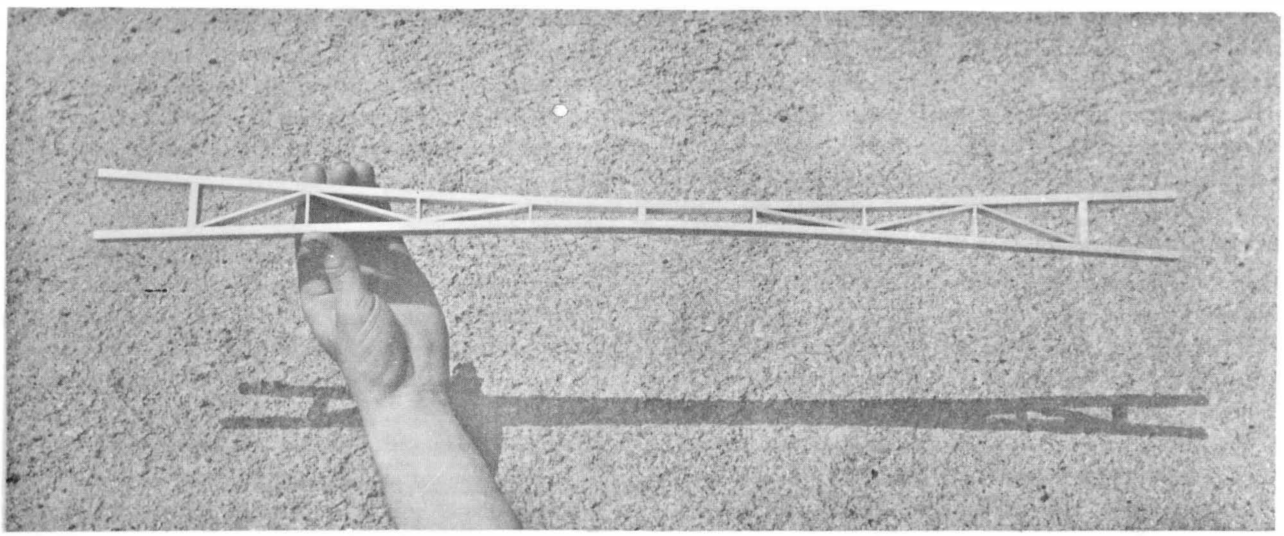
In my answering letter with my temporary comments I promised him to think the brace problem through and try out the brace in practice. This I have done now - too late unfortunately to tell him the result, but I know it will be in Don's spirit that I report the result to the readers of the Journal he has built up.

As now Don has tried out the brace successfully in a microtuned violin (and I know that also Harold Briggs has tried it out in violins with good result) I chose to try it out in a viola and a cello - both of them microtuned, of course.

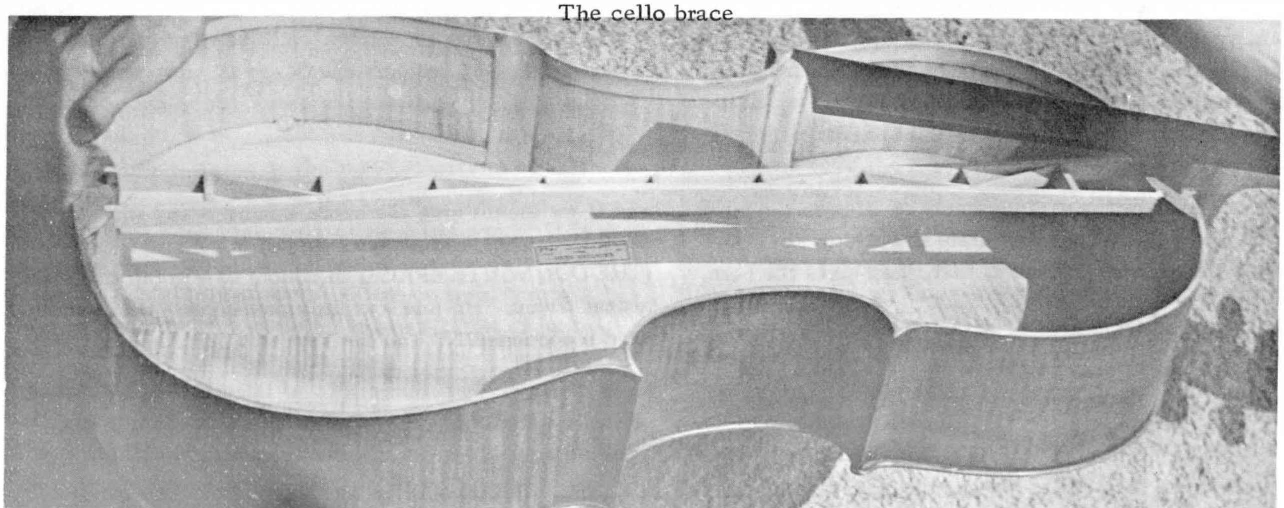
The viola was a very small one, only 38 cm body length, heighth of ribs 33 mm at the bottom end, and 30 mm at the neck end - that is scarcely a viola, rather a big violin, and one should not expect such an instrument able to sound with real viola tone - with sufficient tonal power, sonority and evenness. Especially the C-string we should think without power and sonority, as most C-strings on such small violas sound as if they were of twine. But what happened? With the brace inserted the viola had all desirable qualities - also on the C-string. The tone was as powerful as on most full size violas, and a lot more beautiful. Could I have obtained the same result without the brace - only with the viola perfectly microtuned? I am not sure. I had a full sized microtuned viola to compare with - and that means a lot. The full size viola had but little more tonal power, and regarding distinctness and sweetness the small one with the brace was the superior. What is the effect of the brace? To take off some

of the stress from the top, and enable the top to vibrate more freely. Well, that is what we have aimed for, besides the purpose of giving the instrument a longer "lifetime". But if correctly placed the brace has one effect in addition. A lot of vibration energy is transferred to the resonance body through the vibrating neck, but without the brace the neck has no fixed fulcrum for its movements. The brace will fix this fulcrum, and the tone will be more distinct, more brilliant and sweet. We can express it the way that the brace forms a horizontal counterpart to the vertical sound post. The sound post supports the downwards pressure and acts as a fulcrum for the bridge vibrations, while the brace supports the lengthwise pressure and acts as a fulcrum for the neck vibrations. But the brace must be placed correctly. The tension of the strings is greatest on the treble side, and therefore the brace shall not be inserted (and glued) into the end blocks exactly in the middle line, but a little to the right side (how much depends on the sort of instrument, but everyone can calculate it - the tension being the same on both sides of the brace). The ends of the brace, inserted into the end blocks, must not be deeper than necessary, if the brace shall form a real fulcrum, and the upper level of the brace shall not be situated more than about one mm beneath the upper level of the end blocks, that is as high in the instrument as possible.

The brace Don White placed in his violin was solid, and the brace I placed in the viola was likewise solid, but there is a risk that with unfavourable dimensions such a solid brace will form own vibrations, which may interfere with some or other body vibrations, causing unevenness in the tone production. For a violin and a small viola this risk is less than for a cello, where the brace is twice as long as for the small viola. At any rate, to guard myself I made the brace for the cello non solid, but constructed thus that with minimum mass it had nearly the same strength as if it had been solid.



The cello brace



The cello brace placed

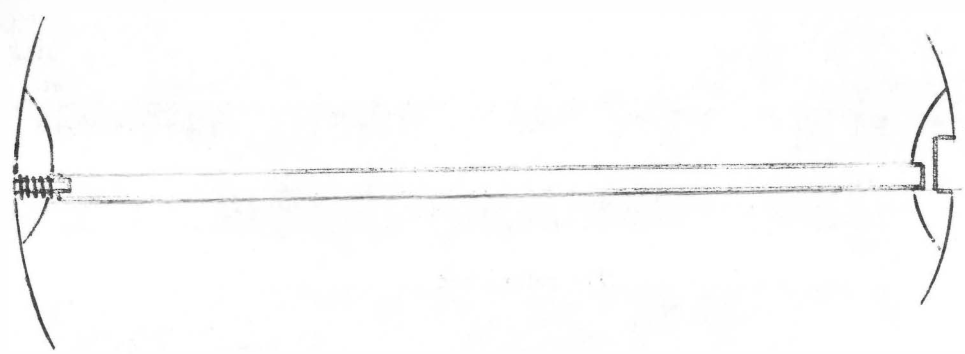
The photos will show the construction better than my words I think, but I have to add that the glue to use for such a construction must be of such a quality that no piece of wood will ever get loose. I used "Araldite".

It is important, of course, that the length of the brace is correct. For a violin this will scarcely be any problem, as the correct length is simply the distance between the end blocks with a little addition for insertion, but compared with a violin a cello is a weak instrument - weak in its construction I mean - and the distance between the upper part of the end blocks is anything but constant for a cello with the top off. Therefore when glueing in the brace I placed and clamped the top until the glue was hardened, and from now - removing the top again - the said distance remained constant, of course.

The cello was an old, deformed one, lopsided, and cracked. I corrected all faults, and microtuned it. Also, the ribs I microtuned. Only the four most acute archings of the ribs could not be tuned fully down, if the solidity should not suffer from it. But it took me 9 months to get the microtone pitch stable in the plates. And now the tonal result from this microtuned cello with the brace inserted? The same tonal characteristics as for the viola, powerful, even all over, distinct, clear, sweet, and sonorous. But it is my impression that the difference between this cello and a cello without a brace is still greater than for a viola with and without a brace. If a person with a weak backbone could be given a new, springy and strong backbone - thus you may imagine the difference.

One thing I think the readers will be interested to know: has the brace to be microtuned? Theoretically there should be no need for it, as it is an internal brace with no sound emitting surfaces. But to be sure that theory and practice should not be conflicting I tuned the cello brace to full accordance in microtones, while I tuned the viola brace to no accordance at all. The tonal results are reported, and theory and practice agree.

If I should outline an improvement of the brace I will say that it is desirable if the length of the brace can be adjustable. The sound post we can easily substitute with another one of suitable length, if changes in the resonance body are calling for it. We cannot in the same way replace the brace, but we can do another thing. We can insert the brace into the neckblock, but not into the bottom block. From the outside of the ribs through the bottom block we can enter a screw of hardwood, and let the interior end of the screw pass into a hollow in the free end of the brace.



Brace with end screw

The sketch will show the arrangement. A nick in the outer end of the screw allows us to regulate the pressure of the brace, and the correct pressure is that, that gives the best tonal result.

Well, this is what I have to report regarding the brace. I hope many other makers will try it out in practice, and if we should give the brace a name - and why not - I should very much to attach Don White's name to it (THE DON WHITE BRACE) in honour of a great man, and a dear friend. He was - as far as we know - the first who used it successfully, and the first who described it.

Kristian Skou

THE BASS BAR EXPERIMENTS

By Harry Adkins and Bruce Yantis

Bruce Yantis and I have just finished a Bass Bar experiment. We clamp fiddle top in place, string up, and whittle away at Bar. We started with a 1/4" Millor curved Bar, 10 1/2" long, angled with G string. Bar same curve as top. Bar not sprung in.

Results:

1. Lowering Bar increased D string but didn't do much for G.
2. Narrowing Bar started to free up G string, but did not completely do so to our satisfaction, even tho' reduced 3/16". A and E strings improved, however.
3. Shortening Bar, lower end. Improved G to some extent.

I might add that I'm of the more "heavy Bar" school - Bruce toward "light Bar".

Best regards.

"Harry Adkins"

THE VIOLIN STRUCTURE

There is one specific principle of the violin which I have not mentioned before in my articles on the violin, and that is firmness throughout its entire structure. By that I don't just mean apparent firmness, but a firmness that complies with the extreme small movement of the molecules (or atoms) and a violin that lacks in the least the apparent firmness anyway is just not a good violin.

Why is this specific firmness throughout the violin so important for creating sound? (I don't mean added weight but the plates so arched, the ribs, blocks and lingings so put together as to produce this.) The violin is all enclosed in by plates, ribs, blocks and lingings to cut out anything pertaining to ordinary vibrations as generally or traditionally known. If the violin vibrated as such there would be no sound, just like a car suspension spring well greased or oiled. It would not even vibrate in the manner of a car suspension spring as the rapid vibrations of the strings bears no comparison to the almost negligible rapidity at which the violin plates would respond. It is a bit difficult to get the thin plates of a violin - so necessary for the production of sound - firm enough, but to a certain extent they will stand a certain amount of looseness (not apparent looseness, strictly speaking), as they can overcome this; similar to a rifle bullet going through some light object without shifting it. Any looseness beyond that by which the small movement of the molecular vibrations can overcome is a drag on these molecular vibrations which must either take the weight of the loose plate with them or knock it about, somehow adding weight with its reinforcement, and this void of sound.

To my mind the modern violin does not comply completely with what I have said above. I feel strongly and to get this specific firmness I have spoken of, the narrow ledges or edges on which the plates are glued are too narrow (and I think this is the worst fault of all). It would not add much weight to the violin to broaden them with the lingings, these lingings 5/16" deep and the ribs a bit less than 1/16" would give a better balance, say, than 1/16" ribs and lingings 1/4" deep. The inner blocks could be of ample surface dimensions; they can be scooped out in the waist and so also the end blocks. I have always thinned out all the blocks in their waists. Next in importance is getting the plates to the specific firmness I have just mentioned and in a position to permit the bar, bridge and post to have the best control over them. Carrying the curve of the plates from end to end, I feel certain, prohibits this to a certain degree, and also brings in certain specific looseness. In making my last violin I countered this tendency by making a contrary or seemingly contrary curve all well round the ends of both plates, about 1 1/2" broad, thus shortening the main curve, and as I said above, giving bar, bridge, and post a better control of the plates. I am varnishing this violin just now but before doing so I tried it strung up in the white and found it really good indeed. To go much beyond the 1 1/2" with the contrary curve around the ends would bring in looseness again but with about this amount it has a firming or binding effect on the plates, and allowing a shorter and more efficient bar to be used. The height of both plates from the ribs at bridge on this violin I have just been making is 23/32" and throughout both plates where the bridge stands 2 5/8". The bar in this violin is 8 1/2" long, 4 1/2" forward from where the bridge stands, and 4" backwards. It has the same amount of wood throughout its length, is vertical as usual below where the bridge stands, but flattens out to the horizontal at the ends. This flattening out bears all to the centre of the breast where it has a more equal control of the breast. While the outside of the bar is straight as in the usual bar. In some violins there is a long 10 1/2" boat-shaped bar which I certainly consider far too stiff. In others you get this 10 1/2" long bar tapered out to almost nothing at the ends. This bar is not so bad, insomuch as it allows 8" with some effect, while the tailing off of the 1 1/4" at each end has very little effect and not actually needed but insures that the bar is to some effect at the ends of the 8" central part.

I feel quite certain the action of the bridge and post is not generally and traditionally understood, and that the main action of the post is to vibrate the back which is the main source of action for the higher strings, and to stabilize by the right foot of the bridge, the action of the left foot on the bar. The bridge pivots from its centre not from above the post. Again the action of the right foot above the post is stabilized by the left foot above the bar. Again the action of the bar itself may be somewhat stabilized by the firmer front portion of the breast immediately above the sound holes.

Maple will give lower pitched notes and pine higher pitched notes in loose thin plates when bowed, but this is not the case when the violin is all fitted together. The weight of the violin strings is negligible compared with the weight to vibrate in violin plates when fitted in the violin. The breast with its bar, and the back with its thicker centre running along the back - which is really the bar of the back. The breast and the bar with its greater elasticity yielding the longest wave is what is required for the lower notes, and the back yielding the shortest wave is what is required for the higher notes. In three of my violins I fitted a vibrating bridge under the post on the back. This is a flat bridge of pine (not maple) 3/4" broad and 2 1/4" long on which the post sits. It is tapered at each end from the 3/4" to about 5/16" on which are cut projecting feet which are glued to the back, raising the broad flat part on which the post sits (which is itself 1/8" thick) clear of the back, 1/4" high altogether. I have found this bridge gives a fuller tone to the higher strings, especially on the E string. I had a very good violinist who paid me a visit; on one of three violins with this bridge which he tried, he remarked that the E string wasn't just ordinary but extraordinary.

I would like to say something about the bridge of the violin. Tradition seems to stick to the Strad, or ordinary type bridge as sold. Definitely I think this bridge with its large loose cut incisions is too erratic in its action, and does not supply the violin with the fine and constant yield that is required of it. I once cut out a bridge from what was supposed to be a full-sized pattern of the genuine Strad. bridge, and to say the least it was definitely weak; also compared with what is now sold as such. (Well, his bars and necks were also weak, and I do not see where his altered violins can be right.) Well, I would not like to be as rude as Alexander G. Murdoch in his book "The Fiddle in Scotland". Listen to what he says: "The Scotch side of the fiddle, biographic and historic interesting as it is, has never been before attempted, though any amount of interesting twaddle has been effusively talked about "Cremona" and the much belauded old fossil fiddles of that famous ilk, greatly to the hurt and discouragement of honest merit and home manufacture."

The problems as related to the various thicknesses throughout the violin has been subject to much speculation, particularly those thicknesses of the breast. There are those who would have it 1/8" thick all over, those who would like it thick in the centre and thin at the edges, etc. Really, the problem seems to be lost in a maze of this speculation, and how can anyone be satisfied without at least having some knowledge of what goes on inside the wood itself. I have broached this subject in my articles I have written for the Journals and meantime it would take some space to go fully into it again. I don't think that either the 1/8" thickness all over, or the somewhat thicker centre with the thin edges, are exactly right. The main part of the breast for the production of sound lies in the cheeks, not in the immediate vicinity around the bridge. (Analogous this would mean in engineering terms the driver and the driven; the part around the bridge the driver and the cheeks the driven, the driven producing the sound.) The cheeks produce the sound but not the immediate edges, these have to be stronger and tapered out to the cheeks to give firmness. In this case the cheeks may be made a little thinner than the rest of the breast (I am not quite clear on this) say, be it 1/8" thick all over with this exception, and taking into account also the thicker edges tapered out to the cheeks. I have spoken about the driven (the cheeks), what about the driver (the part around the bridge). On this part the two sound holes, one on either side of the bridge and bar, give a certain amount of freedom and action to these. These sound holes are about 3" long and also give a convenient spread for the sound waves in a similar fashion to the throat of a whistle. So thin this part of the breast between the sound holes somewhat below the minimum average thickness that would be required of the breast, and giving more strength to the bar at this part may somewhat improve the tone, I do not think it advisable for all the difference it would make, and for all you could dare thin it anyway. On the other hand, thickening this part beyond what is normal for the average thickness of the breast, I think will most certainly weaken the tone, because this thickened part instead of sending its waves like the bar straightforward spreads them in a circular action around it. While if this part is thinned out too much and with a weak bar at this part, the bar and this part would very much vibrate on their own with a proportional loss of transmission to the cheeks.

Much seems to be made by some of the old master violins enshrouded in an air of mystery and doubt by others as to what extent this is justified. In your Vancouver Journal for August, 1962 there is a fine article by Joseph Reid, "Why not use the scientific approach", in which he says, 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 is self-evident.
2. Classification of above facts into consistent series.
3. Determination of a formula which will enable the above facts to be satisfactorily explained.

As far as No. 1 is concerned, the collecting and recording of observed facts, can we put down as such the belief of those who believe in the perfection or near perfection of the Strad. violin as a collection and recording of observed facts, or the classification of these facts into consistent series, as in No. 2, the determination of a formula which will enable these facts to be satisfactorily explained as in No. 3, I need not mention as it doesn't exist.

I think there is far too much made of this worship of the old masters to the detriment of both makers and players alike, something akin to the ancient alchemists with their fruitless efforts to turn base metal into gold, and which hindered for a few hundred years the study of chemistry. The same thing, or similar, is undoubtedly happening with the violin. The high prices paid by buyers and collectors, fed, I feel sure, on an exaggerated belief, and who can blame them -- it is only business.

Violins now made are nearly all copies of Stradivarius, Guarnerius, etc., and to approach these standards, great efforts are made to make them do so with fillers, varnish, etc., some even claiming they have found the Italian tone varnish, etc. By this copying of the old masters' violins, it goes without saying that these old master violins must at least be somewhat similar in construction to the copies and I, somewhat wrong in my predictions, while I believe myself I am substantially right. Most discoveries have to be verified by experiments but how are the very nature of violin vibrations to be verified in a violin even with any electrical appliance? And it appears to me these may not be absolutely necessary. Violin vibrations are in their very nature only an abstract form of ordinary vibrations, and of a phenomenal nature and may be verified by thought alone in conjunction with examples in ordinary existing vibrations, and together with the laws or formula governing them, which may be modified or altered to comply.

I will finish up by giving a quotation from the book entitled: "The World in Modern Science", by Lepold Infeld, published in 1934, with an Introduction by Albert Einstein: "As our scientific knowledge increases, so does also our consciousness of the extent of our ignorance; and the further we progress, the more modest becomes our immediate scientific aim."

William Kirkwood
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Forfax, Angus, Scotland.

EUCALYPTUS OIL AS A SOLVENT AND THINNER FOR OIL VARNISH

For some years, I have been using natural Eucalyptus oil as a thinner for oil varnish and find it superior to turpentine for the reason that any colour or resin, soluble in alcohol, is generally soluble in Eucalyptus oil, whereas some colours will precipitate where turpentine is used unless held in suspension in an alcoholic solution.

It is difficult to lay on a smooth even coat of oil varnish where the colouring matter has to be added per medium of an alcoholic solution because of the rapid evaporation of the alcohol, which causes the varnish to become stiff and tacky. However, where Eucalyptus oil is subtituted there is no rapid evaporation and so there is plenty of time to lay on a smooth and even coat.

Eucalyptus oil is miscible with turpentine, and being a thin oil it is readily absorbed by the wood, which is an advantage to those who wish to size their wood with several coats of thin varnish. However, after the wood has been sized it is not advisable to try and lay on the remaining coats too thin as the solvent qualities of the oil have a tendency to soften the previous coat.

I have found that a small quantity of this oil will increase the spreading quality of Button Lac varnish but too much may cause some precipitation.

Messrs. Bedwell Ply Ltd., Rushcutters Bay, N. S. W., Distillers of Essential Oils, have for years been aware of the value of Eucalyptus oil in the preparation of Oil Varnish and discovered that the oil from Eucalyptus dives was the best for this purpose, owing to the presence of the Ketone, Piperitone, in the oil, which is responsible for its solvent qualities. Messrs. Bedwell Ply have now produced a re-distilled clear oil containing 80% Piperitone, which will be appreciated by all concoctors of oil varnish. This oil can be obtained in the U. S. A. through Messrs. Berlarge Company Inc., 11 East 44th Street, New York 17, N. Y.

H. C. Hayes

COMMENTS ON MR. HARRY WAKE'S ARTICLE

"Getting in the act"

The Violin Makers Journal, April-May 63

So many controversial opinions about the Michelman process have been advanced in the Journal that Mr. Wake's serious desire to recover the "Lost secret" prompts me to make the following remarks. It is absolutely necessary that in all discussions of the process precise data be furnished:

1) - the exact specification of the materials used; trade name, formula and molecular weight.
2) - some information regarding the molecular proportions.
3) - the temperature of the various operations: dissolving, reacting and drying.
4) - the tests used to determine the end of the reactions.
5) - the drying conditions
6) - the yield. A high yield indicates poor washing, a wet product or the presence of undesirable products.

We shall now discuss some of the points raised above:

Rosin combines with various metals in equivalents based on molecular weights. For instance, two molecules of rosin combine with one molecule of Aluminum chloride. Since the molecular weight of rosin is 302 and the Aluminum chloride 241, the theoretical equivalent of Aluminum chloride needed to precipitate one molecule of rosin is 120.5.

Table 1) gives the equivalent for some of the products which we will discuss.

TABLE 1

Name	Formula	M.W.	mol. of rosin per mol. of salt	Theoretical Equivalent
Rosin	$C_{19}H_{29}COOH$	302	--	302
Aluminum chloride	$AlCl_3$-6-H_20	241	2:1	120.5
Calcium chloride	$CaCl_2$	111	2:1	55.5
Zinc chloride	$ZnCl_2$	136	2:1	68.0
Alum	K-$Al(SO_4)$12-H_2O	474	2:1	237.0
Alum	"	474	3:1	158.0
Potassium carbonate	K_2CO_3	138	2:1	69.0
Potassium hydrate	KOH	56	1:1	56.0
Iron chloride	$FeCl_3$-6-H_20	270	3:1	90.0
Ferrous sulphate	$FeSO_4$-7-H_2O	278	2:1	139.0
Potassium bicarbonate	$KHCO_3$	100	1:1	100.0

In other words to form the rosinate of potassium, 56 grams of potassium hydroxide or 69 grams of potassium carbonate will be required for 302 grams of rosin.

TABLE 2

The Alizarine, like the rosin, is first dissolved as a potassium alizarate and then precipitated with the metallic salts :

		M.W.		
Alizarine	$C_{14}H_8O_4$	240	--	240
Potassium carbonate		138	1:1	138
Potassium hydroxide		56	1:2	112
Aluminum chloride		241	1:1	241
Calcium chloride		111	1:1	111
Zinc Chloride		136	1:1	136

TABLE 3

The most brilliant Alizarine Red is the complex-lake made from Aluminum and Calcium alone. To form this lake one would need:

Alizarine	240	240
Potassium carbonate	138	138
Aluminum chloride	241	120.5
Calcium chloride	111	55.5

With the help of these tables we will now analyse Mr. Wake's experiment using 10 ccs of Alizarine 2%.

TABLE 4

	in grams	for 1 mole	ratio equivalent	
200 ccs Pot. rosinate	11.6 rosin	302.0	1.00 mole	
10 ccs Alizarine 2%	0.2	5.2	0.02	
45 ccs 5% Alum. chloride	2.3	60.0	0.50	2.36
15 ccs 5% Calcium chloride	0.7	18.0	0.32	
80 ccs 5% Zinc chloride	4.0	104.0	1.54	
13.8/3 Potassium carbonate	4.6	120.0	1.74	

TABLE 5

As we do not know exactly in which proportions the metallic salts will react, the following study assumes that they combine proportionally to their equivalents:

Alum. chloride	0.50	or	0.212
Calcium chloride	0.32		0.134
Zinc chloride	1.54		0.654
	2.36		1.000

Since one equivalent of rosin requires one equivalent of metallic salts (as shown in Table 1), the figure of 2.36 indicates an excess of 136% of salts.

From Table 4 one also finds that an excess of 74% of potassium carbonate has been used. Dr. Michelman in the reprint of "Violins and Violinists" Jan.-Feb. 1958 issue, recommends an excess of 100%. This excess is transformed during the formation of the rosinate into potassium bicarbonate, deemed beneficial for the formation of harder lakes.

However, during the addition of the metallic salts to the rosinate, when all the rosin has been precipitated, any excess of the mixture of Al-Ca-Zn chlorides added to potassium bicarbonate, will form inorganic oxides and carbonates. These colorless salts are insoluble in water, linseed oil or turpentine.

Table 5) shows that the rosinate formed contains approximately

TABLE 6

21% of aluminum rosinate	colorless
13% of calcium "	colorless
65% of zinc "	ruby-red, but a slow reactor with drying oils.

Table 7, based on molecular equivalents, shows the weights and the % of the products used in the various steps of the reaction. Table 8 gives in grams the weights for the same steps, for Mr. Wake's experiment starting with 11.6 grams of rosin.

TABLE 7

Product	amount employed	Used for precipitation of the rosin	%	For precipitation of Alizarine	%	For precipitation of total resins	%	to precipitate excess Pot. Carbonate	%	Total consumed in reaction	%	Excess unreacted	%
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Rosin	302.0					302.00				302.0	100.0	0	
Alizarin	5.2					5.20				5.2	100.0	0	
Pot. Carb.	120.0	69.0	57.5	3.00	2.5	72.00	60.0	48.0		120.0	100.0	0	
Al Chlor.	60.0	25.5	42.5	1.11	1.85	26.60	44.3	17.9	29.8	44.5	74.0	15.50	26
Ca Chlor.	18.0	7.7	42.5	0.32	1.85	8.02	44.3	5.2	29.8	13.22	74.0	5.83	26
Zn Chlor.	104.0	44.0	42.5	1.92	1.85	45.92	44.3	30.7	29.8	76.62	74.0	27.48	26

TABLE 8

Rosin	11.6			11.6		11.6	0
Alizarin	0.2			0.2		0.2	0
Pot. Carb.	4.6	2.65	0.115	2.765	1.835	4.6	0
Al Chlor.	2.3	0.98	0.043	1.023	0.690	1.713	0.587
Ca Chlor.	0.7	0.286	0.0124	0.298	0.200	0.498	0.202
Zn Chlor.	4.0	1.69	0.074	1.764	1.180	2.944	1.056

TABLE 9

Finally Table 9 indicates the theoretical amount in grams of the products present (before filtration) in the reaction mixture:

	M.W.	valuable resins	products to be avoided	products to be washed away
Aluminum rosinate				
Calcium rosinate		12.87		
Zinc rosinate				
Alizarine lake				
Potassium chloride	74.5			2.500
Aluminum oxide	138.0		0.206	
Calcium carbonate	100.0		0.180	
Zinc carbonate	125.0		1.070	
Aluminum chloride excess				0.587
Calcium chloride "				0.202
Zinc chloride "				1.056
		12.87	1.456	4.345

Starting from 11. 6 grs of rosin and 0. 2 grs of Alizarine, and based on theoretical data,

a crudely made product could yield as much as	18. 67 grams
a product made with excess reactants	14. 33 grams
a product made in ideal conditions	12. 87 grams

Now as to the practical value of all these tables:

1 - If one wishes to make pure rosinates Table I will indicate that:

302 parts rosin require 69 parts of potassium carbonate and

120. 5 parts of aluminum chloride	for Aluminate rosinate
68. 5 parts of zinc chloride	for Zinc rosinate

2 - If instead of obtaining a rosinate containing respectively 21%, 13% and 65% of Al, Ca, and Zn rosinate,* one wishes to obtain equal ratios of rosinates, one would use, according to Table 1,

40. 0 parts of Aluminum chloride	(120. 5 : 3)
18. 5 parts of Calcium chloride	(* as shown in Table 6.)
22. 7 parts of Zinc chloride	

3 - If one desires to make the rosinate in the proportions of Table 4, but without excess of metallic salts, Table 7, Column 7 will indicate the necessary amounts.

4 - If one would want to make first the rosinate of Al, Ca, and Zn, using Table 7, Column 3, then add the Alizarine to produce the more brilliant red lake, Table 7, Column 5 would indicate the potassium carbonate needed, and from Table 3, one would obtain the necessary proportions for the aluminum and the calcium.

Any desired variation can be easily worked up from the tables.

John Moessinger,
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SUPPLEMENT TO ARTICLE #3 ON FILLER AND VARNISH

by Jack Batts

In June of this year, '63, Carmen White and I spent a very enjoyable and profitable visit with Mr. and Mrs. Michelman - just to know such fine people is within itself profitable - however the profit to which I refer has to do with Mr. Michelman's casual remark that "Iron will give a tawny color."

As has been written in this Journal before, Carmen and I have for a number of years experimented with and have now used with considerable success a filler or sizing made from a diluted form of Michelman varnish. For edge and refinement of tone I have never seen its equal. We now have made progress in color also.

Michelman's remark about iron struck both Carmen and me at once as an obvious fact that we should have seen years ago. We both set about running some experiments on this as soon as we returned home, and we were not the least surprised to find that by adding a small amount of iron rosinate to the alum ammonia rosinate (we used as a filler) we could get any degree of yellow we wanted without alizarine (which was never a true yellow anyway.)

The article on varnishing #3 was written before this visit and we have suggested the use of alizarine because we had nothing better. I have used regular color powder solution in this filler - but it is a poor substitute, and the idea was discarded, but if you will use iron rosinate in proportion to the degree of yellow preferred you will get the tawny underfire we have been looking for.

Within recent weeks I have had the opportunity to examine a few fine Italian works - Amati, Guadagnini - Guarneri (Del Gesu) Rogeri and Balestrieri, Peter Guarneri - Stradaveri - Berganzi - and was impressed and encouraged to find the tawny under color so very much like the samples of the iron and alum rosinate I had just made. I have used this on two violins now - with wonderful results, tonally as well as from the standpoint of color.

Perhaps it would be wise to keep the yellow mild in tone for it will darken some in years as has the Italian violins (assuming of course that iron was their coloring medium).

Of course you will understand that the color or upper varnishing goes on as usual with alizarine giving the beautiful reds, and iron used to brown it, if one wishes to go into many color possibilities.

I hurry this article so that those makers who wish to try our filler (or sizing) method may have the advantage of this latest improvement.

Note: This filler is to be used on the raw wood of a good, new violin if it is to give the best results in tone and color.

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VIBRATIONS

I was really very interested in the Journal articles. Norman Miller has a really very good and important article bearing on strings, bar and breast. Somehow or other I cannot get away from the fact, I would have liked it more clear and deeper detailed. Although it was very good, and brings to one's mind the importance of this subject.

There is also two other articles which interested me very much. These are "Testing Tonewood for Violins", by Arthur T. Walker, and your own article, "A Don White Violin". Perhaps you and Mr. Walker won't like what I have to say, and mind you, I don't want to be critical with anyone, but I feel it is my duty to say what I think, although don't take it for granted, but I feel I am substantially right.

In a complete vacuum any piece of wood vibrating must exhaust its own force at the free ends. The vibrations cannot run over these ends. At the attached end, of course, the vibrations would continue through the attachment. It is the same with the cut ends on a violin breast. They must continue through the attachment also, but all the vibrations right along the breast must give these to the air, but only in proportion to the relatively small pressure the air has against the strongly vibrating molecules in the breast and we only get this proportion of sound the air takes against these much stronger vibrating molecules in the breast. Violin vibrations don't travel along the plates of a violin at 15,000 or 16,000 feet per second, only through solid wood will they do that. A violin vibration may not, in its plates, cover anything more than, say, a circle of 3" diameter, which would mean at 500 vibrations per second, a distance of 125 feet per second, quite a different matter from vibrations going through solid wood at 15 to 16 thousand feet per second.

Another puzzling mystery is the statement in violin books and journals, is the velocity of vibrations along the grain of wood, across the grain, and parallel with the grain. I feel quite certain this matter has little or nothing to do with violin vibrations, and solely applies, and has been formulated, from narrow strips of wood as in ordinary, or you may say, visible vibrations. If you took a large square piece of wood I am quite sure you would have difficulty in formulating these findings, unless with the parallel grain.

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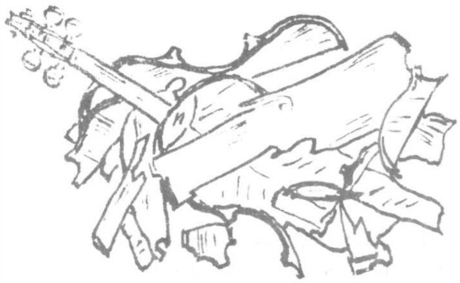

Fiddle Fix.

By H.S. Wake.

Some Notes on Purfling

A few helpful suggestions on this subject may be appropriate at this time for those of our readers who may have difficulties with this phase of violin making; I am aware from my own observations that the percentage of makers who can do a really first class job with this work is small indeed.

Regardless of whether you cut the purfling groove by hand or by machine, be sure to make the groove or channel wide enough so that the purfling strip will drop in easily without being sloppy; it isn't easy to push tight fitting purfling into a channel filled with hot glue, and under these circumstances as a rule all kinds of other problems arise, such as accidentally knocking over the glue pot, or breaking the purfling or getting the miters at the corners all messed up; I know because I've been through it: The purfling should drop in for at least two thirds of the depth of the material or about one sixteenth inch; this means less to trim off in finishing and less danger of the strip lifting out when trimming off. Do the trimming off with a very sharp small gouge (about 1/4" width) as close as possible to the surface, then use sandpaper or garnet paper wrapped over a hard eraser, sand only the top of the purfling and don't overdo it or you will find that you are removing fiddle wood instead of purfling; the idea is to remove the gauge marks from the top of the purfling and that's all; if this is not done it looks bad under the varnish.

Fiber purfling is almost impossible to trim off by any machine cutter; it will just get hot and spread and gum up the cutter; this fiber purfling is excellent and practical but you have to learn how to use it; it can be made more manageable if a few preliminaries are observed; first remove the burr from the edges either by sanding or by burnishing with a round steel rod on a hard surface; just lay the material on a hard plate or bench top with black face down and give the top face a few strokes with a round rod or tool handle, turn the purfling over and treat the opposite side.

Fit the purfling at the C's first but before doing so, cut the adjacent miter on a short piece about two inches long and insert temporarily in the corner, this will give the mitered ends of the C pieces something to butt against until you are ready to fit the adjacent bouts; the short pieces can then be removed and your next piece for the bouts has a properly mitered corner to fit into.

If, after having cut the angle on the end of a strip for the miter, you have difficulty making the short bend and the white inner layer splits and spreads open, turn the piece over, cut the angle on the other side and bend in the opposite direction. If the purfling is quite rigid and you have difficulty making the short bend for the corners, try holding the end in your mouth for a few seconds; don't make it wet, just the warming is sometimes sufficient to make it pliable.

This purfling material as you are aware, consists of three layers and when a short bend is made, the outer black layer is being stretched while the black layer on the inside is being compressed; sometimes it refuses to be stretched and the result is a fracture; to avoid this, try separating the three layers for about 3/4" on the end with a thin knife blade; it will now bend easily; however, you must be more careful during the final glueing.

Don't do any glueing until all pieces are fitted and in place; starting with one of the Cs lift up the purfling with the point of a knife and pull out at one corner only; run some thin hot glue into the corner and about one inch of the groove then push the point of the purfling back tightly into its corner; do likewise with the other corner of the same C. With both of these in place, run the glue into the rest of the C groove and push the purfling down into it. Press the purfling down hard with a rounded wood tool handle and wipe off the excess glue with a damp rag; the pressing down serves a double purpose. It assures you that the material is well down in the groove and it spreads it slightly to fill the groove. The opposite C is next done in the same manner and you will find that the rest of the work is comparatively easy.

A Boring Tool for the End Pin

The tailpin hole in a 'cello can be a problem in more ways than one, and it seems that the main reason for this is that there are several types of tailpin and they all have plugs of different size and angle of taper. Special reamers for these holes are quite expensive and in many cases the reamer purchased will not be of the right taper for the particular job to be done; even in the case of a new 'cello that is being completed, it is a little difficult to justify the purchase of a costly reamer to finish one hole, and should a person be even a professional maker, it isn't likely that he will make too many 'cellos in a lifetime. There is however, an answer to this problem and that is to make your own reamer or cutter to match the socket to be fitted; this will not be a hand reamer of the usual fluted type, but a high speed cutter that must be used in a 1/4" electric hand drill; it is a flat blade or "Spade" drill that will drill the hole and cut the angle of taper at the same time and it will do a beautiful clean job; this cutter can be made in a couple of hours and is well worth the effort, in fact several could be made to suit different sizes and tapers.

The dimensions and sketches will be given for a cutter to suit the average socket size and these can be varied to suit any end pin socket. Hand tools are all that will be required, and the necessary tool steel for the cutting blade can be bought or ordered through any good hardware store. At Fig. 1A is shown a 'cello and pin socket of an average type, and at B Fig. 1 a view of the matching cutter. The cutter blade will have a slight spiral twist for better cutting action. This will give you the general idea as to the type of cutter we are to make, and it will be seen that a cutter of this type cannot be used for the opening up, or changing the angle of taper in an existing hole. The hole would have to be tightly plugged first and a small pilot hole put through to guide the spade cutter; in the case of a new instrument it will only be necessary to drill through the block with a small drill and then follow through with the spade cutter; it goes without saying of course that all precautions should be taken to keep the hole true with the instrument as nothing looks worse than a crooked end pin; it is a good idea also, after putting the pilot hole through the block, to drill in slightly with the spade cutter (no more than 1/8") from the inside or back of the block, this will prevent any possibility of the wood breaking away as the drill emerges from the hole.

For the making of the blade, purchase or order from your tool supply store, a piece of 'precision ground flat die stock'; this is tool steel as the name implies and can be bought in various widths and thicknesses; get one-sixteenth inch (.0625) thickness by one inch width, if possible, as the larger diameter of the end pin socket will rarely if ever, exceed one inch; the steel can be cut with a fine blade jewellers saw because it is in unhardened condition; don't use material any thicker than that specified as it is not necessary and would be more difficult to cut. Now measure carefully the plug end of the socket to be fitted A Fig. 1. This of course is tapered, so take the length of the taper and the diameter at each end. The blade of the cutter must match this exactly, however the length of the taper will be extended by about 3/16" at the small end only, this will allow you to drill the tapered hole slightly smaller than the socket to insure a good fit of the plug in the hole. A small step is cut away at the bottom or wide end of the blade as shown at A Fig. 2. This should be 1/4" wide by 1/16" deep and exactly at the center of the lower edge. At the upper or small end of the blade B Fig. 2 a double tapered point is left as a pilot. This

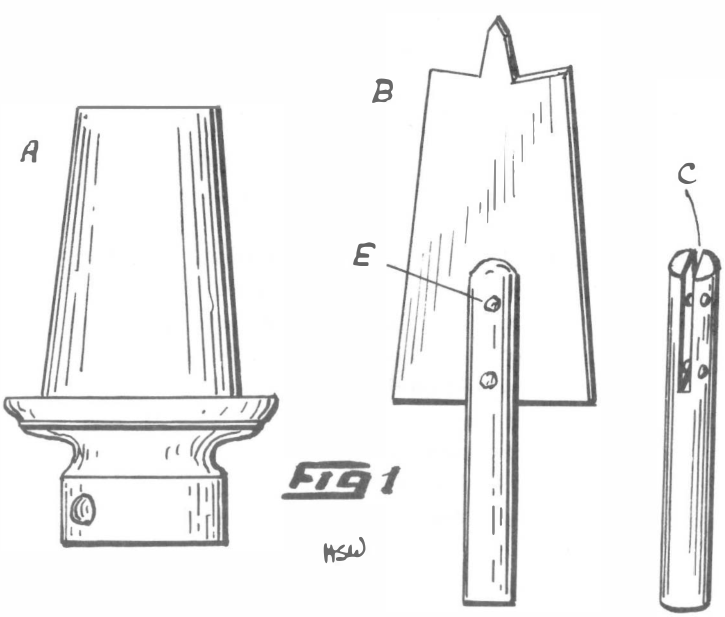

FIG 1

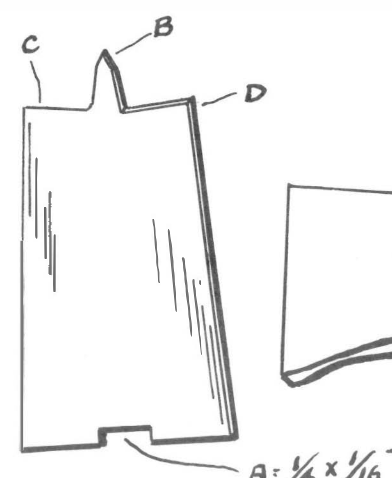

FIG 2.

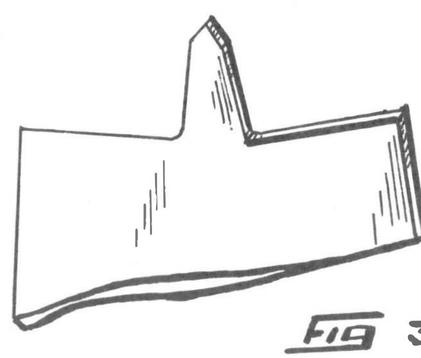

FIG 3.

should extend about a quarter inch and should be 1/8" at its widest point. At points C Fig. 2, a slight angle is shown in order to give clearance for cutting points d.

Having the blade shaped thus far, we must now file a bevel on all cutting edges for clearance as shown in the enlarged view, Fig. 3. Don't make the angle of the bevel too sharp. Just enough for clearance. Now give the blade a slight spiral twist by gripping the lower 1/8" of the blade in the vise and with wrench or pliers grip the upper portion and twist the metal counter-clockwise about five degrees; for the shank, a two inch length of 1/4" steel rod is used. This can be an ordinary steel bolt with the head removed. A 1/16" slot is cut lengthwise of the rod to a depth of 5/8" to receive the blade as shown at C Fig. 1. Cut the slot first with a hack saw and then file to a snug fit on the blade with a thin flat file. Small files sold as 'ignition files' are excellent for this job and they are quite cheap. Push the blade into the slot and up into the recess A Fig. 2. You will see now why this recess should be carefully cut as its purpose is to hold the shank in true center location and to prevent the blade from shifting in use. The shank is secured to the blade with two small rivets about 3/32" size, E Fig. 1. Locate and drill for the rivets through the shank first, then place it on the blade and if its a tight fit so much the better, because before drilling through the blade you must be sure that the blade will be perfectly concentric with the axis of the shank. There are several ways to check this. If you have a lathe it will be easy, or it can be done in a drill press. When you are sure that the blade is located correctly on the shank, secure with a small clamp and drill the rivet holes through the blade, using the holes that you put through the shank previously as a guide. Rivet the two together and run the cutter at high speed in your electric drill. You will see immediately if it runs true and if not quite true you may be able to correct any small error by gently tapping one way or the other and then resetting the rivets.

The cutter blade must now be hardened and tempered; for the uninitiated this is not as difficult as it sounds. The steel of the blade is what is called 'oil hardening' and common engine oil is as good as any other for our purpose. Heat the blade to a bright red and quickly quench in the oil. Make sure that the steel is really red before quenching, especially at the leading portion of the blade, or your hardening will not be effective. Wipe off the oil and polish the blade with emery cloth. The metal in its present condition is too hard and brittle for this type of cutter and must be tempered. While holding the shank with pliers, heat the lower end of the blade very gently and watch it closely, you will see the colors start to form and creep towards the point of the cutter; the leading color will be yellowish, followed by blue to purple. At the instant the yellow reaches the leading edge of the cutter quench again in the oil. Your cutter is now tempered to a hard tough cutting edge and spring like blade.

As mentioned earlier, this type of cutter can only be used through a small pilot hole, so any existing hole must first be plugged and the plug glued in securely. Care must be exercised not to drill too deep with the taper cutter or the hole will be too large for the socket. It is better if anything to go a little short and then file the socket down a little for a nice snug fit. A little dry soap on the plug will help in the fitting.

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THE PURFLING

The reasons, or lack of reasons, for purfling an instrument, as given in texts, have never convinced me. However, I have found an effective purpose for the purfling. You have no doubt noticed how the flank's edges of the plates warp upward when the finished plate is placed on a flat surface, outside up. This tendency is considerable in fine high flame maple. Glueing these plates to the sides is usually accomplished by brute force. The stresses so induced in the sides, I am certain, accounts in most cases for the rib distortion and rib separation from the lower block that is so prevalent.

If the plate is purfled while it is still flat, i. e., before scooping the inside, warpage is reduced and the purfling resists the strain by absorbing the stress. The stress in the plate is the same as before but now none of it is permitted to act on the sides.

Of course, in time these stresses are relieved, the instrument vibrates freely and the ribs have escaped the danger of distortion.

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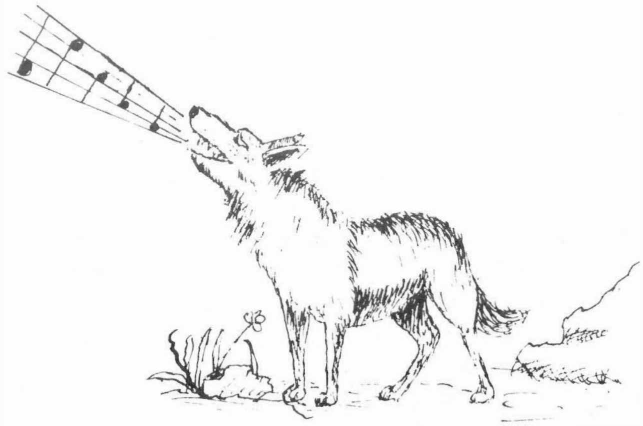
Wolf Notes

by The Editor



WHY?

A new and chill wind seems to blow from the lines of Carmen White's column "The String Section" in the April-May issue of the Journal.

Among other surprising statements we can also read this, "We must combat such ideas as Mr. Skou's "microtone" system."

Why not? Why not combat the system Don esteemed so highly, and from which he built with so great success - the system Don asked me so urgently to describe in order to help other makers!

But as I am of a somewhat other opinion, and the statement is anything but evident, I must ask Carmen White from his experience with the microtone system (the only experience of interest in this connection) to point out exactly WHY we must combat this system.

Kristian Skou

GEOMETRY AND THE OLD MASTERS

The April and May Journal to hand and read with great interest. However, I would like to draw the attention of many of the writers to some items that seem to be overlooked. First, I want to say that I have spent forty years with a steady string of violins going through my hands every day, from the most expensive to many that were worthless, and I have made myself a pair of calipers with which I can caliper an instrument without taking it apart. Also, I have been more fortunate than most makers in that I have had, through my hands, good examples of most of the old Italians. Strad, Amati, Guarneri, Guadagnini, Cappa, Geoffreller, Granaino, Gagliano, and many others. From their letters it would seem to me that most of the makers hope by science or other methods to be able to make instruments equal to the old Masters. To do this is impossible. One may as well go out and bat his head against a wall as to hope to make a new violin equal to a fine old one that has ripened and been played by a good violinist for a century or more, and I would suggest to Mr. Welstead and Mr. Briggs that they wait until they equal Stradivari or any of the old makers before they start to improve on them.

Now a word about the arching of the tables and any geometrical system the old makers had. There is none. Starting with Gasparo De Salo, 1575, to J. B. Guadagnini, 1775, what do we find: Almost every type of arching that one can devise. As for Strad., he never made two alike that I have seen and I have seen and studied over 25. The Circle Strad. is not like the Baron Rothschild, the archings of the Boissier is not like the Dolphin, the arching of the back of the Dolphin is higher than the arching of the top. Also, I have handled many fine examples of other old Italian makers and the arching varies on them all. Recently I sold a fine example of Joseph Gagliano on which the arching of the top was 1/16 inch lower under the bridge than it was at each end under the fingerboard and tailpiece, yet its evenness, tone quality and articulation was excellent. Over the years my almost daily study of many fine specimens of the old Italian violins leaves no basis whatsoever that they used any method, scientific or otherwise, in making their instruments.

Experience and the study of many Italian violins leads me to believe it is not the wood, dimensions or thicknesses, though each plays a part individually or in combination. It is definitely not the color varnish so this leaves us with one thing. The filler, or what the old Italians put on the violin before they varnished it. Experience has taught me that the filler that is applied must stiffen the wood to enable me to make a violin as thin in thickness as Stradivari and experiments over the last fifteen years has taught me that the only filler that will stiffen the plates yet retain the soft fullness of tone is pure raw refined linseed oil. Now to get results with linseed oil it must be warmed and one full generous coat applied all over the violin and then, most important of all, the violin and oil must be oxidized in strong sunlight for at least three months before varnishing. (I think the same result may be obtained by the use of an ultra violet light, tho' I have not used one.)

Speaking of the old Italian violins versus new violins, it must be remembered that Stradivari had been dead 90 years before Tarsis made his first trip to Paris with Italian violins. All the instruments that he took to Paris on his many trips had been lying in Italy for over 100 years and the material in them had seasoned and ripened during this long period. After these fine old instruments went to Paris who got them? Why, the great violinists of that time. Rode, Kreutzer, Viotti, Baillot, Lafont and many others. These players could and did demand everything in a violin. This is why I claim it is impossible to make a new violin, however good, equal to a fine old one that has ripened and been played on for over two centuries. I have five new violins that I am sure are equal to the finest old ones when they were new but they will have to ripen and be played on a number of years before they can take their place among the great.

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SOME CAUSES OF POOR TONAL RESULTS IN VIOLIN CONSTRUCTION

It has been said that the sound-post is the soul of the violin. How can one expect to adjust the vibrations between the top and the back with the sound-post when there are eighty-eight (88) wrong adjustments and only one (1) correct one, considering the bridge and top as a unified whole? In other words, the top and back must conform to each other perfectly in weight and vibration.

Why is the back heavier in the middle than the top? It is because the bridge and bass-bar acts as an added weight to the top, rendering the two plates in harmony.

The bass-bar is not placed in the instrument primarily as a support nor to amplify the lower strings but to offer more resistance to the left side, compensating for the higher tension on the right side. The weight and balance of the bass-bar must conform to the sound-post, bridge and top.

The back should be considered as the amplifier.

The ribs, blocks and sound-post are the road the vibrations travel to the back. It is reasonable to assume that if the ribs on one side of the violin are heavier, that side will have less freedom, consequently the tone of the whole instrument will suffer.

In the violin the strings, bridge, top, right ribs, and back must be correct individually and collectively, one cannot compensate for the other, to produce a perfect tone.

The varnish has two very important functions. The first and most important is to protect the surface. The second is to beautify the instrument.

The secret of violin making, if such secret exists, is to be able to unify all the various parts into one perfectly vibrating whole, each tone as powerful and beautiful as the others throughout the scope of the instrument.

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VIOLIN MAKING AND PHYSICS

Energy - Light, Heat, Sound

Each of the above three can be reflected and deflected. In a study of Energy there is the doctrine that energy is never lost, not even the smallest quantity. Sound is a form of energy and to examine it as a form of energy there appears the reason - that Energy may change in form action or application. It also may come as a shock to some makers of musical instruments to hear and see such statements as these. Violins and other musical instruments have no tone of their own. Nor has the air itself within, or outside, an instrument any. One often sees reference to air tone in a violin. There is no such thing as air tone in a violin because air itself has no tone. No matter how we alter the air capacity within an instrument it does not alter the fact, increasing or decreasing the air content within a violin does not give it a tone. For air itself does not produce musical tones. I can even imagine voices saying "Ridiculous, what nonsense!" Now, make this test of science - physics, which demands an exact provable test.

When all is quiet in a room and no outside noises interfere, get your violin, put it on the table. Leave it there. Now listen carefully, after closing all windows and doors. In that quiet room full of air, where is that sound called air tone? The air makes no sound of its own. "Oh!" exclaims a voice, "What about the wind?" Wind is forced air. Energy is from heat, and cold sets the air in motion. The air in motion causes sound, does it? Actually sound which you attribute to the wind is actually caused from the friction with various obstructions. Trees, buildings, rocks and the sea, also telgraph and telephone wires. Do not overlook the fact that the source of all this energy comes from either heat or cold. The varying temperatures cause the air to move. But what of that violin? It's still doing nothing - not a sound. Where is that air tone? There is not a sign of it - for that violin does not a thing. "Absurd," someone says. My reply, of course, is that it is absurd to say that a violin has air tone at all! Because that violin, its strings and fittings, do not one thing of their own. All that is produced is caused by energy from an outside source. Until a player takes that violin and performs on it, it does not one thing of its own. Sounds absurd, but it's actually a fact that makers and players are making the really absurd remarks about what they have never studied properly or really understood.

Now the player is applying the bow to the strings. There is a very slight forephase before the strings are set vibrating, then another time lag before the body and fittings are set vibrating, another time lag before the air within the violin is vibrating. This build-up of body, strings and air vibrations within and outside the violin, has been called resonance (resound). Attention is also drawn to the fact that vibrations include all surfaces, both inside as well as outside the instrument.

As the air within is set vibrating it is easy to prove that the air within the violin must connect with the air outside. To prove this, cover up both sound holes. Dr. Saunders has mentioned that there could be interference sound waves. The closing of the sound holes gives a sad example of interference. But try it out yourself, using plastic adhesive tape to cover the sound holes. Now use the plastic adhesive tape and half-close the G string side of the sound hole. There is a very slight loss of tone power. Then totally close the same sound hole. The G string increases in volume and the every other string suffers loss of volume and quality as well as other notes on the G. string. Now include half closing the sound hole on the E string side - a loss of volume and tone all over. A total closing of that hole. The whole volume and quality is badly muffled. The experimenters who blow across the sound holes merely set the air vibrating in a similar way to a flutist blowing across the embouchure of a flute. Actually, it is the player transmitting energy to set the air vibrating in both cases, also the quantity of air either within the flute or the violin is favourable to vibrations of a particular wave length and frequency. As the fingering of a flute varies, the semi-enclosed air capacity, it also alters the response to to a particularly required note. Any other note attempted would suffer by interference. Also the body does not vibrate with equal intensity on all notes but is favourable to a particular note. You know that by tapping the made up instrument. To a lesser degree also the harmonies closely associated with the body vibration pitch get some help here. Again, the air capacity within may not be favourable to the vibrating body that favours a certain note of a particular frequency.

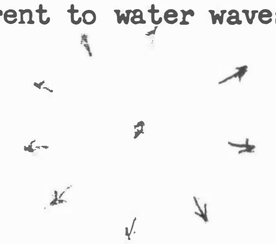
Regarding wood density and micro-tuning, to get even density one just cannot do it because pine has a hard grain and a soft grain. Therefore it cannot be microscopic density tuned.

Human Ear and Sound Holes

The closing of the sound holes acts in a similar manner to the Eustachian tubes which connect with the back of the throat and supplies air to the inside of the drum of each outer ear. The reason for this is to equalize the air pressure so the air presses with equal weight on both sides of the ear drum. If the Eustachian tubes get blocked, hearing is affected and deafness may result and the ear drums may burst if the pressure of air on the inner side is blocked or restricted. Although a violin would not suffer mechanically with the closing of the sound holes, it would not be of much use as a musical instrument. The size of the sound holes certainly affects the production of musical tone.

Sound waves are different to water waves.

No. 1
from source



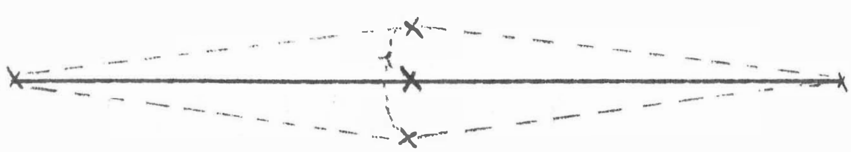
Sound waves travel
in all directions

also up and down

Water waves driven by the wind.

Wind source **Direction in movement** →
Here

Waves at sea travel in the same direction as the wind that drives them.

String  **String**

Pluck the string at a central place marked
Pull it to "A", let it swing across to "B", then back to "A".
That is a complete vibration, forming a sound wave or sound cycle. If a violin is tuned with "A" at 440, means 440 cycles per second. The number of cycles per second is called the frequency.

Arthur Johnston,
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Karorie, Wellington,
New Zealand.