FoMRHI Quarterly

BULLETIN 95
Bulletin Supplement
Membership List

PLANS
Technical drawings of musical instruments - Museum of Fine Arts, Boston

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FELLOWSHIP OF MAKERS AND RESEARCHERS OF HISTORICAL INSTRUMENTS
Honorary Secretary: Jeremy Montagu, 171 Iffley Road, Oxford OX4 1EL, U. K.
Some apologies are called for. We were very late last quarter, and there was no Bulletin Supplement, because Eph was badly ill. He did an heroic job getting the Q out as rapidly as he did, and I gathered from Yvonne that it was quite a struggle for him.

This Q is going to be a bit late, too, because I’ve been badly embroiled in London where my mother is in hospital after a stroke, so if this Bull and anything else, including the List of Members, is even scattier than usual, my apologies – my mind is not wholly on the job.

Most seriously, Barbara says ‘I’ve had a hell of a lot of members saying, correctly, that they’ve paid but been sent a renewals reminder instead of the Jan Q, including quite a number whom we agreed were clear for 99. Anyway, if not too late is it possible to put an apology into the April Q to all those who made a special effort to tell me they had already paid...’ As you see, it was possible and we do apologise. The lists of those who have renewed circulate between us: Barbara and I exchange lists of those whom we think are clear, dispute some of them and eventually produce an agreed list which then goes to Eph; Barbara sends me lists of renewals every while, and I mark them all up on my lists and send them on to Eph. Between the three of us it is unfortunately very easy to lose a list or to forget to mark some up, and so on, especially easy if it coincides with illness or other emergency (so do please make sure you are OK in the List of Members!), and especially when some of it has come by email and some by snailmail. We do try, but sometimes we do let you down. I have a nasty feeling that we are getting less efficient as time goes on and we all get older, but the remedy for that is in your own hands – we’ve been very lazy about elections but anyone is entitled to call for them.

And last to Charles Stroom for not crediting him on the Index with the last Q. You have received the first half of his Index to all our Qs; the second half, the Permuted Index, which I find much the most useful, I hope you will receive with this Q. With both his name should appear as their author, inventor, and originator who has been generous enough to allow us to reproduce them for you all, free, gratis and for nothing. I have been grateful to him for years, for he has sent me copies of them, and now you can all join me in these thanks.

LIST OF MEMBERS: The new List comes with this Q. Use it, please. Check it, please. See if your entry is correct and if it isn’t, tell me. I do seem to have produced a fair crop of errors recently, what with putting one member’s name backwards and spelling another one wrong (and she a friend for many years, and worse, reviewing a book that she had edited and even with the book in front of me still getting it wrong), so abject apologies to Florence Getreau, who has two ‘e’s in both her names, not just the first one.

Like most non-Iberians, I find Spanish names difficult – it’s usually the penultimate name which matters, not the last; I hope all are OK here, but let me know if not.

I did ask a Dutch man who assured me that alphabetisation is by name, not by Van nor Van der and that it’s Forename van Surname, but Van Surname when alone without the forename. I hope that this applies in German also; again correction is welcome.

Two helpful bits of information which arrived this quarter. Jaume Bosser says that all Spanish phone (and fax) numbers have acquired an extra digit. After the country code (+34) insert a 9 before the city code, so whereas Barcelona was +34-3-.... it is now +34-93-.... I have done this to most of the numbers of our Spanish members herewith, but it did not seem to work quite like that with some of them so you may have to experiment.

And Stefano Vezzani produced similar news from Italy, save that there it is a zero, so his number is +39 (for Italy) 0 522 436151.
Even more chaos is due with London’s phone numbers soon, but we’ll wait till we get there for that one.

Only one member commented on websites in the List of Members; he would like to see them, or at least the note ‘web’ to show that one exists. However, I have decided to be lazy and leave them out, partly I must confess because I don’t seem to have adequate notes for who has them and who hasn’t. Any of you who agree with Julian Goodacre can send me email notes between now and July and if there’s strong enough feeling I’ll do a supplement then, either just with ‘www’ which seems the easiest coding or with the address (but do give me the address – don’t rely on my memory) as the majority prefer. Incidentally there was an error in my listing of his site in the last Q. There should have been no dot between goodacre and pipes; correct to: www.goodacrepipes.mcmail.com

FURTHER TO: Comm.1615 on casting mouthpieces. The final stage, ‘no. 7, ready to drill out the bore and back bore’ is not quite as simple as John Downing suggests by saying that. The exact profile of the back bore is vital for tuning and response, as are the diameter of the ‘grain’, the hole at the base of the cup, and the corner where the base of the cup turns into the bore. When Phil Parker copied Joe Wheeler’s Pace F-trumpet mouthpiece for me, he took just a hair, literally half the diameter of a human hair, of that corner and the whole response of the mouthpieces, original and copy, were different; he had to make me a new one. The diameter of the grain and the shape of the backbore are critical for tuning and pitch and they need to be as carefully measured and reproduced as the bore of any woodwind instrument. Maybe Arnold Myers or Bob Barclay would write us a Comm on this – they know far more about it than I do.

Comm.1618 on computer generated plans: I hope that others of our plan-drawing members will take this up. It seems a very exciting development and one with great potential.

COMMUNICATIONS: Using the word in its non-specific to FoMRHI sense. Many of us are a bit leery at present about opening attachments and using floppy discs that we’ve been sent because of the prevalence of viruses. Anyway, in my experience as an incompetently computerate person, most attachments fail to work. Anything sent as plain ASCII text emails comes through fine, even if one has to spend a little time formatting for paragraphs etc, and any special needs can always be indicated by adding [italic] or more conventionally by _putting an underline before and after_ the words italicised, and accents dealt with by adding [first e acute, second grave], and so on.

E-mail needs some care, too. Some of us had a lot of trouble getting emails to Barbara because first her program put an extra three letters into her address which then made any replies bounce, and then after that was sorted out put an intrusive dot between her name and the @, and this also automatically bounced messages sent by using the Reply feature. Some email providers do seem to do funny things to their own programs! The dot in the wrong place is always one to watch out for, partly because it’s all-but invisible.

Other Societies: Julian Goodacre asks me to draw your attention to the Lowland and Border Pipers’ Society and their website www.netreal.co.uk/lbps He also sent me an interesting article about his English pipes from Piping Notes no.6, Autumn 1998. Like me, with mediaeval percussion, the revival of English pipes leans heavily on iconography, but there is plenty of it; far more types of bagpipes appear on corbels and misericords than anyone has yet had time to recreate.

Bernhard Folkestad tells me that Mumharp 2 is well underway (see p.5 of the last Bull for details).
Exhibitions: Florence Gétreau is "preparing a temporary exhibition and a book on a special type of bagpipe: the Chabrettes from Limousin (already described in Mersenne). The title is: "Souffler, c'est jouer: chabretaires et cornemuses à miroirs en Limousin". Musée national des Arts et Traditions populaires (Paris), 14 avril-30 août 1999; Saint-Yrieix-la-Perche (Haute-Vienne) 12 septembre-30 octobre 1999. We are working day and night to be in time. Instruments are coming from Stockholm, London, Morpeth, The Hague, several museums in France, and plenty of descendants of folk musicians."

David Freeman writes that the exhibition in the new building of the Prague Museum of Musical Instruments is not expected to be open for at least another year but that there will be an exhibition of keyboard instruments in the main Národní Muzeum at the top of Wenceslas Square, opening this month in connexion with the UNESCO 300th Anniversary of the Invention of the Fortepiano. This anniversary was instigated by the Dolní Lukavice Haydn Festival, the Czech Ministry of Foreign Affairs, and the Ministry of Culture. Support has come from UNESCO and a local bank and this has enabled some instruments to be restored cosmetically and others to playing order. It is hoped that there will be a small series of concerts as well as a CD. Further information should be available from the Museum's new Director, Dr Markéta Hallová, Muzeum Bedicha Smetany, Novotného lávka 1, Praha 1, 11000, Czech Republic; +420-2-24229075.

Publications: Editions BIM (POBox 576, CH-1630 Bulle 1, Switzerland) has acquired The Brass Press, who publish the English translation of Altenburg Trumpeters' and Kettledrummers' Art (1795) and facsimile and English translation of Fantini Method for Playing the Trumpet (1638) as well as many other works and much music.

Edinburgh University Collection of Historic Musical Instruments has just published a Portfolio of Drawings of Mouthpieces for Brass Instruments. The drawings have been drafted by Raymond Parks and the accompanying pictures are from photographs by Antonia Reeve. Arnold Myers writes: "Mouthpieces are every bit as important to brass players as the rest of their instrument, yet we believe this is the first time that a systematic series of technical drawings of mouthpieces has been published. The 44 mouthpieces have been selected from the Collection's holdings by the following criteria: Importance as good examples of historic mouthpieces for copying or for study; Reliability of provenance or association with particular instruments; and Condition. The drawings are provided on acetate sheets for ease of comparison by overlaying. They are also provided on diskette as CompuServe GIF files for further use. The drawings show only the interior of the mouthpieces. Information about the exteriors is provided by the accompanying pictures. Full details with thumbprint pictures are at: http://www.music.ed.ac.uk/euchmi/uwrahmw.html. Arnold also says: "We have just posted the report of last year's work at the Edinburgh University Collection of Historic Musical Instruments at: http://www.music.ed.ac.uk/euchmi/ura98.html. It is, for the first time, an illustrated annual report.

Courses & Conferences: David Freeman has sent me details of several courses in the Czech Republic: an International Summer School of Early Music in Valtice, South Moravia, with all the usual subjects taught by a variety of well-known international figures, including Andrea von Ramm, Poppy Holden, Nancy Hadden, and others, and another in Bechyn taught by Florilegium, Peter Holstlag, and others. Unfortunately the 'book before' dates are long past, but if you'd be interested in such courses in the future (they're all reasonably priced and in interesting places one doesn't normally get to, and above all the Czechs are very anxious for contacts with musicians from elsewhere), do get in touch with David (in the List of Members) and get him to tell you of such things in good time. Maybe next time he'll tell me far enough ahead, too. The NEMA Conference in York on Early Baroque, 2-4 July 1999, has now got a fairly firm programme with a number of FoMRHI members speaking (Bruce Haynes, Jan Bouterse, Eph
Segerman, Dominic Gwynn, Peter Holman, me, to take us in order of appearance) as well as others (some of them even more distinguished than us!) and it looks like a really good programme and well worth coming to if you have any interest in music and instruments of the first two-thirds or so of the 17th century. Also several concerts. More details and booking forms from York Early Music Festival, PO Box 226, York YO30 5ZU.

The Council for the Care of Churches – Diocesan Organ Advisers, the British Institute of Organ Studies, and the Institute of British Organ Builders have organised a conference on Ethics and Conservation of the Organ, 23-26 August 1999, at St George’s Hotel, Liverpool. They say: “The important area of conservation has become increasingly prominent in recent years. Ethics and Organ Conservation will give us an opportunity to stand back from the organ loft and work-bench and consider the questions and thoughts which should be the basis of any organ conservation scheme. Speakers from the UK, Sweden, the USA and conservators from the Liverpool Conservation Centre will present a wide-ranging, provocative and challenging programme.” Details and booking form from Wendy Ward, Council for the Care of Churches, Fielden House, 13 Little College Street, London SW1P 3SH, tel: +44(0)171 222 3793, fax: +44(0)171 222 3794, email: wendy.ward@c-of-e.org.uk

There are, as usual, the Corsi di Musica Antica a Magnano, directed by Bernard Brauchli, this year 19-29 August, on 16th-18th century keyboard music, organology, organ building, and choir. Details from Via Roma 48, I-13887 Magnano (BI), Italy, tel: +39-015 679260 or +41-21 728 5976, fax: +39-015 679260 or +41-21 728 7056, or bbrauchli@worldcom.ch

Susan Brauchli and Christoph Coin are calling for papers on all aspects of the historical viol in Italy, including repertoire, social role, construction, stringing, etc, for the International Symposium on the Italian Viola da Gamba, 29 April to 1 May, 2000. Same address, phone, fax, and email.

The Suffolk Villages Festival is from 27 to 30 August and includes concerts in Stoke by Nayland, Boxford and Little Cornard, the last a Haydn opera, all directed by Peter Holman. Details from 119 Maldon Road, Colchester C03 3AX, tel 01206-543417, fax -562072, peter@parley.org.uk

And finally, don’t forget the Early Instrument Exhibition at the Royal College of Music, 29-31 October. I’ll be there and will be glad to see any of you; I don’t think Barbara is exhibiting this year and I’ve not heard whether Eph is. You’ll be able to renew your subs, too. I gather the final date for booking stands is not till 27 August, so anyone who wants to exhibit can still get on to the Early Music Shop, 38 Manningham Lane, Bradford BD1 3EA, tel 01274 393753, fax -200045, sales@earlyms.demon.co.uk

Museums: The new director of the Musée de la Musique in Paris is Frédéric Dassas.

As noted above, the Prague Museum also has a new Director, Dr Markéta Hallová.

Darcy Kuronen writes that The Museum of Fine Arts, Boston, is pleased to announce the availability of four new, full-scale, technical drawings of early oboes from its collection of musical instruments. Based primarily on measurements taken by various examiners over the past twenty-five years (including Friedrich von Huene, Jonathan Bosworth, Mary Kirkpatrick, Bruce Haynes, and Cecil Adkins), the drawings were beautifully rendered for publication by local draftsman Stephen Korbet. The new drawings are of the following instruments: (1) Wolfgang Kenigsperrger, Germany (Roding), about 1725-1750, pearwood with three brass keys, (2) Unknown maker, possibly England, first half of 18th century, ivory with three silver-plated keys, (3) William Milhouse, England (London), about 1789-1815, boxwood with two original silver keys and added low C-sharp key, (4) Andrea Fornari, Italy (Venice), 1815, ebony with ivory mounts and two ivory keys. During the coming year the Museum also hopes to complete drawings of oboes in its collection by Bizey, Astor, and Kusder. Darcy has sent me a complete list of all their plans available at present, with prices, etc, which appears elsewhere in this Q.
Queries: Anthony Elmsly writes: “I would like to avoid in conservation, retouching mediums that are alcohol based. I have been doing some work with dammar in white spirit, have used “Soluvar” (white spirit soluble and re-soluble). (I have rejected mastic and colophony). The non-interference of such mediums with pretty much any existing varnish is to my mind desirable. However, their softness, and control of surface texture I find less than ideal. Where a substantial thickness is sought, such as where there are full depth voids in a very thick varnish, these mediums do not perform very well. MC-wax over a colour layer is also a possibility as an aesthetic measure, where depth without hardness may be satisfactory, but again the surface texture is a problem, transparency problematic, and the extreme softness means any surface that has been created is gone with the slightest touch. I would like to hear any practical suggestions on this topic; any ideas for a hard drying medium, that can be built to some depth, the surface texture of which can be manipulated, including being made to appear like hard polished varnishes, with good reversibility characteristics in weaker solvents at least than alcohol and acetone.”

Beresford King-Smith wrote: “Midlands Early Music Forum was recently given an instrument which was described as ‘an extremely large viola’. On close examination, it appears to have the body of a Quinton. The body is well-made, probably 19th century (Markneukirchen?); the neck appears to be much later and rather crude attempt to turn the instrument into a viola. Is there someone out there who might like to attempt a restoration? – no reasonable offer refused from a bona fide restorer. Contact Beresford King-Smith, 8 South Parade, Sutton Coldfield, West Midlands B72 1QY.” JM adds that if it’s 19th century Markneukirchen it’s hardly likely to be a quinton, and Beresford wrote a second time saying that “Catherine Mackintosh has inspected the instrument closely; she believes that it may have been built as a viola d’amore and later changed into a viola; there is some evidence of where the sympathetic strings may have been. This, of course, would widen the scope for possible restoration and subsequent use.”

Coda: That seems to be it, though I’ll hold this open till I’ve done the List of Members. If I’ve omitted anything you have sent me, renewed apologies and please send it again for July.

Deadline for next Bull: Let’s say 5th July, immediately after the NEMA Conference in York, and hope that things are more settled by then.

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BULLETIN SUPPLEMENT

Opinions about history and historical evidence

Ephraim Segerman

Here we go again! In two Comms in this Q, I criticise Smith for expressing an opinion about history (in his two Comms in the last Q) just because one little piece of historical evidence is against it. In doing this I am committing two sins, considered distasteful by many. One is that it is poor manners (in England especially) to criticise anyone publicly because that is hurtful. The 'proper' approach is not to say that the other person's position is wrong, but just to say how one's own position is better. Making it seem like it is only a matter of opinion will preserve the feelings of the sensitive author, but isn't it more important to state the issue of right and wrong clearly to the reading public (some of whom may have not thought about it in these terms before)? When a person states his views on a public platform, seeking the agreement of others, he should be robust enough to take disagreement if it comes.

The other sin is that I am apparently trying to inhibit him from stating his opinions, which should be his right in any democratic society. We all believe in freedom, but with every freedom should be the responsible use of it because of respect for social values. One should not feel free to yell "fire" in a crowded room, nor should we feel free to make racist or sexist or similar remarks in public. In FoMRHI, we are concerned with musical instrument history. We all agree that the way to discover it is by historical scholarship, and that historical scholarship depends on theories that explain the historical evidence. Except for post-modernists who believe that there is no truth, only subjective beliefs about truth, we also all agree, in principle, that historical scholarship should be objective.

What many are not clear about is whether strict accountability in explaining all of evidence by a theory is necessary for the theory to be objectively vailable. Strict accountability is not necessary for a working hypothesis that one considers most probable while collecting evidence. But to maintain objectivity, when just one piece of evidence that cannot be reasonably explained from within the theory shows up, that should force that theory to be rejected and replaced by a modified or different theory that does not suffer from having such contrary evidence. Otherwise one could always reject the evidence against any theory we want to hold on to, and the process becomes hopelessly subjective.

I am not saying that one should not publicly express opinions about history. Speculation when there is no contrary evidence is very constructive. If one is not on top of all of the relevant evidence, floating an idea, seeing whether contrary evidence will show up, can also be very constructive. If one has an opinion and knows about contrary evidence, one can rightly ask publicly for help in getting rid of the contradiction between the opinion and that evidence. That help can be in modifying the opinion (hopefully preserving its essence), or in thinking of a reasonable explanation for that contrary evidence, or in finding new evidence that makes an unlikely explanation for the contrary evidence much more reasonable. My point is that publicly trying to get support for an historical opinion, when one knows about contrary evidence which one chooses to ignore or reject, is inconsistent with accepting the principle of objectivity in historical scholarship, and is only consistent with a post-modernist philosophy of cynicism about truth.

In most walks of life, especially in the arts or crafts (like being a musician or an instrument maker), having confidence in one's judgement, even though it might break a rule or two, is not only acceptable, but it is often an important contribution to success. Why not here? It is because the rules that one breaks in the arts and crafts are those of common expected practice, which will change slowly with time as a result of successes made while breaking them. In historical scholarship, objectivity is a matter of principle, not of fashion.

Reactionary attitudes to music history and new historical scholarship

The musicologists are convinced that whatever is generally knowable about the history of music is known, that the remaining big mysteries are unknowable, and that all they can do today is to sort out little mysteries and to fill in details. This conviction will usually be widespread in any field where there have been no radical reappraisals for some time. Consequently, the musicologists would be resistant to a theory that sorts out a long-standing big mystery in music history. The particular mystery I am concerned with here is interpreting the evidence on tempo. There would have been no
mystery if they could have believed the evidence. But that would have required the admission that what sounds 'right' to modern musicologists can be different from what sounded 'right' centuries ago. So a theory that accepts and makes historical sense out the evidence would not be popular, and very few musicologists would consider pursuing such an enquiry. But if someone actually did this, a professional musicologist editor would probably still publish the theory if it was backed by good scholarship. A professional musicologist cares about, and can usually tell the difference between, good and bad scholarship.

So *Early Music* published my history of tempo standards in 1996, in spite of the musicologists finding the conclusions quite unpalatable.

The musicians also have the impression that whatever is generally knowable about the history of music and their instruments is known, that the remaining mysteries are unknowable, and their concern is to make what is known into living music. They explore musical interpretations, and explore history only to expand repertoire and to get fuller stories for programme notes. Historical scholarship would become subversive if the results could change what is considered to be historically appropriate. This could threaten their investment into instruments and skill development, and the authority of teachers who pass on the knowledge and of performances and recordings that claim historical accuracy. Such scholarship would rarely be contemplated, but if someone did it, he or she could have difficulty in getting it published, especially in journals of organisations devoted to specific instruments. These organisations are run by musicians, makers and instrument teachers who are amateur musicologists. As with the professional musicologists, they are resistant to any study that suggests significant changes in the accepted picture of history. But they care much less about the difference between good and bad scholarship.

So the editor and his three 'peer reviewers' of the Lute Society's journal *The Lute* unanimously decided not to publish an article that I submitted that relates original nominal tuning pitches and size names of lutes with their actual sizes. They made it clear to me that no possible revision could make it acceptable. The reason given for rejection was 'there were elements in it which were too contentious for a publication which is only annual'. And, of course, it is 'rather too heavy going for *Lute News*, which comes out several times a year. The policy of publishing lute scholarship in *The Lute* that only builds on and doesn't challenge received knowledge is a most reactionary view of what scholarship is about. Publication in *FoMRHIQ* was suggested. They apparently believe that this is the appropriate place for publishing wild scholarship that musicians need not take notice of.

I agree with Jeremy (Bull 94) that it is best to publish an article in a journal whose readership is most concerned about its subject. Those most concerned with this subject would be lute players and musicologists concerned with music involving the lute. *FoMRHIQ* is not the right place for it, especially since the basic theory behind it appeared here in Comm. 632, with data given in Comm. 1545 and 1593 and some of the specifically lute applications have appeared here in Commns 867 and 1592.

That rejection was a great disappointment to me. Wondering what original lutes were like was what originally led me into studying the physics and history of strings and the history of pitch standards. For the information of readers, following is a summary of that paper:

**SUMMARY:** New ideas on how nominal pitches, size names and actual sizes of early lutes related

The types of evidence on early lute sizes are surveyed and compared. This paper offers a theoretical way of deducing pitch ranges from sizes, or size ranges from pitches. It is based on the judgement of Praetorius's lute player concerning the shortest acceptable life of the highest gut string and the most unfocussed and still acceptable sound on the lowest gut string. A theory of string stresses and inharmonicity allows extrapolation of these range limits to lutes of other sizes and pitches. The limits of string stop are given in a table for each upper and lower open-string pitch limit.

A prediction of this theory is that an open-string range of 2 octaves and a fifth was unlikely for lutes much smaller than the one Praetorius depicted. The string-stop ranges of lutes with an open-string range of 2 octaves and a fourth are listed for the size names and nominal pitches given by Praetorius, and it is suggested that these could be an objective basis for identifying the pitches and size names of the many surviving Renaissance lutes with up to nine courses.
With baroque lutes, the reason is sought for why two tunings given by Mersenne and two different tunings given later in the Burwell tutor were called by the names ‘B flat’ and ‘B natural’ (or ‘B sharp’). These four included the most popular tunings in the 17th century. In one of these tunings, as used in a Bodleian ms of mixed ensemble music, the actual pitch of the first course agrees with the name.

It is suggested that all of these tunings could have acquired their names because they were developed on lutes that were of the appropriate size to have these first-course pitches. It is argued that if those pitches were those just below middle c, the lutes would be too large to effectively play the repertoire, so they most probably were an octave higher. This results in their being of small treble size (about 50 cm string stop).

Lutes of such small size could well have been common in the 17th century, but then very few would have survived because they had no musical use in the 19th century after conversion to mandoras in the 18th. That Mace’s 12-course lute was one of them is argued from some of his evidence, plus a comparison with the 12-course lute tuned a tone lower that was measured in the Talbot ms.

**Terraced tempi**

Most who are concerned with the interpretation of late Renaissance and early baroque music are aware of the evidence for terraced dynamics. What they are much less aware of is that there is similar evidence for terraced tempi in the early baroque music influenced by Italian madrigals. Some of it is in the above-mentioned papers on the history of tempi.

**A stringing for an Irish harp**

I have been asked to provide brass strings for a harp modelled on the Queen Mary harp. I read off the vibrating string lengths for that harp from Downing’s Comm. 1112 Plot 1, and did a linear scaling adjustment to his figures to fit the longest and shortest string lengths of the particular instrument being strung. It seems to me that the Queen Mary harp can be considered to be like the Praetorius Irish harp but without its lowest octave, and without most of the chromatic notes. With 29 strings in a range of 2 octaves and a third (diatonic c to e’’’ with 5 dispersed additional chromatics on b’s and f’s), I used the power law as described in Comm.1418 for stringing design. For constant tension, as Downing prescribes, p = 0 and the thinnest string would be about 2/3 the diameter of the thickest. At p = about 0.3, as in harpsichords, the thinnest string is about half the diameter of the thickest, with a tension of about half that of the thickest.

I prefer the latter because I know of no historical precedents for equal-tension stringing (p = 0) on instruments with varying string lengths, and several historical precedents for p greater than 0 on such instruments, with p = about 0.3 on metal-strung keyboards and p = about 0.6 on gut-strung harps. The p of the power law is an excellent parameter for exerting judgement in stringing such instruments, and my choice of p = 0.3 was a compromise between expecting similar acoustics as with the gut-strung harp and taking into account Downing’s reported success in his stringing.

For this instrument, I had Downing’s measurements giving the lengths of each string. If I had a future stringing request for an instrument when such information was not available, I wondered about what would be the minimum number of string lengths I could ask for to be able to reconstruct the lengths of all the other strings. With these lengths, an assumed p, and a single string diameter that works, all of the other diameters can be calculated. Fitting a cubic equation to four evenly-spaced string-length measurements (including the longest and shortest) seemed a reasonable possibility, so I checked out how good such a fit would be on Downing’s measurements. The worst mismatch was 8 mm. For greater accuracy, I fitted a quartic equation to five lengths. The worst mismatch was 5 mm. I would think that this is good enough to do a power-law string-design job with.

I would be glad to do such stringing design calculations for anyone who asks (no string purchases required).
Flute (1 key)  $30.00
Marked: Chevalier, France, about 1700
Accession no. 17.1846
Measured by Catherine Folkers, 1983; drawn by Stephen Korbet, 1995

Flute (6 keys)  $30.00
Caleb Gedney, London, 1769
Accession no. 1983.330
Measured by Timothy Burnett, 1986; drawn by Stephen Korbet, 1993

Tenor recorder (voice flute)  $20.00
John Neale, Dublin, about 1730
Accession no. 17.1804
Measured and drawn by Catherine Folkers and Rob Turner, 1984

Oboe  $30.00
Johann Wolfgang Kenigsperger, Roding, Germany, about 1725
Accession no. 17.1908

Oboe  $30.00
Unknown maker, Possibly England, first half of 18th century
Accession no. 17.1905

Oboe  $30.00
William Milhouse, London, about 1800
Accession no. 17.1909

Oboe  $30.00
Andrea Fornari, Venice, 1815
Accession no. 17.1906
Measured by Cecil Adkins, 1989; drawn by Stephen Korbet, 1998

Straight trumpet (salpinx?)  *see below
Greece, about 1st century B.C.
Accession no. 37.301
Measured by Mary Kirkpatrick; drawn by R. K. Lee, 1978

Harp  $35.00
Unknown maker, Germany, about 1700
Accession no. 17.1785
English guitar
Lucas, London, 18th century
Accession no. 17.1746
Measured and drawn by J. Donald Warnock, 1970

$20.00

Division viola da gamba
After various instruments in the MFA collection
Designed by J. Donald Warnock, 1967; drawn by Paul B. Martin, 1968
Includes a twelve-page assembly manual written by Donald Warnock

$30.00

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Accession no. 17.1796
Measured and drawn by Edward Turner, 1983

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Johann Christoph Georg Schiedmayer, Neustadt an der Aisch, 1796
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Measured and drawn by John Koster, 1983

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Double-manual harpsichord
Joseph-Joannes Couchet (Antwerp, 1680) with alterations and additions by
François-Etienne Blanchet I (Paris, 1758) and Pascal Taskin (Paris, 1781)
Accession no. 1977.54
Measured and drawn by John Koster, 1983

$95.00

Double-manual harpsichord
Henri Hemsch, Paris, probably 1736
Accession no. 1981.747
Measured and drawn by R. K. Lee, 1976

*see below

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*These drawings are not sold by the Museum, but can be purchased directly from Mr. R. K. Lee, 353 School Street, Watertown, MA, 02172.

December, 1998
The subtitle is *Carvings of Musicians in Medieval English Churches*. Carvings, in wood and stone, provided clouds of angels to praise God in Heaven, in sympathy with humans doing the same beneath. As mentioned in the Bible, they praise with music, in the way that was understood at the time. Carvings appear less frequently on the outsides of churches. They also appear, but less formally, on chuch furnishings such as bench ends and the backs of seats in choir stalls. For us, church carvings are a major source of evidence about musical instruments used at that time. They tell us much about instrument shapes and sizes, how they were held, and often how the sound was produced when played.

For many years, the Californian bacteriologist Robert Nicewonger and his music-librarian wife Harriet travelled throughout England in their spare time, finding these carvings, which Harriet recorded quite thoroughly and Robert photographed. The resulting archive of notes and photographs is probably the most comprehensive on this subject that has been assembled. After Robert’s death, Ann Basart, the publisher, asked the Montagus to write a text to go with the photographs. They did much more, providing a comprehensive handbook on the subject. From a researcher’s point of view, the centrepiece of this book is Chapter 10, entitled ‘Gazetteer’. It lists all of the reported carvings of musicians alphabetically by place name. For each place name is given the county and the names of the churches that have the carvings. For each church is a summary of its history which leads to dating of the carvings, a list of the instruments depicted, and where on the building they are located. The previous chapter called ‘Terminology of Church Architecture’ explains the terms used in locating the carvings. The chapter before that entitled ‘Styles & Times’ outlines the history of church building that helps in the dating. Following the ‘Gazetteer’ is an alphabetical ‘Index of Instruments Noted in the Gazetteer’, a ‘Bibliography’, a ‘Chronological Index’, and a normal general ‘Index’.

Before all this very useful scholarly stuff is the seven chapters reproducing 124 of Robert Nicewonger’s black and white photographs and the Montagu’s explanations of the carvings and of the instruments. By comparison with the number of instruments observed by the Nicewongers listed in the Gazetteer, the plates reproduced in the book represent about a quarter of the carvings in the archive. It seems that the selection made by the Montagus is quite representative of all of the types of instruments in the carvings.

The quality of the plates reproduced is very variable, with many seriously out of focus. From a research point of view, this does not matter, since there appear to be no details about the instruments that are lost by poor focus. But this will somewhat devalue this book as one for casual perusal just to enjoy the pretty pictures. The quality of the printing, paper and layout would otherwise qualify it as a coffee-table book.

The text written by the Montagus is as we would expect from them, very clearly written, full of interesting information and thoroughly competent. Of course, I have quibbles, but they are minor ones. Perhaps the Montagus would reconsider their statement that ‘the bow crosses the strings at an impossible angle’ (concerning plate 23) when they read my Comm. in this Q on multiple-string bowing, and try moving a bow at such an angle across the strings in a motion that is perpendicular to them. And just because the wider part of the body of a gittern in plate 84 is shorter than usual, and so might remind an ethnomusicologist of a small Turkish saz, and Tinctoris happened to mention that instrument, I think that it is not wise to even suggest a possible influence of it in medieval English iconography because there is no evidence of its use in Europe at the time. It is explained much more simply in terms of shape variation.

In short, this is a great book, and I would not be without it.
Bouwerskontakt Bouwbrief 92, My Summary

BB-92 has a slightly different format from the previous issues. There is an article from the Bouwerskontakt organisation explaining that its relation with the LOAM (no clue what that stands for) has been changed due to financial problems and that therefore the editing of the BB is now (again) in their own hands (was done by/with LOAM).

In an article by John Boersma, the organ maker Kristian Wegscheider (Dresden) is interviewed. KW is very much interested by the Silbermann organs and KW's vision on the sound and craftsmanship of Silbermann is discussed. The article has many interesting remarks (but I am not an organ man myself).

Another organ aspect gets much attention in an article by Wim Krijger on the air supply by means of motorised bellows. The difficulties to obtain a smooth continuous pressure when the bellows are pushed and pulled are described, with very good working drawings. Several experiments are described to understand the pulse in pressure and how to reduce it. Finally, drawings of a working wind supply unit are given.

Several reviews are included, covering: Technik und Geschichte der Intarsia (1891), Christian Scherer; Anleitung zum Einlegen der Metalle in Holz (1889), I. Matthias; The journal Instrumentenbau, # 5/6-1998; Instrumentenbau Report 26 (covering woodwind in schools); Houtdraaien (wood turning), 1998, G. Bockelmann.

The active group of organ builders has regular meeting days during the year and in a 1 page report of such a day on 14 November 1998, the Baldachin organ (a special type of table positive) was central point of discussion.

A new group (woodwind makers) is being announced, they will meet for the first time in April 1999.

A rather basic article on the characteristics and origins of various oils, greases and graphite is given, but it does not go into much useful details.

The BB is finishing with a very interesting article on the properties of various hot glues by a member of the working group for string instruments. Many conclusions are presented, backed up by experimental evidence on the strength and open time, as function of temperature. One of its conclusions is that keeping hot glue at near 100 deg.C for as long as 6 hours, does not affect the ultimate bonding strength, but it increases the open time up to 15 min (which could come in very handy) and the required clamping time. Furthermore, some recipes and experiments with lacquer formulations are described.

All in all, an interesting issue (which is, in my view, not always the case).
PERIOD INSTRUMENT PERFORMANCE IN THE CZECH REPUBLIC

Ten Years After The Velvet Revolution... Progress?
(OR - The Stunted Oak Tree! see Comm. No. 1026, April 1991)

The start...
The first organised course in instrument making was held in Prague in August 89 with Barbara Stanley and Alec Loretto, shortly before the so called 'Velvet Revolution' - not long after that, one of the first of a long series of interpretation course was held in Prague with Catherine Mackintosh. This first course (and the following courses in making) out of which so much which, was held in memory of Nancy Brien, who had the original dream of helping makers here in this way. Where did this lead and what has been achieved?

The Follow Up...
Several courses in making followed the first one in recorder and renaissance flute making, for instruments such as the harpsichord, gamba, lute and baroque oboe as well as several harpsichord voicing courses.
In a similar fashion, the interpretation courses continued for string players (both plucked and bowed), wind players and keyboard players. Many of these were organised by Modi Gaudio, who also introduced leading teachers to the Valtice Summer School, who up to then had very few teachers from abroad.
Following on the interest from these courses there were Early Music Festivals held in Prague from 1991 to 1994, which were based not only on wonderful concerts from many of Europe's leading performers, but also on a series of master classes and courses each year involving the majority of performers. Over fifty courses were held.
All these events were made possible by the generosity of the players and makers, the regular help of organisations such as The British Council and the Institut Francais, the City of Prague and companies such as ICL, Inexco Argosy, Shell and Živnostenská banka, as well as smaller contributions from many other companies, the Ministry of Culture helped mainly in the provision of halls under their control.

The Results...
Initially there was great interest from both makers, players and listeners.

The Makers: There has been considerable progress particularly in this area. There are now two good harpsichord makers, František Vyhnálek and Jiří Vykoukal, as well as one or two new ones just coming on the scene. The gamba maker Petr Vavrouš is now making a wide variety of excellent gambas that are sold both here and abroad as is the lute maker, Jiří Čepeláč. There are at least three other gamba makers, one of them, Pavel Cely, also making several types of instrument. Pavel Cip, in conjunction with the parent German company run by the Czech Peter Kobliczek, is making some excellent wooden school recorders (he also makes bagpipes of very high quality which are sold here and abroad). David Freeman makes renaissance flutes which are sold locally and in Poland. There are also one or two makers who produce one off wind instruments such as Vladimir Richter. Two bow makers, Jan Dejmal and Jiří Želba, are making and selling high quality bows both here and abroad. There are also several makers of small organs being built of high quality by makers such as Martin Poláček, Daniel Přib and Vladimir Slajch. There are some good makers of instrument cases too.
All in all, there has been steady progress and improvement, and seemingly a healthy growth.

The Players: Here the story is more mixed. Initially there was great interest in all areas from string, wind and keyboard players as well as from singers. This was followed by a similar growth of ensembles - mainly in the baroque field. Courses were well attended and the students enthusiastic. Some good players emerged in all these areas. Many of these courses were made possible by the encouragement of the Týnská škola, who started a church music school in the early days and are one of the few such organisations to still exist. They made their premises available in these early years and there was considerable co-operation between them and Modi Gaudio in organising courses of many types. They continue, separately now, to run courses with good teachers from other countries as well as promoting various concerts and early music projects - an exciting one this year will be a production of a baroque opera. In Brno there has been greater interest than in Prague at the academic level. Janáček Academy has held regular harpsichord classes - originally with the Czech player, Stanislav Heller, together with the young German player Barbara Willi. She now continues taching there on her own and has also developed links in other areas and presented some excellent courses. Also in Brno, Masaryk University started a small Early Music Academy under the German flautist, Andreas Kröper, where there have been again a wide variety of courses for flautists, keyboard players, string players (plucked and bowed), singers and recorder players. In Prague there has been less enthusiasm in spite of some excellent courses, an especially good series has been financed from Holland and organised by Hans van Lier, over the last two years. Some Acade
attending - but others from other areas have been quick to seize the opportunity of some excellent teaching. But here, as in other courses, there has been a slow but steady decline of interest that is very puzzling. Most of the earlier students have now turned professional and seem to feel they have no need of further tuition - maybe the temptation of earning money from concerts for tourists and recording a large number of CDs with local companies had proved too tempting? But it is sad to see the initial progress in many ways almost brought to a halt. Some recently planned courses for gamba, lute and fortepiano have also received almost no support and some have been cancelled.

These problems are well demonstrated by one or two professional Czech players from abroad who have returned to their homeland in the hope of making a living teaching period instruments, only to find their progress blocked and barred in a variety of ways and the interest from players very minimal. On the positive side, there are a few players who have studied in England, France, Holland, Belgium, Switzerland and Italy, and through determination and hard work (as well as the support of various organisations in many cases), have qualified as professional teachers and players. But they too are finding it hard to make a living here.

Never the less there is progress, as the recent Plzeň period performance of Dido & Aeneas shows. This was also performed at Prague's Stavovské theatre. Ten years ago this would have been impossible.

The Listeners - the Market: An even sadder story. Most of the Early Music Festivals have vanished from the scene when it was found that audiences were so small that it seemed a mis-use of sponsors support, or in the case of the purely commercial ones, that they were not so lucrative as hoped. Few remain of these originally specialist Period Instrument Festivals and they now incorporate Modern and Ethnic music in an attempt to draw audiences and sponsors.

I think one of the reasons for this was that a huge number of organisers thought they could organise their own festivals (i.e. more than one concert) with an 'International' label (i.e. one unknown 'foreign' performer). This caused the name 'festival' to become meaningless and similarly, the word 'international' became abused. The small amount of sponsorship was spread so thinly, that in the end it was not possible to continue. Bodies like the British Council and Institut Français (whose impact in this area of music has been huge) had slowly reduced budgets to work with, and this seems to have resulted in support mainly for the big commercial 'prestigious' events such as those held at the Prague Castle or in Prague itself. But thankfully, there is still support for the two main Summer Schools of Early Music held in Bechyně and Valtice.

The Prague Spring Festival also has now an even smaller number of concerts (around six or so each year for 99 and 2000) in spite of their popularity with audiences and reviewers over the last few years. 1996 was a wonderful year with sixteen concerts in the series, but since then, the organisers have progressively reduced the number, and it is an uphill battle to keep the remaining small number.

The Conclusions. One of the problems it seems to me has been the path from which many of these people have approached Period Instrument making and playing. In the rest of Europe one can possibly make a generalisation and say that the 'early music movement' developed from amateur enthusiasts and professionals who had a love for the music that exceeded their financial expectations. I think this is still true of many performers, who are more concerned with playing the music they have researched and love. But here in the Czech Republic, this new market was seen as a way of making a good financial living by many of the players. This has shown its face in a variety of ways, such as many rather substandard CDs and under rehearsed and over expensive (both the musicians fees and the ticket prices) concerts, also in many cases bad programme planning involving concerts that are not really attractive to audiences. Recording CDs is preferable to concerts, because it pays better! Another major problem is communication - or rather lack of it, and bad or non-existent publicity! Many times there are similar courses being run at the same time. When these involve foreign tutors and sponsorship, this is not only a waste of money, but also due to lack of publicity also a waste or everyone's time.

One of the things we have tried hard to encourage is the communication of courses and summer schools and early information on dates. Every few months, we try to put together information sheets and distribute these to Academies, Conservatoires, Music Libraries etc. Most of our own projects have been run in conjunction with two organisations (which does not necessarily mean that they do anything!) to try to strengthen their work and give an idea of co-ordinating projects to others. This has sometimes backfired when we have found that these organisations have been taking the credit for running the events - in the case of the festivals, even after they have ceased to exist!!! But as our work is done on a voluntary basis, we cannot always give free publicity for everyone at our own expense sadly!
We have just issued a Database of individuals, makers, players, teachers, teaching institutions, shops etc dealing with period instrument music. A total of around 500 names and (most of) their addresses. But only one ensemble bothered to send us a list of suitable people, and there have so far only been four requests for copies!! I think this shows the general feeling about communication quite well! It is also perhaps a good indicator of the attitude here, that the Prague Academy of Music has just voted to discontinue their so called 'Early Music Dept' (after hosting a series of nine four day courses from Holland). Apparently the board feel there is no need for this sort of teaching and that it is apparently "bad for the modern players..." They teach the harpsichord and organ, and that is sufficient!

The Future: ...? Well, there are three baroque opera projects taking place this year, in the National Theatre, at the Týnská škola as well as another in the regular series of annual Handel operas performed by Capella Accademica in the Dobříš stately home - so that is progress. But structured teaching is essential, and this is only possible if students go abroad - and that is only possible for a small handful. Meanwhile, and I quote "teaching is unnecessary, those who are interested are doing it anyhow".

FoMRHI Communication Number - 1625

Musical Instrument Cases

Maggie Lyndon-Jones' [MLJ] Communication 1584 on music instrument cases rang a distant bell in some way connected with FoMRHI member David Smith. A local telephone call confirmed my hunch. David had indeed written an article on music instrument cases - refer to Issue 49, Communication 827. This in turn brought forth a very interesting reply from Peter and Ann MacTaggart - issue 52, Communication 877. And I was a little astonished that, to my knowledge, there is no comprehensive catalogue of case makers to complement the numerous catalogues of instrument makers. Communication 877 explains in part why compiling a case catalogue would be a time consuming research project. From the evidence that instrument cases provide, a number of theories can be advanced, though not proven. For example, MLJ puts forward the idea that because the Ganassi Recorder fits perfectly into a case that holds a total of four instruments, this can be taken to show that it [the Ganassi Recorder] was not exclusively a solo instrument. Dates hidden by the materials used to line instrument cases [Communication 827] might help in confirming a number of other matters. And the stuff used to make the cases and their fittings, as well as the stuff used to line and cover the cases [veneer, cloth, leather, brass, laminated wood, glue etc] might indicate some of the local and distant markets from which case makers obtained their materials. An examination of marks left by hand tools on cases, might shed light some of the techniques used to make the instruments themselves - and so on.

And MLJ in her whimsical final paragraph is absolutely correct in wondering whether a large number of recorders in any one place [Vienna in her example] can be described as an ensemble. It might be better better to use the word collection. All the more so as finding a combination of recorders from the Vienna Collection which can be played as an ensemble is not easy. The pitch of the instruments, their tunings, as well as their condition present quite a challenge.
The present writer has played the 'munnharpe' (trump / Jew's harp) for quite a few years now, and for the benefit of the readers would like to sum up his experience with this tiny instrument. Most people do not find the sound too attractive; the key note drone blurs the melody line; the intervals are weird; the volume of an average instrument does not carry very far; in short, is it a musical instrument at all?

1. A well made metal trump is an instrument of precision. Its frame can be forged, cast, hammered out of steel bars, or from a 5" nail. The tongue (lamella) is of some sort of spring steel, which is fastened to the frame by riveting, or lodged in a hole in the frame by a wedge.

2. Although there seems to be some disagreement as to how old the metal trump is in Europe, one may safely assume that some archaeological finds date back to the Gallo-Roman time (John Wright, at the Munnharpefestival in Fagernes, Norway, 1996). All the shapes of medieval trumps (archaeological finds are quite numerous) are reflected in today's trumps. Long and narrow instruments, however, were more common than the wide, D-shaped ones (Molln type) found today. The Norwegian munnharpes, which have been made continuously since the Middle Ages, adhere very closely to the narrow, medieval shape.

3. The trump plays in one key only. The key depends on the key note yielded by the tongue when struck. If you want another key you need another trump. The Alpenraum tradition of playing with two or more trumps reflects the need for playing chords based on the tonic, subdominant and the dominant.

4. Although the trump sticks to one key, the number of notes available in that key can be quite impressive. If the clearance between the legs/arms and the tongue (i.e. lamellae) is around two tenths of a millimeter or less, and the tongue answers nicely, you may get as high as no. 32 in the harmonic series (Reidar Sævåg, Det gjallar og det lét, 1974, has played museum specimens that range from no 8 to no 32 in the harmonic series). Especially on deeply tuned instruments you can play melodic phrases in minor on top of the drone major chord most listeners hear at the bottom.

5. The munnharpe gives us direct access to the sound of an instrument which sounded exactly the same in the Middle Ages as it does today. Admittedly, there were good and bad players at that time, as well as today. The techniques used in playing the munnharpe vary enormously according to the traditions and styles the musicians are accustomed to, but the instrument in itself plays what you want it to. You can play a Norwegian folk tune on a Yakutian khomus or an Austrian Maultrommel, or conjure up shamanistic visions on a Norwegian munnharpe. Irrespective of playing style, however, the sound is medieval.

Post scriptum: If anybody be interested in buying high quality trumps I would be happy to forward names / addresses of trump makers.
The real diameter of shell augers.

Recently I got a shell auger, in order to have a look on it. It was the tool of an old, now late turner in Austria. He produced "Seitelpfeifen", that is a special kind of pipes. The auger now is blunt, so I was not able to get a test-bore. Now the question is which diameter of bore will it generate? Because the shell auger is not exact a halved cylinder, the problem is not trivial; but calculations can be done with simple school mathematics:

\[
\begin{align*}
AC &= FG \\
DE &= d \\
BC &= h
\end{align*}
\]

ABC is a right angled triangle and therefore
\[
(D - h) \times h = (d/2 \times d/2)
\]

and you get the formula:
\[
D = h + (d \times d)/(4 \times h) \quad (1)
\]

In the trivial case \( h = d/2 \) you get \( D = d/2 + d/2 \) that means \( D = d \).

In my special case I get the measures:
\( h = 4.2\text{mm}, \ d = 6.2\text{mm} \)

Formula (1) yields \( D = 6.49\text{mm} \).
A recently discovered traverso by I.W. Oberlender Senior

Jan Bouterse

The Openluchtmuseum ('Open-air museum') in Arnhem (Netherlands), with its farmhouses, mills and other buildings is not exactly the place where you go to see musical instruments. But as so often in such museums, the depots are full of interesting objects, collected in many years, and often described incompletely or incorrectly, waiting to be discovered by specialists. Recently I got from Annemies Tamboer (Driebergen, Netherlands; she is working mainly on medieval and older instruments) information about a recorder and a traverso in the collection. She sent me a copy of a photo from the museum files; as far as I could see the traverso (in four joints, with one key; see photo no. 1) was baroque and might be of Dutch origin, and so I made an appointment in Arnhem to see the instrument.

A first glance on the instrument caused a little disappointment: the flute (with the inventory number 1264, and granted to the museum in 1924 by a woman, 'Widow Lugten', from Zevenbergen, Netherlands) was not Dutch. But as the stamps were from Oberlender, one of the best makers of Nuremberg (Nürnberg, Germany), I decided to spend some time to this instrument, which happened to be more interesting than I first thought.

The mark on the flute: I.W. OBERLENDER in a scroll, set diagonally (SW-NE), with an 'O' in the middle under the scroll and a fleur de lis above the scroll. This mark was visible on the head and the upper and lower middle joint; the foot had no marks. Ekkehart Nickel (in his book from 1971 about the woodwind makers in Nuremberg, see also William Waterhouse in the New Langwill Index, London 1993, p. 284) suggested that the instruments with this tilted mark were made by I.W. Oberlender-I (1681-1763), and those with horizontal marks with a tree by his son, I.W. Oberlender-II (1712-1779). Well, this theory can now be confirmed by the fact that very clearly (but only on the head joint) the addition 'Senior' is stamped under the 'O' (see photo no. 2). As far as I know no other instruments by Oberlender have this Senior-mark; I do not know about the fleur de lis. Phil Young does not mention these marks in his 4900 Historical woodwind instruments (London 1993), neither does Nickel.

Young gives information about 6 other traverso's by I.W. Oberlender-I (= Senior), four of them made of ivory (two in museums in Rome and Vermillion; the other two in a private collection in San Fransisco). Two wooden instruments are in a museum in Modena and in a private collection in Stuttgart (the only one which is now in Germany). As far as I can see the instruments in San Fransisco come from the Willy Burger collection, formerly in Zürich (Switzerland), where I was in 1990 to measure a Denner-oboe. I remember that the caps on the head joints of the traverso's were made of ebony, and that the mouthholes on both instruments (or on one of the two) were enlarged.

Actually, the traverso in Arnhem is the third wooden traverso of Oberlender Senior and as at least two of the other instruments are not in original condition, I decided to have a good look at the condition of this instrument. The traverso is made of boxwood; the tangential face of the wood (the flamed side) can be seen on the front of all joints. The head joint is rather warped and in cross section I measured some ovality in all joints, 0.2 to 0.5 (average 0.3) mm. Three small ivory rings are turned at the sockets of the head, lower middle and foot joint. There was never a ring at the lower end of the foot. The cap of the head joint is missing, also the spring of the (brass) key.
The head joint has a not very long but open crack at the back, just in the middle of the joint (this is not a common place for cracks on wooden traversos'). The small mouthhole is almost round (8.5 x 8.6 mm), not heavily undercut (to 11 mm in length direction), but there is some damage at the 'north-end' of the hole, were small chips of wood are cut out (see photo no. 3; also the present rough surface of the undercutting of this hole is visible). It is not easy to explain how this has happened; I am sure that this was not the result of an attempt to enlarge the hole. As the chips are only superficially broken out the original size of the hole is hardly changed, and also the acoustical important corners of the hole (east and west side) are in fair condition. The surface of the wood of the other parts of the traverso is not very smooth, showing traces of dirt, small scratches etcetera. The bore is very dusty. Finally, the ivory ring at the foot socket has a crack (see photo no. 4).

A greater problem happened to be to reconstruct the length of the upper middle joint. As the mark of Oberlender is now located very close to the upper shoulder and misses the fleur de lis, I got the suspicion that the joint might have been shortened here. The thread at the tenons could easily be removed (that is only possible in a museum where nobody is specialized in musical instruments...) at now was clearly visible that a part of both upper and lower tenon were thicker (see photo no. 4, with the lower tenon of the upper joint), and/or turned with deeper grooves. Actually, it was evident how far the joint was shortened: 12.5 mm at the upper shoulder and 4.8 mm at the lower shoulder. The tenon of the lower middle joint seemed to me unchanged, but the length of this joint without tenon is 131.8 mm and that is rather short (I expected a length of at least 135 mm); could it be that the joint is yet shortened for a few mm at the lower shoulder, and that this is done more neatly than on the upper middle joint? In that case, we must also consider that the foot (which has a length of about 100 mm) is shortened as well, what could have caused the lost of an ivory ring at the lower end. But: there are no obvious traces that the lower middle joint and foot are shortened and the tenons of the upper middle joint have the same light brown colour, what is an indication that all changes were carried out long ago.

The fingerholes of both middle joints were in original condition; they were moderately (and straight conically) undercut. The bore of the traverso showing the common characteristics (see the graphs): in the head joint almost cylindrical (near the mouth hole about 19.0 x 19.2 mm, near the socket 18.8 x 19.0 mm); in the upper middle joint the bore narrows from 18.3 to 15.0 mm, with the greater part of the narrowing after the second finger hole. In the lower middle joint the bore begins a little wider, at 15.6 mm and narrows with a typical parabolic shaped end to 13.2 mm. The bore of the foot widens from 12.8 mm just after the socket to 14.2 x 14.4 mm at the lower end.

About the turned profiles of the traverso: the straight section of the head joint has over the whole length about the same dimensions (Ømax. at cap end 29.7, near mouthhole 29.6, near stamp 29.6, close to bulge 29.7 mm). The straight sections of both middle joints does not show an increase of the thickness near the lower shoulder (in German language: 'Aufblühen'). About the socket bulges (the German language has a perfect word for this: the 'Wulst'): they are turned in a characteristic profile, not very thick, but with nicely defined smaller rings at both ends (see photo no. 5). The turning is all good work, but misses the elegance of for instance the profiles of the dashing ivory alto recorder in the museum in Berlin. The key of the traverso in Arnhem has the common shape, seen on many instruments from the first half of the 18th century. The top section of the key is buckled a bit (see photo no. 4).
The instrument was not in playing condition, because of the crack in the head and a missing pad and spring of the key. However, it was possible to play some tones by covering the crack with one hand. The pitch of the a' and b' was then 40 cents sharper than a-415 Hz, but I expect a lower pitch if the crack is closed more professionally. Maybe the pitch with the original and unshortened upper middle joint was close to a-415 Hz.

Conclusion: this traverso is interesting because of the marks and because of the fact that the 'informative value' is rather high. Despite the shortening operation, the original dimensions of the instrument can be reconstructed quite accurately.

Some measurements (in millimeters)

Head joint: total length 230 (front) and 227 (back); sounding length (to centre of mouthhole): 178; socket: length 27.5, Ømax 23.8; mouthhole: 8.5 (++) length) x 8.6 (↑: cross), Ø of wood near mouthhole: 29.4 x 29.6; length of socket bulge: 42.1, Ømax 34.1; bore of head joint (from top, Ø and length): 20.0 x 20.2 - upper end 19.0 x 19.2 - near mouthhole 18.8 x 19.0 - just before socket

Upper middle joint: length between shoulders: 137.1 (originally c.12.5 longer at upper shoulder, and 4.8 at lower shoulder); upper tenon: length 27.2, Ø at upper end 22.3; lower tenon: length 24.2, Ø near shoulder 20.4, at lower end 19.2, Ø wood at upper shoulder: 27.2 x 27.5; at lower shoulder: 24.3 x 24.5; at hole finger hole 2: 25.0 x 25.3. Finger holes (length from upper shoulder to centre hole, then Ø (↑:cross x ++:length): hole 1: 47.0, 6.6 x 7.4; hole 2: 82.3, 6.8 x 7.1; hole 3: 119.3, 6.4 x 6.7; bore upper middle joint (from top, Ø and length): 18.3- top; 18.0- 8/11; 17.5- 36/44; 17.3- 54/57; 17.0- hole 1/102; 16.5- 118/125; 16.0- hole 3/147; 15.5- 165/167; 15.0- 178/183; 15.0/15.3- lower end.

Lower middle joint: sounding length (= length without tenon): 131.8; tenon: length 15.5, Ø near shoulder 18.4, at lower end 18.2; socket: length 25.9, Ømax 21.4; length of socket bulge: 29.1, Ømax 30.2. Ø at hole 4: 24.6, at lower shoulder 24.5. Finger holes (length from upper end to centre hole, then Ø (↑:cross x ++:length): hole 4: 35.8, 6.3 x 6.4; hole 5: 73.4, 6.0 x 6.0; hole 6: 112.8, 5.3 x 5.3; bore lower middle joint (from upper end: Ø and length): 15.6- 26; 15.5- 30; 15.0- 33/64; 14.5- 85/103; 14.0- 112/123; 13.5- 136; 13.2- 144 and through; 13.2 x 13.4- lower end.

Foot: length 100.4; socket: length 16.0, Ømax 19.4; hole 7 (key hole) at 37.4 from upper end, Ø c. 5.5; Ø wood near hole 7: 24.2; at lower end of the foot: 24.0; Ø of key ring: 29.6; bore of foot (from lower end: Ø and length): 14.2 x 14.4- lower end; 14.0- 16/22; 13.5- 45/48; 13.0- 60/65; 12.8- 60 and through.
Bore graphs of traverso by I.W. Oberlender—Senior

\[ \Phi \text{ (10:1)} \]

- Head joint
- Upper middle joint
- Lower middle joint
- Foot

√: position of mouth- and fingerholes

0 50 100 150 200 L
There is a lot of lore existing today about harpsichord plectra which is technically unsound and even downright wrong. I suspect that there may be people who think that harpsichord plectra have always been made of Delrin or Celcon since the 18th Century. Sometimes the technology used in harpsichord making of the 1930's to 1950's is regarded as a dark age that did not recognize the true value of plastic plectra.

In 1951, I was a senior at the Massachusetts Institute of Technology in Mechanical Engineering and at the same time a part time apprentice at the firm of Hubbard and Dowd. The firm had recently completed the restoration of an Italian harpsichord made by Franciscus Marchionus, Roma 1666 that was fitted out with crow quill, then a novelty in the era of leather. Indeed Frank Hubbard was seriously poisoned by arsenic used in curing crow wings that he had purchased from an antique store. In 1950-1951, I completed the first restoration of the "F. A. 1677" under Frank Hubbard's guidance.

At M. I. T., I had the good fortune to take a course with A. G. H. Dietz studying the technology of modern laminates, (orthotropic materials, materials whose properties are different in different directions). I discussed the crow quill problem with Prof. Dietz and he suggested that we try nylon as plectrum material, since it seemed like the most appropriate approximation to quill that he could imagine. He also said that quill had a pretty unusual structure composed of high strength proteins and would be difficult to approximate with synthetics known at that time.

Immediately, at Hubbard and Dowd we tried the nylon as plectra (after finding that celluloid was not durable enough). At first everything seemed great. It was easy to voice and install, while it sounded exactly like quill in the F. A. harpsichord. Then the weather changed to a dryer state. The plectra immediately stiffened up and the instrument sounded terrible. Apparently, the stiffness of nylon is a direct function of its moisture environment, a relationship that cannot be mitigated or avoided. That was the fate of the first and most promising plastic plectrum. Modern tables of plastic's properties show nylon having a 24 hour moisture absorption capacity from two to six times larger than the Delrin acetals.

About five years later, some DuPont engineers visited the Hubbard and Dowd shop out of curiosity and they had just invented Delrin. The rest is history. As far as I know, the first commercial application of Delrin outside of the DuPont Laboratories was as harpsichord plectra.

A few years later in 1958, I tried a new material called polyurethane as a leather substitute. Unfortunately, it lacked the hard slick surface of leather, being somewhat rubbery and sticky to the string and did not work out as a plectrum, even when loaded with a graphite additive. I did use it as a support for Delrin plectra in jacks that had large mortises for leather. After a few years, however, polyurethane gets hard, brittle and weak and is not even useful as a support vehicle for Delrin.

In 1954, at Hubbard and Dowd, I completed my own harpsichord that was an extended adaptation of the "F. A. 1677" using leather for plectra. Later, I learned of the success of Delrin at Hubbard and Dowd, I obtained a sheet and adapted my jacks mortised for leather to Delrin plectra around 1959 by installing the Delrin over leather wedges in each mortise. Because of the yielding nature of the leather support, I suspect that this is a superior method of installing Delrin as compared to installing it in a hard faced mortise. I have been playing the harpsichord ever since that time and I have found no change whatsoever in the behavior of the Delrin plectra in that 40 year period. This evidence of stability of behavior has been corroborated by extended fatigue testing conducted by Eric Herz and others on Delrin plectra.
In the 1970’s, I learned that a composite of Delrin and Teflon was available, Delrin AF. I obtained a sheet and have used it with good success in one harpsichord (that now belongs to an organist in Bismark, North Dakota). Life testing by Eric Herz showed that this material lasted about 0.7 times as long as did whole Delrin. I liked this material because it was more slippery than Delrin and behaved more like crow quill. Furthermore, its structure is more like a natural quill in that it has the Teflon fibers linearly oriented in the Delrin matrix. I dubbed this material “Crowlon” for the sake of a little mystery at the time. Figure 1 shows a comparison of Delrin and Delrin AF in terms of how much the string is deflected at the time of release as a function of plectrum length. The effect of the reduced friction is substantial. The Delrin AF harpsichord will release sooner with less key stroke than plain Delrin.

Eric Herz at his firm instituted an important innovation for quality control of his instruments. Herz used a dynamometer to measure the release force of each jack in his instruments, limiting the amount of allowable variation in touch pressure to about +/- 10% of the plucking force. This yielded a beautifully uniform feeling touch to the player and to everyone’s surprise a uniform loudness for each note (wolfs or resonances excepted). The ear’s logarithmic response to sound levels is apparently less discriminating than our sense of touch when it comes to comparing notes on a harpsichord. The following, Figure 2, shows such a dynamometer. The instrument used by Herz was actually a peak reading dynamometer of a type used for observing electrical relay contacts and is more expensive than the simple laboratory scale in the figure.

Once that we recognize that all plectra in a register should be the same (with the above exceptions), it is apparent that we should manufacture them in such a manner as to ensure absolute consistency in their dimensions. It is clear that hand carving each plectrum in a harpsichord one by one is both a waste of time and can be a contributor to a poor outcome. Some sources use molded plectra; this is a satisfactory solution to the task at hand. I prefer the original sheet Delrin that seems to be orthotropic and very uniform.

Some time ago, I performed a sensitivity analysis for plectra and determined that their thickness dimension must be controlled as closely as possible to less than 0.001 inches (0.02 mm); Figure 3. Therefore, I devised a method of manufacture for plectra which can be used by anyone having access to a metal working lathe. The steps are simple and are performed as follows:
(1) Install a faceplate in the lathe. Take a fine cut on its rim so that you know that its outside circumference is perfectly true. Usually the result is less than 0.0001 inches (.0025 mm).

(2) With a sharp knife and straightedge cut a strip of Delrin whose width is about 1 mm wider than a plectrum is long (including the plectrum length inside the jack). The strip should be cut so that the grain direction of the Delrin runs across its short dimension.

(3) Set the compound feed of the lathe to an angle of 0.0414 radians (0.497 inches/foot) with respect to the lathe axis.

(4) Attach the plectrum strip to the edge of the faceplate using double sided adhesive tape of the type usually employed in a machine shop. Burnish it thoroughly so that it is very securely attached to the rim of the face plate.

(5) Use a freshly sharpened lathe tool with a right angle chisel point in plan view to even up one edge of the plectrum strip so that it runs perfectly true. Use the compound rest to move the tool one plectrum length plus a tool width to make the other edge of the strip exactly one plectrum length wide to within 0.005 inches (0.13 mm). My plectra are exactly 0.300 inches long for my instruments (7.62 mm).

(6) Use the compound to generate a taper on the outside of the plectrum using a fine feed for the smoothest possible finish. This will become the undersurface of the finished plectrum. The fine finish will avoid the creation of any stress concentrations that could later cause the plectrum to crack or fail under repeated flexure.

(7) The plectra are finished to 0.022 inches (0.56 mm) on the thick end and 0.0079 inches (0.20 mm) thick on the thin end. I verify these dimensions using a dial indicator in the lathe.

(8) Lastly, the plectra are cut to width using a wedge shaped punch and die that has a cross section in the outline of the plectrum plan view. By cutting both edges of the plectra in one operation, a guarantee of identical width will be assured, although there is a little material wasted in the off cuts. (Most people cut the plectra one edge at a time so that a possible error in width can arise).

(9) The plectra are installed in their jacks so that they are exactly flush with the back side of the tongue. Therefore, each plectrum will project out of the other side of the jack a precise, constant amount. My tooling was created for the molded plastic jack that I designed for Eric Herz in 1956.

(10) Each tongue will be adjusted so that the distance from the
tongue's face to the string center line is a constant. Final adjustment of voicing is done by narrowing the plectrum with a sharp knife; never carve the under side because it is almost impossible to control the thickness precisely enough by hand methods.

This method of creating plectra may seem a little daunting at first sight, but it is well worth the trouble in saving time at final assembly and results in a beautiful even feeling of the action. In my opinion, it just is not efficient or practical to hand carve each plectrum, one by one, into a state of uniformity that satisfies the foregoing requirements for action response.

Figures 4 and 5 show the computed force produced by a plectrum (Delrin and Delrin AF) at its dimensions in a model that uses straight (not tapered) plectra with straight sides for simplicity in computation. The behavior of tapered plectra is similar, but the numbers will differ a little from those shown here for constant sectioned plectra.

As the plectrum gets thicker for a given length, the force required to release it increases while the deflection at release remains constant. This is because the coefficient of friction between the Delrin and steel string controls the process and the release is determined solely by the friction angle.

The amount of force required to release multiplied by the distance that the plectrum moves vertically to release (times one half) describes the amount of energy input needed to produce a note on the harpsichord. This quantity is a measure of the loudness of the note produced. Figure 6 shows the amount of sound level change possible to achieve by voicing a harpsichord, relative to a lightly voiced instrument that releases at 40 grams and a motion of 0.9 mm. Plucking forces of the order of 160 grams or more become unpleasant to the touch, and so I have cut the curves off at forces much larger than that because the instrument becomes too unpleasant to play.

A similar curve may be plotted for Delrin. Because of its greater stiffness, the force curves are crowded and more difficult to control than Equations for Plectra Delrin AF.
It is instructive to compute the amount of slop or change in overlap of a jack that can occur before an increase in output is observed. Figure 7 also shows how much less sensitive the sound output is as a function of plectrum length, and hence engagement with the string than it is to plectrum thickness changes. It can be seen that the amount of length change needed to change the sound is large, but that the amount of sound change for only 0.02 mm of thickness change is appreciable. A one decibel sound level change is not easy to hear by ear alone.

Conclusions:
• For equally loud sound on each of the notes of a harpsichord, the plectra have identical dimensions.
• More precision in voicing can be achieved by using a dyna-mometer to observe plucking force; this is more accurate than using the ear (excepting when resonances are present).
• Use plectra made by precision mechanical methods, e.g., molded or machined to shape.
• Avoid carving the thickness of the plectrum because it leads to nonuniformity, scratches or nicks and frequent early failure.
• Delrin plectra maintain constant characteristics for times at least as long as 40 years in trials at the author’s residence.
• Friction between the plectrum and string is an important factor in voicing an instrument. Delrin AF is similar to oiled crow quill in the author’s experience.

Equation for Plectrum Bending

\[
Plucking \text{ force } F = \frac{\theta \cdot E \cdot w \cdot t^3}{6 \cdot (1-a)^2}
\]

where \( \theta \) is the arctangent of the angle of the friction coefficient, \( E \) is Young’s modulus, \( w \) is the plectrum width, \( t \) is the plectrum thickness, \( l \) is the plectrum projection from the face of the tongue, and \( a \) is the overlap from the end of the plectrum to the centerline of the string. The graphs may be produced by solving the equation for plectrum thickness for given length, friction condition, width, and overlap.


<table>
<thead>
<tr>
<th>Material</th>
<th>Delrin</th>
<th>Delrin AF</th>
<th>Nylon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young’s Modulus</td>
<td>450,000</td>
<td>420,000</td>
<td>350-450,000</td>
</tr>
<tr>
<td>Tensile Strength to Yield</td>
<td>10,000</td>
<td>7,600</td>
<td>11-14,000</td>
</tr>
<tr>
<td>Friction coefficient on steel</td>
<td>0.35</td>
<td>0.14</td>
<td>0.15-0.35</td>
</tr>
<tr>
<td>Water Saturation (percent)</td>
<td>0.25</td>
<td>0.20</td>
<td>0.6-1.2</td>
</tr>
</tbody>
</table>
Violin neck. The changes from baroque to modern.

First of all, about the terminology used herein. The terms instrument and violin are to be understood as instrument of a violin family. I refer to the treble, alto and tenor violin necks to display the evolution of its form. Cello neck, as it is known, have passed a similar way, although there have been distinguished differences in its very early age1.

Evolution of a performance practice determined the way the instruments were played. Playing position has made consequential influence on the whole set-up. The neck was one of the essentials that bore the changes in order to perfectly suite the ever changing musical demands.

Playing positions

1. The instrument is held on the solar plexus level. Iconographical sources suggest that, with a few exceptions, instruments bigger than treble violin were held this way2.
2. The instrument is held just below3 or above the collar bone without a chin support, or chin-off4.
3. Chin braced grip.
4. Instrument held 'da gamba'.
5. Instrument held in the right hand.

Dependence between the described playing positions and the form of the neck is obvious. I shall elaborate on this topic in details.

Playing position and the form of the neck

1st Position

This position is documented in the printed sources5 and largely in the iconography. Generally the 16th – 17th cc neck must have been thicker. It is apparent that a

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1. I.e. violone age
2. This resolves a common among the modern viola players question: how such a big instruments as the Medici tenor viola were played. Jonathan Talbot, a leader of the violin band ‘Braccio’ (The Hague) proposed, that alto and tenor violas held at body’s center or near the right shoulder could be supported with an aid of a strap, attached to the button of the instrument.
5. JOHN PLAYFORD, A Breefe Introduction to the skil of Musick..., London, 1654. 'The lower part of the violin is rested on the left breast, a little lower the shoulder...'; FRANCESCO GEMINIANI, id., 'The Violin must be rested just below the Collar-bone...'; L.Mozart, 'Osnovatelnoje skrypichnoje uchilische', St.Petersburg, 1804. 'First way to hold a violin ..., a little above the breast...'; 'Another way is more comfortable..., i.e. the violin is held against the neck...'.
6. LENTON, The Gentleman's Diversion, or the Violin explained', London, 1693. Riley: “Lenton cautioned against holding the violin under the chin as well as holding it as low as the girdle”, which. “Lenton maintained, ‘some do in imitation of the Italians’.” DANIEL MERCK, Compendium Musicae Instrumentalis Chelicae..., Augsburg, 1695. 'Hold the Violin neatly below the left breast, leaving the arm free and not resting it on the stomach'. (quoted from: MAURICE WINTON RILEY, The teaching of
thicker neck is more comfortable in conjunction with this playing position. There is a number of paintings that show instruments with thick archaic necks. The famous Violetta of S. Caterina de' Vigri, Bologna, Corpus Domini Convent, ca. 1435, proves that these paintings do resemble some truth. Observe the drawing demonstrating the low playing position (see fig. 1).

Observe the button. It rests on the wrist joint and the neck's body comfortably lies in the palm. It is obvious that a thinner neck will leave some extra space between the player's hand and the neck. Thence, the button will rub inconveniently against the wrist joint.

The thickness of the neck's root guarantees a twofold comfortableness, which will be explained after I make intelligible what the shifting technique is when playing chin-off (2nd Playing Position) or holding an instrument on the breast or solar plexus level (1st Playing Position).

Shifting upward is a little problem since the instrument is pulled against a player's body. Shifting downward require a motion contrary to the direction of shifting. If there is no such a motion the instrument falls down. The only medium to fulfill the charge is the thumb (see fig 6). The thumb follows the motion of the palm during the shift and allows to pull the instrument in aforesaid contrary direction. The thumb starts its motion after the last note before the shift is stopped. Shifting down from high positions, the thumb presses against the neck pushing the instrument towards the body while the palm shifts down. The thumb takes its final position only after the following after the shift note is stopped. Geminiani thus describes it: 'It must be observed, that in drawing back the Hand from the 5th, 4th and 3rd Order to go to the first, the Thumb cannot, for Want of Time, be replaced in its natural Position, but it is necessary it should be replaced at the second Note.'

Thus the thickness of the neck’s root insures the following:
- The inner length of the neck is shorter. Therefore the thumb has a shorter distance to go when shifting, i.e. the distance between the 1st and the 3rd positions is smaller.
- The out-line of the neck gently follows the curve of the hand. It is obvious that a thinner neck will leave extra space between the player's hand and the neck. Thence, the button will rub inconveniently against the joint.

_bowed instruments from 1511 to 1756, 1954, facsimile_. University Microfilms, Ann Arbor, Michigan, 1978
While stability of this playing position is obvious I should emphasize its admirable flexibility. The position of the hands doesn't change at all, or changes but little when changing the instruments (lutes, violins, viols). This is an important circumstance, because, often the same musicians played many different instruments. It is sufficient to move the instruments closer to the solar plexus and one has never stretch one's left hand when changing for a huge tenor violin, for instance, and the right hand draws closer (!) to the body (see fig.2).

Fig.2

However, holding the instrument on the solar plexus level limitates playing in the first 3 positions. Shifting up is a difficult and hardly possible trick because the wrist is bent to its limit already in the 3rd position (see fig. 3).

Fig.3

Shifting up is a difficult and hardly possible trick because the wrist is bent to its limit in the 3rd position.

\* One has no fear of dropping an instrument when playing.
2nd Position

Changing musical demands and request for higher positions stipulated the following:

- The instrument was shifted up to the collar bone. This allowed more relaxed wrist and easier access to the higher positions, however, made the instrument less stable. Excessive thickness of the neck's root became unnecessary (see fig. 4) and even awkward.

- The thickness of the neck's root and the button were reduced. It has facilitated reachability of the 3rd and higher positions, but it has increased the inner curve length. Thence, the way to go between the positions was lengthened.

- Instability of the instrument and augmented awkwardness of a shift down appealed for development of a compensating shifting technique. That technique, apparently of the 17th c. origin, will form the basis of the whole violinistic practice up to the 20th century.

Excessive thickness of the neck's root became unnecessary and even awkward.

Talking about different playing positions it is essential to mention another important factor - position of the bridge. It has often been lower than the f-hole notches. The string length, therefore, was considerably longer than the normal modern length. It affected the distances between the positions on the fingerboard which were consequently longer. Probably the bridge was moved towards the fingerboard to shorten the distance of the shifts first, and only after that, the instrument was lifted up, and the neck's root has been trimmed, but it is hardly possible to say which change has taken place first, or they did both simultaneously.

The 18th century development of violin idiomatic technique has determined the position of the instrument above the collar-bone because only this position allow most flexible left hand (see fig. 5).
3rd Position

In the last quarter of the 18th c, the neck's inner length has been raised again, although yet not as much as that of the 19th or 20th century necks. Once again it was accomplished by cutting down the neck's root. It is remarkable, that the upper length remained unchanged⁷ and, indeed, there was no serious reason for that. Growing demand for the higher positions stipulated the neck's inclination in the end of the 18th c. The neck has been inclined backward, which allowed further thinning of the root. This must have been a serious reason for inclination of the neck. Not the string tension. This resulted in such a great distance between the 5th and the 1st positions that the shift down without a chin support became truly stubborn, although the shifting technique itself remained basically baroque⁸ (see. fig.6).


Antedating movement of the fingers is the key. First described by Geminiani. KARL FLESCH, 'The art of violin playing', Boston, New York [etc.] C. Fischer, inc. [c1924-30], wrote: '...shifts...is one of the most difficult parts of the left hand technique.; 'A shift down... is considerably more difficult than a shift up,... a performer has an unpleasant feeling, as it seems, that a descending movement of the hand may tore a violin out of the support, made of a collar-bone, a shoulder and a chin...... We are forced therefore to subdivide the movement, moving the thumb to the lower position aforehead...'.

This technique also described by NEMIROVSKY, L.G., 'Mekhanicheskije I psikhofiziologicheskije momenty v osnovnykh priemah skripichnoj tekhniki', Jurgenson, Petrograd, 1915. He wrote that antedating movement of the thumb is required when performing a shift down.
Fig. 6. Antedating movement of the thumb during shift down. First picture shows a shift from a high position to the first position on the third finger. The second picture shows movement of the thumb into its natural position.

The fact that the shifting technique has remained fundamentally unchanged has determined the shape of the mid 19th c. neck, that is, of the neck which usually called today as a modern. This statement needs an analyze. J.-B.Vuillaume’s necks, for instance, do differ from the late 20th century type. The drawing (Fig. 7) clearly illustrates the difference between the modern and Vuillaume’s necks. The difference is still the same as between the early and late baroque necks: thickness of the root, thence, length of the inner curve. The root of the modern neck has been thinned down to its limit and the body of the neck became practically straight. This has facilitated the reachability of the 9th - 12th positions (Fig. 8), and the inner length of the neck became outmost. Players with relatively small hands had to seek for another shifting technique, because assisting movement of the thumb has lost its sense for the distance became too long.

Fig. 7

The drawing clearly illustrates the difference between the modern (from Weishaar & Shipmann, Violin Restoration, Los Angeles, 1988; thin line) and Vuillaume’s (bold line, 1852) necks. The difference is still the same as between the early and late baroque necks: thickness of the root, thence, length of the inner curve, although the difference is more subtile. Note that the length of both necks is similar = 131mm.

Fig. 8

An instrument stabilized by a shoulder and a chin made the aforesaid assisting movement of the thumb, according to L. Auer9 unimportant, and according to more

9 LEOPOLD AUER, Moja shkola igry na skripke, Triton, Leningrad,1933, p. 56: ‘The thumb does not have very important role when shifting from one position to another. There is too much said, as it
modern Jankelevitch even harmful. It is important to emphasize, that in spite of his statement about the assisting movement of the thumb, Auer played somewhat *all'antica*, i.e. practically without an aid of the shoulder. Moreover, described in the *School* thumb that follows the palm when moving in the positions is nothing else as the assisting movement. Some of the Auer’s students did adopt this technique, others did not.

According to Strouve, the modern schools of violin playing could be divided into two large and ‘diametrically opposed’ ways of holding the instrument:

1. Holding the instrument on the collar bone with a shoulder lifted up.
2. Holding the instrument on the collar-bone and between the forefinger and the left hand thumb, without a shoulder raised.

Furthermore Strouve writes, that the followers of the 1st method were ‘Fritz Kreisler, L. Auer and others’, whereas the followers of the 2nd method were ‘Franz Vecsey, Bronislav Gouberman, Misha Elmann etc.’ Subdivision of the schools similar to the proposed by Strouve remain actual nowadays. For this reason the 19th c violin necks go transformed according to requests of the owners, or sometimes without the latter: just because the neck’s shape does not mimic a template given in a manual (see Fig. 7).

Treatises of the 18th century pay remarkably little attention to the problem of shifting whereas the more recent books on the violin performance dedicate huge sections to the problems of shifting. By no means, the 18th c. music is less difficult to play than the 19th or 20th music. However, the 18th c. treatises and left hand postures described therein make one conclude that the authors did not shift at all whenever it was possible. Indeed, high position of the thumb gives possibility of reaching higher positions without moving at all, or moving but little. Actually, moving the thumb is the shifting, and a little moving is a little shifting.

High position of the thumb have been adopted by many violinists. It economises movement in general. Shorter inner curve of the neck makes the movement still more economical.

seems to me, about importance of a thumb... The thumb must lightly touch the neck and follow the forefinger when moving in different positions, aiding the hand to shift up and down without clutching the instrument.’


12 Strouve, id.

13 Sementsov, K.M., *Iskusstvo skripichnyh smen*, Moscow, 1971, p. 33: ‘Shifting... can be considered one of the most complex barrier on the way of a correct frasing’. Id., p.22, Yankelevitch, Y.I.: ‘The problem of shifts is one of the most important problems in violin performance’.


15 Yankelevitch, id., p. 56, wrote that: ‘L.Mozart recommended to keep the thumb closer to the middle finger rather than to the forefinger (i.e. infron of F sharp on the III string), bearing in mind that in that case there is more possibility of movement...’ That point of view, according to Yankelevitch, does not differ from that of Moser (A.Moser, Methodic of violinistic performance, Lipasia 1920), as well as from that of Auer and ‘some others’. The authors who presume high position of the thumb are: Walter (See: W.WALTER, *How to study violin, St. Petersburg, 1910*) - the thumb has to be inclined in direction of the musician’s body; Campagnoli (the thumb is held against B on the G string) [see: CAMPAGNOLI, op. cit., Lipis 1797], Auer (the thumb is held against F natural on the D string); the
While the first three playing positions were basically important for the violin development, there were two other: ‘da gamba’ as well as holding the instrument in the right hand. These did not contribute much into the history of the violin.

The cello’s neck has passed a similar way, at least, since the time it has emerged. The old violone must have had a period of long necks, probably, prior to the introduction of metal wound bass strings.\(^{16}\)

I hope this article will stimulate experimenting with the earlier types of the necks. I would be thankful to anyone for comments.

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- Nemirovsky, L.G., ‘*Mekhanicheskije I psikho(fizio)logicheskije momenty v osnovnykh priemah skripichnoj tekhniki*’, Jurgenson, Petrograd, 1915

\(^{16}\) Neal Zaslav, “Lulli’s Orchestra”, J de la Gorge & H., Schneider, Laaber, 1991, p.542-43, ‘The instruments neck is roughly one-and-a-half times the length of its body... There are 16th and 17th c. pictures from other countries showing such long-necked 8’ bass instruments, and there are also other pictures with large bowed instruments played across the chest. These pictures have generally been laughed at as fantasy or incompetence on the part of artists, but they should perhaps be taken more seriously. There were, in any case, phisical and acoustical reasons for making the necks extremely long on 8’ bass instruments prior to the introduction of wound or overspun strings’.

authors who presume lower position of the thumb are: Beriot (the thumb is held against A on the G string); Singer and Seifriz (same position as in Beriot) [See: Singer Ed., Theoretical and practical school for violin, Berlin, 1887]; Joachim and Moser state the lowest position for the thumb - against the forefinger; Koeckert (G.KOECKERT, Tecnica razionale del violino, Lipapia 1909) - it has to ‘look’ in direction of the nut. Yankelevitch, p.56, wrote that all the evidence ‘insists on the fact’ that the violin playing schools do not have any universal idea on where to keep the thumb during execution.
Response to Comm. 1619 - Smith on Talbot's bass violin

I would like to suggest that some of the judgements made by Mark M. Smith in this Comm. were not up to the usual standard of respect for historical evidence that we have come to expect from him.

In the conjectural reconstruction of Talbot's bass violin of Comm. 1619, Smith concludes that most of Talbot's measurements did fit together. The only exception is that the pegbox length, which was given as 8 1/2", is inconsistent with 6" that is left when we subtract the body length (28") and the neck length (10") from the total length (44"). This difference is indeed too large to be caused by any accumulation of inaccuracies, so there appears to be an error. Since the neck and body lengths fit so well with the measurements from the nut to the bridge and from the bridge to the far end of the tailpiece, it is likely that the error is elsewhere. Smith assumes that the error is in the measurement of the pegbox length, as it would be unusually long on even the largest of cellos. He does not consider the other possibility, that the error could be in the total length. Every error in a source needs some likely explanation of how it occurred, and none is offered.

His judgement is based on experience with cellos, which are almost all descendants of 16th century Cremonese fiddle design. It is true that the design origin of Talbot's bass violin is the Italian basso da braccio, but we do not know about variations in how the English interpreted that design then. We have very little other information on English instruments of this type on which to base a judgement. As an example of quite different possible influence, the title page of Playford's The Division Violin (1685) shows both a violin and basse de violon of early French design, with the hole shapes being more like S's than f's, and the bridge only a quarter of the way up the soundboard. It is reproduced on p.270 of Holman's 4+20 Fiddlers.

Smith is probably right in deciding where Talbot's error was because a likely explanation of the discrepancy is that the instrument Talbot measured had a replacement pegbox from a basse de violon, which he knew was not right, and so when he later inserted the total length, it was that of another such instrument with an original pegbox, but he neglected to correct the pegbox length in his notes. Smith has no relevant basis to judge that the soundholes were too short or that the bridge was too high. A basso da braccio was not a cello, and an English one was not necessarily identical to an Italian one.

Smith's adding 1/8" to the string stop to make the bridge sit half way up the soundboard is unnecessary. If we assume that it was placed there, Talbot's measurements remain consistent. We have two right triangles with the bridge top at their apexes. The triangle for the lower part of the instrument has half the body length (14") as the base, the bridge height plus the arching height (4 7/8") as the height, and as the hypotenuse we have the bridge to tailpiece distance (4") plus the tailpiece length (10") plus the distance from the end of the tailpiece to the edge of the soundboard. Pythagoras tells us that the last distance is a little more than 3/4", a not unreasonable figure.

The triangle for the upper part of the instrument has the string stop (24 1/2") as the hypotenuse, half the body length (14") plus the neck length (10") as the base, and as the height we have the bridge height plus the arching height (4 7/8") times the sine of the angle that the neck is bent back minus the nut height. Pythagoras tells us that the difference represented in the last two terms would be less than 1/16". This also is a reasonable figure, implying a very small neck angle.

Smith's drawing has that difference at about 3/4", resulting from adding 1/8" to the string stop and having a larger neck angle. He misleadingly wrote as if the neck angle somehow evolved from fitting Talbot's measurements. I suspect that he initially set it to emulate the Kaiser angle, added the 1/8" to make it work, and then misremembered this initial sequence in making his
In the remainder of his Comm. Smith argues against a ‘tenor tuning’ that I ‘proposed’. ‘Proposed’ could imply a considerable speculative component which was not there, so I prefer ‘deduced’. I deduced it from the Talbot evidence, and it was a bass tuning, not a ‘tenor’ tuning. A bass part does not need to go below the bottom line in the bass clef, as Monteverdi’s writing for the basso da braccio in Orfeo illustrates. The name of a part relates to its musical function, not to a particular tuning. Dolmetsch advocated using this tuning (of an octave below the violin) for performing a tenor function in baroque and modern orchestras, and Hitzler (1628) used it as a tenor in a mixed string band of viols and fiddles. In early fiddle bands it primarily performed the bass function.

My analysis of the tuning must have violated a deeply held belief for Smith to have abandoned his usual objectivity and insight and take the trouble to present so many pitifully weak arguments both against the Talbot evidence and for the basse de violon tuning he advocates. It is as if many weak points can somehow substitute for the only one strong point needed to make his position tenable.

Offered against the Talbot evidence is: 1. Lewis’s comments may be unreliable because we don’t have the large sample of his working methods that gives us the confidence we have in Talbot’s methods. 2. They may not be reliable because of the ambiguities they contain. 3. Talbot does not unequivocally state that the third strings of the bass violin and the bass viol have the same pitch, and 4. It is possible that Lewis was comparing his 6-string bass violin with a 5-string bass violin.

What Talbot wrote was: ‘Lewis has a Bass Violin (made for Lord Abergenny) which has 6 strings: its neck is somewhat shorter than that of the usual B. Violin to bear a Pitch: he says the treble string is of the same sound and size with the 3d of B. Violin (or B. Viol) [:] it is louder than either. And tuned B. Viol way.’

As for Smith’s point 1., there is no evidence that implies that Lewis was an unreliable reporter, and if there were, except for whenever his evidence is contradicted by other more reliable evidence, we have no choice but to accept it. The evidence is all that we have about history that is objective, and every bit is precious. As for point 2., in my analysis, I interpreted the ambiguity in the ‘same sound’ as meaning an octave higher for the 1st string of Lewis’s bass violin. This makes it consistent with it being ‘tuned B. Viol way’), and then all makes sense. All that ambiguities do to evidence is possibly to increase the number of hypotheses that could be consistent with it, but such ambiguities do not decrease the power of the evidence to reject hypotheses that are not consistent with it. Smith doesn’t even try to make sense out of the Talbot evidence by applying his hypothesis. I can’t imagine how it could be done. As for his point 3., if Smith thinks that the passage can be interpreted so that the 3rd strings of the bass violin and bass viol were not at the same pitch, he should show us how it is thus equivocal. Expecting an early source to repeat what it says because you don’t want to believe it is a bit much to ask. As for point 4., I can’t see how whether the ‘usual’ bass violin had 4 or 5 strings has any effect, since only the 3rd string and the neck length are involved.

I find it embarrassing to see the Smith that I have always respected clutching at such meagre straws and still expect to be taken seriously. It seems that he truly believes that the world of historical scholarship is no different from the world of artistic fashion, where all you need to do to make your idea viable is to open your stall in the marketplace of ideas and sell by casting doubts on competing ideas and show the attractive virtues of your own. In the fashion world, sales success depends on the attractiveness to the public of what you offer and of the rhetoric promoting it. In the world of historical scholarship, long-term success of an hypothesis only depends on accountable (not rhetorical) fidelity to the body of evidence.

The four arguments Smith gives for his hypothesis that the tuning was that of the basse de violon all make some sense, and if there were no other evidence, they make it attractive. None
of them (or their combination) is strong enough to exclude the *basso da braccio* tuning hypothesis. But the Talbot/Lewis evidence exists, and that evidence cannot be ignored. It cannot be explained by his *basse de violon* hypothesis, so that hypothesis (not the evidence) must be rejected. An hypothesis can only have objective validity if is able to explain all of the relevant evidence in ways that are reasonably likely historically. There is no reason why the 'usual' violin could not have used the *basse de violon* tuning sometimes by having an overspun 4th string, but the evidence from the Talbot ms. is only consistent with the 'usual' bass violin having the *basso da braccio* tuning.

**Ephraim Segerman**

**Response to Comm. 1620 - Smith on fiddle iconography**

It seems reasonable to expect some correlation between bridge position and pitch standard. In each country, there usually were a variety of pitch standards that applied to different circumstances, and these sometimes changed with time. The choice was usually between a high standard close to modern and a low standard about a tone lower. All I can get out of Smith's bridge-position table 1 (by date) is that the international tendency to standardise on the high standard in the second half of the 18th century is paralleled by more pictures with the high bridge position. Otherwise the numbers show that his collection of pictures has considerably more examples from the first halves of centuries than second halves. Since the violoncello as we know it was invented around 1700, and the first three of the five rows are from before then, there is some ambiguity about the identity of the instruments in the pictures.

The table 2 (by country) is more interesting. During this whole period, Italian fiddles were usually played at the low corista standard, but sometimes they had to play at higher organ standards. This is reflected in the bridge positions. The French standard was low before the 18th century and higher later. It is surprising that there were no examples in the collection of the lowest (a) bridge position (like in the Playford drawing mentioned in the above Comm.), so I suspect that most French pictures in the collection come from the 18th century. The predominance of low bridge positions in the German examples makes me suspect that most of these were from southern Catholic Germany where the standard was usually low. I would expect that the distribution in north Germany and Scandinavia would be like that in Holland and England, where a high standard was favoured for fiddles. Flanders was indecisive on standards and the distribution reflects this. Such a study would be more useful if the German examples were separated according to location (as indicated above) and the categories involved both date and country.

Smith worries greatly about the reliability of iconographical sources. Judging reliability is usually a very subjective business, but can be useful at times. A good example is Talbot's measurements of the bass violin. Only whole and half inches appear on his measurements of over 5". It is unlikely that the maker fixed all of these dimensions with a ruler. Only below this length do measurements with 1/4" appear. A similar pattern appears in his measurements of other instruments. It is thus possible that the accuracy that he worked to was more like a % of the total than a consistent 1/4" or 1/8". As a result, I would consider that the accuracy of his measurements is not high enough to deduce more sensitive parameters like the angle of tilt of the neck.

I worry greatly about what Smith does with his judgements of reliability. Can he be fair in his judgements about the reliability of evidence so that they are independent of whether that evidence supports or rejects his own theories? The previous Comm. shows that the answer is NO. There, he ignored the effect of the evidence of Talbot's report of Lewis's statement on the viability of the tuning he was promoting. He felt free to do this by offering just the vaguest possibility that that evidence was unreliable. Judgements of evidence reliability can sometimes be useful in historical scholarship, but they are more often used for propaganda, providing an excuse for ignoring evidence one would prefer didn't exist.
Multiple-string bowing in the Renaissance

This Comm. was prompted by my wondering about what was the nature of the ribechino, which was a soloistic Italian fiddle before the violino apparently replaced it in the last quarter of the 16th century.

Too often, when we are confronted by historical evidence that is not what we expect, we try to avoid interpreting it by assuming that it is mistaken or an unsuccessful experiment. If it is confirmed by other evidence, interpretation is often still avoided by consigning it to the bin of 'mysteries', ostensibly to await further evidence for 'clarification'. This approach trusts expectations more than evidence. It is a perfectly normal human response, but if the methodology of scholarship was properly applied, the order of trust would be reversed.

Our expectation of early Renaissance fiddles (small violas) and viols (large violas) is that they were played essentially in the same way as their baroque and modern descendants, i.e. one can choose to bow one or two strings at a time, and if a chord involving more strings is to be expressed, it is arpeggiated. We tend to rely on our experience (and keep the lid on our imagination to maintain respectability), so that modern kind of bowing seems to be the only one that makes musical sense. Of course we know about hurdy gurdies, but we tend to agree with Praetorius that it is an instrument of low life, and the less said about it, the better. We have heard also about flat-bridged medieval fiddles, but that evidence is consigned to the bin of 'mysteries'.

Let us now try to consider that other kind of bowing: that of consistently bowing three or more strings at a time. This kind of bowing seems to have come in three versions of where on the string the bow operated. The first was the usual (for us) position of bowing perpendicular to the strings quite near to the bridge, giving the incisive projecting kind of bowed sound that we are used to. The second also was bowing perpendicular to the strings, but much further from the bridge. This gives a mellow humming non-projecting kind of sound. The third is when the bow is held at a considerable angle from perpendicular to the strings. Since strings will only sound if the bow hair moves perpendicular to the string, an angled bow must sweep across the strings in this perpendicular direction. Thus during the bow stroke, the bowing point on each string moves from one to the other of first two versions.

The obvious musical use of multiple-string bowing is to provide a slowly-changing harmonic background accompaniment to a melody, either produced elsewhere or played amongst the strings of the same instrument. The latter uses the available fingers not occupied with maintaining the harmony to finger it. A drone accompaniment is only the most primitive type of harmonic background possible.

TINCTORIS

The bowed instruments mentioned by Tinctoris (c. 1487) include two types of viola and the rebec. One type of viola had 'three simple strings tuned to a pair of fifths, which is the most usual', while the other type had 'five strings tuned unevenly in fifths and unisons. These [strings] are stretched in a protuberant manner so that the bow can touch any one string the player wills, leaving the others untouched'. The rebec was very small and 'like the last-mentioned viola, is also strung for bowing, but, like the lute, it is tortoise-shaped.'

The stringing of the first type of bowed viola is unambiguous - 3 strings with fifths between them. The second type could be ambiguous if we allow 'unisons' to include octaves. Making this allowance, Jerome of Moravia's first two tunings (d' | g g' d"d") and a d d' a' d") and the Renaissance lira da braccio tuning (B^b|ff c g' d") would qualify (the symbol | separates off-fingerboard from on-fingerboard strings). The strings not being necessarily 'simple' could imply courses of pairs of strings, and unevenness could be in the sequence possibly being reentrant or in the on- or off-fingerboard positioning. If we do not make this allowance, a
single strings (or unison pairs) version of the *lira* tuning ($B^b f c' g' d'''$) seem to be the only known tuning that qualifies. If the latter were the case, the more stretchy strings made in Munich (mentioned in the Capirola lute ms. in 1517) would have already been available in 1480's for the bass strings to have a decent sound without octave support.

The 'protuberant' stretching of the strings implies a bridge or combined bridge-tailpiece with a convex curved top. Playing only one string at a time with such a curvature can only happen when bowing is near the bridge. The player could alternatively choose to bow farther from the bridge and play multiple strings. Many pictures show this, but curiously Tintoretta didn't mention it. A related curiosity is that in Tintoretta's discussion of the first type of viola, he also mentioned that a type was invented by the Spanish, tuned like a lute, 'in most cases curved inwards on each side', and plucked. He did not mention the alternative of bowing this 'Valencian viol' (as Woodfield called it). When bowed, this viola could only play multiple strings (see below). It seems very likely that Tintoretta considered that playing styles where some notes were played for only harmonic and not polyphonic function were not respectable enough to mention. He did call the Turkish *tambura* 'miserable and puny', but his disrespect here would not offend any of his readers, while overtly expressing his disrespect for music with multiple-string bowing might. Tintoretta's writings on this subject cannot be considered to be comprehensive.

**VIOLS**

**Spain**

We can't do better than Ian Woodfield's collection of 15th century Spanish paintings (in *The Early History of the Viol*) for a guide to the early development of the viol. The first Spanish invention was the cut-away waist with sharp corners on a viola body. It first appeared late in the first half of the 15th century on fiddles played against the shoulder (see Woodfield Fig. 27, 28). Such a cut-away waist provides the bowing advantages of a narrow instrument on a wider instrument.

One such possible advantage could be, as with modern instruments, to give the bow more angle of manoeuvre while playing one string at a time. Another possibility is that if one was playing all of the strings at the same time, it allows the bridge to have less height without increasing bow-hair tension. It is the latter possibility which was exploited to develop a new dual-purpose viola tuned like the lute that could also be bowed. In this second Spanish invention, the bridge could be so low that it could be glued on to the soundboard with the strings tied to it (without pulling it off), as with most lutes.

The earlier depictions of this new viola show it plucked with a quill, as the lute then was (see Woodfield Fig 18, 19, 20). As with the lute at the time, it appears to have had 9 strings in 5 courses. It is likely that the instrument was developed by Moorish musicians who played it both ways, but the sitters for the angels in the paintings were aristocrats who initially appeared playing it in the simpler plucked way.

When the pictures show this viola being bowed, they show the bow located at the waist cut-outs, which was at about a quarter to a third of the way from the bridge to the nut. It could only have all of the strings bowed simultaneously, producing a humming non-projecting sound.

The dual-purpose character of this viola eventually ceased to be valued, but it flourished in each of its functions separately. The Italians adopted it early as a plucked instrument, redesigning the waist to eliminate the sharp corners, leaving the gentle curves we now call a guitar shape. After 1500, the Spaniards adopted this shape for their plucked violas.

**Italy**

Around 1500, the Italians scaled the bowed violas up to larger sizes and redesigned them to play more like fiddles. This involved using higher movable bridges (usually with curvature) and single strings. Their necks were either tilted back or they had raised overhanging
fingerboards. I consider them to be the first proper viols. This setup reintroduced a choice between single- and multiple-string bowing, depending on the bridge shape and bowing position. Some Italian pictures show very shallow curvature on the bridge, and most show less curvature than on baroque viols. Many of these could have been *lirone* rather than *violone*, in the sense of the following Comm.

One item in a 1539 intermedio was performed by a solo male singer accompanying himself with a viol playing all three of the other parts. It is possible that this was a particularly early example of the arpeggiated *viola bastard* playing style, but it is much more likely that this was done by multiple-string bowing in a *lira* style. Ganassi (1543) published instruction mostly on single-string bowing, but mentioned that some viol players imitated the *lira da braccio* by using a particularly long bow with slack hair tension, and having a viol with less curvature on the fingerboard and on the bridge. He illustrated this polyphonic style of playing with two ricercars and a madrigal with the viol accompanying the voice. Ganassi used *lironi* (large *lire*) as an alternative name for viols (his usual name was *viole*, "though most say *violone"), and it is likely that when the terms appear to distinguish between different instruments, the difference was in the above curvatures and associated playing styles (see the following Comm.).

**Germany**

The Germans adopted the original Spanish bowed viola (with 5 courses, a low flat glued bridge and mostly paired courses), but lengthened the waist so that the musician had the choice of all-string bowing at the original large distance from the bridge, or doing the same but much closer to the bridge, which gives a more projecting tone. This instrument is illustrated in Virdung’s book (1511).

In the first few decades of the 16th century, when families of different sizes of most instruments were developed, small and large families of these violas with single strings appeared in Germany. These were discussed and illustrated in Agricola (1528). A family of large violas (*grossen Geigen*) was mentioned which had the bass tuned to *GG C F A d g*, the tenor and alt tuned to *C F A d g*, and the discant tuned to *F A d g c’*. This family was not illustrated, and so could possibly have been viols of the Italian redesigned type, for which there is other evidence of use in Germany at the time. A set of 4-string *grossen Geigen* was illustrated, and these were violas of the flat glued-on bridge type. It was a family with the bass tuned to *GG C F A*, the tenor and alt tuned to *C F A d*, and the discant to *G c f a*. Agricola wrote that these illustrations and tunings also applied to a smaller set (*kleine Geigen*). Their tunings would then be *G c f a*, *c f a d’* and *g c f a’* respectfully. He also illustrated an even smaller set of *kleine Geigen* with 3 strings each tuned in fifths, and with the same long viola waist and flat glued-on bridge. Their tunings were given as *F c g*, *c g d’* and *g d’ a’*, but probably were an octave higher.

In these German violas with all-string bowing, chord fingerings had to be used continuously, so frets on the neck would be necessary to maintain decent intonation. Playing such instruments could be likened to strummed music on the Renaissance and baroque guitar (the latter being written down in Alfabeto notation), and more recently on the tenor banjo and ukelele. Agricola indicated that the frets on the 3-string instruments could be removed, but playing then became much harder. He also illustrated a set of *kleine Geigen* without frets, and indeed the bridge is protuberant so that individual strings could be bowed. We would identify their body designs as those of rebecs. In his 1545 edition, Agricola used the same illustrations (implying all-string bowing) for the 4-string tunings, but omitted the 3-string ones. It appears that all-string bowing had been abandoned for instruments tuned in fifths. In the text, the 4-string tunings were different (the bass having 5 strings), and applied to what he called the *grossen Welschen geigen*.

Gerle (1532) illustrated a viol of the Italian redesigned type, but without a bridge. The *bri* could not have been integral with the tailpiece because the tailpiece was flat, and from
discussion of the instrument (and the music he provided for it) it is clear that it was usually
played one string at a time. It is thus quite possible that in his culture, bridges were removed
from viols when they were not being played. This could be to make strings last longer, or to
have smaller cases to carry, but it also could mean that there was a choice of inserting a curved
or flat (or an in between) bridge for different styles of bowing. This also raises the possibility
that a curved bridge could have been inserted between the glued bridge and the rose (with the
frets moved) on the violas Agricola illustrated, if one didn't want all-string bowing.

FIDDLES
In the 15th century, we sometimes see pictures where a bridge has been curved for bowing
single strings, but the bow is placed so far from the bridge that only all-string bowing was
possible. Musicians probably valued exerted their choice on this matter.

There were some fiddle designs which catered for both types of bowing to be near the bridge
by having two bridge alternatives. They had a step in the middle of the body, below which
was a convex soundboard on which a tall curved bridge could be placed, and above which was
a flat extension of the fingerboard where, near the step, a low flat bridge could be placed.
These instruments usually looked like fiddles from the neck down to the step, with the tail end
of a rebec grafted below. Some years ago, Lewis Jones showed many slides of depictions of
these instruments at a seminar, with examples of the bridge placed in both places. One
survives (with a flat bridge above the step) as a relic of Saint Caterina de' Vigri in the Corpus
Domini convent in Bologna.

A different shape for this instrument was that of a rebec above as well as below the step. This
became a common design for the rebec-shaped fiddles of the 16th century. Though I have not
seen any 16th century pictures showing a flat bridge above the step, the possibility is clearly
there, and it is likely that some musicians were able to exploit it, playing in a very impressive
manner. That makes it a candidate for the ribechino called for in some of the Intermedii before
(and up to) 1586.

LIRAS
The bridge curvatures on lira da braccio were discussed in Comm. 715. The protuberance
that allowed single-string bowing, which Tinctoris reported, was not common till late in the
16th century, when they were sometimes used as pretentious viole da braccio. Multiple-string
bowing was the usual practice in the early Renaissance, with enough string curvature to give
the musician the choice between bowing three to seven strings, depending on bow pressure
and the bow's position on the string.

By the 17th century, the lira da braccio was so neglected that the name lira could be
unambiguously applied to the much larger lira da gamba (also called lirone perfetto). This
newly-invented instrument was popular as a multiple-string bowed continuo instrument. It had
about a dozen strings which from the top was tuned as a sequence of down a fifth and up a
fourth repeated (with perhaps octave pairs in the bass), plus off-fingerboard strings and a flat
peg plate for tuning (to visually establish its lira credentials). I have not noticed any early
source that associates the simple name lirone with this instrument (as the New Grove does).

CONCLUSION
Multiple-string bowing has been known and practised on reproductions of lira da braccio and
lire da gamba for some time, but the method of bowing Spanish and the depicted early
German violas has been considered a mystery. It need not be a mystery if we trust the
evidence that we see and try it out, giving it a fair chance. I've done that. Bowing strings at a
quarter to a third of their vibrating length away from the bridge may not be considered to be
practical in modern concert conditions (as playing the clavichord is deemed), but there is no
technology problem with the history.
ADDENDUM - Why viols have frets

Everyone knows that a good musician playing one note at a time can be more in tune without frets than with them. Only poor musicians and learners are better off playing such music with frets. The printed early tutors for viols mostly taught playing one note at a time, but they were for amateurs to learn, so frets were appropriate. If professional viol players also only played one note at a time, most probably they would have dispensed with the frets. This seems not to have been the case, so we can assume that they valued a chordal component to their playing more than optimal intonation in single-note playing. Basic training on the lute was universal for string players then, so they knew all of the chords well. Playing chords must have been an important component of professional playing of all viols, and besides explaining why viols have frets, this is probably the main reason why so often they have strings that are not required for playing the notes in their surviving repertoires.

E. Segerman

Origin of the English name 'violin' and more on the 16th century lirone

I have always thought that the English term 'violin' was an English adaptation of the Italian term 'violino'. I was wrong. The English term 'violin' most probably comes from the Italian (or at least Venetian dialect Italian) term 'violino'.

I've been looking at Baroncini's article 'Contributo alla storia del violino nel sedicesimo secolo' in Rivercure VI (1994), which collects and discusses documents (dated from 1533 to 1590) from the Scuola Grande di San Rocco in Venice that mention players of bowed instruments. Before 1550 the players (sonadori) appear in the documents as sonadori de violone (viols) 4 times, de viola (either viols or plucked instruments) twice, de lironi (probably viols playing tunes plus chords, as described by Ganassi) 8 times, de lire (lire da braccio) once and de violetta (viole da braccio) once. After 1550, the players appear as sonadori de lironi 11 times, de violini (probably with the same meaning of 'small violas' as de violetta) 9 times, de violone 5 times and di violle once. Solo players appear of the lire in 1575 and of the violin in 1576, 1580 and 1588.

The author presents the hypothesis that all of the terms meant violins, and those other than violini and violin were 'transitional'. I cannot see how his evidence can possibly support this unlikely hypothesis, but my Italian is not good enough properly to evaluate his arguments.

What I find interesting in this evidence is the increased use of viole da braccio and the continued use of lironi later in the 16th century. Since lironi were in ensembles (usually of 6 members called by voice names such as sopran, falseto, contraltito, tenor, baseto and bason), they most probably played polyphony. So a lirone here was not the same instrument as the lira da gamba (or lirone perfetta), which was popular in the 17th century. The lirone apparently differed from the viol in the bridge and fingerboard curvatures and style of playing.

In Italy later in the 16th century, small viol sets with high tunings coexisted with size-shifted large viol sets of low tunings. The original large size sets could have retained the original names violoni, while the name viole da gamba was introduced for the small sets. The name lirone, being a multiple-string bowed approach to a viol, could apply to all sizes, and it is tempting to associate the 6 voice names with highest-string tunings of d', a', g', g, d and g.

The style of playing polyphony with chords could have had some resemblance to the music for multiple lutes by Adriaensen, where the appropriate vocal line is played on each instrument, with chords that fall under the fingers expressing the current harmony above the bass line and below the other lines.

The plural violini (in contrast with violoni) occurred much earlier than the singular term violin (or violino). The earliest evidence here for the soloistic violin is from 1576.