FOMRHI Quarterly

BULLETIN 92
Bulletin Supplement

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FELLOWSHIP OF MAKERS AND RESEARCHERS OF HISTORICAL INSTRUMENTS
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As one grows older time passes more quickly. Not, however, as quickly as I suggested in my date for next Q in the last Bulletin! Apologies for that and I hope that that was not the reason why not much has come for this Bulletin.

Further to: Last Bull: Self-Adhesive stamps: Don Gill’s tip has proved very useful, though the results are slightly different. You can get these in any post office, not just by post, but they come in rolls (in useful dispensing boxes) of 200 only. Either first class (£52 per box) or second class (£40). What Don got must have been a preliminary version because the stamps in my box are the usual size and shape, marked 2nd rather than 20p. Anyway, it does save licking and I’m grateful for the information.

Pipe & Tabor course: Sorry we had to cancel that; Sabin was coming over to do something else and that got cancelled so that he would have been coming just for us, and we felt, Hélène La Rue and I, that it really wasn’t fair to ask him to do that, especially as we wouldn’t have been able to cover all the air fare etc (though he did offer to come nevertheless). We hope that he will come eventually and that we shall be able to fix something up when he does. Don’t hold your breath, but in the meanwhile it would be useful to have an idea of who might be interested - so if you would be, please let me know.

Emailing the Bulletin: This was just the Bulletin, this part; none of the Comms. It seems to have been well received - I got quite a few responses saying they liked it and only one saying he didn’t. So I’ll go on doing it. Judging from the reactions, most people don’t want the whole thing on email - too much to read on screen, but the Bulletin was thought useful.

Comm.1522 (Camwood): Philippe Beltra writes: “The following may hopefully help FoMRHI readers not to fall into the trap of doing business with them and consequently avoid any disappointments. At the beginning of April 1996 I ordered a small quantity of boxwood squares. After some months of anger, some letters and phone calls to England, I finally got my wood mid November 1996. Luckily I had not paid before. I must confess the wood was very nice, which motivated me at the beginning of December 1997 to pass a more important order. I got a phone call some days after and was told my wood was on the way to be forwarded to me. I made the mistake to pay the day after. This time I got the wood rather quickly, but unfortunately the bad surprise was in the parcel: some pieces were missing, others were cut undersize, some had the heart in them, some had knots bigger than 3/8" and a couple were cracked. Moreover the half of the pieces presented big, ugly, grey to nearly black stripes. In conclusion between half and 2/5 of the pieces were more or less OK, the rest going from rather bad to not even tool handle quality. I sent a sample back together with a letter of complaint, after a phone call of apology I got the missing squares and half a dozen others in replacement of the around forty bad ones! I complained again: that was end of last January and since then I wrote some letters and sent some fax (the last one at the beginning of this month [June]. From time to time I get a nice, polite, promising and apologizing letter, but no wood! That’s it. I hope my bad experience with this firm will help others not to have the same.”

Camwood still: Tom Pockley writes: “I am writing to redress the balance a little regarding Camwood UK and supplies of Boxwood. I ordered some pieces to make a Rottenburgh Taille
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(Plans from the Bate Collection). The timber was sent promptly and when a knot appeared in the Bell joint, quite invisible on the billet, the piece was speedily replaced without any quibble or charge.

Comm.1569 (Steenbergen recorders): Jan Bouterse asks: "What is reason that there are almost no reactions on my articles in the FoMRHI-Q? Am I the only person in the world doing some research into woodwinds?" JM adds: I suspect that many of us who write for the Q feel a bit like that at times. We started FoMRHIQ as a medium for rapid interchange on relevant subjects, and there hasn’t, especially in recent years, been a great deal of ‘inter’.

Comm.1572½: Thinking of hurdy-gurdies, I’ve often wondered just what the King of Naples’s (and thus Haydn’s) machine was like. The Lira Organizzata was a highly organised (in both senses of that word) hurdy-gurdy — did it have drones? And if so were they wind or string, or both? And if so, wouldn’t those pieces for Lira sound rather different from the way they look in the printed editions with alternative woodwind? Any ideas?

News: An email arrived from Allan Atlas in New York: “The Graduate School and University Center of The City University of New York has established a Center for the Study of Free-Reed Instruments, the goals of which will be to foster — and serve as a resource for — fresh scholarship about all aspects of all free-reed instruments, from the harmonium, India’s national instrument, and mouth-blown sheng family of Southeast Asia, China, and Japan to the ‘art-music’ repertories for the English Concertina and accordion to the entire ‘squeezebox’ family and harmonica as they are used in myriad folk and pop traditions around the world. The Center will publish the FREE-REED JOURNAL on an annual basis beginning in Fall 1999. For further information about both Center and Journal, please be in touch with Professor Allan Atlas at Ph.D. Program in Music, Graduate School/CUNY, 33 West 42nd Street, New York, NY 10036, or by e-mail at free-reed@email.gc.cuny.edu.”

And one from Peter Holman: “I am trying to reinvigorate NEMA, and we have agreed to put on a series of summer conferences trying to deal with outstanding problems in the early music field. I’m mentioning this now because I’d like to enlist the support and participation of specialist societies such as FoMRHI and Galpin.” I spoke to him last weekend, and while there’s nothing immediately fixed, there are various things in the planning process, probably for next year — more news will follow.

Queries: Jan Bouterse asks who introduced the term transitional recorders for the one-piece 17th century instruments with ‘a (moderately) narrowing (choke) bore, sometimes playable with Hotteterre-fingerings etc’ and also who is currently using the term in publications?

Would anyone like to review Gustav Fock’s book Hamburg’s Rôle in Northern European Organ Building? I asked Eph a month or more ago to whom he would like me to send it, and he’s never answered, so I think it’s up for grabs.

Festivals: The Suffolk Villages Festival is on 28-31 August in Boxford, Stoke by Nayland, and Assington. Main subject is Haydn in London but will include some other composers. Director is Peter Holman, with Parley of Instruments and others, and there’s a makers’ exhibition also. More information from SVF, The Long House, Coram Street, Hadleigh, Ipswich IP7 5NR.

Coda: That’s it — I said there wasn’t much news.
Deadline for next Q: I really do mean October 1 this time!

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(was with devolution looming in Scotland and Wales, I'm not sure how United the Kingdom is any more, so maybe GB, like on the back of cars, is better than UK)

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BULLETIN SUPPLEMENT

Ephraim Segerman

Soundboard wood imported to England

In Comm. 1575, I mentioned the probable importation of soundboard wood to England in the 17th century. The Talbot ms mentioned woods used to make the treble violin. He said 'Belly of Cullen Cliff. Back, Neck & Ribs of Air. Pegs of dryd Box Ebony or any hardest wood : Fingerboard finest Russian Ebony very hard wood & brings forth clearer sound of Instrf by hard stopping : commonly of Air wood.' Also, 'Bow of fine Speckled-wood'. The only other mention of woods in Donington's published transcription of the parts of the ms. relevant to bowed instruments is 'Back of Air, Belly of Cullen Cliff for the Trump Marine. Donington interpreted 'Cullen Cliff as 'Cologne Cleft', the apparent meaning being split wood imported from Cologne. The instruments themselves could have been imported, so this is not unambiguous evidence of the importation of instrument-building wood, but unless musicians (from whom Talbot extracted his information) conversed with makers who used it, how else would they have known the term 'Cullen Cliff'?

Response to bass violin comments by Catch in Comm. 1574

Dolmetsch postulated the 'tenor violin' as the natural instrument to play tenor parts which are between the alto parts played on the viola and the bass parts played on the cello. He though it would be improve modern orchestras, and was sure that it was used for this function in the baroque. He had no specific evidence and apparently didn't feel that it was necessary to look for any. This is far from the only time that someone has felt that his idea was such a good one for the period that it had to be authentic. The Italian bass violin, though having the appropriate tuning, hardly ever performed this specific role. We only have evidence for it playing tenor parts (and so it was called a tenor geige) in Hitzler's string band of mixed violins and viols.

Since Holman was trying to be comprehensive in the Fiddlers book, I would be very surprised if, in the next edition, he did not mention my work on the sizes of the instruments he discusses. That is irrespective of whether he is convinced by it or not (the latter apparently is Catch's view).

Several waves of scholars studied stringed instrument history, discovered whatever they could, and wrote the textbooks and dictionaries we all refer to today. Most musicians and many researchers today feel that what is in these textbooks and dictionaries is all of what is securely knowable, and research since then has only filled in details; while what was not discovered then is not securely knowable, and have been and should remain mysteries. Catch seems to be one of these. A good scholar considers mysteries are there to be solved by imaginatively collecting and interpreting all of the evidence available.

When the early violino acquired the bass bar

In Comm. 1562 I associated acquiring a bass bar with the transformation of the violino from an alto/tenor instrument to a soprano instrument. The lower range was employed in Giovanni Gabrielli's Sonata pian e forte (1597). Steve Heavens recently showed me the preface of Emilio Cavalliere's Rappresentatione di anima, et di corpo (1600), which mentions a solo violin playing the soprano part. This narrows that time down to about 3 years.
FoMRHI Comm. 1577

Jeremy Montagu

Review of: *Harpa*, no.28, spring 1998, Odilia Verlag, Dorneckstrasse 105, CH-4143 Dornach; info@odilia.ch

This is a periodical which has sometimes been *Harpa*, then *Harpa-Piano*, and now (but for how long?) *Harpa* again. It's all excited about harps, pushing promotion of harps on the first page, and I'm not sure why it has come to us since although there is a little space for early harps they really prefer harps to have pedals, or at least levers if you must play something small. It has lots of pictures of harps and harpists, lots of advertisements, offers you a place on its web site if you're involved with harps, and is probably worthwhile, though expensive (£20, $35, SF 50 a year for three issues of a wholly commercial magazine), for anyone making or playing harps. It is, as it says, the harp promotion journal.

FoMRHI Comm. 1578

Jeremy Montagu


As always there are interesting articles, but this issue begins with a full-page notice of a stolen trumpet from the Bad Säckingen Museum. This a natural trumpet in E♭ marked: Johann Siegmunt Graf in Breitenbach 1746. If anyone sees it, please inform the Mayor's Office, POBox 1143, D-79702 Bad Säckingen, fax +49 7761-51-321. There is a photo of the instrument on the front of Ed Tarr's published catalogue of the collection.

The first article is on a Persy trumpet with an interesting and unusual guidance system for the pistons. This is followed by a short note on the carnyx, a reproduction of which has been produced by John Kenny in Edinburgh, apparently for 'the museum in Edinburgh' but they don't say which museum - if it had been EUCHMI I'd have thought Arnold Myers would have told us about it - perhaps he can add some information for the next Q?

Next one of their very useful catalogue excerpts, this one only a single page, from M J H Kessels of Tilburg, on their miniature brass instruments 'designed specially for bicyclists and unofficial military musicians who also have to carry their full equipment'. This is a set of saxhorns, ranging from a sopranno 21 cm long to an E♭ bombardon in bugle shape only 40 cm long.

A short note on a saxophone mute precedes a note of 1855 by Castil-Blaze on the introduction of wind instruments to the orchestra of the Academy of Music. There is a reproduction of a really revolting American patent for cornet mouthpieces which will avoid the need to learn how to double and triple tongue by using a special valve which will interrupt the air flow in the mouthpiece throat and thus save doing it with the tongue. It will also constrict the diameter and so save having to do the same with the lips for high notes!

This is followed by 26 pages (in the original - two pages on one here) of Anton Hummer's of Graslitz woodwind and brass catalogue of about 1900.

And finally, except for the usual for sale and wanted advertisements, an article on the decline and renaissance of the Boehm flute.

A rather wider range of interests covered than sometimes and, as always, much to interest any wind people.
As you will see above, and indeed as many of you know, this book has been around for quite a while, so why are we reviewing it now? Well, one reason is that we didn't get a copy when it first appeared. Another, which arose during conversations with various colleagues earlier this weekend during the Holywell Music Room 250th Anniversary Conference, is that there are still things to say about it and which, perhaps, need to be said now more than they did when the book was new.

It's a book that many of us know and which many of us admire, undoubtedly a major work of research and scholarship of the sort that we expect from these publishers, one that will become a mine for many other researchers to quarry, and indeed one that already has so become.

For the benefit of any our members who haven't met the book before, it recounts the lives and works of a dynasty of musicians and instrument makers who came from Italy, initially from the town whose name they bear but more immediately from Venice, to the court of King Henry VIII, perhaps in 1525, certainly in 1531, and more permanently from around 1538, with some of the family remaining in this country continuously thereafter, with some to-ing and fro-ing, to the present day. They appear in the court records (for which see Andrew Ashbee's invaluable compilations of these, available from the same publisher) under a variety of names, which can without much difficulty be recognised as being this family, or under group titles such as 'the Italians' or 'the recorders'. They seem, initially at least, to have been wind people, though keyboards and string instruments also turn up among later generations. A modern descendent, who bears their name, is one of our more eminent sackbut players, very appropriately in that that was their initial occupation here in the 1520s. They also made and repaired instruments for the court and, perhaps, for many other courts and lesser customers also.

The reason for writing this review is that while the book teems with facts which give us a vast amount of information about musical life at the Tudor court, it also presents several important hypotheses, and some people, who perhaps have not read the book themselves, are beginning to take these hypotheses as established fact. They have either forgotten, or do not realise, that some of the most frequently used words and phrases in this book are 'perhaps', 'it may be that', and other similar expressions. These hypotheses, these 'perhaps's' and 'it may be's', are important theories, because we can only advance our knowledge by presenting theories and hypotheses, and then, as Eph would remind us, either establishing them as facts or abandoning them as false leads.

This is what David has done: he has established a multitude of facts and, as well as providing a very important historical record, presented, in the main, three theories which it is up to further work, by him and by others, to prove or disprove.

Of these theories, one is central to our work, one is a matter of social history, and one is a rather minor but nevertheless intriguing matter of literary history.

Social history first. This is Roger Prior's area, rather than David Lasocki's, and the hypothesis is that the Bassanos were Jewish. The evidence presented is slender, very briefly that there were other Jews in Bassano, that there were other Jews called Bassano (a number of Jews are called Cowan, but so are lots of Christians; a lot of Christians are called Montagu, but I'm a Jew), and that they had Jewish friends and colleagues ('many of my best friends are...'). On the other side, they seem to have married in church, baptized their
children, and so on; if they were Jewish, we’d say today ‘not very’, and, so far as we are concerned, ‘so what’? To my mind, it’s not something worth spending a great deal of time or trouble on as regards their musical history or status – an interesting side-line if you like, and anyway non-proven. There is a danger here, though. Prior has already written a number of articles on this in various periodicals, and there is a tendency, both in his and in David’s parts of the book, to take those articles as evidence to prove the hypothesis, whereas they are only other presentations of the same hypothesis with greater or lesser detail.

The second is already fairly old-hat, for A L Rowse presented it a number of years ago, that a Bassano daughter, Emilia, was the Dark Lady of Shakespeare’s sonnets. It is an intriguing theory, great fun, may or may not be true (we are unlikely ever to find a note signed WS saying that it was Miss – or Ms – Bassano that inspired him), and anyway irrelevant to us, so I’m not going to say anything more about it here (and anyway I’m not a literary critic, even though I’ve been listening to discussion about this ever since Rowse first propounded it). This again, by the way, is in Prior’s parts of the book. And, again, a warning, for at the beginning of the relevant chapter it is an hypothesis but by the end it seems to be fact, for instance ‘To Emilia we also surely owe Shakespeare’s interest in Venice...’ whereas there is no proof that they ever met each other.

The third, and the one that is of great importance to us, is the possible identification of the double plume mark, the rabbit’s foot mark, the !!! mark, as that of the Bassanos. It is a very tempting hypothesis. All the instruments with this mark are of the right date and the right types. The mark has, for quite a long time, been associated with Venice. At one time it was suggested that it was some official or semi-official registration mark, perhaps a seal of approval like the British Standard kite mark, or the Good Housekeeping seal. I don’t think that anyone ever suggested that the single !!! was standard quality, the double !!! !!! super quality, and the triple special extra, but they might well have.

One quite strong argument against the mark being the Bassanos’, though, is that it appears only on woodwind and cornetts and not on any of the other instruments with which David proves they were involved. This could, of course, be a matter of chance survival; it could be that lute and viol people have not spotted the mark, which is of course quite small. It could also be that such instruments were modified far more than woodwind and cornetts and that the bits with the original mark were those which were discarded when the instruments were remodelled to bring them up to date.

Another argument against is that if they were working for the Tudor court, why are there so few instruments so marked in English collections, to which, of course, one could reply ‘look at the vast list of instruments in Henry VIII’s inventories (in Ashbee’s Court Records, vol.VII, and in Galpin Old English Instruments) and tell me where even one of them is today’.

It is a good theory, it may well prove to be true, but so far it is still only a theory. And this is really why it was felt over the weekend that it would be worth writing this review after all and so far behind the book’s original appearance: to say to us all, please remember that it is a theory – try your best to prove it, but don’t write, as some people are already doing, as though that proof had already appeared. And to say that if you don’t already know the book, get it and read it, both to make your own mind up on these issues and because it is an essential historical record.
Modern errors

On the first line of the 4th paragraph of p. 40 in the last Q, all the pitches in A. S.'s Discant cittern tuning were double-primed (in the second octave above middle C), an octave higher than makes sense in the context. It was a typing error, and all of the pitches in that tuning should have been single-primed. I remember that when I typed it, I was particularly impressed by the coincidence of all the course pitches being primed the same (in the same octave). Apparently this distracted me and I was careless about whether the keyboard shift key was up or down. Subsequently, since it is not a common type of error I make, I was careless about looking for it (and so missed it) in my proof-reading.

D. Z. Crookes made the same error of having a prime too many on p. 61 of his translation of Praetorius. He was discussing the small English cittern (which was the same size of cittern as A. S.'s Discant). The error was in copying the tunings given for the ancient 4-course lute, from which the given cittern tunings were supposed to have been derived. Praetorius then stated that the cittern tunings were an octave higher than these tunings. Crookes's typographical error probably resulted from momentarily mixing up the tunings in the two octaves in his mind when he wrote it.

Errors and inconsistencies in early sources

A valid hypothesis in scholarship must offer explanations of all of the relevant evidence. Thus the hypothesis must be able to offer a reasonably probable explanation of how every piece of apparently contrary evidence got to be mistaken. Typographical errors like mine and Crookes's are reasonably probable. Each of our errors created inconsistencies with other information in the contexts around them. That is how they were detected. Assuming that they are errors, and stating what the correct tunings should be, removes these inconsistencies in our writings.

The same applies to early sources. Inconsistencies in early sources are the main way of detecting the existence of errors. Postulating a reasonably probable error (replacing what actually appears with an assumed original intention) that removes an inconsistency is the main way of correcting errors. If evidence that is relevant to an hypothesis includes an inconsistency, the hypothesis needs to include reasonably probable speculations that remove the inconsistency. These speculations could include errors, but explanations that do not assume errors would be preferred.

Inconsistencies without errors

Of course, there are situations when an inconsistency or internal contradiction does not necessarily indicate that the author made an error. Mace, on p.49 wrote about choosing a lute: 'The Shape generally esteemed, is the Pearl-Mould; yet I have known very excellent Good Ones of several Shapes or Moulds: But I do acknowledge for constancy, the Pearl-Mould is Best, both for Sound, and Comliness, as also for the more conveniency in holding or using.' Then, on p. 205, when discussing his newly-invented Dyphone or Double-Lute, he wrote: 'It is in Its Body of a Perfect Pear-Mould, both Ways, (which is Judg'd the Best Shape for any Lute;) And indeed the Very Best Sounding Lutes are Pear-Mould.' Here the contradiction between the two statements (as to whether the pearl or pear shape was the best) could well be that the author changed his mind. He was very proud of the Dyphone, and it could only have been a double pear shape (because that shape has a much flatter bottom curve). The book was published in bits, and each bit was sent out to subscribers when finished and printed, and Mace did not have the opportunity to edit earlier parts when he wrote later parts.
Errors without inconsistencies

Errors that do not cause inconsistency in a source (or inconsistency with other sources), and make equal sense in the context, are undetectable. One can assume that such errors exist if it is necessary to explain all of the relevant evidence by one’s hypothesis, but if a different hypothesis is offered that equally well explains all of the relevant evidence without assuming such errors, that other hypothesis is to be preferred.

Common errors in writing down numbers are moving the decimal point, writing a 9 for a 6 or vice-versa, interchanging neighbouring digits and leaving out a digit (which could be replaced by doubling a neighbouring digit). Common errors in writing down words are misspellings and the omission of words or groups of words in copying. Replacing assumed missing words can radically change the meaning. Writing a different word than the one intended is rare.

Scholarly method

Many have no patience with all this ‘theory’. All agree that scholarship has to do with collecting and sorting out evidence, from which one comes to a conclusion. We differ in how to get from the evidence to the conclusion, with me advocating formal analysis of the fidelity to all of the evidence of the hypothesis of the conclusion, while the others are content to rely on a general judgement of how well the hypothesis fits the evidence. Since judgements of things being ‘reasonably probable’ are important ingredients in the formal analysis, they see no advantage this methodology has over a direct judgement of how probable an hypothesis is. To them, this methodology can give the ‘wrong’ answers, because it gives too much weight to what they feel is less important and less certain evidence, which they don’t mind rejecting. This is where the formal analysis confers objectivity to the process. They judge the ‘quality’ of the evidence in the light of their confidence in the truth of their hypotheses. It is very difficult to retain the objectivity of being fair to all the evidence without somehow shielding the evidence from judgements of the truth of one’s hypotheses.

H. M. Brown has been quoted as saying ‘Musicology is what you do when you know what is true, and you have to go out and prove it’. Such confidence is fine when pursuing a working hypothesis, but eventually the evidence must have control over the final hypothesis. Also, this statement is wrong because scholarship can never prove that an hypothesis is true, only that it explains all of the available evidence better than others that have been proposed. The other extreme in confidence in getting to truth, as mentioned by Tiella in Comm. 1551, and equally wrong, is that since scholarship cannot prove truth, its conclusions, if not obvious, are worth little more than speculation. In proper scholarship, there is confidence that the hypothesis that explains all of the evidence best is closer to truth than any other, and that is the best that we have any right to expect. Our knowledge is made up of such hypotheses, and it can occasionally change when new evidence or a new better hypothesis changes the situation. There are no mysteries, just the best we can do with the evidence we have and the hypotheses we can imagine at the time.

The advantage of a detailed accounting of how an hypothesis explains each piece of evidence is that it gives the evidence the respect that scholarship is supposed to give it. By requiring careful thought to be given to how easily the evidence could have originally been intended to be what one might want it to be, but then became what it was, avoids cavalier rejection of the evidence by judgements of its quality or importance. Judging the quality and truth of evidence is central in law and much of common experience because the evidence is strongly subject to bias and duplicity. It seems like common sense to treat historical evidence the same way. It can’t and still be objective. Historical scholarship is very different. The historical evidence is all we have. If we don’t trust it to be honest, we can’t have objective history, and can only have what writers want to imagine it to be. Scholarship is a discipline that trusts evidence much more than it trusts hypotheses, and it requires training to follow that discipline.
Contrast with music scholarship norms today

What I have been discussing and advocating here is formal arguments involving fidelity to all of the evidence by an hypothesis. This is rarely seen in what is supposed to be music scholarship today: While professionalism is admired and supported in all aspects of the music industry, the people entrusted with music scholarship believe that it can be done with little or no training in its methodology. What one usually finds is that scholarship is not distinguished from research. The primary objective is to collect evidence and then rework it so that it can be presented it to the field in a comprehensible and usable fashion. The interpretation of what it means, if not immediately obvious, is considered to be a matter of judgement, opinion and speculation. Knowledge is the evidence, plus opinions on its interpretation by the recognised specialist experts in the field, if they all agree. If they do not agree on an interpretation, the issue is labelled ‘controversial’ or ‘a mystery’, and can remain so indefinitely. The formal presentation of an hypothesis, and analysis of how the hypothesis explains the evidence more comprehensively than a rival hypothesis is rarely if ever considered. It would probably be thought of as not in good taste, probably because of an ideal that everyone is working together to advance knowledge, so differences should be presented subtly and not highlighted.

As with an Art, fashions in current thinking and promoting one’s insights are the most important ingredients in the interpretations. Without discrimination according to fidelity to the evidence, there is democracy in ideas, where any reasonable belief about what is true, that can be supported by some evidence, is acceptable. Everyone is free to believe whatever they want. This makes everyone happy and keeps acrimony of disputes down to a minimum, since there rarely are outright winners or losers. Competition between hypotheses that are offered for truth is in popularity and not in fidelity to the evidence. The popularity of a theory depends on how convincing it is to others, with selective use of the evidence used to show its attractiveness.

The concept that scholarship is based on fidelity to the evidence is widely agreed with, but the degree of fidelity is rarely considered or critically examined. This allows judgements using ears filled with and conditioned by modern music performance to compete successfully with the original evidence in how ‘convincing’ an historical hypothesis is deemed. When interpretation is not immediately obvious, these fruits of music research become matters of fashion, and evolve as fashions do. The methodology followed in the field has a long way to go to be proper scholarship that will provide music history with a steady growth of objective knowledge.
Henry VIII’s 1542 and 1547 inventories

Ashbee’s *Records of English Court Music* Volume VII (Aldershot 1993) gives complete transcriptions of the 1542 and 1547 inventories of Henry VIII’s musical instruments. A direct comparison of the two inventories reveals which instruments were acquired between 1542 and 1547 and also sheds some light on enigmatic descriptions. Here is Ashbee’s transcription of the 1542 inventory with the corresponding entry from the 1547 inventory given in italics underneath, omitting the keyboard instruments. Note that they are mostly wind instruments. Comments given in square brackets are annotations made to the 1542 inventory in 1547.

1542 Palace of Westminster inventory

1547 inventory

Item Elevin Vialles great and smale with 3 cases of wodde coverid with black lether to the same.

*Item.* 19 Vialles greate and small with 3 cases of woodde covered with blakke leather to the same.

Item four Gitterns with 4 Cases to them.

*Item.* Foure Gitterons with 4 cases to them: they are caualled Spanishe Vialles.

Item two Gitterns pipes of Ivery tippid with silver and gilt.

*Item.* Twoo Gitteron pipes of Ivorie tipped with siluer and giltie: they are caualled Cornettes.

Item fourtene Gitterns pipes of wodde in a bagge of Lether.

*Item.* 14 Gitteronne pipes of woodde in a bagge of Leather: they are caualled Cornettes.

Item Twenty and foure Lutes with 24 cases to them.

*Item.* 23 Lutes with 23 Cases to them.

Item oone Gittem and oone Lute beinge in a case Chest fashion of Tymiwer coverid with Lether.

*Item.* A Gitteron and a Lute beinge in a Case Cheste fashion of Timbre coverid with leather.

Item sixe cases with Flutes and in every case 4 flutes.

*Item.* 5 Cases with Flutes and in euerie of 4 of the saide Cases 4 flutes and in the 5th three Flutes. [one case wth 4 flutes in it and 1 small flute taken out of an other of the said cases ... to thuse of my lorde pector ... and the rest to the said Phillip vanwilder]

Item oone other case furnisshed with 15 flutes in hit.

*Item.* One Case furnishshed with 15 Flutes in it.

Item oone other case with 10 flutes in it.

*Item.* One Case with terme flutes in it: the same are caualled pilgrim Staves and the same case furnishshed conteinethe butt 6 hole pipes.

Item oone case with 7 flutes in it.

*Item.* One case with 7 Flutes in hitt.
Item fyve flutes of Ivery tipped with golde enamelled blac with a case of purple vellat garnisshid at both thendes with Silver and gilt.

Item. 5 Flutes of Ivery tipped with golde enamelled blacke with a Case of purple vellat garnisshed at both endes with Silver and guilde: the same Case furnisshed containeth the but 4 hole pipes.

Item four flutes of Ivery tipped with Golde in a case coveryd with grene vellat.

Item. Foure Flutes of Iuorie tipped with golde in a Case covered with grene vellat.

Item two cases with Crumhornes with 8 in thone and 7 in thother.

Item. One case with 7 Crumhornes in it.
[thone case ẘ 8 crumhornes in it ... to the use of my lorde pecto'[ ... and thother with 7 in yt to phillip van ut supra]

Item 6 Recorders of Ivery in a case of blac vellat.

Item. 6 Recorders of Iuorie in a case of blacke vellat.

Item oone great base Recorder of wodde in a case of wodde.

Item. One greate base Recorder of woode in a case of woode.

Item foure recorders of walnuttre in a case cov'ed with blac vellat.

Item. Foure Recorders of waulnuttre in a case covered with blacke vellat.

Item nyne Recorders of wodde in a case [of] wodde.

Item. 9 Recorders of woode in a case of woode.

Item oone case with 6 recorders of boxe in it.

Item. One case with 6 recorders of Boxe in it.

Item oone other case with 7 Recorders of walnuttre in hit.
[the said case ẘ 7 Recorders ... to the k[ing]s ma[jes] the owne use]

Item sixtene Recorders great and smale in two cases coveryd with blac leather lyned with cloth.

Item. 8 Recorders greate and smale in a Case covered with blacke Leather and lined with clothe.
[one case ẘ 8 Recorders in it ... to the L pecto'[ ... and the rest to phipp van wilder]

Item two base Recorders of Walnuttre, oon of them tippid with Silver.

Item. Twoo base Recorders of waulnuttre, one of them tipped with Siluer: the same are butt redde woode.

Item foure Recorders made of oken bowes.

Item. Foure Recorders made of okin bowes.

Item oone pipe for a Taber in a case of blac Lether.

Item. A Pipe for a Taberde in a Case of blacke leather.

Item oone Sagbutt of brasse in a case coverid ẘ blac Lether.
[... to the Lorde pecto'[ ...]
Item eight Shalmes in thre cases coverid with Lether.
Item. 8 Shalmes in 3 Cases couered with leather.

Item oone other case wth 7 Shalmes in it.
Item. A case with 7 Shalmes in it: the same case furnissheth conteneth but 5 whole pipes caulld pilgrim Staves.

Item oone case with a great base Shalme in it.
[Def (lost) thole Instrument]

Item oone case with a Shalme of boxe in it.
Item. A case with a Shalme of Boxe in it.

Item oone Bagpipe with pipes of Ivery and the Bagg coueryd with purple vellat.
Item. A Baggepipe with pipes of Iuorie, the bagge couered with purple vellat.

Item two Chestes for instrumentes of wodd paintid thone being gretter then thother.
[to phillip vanwilder ...]

Stuff in the King’s Upper Library:

Item oone Viall.

Item oone Shalme of wodde.
Item. One Shalme of woode.

Instruments listed in 1547 but not in 1542:

Item. A Case couered with crimsom vellat hauninge locke and all other garnisshements to the same of Siluer gilt with 8 recorders of Iuerie in the same Case the twoo bases garnisshed with Siluer and guilte.
Item. One case of blacke leather with 8 recorders of boxe.
Item. A case of white woode with 9 recorders of boxe in the same.
Item. A case couered with blacke lether with 7 recorderes of woode in it.
Item. A little case couered with blacke lether with 4 recorderes of Iuerie in it.
Item. One flute and 6 phiphes of blacke Ibonie tipped with Siluer thone of the phiphes lackinge a tippinge at one ende in a bagge of redde leather.
Item. 3 Flutes of glasse and one of woode painted like glasse in a Case of blacke leather.
Item. 3 Flutes of woode in a case of blacke lether.
Item. 3 Flutes in a redde leather bagge.
Item. A case with 4 Crumhornes in it.
Item. Another case with 7 Crumhornes in it.
Item. 5 shorte Instruments caulld Dulceuses in 5 severall cases to them couered with blacke lether.
Item. 8 Dulceuses couered with blacke lether, some of them havinge tippinges of Siluer.
Item. 4 bagge pipes with pipes of Iuerie.
Item. A little Venice lute with a case to the same.
Item. A chest collered redde with 6 Vialles hauvinge the Kinges Armes.

(5 pairs of Virginalles are also newly listed)
Being fair to evidence in scholarship

I have deliberately taken my title from a section heading in Eph’s last Bulletin Supplement (Q 91 p.6) because, on the opposite page, Eph immediately transgresses his own demands of “What is missing from his approach to scholarship is objectivity. That means having respect for, and being fair to, every piece of evidence.”

So, on the opposite page we read: “Jeremy obviously thinks that much of the music he discusses that didn’t use timps would have been better if they had been used.” Where is the evidence that I suggested that? It’s not obvious to me. I asked whether anyone had any ideas of why they were used by two composers only once – I didn’t even mention of any other works by either of them, let alone suggest that these unmentioned other works would have been better if they had included timps. Perhaps the reason for this is that I didn’t believe that they would have been better! Timps were normally only used with trumpets, a convention that continued into the nineteenth century, and Praetorius (this is Michael, the Syntagma and Terpsichore chap, not Hieronymus) doesn’t seem to have used trumpets anywhere else either (perhaps Guild troubles). Schütz did use a couple of trumpets in another work, his Historia von der Geburt unser Herrn Jesus Christi, where the trumpets are playing typical Trumpet Tune passagework – to use timps there would be wholly unsuitable.

As Eph would seem to imply (this is the way that scholars properly treat implications where statements are not specific – they don’t go tossing words like ‘obviously’ into their texts) timpani were effect instruments, used to make a special emphasis. This isn’t in fact how Schütz used his, though it is rather how Praetorius did use his trumpets and timps in two places in his work though not in the first chorus – it would appear (ahem! – I won’t repeat myself) that Eph has not looked at either score.

The interesting point is that both composers used the instruments once and not again. If they’d never used them at all, it wouldn’t have been surprising. Praetorius’s could be the first use in a musical context (musical as distinct from ceremonial, for which there is plenty of earlier evidence, what with Aufzüge, Auszüge, tuckets, sennets, and so forth). I’m not saying that it is the first (to do so would be unscholarly because who knows what other works are tucked away in libraries or even sitting on the shelves of libraries I know, in volumes I’ve not yet looked at), but it’s the earliest I’ve found so far. So he did something newish. Now when many people do something newish, if it’s successful they often again. If it’s not successful, they don’t. Maybe it wasn’t, and that could be one reason why Praetorius didn’t do it again. Another could be he didn’t write another piece of music in which they would be suitable (that needs chronological and qualitative musicological research that I’ve not done). There are all sorts of possible reasons, and I was asking whether anyone had come across any.

Schütz is in a slightly different position. He was following his exemplar and teacher Giovanni Gabrieli, and Gabrieli didn’t use them either (it looks as though Italians didn’t, and in fact one query is did Monteverdi use timps in the L’Orfeo toccata or not? My guess is not – if he’d been writing in Germany he certainly would have done, for this is a typical trumpet and drum Aufzug, but not I think in Mantua). All the same, it would be interesting to know why Schütz tried them once and not again. Remember that he’s a lot later than Praetorius – by this time other people were using them quite often.

But Purcell is the most interesting one. Again I am not saying that the music would have been better with timps. But I am wondering why he imitated timps on other instruments – doing so
suggests (no, I wouldn't use the word 'obviously') that he thought it would be better with timps but that for some reason he could not or would not use them. It can't have been a matter of expense, surely – these were Birthday Odes for the Queen (I'm not thinking here of his dramatic music, etc – theatres are always strapped for cash; these are specific cases, Arise my Muse, 1690; Welcome Glorious Morn, 1691; also the Yorkshire Feast Song of 1690, but that last one could have been lack of cash). These are cases where he wanted, and indeed wrote, timpani parts but did not (could not? would not?) use those instruments, so the parts are there for the string etc basses. Why not?

Eph also says: "Timps have no melodic or harmonic contribution to make to a musical ensemble..." Do I really read this aright? Is he really writing about the same instruments that I am? Timpani were, in the seventeenth, eighteenth, nineteenth, and early twentieth centuries tuned conventionally (there are plenty of exceptions) to the tonic and dominant, sometimes plus sub-dominant, of the prevailing key (one can change tunings as one goes along and thus accommodate changing keys, though not all composers asked for this). It is therefore possible to provide a "harmonic contribution" and many composers, from the earliest days of trumpet/timpani fanfares down to the present day, expected timpani to do so. I don't think I have to list musical examples, do I? From at least the late eighteenth century onwards timpani have, from time to time, been asked to provided melodic contributions also; a very simple example is the Mozart Serenata Notturno K.239, and an earlier one is the Philidor March for two timpanists. But there are concertos for timpani (not very successful, actually, though rather fun in an elephantine sort of way) and one of the most brilliant examples of melodic use is in Britten's Nocturne Op.60, from figure 15 to figure 20. There is a strong temptation, at the end of this paragraph, to be thoroughly unscholarly and to use, as Eph says timpani are only capable of doing, and therefore perhaps appropriately for a timpanist, some four-letter words (I beg his pardon – 4-letter), though the word 'crap' has five.

PS Eph also says "Obvious misprints can easily be explained as errors of carelessness" – hence my 'Deadline for next Q of 1st October' instead of July – oops! and apologies.
The current restoration by Martin Goetze and Dominic Gwynn of a Thomas Parker c. 1765 'changeable organ' for Edinburgh University has revived interest in Dr. Robert Smith's 'Harmonics, or the Philosophy of Musical Sounds' (1st Ed. 1748; 2nd Ed. 1759).

In it he advocates two methods of tuning organs or harpsichords:

(a) His 'Equal Harmony' tuning (not to be confused with 'Equal Temperament') where he designs an equal, but restricted (non-cyclic) temperament in which, over the entire keyboard compass, each flattened fifth and sharpened major sixth (as measured from their common bass note) beats at the same rate.

In describing this, Smith writes:

But upon telling Mr. Turner, one of our organists at Cambridge, how he might approach near enough to that system, ... by his great dexterity and skill in tuning he presently put my rule in execution upon a stop of his organ; and affirmed to me, he never heard so fine harmony before, especially in the flat keys; but he added, that for want of more sounds in every octave the false concords were more intolerable than ever ... and as the old expedient for introducing some of those sounds by inserting more keys in every octave, is quite laid aside by reason of the difficulty in playing upon them; I have therefore invented a better expedient ...

Provision for these extra sounds of both C sharp and D flat, E flat and D sharp, G sharp and A flat, and B flat and A sharp was made on the harpsichord specially built for Dr. Smith by Jacob Kirckman in 1757, who cleverly rearranged the use of the Unison registers, one supplying the sharps, the other the flats. Also, Thomas Parker, having been closely associated with Dr. Smith in Cambridge because of his work on the organ at Trinity College, provided similarly-equipped organs in the 1760s, by the use of additional pipes operated by various levers. The Edinburgh organ evidently is an early example of this, to be closely followed by the second Foundling Hospital organ of 1768, which supplanted Handel's original instrument of 1751.

The Equal-Harmony tuning for these instruments requires the Vths to be even flatter than those of the conventional 1/4 comma, or Mean Tone, their being, in fact, reduced to 4/3.8 comma, this resulting in the major thirds therefore being very slightly flat.

As no pure intervals other than octaves are present, the tuning is best achieved by reference to a pitch meter; nevertheless a suggested method by ear, counting beats, is appended.

(A word of caution here about the printed table of beats on page 274 of Smith's 2nd Edition with its associated text.)
Notwithstanding this, the authors trust that the figures they have presented properly represent Smith's ideal system of 'Equal Harmony').

(b) Because this Equal-Harmony scale forced the chromatic accidentals (e.g. C sharp versus D flat) even further apart than they were in Mean tone, it was then paradoxically even more musically essential for these alternative chromatic accidentals counterparts to be provided. However, this being generally extremely impractical, as Smith himself recognised, he then proposed an alternative method to Mean Tone which he considered far superior for tuning conventional instruments — those he identifies in less than complimentary terms as having 'defective scales' (i.e. with only the usual twelve notes to the octave).

His consequent 'proper system for defective scales' is a \( \frac{5}{4} \) comma equal, but restricted (non-cyclic) temperament that creates a scale where each tuned fifth beats slightly flat at the same rate as the major third on the same bass note beats slightly sharp. For music with predominately simple, root-position chords, this is a very useful alternative to \( \frac{5}{4} \) comma or Meantone; especially so, of course, for the sustaining qualities of organs.

As the Edinburgh Parker organ is at \( a^4 = 440 \) Hz, the calculations on the next two pages are for this pitch. Beat rates must, of course, be adjusted proportionally for other pitch standards.
Dr. Robert Smith's "Equal Harmony" Scale for $a' = 440\text{Hz}$.
(A $\frac{5}{12}$ comma restricted (non-cyclic) equal temperament, in which the IVth beats flat at the same rate as the VIth on the same lower note beats sharp).

<table>
<thead>
<tr>
<th>Scale</th>
<th>Hz</th>
<th>Beat Rates</th>
<th>Cents</th>
<th>(E.T. Cents)</th>
<th>Difference (Cents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>c'</td>
<td>263.65415</td>
<td>2.72</td>
<td>71.86</td>
<td>100</td>
<td>-28.14</td>
</tr>
<tr>
<td>&lt;#1</td>
<td>274.62038</td>
<td>2.84</td>
<td>120.10</td>
<td>100</td>
<td>+30.10</td>
</tr>
<tr>
<td>#1</td>
<td>282.37895</td>
<td>2.92</td>
<td>191.96</td>
<td>200</td>
<td>-8.04</td>
</tr>
<tr>
<td>c#1</td>
<td>294.34735</td>
<td>3.04</td>
<td>263.82</td>
<td>300</td>
<td>-36.18</td>
</tr>
<tr>
<td>c'</td>
<td>306.82293</td>
<td>3.17</td>
<td>312.06</td>
<td>300</td>
<td>+12.06</td>
</tr>
<tr>
<td>c'</td>
<td>315.49132</td>
<td>3.26</td>
<td>383.92</td>
<td>400</td>
<td>-16.08</td>
</tr>
<tr>
<td>&lt;##1</td>
<td>328.86315</td>
<td>3.34</td>
<td>504.02</td>
<td>500</td>
<td>+4.02</td>
</tr>
<tr>
<td>&lt;b'</td>
<td>352.48665</td>
<td>3.64</td>
<td>575.88</td>
<td>600</td>
<td>-24.12</td>
</tr>
<tr>
<td>&lt;b'</td>
<td>367.42063</td>
<td>3.80</td>
<td>615.95</td>
<td>700</td>
<td>-4.02</td>
</tr>
<tr>
<td>&lt;b'</td>
<td>393.81984</td>
<td>4.07</td>
<td>767.84</td>
<td>800</td>
<td>-32.16</td>
</tr>
<tr>
<td>a'</td>
<td>410.51146</td>
<td>4.24</td>
<td>816.08</td>
<td>900</td>
<td>+16.08</td>
</tr>
<tr>
<td>a'</td>
<td>422.10924</td>
<td>4.35</td>
<td>887.94</td>
<td>900</td>
<td>-12.12</td>
</tr>
<tr>
<td>a'</td>
<td>458.64886</td>
<td>4.74</td>
<td>959.80</td>
<td>1000</td>
<td>-40.20</td>
</tr>
<tr>
<td>b'</td>
<td>471.60668</td>
<td>4.87</td>
<td>1008.04</td>
<td>1000</td>
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<tr>
<td>b'</td>
<td>491.5953</td>
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<td>1079.90</td>
<td>1100</td>
<td>-20.10</td>
</tr>
<tr>
<td>c'</td>
<td>526.9083</td>
<td>5.45</td>
<td>1200.90</td>
<td>1200</td>
<td>0</td>
</tr>
</tbody>
</table>

Method of tuning from $c' = 440\text{Hz}$ for $c$ (0 = note to be tuned, * = note already tuned).

[Make sure all IVth beats flat at the major VIth beats sharp at the same rate.]

# Tuned

Then $\textit{tuned}$.

(C) ALN MacKenzie. 1998

Kenneth W. Moobes
Dr. Robert Smith (1768) "A proper system for defining scales" (i.e. when the keyboard has only the standard number of notes to the octave). This system of \( \frac{1}{2} \) comma Eigné, but restricted, temperament creates a scale where each tuned \( 2 \) beats flat at the same rate as the \( \text{III}^{\text{rd}} \) on the same lower note beats sharp.

<table>
<thead>
<tr>
<th>Scale</th>
<th>( f(\text{Hz}) )</th>
<th>Beat rates of ( \text{VII}^{\text{th}} + \text{III}^{\text{rd}} ) above</th>
<th>Cents</th>
<th>(E.T. Cents)</th>
<th>Difference (Cents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>c'</td>
<td>262.146177</td>
<td>( \frac{17}{12} ) ( \frac{19}{12} ) above</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>c#</td>
<td>275.94593</td>
<td>( \frac{17}{12} ) ( \frac{19}{12} ) above</td>
<td>59.465</td>
<td>100</td>
<td>-19.04 -10.32</td>
</tr>
<tr>
<td>d'</td>
<td>296.12657</td>
<td>( \frac{17}{12} ) ( \frac{19}{12} ) above</td>
<td>198.55</td>
<td>200</td>
<td>-5.44 +2.72</td>
</tr>
<tr>
<td>e'</td>
<td>314.07614</td>
<td>( \frac{17}{12} ) ( \frac{19}{12} ) above</td>
<td>308.16</td>
<td>300</td>
<td>+8.16 +16.32</td>
</tr>
<tr>
<td>e^#</td>
<td>329.11001</td>
<td>( \frac{17}{12} ) ( \frac{19}{12} ) above</td>
<td>384.12</td>
<td>400</td>
<td>-10.88 +19.04</td>
</tr>
<tr>
<td>f'</td>
<td>351.13015</td>
<td>( \frac{17}{12} ) ( \frac{19}{12} ) above</td>
<td>502.72</td>
<td>500</td>
<td>+2.72 +10.88</td>
</tr>
<tr>
<td>f^#</td>
<td>365.2564</td>
<td>( \frac{17}{12} ) ( \frac{19}{12} ) above</td>
<td>583.65</td>
<td>600</td>
<td>-16.32 -8.16</td>
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<tr>
<td>g'</td>
<td>393.22928</td>
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<td>677.28</td>
<td>700</td>
<td>-2.72 +5.44</td>
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<tr>
<td>g^#</td>
<td>419.05461</td>
<td>( \frac{17}{12} ) ( \frac{19}{12} ) above</td>
<td>778.24</td>
<td>800</td>
<td>-21.76 -13.6</td>
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<tr>
<td>a'</td>
<td>440.00000</td>
<td>( \frac{17}{12} ) ( \frac{19}{12} ) above</td>
<td>891.84</td>
<td>900</td>
<td>-9.16 0</td>
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<tr>
<td>a^#</td>
<td>466.84066</td>
<td>( \frac{17}{12} ) ( \frac{19}{12} ) above</td>
<td>1005.44</td>
<td>1000</td>
<td>+5.44 +13.6</td>
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<tr>
<td>b</td>
<td>492.33333</td>
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<td>-13.60 -5.44</td>
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<tr>
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<td>( \frac{17}{12} ) ( \frac{19}{12} ) above</td>
<td>1200.00</td>
<td>1200</td>
<td>0</td>
</tr>
</tbody>
</table>

**Method of Tuning** from a' \( = 440 \text{ Hz} \) fork (make sure all the \( \text{VII}^{\text{th}} \)s beat flat and the major \( \text{III}^{\text{rd}} \)s beat sharp!)

- 440Hz
- \( \text{VII}^{\text{th}} \)s beat flat
- \( \text{III}^{\text{rd}} \)s beat sharp

**Beats per sec**

- 3 56 0 2 67 2 38 0 3 18 2 13 0 2 85 0 3 81 2 35 0 0

**No. of Beats**

- 1 7 8 0 13 35 11 9 0 15 9 10 65 0 14 35 0 19 05 12 75 0 0

**Then notes tuned**

- Chromatic

© Kenneth Mabbs
1998
A case for the ‘Ganassi recorder’ in Vienna

This is a reply to Alec Loretto’s very interesting Comm. 1570.

In 1997 I was awarded a Winston Churchill Travelling Fellowship to visit many of the European collections of wind instruments and I am very grateful to Dr Stradner of the Kunsthistorischesmuseum, Vienna, for allowing me to spend a week there in November. While there, I examined all the wind instruments with the maker’s mark !! and found about 10 different variations in the mark in this collection alone. When I explained to Dr Stradner about these variations he recalled seeing a !! mark on one of the surviving recorder cases. We brought up all four cases, examined them closely and found the mark on the inside of the lid of case SAM 171. I pointed out to Dr Stradner that this variation of the mark was identical to the mark found on SAM 135 which he then put into the case and it fitted perfectly.

This case was made to hold four recorders: SAM 135 and another of the same size, one smaller and one larger (i.e. descant, 2 altos & a tenor or discant, 2 tenors & a bass depending on your terminology). This same mark is also found on three other recorders in Vienna namely SAM 146, SAM 149 and SAM 150 which are all tenors, so there must have originally been more than one set of recorders with this particular variation of the !! mark. SAM 135 is the new number for C8522, the so-called ‘Ganassi recorder’, so it doesn’t seem to have been exclusively a solo instrument. The dimensions and a photograph of the case are given in Schlosser’s 1920 catalogue, unfortunately it has been damaged since then during the second World War.

Incidentally, about 40 of the recorders in Vienna came from the Catajo collection and there must have been even more originally. If this doesn’t constitute a huge recorder ensemble then I’d like to know what does (only a joke, Alec – no doubt they were in a variety of pitches).
Recorder Fingerings in Print

Variety, we are told, is the Spice of Life. One doesn’t need to look far to find a variety of ways in which people do a number of things differently. Some drive on the left, others on the right. In the English language it’s possible to chop a tree down, and then chop it up. But not in the German language. Some eat this part of a vegetable and throw away the remainder. Some eat the remainder and throw away this part. And some write recorder fingerings this way. Others write it that way.

There’s no really important reason why everyone should write recorder fingerings in exactly the same way, even though some methods might be a little clearer than others. I prefer to use the following system -

a] The thumbhole is shown using zero - 0  
b] The finger holes are numbered from north [mouthpiece] to south [foot] using 1234567  
c] The south end of the bore is shown using the figure 8  
d] A hole partially covered, pinched, or leaking is shown with a diagonal thus - 0 8 8  
e] Open [ie unfingered] holes are not written

Using this system the lowest note obtainable is shown 012345678 with the knee perhaps shading hole 8
The lowest fingered note of the recorder is written 01234567
The note an octave higher is written 02 and not 0.2 . . . . . .
The note a semitone higher than 02 is written 12 and not .12 . . . .
Using Dolmetsch fingering on an appropriate instrument the octave of 0123 becomes Ø123
Similarly, using Ganassi fingering on an appropriate instrument, Ganassi gives the octave of 01 as Ø16 or Ø156
Ganassi gives a fingering of 0123567 in the lower register
He gives a choice of two fingerings for the octave, one being Ø12356

And so on. Keep it simple. Use the minimum number of symbols. Write only that which is essential. Nothing else.
FoMRHI Communication Number - 1586

Alec V Loretto

Long and Short Recorder Feet

FoMRHI Comm 1555 by Jan Bouterse [JB] I found most interesting and he was kind enough in private correspondence to invite my comments. I'm quite happy to accept his definition of what constitutes a long foot and what is meant by short foot -

1] JB Long Foot definition - 107mm or longer
2] JB Short Foot definition - 105mm or shorter

but would point out that these are overall lengths.

If example 1] has a socket length of 16mm then the actual bore length of the foot is 107mm minus 16mm = 91mm.
If example 2] has a socket length of 14mm then the actual bore length of the foot is 105mm minus 14mm = 91mm.

In other words, physically the feet vary greatly with different overall lengths and different socket lengths. But, having the same bore length, they could acoustically be very similar. Such differences in socket lengths do exist. Maybe overall length of the foot is not the main factor to consider. Perhaps we need another definition derived from a clearly defined percentage length - see below.

Important to consider with these recorders of different design are -

3] The bore length of the foot
4] The speaking length of the actual foot bore, expressed as a percentage of the overall speaking length
5] The distance from the Blockline to the centre of Hole 7
6] The distance from the Blockline to the centre of Hole 7, expressed as a percentage of the overall speaking length.

Here are a few details of four original alto recorders some derived from my measuring and some from Fred Morgan's. All figures are rounded off to one decimal place.

7] Bressan 1: Overall speaking length - 450.5mm
Actual foot bore length - 94.1mm
Actual foot bore length expressed as a percentage of overall speaking length - 20.9%
Distance from Block Line to centre of Hole 7 - 361.8mm
Distance from Block Line to centre of Hole 7 expressed as a percentage of the overall speaking length - 80.3%

8] Bressan 2: Overall speaking length - 450.2mm
Actual foot bore length - 90.3mm
Actual foot bore length expressed as a percentage of overall speaking length - 20.1%
Distance from Block Line to centre of Hole 7 - 364.3mm
Distance from Block Line to centre of Hole 7 expressed as a percentage of the overall speaking length - 80.9%
Bressan 3:
Overall speaking length - 444.6mm
Actual foot bore length - 86.2mm
Actual foot bore length expressed as a percentage of overall speaking length - 19.4%
Distance from Blockline to centre of Hole 7 - 361.3mm
Distance from Block Line to centre of Hole 7 expressed as percentage of the overall speaking length - 81.3%

Stanesby
Overall speaking length - 442.2mm
Actual foot bore length - 84mm
Actual foot bore length expressed as a percentage of overall speaking length - 19%
Distance from Block Line to centre of Hole 7 - 360.6
Distance from Block Line to centre of Hole 7 expressed as a percentage of the overall speaking length - 81.5%

The above four instruments, using JB’s definition, can be classified in two groups - 7] and 8] are longer recorders with long feet, while 9] and 10] are shorter recorders with short feet. There was a tendency, with long foot joints, for Hole 7 to be positioned [pro rata] further north, which requires a decrease in hole size, to facilitate a well tuned octave of 012345 using 012345. This change in position and size of Hole 7 affects the upper register’s ability to speak freely and in tune. A small Hole 7 placed a little too far north, seems to cause problems with the speech of some higher notes, and in addition seems to vent them insufficiently, leading to flatness. One cure for this is to humour problem notes using a variety of fingerings and to this JB rightly draws our attention.

It’s too easy to justify theories by using selective information. But it is nevertheless interesting to note that when the third detail [in the tables above] is smaller than 20%, and when the more the fifth detail is greater than 75%, such instruments both speak and play in tune more easily than those tending towards opposite values. Put simply, it is my experience that two important factors among many that influence the speech and intonation of the high register, are first - the actual ratio of foot bore length compared with the overall speaking length, and second - the distance of Hole 7 from the south end of the instrument.

Some years ago it was explained to me by an acoustician that the theory was valid for more instruments than just the recorder. I understood very little! But not to be overlooked is the considerable influence modifications, repairs, restorations and ageing can have upon how a recorder plays. And none of the above of course, takes any account of the enormous effect of the bore on speech and intonation.

JB has carefully avoided trying to extract too much from the way bass recorders behave because there are contradictions if one seeks answers using a bass recorder, and then applies one’s discoveries to the alto, because the basic design of the two instruments is so different. Due to the limits imposed by arm lengths and finger spans, enormous compromises are made in the design of the single keyed large recorders. It’s interesting to get a long enough piece of broom handle and mark on it with a felt nibbed pen typical F alto finger hole positions. Using the same broom handle now multiply by two and mark with a different colour the theoretical finger hole positions for an F bass recorder. Now multiply the F bass positions by two and mark the theoretical finger hole positions for the F sub-bass. Both the bass and the sub bass [unless fitted with some keys] become unplayable. The felt pen marks are simply too far apart to be fingered. Since the earliest times makers have solved this problem by spacing the finger holes as much as they dare, and at the same time widely separating the left and right hands, creating a large distance between holes 3 and 4. The serious intonation problems these moves cause, by positioning finger holes
well away from their acoustically correct positions, are alleviated as much as possible by changing finger hole sizes, undercutting, and bore adjustments. All of this is not necessary on an alto, the finger holes of which are more or less in the correct acoustical positions. I haven’t explored this topic as fully as JB, though I have been aware for many years of long foot and short foot recorders. I’m quite unable therefore to answer with any certainty JB’s principal questions as to why some makers made mainly recorders with short feet, why others made mainly recorders with long feet, and why others made both. But over the years thoughts have crossed my mind. For example, some recorder bores of different makers are so incredibly similar that I wouldn’t be surprised if they were able to obtain pre-reamed blanks, even that many years ago. To put it another way, were there craftsmen in a number of places who could produce reamers, but wanting to increase their incomes even further, supplied the three reamed alto recorder blanks using wood of their own? And if sometimes the three wooden blanks requiring boring and reaming came from a different source including the makers themselves, might they have different length ratios? It could possibly explain the apparently random production of recorders with long and short feet. The makers of course could modify the supplied bores, even if they hadn’t done the principal boring and reaming themselves.

Corn 1555 points out that few recorders today are made with long feet but I hope that Jan Bouterse can reach some firm conclusions in his study of original alto recorders with feet both long and short. Having done that he might like to turn his attention to original Voice Flutes, where results are even more surprising, not to say confusing!

BULLETIN SUPPLEMENT (CONTINUED FROM PAGE 4) Ephraim Segerman

Pitch standards and playing viols in the 16th century

Musicians are the ones who create and abide by a pitch standard. Abiding by it can involve the problem of acquiring an instrument of the right size to start with, but it makes playing with others a lot easier afterwards. This clearly happened all over in the baroque, but it is not so clear how much this happened in the Renaissance beyond the standard obviously needed for each set of the same type of instrument. When there was no need to play with other types of instruments, one just tuned to a convenient pitch. When a particular pitch level was given a name, this indicates that a standard was widely recognised because it was needed for playing with other instruments (or instruments not in one’s set). The standard name corista was mentioned in Italy at least as early as 1562.

In Comm. 1545, I mentioned that Ganassi (1543) wrote that most of his contemporaries played on 5-string viols with highest-string assumptions of a’, d’ and a. I interpreted using only 5 strings as evidence that they wanted to play at the corista standard. It thus seems quite likely that playing in pure sets was not all that they did with their viols. Pictures show a lute often playing with viols.

FoMRHI Index project

You might have thought that the Index project was well on its way. Wrong. It has stopped dead in its tracks. Jeremy and I don’t agree. He feels that full usefulness requires it bound in one volume (at least the permuted index). I favour publishing in a series of volumes, each one like an ordinary Q. The only way the log jam can be broken is if you, the members, express your preferences, and a strong majority favours one way or the other.

One-day Conference on the historical background to the new ‘Handel’ organ in St Cecilia’s Hall

This conference is on 15 August, 1998 at The Laight Room, St Cecilia’s Hall. The fee is $20 (£13 for students and concessions) and includes conference fee, morning coffee, lunch, afternoon concert and interval coffee. Post application and fee to Organ Conference, St Cecilia’s Hall, Niddry Street, Cowgate, Edinburgh EH1 1LJ, Scotland. Make cheques etc payable to ‘University of Edinburgh’.
Tinplate instruments – Further to Comm. 1568

One instrument in my own collection, which I showed John when he was over here, is a tinplate tuba which I bought in Iowa City (West's Music Store). It is not unlike his figure 4, but tuba shape rather than trumpet shape, and the bows are more elaborate with a couple of joints at each corner, instead of one, to simulate a curve. The mouthpiece is much more elaborate, formed with inner and outer shape with something, perhaps pitch or some similar substance, between the two into an exact simulacrum of a ‘proper’ tuba mouthpiece. I was told that it was made around 1848 by a Czech immigrant (remember that it was in Iowa that Dvořák spent some time) for use in a Czech band, and certainly it will provide an adequate oompah, the pitches of which can be bent by the lips for more than one chord. One of my American colleagues was going to publish the instrument in a tuba journal but I don’t know whether he ever did. If so, some of you may have seen a photo of the thing.

An European tinplate ‘blowhorn’ is the midwinterhoorn of the early years of this century. This is a lowland alphorn used in the Twente district of Holland – I won’t repeat all the details here, which can be read in my article in Galpin Society Journal XXVIII, 1975. Originally, and again today due to the machinations of the folklorists, it was made of wood, always with a curve in the body, mainly straight and then curving to the bell (this curve is essential for the quality of the sound, makers say as do crumhorn and cornett makers). It is made by cutting down a tree, splitting it lengthways, perhaps originally with an axe but now with a saw, and hollowing the two halves with gouges, and then reuniting the two halves. Early this century (maybe late last century?) stove pipe makers saw a way to make some extra pennies, and it was of course very much easier and quicker to make such instruments of blik, as the tinplate was called, than chopping down trees and doing it all from wood. The cheapest blik hoorn would have just one joint to make a bend – I found a man, Mr Geerligs of Deurningen, who used to make them and who made me one like that (details in Appendix 1 & 2B in GSJ). He quoted me a price per joint, and I took the cheapest. After the last war, the folklorists insisted on people going back to wooden ones, and as they run competitions with prizes, if you want a prize you use the hoorns they want. So that was the end of the blik hoorn.

Whether metal ones still exist in Romania, I don’t know. They used to, but these were straight, like the wooden buciun. As well as the usual copper and brass ones, I have a Moroccan nfir of ferrous metal but I think that this is reused petrol tin or something of that nature rather than tinplate.
Alec Loretto says in a Comm also in this Q that 'Some recorder bores of different makers are so incredibly similar that I wouldn't be surprised if they were able to obtain pre-reamed blanks, even that many years ago.' This reminded me of the following Comm which I started nearly fifteen years ago and for some reason never got round to finishing (though I have spoken of it to various people, hence the reference to its subject in the New Langwill Index). So I mentioned it to Alec and later the same day (the wonders of email), he encouraged me to put it in the same Q as his Comm, saying that he had also been mulling over this idea for quite a while but had never put it into print before.

What caught my eye, not long after we had acquired the Edgar Hunt Collection at the Bate, was the outside, not the inside of two of the recorders, but it produced exactly the same reaction as Alec's: were there eighteenth-century makers turning out recorder blanks to the trade? It would not be surprising if there were. We know that there were eighteenth-century key makers, John Hale for instance; many instruments with other names on their bodies have keys whose undersides, where they can't be seen unless you take them off the instrument, are stamped IH for John Hale and other marks for other makers. It is possible, of course, that IH meant that Hale had made and wholesaled the instrument itself, as he probably did my 'Goulding' six-key bassoon. Similarly Potter wholesaled flutes to Clementi, as did Prowse in the next century.

The two instruments concerned are rather earlier. One is the famous Bressan treble recorder, which has inspired so many modern copies, and the other is the Urquhart treble. Bressan is, of course, well-recorded as a maker (eg in the Talbot Manuscript – see Tony Baines in GSJ I – and by Maurice Byrne in GSJ XXXVI). Urquhart, on the other hand is a much darker horse, and nothing is known of him save that he made, or anyway sold, this and at least two other recorders, and one transverse flute. His name, and the use of a thistle on his stamp, have suggested a Scottish origin or domicile, but this may have some quite different reason, just as Bressan's Tudor rose indicated his London address rather than a York or Lancaster origin.

Externally these two instruments are all-but identical. Save for two very small points, every detail of their turning, every ring, every groove, and every angle are not merely similar but identical, so much so that it would seem that one hand turned both of them on the same lathe and with the same tools. The two differences are, one in the radius of the curvature where the foot ring turns into the upward line of the foot; the other that the ivory ferrule over the socket of the head joint extends a couple of millimetres higher on the Bressan than it does on the Urquhart.

One day John Willman brought another Urquhart treble into the Bate, one that he was restoring for Gordon Saunders, so we compared all three. There were two slight differences of turning between the two Urquharts, and those two differences were those noted above: the Saunders Urquhart was identical with the Bressan, rather than with the Hunt Urquhart.

In finish the Hunt Urquhart and the Bressan are quite different [I am ashamed to say that at this distance of time I cannot remember the finish on the Saunders Urquhart]. The Bressan is plain stained box, the Urquhart is stained in the pattern sometimes called tiger-striped. The finished bores are also different. The Urquhart is a good average recorder, but the Bressan is one of the world's wonders.

So who turned them? Were both Bressan and Urquhart trained by the same master (presumably in Bourg-en-Bresse, whence we know that Bressan came) whose training was so strict that
both his pupils made every detail the same? Clearly not, for one thing such identity is impossible and for another there are many other Bressan recorders which are quite different in such details. Did Bressan churn out blanks to the trade? Surely not, for the same reason. Did Urquhart do so, and finish and put his own VR-QVHART stamp on a few of them? Perhaps. Or was there 'a little man', sitting in a small back-street workshop with a lathe, knocking them out for any maker who wishing to save time by starting with a shaped body and a pilot bore. To me this seems the answer. I remember just after the War, before Birmingham was flattened by the planners far more disastrously than the Luftwaffe had ever managed to do, that one could get parts for pretty well any machine or object one wished in one back alley or another. Little workshops everywhere. And I'd be willing to bet that the eighteenth century was not so different.

Whoever he was, he was a master craftsman with an unerring eye for beauty of shape and curve. Perhaps we should follow the example of the art historians who have to give a name to the illuminator of a manuscript or the painter of a masterpiece, and refer to him as the Master of the Bressan Recorder.

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FoMRHI Comm. 1589

'What Say You, Simon Catling?'

(Romeo & Juliet, Act IV, Scene V)

John Catch

There are three Catlings and two Catlins in my local telephone directory; it is not a particularly uncommon name. Sampling ten UK directories more or less at random I found:

64 Catlings; 40 Catlins; 3 Catlyns; 3 Cattlins; 3 Catlmes.

These figures are consistent with the preferred spellings of the OED. Another significant point is that the large and ancient seaport of Bristol has 2 Catlins (only), while smaller inland towns of more recent growth have often many more (Barnsley, 13 Catlings; Rotherham, 7 Catlings).
Late 17th century English bass violins, and catlin highest pitches

Bass Violins

In Comm. 1574 Catch questions my deduction in G.S.J. XLVIII (1995) that the ‘usual bass violin’ mentioned by Talbot (c.1694) in connection with his description of Lewis’s bass violin was the same as the bass violin that he provided measurements for. I will be glad to explain the logic of it, and while at it, take the evidence a bit further than I have previously in print. The measured bass violin had a string stop of 24.5 inches (62.2 cm). This was the Italian bass violin that Banchieri listed with a tuning an octave below the treble violin. According to Table 1 of Comm. 1545, the possible string pitches in all-gut stringing for this string stop at a’=430 and 383 Hz is C to f’ and D to g’ respectively. All-gut stringing on bass violins was not universal at the time though, since Talbot mentioned that the lowest string on a bass violin or bass viol could be wound with metal. If such a wound string was used, the lowest pitch could be considerably lower.

The only tuning that Talbot offered for the bass violin, given in a section largely copied from Mersenne, was BBB F c g. That was the French bass violin which, according to Comm. 1545, would have had a string stop for this pitch range in all-gut stringing of at least 77 cm. That the French bass violin still used all-gut strings in 1742 is indicated by Prin’s description of the string diameter of his trumpet marine (containing 60 guts, which implies a diameter of about 4.2 mm) as a little thicker than a ‘basse’ 3rd and somewhat finer than a 4th. In L’Encyclopédie of the 1750’s, the ‘basse’ was the basse de violon tuned in 5ths upwards from BBb.

The French bass violin was played in the Royal violin band in Restoration England. Roger North (ed by Wilson, pp. 304 and 352), when writing around 1720 about the beginnings of public concerts in London in his youth, mentioned that ‘There was a society of Gentlemen ... that used to meet often for consort after Babtist’s [Lully’s] manner; and falling into a weekly course, and performing exceeding well, with bass violins (a course instrument as it was then, which they used to hire), their friends and acquaintance were admitted, and by degrees as the fame of their meetings spread, ...’. Since these gentlemen had to hire the bass violins that were needed to play the French music (presumably hired from the Royal violin band), they did not own such instruments themselves.

This indicates that French bass violins were not the usual bass violins in England then. The only other bass violin we have evidence for is the type measured by Talbot. We still need to deduce how that instrument was tuned. One possibility is that, using a wound 4th string, the tuning was the same as the French bass violin, which was also the tuning Talbot reported. To find this out, we need to look at what Talbot wrote about Lewis’s special bass violin:

Talbot wrote: ‘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 3rd of B. Violin (or B. Viol) it is louder than either. And tuned B. Viol way.’. Also on that page was: ‘Bass violin all Venice Catlins.’.

This says that the 3rd strings of the usual bass violin and of the bass viol had the same ‘sound and size’. We know that the pitch of the bass viol’s 3rd string was e at what Mace called ‘Consort Pitch’ (at about a’=383 Hz). Talbot’s Violin Treble had a string stop of 13 inches (33.0 cm), and Playford wrote that the e” highest string of the violin was tuned as high as it could go, so Table 1 of Comm. 1545 leads us to conclude that the pitch standard of the violin (and the rest of the violin band) was about a tone higher than that of the viols. Then the 3rd string pitch called e on the bass viol was called f on the bass violin. Thus the bass violin tuning was an octave below the violin, as Banchieri specified. It is likely that a wound 4th string was mainly used on the bass violin to use French bass violin tuning when people wanted
to play 'after Babtist's manner' without hiring the appropriate bass violin.

The neck length on Lewis's bass violin

We are considering an instrument called a 'bass violin' even though it was tuned like a bass viol. This most probably implies that it played with the violin band at its pitch standard. Its tuning at that standard was $D\ G\ c\ e\ a\ d'$. For each semitone (fret length) of neck shortening from the usual bass violin, the lowest pitch of the lowest catlin bass string rises by a semitone. A neck shortening of two fret lengths is as far as one can go because it brings the lowest acceptable pitch up from $C$ to the lowest actual pitch of $D$. The shortest string stop of about 55 cm represents a maximum reduction of about 3 inches in the original 10 inch neck length of the usual bass violin.

String tensions

Since the string pitches and diameters were the same on the usual bass violin (with a 24.5 inch string stop) and the bass viol (with a 32 inch string stop), the ratio of the tensions of the two strings equals the inverse square of the ratio of string stops. Thus the string tension on the bass violin was 1.7 times that of the bass viol. A string of the same diameter was the first string of Lewis's bass violin and was tuned an octave higher. The ratio of tensions of strings of the same diameter between Lewis's (the 1st) and the usual bass violin (the 3rd) equals the square of: the ratio of frequencies (2/1) divided by the ratio of string stops (8/9 or a bit more). Thus the string tension on Lewis's bass violin 1st was up to 5.1 times that of the usual bass violin 3rd. No wonder Lewis's instrument was louder. The comparisons above just refer to individual strings, but the more that the stringing tended towards equal tension, the more the above gives a general indication of the relative string tensions on these instruments.

The highest pitch of catlins

The information from Praetorius used in Comm 1545 defined the highest pitch for a string stop (or the longest string stop for a pitch) for a low-twist highest string, and the lowest pitch for a string stop (or the shortest string stop for a pitch) of a catlin lowest string. Under investigation here now is the highest pitch for a string stop (or the longest string stop for a pitch) of a catlin. Lewis's special bass violin gives us some information on this since all of the strings were supposed to be catlins. Assuming that the neck length was shortened so that the highest string catlin wouldn't break, and the lowest string was at or close to the lowest limit for a catlin, the pitch range for catlins was close to the pitch range of open strings on this instrument, which is just two octaves. The total bowed range of instruments with catlin basses and low-twist treble strings was two octaves and a fourth. So the highest pitch of a catlin would have been about a fourth (5 semitones) lower than the highest pitch of a low-twist string at the same string stop.

Now let us consider other relevant evidence. Talbot indicated that the lowest two strings of the treble violin were catlins. The first string was as high as it could go, and the highest catlin was tuned a ninth (14 semitones) below it. So if the deduction from Lewis's bass violin is correct, the second string could easily have been a catlin as well as the 3rd and 4th. Why wasn't it?

Dowland had two categories of string for a lute: Great and Small. Venice Catlines were in the Great category. The highest-pitched Great string was on the 4th or Contratenor course, which was tuned a ninth (14 semitones) below the first course. Dowland did not write that the treble strings of the lute were tuned as high as they could go without breaking, but Robinson did. If they could go higher, the highest catline would be tuned even lower than the highest pitch of a low-twist gut string on the same string stop. Here again, if a catline could be tuned up to a fourth below the highest that a low-twist string could go, why were not catlines on the 2nd and 3rd courses of Dowland's lute as well?

Mace mentioned 3 sorts of strings: Minikins, Venice-Catlins and Lyons, with a 4th (seldom
available) called Pistoy Basses that were like thick Venice-Catlins. Minikins were for the high pitch range, Catlins for the middle pitch range, and Lyons and Pistoy Basses for the lowest range. The highest Catlins were on the 4th course, tuned a minor 7th (10 semitones) below the first and highest course. There is no statement that the highest string was as high as it could go. If the highest a catlin can go was only a 4th below the highest a low-twist gut string can go, why was the 3rd course of Mace’s lute not also of catlins?

There are two obvious possibilities for a solution of our problem. One is that the statement ‘Bass Violin all Venice Catlins’ was not strictly true. With the d’ first string of stronger gut, we can have the neck shortening being to avoid breaking the a second string (a catlin) if the highest pitch a catlin can go was 10 semitones lower than that of a low-twist string. With the first two strings of stronger gut, and the 3rd string catlin as high as possible, this figure would be 15 semitones lower than a low-twist string.

The other obvious possibility is that catlins had variable highest pitches depending on how much twist was put into the rope construction of the gut. For the lowest strings and almost all others, maximum twist is usual today and probably would have been usual then. This is because, as the twist gets less than maximum twist, the advantages over high-twist gut of richness and focus in the sound rapidly disappears (as tensile strength increases). The only reason for making catlins of lower-than-maximum twist is that musicians want them for higher strings than usual because of the superior-sound reputation of lower catlins. We at NRI have a small but steady market for lower-twist catlin violin 2nds and bass viol 3rds, where the customers are willing to tolerate a particularly high rate of string breakage for an improvement in sound that few beside themselves can notice.

The second possibility is to be preferred because it does not assume an error in the evidence, as the 1st does. The conclusion then is that the highest pitch for maximum-twist catlins is usually about 14 semitones below that of low-twist gut, but lower-twist catlins could be tuned higher.

Catch’s non-view on the construction of catlins

I think that Sherlock Holmes was supposed to have said that once you have eliminated all of the other possibilities, the remaining one, no matter how unbelievable, must be true. I was using this approach in Comm 1557. I also mentioned the direct evidence of rope construction from Ramielli. Yet in Comm 1574 Catch persists in promoting the idea that early bass gut strings were not of rope construction by claiming that there is not a shred of evidence for that construction of catlins. He does not try to defend any of the possibilities that I claimed to have eliminated. He does not try to offer any alternative type of string construction that could be consistent with the historical evidence. Nor does he try to debate the vast majority of the points I make. He appears just to be trying to undermine acceptance of the scholarship results.

This reminds me of the anarchists whose primary aim is to make current society break down because it is so terrible. They don’t try to think about what type of society should replace it, but they believe that any different society that would emerge from the chaos they hope to create would have to be better than this one. Too often, this philosophy is just an excuse for indulgence in destructive behavior.

Catch is no anarchist, but I do believe that his objective here is to impede the acceptance of an advance of knowledge in this area by keeping the issue publicly controversial. Thereby he creates an excuse to pursue an agenda that is contrary to the results of good scholarship while still claiming to remain within its mantle. There is nothing wrong with being sceptical about a result of scholarship. That is a very good reason to pursue further scholarship that might lead to a more acceptable result being better. But promoting rejection of a valid result as ‘wrong’ or ‘not proven to my satisfaction’, without exploring any alternative, has no place in scholarly discourse.
Mace had all of his instruments tuned to the same pitch standard, which he called ‘Consort Pitch’. The viols were at that standard, so we expect it to be over a tone below modern or at about $a' = 383$ Hz. The nominal pitches of the courses on his favourite lute tuning, the ‘French flat’, were $C \mid D \mid E \mid F \mid G A B e a c' e' g'$. Where ‘$l$’'s separate courses on different nuts. On what he called the ‘New’ tuning, the pitches were $B \mid D \mid E \mid F \# \mid G A B e g b e' g'$. The difference between the two tunings is one semitone on the 3rd, 9th and 12th courses, and two semitones on the 4th course. At his pitch standard, if the highest string was tuned as high as it could go, the string stop could not be longer than 61 cm. With only a 2-octave range of open strings on the main nut, and the longer lower strings asking little more of the string technology than the $G$, this instrument could have used strings readily available throughout the 16th century. Any use of roped-gut bass strings can either brighten their sound or allow the highest string to be tuned lower than the highest it can go (or both).

There are two pieces of evidence which suggest that the highest string was not tuned as high as it could go, so the string stop was shorter than 61 cm. One is that the highest course that used catlin strings was the 4th, that in his normal tuning, would be only 10 semitones lower than the highest string. In Dowland’s stringing specifications, the highest course that used catline strings was 14 semitones lower than the highest string. On Talbot’s violin, the highest string that used catlins was also 14 semitones lower than the highest string. The other piece of evidence is in Mace’s drawing of his Dyphone, a combined 12-course ‘French’ lute and ‘English’ lute (which he also called ‘theorbo’). He specified that the first courses of both were tuned to ‘$G$-sol-re-ut’, but the string stop of the ‘French’ lute is about 3 frets shorter than that of the ‘English’ lute.

In *Chelys* Vol. 6 (1975-6), Tim Crawford described a set of 5 part books of ‘ayres’ in the Bodleian Library (Mus. Sch. E410-4), which includes a book for treble (viol or violin), one for 2nd treble or lyra viol (in tablature), one for 12-course lute (in tablature) and two identical unfigured bass parts (one for theorbo). Two tunings were used on the lute part (indicated by tuning diagrams). One is identical with Mace’s ‘French flat’ tuning, and the other was $d g b d' g' b'$ with 6 diapasons going down to $D$ (Crawford transcribed the tunings an octave lower). Lute players rarely kept different instruments for different tunings.

All of this evidence makes sense if the English 12-course lute was usually a treble instrument with a string stop of about 50 cm, like the only unmodified surviving one in Linhoping Library (see Comm.156, Q. 13. pp. 30-8, but 33-6 are missing in a pagination error). If we postulate that this instrument was originally in Renaissance tuning with the highest string at $b$ (which is as high as it can go at this string stop and the usual lute pitch standard), its tuning would be $C \mid D \mid E \mid F \mid G A B e a c#' f\#' b'$. One can get the ‘French-flat’ tuning by lowering the 1st course by a major third, the 2nd course by a tone and the 3rd course by a semitone. One can get the other Bodleian part-books tuning from this Renaissance tuning by raising the 2nd, 3rd and 10th courses by a semitone, the 4th, 7-9th, and 11-12th courses by a tone and the 5-6th courses by a minor third. It is remarkable how such radical retunings affect perceived balance between strings much less with gut than with modern stringing.

With the highest string in the last tuning being a $b'$, it would be natural to call the tuning a ‘$B'$ tuning. The Burwell Lute book called it just that: ‘$B$ sharp’. The name would make sense if that tuning was first invented on the 12-course lute (with this treble size) and the name stuck with the tuning when other lutes of different sizes and pitches adopted it. The Burwell book also has a ‘$B$ flat’ tuning, where all the $b'$s in the original ‘$B$ sharp’ tuning are dropped a semitone. This could imply that the ‘$B$ flat’ tuning, which was ubiquitous later in the baroque (nowadays called the ‘d-minor tuning’) was originally developed on the little 12-course lute. Mace’s version of it, which he called the ‘New’ tuning was a minor third lower. It requires a minimum of string retuning from the ‘French-flat’ tuning, while the higher version with a real
\( b^b \) could be appropriate if one was retuning from the original Renaissance or ‘B sharp’ tuning.

The Talbot ms (c.1694) gave measurements of two 11-course ‘French’ lutes and a two-headed 12-course ‘English’ lute. Talbot’s informants, Agutter and Crevecoeur, both agreed that the tunings of the two types of instruments were the same: \( C D E F G A d f a d' f' \), with an \( AA \) as the lowest course of the 12-course one. It appears that the process of switching from other tunings to the d-minor tuning that Mace observed and resisted was completed before the end of the century.

The string stops of two 11 course French lutes were 27 15/16 inches (71.0 cm), and 27 inches (68.6 cm). These stops are just about right for a highest string tuned to \( f' \) at Consort Pitch to be as high as it could go according to the Praetorius criterion (stop in metres times frequency in Hz is about 210 m/sec).

The string stop of the two-headed 12-course English lute was 23 1/2 inches (59.7 cm). That is almost the size at which the highest string could go no higher than the Consort Pitch \( g' \) in Mace’s tunings. Was this the same instrument that Mace and many others used earlier in the 17th century (and he called the ‘French’ lute), or was it a newly invented size for the 12-course instrument for playing in the newly universal d-minor tuning for lutes? The hypothesis that the two 12-course lutes were the same size would be quite convincing to those who do not expect strict fidelity to the evidence and highly value the attractiveness of simplicity in instrument history. That hypothesis would be preferred if there were no contrary evidence, but there is such evidence:

If the sizes were equal, the French lute half of Mace’s Dyphone, at maximum length for \( g' \), could not be shorter than the other half, but since it is shown that way, the illustration would have to be drawn wrong. Also, Talbot wrote ‘New tuning lower than old by 3d Major (viz New \#f Old a).’ Irrespective of how we resolve the discrepancy that \#f to \( a \) is not a major third, this is a strong indication that the size increased to lower the pitch to the new tuning standard for all lutes. The \( a \) of the ‘Old’ tuning is in-between Mace’s version (it was the ‘New’ tuning to him) and the postulated original ‘B-flatt’ tuning for the small 12-course lute. The increase in size implied here explains why there are surviving larger 12-course lutes converted from other types of lutes. As for the motivation for such conversions, Agutter mentioned (in the Talbot ms) that ‘the 15 Trebles have the (lower) head bearing back as the French lute of which this seems to be an improvement’. 
Praetorius’s Plucked Instruments and their Strings

Introduction

In Comm. 1545, I explored the string-stop and pitch ranges of Praetorius’s bowed instruments compared to the maximum ranges they could have with gut strings. The main interest then was to find the string stops to expect from Renaissance fiddles and viols of which we knew only the reported tunings and expected pitch standards. This Comm. performs the same job covering all of the plucked instruments which appear in the scaled drawings and have tunings given in Praetorius’s Table of tunings. The interest here is not in sizes, of which there are few misunderstandings, but in string properties, especially of the metal strings used then.

The fL product

The maximum pitch range of an instrument with particular types of strings is determined by the highest string tuned up to as close to breaking as the player’s tolerance of the rate of string breakage would allow, and the lowest string tuned down to either the minimum acceptable amount of brightness and focus in its sound or the maximum tolerable amount of sharpening of the pitch of the string on pressing it against the fingerboard. Essential for the analyses of Comm. 1545 was that, for the same types of highest and lowest strings, that range is the same for all string stops. The theory behind this was given in G.S.J. XXVII (1974) and Comm. 162 (Q 13). Furthermore, that range shifts with string stop in such a way that the string stop multiplied by the fundamental frequency of the string’s pitch is one constant at the top of the range, and a different constant at the bottom of the range. Using Praetorius’s viola bastarda as the bowed instrument that pushed the range of gut strings to its limits of tolerance in his time, Comm. 1545 concluded that the frequency (in Hz) multiplied by the string stop (in metres) was about 209 (m/sec) for the top of the range of a bowed low-twist gut string, and was about 39 (m/sec) for the bottom of the range of a bowed roped-gut string.

By myself, I have been calling this string parameter the ‘fL product’ because it is the product of the frequency (f) multiplied by the string stop (L). It is an important parameter for the material and construction of a string type. The maximum fL product for that string type is related to tensile strength, and below that, it is related to the string stress (stress is the tension divided by the cross-sectional area) and the brightness of the sound (by affecting the number of higher harmonics that can be heard). It also happens to be half of the velocity of wave motion on the string (that is how the units are in metres per second). I have been trying to think of a better name for it that describes its properties, but haven’t been able to. I have previously called the maximum fL product ‘breaking index’, but the concept is useful when not at maximum.

It is useful to compare one fL product with another by the semitones difference between them. This is calculated from the ratio of the larger fL product divided by the smaller fL product. The semitone difference is 12 times the logarithm of the ratio divided by the logarithm of 2. The semitone difference is negative if the ratio is the smaller fL product divided by the larger one. Elsewhere in this Q I suggest, in effect, that the maximum fL product for maximum-twist roped-gut strings is about 14 semitones below the maximum fL product for low-twist gut.

Constructing the Table of Praetorius’s plucked instruments

The string stops of all of the plucked instruments Praetorius depicted in scaled drawings were measured from the scales provided, and are listed in the Table. When that is different for the highest and lowest string of a slanted nut, both are given. When there are different nuts, these are given separately. In the drawing, the lute nut slants for perspective purposes only, so the maximum (in the foreground) is only considered.

Two figures are given in the Table for the Gross Sechs Chorischt Cither, one as is in the...
drawing, and the other reduced by the ratio of the string stop divided by the total length. This is because in his discussion of this instrument, Praetorius gave the total length as nearly two ells (2 feet = 1 ell), but that happens to be the string stop in the drawing. Praetorius hardly ever gave a measurement in his discussions of instruments included in his scaled drawings, and in this case, it appears that he was correcting an error in the drawing. That drawing suffers from unusual carelessness. He was always careful about depicting the right number of strings and pegs, but in this case there are 8 pegs for 6 strings. Also the body outline shows through the fingerboard where that covers it. He apparently discovered the error of mixing up the string stop with the total length in the middle of cutting the wood block, and then finished it off carelessly just to show its shape, relying on the statement in the text to give the size.

The highest and lowest pitches associated with the string stops are in Praetorius's Cammerthon pitch standard. They are those given in Praetorius's pitch tables with the following exceptions: The ChorLaute and ChorZitter pitches are assumed a tone lower than in the table because the 'Chor' apparently indicates that these instruments were tuned in his preferred Chorthon, which was a tone lower than Cammerthon. The Mandoraen pitch is also assumed a tone lower since he indicated that it was a French instrument, and that was the pitch standard of France. If anyone doesn't like this tone-lower assumption, he or she would have to offer a different and at least as reasonably probable explanation of the use of 'Chor' here, and for the two anomalous highest FL products for a gut string that would be a tone higher than any other plucked or bowed instrument.

The Quinterne illustration is of a typical 6-course viola da mano, apparently pressed into service as a guitar. The tunings given were for 4-course guitars, one from c to d', and the other from f to g'. I assume a possibly original viola da mano tuning G to g', which includes these ranges. There were two tunings given for the Orpheoreon, a tone apart, and the highest of the high tuning and the lowest of the low tuning are the pitches listed.

Multiplying the string stops with the frequencies at a' = 430 Hz for the pitches gives the FL products listed in the Table. From these listings the semitones of FL below the highest FL product for the lute (for all) and bandora (for metal stringing) are calculated and listed.

Interpreting the Table - gut strings

We see that the highest FL products of the gut-strung instruments are in the region of 210 m/sec, the same as was found for the bowed instruments in Comm. 1545. As expected, the closest to breaking that one would tune a low-twist gut was the same whether it was plucked or bowed. There is a difference though at the bottom of the range, which is the lowest FL product for roped-gut strings. It is 39 m/sec (29 semitones from the top) for bowed instruments, and 35 m/sec (31 semitones from the top) for plucked instruments. The reason for the difference might be that pluckers could get a sound that they thought was decent enough by plucking very close to the bridge, while bowers could not get that close to the bridge and still be confident about getting the string to start vibrating properly.

In Comm. 162, I theoretically calculated that the lowest pitch for low-twist gut is about 19 semitones from the highest. Of the ten sets of measurements of gut strung instruments in the Table, only the lute, the viola da mano, the long strings of the Paduan theorbo and the left side of the double harp needed strings with more twist than low-twist ones.

Interpreting the Table - metal strings

Praetorius's Testudo Theorbata (theorboed lute) looks like it was strung with metal since the strings go over a movable bridge and apparently tie to the lower end of the body. This suspicion is confirmed by the FL product of the highest string, which at 276 m/sec, is much higher than any gut string, almost as high as modern chromium-steel piano wire, and higher than any other metal-strung instrument Praetorius depicted. The negative sign of the value of 'Semitones of FL below' means that it is that number of semitones above.
It is likely that the material was a carbon-free phosphorus iron/steel like other ferrous wire strings of the period were, but modified (possibly with strengthening additives) by a process developed and kept secret, as all new processes then were. Instruments requiring such stronger strings started to appear around 1580. We have evidence implying that this wire was made only by Jobst Meuler of Nuremberg. Heinrich Schütz wrote that the like of Meuler's strings were unobtainable elsewhere, and that the demise of Meuler's wire making coincides with the end of the wire's availability. Meuler ran into trouble in 1608 because a rival obtained a priviledge (monopoly) on all wire-making from the Imperial Court in Vienna (see Comm.866). In 1610, the Nuremberg Town Council supported Meuler's claim that he had invented a new kind of wire, in great demand, that others couldn't make, and so was outside the specifications of the priviledge. A more powerful priviledge was granted in 1621, after which Meuler was only able to fill a wire order if he was given permission by a resolution of the Council. No business can survive in these conditions, and his specially strong wire became unavailable. Instruments designed for its use either disappeared or changed to lower tunings.

The range in the Table of highest FL products of instruments that required the use of Meuler's wire is unusually wide. A simple explanation for this would be that some time after he started making his super-strong wire, Meuler found a way of making it even stronger. The orpharion (with top string at g') and the small English cittern (with top string at e") were invented very soon after he started making super-strong strings. Their highest FL products would then have been 6.4 and 6.9 semitones (respectively) higher than that of the bandora's iron (which we assume represents the norm previously). The corresponding figure of 6.3 for the 12-course cittern shows that it was designed to use the same wire. When the extra-super-strong wire was later developed, it could be tuned over 3 semitones higher. This allowed Praetorius's wire-strung theorboed lute to be developed, as well as allowing the orpharion to be tuned a tone higher, and allowing the small English cittern to have a new and particularly useful tuning that had the highest string 3 semitones higher than before.

Only four of the ten wire-strung instruments Praetorius depicted (the bandora, the two 6-course citterns and the Irish harp) came from before this period of Meuler's wire, did not use it, and so were not affected by the end of its availability. Of these, the FL product of the bandora (157 m/sec) is the highest, so we can expect that it represents the highest for normal iron wire previously. That was also the first instrument with sloping frets. We presume that this was to get over an acceptability threshold for a desirable lowest pitch, with the string stop of the highest string at maximum length for the desirable highest pitch. So we can expect that its lowest FL product, 24.6 semitones lower than the bandora's highest, represents the lowest for high-twist brass rope strings. The bandora established a fashion for sloping frets, so subsequent instruments having them did not necessarily go down to the lowest FL product.

The above expectations might well be true about the wire that the sloping-frets bandora was designed for, but it is inconsistent with other other evidence we have. The lowest FL product for the penorcon is over a semitone lower than that of the bandora. Either the appropriate FL product should be lower, or the penorcon was an experimental instrument that was made too small for its intended purpose. I prefer the latter explanation because this instrument was not mentioned in any other source, and Praetorius apparently didn't use it for his own compositions, as he used the bandora and the small English cittern.

Also, the highest-octave strings of the Hans Ruckers 1581 mother-and-child virginals discussed in Comm. 1494 have an FL product of 174 m/sec at the assumed pitch standard. This is 1.8 semitones higher than the iron of the bandora. I expect that the least probable explanations are that the Ruckers pitch standard was lower than assumed, and that the Ruckers strings were thinner and so drawn harder and stronger than the bandora highest string. By experience with the bandora and from historical keyboard stringing, we would expect both to be about 0.25 mm thick.
I think that the following is a more probable possibility: The year 1581 was after the sensation that Meuler’s super-strong wire probably caused, and it is probable that other wire makers were then trying hard to follow Meuler and refined their traditional processes to increase tensile strength, with an fL product of 174 being the measure of their success.

The working fL product for the lowest course of strings of the small English cittern could well be a good estimate of the highest working fL product for brass at that time. Praetorius mentioned that the strings were of hardened iron and brass, so at least one course was brass (I can’t imagine any other course also being brass). The fL product of 151 at a' and 160 m/sec at b' are so high that they bracket the highest fL product of bandora iron. Traditional stringings had iron for the highest-pitched strings and brass for lower ones, so we would expect a rather lower highest fL product for brass than for the iron of the time. It seems that the efforts to improve tensile strength of non-Meuler iron around 1580 were applied to brass as well. If it were the same improvement, then it presumably involved the conditions under which the wire was drawn.

The recommended highest fL products of the modern harpsichord wire produced by Malcolm Rose are about 183 m/sec for his ‘English iron’ and about 150 m/sec for his ‘English brass’. He claims that his products are based on research on the wires used from the late 17th to the mid-19th centuries in Europe. I have not seen that research, but the strength of his wires seem to be generally consistent with the improved strengths arrived at here.

**********

An Error in Comm. 1545

In the Lirone entry in Table 2 of Comm. 1545, the last two pitches listed should be a and e', the maximum string stop 65.0, and the semitones shorter than longest -0.7. The negative sign indicates that, as with the Lira de Bracio, it was a bit large for Praetorius’s Cammerthon pitch standard.
## PRAETORIUS'S PLUCKED INSTRUMENTS

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<tr>
<th>Plate/ Number</th>
<th>Name in Plate</th>
<th>Other Information</th>
<th>HIGHEST STRING</th>
<th>Stop at a'=(cm)</th>
<th>Pitch 430 Hz (m/sec)</th>
<th>Semitones of fL below highest of lute bandora</th>
<th>LOWEST STRING</th>
<th>Stop at a'=(cm)</th>
<th>Pitch 430 Hz (m/sec)</th>
<th>Semitones of fL below highest of lute bandora</th>
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On the early violin bridge position.

The chief concern of this article is the position of the bridge on the instruments of the violin family. Bridge emplacement is often seen in the paintings; some surviving old instruments bear clear bridge stamps in both the wood and the varnish.¹

The position of the bridge has been the cause of much study and speculation, the consensus of researchers seem to reach the conclusion that either a longer sounding length or length adjustment or, a certain quality of sound was being sought.²

The only contemporary position of the bridge that is universally acceptable is that exactly on the line between the \( f \)-hole notches, but historical evidence suggests that this feature had not been standardized. Two or more ways of bridge placement existed and permitting variation in sound colour and response.

It is evident from the templates for measuring the string length given in the Prelleur’s *The Modern Musick Master...,* 1730, and the English anonymous *The Compleat Tutor for the Violin...,* 1750 that most of the early writings show of no concern with the \( f \)-hole notches. They seem to have been a mere finishing touch up to the design of the \( f \)-holes. Both of these sources recommend moving the bridge ‘a little forwarder or backwarder as occasion requires’⁴ in order to achieve the length of the given template. Giuseppe Tesarini in ‘*Gramatica di Musica*,’ 1741, says: ‘Measure off the stops or fingering of the violin with forty eight Tones and twelve perfect fifth, the halftones are not marked seeing they are changed or made by a Sharp or Flat. N: B: Where the hand are put, marks the three principal Transpositions in Terza, Quarta, and Ottava’.⁵

There is no template, but the spacing of the tones and positions is interesting and needs to be explained. The noticeably high position of \( b^1 \) and \( c^2 \) rises a question: what length of the neck was on Tesarini’s violin and what position of the bridge drives to the prescribed distribution of the tones.

Talbot’s treatise (ca.1695) is the earliest to mention \( f \)-hole notches. The fingering charts from the early sources prove to be neither uniform nor to provide a reason for the various bridge placements. This situation is clearly out-lined by the pictorial evidence as I will show later, but before it is necessary to introduce some more ideas.

The work which deserves a special attention is the Curt Sachs’s ‘*The History of Musical Instruments*,’ 1890. On the p.320 he wrote about the Viol: ‘With the holes and the bridge correctly placed (as it is prescribed by Thomas Mace⁶ - D.B.), the viol achieved a perfection of appearance that could even surpass the pattern of the violin’. It seems to figure as one of the first statements in the modern literature where the correct position of

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¹ The list of these instruments follows below.
² See reference at the end of the article.
³ Prelleur.
⁴ The lengths of the templates are 320mm and 316mm respectively which is rather short. Probably, the bridges meant to stand more or less high up, that is closer to the fingerboard or to the \( f \)-hole notches. The lengths of the templates are 320mm and 316mm respectively.
⁵ Mace wrote (*The Musick Monument...*, 1676, p.245): ‘Let This Suffice, to put you in to a Compleat Order for Viols, (either way,) Only Note, That the Best Place for the Bridge, is to stand just in the 3 Quarter Dividing of the Open Cuts Below, though Most, most Erroniously suffer them much to stand too High, which is a Fault.’
The bridge is given an aesthetically important role for external view of an instrument (although there is no aesthetic statement in Mace).

The more recent publications\textsuperscript{6} dedicated to the violin design highlights the fruitfulness of proportional, geometrical approach apparently used by certain instrument builders of the past. These studies are mostly based on the geometrical analysis of the surviving instruments\textsuperscript{7}. According to these, the instrument was conceived in all its parts as a harmonious whole. Therefore the bridge must have had its proper place defined by the number, which conducted the entire design of the instrument to the Beauty. Various types of proportions once had been important for the Renaissance and Baroque artist and as applied to the lutherie, most comprehensively explained by K.Coates. Although the modern geometrical studies do not confabulate the further back bridge emplacement, and on its own do not prove to be convincing as regards to the peculiar bridge stand, turn out to be elucidating on these matters in conjunction with iconographical analysis.

The iconography is an important vehicle, revealing the question in all its complexity. It certainly can not be used as a source of information directly applicable for to design an instrument. Nevertheless, the "pictures are our main guide"\textsuperscript{8} to the aesthetics of the periods through which the violin have also passed. That the violin is a beautiful object in itself is beyond debates. This implies that the violin is an object of a visual art and, therefore, the esthetical rules developed during the Renaissance and early Baroque periods should be applicable in the appreciation of the violin design and its development. Available written sources on the visual arts help to better appreciate not only the paintings themselves and the instruments thereby shown, but also to perceive more adequately the idea which led the early artist, either one was painter or an instrument builder to create things in a certain way, that we call - style.

Beauty and Harmony are rational qualities for the Renaissance and Baroque artist. These qualities were explained in the terms of mathematics and geometry, essential parts of humanistic education. Thus, according to many\textsuperscript{9}, the formula of beauty\textsuperscript{10} lie in "...the form and correspondence of the whole, with respect to the several parts, of the parts with regard to each other, and of these again to the whole"\textsuperscript{11}.

Indeed, analyzing the instruments found in the paintings of different periods with the square and compasses one finds oneself introduced to several curious circumstances. Here is the example of the iconographical database (see fig. 1\textsuperscript{12}) which outlines the field of research, and gives a clear idea of what has been studied.

Conforming to the scale of the table, about 184 pictures of different times and origins, containing 200 instruments few fiddles and both violins and viols were measured. It is

Edward Cowell, 'Violin and Viola designs of the Old Italian Masters', Hannan ......, Essex, ca. 1950.
\textsuperscript{7} The problem here is that we can not be sure whether these instruments preserved in original condition or not.
\textsuperscript{8} P. Holman, 'Four and twenty Fiddlers..., 1995, p.3.
\textsuperscript{9} Giovanni Paolo Lomazzo (nephew of Gaudenzio Ferrary), 'Trattato..." Milan, 1584; Paolo Pino, 'Dialogo di pittura', Venice, 1548; Leon-Battista Alberti, 'Of Architecture', ca.1435; Leonardo da Vinci, A.Durer, G. Vasari, etc.
\textsuperscript{10} Shestakov, V.P., 'Renaissance Aesthetics', Moscow, 1981; p.539
\textsuperscript{11} Andrea Palladio, 'Four Books on Architecture', Venice, 1570.
\textsuperscript{12} Refer to appendix for explanation of entries.
rather wide field of interest. The reason for such a comb out of the early pictures lie in the general statement that the early violin fittings and the low position of its bridge persisted into the 17th and 18th centuries from the 'similar usage much earlier in the 16th century' (D. Boyden, 'The History...'(1965). Somewhat broader views on that matter were expressed by Emmanuel Winternitz, in 'Musical Instruments and their Symbolism...'(1979); Sybil Marcuse, in 'A Survey...'(1975); 'The Scribner guide to the Orchestral Instruments'(1983); Francis W. Galpin, 'A textbook of European Musical Instruments...'(1937, 1944). According to these, the violin design was not an absolute novelty but the combination of many successful features of the earlier musical instruments. Indeed, the pictorial evidence and extant instruments support this idea and enable to undertake the research starting from the late 15th - early 16th centuries, checking proportions of the fiddles, viols and hybrid instruments, and studying how their proportions influenced violins.

The result of this iconographical research is surprising: only 19 violins represent their bridges in the line with the ff strokes (few of them even higher). 6 other instruments resemble the same proportion. 64 violins got the bridges below the f-hole notches. 41 instruments of all families have the bridges in ±1,6 division of the body length. 25 instruments - ±1,7. 21 instruments have the bridges even lower than the above listed - 1,4 - 1,5 division of the body length, these proportions are more characteristic of the earlier end of the 15th and whole 16th centuries instruments. 32 violins have the bridges lower than the f-hole strokes, but for various reasons can not be studied with measuring tools. 8 instruments show the bridge higher than all of the over described - that is in the middle of the bellies. 1 instrument (fiddle) has the bridge in the lower one sixth of the body length. 43 instruments depicted facing backs and therefore impossible to know about their bridges.

Bearing all this in mind, I suggest that the bridge position could be determined by a luthier on the very initial stage when designing an instrument on the paper. It appears logical to conclude that there were several ways of embodying that job. That is: expressing personal attitude, following recommendations of the musicians, both spoken and printed, such as those treatises mentioned at the beginning of the article. Certainly there were craftsmen who, being unaware of any rules of any arts, created instruments that have, in the words of Coates, dessin naive. The last but not least, musicians themselves were active enough to introduce here and there re-designing of the instruments. Visual aesthetics could well be considered among the other reasons, such as manageability of the instrument, its sound, durability of the upper strings.

If position of the bridge is to be defined by the number or numbers which conduct the entire design of the instrument's body, we arrive to a few variations in positioning the bridge. These are: the placement of the bridge with the line of the ff; the placement of the bridge in accordance with the ratio ±1,7, or the SQRT3 (see Coates, and the summary of

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13 This is one of the basic approaches in the renaissance aesthetics. Combining the most perfect features of different phenomena in one in order to avoid imperfection is suggested by many writers. (See: Albrecht Durer, 'A book on painting', Paolo Pino, 'Dialogo di Pittura', 1548, in the 'Renaissance Aesthetics', Shestakov, V.P., Moscow, 1981.

14 See record No.34 in the table on the fig.1. Note the perfectionism of the painter in the way he designs the proportions of the instrument. Indeed, this is the most mathematically accurate design of an instrument in my picture collection.

my iconographic study); the placement of the bridge in accordance with the ratio of ±1.6, or the Golden Section; and various but not numerous ways of the placement of the bridge still further back to the tail-piece, which is often seen in the pictures of the 15th century.

The bridge standing further back drives to the introduction of a greater string tension, which confirms the conclusions made in the most recent research in that field (Segerman, Peruffo). It facilitates sound projection of the bass strings, and playing the smaller instruments - violin and viola - holding them below the collar bone as it eliminates tension in the left hand for the fingers fall naturally higher in that playing position. Distribution of the tones on the fingerboard resembles that of Tessarini. The instrument's sound becomes louder. It must be an essential feature for the instrument, the earliest use of which were out-door events and doubling choirs in a churches. The further research involves thicknesses of the instrument's plates, bass-bar, string diameters and tensions, and early woodworking aesthetics. The equal thickness of the plates in the instruments of the great Italians, as stated by the Hills, seem to be the most appropriate in conjunction with the equal string tensions (Segerman, Peruffo). The position of the soundpost in conjunction with the lower bridge position remains unclear for I have no evidence.

A curious fact appear when analyzing the pictures. There are more variations as regards the bridge emplacement in the paintings of the north Europe, comparing to that of the south. These areas are mostly: northern Europe, i.e. England, the northern Netherlands, and northern Germany. In the pictures of these countries, more instruments have bridges standing higher, i.e. closer to the modern position. Pictures of the southern
areas are more regular in that sense, though a few instruments furnished with higher bridges.

Segerman in his e-mail regarding the Comm., pointed out that the pitch standard must have been one of the important factors affecting the bridge placement. Indeed, there is a 'strong correlation between where the bridge was placed and the geographical region where the picture was created. A high pitch standard close to modern was mostly followed for violins in England, Scandinavia and Protestant (northern) Germany. A pitch standard a tone lower was mostly followed in Catholic (southern) Germanic-speaking areas, France, and the rest of southern Europe. In regions of high pitch standard, except for instruments smaller than usual (like Praetorius's violin), the bridge could not be placed much lower than the modern position without frequent breaking of the e' string becoming a serious problem. In regions of low pitch standard there was a choice, with a lower bridge position giving more projection, and a higher bridge position being more relaxed, with longer-lasting e' strings' (Segerman).

The other reason that might have been a strong factor was the music and the technical skill of the players. The northern music in the 17, beginning of the 18 centuries is often more virtuosic than that of south (with a few exceptions). Playing in high positions, shifting, difficult passages etc. become more difficult if the bridge is placed too far further back. The more advanced technically music, the higher playing positions were introduced, the higher standing bridge, etc. up to adoption of 'chin-on' playing technique and various devices as chin- and shoulder-rests.

Proportions of a number of surviving old instruments which have distinct marks in the varnish definitely caused by the bridge are not studied. Therefore it may be useful to list them here, in chronological order.

**Museo dell Castello, Milano**

1. Violin, cat.no.49, attrib. to Michel Angeli, Brescia, 16\textsuperscript{th} c. The bridge of this violin is placed on the line between the f-hole notches, but the f-holes themselves are cut out considerably lower than usual.

2. Violin, cat.no.?, attrib. to Zuan Maria da Brescia, Venice, 16\textsuperscript{th}. There is a visible damage in the varnish around 12mm lower the f-hole nicks and clearly caused by the bridge.

3. Alto, cat.no.?, attrib. to Jacob Stainer, Absom, 1659. The varnish is marked by the former bridge placed about 10mm lower than its present stand.

4. Violoncello, cat.no. 139, attrib. to Mathias Albani, 1703. The varnish is worn out a little lower than the f-hole nicks.

5. Violoncello, cat.no.52, attrib. to Pietro Ranta, Brescia, 1729. The varnish of the instrument is damaged by the bridge approximately 30mm lower than the line between the f-hole nicks.

6. Violin, cat.no.99, attributed to Gennaro Gagliano, Napoli, 1763. Description: the varnish is extensively worn out around the bridge both higher and lower the f-hole nicks.

7. Violin, cat.no.105, attrib. to Pressenda, Torino, 1834. The varnish bears damage from the bridge approximately 12mm lower the f-hole nicks.

8. Alto, cat.no. 104, attrib. to Raffaele Gagliano, Naples, 1\textsuperscript{st} half of the 19\textsuperscript{th} century (!). The varnish bears clear damage caused by the bridge around 20mm further down to the tailpiece.

**The Freiborg Cathedral**
The five Freiborg Cathedral’s instruments (from ca.1589-90) have the bridges in the line with the j-hole notches, but the ff are placed much lower than is ‘normal’. This feature is analogous to the violin no.49 in the collection of Museo dell Castello.

Musicinstrumenten Museum in Brussels.

14. Violin, cat no.2792, attrib. to Mathias Holmans, 1665
15. Alto, cat no.2794, attrib. to C.Borbon, 1692

Galleria Estense di Modena.

17. Violin, cat no.2023, attributed to Domenico Galli, 1687.

Really remarkable specimens are the violin (1687) and violoncello (1691) attributed to Domenico Galli, Parma, and exposed at the State Museum of Modena (See fig.2). Note the only clear from drawing place left by the maker is suited just below the f-hole strokes. The clear space was undoubtedly reserved for the bridge, but regardless with the will of the creator, modern repairmen placed the bridge exactly on the drawing, leaving the place destined for it empty and causing harm to the drawing. This emplacement of the bridge conforms to the recommendation of Thomas Mace (1676) given for a viol's bridge: "Let This Suffice, to put you in to a Compleat Order for Viols, (either way,) Only Note, That the Best Place for the Bridge, is to stand just in the 3 Quarter Dividing of the Open Cuts Below, though Most, mostErroniously suffer them much to stand too High, which is a Fault'.

Summary of evidence on Low bridge position.

Violin tutors, proving existence of certain freedom in bridge positioning. Show off no concern with the f-hole notches, but provide no explanation for the given string stops:

1. Prelleur’s The Modern Musick Master..., 1730
2. English anonymous The Compleat Tutor for the Violin..., 1750

The tutor which does not provide a template for measuring the string-stop, but shows up a specific for long stop string distribution of the steps on the fingerboard:


Evidence of existence of precise criteria for positioning the bridge, and existence of an alternative ways is found in:

5. Iconography: majority of violins are furnished with the lower standing bridges.
6. Surviving instruments.

I would be grateful for comments, criticism, and evidence.

***

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**Appendix.**

Description of entries into the Instrument Treasurer - database.

1. First entry is an autonumber. A number of a record in the database. Facilitates search and retrieval of the needed records. A number of the records is a total number of instruments found in the studied pictorial sources.
2. Second entry is a description of a specific technic in which the source is accomplished, that is - painting, drawing (ink, chalk, pencil or whatsoever), fresco, &c.
3. Third entry is an adopted title of the work, or one of the widely recognized.
4. Fourth entry - author's name, if not anonymous.
5. Fifth entry - life-time, as established by recent study. The values like 0000 mean that one of the dates is not known. Record is missing when both dates are not known.
6. Sixth entry is used when the life-time of an artist is not known.
7. Seventh entry is a description of the present location of the source.
8. Eighth entry defines origin of the source, not the origin of an artist.
9. Nineth entry describes the musical instruments found in the source. Each sell of that column has its entry, since all of the bowed instruments seen in a source are mentioned here, including those that are too obscure or show only a small part, and therefore
appear impossible to measure their proportions. I adopted certain abbreviations for the
names of the instruments in order to facilitate use of the software. These names are: fid
- for fiddles; vdg(a,t,b,d - alto, tenor, basse and discant respectively) for viola da
gamba; vln, vla, vc, bass, basset - instruments of the violin family; a question mark - ?
-preceding an entry mean that there is a difficulty of determining the size of an
instrument, or its family - ?fid vla.

10. Following eight entries describe the relative proportions of the instruments. Always
bigger part is divided by smaller one:
(10.) Br PN - numerical expression of the relative position of the bridge - the ratio
between the upper and the lower portion of the body.
11. Br P - literal expression of the bridge position. 'L' - for the bridge standing further
back towards the tailpiece, but within the f-hole length; "LL" - for the bridge standing
beyond the f-hole length; 'B' - for the bridge standing between the F-hole notches; 'H'
- for the bridge standing higher than the visible f-hole notches or the actual middle of
the f-holes regardless with perspective distortion. For viol bridges 'L' means that the
bridge stands as it is prescribed by Mace, 'LL' - if further back, 'H' or 'B' - if the bridge
stands higher up. When the values of one of these eight fields are missing it means that
for certain reason it was not possible to have reliable data.
12. Tip L - the relative length of the tailpiece - the ratio between the entire length of the
tailpiece and the length of the string between the tailpiece and the bridge.
13. Fngb L - the relative length of the fingerboard - the ratio between the length of the
string and the length of the fingerboard, where the length of the string is divided by
that of the fingerboard.
14. Neck length - the relative length of the neck - the ratio between the body stop and
the neck, or between the string length from the top of the body to the bridge and the
neck, where the greater value is divided by the smaller, that is , by the value of the
neck.
15. S to B - the ratio between the length of the string and the length of the body, where
the value of the former is divided by the value of the last.
16. Br H - relative height of the bridge - the ratio between the bridge and the rib height,
where the value of the bridge is divided by that of the rib.
17. B to O - the ratio between the length of the body and the overall length of the
instrument, where the last is divided by the former.

18. Eighteenth entry describes degree of the refinement of the art in accordance to Vasari's
system: Sketches - '...a rough draft of the whole. Out of the artist's impetuous mood
they are hastily thrown off. 'If Sketch is the first step, the following is Drawing. It is
'executed in a more finished manner, in the doing of which the artist tries with all
possible diligence to copy from life.' (Louisa S.Maclehose, 'Vasari on technique'). The
last degree of refinement corresponds to 'design'.
19. Nineteenth entry lists the most clearly depicted parts of the instrument.
20. Twentieth entry lists missing or unclear features of the instrument.
21. Twentyfirst entry determines intensity of the colour relatively to the colour of the flesh
or other light coloured subjects. Thus the colour is defined as light when it is as light
or but little darker than the flesh colour or any other light coloured objects such as
paper, certain fruits, light coloured wooden objects such as lutes, &c ; the colour is
defined as dark when it is darker than the colour of the listed examples and when the instrument is depicted shadowed. In most of the cases the field does not have a value when monochrome pictures are being described, that is, drawings, etchings, monochrome sketches. Poor quality reproductions not considered.

22. The number of the visible frets.

23. The number of the visible strings.

24. The following four entries are dedicated to the bows:
   (24.)BC - description of the bow curvature: p - pronounced curve; s - straight bow; complex - combination of both features; ? - unclear or invisible curvature.

25. Relative length of the bow - ratio between the length of the bow and the length of the instruments body.

26. Presence of the a screw.

27. Colour of the hair. Monochrom pictures mostly not considered.

28. Playing position of the instrument. If the value is missing, the depicted instrument is not played. Bc - the instrument is held below the collar bone; ac - the instrument is held above the collar bone; cn - chin on technique; of - the instrument is held on the floor; bk - the instrument is held between the player's knees; lute-like - the instrument is held lute-like when played.

29. Date of the execution as established by the recent research. (Missing value means that the date was not known to me on the moment of creating the record).

30. Century of the execution - an approximate date. Efficient tool for retrieving needed records for when the previous entry is missing.
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<th>Lifetime</th>
<th>Active</th>
<th>Museum or other location</th>
<th>Origin</th>
<th>Instrument(s)</th>
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<td>Terbruggen Hendrick</td>
<td>(1587-1629)</td>
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Historical varnishes and colour of the bowed instruments in paintings.

Esthetical delight in instrument making is a subject of a great concern. External appearance of an instrument is one of the hot topics of many discussions.

Indeed, outlook of an instrument is a combination of many different features accomplished on different stages of the work. These include drawing, or design, woodworking and finishing techniques. Hereby I will point out a few important details concerning the latter.

There is quite a number of historical varnish recipes at our disposal. These are scattered in various old and recent studies in the history of varnishes, sources on painting, furniture, general works, &c. Few reprints can easily be accessed. Analyze and comparison of the written and iconographical sources discovers an important feature common for both.

The vast majority of the varnish recipes are instructions for making colourless varnishes. Similarly, the vast majority of bowed instruments in my picture collection (containing 200 instruments) have a light colour: 110 instruments, while only 26 of them are dark. (The colour intensity of the remaining 64 was impossible to correctly evaluate for different reasons: monochrome pictures and poor quality reproductions were not considered). It appears obvious that in most of the cases, the early instruments were covered with light-coloured varnishes.

Today's practice is somewhat different. The old instruments naturally darkened. The new instruments are mostly dark, because they are copies of the old examples in their modern state. It is evident that the fashion has changed since the time passed by, and the light coloured instruments gave the way to the dark ones.

Obviously, the source of inspiration and values of nowadays differ from that of the earlier times. Alberto Bachmann wrote: The surest way of tracing a fine violin model is to obtain an original or "creator's" violin. At the best circumstances, modern instrument builders do so. However, there is no secret that practice of tracing photographs of instruments is more common.

In one way or another, majority of today's instrument makers copy their instruments from the old examples, whereas renaissance or early Baroque makers might have had drew their ideals from the outer world and a human figure, possibly, including its colour. It is one of the basics of the Renaissance, the basis of the esthetical ideals of many architects, sculptors and paintists. It seems to be obvious that these ideals have had its influence on a number of instrument-builders. Sufficient to notice that there must have been a frequent communication between the painters and the instrument makers: the painters were often musicians. Thus, Jacopo Tintoretto played many different instruments, including viol. Jacopo Bassano, Paolo Veronese and Tizian played viols. Guido Trasuntino even made a harpsichord for Tizian in exchange for painting.

Renaissance admiration at Nature can be seen in 'Scintille di Musica, 1533, of Giovanni Lafranco, where he praises at the lutes and viols of the Brescians Zanetto Molichiaro and Giovanni della Corna, whose instruments said were 'almost too beautiful to have been made by human hands. They seem to have been made by Nature herself, without stain or blemish'.

1 This is a mistake in the Riley's book. G.Lafranco does mention either lutes or viols in the Ms., but organs.
Existing Renaissance and Baroque esthetical treatises concerned with visual arts must to be considered when studying appearance of the instruments in the pictures. This will ensure that the pictures and the instruments thereby shown are not taken at 'face value, without sufficient regard for successive styles'. It is possible, but not is necessary so, that the colour of the instruments have been altered according to the personal preference of an artist, or the influence of a certain school. 'The colours should be employed with so much harmony that a dark and a light are not left unpleasantly contrasted in light and shade...'' Giorgio Vasari in the 'Lives...'' 1550, says: '...especially let there be great care always in putting the most attractive, the most charming, and the most beautiful colours on the principal figures...'. It is often the principal figures, who hold the instruments. We may conclude that the light tints given to their instruments were considered to be the 'most beautiful'.

The intensity of colour- varnish used for finishing the instruments has been various then and now. Both dark and light tints were applied. Historical evidence suggests that for one or another reason there was a strong preference to the light coloured appearance of the instruments.

Selected bibliography:

- E.WINTERNITZ, 'Visual Arts', p.31, EWA, 1965
- MARRY P. MARRYFIELD, 'Original Treatises, dating from the 12th to 18th centuries on the Arts of Painting, in Oil, Miniature, Mosaic, and on Glass...', London, John Murray, Albemarle Street, 1849.
- SHESTAKOV V.P., 'Estetika Renessansa', Moskva, 1981.

1 However these varnishes have a light color of the components such as oil and resins.

5 The teaching of bowed instruments from 1511 to 1756, Maurice Winton Riley, 1954, facsimile University Microfilms, Ann Arbor, Michigan, 1978.
6 E.Winternitz, 'Visual Arts', p.31, EWA, 1965
8 Idem.
44 Historical Varnishes and Polishes.

MANUSCRIPTS

1. Jehan Le Begue Ms, 1431.

1. Recipe no. 117: "Azzurrum sic fit".
Contains a recipe for varnish: '...put the mastic and varnish (sandarac) in powder into
the oil ("olei communis") and stir it well with a stick, and when you see that they are
dissolved, add the Greek pitch in powder, and let it boil a little, until the whole is
incorporated. ... Let it stand for three days.'

2. Eraclus Ms, dated 15c.

2. How to varnish gold so that it will not lose its colour. - If you wish to varnish gold
that has been laid upon gypsum, varnish over the gold, not with pure varnish, but with
that colour which is made for preparing auripetrum, mixed, however, with oil, and a
little varnish, lest it should be too thick. ... But you may varnish figures and other
colours with pure varnish or with thick oil.

3. How wood is to be prepared before painting on it. - Whoever wishes to adorn any
wood with divers colours, let him hear what I say. First make the wood very flat and
smooth by scraping it, and lastly by rubbing it with that herb that you called shave-
grass. But if the piece of wood is such that you cannot smooth down its inequalities, or
you have reasons for not wishing to do so, and at the same time are not willing to
cover it leather or with cloth, grind dry white-lead ..., but not so finely as if you were
going to paint with it. Then melt wax over the fire in a vase, add tiles ground fine.
Then mix it with the white-lead which you have ground, stirring it frequently with a
small stick, and so let it cool. Than heat an iron, and with it melt the wax into the little
fissures, until they are level and than scrape off the rough parts with a knife. ... And
when you have made it smooth, as I was saying, mix plenty of white-lead very finely
ground, with linseed oil, and lay an excessively thin coat of it wherever you intend to
paint...'

3. Marcianna Ms, 'Secreti Diversi', middle of the 16th c.

4.377. A most excellent glue for damp and moist places which always becomes harder,
but only fears the heat, and fixes everything to wood and stone, which must be as
smooth as porphyry. - Take one pound of good yellow wax, nine pounces of liquid
varnish, and one pound of black naval pitch. Put the varnish into a pipkin over a slow
fire, that is enough to liquefy without burning it; then through in the wax, liquefy it in

1 This communication is a summary of varnish recipes from the sources analyzed by Mary
P. Marryfield in the book 'Original Treatises, dating from the 12th to 18th centuries on the Arts
of Painting, in Oil, Miniature, Mosaic, and on Glass; of Gilding, Dyeing, and the Preparation
of Colours and Artificial Gems; Preceded by a General Introduction; with Translations,
Prefaces, and Notes.' By Mrs. Merrifield, Honorary Member of Academy of Fine Arts at
Bologna, Translator of the Treatise on Painting of Cennino Cennini, and Author of 'The
Art of Fresco-Painting'. London: John Murray, Albermarle Street, 1848.

2 That is linseed or olive oil.
the same manner and incorporate it well with the varnish; then do the same with the pitch, having previously pounded it, etc. Then take Armenian bole ground to a fine powder, and stir some of it into the other ingredients until the whole material becomes liquid, and yet tenacious that it fixes and holds together things which you wish to put together; and you must stir the ingredients well together and use then warm, because in a short time the cement hardens so you can not glue with it. And when you applied it where you please, and wish to make the surface smooth and polished, take a firebrand from the fire and bring it near to the glue until the heat causes it to liquefy and spread; you should also move the firebrand over the surface of the glue, and melt it so that it at length becomes smooth and beautiful, &c.'

5.394. Modes of making divers varnishes; and first, of 'bengivi' (benzoin), which will dry in the shade. - Take 2oz. Of spirit of wine which has been distilled 4 times (that which has been distilled 3 times will do, but not so well), and one ounce of benzoin. Put the ingredients into a bottle, and shake them until the benzoin is dissolved; the varnish is then finished. It must be kept in a vessel closely stoped. This is a very fine varnish upon miniatures and all other delicate works, on paste, or glue, or wood, and also on paper and glass.

6.395. Item, a varnish. - Take one pound of linseed oil boiled 'ut scis', etc., and anoint vessel with ft while hot, and 4 ounces of pounded carabe (Carbone - in the Ms)(amber -M.M); place it to dissolve with the bottle closed on the coals, and when it is nearly dissolved pour in the hot oil and stop it up; afterwards, at the proper time, when the whole is dissolved, stir in 3oz. Of alum. Dilute the varnish with the necessary quantity of naphtha, or linseed oil, or spirit of wine, and use it warm'.

7.396. Item, a varnish of benzoin, which dries very quickly and may be used on everything, because it is pale and admirable for all delicate works. - Put into a large vessel 5 ounces of good spirit of wine, with an ounce of fine benzoin pounded into very small pieces; stop the vessel closely, and agitate it until benzoin is well dissolved. Then let it stand for a day and night; pour off the clear part, throw away the sediment at the bottom, and keep the liquid in a well-closed glass vessel: this liquid is the varnish.

8.397. Item, an excellent varnish which is made without the aid of fire, which dries very quickly without being exposed to the sun, and remains very clear, and which may be varnished anything painted on panel, pasteboard, or iron. - Take spirit of wine which has been rectified at least three times, because otherwise it would not dissolve the benzoin properly, and put it in a glass vessel; than take some benzoin and add either at once, or a little at a time, that quantity which you know to be sufficient. Then stop up the bottle and agitate it until the benzoin is entirely dissolved; and, if, after it is dissolved, it is of the consistence of good 'vernice liquida', and, as it were, tenacious, and varnishes well, it is finished; but if it is too thick, add more spirit of wine until you bring it to the correct standard; and if it is too thin, add more benzoin. You may then preserve it for use'.

9.398. Item, a varnish tried by Master Jacop de Monte San Savino, the Sculptor, which is proper for every kind of work and on all materials. - Take one ounce of sandarac, ground to a very fine powder, and 3 ounces of clear nut oil. Heat the oil in a glazed pipkin over a slow fire in the same manner as linseed oil is boiled; then add the powdered sandarac a little at a time until it is dissolved; ad to it also at the same time so much clear incense finely powdered as will impart a pleasant savour to the whole mixture, stirring it well that it may dissolve, and, if you please, you may also add a
sufficient quantity of burnt and pounded roche alum to have a sensible effect on the whole composition; and the addition of the alum will improve the varnish if you stir it until it is dissolved. It should then be strained through a linen cloth, and afterwards exposed to the sun and dew until a sediment is formed, which should be separated by pouring off the clear varnish, after which it will be ready for use'.

10.399. Item, a varnish which spreads like oil, dries quickly, and is very lustrous and beautiful, appearing like a glass mirror, and which is admirable for adhering firmly and varnishing lutes and similar things. - Take on pound of linseed oil, boil it in the proper manner in a clean glazed pipkin, add to it half a pound of well pulverized clear and fine Greek pitch, and stir and incorporate the hole over a slow fire; then add half a pound of powdered mastic, and the moment you have done so, withdraw the pipkin gradually from the fire, because it swells up, and incorporate the ingredients thoroughly; then replace the pipkin on the fire, and keep it there until everything is dissolved and incorporated. Then take the varnish off the fire and strain it through an old linen cloth. Your varnish is then made, and it will be found to be beautiful varnish for wood, iron, paper, leather, and all kinds of painting and works, and for withstanding water. When you find it too viscous, dilute it with linseed oil in the proper manner'.

11.400. Item, a most excellent varnish of mastic for lutes, leather, panels, cloth wood, and pasteboard. - Take 3 ounces of strained and clear linseed oil and boil it. Than take half an ounce of mastic pounded and ground, and add it gradually to the oil, mixing it in such manner that it may be entirely dissolved and incorporated with the oil, and that it be properly evaporated and made into a varnish 'ut scis'; then put in a little pulverized roche alum at discretion, but sufficient to affect all the varnish; keep it over the fire until it is entirely dissolved and incorporated with the varnish and evaporated, after which you may take it off the fire, and strain it through an old and good linen cloth. When you find it too viscous, dilute it with linseed oil in the proper manner'.

12.401. Item. A most excellent mastic varnish. - Take one pound of mastic, half a pound of naphtha, and half an ounce of clear nut oil melt them together in a bottle or glass over a charcoal fire, and strain through an old linen cloth'.

13.402. Item. A most excellent clear and drying varnish proper for colours, both in oil painting and other kinds of painting. - Take 2 ounces of clear and good nut oil, one ounce of clear and good Greek pitch, and half an ounce of clear and good mastic; grind the pitch and the mastic [separately] to a very fine powder, and place the oil in a clean glazed pipkin over a charcoal fire, and let it boil gently until it is done sufficiently, that is, until one third is evaporated; then put in the powdered pitch a little at a time, mixing and incorporating well; afterwards throw in the mastic in the same manner, and when it is dissolved, take the varnish off the fire and strain it through a fine and old linen cloth.

And if you wish it to be steel clearer, prepare the mastic with tepid water in the following manner; - Take the largest and clearest teas of mastic that you find, and soak them in tepid water, so that they may become tender; then select the best piece, dry them, and pound them'.

You may also try the effect of adding a little burnt and pulverized roche alum when the other ingredients are dissolved, so that the whole may virtually be seasoned with it, straining it afterwards. This is done in order to purify it better'.

14.403. Item. A varnish of 'olio di abezzo', which must be genuine and not adulterated, and if you wish to know whether it is falsified, distemper it with nut or linseed oil, or naphtha, heating both the oils, etc., and spread it on a work, when, if it is not genuine,
it will not dry a long time, and then badly, because it is adulterated with turpentine, but if it is genuine it will dry quickly and perfectly.

If you desire to varnish delicate works which will not be exposed to water, but merely to bring out the colours and show their beauty, distemper the olio abezzo as above. But if you wish to varnish more permanently on works which are intended to resist water, do not distemper the olio di abezzo with other ingredients, but heat it in a vase, melt it, and varnish with it.

When you distemper it with linseed or nut oil, let it be with oil which has been exposed to the sun to evaporate, and the varnish will be much clearer.  

15.404. A most excellent varnish for varnishing arquebuses, crossbows, and iron armour. - Take of linseed oil Lbs.2; varnish in grains (sandarac), lbs.1; clear Greek pitch, oz.2.

Boil the oil, then dissolve in it the other ingredients, and strain through a much worn linen cloth, and when you wish to use the varnish, scrape and polish the work, and heat it in a hot oven, because that is the best place to heat it; and when it is of a proper heat, that is, when the varnish adheres to it firmly and does not fry [bubble or blister from too great heat], then lay it on thinly with an instrument of wood, so that you may not burn your fingers, and it will make a beautiful changing colour.

And if you supplied the Greek pitch with naval pitch, I think it would make the iron work black when you varnish it.

When making the varnish you must boil it well, even to such a degree as to make it foam and bubble, if necessary, in order that it may be clear and thick.

16.405. Item. An excellent common varnish, good for varnishing whatever you please. - Take 2 ounces of clear and good linseed oil and one ounce of good and clear Greek pitch, but 2 ounces of latter also will make the varnish thicker and give it more body; boil the oil over a slow fire, and then put in the pounded pitch a little at a time, that it may incorporate well, and add a little roche alum previously burnt and pounded, and when it is incorporated and boiled sufficiently, that is, when you try a little of it in your fingers and find that it is done, strain it and keep it. When it is used it will be beautiful and good; if it is too tenacious you will dilute it with a little oil.

4. Bolognese Ms. dated 15th c.

17.204. To make a certain water which is good for applying upon figures and miniatures. - Take oil of aloes, linseed oil, and liquid varnish, of each equal quantities; boil these ingredients together, and put them into a flask. When you wish to use the liquor, anoint with the figures or miniatures when they are dry, and not before, and they will be shining and very beautiful.

18.205. To make linseed oil. - Take one quart of clean and pure linseed oil, damp it a little and then put it into a vase over the fire and stir it up with a spoon, and then push the spoon several times to the bottom so as to moisten all the seeds. You must add a little water in order to soften them; then put the seeds into a strong woolen cloth, place it in the press, and the oil will flow out.

19.206. To make liquid varnish. - Take of the gum of the juniper [sandarac], two parts, and one part of linseed oil, boil them together over a slow fire, and if the varnish appears to you to be too stiff, add more of the oil and take care not to let it catch fire, because you would not be able to extinguish it, and even if you could extinguish it, the varnish would be dark and unsightly. Let it boil for half an hour, and it will be done.
20.207. To make liquid varnish in another manner. - Take 1 lb. of linseed oil, and put it into a new glazed jar, and then take 1/2 a quarter [of an ounce?] of roche alum in powder, and an equal quantity of minium or vermilion ground fine, and 1/2 oz. of incense also ground fine. Mix all these ingredients together and put them into the oil to boil, stirring it with a stick; and when the oil is boiling, as it is likely to run over, have another glass jar ready, and put it by that which contains the oil, so as to catch the oil that runs over, in order that it may not run on the ground, and in this manner make it boil up 3 or 4 times, and each time pour back what has run over, on that which is boiling the jar. Having done this, set the fire to the oil on the right hand side with a lighted straw, and let the oil burn on the upper part, but so that the jar may not burn on the inside, in account of too great heat, for otherwise the oil would smell unpleasantly. When you light the oil with the straw, remove the jar from the fire, and let it burn while you can say three paternosters, then extinguish the oil with a wooden cover, putting it upon the jar, and when it is extinguish, remove the cover in order to let the vapor escape. Then put it back over the fire; do this three times, and it is done.

21.45. A clear and fine varnish. - Take off clear Venice turpentine oz. iij. and of odoriferous oil of spike oz. J, melt them well together over a slow fire, and use the varnish hot, recollecting that if you are using it on wood you must first give it a good coat of glue, or distemper the colours with gum water, in order that the varnish may not penetrate.

22.46. A varnish which has been tried. - Take equal parts of white mastic and linseed oil, put them together into a new pipkin over a slow fire, and when the oil is hot, add to it a little 'olio d'abezzo', and continue to mix.

23.47. Another good varnish. - Take equal quantities of red mastic well powdered and linseed oil with a little resin; put them over the fire in a new pipkin, stirring the ingredients continually for quarter of an hour, when it will be finished.

24.49. A varnish which dries directly. - Take equal parts of boiled linseed oil and white mastic, place them over the fire in a new pipkin with a little oglio di abezzo; let them boil while you can say a credo; then add to them spirit of turpentine, equal in quantity to half the oil, mixing it well with the other ingredients.

25.50. Another varnish which dries directly. - Put into a pipkin a proper quantity of mastic, cover it with a somewhat greater quantity of naphtha, and leave the pipkin over the hot coals until the mastic is dissolved.

26.51. A varnish which does not dry immediately. - Take of white mastic oz. J, of nut or linseed oil oz. ss; put the whole into a pipkin, and boil over a slow fire until all the mastic is dissolved; then add a little naphtha at discretion.

27.52. A varnish which has been proved to dry instantly. - Take of coarsely pounded white mastic oz. j, of spirit of turpentine oz. j, of naphtha oz. j, and of oglio di abezzo oz. ij; put all the ingredients into a glass vessel closely covered with paper; then put a tin pot over the fire, to the handle of which the glass must be suspended, being secured to it by a string; and put into the tin pot sufficient water to cover the glass. Boil the water for half an hour, and until the mastic is dissolved, taking care not to take out the glass while the water is boiling, as it would crack.

28.53. Another varnish. - Let any quantity of oglio di abezzo, naphtha, and mastic, be placed in a pipkin in the summer and exposed to the sun, and in this way excellent varnish will be made.
29.55. A varnish for old pictures.- Take linseed or nut oil, oil of spice, and powdered mastic, all at discretion; put them into a pipkin over a slow fire. This is found to succeed.

30.57. A varnish which does not dry immediately. - Take a pipkin, and put into it white mastic, linseed, or nut oil, at discretion; then boil it over a slow fire until all the mastic is dissolved.

31.88. To make Indian varnish. First notice. - You must first heat an earthen vase, and while it is very hot put into it the gum lac pounded and sifted through a silk sieve; then add to it about 1/4 of an ounce of colophony, and at the same time, that it may have a body, collect it on the end of a stick in order to present all parts of it to the fire, that it may all be of the same colour, and as soon as it is liquefied you will add to it, a little at a time, the powdered colours, observing that they must be quite dry when they are put in.

32.92. An amber varnish. - Take common turpentine, make it to boil for a quarter of an hour, add to it some amber well powdered on a marble, boil it for half an hour until the amber is liquefied, and take it from the fire. As soon as it is cold it will become hard; when you wish to use it, dilute it with oil of turpentine in order that it may liquefy, an it will be better to heat it slightly that it may be more manageable, taking notice that while it is hot, it should be passed through a cloth, and the part which passes through will be the best part. Apply it with the pencil or with the warm hand. It is necessary to acquaint you that this composition should be washed in hot water, after it has been strained, that it may be clean and pure.

33.93. Another secret to make the true Indian varnish. - Take gum lac and oil of spike, both of them clean and pure. The oil must be cleansed from its impurities with an equal quantity of litharge of gold; it must then be redistilled and again left to settle until it becomes clear after being passed twice through the still. Another vessel shaped like this must be procured, and for every four ounces of spice must be taken one ounce of gum lac (if it is very yellow and clear there is no doubt of its goodness); the whole is then to be placed over a charcoal fire and to be boiled until the colour is changed, and varnish becomes like honey. To know whether it is good, put drop on a knife, and if it remains united it is good; it must afterwards be poured through a linen cloth into a vase of majolika and preserved.

(Following indications on the use of different colours in several coats with this varnish)

34.94. A very clear varnish for pictures and paper alla Fiaminga. - Take 7 ounces of highly rectified spirit of wine, 2 oz of sandarac, and 2 ounces of olio d'abezzo. The sandarac, which should be very clear must be pulverized and put in a bottle with the olio d'abezzo, which also must be very clear. The spirit of wine must then be added, and whole boiled gently over the fire, until the whole is dissolved, keeping the mouth of the vessel well closed, that the spirit of wine may not evaporate. The varnish must then be strained into a glass vase, leaving the impurities at the bottom. When it is used it must be put into a majolica cup, the picture also must be heated, and the varnish applied with a pencil.

35.102. To make the finest Indian varnish. - Take oz.8 of gum lac, oz 4 of the white resin of Arabia (Oriental Copal?), oz3 of mastic, and oz 1/2 of borax; liquefy the whole in a glazed basin. When dissolved, strain them through a silk cloth; then take an ounce and a half of the composition, reduce it to powder, put the powder into a receiver, and throw on it half a pound of spirit of wine rectified four times, and put the receiver into hot ashes or a sand bath until the powder is entirely dissolved. The varnish will then be finished. It is then used in the following manner: - Add to it a 6th part, by weight, of
Spanish red (The Almagre of the Spanish writers. A pigment which is still sold at Venice - M.P.M.), and with this give 7 or 8 coats to the wood which you wish to varnish, leaving each coat 5 or 6 hours before the next is laid on. After it is quite dry, it must be polished with a small brush and olive oil; then two coats of varnish must be applied, and when it is dry it must be rubbed very softly with goatskin and with a tripoli powder and oil, when it will be done; but I warn you must follow the recipe exactly.

36.103. Another Chinese varnish. - Take of white carabe [amber] oz 2, of gum lac oz 1/4, and of rectified spirit of wine lib 1. The gums all be pounded, and put into a long-necked bottle, and left infusion for two days, in order that it may be perfectly dissolved, keeping the bottle well closed. The bottle must then be put in a sand bath of such a heat that the varnish will boil. It will then be finished.

37.106. Varnish is made as follows. - Take one ounce of juniper gum [sandarac], oz 1/4 of pure and clear oglio di abecco, which is called oglio d'abecco for making varnish, oz 1/2 of the best 7 times rectified spirit of wine. The sandarac must be ground up, and made into a paste with the abecco. It must then be put into a bottle, the spirit of wine must be added, and it must be placed over a slow fire until it is well incorporated. When it is done, wood or glass which is to be varnished is painted with a tuft of feathers.

38.107. A varnish for miniatures and picture frames. - Take of spirit of turpentine lib 1, of benzoin oz 4, and of mastic oz 2. Reduce the mastic to a very fine powder, and mix it with the benzoin in a varnished pipkin. Then put the spirit of turpentine into a bottle, which you must heat by means of water-bath, and then mix it with the benzoin and mastic in the pipkin; afterwards incorporating it with the other things over a slow fire, &c.

When this varnish is used on picture frames, you must add to it two ounces of sandarac also well pounded, and you must mix with the varnish the colour which you wish to apply on the frames.

39.143. To polish the work. - Rub it well with new cloth; then take fine Tripoli powder which has been well rasped and pounded finely with goatskin, and rub the work well, so that it will have a lustre; then take white wax, if you wish it to be still brighter, and rub it over the work, which will thus become most beautiful.

6. Gian Batista Vopalto. 'Modo de tener nel dipinger'

40. F. Varnishes are of different kinds: some we make ourselves, others, such as the 'vernice grossa' and amber varnish, we purchase, but I make the mastic varnish myself.
S. Tell me how you make it?
F. I take pulverized white mastic, and put it into a pipkin with spirit of turpentine, or naphtha, in such quantities that the spirit of turpentine may rise two-thirds above the mastic in the pipkin. I then set the pipkin over the fire, and boil it until the mastic is perfectly dissolved, and sometimes add to it a little 'olio d'abecco'. This serves for varnishing finished pictures, but if you wish to see divers modes of preparing these varnishes, consult Armenino da Faenza and Rafael Borghini....

'Recueil des essais des merveilles de la peinture'
41. To make very good varnish for varnishing gold and all other things. - Take benzoin, and grind it as finely as possible between two pieces of paper, then put it into a phial and pour on it some very good spirit of wine, which must cover the benzoin to the depth of 3 or 4 fingers, and leave it in this state for a day or two; then to half a phial of this spirit of wine you must add 5 or 6 blades of Saffron, slightly bruised, but not broken in pieces. When you have done this, strain it, and varnish with it something that has been gilt, which will then become very beautiful and shining; this varnish will dry very quickly, and will last several years. ... This varnish is very good for varnishing all things, as well painted s unpainted, such as tables, and boxes of nut tree, ebony, &c., gilt or not gilt, or copper, ...'

42. To make a varnish with mastic for oil paintings. - Take 2 ounces of hard mastic and one ounce of olio d'abezzo (huile de sapin), put the last into a small new pot, melt the mastic over a slow fire, then add the oil, which must boil when mixed with it, and must be kept boiling very slowly; for if it were to boil fiercely, the varnish would become too viscous. To know when it is done you must dip a hen's feather in it; if this is burnt, the varnish will have been sufficiently boiled; then pour it into a phial or bottle to preserve it from the dust. When required for use it must be warmed in the rays of the sun.

43. Fine varnish (benzoin) is made with turpentine melted over the fire; when melted, remove it from the fire, and add oil of spike with mastic, and, if required, sandarac.

44. Gros [vernis] is made with turpentine, oil of turpentine, and resin, melted up together.